World Conference on Drowning Prevention
Vancouver
October 17 – 19
2017
Share Globally, Prevent Locally

Abstract Book
CONTENTS

Foreword - International Life Saving Federation 2
Foreword - Lifesaving Society Canada 3

PROGRAM

Program and Thematic Review Committees, 4
Program Committee, Reviewers 4
WCDP Scholarship Program 5
Global Report on Drowning Infographics 6

ABSTRACTS

Data 11
Prevention 53
Rescue 127
Partnerships 193
Medical 218
Disaster and Climate Change 237
Swimming and Water Safety 249
Global Drowning 326
Plenaries 343
Index by Author(s) 350

This Abstract Book was developed with financial assistance from the Lifesaving Society Canada.

Editor:
Dale Miller

Editorial Assistance:
Doreen Drysdale

Publication Production:
Krystyna Domes
Emily Witter

Design:
Mel Di Pietro | GG media lab.
www.ggmedialab.com
FOREWORD-INTERNATIONALLIFESAVINGFEDERATION

Welcome to Vancouver Canada and the World Conference on Drowning Prevention 2017.

On behalf of the International Life Saving Federation (ILS) it gives me great pleasure to welcome all participants to the World Conference on Drowning Prevention 2017 (WCDP 2017).

The World Conference on Drowning Prevention is the International Life Saving Federation’s flagship educational event. This biennial conference brings together the world’s foremost experts, research, systems and information on drowning prevention, rescue, lifesaving and water safety. The exchange, debate and development are designed to find ways to further reduce drowning death and injury in all aquatic environments worldwide.

Drowning death continues to be a major global public health issue, bigger than many know, understand or accept, and is almost entirely preventable. The vision for the ILS is “A world free from drowning.”

The ILS is once again extremely proud that the WCDP 2017 is co-sponsored by the World Health Organisation (WHO). The co-sponsorship of the WCDP 2017 by the WHO, builds on the co-sponsorship of WCDP 2015 in Penang Malaysia and further highlights the joint effort by ILS and WHO to raise global, regional and national awareness of drowning and its prevention. Building on the WHO 2014 Global Report on Drowning, the WHO has released the 2017 Implementation Guide which provides guidance on how to implement 10 identified effective measures to prevent drowning.

The ILS is a world authority on drowning prevention, and leads, supports and collaborates with national and international organisations engaged in drowning prevention, water safety, water rescue and lifesaving.

At least two of the strategic goals of the ILS in the 2016 to 2020 quadrennial will be considered and expanded upon during the course of the WCDP 2017. Establish and promote global best practice in lifesaving, lifeguarding and the broader drowning prevention. Engage with every organisation with objectives similar to the ILS and with every nation on drowning prevention, water safety, water rescue, lifesaving, lifeguarding and lifesaving sport.

It is gratifying that numerous national and international organisations have chosen to link their gatherings to the WCDP 2017 event thereby giving their members a unique opportunity to attend a global event of significant humanitarian importance.

On behalf of ILS, I would like to thank the Lifesaving Society Canada, its British Columbia and Yukon Branch and the organising committee under the leadership of John Bankes for hosting the World Conference on Drowning Prevention 2017.

The WCDP 2017 provides a significant opportunity to make a difference and advance the cause of the global reduction of drowning and I look forward to meeting all the participants at the conference.

Share Globally, Prevent Locally

Graham Ford AM
President
International Life Saving Federation
FOREWORD - LIFESAVING SOCIETY CANADA

On behalf of the Board of Directors of the Royal Life Saving Society Canada (Lifesaving Society Canada), I am very pleased to welcome you to Canada and in particular, to Vancouver for the 2017 ILS World Conference on Drowning Prevention.

Lifesaving Society Canada is honoured to be hosting this event on behalf of the International Life Saving Federation (ILS) and it is of great significance that the World Health Organization (WHO) has chosen to be co-sponsor of this conference. This speaks to the global importance of the drowning prevention issue and the need for coordinated action world-wide.

Our conference slogan “Share Globally, Prevent Locally” is indicative of the importance of this conference in bringing together not only the world’s experts on drowning prevention, but also representation from those low- and middle-income countries where the problem is most critical. Knowledge gained through the conference and related networking will assist in their efforts within their home countries and communities.

Knowing that many of the conference delegates are Canadian will hopefully answer to one of our reasons for hosting the conference. The insight and connection with global drowning prevention will provide Canadians with a greater sense of the issue, the importance of their work in the aquatics field and motivation to become more involved in the cause. That can only help to bolster efforts required to address the drowning prevention objectives identified in the Canadian Drowning Prevention Plan to be released at this conference.

We are also hopeful that the presence of the conference in Canada, along with ILS and WHO collaboration, will increase our provincial and federal governments’ urgency to become involved in the reason for losing nearly 500 Canadians each year.

I am highly impressed by the quality of presentations to be provided at this conference and hope that you will join me in absorbing and appreciating the knowledge to be gained through our active participation. My thanks go to ILS President Graham Ford, Secretary General Harald Vervaecke and Drowning Prevention Commissioner Justin Scarr for their support and confidence in our hosting of WCDP 2017.

And of course, much appreciation goes to the staff and volunteers of our British Columbia and Yukon Branch of the Lifesaving Society for their tireless efforts in ensuring you have an excellent experience in Vancouver.

I look forward to meeting you and sharing our Canadian character with you.

Dr. Robert Campbell
President
Lifesaving Society Canada
PROGRAM AND THEMATIC REVIEW COMMITTEES

The World Conference on Drowning Prevention 2017 scientific program was developed after two calls for abstracts and an extensive review process by the Thematic Chair and reviewers. These groups reviewed nearly 500 abstracts, guided program development and were given opportunities to recommend keynotes, symposia and workshops. Following the evaluation of papers and speakers, the WCDP 2017 program was developed.

WCDP 2017 PROGRAM COMMITTEE

Justin Scarr – Program Committee Chair
Steve Beerman – Partnerships Theme Chair
Joost Bierens – Disaster Theme Co-chair
Jenny Blitvich – Swimming & Water Safety Education Theme Chair
Barbara Byers – Prevention Theme Co-chair
Shane Daw – Disaster Co-chair
Richard Franklin – Data/Research Theme Co-chair
Peter George – Rescue Theme Co-chair
Dan Graham – Rescue Theme Co-chair
Ana Dominguez Pachon – Prevention Theme Co-chair
Ana Catarina Queiroga – Data/Research Co-chair
Peter Wernicki – Medical Theme Chair

ABSTRACT REVIEWERS

We wish to acknowledge the following people for reviewing WCDP 2017 abstracts:

Michael Bassett-Foss
Elizabeth Bennett
Tessa Clemens
Shelley Dalke
Michael Dunn
Norm Farmer
Hafþór Guðmundsson
Natalie Hood
Job Kania
William Koon
Alison Mahony
Yasuko Nakagawa
Amy Peden
Stacey Pidgeon
Dan Ryan
Linda Quan
Sabine Spinde
Robert Stallman
David Szpilman
Organizers of the World Conference on Drowning Prevention 2017 established the WCDP 2017 Scholarship Program as a strategy to ensure that the conference is accessible to those from nations in greatest need but without the resources required to attend an international conference of this type. Contributions to the fund assisted in areas such as subsidizing registration, travel and accommodation.

Organizations that have contributed to the Scholarship Program include:
- Princess Charlene of Monaco Foundation
- Lifesaving Society Canada – National
- Lifesaving Society Canada – BC & Yukon
- Maatschappij tot Redding van Drenkelingen (Netherlands)
- Royal Life Saving Society - Commonwealth
- Royal National Lifeboat Institution
- Vancouver Lifeguard Association
- DB Perks Group

Individuals who have contributed to the Scholarship Program include:
- Ron Aubrey
- Satnam Lalli & Andrea Ndam
- Nicole Liddell
- Dale & Kathy Miller
- Ian Robertson
- Glenn Schultz
- Tony & Tammie Toriglia

Management of the Scholarship Program was provided by staff and volunteers of the British Columbia & Yukon Branch of Royal Life Saving Society Canada on an in-kind basis.
KEY FACTS

- **372,000 people die from drowning EVERY YEAR**

- **OVER HALF of all drowning deaths are among those aged UNDER 25 YEARS**

- **MALES ARE TWICE AS LIKELY to drown as females**

- Drowning is one of the **10 LEADING CAUSES OF DEATH** for people aged 1-24 years

DROWNING RATES

DROWNING MORTALITY

- **< 1.3 PER 100,000**

- **1.3 - 3.9 PER 100,000**

- **> 3.9 PER 100,000**

A LEADING KILLER OF CHILDREN

Number of deaths for children under 15 years

<table>
<thead>
<tr>
<th>Disease</th>
<th>Number of Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUBERCULOSIS</td>
<td>69,648</td>
</tr>
<tr>
<td>MEASLES</td>
<td>125,813</td>
</tr>
<tr>
<td>DROWNING</td>
<td>140,219</td>
</tr>
<tr>
<td>HIV</td>
<td>199,071</td>
</tr>
<tr>
<td>MENINGITIS</td>
<td>217,580</td>
</tr>
</tbody>
</table>
RISK FACTORS

LIVING AROUND WATER
Wherever there is water, there is the threat of drowning

- Pond: 43%
- Ditch: 26%
- Container: 13%
- Lake: 7%
- River: 5%
- Other: 6%

Place of drowning of Bangladeshi children under 5 years

PREVENTIVE ACTIONS

- Install BARRIERS controlling access to water
- Provide SAFE PLACES (for example, a crèche) away from water for pre-school children, with capable child care
- TEACH school-age children basic SWIMMING, WATER SAFETY AND SAFE RESCUE SKILLS
- TRAIN bystanders in SAFE RESCUE AND RESUSCITATION
- Set and enforce safe BOATING, SHIPPING AND FERRY REGULATIONS
- IMPROVE FLOOD RISK MANAGEMENT locally and nationally

YOUNG CHILDREN
The highest drowning rates are among children aged 1-4 years

FLOOD DISASTERS
Extreme rain fall, storm surges, tsunamis or cyclones

TRANSPORT ON WATER
Especially on overcrowded or poorly maintained vessels

WWW.VIOLENCE_INJURY_PREVENTION/GLOBAL_REPORT_DROWNING
PRINCIPAUX FAITS

372 000 personnes meurent noyées CHAQUE ANNÉE

PRÈS DE LA MOITIÉ des noyés ont MOINS DE 25 ANS

LES HOMMES COURENT DEUX FOIS PLUS DE RISQUES de se noyer que les femmes

La noyade est l’une des 10 PRINCIPALES CAUSES DE DÉCÈS entre 1 et 24 ans

TAUX DE NOYADE

MORTALITÉ DUE À LA NOYADE <1,3 pour 100 000

MORTALITÉ DUE À LA NOYADE 1,3-3,9 pour 100 000

MORTALITÉ DUE À LA NOYADE >3,9 POUR 100 000

L’UNE DES PRINCIPALES CAUSES DE DÉCÈS D’ENFANTS

Nombre de décès d’enfants de moins de 15 ans

<table>
<thead>
<tr>
<th>Maladie</th>
<th>Nombre de décès</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUBERCULOSE</td>
<td>69 648</td>
</tr>
<tr>
<td>ROUGEOLE</td>
<td>125 813</td>
</tr>
<tr>
<td>NOYADE</td>
<td>140 219</td>
</tr>
<tr>
<td>INFECTION À VIH</td>
<td>199 071</td>
</tr>
<tr>
<td>MENINGITE</td>
<td>217 580</td>
</tr>
</tbody>
</table>
FACTEURS DE RISQUE

VIVRE À PROXIMITÉ D’UN PLAN D’EAU
Toute présence d’eau implique un risque de noyade

Lieux de noyade d’enfants de moins de cinq ans au Bangladesh

JEUNES ENFANTS
C’est parmi les enfants de 1 à 4 ans que les taux de noyade sont les plus élevés

INONDATIONS
Pluies violentes, tempêtes, tsunamis ou cyclones

TRANSPORTS PAR EAU
Notamment sur des embarcations surchargées ou mal entretenues

MESURES DE PRÉVENTION

Installier des **BARRIÈRES** pour limiter l’accès aux plans d’eau

Aménager, pour les enfants d’âge préscolaire, des **LIEUX SÛRS** (par exemple des crèches) où ils puissent être pris en charge correctement, à distance des plans d’eau

**ENSEIGNER** aux enfants d’âge scolaire les bases de la **NATATION**, les **RÈgles de SÉCURITÉ DANS L’EAU** et des rudiments de **Secourisme**

**ENSEIGNER** aux témoins potentiels de noyades les **MANŒUVRES DE Secourisme ET DE RÉANIMATION**

Mettre au point et appliquer une **LÉGISLATION concernant la Sécurité à bord des Bateaux de Plaisance, des Navires de Commerce et des Ferries**

AMÉLIORER LA GESTION DES RISQUES D’INONDATION aux niveaux local et national

WWW.WHO.INTERNET/VIOLENCE_INJURY_PREVENTION/GLOBAL_REPORT_DROWNING
© World Health Organization 2014

Organisation mondiale de la Santé
DATA
EXAMINING THE CLASSIFICATION OF DROWNING: AN AUSTRALIAN EXEMPLAR

Dr. Richard C Franklin¹, ², Ms. Amy Peden¹, ², Ms. Alison Mahony¹, Mr. Justin Scarr¹
¹Royal Life Saving Society – Australia, Broadway, Australia, ²James Cook University, Townsville, Australia

INTRODUCTION
The Global Burden of Disease reports that drowning deaths decreased worldwide by 27% from 1990-2013. The World Health Organization’s 2014 Global Report on Drowning estimated 372,000 fatal drownings annually. Many believe this to be an underestimation of drowning. Shortcomings in the way drowning is classified using International Classification of Diseases (ICD) Version 10 (ICD-10) external cause codes, as well as the lack of clarity around the reporting of drowning location have previously been identified.

AIMS
To compare the case coverage of ICD-10 classification for unintentional drowning deaths against the Royal Life Saving National Fatal Drowning Database (the Database).

METHODS
The Global Burden of Disease reports that drowning deaths decreased worldwide by 27% from 1990-2013. The World Health Organization’s 2014 Global Report on Drowning estimated 372,000 fatal drownings annually. Many believe this to be an underestimation of drowning. Shortcomings in the way drowning is classified using International Classification of Diseases (ICD) Version 10 (ICD-10) external cause codes, as well as the lack of clarity around the reporting of drowning location have previously been identified.

RESULTS
Between 2007-2011 there were a total of 1,428 unintentional fatal drownings in Australia recorded in the Database. Of these, 83 (5.8%) were open and 53 (3.7%) did not have complete ICD coding. 866 cases (60.6%) had an ICD code of W65-74 as the UCoD. A further 5.5% and 3.5% of cases recorded V90-accident to water craft and V92-accident on board watercraft respectively as the UCoD followed by X38-flooding (2.4%) and Y21-drowning undetermined intent (5.9%). Common non-drowning UCoD codes were G40-epilepsy (2.8%), I25-diseases of the circulatory system (2.1%) and R99-ill-defined and unknown cause of mortality (1.1%).

DISCUSSION
Of all unintentional fatal drowning cases in Australia assigned an ICD code, 60.6% were W65-74 at the UCoD level. The codes V90, V92, Y21, X38 were assigned in 17.2% of UCoD cases. The identification of drowning by ICD code was not evenly distributed with adults, watercraft and non-aquatic transport-related drowning deaths under-represented. Using a wider inclusion of ICD codes, which are drowning-related and multiple causes of death minimises this under-representation with 91.2% of all deaths having at least one drowning related ICD code at any cause of death level.

CONCLUSION
This study highlights the need to take a holistic view of drowning when compiling statistics, expanding the range of ICD codes and factors considered. This study shows that use of Level 1 ICD coding of W65-74 under-reports unintentional fatal drowning in Australia by approximately 40% and ICD coding lacks sufficient detail for location. Both shortcomings are thought to affect the development of evidence-based, site-specific strategies for prevention. This study highlights the need to broaden the use of ICD-10 codes for cause and location, and to review cases for second and third cause of death.

ACKNOWLEDGMENTS
This research is supported by the Royal Life Saving Society –Australia (RLSSA) to aid in the reduction of drowning. Research at RLSSA is supported by the Australian Government. The RLSSA National Fatal Drowning Database was developed using funds from the Australian Government and the support of the Australian National Coronial Information System (NCIS).
DROWNING TIMELINE: A NEW SYSTEMATIC MODEL OF THE DROWNING PROCESS

Dr. David Szpilman¹, Professor Michael Tipton¹, MD, FAAEM Justin Semsrott¹, Honorary Senior Clinical Tutor Jonathon Webber¹, MD, PhD Joost Bierens¹, Lifesaving Services Manager Peter Dawes², PhD CIBIO/InBIO Rui Seabra³, PhD Roberto Barcala¹, Dr. Ana Catarina Queiroga¹,³

¹Founder Member of International Drowning Research Alliance - IDRA, , International, ²Royal National Lifeboat Institution, Poole, UK, ³EPIUnit - Instituto de Saúde Pública da Universidade do Porto, Porto, Portugal

ORAL PRESENTATION

Data 1, Salon 2, October 17, 2017, 11:00 AM - 12:30 PM

Analogous to trauma, drowning is a preventable, non-communicable disease with significant morbidity and mortality around the globe. The 372,000 annual deaths from drowning reported by the World Health Organization significantly underestimate the true burden. The statistics are routinely derived from resuscitation attempts, hospitalizations and death records, thereby excluding many non-fatal cases with life-long morbidity. Drowning due to boating, transport, suicide, homicide and natural disasters are also excluded.

Despite continuous advancements in policy, standardized drowning data collection systems are still lacking. Issues remaining include: i) marked differences in the definitions, terminology and data collection methods used by local, national and international agencies, and ii) lack of consistent bilateral communication of drowning data between prevention, rescue and life-support services and downstream care entities.

Injury prevention models such as the Haddon Matrix are used extensively in the context of trauma and have also recently been applied to drowning. In 2002 a uniform definition of drowning was presented; “the process of experiencing respiratory impairment from submersion or immersion in liquid”. Though the uniform definition clarified the numerous ancillary terms associated with drowning, it created additional complexities. Defining drowning as a process rather than an outcome widened the scope of the problem of drowning. New models are now required to completely understand the ‘process’ and develop strategies for prevention, rescue and treatment.

The lack of clear-cut distinctions between pre-event, event and post-event aspects, as well as between triggers, actions and interventions, hampers the systematic collection of drowning-related data. This, in turn, severely impacts the quality of the estimation of the global burden of drowning, and consequently on the effectiveness of drowning prevention strategies.

To better understand the drowning process, we propose a timeline that identifies distinct phases before, during and after the event. We additionally highlight triggers, actions and interventions in a concise manner, with a strong focus on prevention.

The new systematic model of drowning addresses the inadequacies of previous injury prevention models and reinforces the primary role of prevention in the effort to tackle drowning morbidity and mortality worldwide. It also represents a major step towards creating a global consensus on the chronological sequence of the drowning process. By creating unambiguous definitions of the triggers, actions and interventions, it provides the necessary tools for more effective deployment of resources, better coordination between all persons and agencies involved in drowning prevention, rescue and treatment. The drowning timeline seeks to reduce the global morbidity and mortality of drowning by serving as a tool for the establishment of effective prevention strategies and for the measurement of cost/benefit ratios related to outcomes in terms of public health, financial, political and societal costs. The new systematic model and its components will be presented in detail.
DISEASE BURDEN OF DROWNING IN CHINA, 1990-2013

Dr. Leilei Duan¹, Pengpeng Ye¹, Xiao Deng¹
¹National Center for Chronic and Non-communicable Disease Control and Prevention, China

Data 1, Salon 2, October 17, 2017, 11:00 AM - 12:30 PM

OBJECTIVE
Comprehensively analyze the disease burden of drowning in China at both national and provincial levels from 1990 to 2013, to provide information for the development of strategies for drowning prevention.

METHODS
Information and data was acquired through:
• a unified measurement framework and standardized estimation method of Global Burden of Disease Study 2013,
• injury death data from the National Disease Surveillance Points System, the National Maternal and Child Health Surveillance Network, the China CDC Death Registration System and death information from Macau and Hong Kong area
• injury incidence data from the National Injury Surveillance System and literature review, using death/death rate, YLL/standardized YLL rate, YLD/standardized YLD rate and DALY/standardized DALY to analyze the disease burden of drowning and the change in China and all provinces.

RESULTS
In 2013, 63,619 people died from drowning in China, and the standardized mortality rate of drowning was 5.29 per 100,000, accounting for 8.0% of total injury-related deaths. Drowning was the fourth leading cause of injury death for the whole population, and the first leading cause of injury death of children aged ≤5 and 5-14 years old. From 1990 to 2013, the standardized mortality rate of drowning in China dropped from 15.09 per 100,000 in 1990 to 5.29 per 100,000 in 2013. In 2013, the YLL of drowning was 3.49 million person years, YLD was 0.04 million person years, and DALY was 3.53 million person years in China. The YLL, YLD, DALY and standardized YLL rate, standardized YLD rate and standardized DALY rate of drowning declined from 1990 to 2013 in China. In 2013, the five provinces with the highest rates of drowning in China were Xinjiang (10.08 / 100,000), Jiangxi (8.44 / 100,000), Anhui (7.92 / 100,000), Guizhou (7.77 / 10 Million), Sichuan (7.68 / 100,000), which are located in the west and central of China. Compared to 1990, both of the standardized mortality of drowning and the standardized DALY rate of drowning reduced in all provinces in China in 2013.

CONCLUSION
Disease burden of drowning in the Chinese population, especially children, declined significantly from 1990 to 2013, but the drowning problem is still much more severe in China than other countries. Child drowning prevention should remain as the priority of Chinese injury prevention, and drowning prevention research and project is in great need in western and central China.
On average, 287 people drown in Australia every year, with males drowning at a rate four times that of females. Although males are over-represented in all age groups, the burden is most pronounced in the early adult years (1); a pattern which has also been observed in international drowning studies.

To gain a better understanding of drowning among males aged 25-34 years, including the circumstances leading to fatalities and key risk factors.

All unintentional drowning deaths in Australia among males aged 25-34 years between 1 July 2005 and 30 June 2015 were included. A year-round media monitoring service was used to identify drowning deaths reported in print and broadcast media, which were then corroborated with national coronial data. Descriptive statistics were utilised, as well as chi squared analysis.

Between 1 July 2005 and 30 June 2015, 355 men aged 25-34 years drowned in Australia (age and gender specific drowning rate of 2.23 per 100,000). Rivers were the leading location for drowning, accounting for 28.5% of deaths. Over a third of all drowning deaths were known to involve alcohol (36.1%). Drowning deaths involving alcohol were significantly more likely to occur at rivers ($X^2=16.1$, $p<0.05$) and less likely to occur at beaches ($X^2=11.5$, $p<0.05$).

Swimming (32.7%) and boating (13.8%) were the leading activities prior to drowning. Drowning deaths involving alcohol were significantly more likely to occur following an incident related to non-aquatic transport ($X^2=6.3$, $p<0.05$) or boating ($X^2=6.9$, $p<0.05$) and less likely to occur while rock fishing ($X^2=7.8$, $p<0.05$). Drowning deaths among Aboriginal or Torres Strait Islander people were significantly more likely to involve alcohol ($X^2=12.9$, $p<0.05$) than non-Indigenous people.

One quarter of drowning deaths were known to involve drugs (25.6%), including both legal and illegal substances. The most commonly recorded illegal drugs were cannabis and methamphetamine. Among boaters, only 2.0% were known to be wearing a compliant lifejacket correctly, with a further 8.2% using a lifejacket which was either not worn correctly or unsuitable. Only 3.4% of rock fishers were wearing one. In 15.5% of cases, more than one person drowned during the incident, resulting in a multiple fatality event.

Alcohol and drug consumption are key risk factors for fatal unintentional drowning among young males. More than half of those who recorded positive alcohol readings had a BAC ≥0.05. Excessive consumption of alcohol not only impairs the decision-making process but also the thought process required to manage an emergency situation.

Among cases where lifejacket status was available, the majority of people were not wearing a lifejacket. An understanding of the motivations underlying lifejacket usage, or lack thereof, in young males should be a topic of future research and prevention efforts.

The study revealed key risk factors for drowning among males aged 25-34 years, including alcohol and drug consumption and not wearing lifejackets. Targeted, evidence-based prevention strategies are needed for this demographic.

Research at the Royal Life Saving Society – Australia is supported by the Australian Government.
DETERMINATION OF THE RESEARCH PRIORITIES FOR A NATIONAL DROWNING PREVENTION ORGANISATION IN SOUTH AFRICA

Dr. Colleen Saunders¹,², Dr. Jaybalan Matthew²,³

¹Division Of Emergency Medicine, Department of Surgery, University Of Cape Town, Observatory, South Africa, ²Lifesaving South Africa, Durban, South Africa, ³Division of Emergency Medicine, University of KwaZulu-Natal, Durban, South Africa

Data 1, Salon 2, October 17, 2017, 11:00 AM - 12:30 PM

There are more than 1500 fatal drownings in South Africa annually. In addition, the World Health Organization global burden of disease study estimates that 125,500 years of healthy life are lost annually due to both fatal and non-fatal drowning in South Africa. Drowning prevention is therefore a key priority for international and local water safety organisations such as Lifesaving South Africa. In resource-limited settings such as South Africa, the strategic implementation of drowning prevention programs informed by a reliable evidence base is of prime importance. However, the 2011 ILS Drowning Data and Research survey reported the unavailability of drowning surveillance data and research from South Africa. There is therefore a need for a coordinated drowning research program within the South African context.

This study aimed to determine the consensus research priorities for Lifesaving South Africa in order to guide their research agenda. The Delphi technique was used to collect, and collate, informed suggestions for research themes and projects from local and international water safety and drowning prevention researchers and practitioners. The highest priorities for drowning prevention research in South Africa were found to be (i) measuring the effectiveness of current drowning prevention interventions, (ii) understanding the barriers to effective implementation of these programs, as well as (iii) describing the epidemiology of both fatal and non-fatal drowning in South Africa. The results of this study will inform the future research strategy of the Lifesaving South Africa Scientific Advisory Committee.
ORAL PRESENTATION

NON-FATAL DROWNING IN THE AUSTRALIAN CONTEXT

Miss Alison Mahony¹, Ms. Amy Peden¹, Mr. Justin Scarr¹, Mr. Paul Barnsley¹

¹Royal Life Saving Society - Australia, Broadway, Australia

Data 2, Salon 2, October 17, 2017, 1:30 PM - 3:00 PM

BACKGROUND
The collection, analysis and reporting of fatal drowning data has allowed the drowning prevention community to determine the patterns of fatal drowning in Australia. This research has enabled key risk factors to be identified and targeted by the Australian Water Safety Strategy. However, the full burden of drowning cannot be understood until non-fatal drowning statistics are also routinely collected and reported. Previous research has identified important patterns in non-fatal drowning, as well as ratios of fatal to non-fatal drowning at an Australian state level. However, current comparison data at a national level is scarce.

AIMS
To gain a greater understanding of the full burden of drowning by focusing on non-fatal incidents, including a comparison of fatal and non-fatal drowning.

METHODS
Non-fatal drowning incidents that occurred 1 June 2002-30 June 2015 were collated using hospitalisation data. Hospital separations where the first reported external cause of morbidity was Accidental Drowning and Submersion (W65-W74) were included, with figures obtained from the Australian Institute of Health and Welfare’s (AIHW) National Hospital Morbidity Database. A comparison between fatal and non-fatal drowning data was undertaken using the Royal Life Saving’s National Fatal Drowning Database, with overall and specific ratios calculated (sex, age, location, remoteness classification). Economic costs were calculated by taking into account the value of lost health, health system and emergency service costs, short and long term lost productivity and costs of long term care.

RESULTS
Between 1 June 2002 and 30 June 2015, there were 6158 cases of non-fatal drowning in Australia (average 474 per year), with 66.1% occurring in males. Since the beginning of the study, non-fatal incidents increased by 42.4%. Across the 13 years, for every 1 fatal drowning, there were 2.78 non-fatal drowning incidents. Children aged 0-4 years accounted for 41.9% of all non-fatal drowning cases, with 1 fatal drowning for every 7.63 non-fatal drowning incidents. More than a third of cases occurred in swimming pools (36.1%), with 4.34 non-fatal incidents for every 1 fatality. The total cost of non-fatal drowning over the study period was $2.45 billion, an average $188 million per year.

DISCUSSION
The increase in non-fatal drowning could be due to an increased knowledge of CPR, or a general increase in community awareness of drowning, leading to an increase in hospital admissions. There is an inverse relationship between the ratio and age, that is, as age increases, the ratio decreases, meaning it is highest for children and lowest for older people. The high proportion of non-fatal drowning incidents in swimming pools is suggestive of a more controlled and regulated environment, often in close proximity to assistance from bystanders or trained professionals, as well as medical treatment. By comparison, natural waterways are more likely to be located in isolated areas, increasing the likelihood of a fatal outcome.

CONCLUSION
The study revealed the number of non-fatal drowning incidents in Australia and highlighted the high proportion of cases which occur in children and at swimming pools. By examining both fatal and non-fatal drowning data, the full burden of drowning in Australia can be established.

ACKNOWLEDGMENTS
Research at the Royal Life Saving Society – Australia is supported by the Australian Government. Sections of this report are based on data made available by the AIHW. The authors are responsible for the use made of the data in this report.
Despite the fact that non-fatal drowning is a significant cause of morbidity from water-related injury events, there is a paucity of information on its incidence. Most epidemiological studies of drowning have focused on fatalities only; consequently, there is a lack of evidence on the characteristics of non-fatal drowning. The majority of existing non-fatal studies focus on children and adolescents only, and often do not include water transport related drowning events.

**OBJECTIVES**

(1) To describe non-fatal drowning in Canada; and

(2) To identify which characteristics, if any, differ significantly between non-fatal and fatal drowning incidents.

**METHODS**

This retrospective study was conducted using data collected on drowning incidents in Canada over a five-year period, from fiscal year 2008/09 to 2012/13. Data were extracted from three databases, the Discharge Abstract Database, the National Ambulatory Care Reporting System, and the Drowning Prevention Research Centre database. Victims of a non-fatal drowning incident who required ambulatory care or who were discharged by an acute care facility in Canada were compared to fatal drowning cases where the cause of death was unintentional drowning, as determined by the coroner or medical examiner.

**RESULTS**

The ratio of fatal to non-fatal drowning was 1:3. The characteristics of non-fatal drowning differed significantly from those of fatal drowning across all variables: age, sex, province, urban versus rural residence, and external cause.

**CONCLUSION**

The study results suggest that there may be a basis for expanding drowning prevention interventions to target characteristics specific to non-fatal drowning. Further research related to non-fatal drowning is warranted.
THE BURDEN OF NON-FATAL DROWNING IN BARISAL, BANGLADESH

Dr. Jagnoor Jagnoor¹, Dr. Kamran Baset², Mr. Dan Ryan³, Dr. Aminur Rahman², Ms. Caroline Lukaszyk¹, Prof. Stephen Jan¹, Prof. Lisa Harvey⁴, A/Prof. Rohina Joshi¹, Prof. Fazlur Rahman², Prof. Rebecca Ivers¹¹

¹The George Institute for Global Health, Sydney, Australia, ²Centre for Injury Prevention and Research, Bangladesh, Dhaka, Bangladesh, ³Royal National Lifeboat Institution, Dorset, England, ⁴Sydney Medical School, University of Sydney, Sydney, Australia

ORAL PRESENTATION

Data 2, Salon 2, October 17, 2017, 1:30 PM - 3:00 PM

BACKGROUND
While previous studies highlight the high burden of drowning-related mortality across Bangladesh (mortality rate 72 per 100,000 populations), little is known about the prevalence or impact of non-fatal drowning-related morbidity, either in Bangladesh or globally. Within Bangladesh, morbidity data is required to inform prevention efforts and to establish appropriate treatment and support systems for individuals following a drowning event. There are currently no validated data collection tools available for the specific assessment of drowning morbidity on a population level.

AIMS
To assess the burden of non-fatal drowning morbidity in the Barisal division of Bangladesh.

TARGET
People of all ages living in Barisal division of Bangladesh, who have experienced a non-fatal drowning event within 6 months prior to data collection.

METHODS
A population-based cross-sectional survey was conducted to gather regionally representative data on the magnitude and context of fatal and non-fatal drowning cases within Barisal, Bangladesh. Data were collected on a household level, with households selected through multistage cluster sampling methods. Approximately 90,000 households were recruited for the study. The World Health Organisation’s Disability Assessment Schedule 2.0 (WHODAS 2.0) documents self-evaluated health status and disability. It has been shown to maintain reliability and validity in 19 countries, including low and middle income countries (LMICs) such as India, Cambodia and Nigeria. A shortened version of the WHODAS 2.0 was incorporated into the survey and will be administered to all individuals reporting to have experienced a drowning event within 12 months prior to data collection. Data collection is currently ongoing and will end in 2017.

RESULTS
The study findings will be the first to report drowning related disability from population based data in a LMIC setting. Utility scores will be calculated and disability adjusted life years will be reported. Results from WHODAS will be validated against other questions on hospitalisation, treatment and life style activities used in the survey.

DISCUSSION
Including WHODAS as an element of a regionally-representative survey will provide important and unique data on drowning-related morbidity in resource poor settings, rarely collected on a large scale. This will help guide interventions such as first responder cardiopulmonary resuscitation and measuring any shift in mortality to morbidity burden with post event interventions. The data collected through this study will be of importance to policy makers, and those involved in health service and social service planning, as it will highlight potential gaps in treatment and support systems for individuals who have experienced non-fatal drowning injury. It will be important in understanding injury burden in a LMIC and informing the need for health services, both acute and on-going.

CONCLUSION
Data on the physical, social and economic impact of drowning morbidity is necessary for identifying gaps in health and support systems available for individuals who have been affected by drowning-related injury. This is a particular priority for countries with high drowning mortality rates, such as Bangladesh. Although there is an absence of data collection tools to specifically assess drowning morbidity, the WHODAS 2.0 tool shows potential to collect relevant information addressing this topic.
In June 2017, Royal Life Saving Society – Australia, held a Non-Fatal Drowning Symposium which brought together more than 40 representatives from industry, Government, the private sector and academia in order to review the latest research, consider lessons from the field and gain a greater understanding of the human impacts of non-fatal drowning. Following the release of a new report investigating the scale of non-fatal drowning in Australia, produced by Royal Life Saving Society – Australia and research partners Surf Life Saving Australia, speakers from across Australia presented research on the full burden of drowning, with the event also giving attendees the opportunity to hear from those directly affected by non-fatal drowning and contribute their own thoughts to the discussion.

To produce an action plan on non-fatal drowning published as a declaration, which captures the present situation in Australia and proposes recommendations for future strategies across research, policy and advocacy.

During the symposium discussion and small group work included brainstorming of potential issues and priorities. This resulted in a declaration, published as a consultation draft. The draft was reviewed by attendees. All feedback was carefully considered, adjustments made, and a final declaration published.

The declaration, ‘Reducing the burden of non-fatal drowning: Symposium declaration’, outlines Research, Policy, Advocacy, Support and Collaboration actions agreed to and prioritised by the sector. The declaration has been sent to all stakeholders, with an expectation that they will adopt some or all of the recommended actions.

Workshop sessions at the symposium facilitated robust discussion within the action areas. The declaration proposed next steps in the areas of Research; identifying and monitoring trends in non-fatal drowning and defining the inclusion/exclusion criteria for non-fatal drowning incidents, Policy; engaging with policy makers, mostly Government and relevant organisations, Advocacy; increasing awareness within the sector, community, Government and media, Support; providing support to those individuals and families, and Collaboration; recognising the need for multi-sectoral collaboration.

By bringing focus to non-fatal drowning, the symposium declaration serves as a guide to those working in the drowning prevention sector, ensuring the full impact of drowning on individuals, families and communities is considered now and into the future. The cross-sectoral format provided for actions across research, policy, advocacy, support and collaboration.

The symposium was hosted by the Australian Water Safety Council, of which Royal Life Saving Society – Australia is a member. Research at the Royal Life Saving Society – Australia is supported by the Australian Government.
Dr. David Meddings¹

¹World Health Organization

Data 2, Salon 2, October 17, 2017, 1:30 PM - 3:00 PM

Dr. David Meddings was born in Canada where he obtained his degree in Medicine and subsequent Canadian Fellowship in Community Medicine. He has earned several awards including the S. Stewart Murray Award and a Fellowship from the Medical Research Council of Canada. His clinical work in humanitarian contexts began in Sudan in 1989. In 1990 he began a series of missions in conflict areas with the International Committee of the Red Cross, and served as the head epidemiologist at the ICRC headquarters from 1997 to 2002.

In 2002 he was recruited by the Department of Violence and Injury Prevention and Disability of the World Health Organization to coordinate a multi-country study examining interpersonal forms of armed violence. Subsequently he also took over coordination of both policy development and capacity development for injury and violence prevention. In early 2010 he handed over responsibilities in the area of armed violence to colleagues and has taken on coordination of an expanded range of unintentional injury mechanisms, including coordination of WHO’s work on child injury, drowning, burns, and fall prevention.

He is the Executive Editor of the Global Report on Drowning and Preventing Drowning: An Implementation Guide, both of which were launched by WHO’s Director-General in 2014 and 2017 respectively.
ANALYSIS OF TWO TYPES OF STATISTICS ON DROWNING IN GERMANY

Dr. Detlev Mohr¹, Bernhard Abouid²
¹DLRG, Potsdam, Germany, ²Ulm University Medical School, Ulm, Germany

Data 3, Salon 2, October 17, 2017, 3:30 PM - 5:00 PM

Drowning is the 3rd leading cause of unintentional injury death worldwide and in Europe drowning is the second leading cause of death among 5-14 year olds and more important for elders. Every second victim in Germany was a senior person 50 years of age or older. An average of 3.5 people drown every hour even in Europe. One of the main messages of the World Water Safety Conference in Porto 2007 was: Drowning needs more attention. Prevention needs better and more information about the real reasons. For the prevention of drowning it is important to have reliable data and statistics on this incident.

In Germany there are currently two relevant statistics from different sources on drowning:

- Cause of death statistics of the statistical offices of the German government. “Drowning” is recorded here as a cause of death, when it was stated by the emergency doctor or general practitioner in the death certificate and by the registrar’s office reported to the regional statistical office

- Statistics of the Deutsche Lebens-Rettungs-Gesellschaft e.V. (DLRG), case numbers to drowning collected by media clippings since the year 2000

These two different statistics are barely comparable and display inconsistent figures. Therefore, the two statistics on drowning in Germany have been analyzed for several years case by case. The aim of the project is to gain reliable data on drowning in Germany by comparison of the individual cases and to derive corrections as multiplying factors for the DLRG statistics to estimate the real figure of drownings and their circumstances.

One of the objectives of the research study is to gain better knowledge of which cases are reported in both statistics or only in one of them. An improved national drowning statistics based on media clippings with corrections shall give us more reliable data to decide what preventive measures must be taken in order to reduce the number of fatal water incidents significantly in the future.

The data can give information about drowning during different activities (swimming, surfing, sailing, diving, etc.), dangerous locations but also information about regional differences in the reporting system. Unfortunately there are only rough estimations of the dark figures to calculate as well as for deaths late after the drowning accident based on research data of studies in smaller regions, which will be also referred by the authors.
Drowning is a neglected global public health problem. It is estimated that 372,000 people die due to drowning each year worldwide. However, the situation is serious in low- and middle-income countries (LMICs), where 90% of these deaths occur. Lack or absence of preventative measures is the reason for the high drowning mortality in these countries. Again the reason behind the absence or lack of preventative measures is the non-availability or scarcity of essential data in LMICs.

Until the groundbreaking research published by the Bangladesh Health and Injury Survey (BHIS) in 2005 it was not known to the professionals and policy planners that fatal drowning was the leading cause of death of children under 18 after infancy. The BHIS findings encouraged the health professionals and the policy planners to include drowning prevention issue in the national health programme for the first time in 2006. However, the professionals and the planners could not proceed much as there were no proven interventions applicable for Bangladeshi setting.

In response to that the researchers of Bangladesh conducted some community trials which identified a few interventions which were found feasible, acceptable and effective in preventing childhood drowning in a low-resource setting, Bangladesh. The data of this research work convinced the health professionals and policy planners to develop policies and introduce programmes in the health system.

Both the survey and intervention data helped to take the following decisions:

- Ministry of Health and Family Welfare (MOHFW) allocated a focal person who coordinates drowning prevention activities since 2006
- Since 2010, budget has been allocated by the MOHFW each year to address drowning
- Drowning prevention has been incorporated in the National Health Policy 2011
- Injury (including drowning) prevention cell has been formed at the Prime Minister’s Office in 2011
- In 2012 MOHFW identified six preventable diseases and health-related events including drowning to be eliminated by 2035.
- Currently MOHFW is in the process of finalizing the National Drowning Prevention Strategy and Action Plan.
ORAL PRESENTATION

DID DROWNING WATER SAFETY ACTIONS MAKE ANY DIFFERENCE? A 35 YEAR EVALUATION ON BRAZIL

Dr. MD David Szpilman1,2, Danielli Mello1,2, Dr. PhD Ana Catarina Queiroga1,2,3, Rogerio Emygdio4

1SOBRASA, Rio de Janeiro, Brazil, 2IDRA - International Drowning Researchers Alliance, 3EPIUnit, Instituto de Saúde Pública da Universidade do Porto, Porto, Portugal, 4Oswaldo Cruz Foundation, Rio de Janeiro, Brazil, 5Physical Education College of Brazilian Army, Rio de Janeiro, Brazil

Data 3, Salon 2, October 17, 2017, 3:30 PM - 5:00 PM

INTRODUCTION

Brazil has one of the largest water surfaces, exposing hundreds of millions of inhabitants every day, year-round to water incidents. In 2013, drowning was responsible for 6,030 deaths (2.9/100,000 inhabitants) and was the second leading cause of death of children aged 1 to 9 years old. The Brazilian Lifesaving Society (SOBRASA) was founded in 1995 with the mission to reduce drowning through water safety programs. Since its formation, more than 30 different water safety programs embracing all aquatic scenarios, activities and ages were created and promoted with the main approaches being:

- Gather all professionals with a duty of care to share information and debate the best practices on water safety
- Create and promote water safety campaigns and information freely available to everyone.

Although several prevention strategies are outlined and promoted worldwide as the first step to reduce drowning, this is still an expert assertive based on scarce and low level scientific evidence studies.

OBJECTIVES

The purpose of this study was to evaluate the effectiveness of SOBRASA’s water safety actions in reducing drowning mortality in Brazil.

METHODS

Drowning mortality was collected at National Mortality Information System (DATASUS) using ICD10 along 35 years for all 27 States. The data was divided in 2 periods (before SOBRASA actions[1979-1997] and after [1998-2013]) comparing “drowning water safety score (DS)” to mortality/100,000 population for each State. The DS was calculated multiplying the number of years affiliated to SOBRASA multiplied by the water safety number of Preparation/Education and/or Prevention (active and reactive) actions conducted by each State. The DS were grouped in levels and differences among groups considered statistical significance for P<0.05.

RESULTS

There were 246,265 drowning deaths from all causes averaging 7,036 deaths/year in 35 years. On average, most deaths (88%) were unintentional. A significant 27% decrease (5.2-to-3.8/100.000; p<0.05) in drowning rates was observed between the two periods. Males died 5.3 times more frequently. Deaths were higher in 15-19 year olds (16.4%; 4.7/100,000 hab.). A huge geographical imbalance in drowning death distribution was observed ranging from as low as 1.3 (Federal Capital) to as high of 11.7/100,000 (Amazon-region). A linearly dependent relationship between water safety actions and years affiliated to SOBRASA was observed. A strong and significant association (OR=241.7; IC 95% [9,0–64,84]) between DS and cases of improvement (drowning reduction) was observed.

DISCUSSION

In this study, there were at least 5 biases to attribute improvements on reducing drowning death by just water safety actions. Evaluation of a prevention campaign using only death as an outcome is not the best approach. Education and prevention takes time to produce effect on rates. Impact actions on population (how many affected, how deep, how long lasting, what age is most impacted) was also not considered and this needs further investigation.

There was a significant inverse correlation with DS and drowning deaths. This is a fundamental tool to allow institutions, municipalities, states and countries to estimate the efforts needed to achieve their goal on drowning reduction. From this study, a DS above 100 (i.e.: 10 actions along 10 years) it is possible to reduce drowning deaths by as much as 2.3% a year. Table 1 shows different DS levels and their correspondence drowning death reduction.
KEEPING OUR HEADS ABOVE WATER: A SYSTEMATIC REVIEW OF FATAL DROWNING SURVEILLANCE IN SOUTH AFRICA

Dr. Colleen Saunders¹,³, Mr. Dhaya Sewduth³, Mr. Navindhra Naidoo²

¹Division Of Emergency Medicine, Department of Surgery, University Of Cape Town, Observatory,, South Africa, ²Department of Emergency Medical Sciences, Faculty of Health and Wellness Sciences, Cape Peninsula University of Technology, Bellville,, South Africa, ³Lifesaving South Africa, Durban,, South Africa

Data 3, Salon 2, October 17, 2017, 3:30 PM - 5:00 PM

BACKGROUND
Drowning is defined as the process of experiencing respiratory impairment from submersion/immersion in liquid and can have one of three outcomes – no morbidity, morbidity or mortality. The WHO African region accounts for approximately 20% of global drowning with a drowning mortality rate of 13.1 per 100,000 populations. The strategic implementation of intervention programmes driven by evidence-based decisions is of prime importance in resource-limited settings such as South Africa.

OBJECTIVES
This study, therefore, aimed to review the available epidemiology data on fatal drowning in South Africa in order to identify gaps in the current knowledge base and priority intervention areas.

METHODS
A systematic review of published literature was conducted to review the available epidemiological data describing fatal drowning in South Africa. In addition, an Internet search for grey literature, including technical reports, describing South African fatal drowning epidemiology was conducted.

RESULTS
A total of 13 published research articles and 27 reports obtained through a grey literature search met the inclusion and exclusion criteria. These 40 included articles and reports covered data collection periods between 1995 and 2016, and were largely focused on urban settings. The fatal drowning burden in South Africa is stable at approximately 3.0 per 100,000 population but is increasing as a proportion of all non-natural deaths. Drowning mortality rates are high in children under the age of 15 years, most particularly in children under the age of five years old.

CONCLUSION
This review suggests that South African drowning prevention initiatives are currently confined to the early stages of an effective injury prevention strategy. The distribution of mortality across age groups and drowning location differs substantially between urban centres and provinces. There is therefore a need for detailed drowning surveillance in order to monitor national trends and identify risk factors within all South African communities.
Miss Jessica Pino Espinosa¹, Dr. Ana María Domínguez Pachón¹, Mrs. Isabel García Sanz¹, Mr. Alberto García Sanz¹, Dr. Francisco Cano Noguera¹,²

¹Royal Spanish Lifesaving Federation (RFESS), San Sebastián de los Reyes, Spain, ²Murcia University (UMU), San Javier, Spain

BACKGROUND
Spain is a tourist country which receives 52.2 million of tourists each year according to data from the Spanish Ministry of Tourism, ranking in the three most visited countries in the world. The destination of leisure, good weather and beach is the most chosen with 81.5%. These last three years Spain has surpassed the number of tourists by 10% compared to other years.

Selected destination is due to general safety, which contrasts with the number of deaths caused by drowning in our water areas, especially beaches, where more than 50% of deaths by drowning are recorded per year and more than 60% during summer season.

In the past few years, there have been a record number of tourists on our coasts and there have been a very high number of fatal water accidents causing the Royal Spanish Lifesaving Federation (RFESS) to carry out a study about the number of drowning and the characteristics of the water areas where these deaths by drowning take place.

OBJECTIVES
- To know the characteristics and deficiencies of the water areas and the circumstances for those deaths by drowning are produced.
- To create a classification of safe water areas and zones of risk.
- To prepare reports in order to take the necessary preventive measures to reduce the number of fatal water accidents.
- To carry out a comparison over three years to check the effectiveness of the measures adopted and develop new considerations.

METHODS
Information on the characteristics of water areas, such as: situation, rank of affluence, existence of lifeguards, is collected by data provided by the Spanish Ministry of Health. On the other hand, the number of deaths caused by drowning and the parameters needed to determine the statistics were collected from written and digital press clippings through internet search engines using the following keywords: drowning, drown death, missing and corpse. Both sources data are used to show the number and percentage of each variable.

RESULTS
The number of fatal incidents in water during the summer season is around 50% of annual deaths by drowning, of which more than 75% occur in unguarded areas. Water areas with a high affluence are the most secured due to there being lifeguards on duty, but 25% of these areas do not have lifeguard service. In fact, 30% of the deaths caused by drowning occurred in areas of much affluence without lifeguard service.

CONCLUSION
The high number of drownings each year, added to the lack of interest of public administration in adopting prevention measures to avoid death by drowning, requires us to carry out these studies in order to show and measure the magnitude of the current problem, to develop specific campaigns of prevention, as well as to monitor their success through a 3 year comparison. Moreover, information analyzed is important to raise awareness in society of the problems existing in water areas and the importance of swimming in water areas with lifeguard service with appropriate signal flags.
CHILDREN WITH KNOWN PRE-EXISTING MEDICAL CONDITION AND ITS ROLE IN DROWNING FATALITIES

Dr. Richard C Franklin1,2, Professor John Pearn1,3, Ms. Amy Peden1,2, Mr. Justin Scarr1

1Royal Life Saving Society – Australia, Broadway, Australia, 2James Cook University, Townsville, Australia, 3Lady Cilento Children’s Hospital, South Brisbane, Australia

Data 4, Salon 2, October 19, 2017, 11:00 AM - 12:30 PM

INTRODUCTION
Drowning remains a major cause of childhood mortality worldwide, in both developed and developing nations. Several studies have highlighted the risks of pre-existing medical conditions and drowning, particularly epilepsy. The crucial question for future preventative and public health programs is whether pre-existing medical conditions are primarily causal; are a contributory factor conferring increased risk; or are simply associative.

AIM
To describe the contribution of pre-existing medical conditions in unintentional fatal drowning among children in Australia; compare prevalence of medical conditions to general population and explore potential prevention stratagems.

METHODS
This study is a total population, cross-sectional audit of unintentional fatal drowning among children 0-14 years in Australia. Data were sourced from the Australian National Coronial Information System (NCIS) for the period 1-July-2002 to 30-June-2012. Australian Institute of Health and Welfare description of age-specific disease patterns in the general population.

RESULTS
468 children drowned during the study period, 53 (11.3%) had a pre-existing medical condition. Common conditions included epilepsy (35.8%), autism (24.5%), intellectual disabilities (9.4%) and other non-specific medical conditions (18.9%) including cystic fibrosis, fetal alcohol syndrome and Duchenne Muscular Dystrophy. Epilepsy is a risk factor in childhood drowning deaths, with a prevalence of 4.1% of drowning fatalities, compared to 0.7-1.7% among the general 0-14 years population (relative risk: 2.4-5.8). Epilepsy was deemed to be contributory in 16 of 19 cases (84.2% of all epilepsy cases). Asthma and intellectual disabilities had a lower risk of drowning than the general population.

DISCUSSION
This study has confirmed that the only pre-existing condition which leads to an increased risk of drowning, once a child is in the water, is epilepsy (RR 2.4-5.8). An assessment of the mathematical increase in risk necessitates a compilation of exposure denominators which are unknown and probably unknowable for this group of conditions. Supervision is a key prevention strategy for all children and with appropriate prevention these children should be at no greater risk than any other child. From our experience we believe that the lower rate of drowning in children with developmental delays reflects the supervisory practice and reduced exposure.

CONCLUSION
Drowning deaths in children are preventable. The implementation of safety barriers for home swimming pools has resulted in a significant decline in child drowning deaths. With the exception of epilepsy, this research has indicated that the risks of drowning while undertaking aquatic activities are not increased in children with pre-existing medical conditions. Children with pre-existing medical conditions can enjoy aquatic activities when appropriately supervised.

ACKNOWLEDGMENTS
This research is supported by the Royal Life Saving Society – Australia to aid in the reduction of drowning. Research at the Royal Life Saving Society – Australia is supported by the Australian Government.
INTRODUCTION

Drowning is a leading cause of unintentional death among children, particularly those under five years. Previous studies of childhood bath fatalities have highlighted the risk in this age group.

AIM

This first Australian total population analysis, aims to establish the prevalence of unintentional fatal drowning in baths involving children <18 years in Australia; and to identify causal factors to underpin prevention.

METHODS

We report a total population study of all childhood (0-17 years) unintentional drowning fatalities in baths (bathtubs, spa baths and showers), in Australia between 1-July-2002 and 30-June-2014. Demographic and forensic data (co-bathing, use of bath aids, supervision, water depth and enactment of CPR) were documented for each victim.

RESULTS

78 victims were identified; two thirds (66.7%) were under 2 years of which 43.6% were aged <1 year (1.0/100,000/annum) and 23.1% aged 1-2 years (0.27/100,000/annum). Nine older children (10-17 years) also drowned. Causes included: infants and children unable to hold head out of water whilst unsupervised; and associated medical conditions including epilepsy. All children who drowned were left without adult supervision. No child drowned in water deeper than 40cms (M=19.4cms). Custodian-reported ‘time left unsupervised’ ranged from 30 seconds to 60 minutes. Children with pre-existing medical conditions were on average older (9.9 years (CI: 7.86-11.92)) and left unsupervised for longer (M=15.4 minutes; CI: 3.84-27.05) than those without.

DISCUSSION

This presentation will compare Pearn and Nixon’s 1977 study with these results and describe prevention stratagems and their effectiveness as found in other studies. Little has changed with our study also finding those <1 year to be most at risk (43.6%), both sexes represented evenly (53.8% male), all incidents occurred in the child’s own home and that the victim often had a sibling. All victims were left unsupervised, with some drowning in just 30 seconds. While some parents admit to leaving their children unsupervised in the bath, commonly those aged 6-12 months, this study has highlighted children as young as 1 month of age are bathing unsupervised.

CONCLUSION

Child drowning deaths in baths are preventable through active adult supervision. The rate of drowning (0.13/100,000/annum) remained unchanged throughout this study. Both sexes are equally represented. Children <1 year, use of bath seats, co-bathing and children with epilepsy are risk factors.

ACKNOWLEDGMENTS

This research is supported by the Royal Life Saving Society –Australia to aid in the reduction of drowning. Research at the Royal Life Saving Society – Australia is supported by the Australian Government.
UNINTENTIONAL INFANT DROWNING: A DESCRIPTIVE ANALYSIS OF CHARACTERISTICS AND RISK FACTORS FROM THE NATIONAL CHILD DEATH REVIEW CASE REPORTING SYSTEM

Ms. Heather Dykstra¹
¹MPHI, Okemos, United States

Data 4, Salon 2, October 19, 2017, 11:00 AM - 12:30 PM

BACKGROUND
Among unintentional injuries, drowning is the third leading cause of death of infants in the United States. 868 infants died by unintentional drowning between 1999-2015 in the United States.

METHODS
Analysis of 2004-2015 child death review data from 36 states from the National Child Death Review Case Reporting System was conducted. Frequencies and proportions for child, supervisor, and incident characteristics were generated for infants who unintentionally drowned (n=194).

RESULTS
Of the 194 unintentional infant drownings reviewed by child death review teams, the most common location occurred in bathtubs (79%), followed by pools (9%) and buckets (6%). The primary location of incident was the child’s home (84%) and relative’s home (5%). The majority were boys (54%), and the mean age was 269 days. 41% were identified as non-Hispanic White, 16% as non-Hispanic Black, and 31% were Hispanic. Child death review teams noted that supervision was absent in 61% of these deaths and present in 36%. Where supervision was noted to have been present (n=69), it was provided mostly by a biological parent (83%) or grandparent (7%). The supervisor’s mean age was 27.0 years. Supervisor impairment, which includes drugs, alcohol, injury/illness, being asleep, or distraction, was reported in 62% of the fatalities. The median time the infant was left unattended was 8.5 minutes (mean time=16.2 minutes), although it should be noted that the data on lapse of supervision was missing in approximately half of all cases. Open child protective services case was reported in 6% of these deaths. History of child maltreatment was noted in 9% of these drownings.

153 of the unintentional infant drownings occurred in bathtubs. A bathing aid, such as a bath seat or bath ring, was indicated in 22% of these deaths. The median time the infant was left unattended in a bathtub while in a bathing aid was 5.0 minutes (mean=6.5 minutes); this compares to a median of 11.0 minutes (mean=26.1 minutes) for infants not in bathing aids.

CONCLUSION
Unintentional drowning continues to be a leading cause of infant mortality. Bathtubs, in particular, are significant hazards to infants. Lack of supervision or lack of adequate supervision remains a key factor in these preventable deaths. In reviewing the circumstances of these cases, in over one-fourth of these fatalities, child neglect was identified as an act of omission that caused or contributed to these deaths by child death review teams. Educational efforts must continue to reinforce the need for active supervision, which includes never leaving the infant unattended around bathtubs or buckets.

DATA SOURCE
The National Child Death Review Case Reporting System is a web based, standardized case reporting system used in 45 states by child death review teams. Child death review teams collect extensive information on the circumstances surrounding the death, child and parent characteristics, death scene investigations, and prevention initiatives undertaken as a result of the death.
The Canadian Agricultural Injury Reporting program (CAIR) has been collecting data on farm deaths since 1990. The most recent data is for 2013. Among those 18 years of age and younger, the second most common mechanism of death is by drowning. The purpose of this research is to examine the factors related to drowning among children and youth on farms in Canada.

Each year CAIR affiliates in all 10 Canadian province review death records from the provincial coroner or chief medical examiner’s office. Data are extracted from the record using a standardized data abstraction form. In addition to categorical lists of the decedent’s characteristics and circumstances of death, there is also a text description of the fatality.

There were a total of 44 drowning deaths between 1990 and 2013. Of these 39 (89%) were male. The mean age was 5.4 (sd 4.0) years with boys being significantly (p < .05) older [5.7 (sd 4.3)] than girls [3.0 (sd 1.2)]. The majority of children drowned in a dugout; 17 (39%) followed by ponds 8 (18%) and sewage pits/lagoons 8 (18%). Fourteen (32%) fatalities “wandered” away from supervision and 20 (45%) were in the presence of other children at the time of the drowning. Sixteen (36%) were in the presence of adult supervision. Seven (16%) of deaths occurred when the victim broke through thin ice.

Farm children are exposed to a variety of animal, machine and environmental hazards due to farm home being at the worksite. This research specifically outlines the variety of drowning hazards children may be exposed to on Canadian farms. As with other child related farm deaths prevention efforts should be focused on safe play areas and the separation of the child from zones where farm work is conducted. In addition, it is recommended that all farm ponds, lagoons and dugouts have child proof fencing.
Currently, about 1 in 68 children has been identified with Autism Spectrum Disorder (ASD) according to estimates from Centers for Disease Control and Prevention’s Autism and Developmental Disabilities Monitoring Network (CDC, 2014), and ASD affects over 2 million individuals in the U.S. and tens of millions worldwide.

It is documented that many individuals with ASD are drawn to water. Some of this may be explained by the physical and sensory needs of this population. Water provides a safe and supported environment, which not only supports the children, but also provides them with hydrostatic pressure that surrounds their body in the water. This pressure actually soothes and calms the children, providing the necessary sensory input they crave. "(www.recreationtherapy.com). The literature also confirms that elopement, or wandering behavior, is common in children with ASD (Anderson et al., 2012). In their report, “Lethal Outcomes in Autism Spectrum Disorders”, McIlwain and Fournier state that “48% of children with ASD attempt to elope from a safe environment, a rate nearly four times higher than their unaffected siblings.”.

The combination of the increased risk of elopement or wandering in this population and the attraction of many individuals with autism to water can have tragic consequences. In 2009, 2010 and 2011, accidental drowning accounted for 91% total U.S. deaths reported in children with ASD ages 14 and younger, subsequent to wandering/elopement.

As an industry, we need to look closely at the ways in which we are teaching this population to swim. It is well known in the education system that many people with autism have difficulty transferring knowledge and skills gained in the learning setting to alternate settings or under different conditions. This is known as ‘generalization’. Generalization is not generally considered a challenge in a learn to swim program for typically developing children and the majority of our teaching approaches were designed to meet this needs of this population. By contrast, instructional strategies that improve generalization must be included in swimming programs for children with ASD. It is conceivable that the inability to generalize swimming skills from the learning environment to an alternative aquatic venue may contribute to the significant increase in the drowning rate in this population.

In this presentation we’ll review what the drowning statistics suggest about our ability to teach this population to swim effectively, and look closely at the teaching strategies that vastly increase the likelihood that swimming skills can be generalized by people with ASD. Those responsible for teaching learn-to-swim skills to individuals with autism and the parents/caregivers of this population must be made aware of the concept of ‘generalization’ and the danger that this challenge may present in aquatics. We need to be clear in our communication to swim instructors and to the public that “being able to swim in one location does not necessarily mean an individual will be able to swim in a different location”.
SLSA’S NATIONAL COASTAL SAFETY SURVEY: ANALYSIS OF PUBLIC PERCEPTIONS AND PRACTICES IS USED TO INFORM DROWNING PREVENTION STRATEGIES

Mr. Shane Daw ESM¹, Mrs. Sarah Anderson¹, Mrs. Barbara Brighton¹, Ms. Eveline Rijksen¹

¹Surf Life Saving Australia, Bondi Beach, Australia

Data 5, Salon 2, October 19, 2017, 1:30 PM - 3:00 PM

Surf Life Saving Australia (SLSA) works with Omnipoll to deliver an annual national coastal safety survey to understand coastal users’ perceptions, their understanding of the coastal environment and water safety practices.

Since 2014, SLSA has completed three surveys that asked questions about coastal visitation, swimming ability, perception of coastal hazards, participation in coastal activities and safety practices. Focused questions on Australia’s number one coastal hazard—rip currents, including testing people’s confidence and ability to identify rips, were also included.

The surveys revealed that there is a lack of awareness among the Australian public about the hazards posed by the Australian coast combined with poor swimming ability and low adherence to safety practices:

- 47% of people say the coast is only somewhat hazardous, while 36% of people say the beach is not very hazardous;
- 72% of people perceive rip currents to be very or extremely hazardous, but only 2 out of 3 people are able to correctly identify a rip current;
- Only 37% of people say they are able to swim 50m in the ocean without stopping or touching the bottom; and
- Only 44% of people usually swim at a patrolled beach during patrol hours, while 21% say they usually swim at unpatrolled locations.

While certain coastal hazards, such as rip currents, are recognised as dangerous by most people, participation in coastal activities where rip currents may be present (such as swimming and wading) is not seen to be hazardous. In general, occasional (and potentially less experienced) participants in coastal activities see the activity as less hazardous than frequent participants say they perceive the same activity.

The insights from the survey are invaluable. SLSA is able to interrogate the data to correlate people’s swimming ability with their adherence to safety practices, such as swimming between the red and yellow flags. Or to look at people’s coastal visitation and their ability to identify rips. Or examine the relationship between how frequently they go surfing with how hazardous they perceive the coast or surfing to be. The results can be analysed by age, gender, state, and where they live, including distance from the coast, metropolitan or regional areas.

SLSA uses the insights from these surveys regarding the attitudes and practices of specific coastal visitors such as swimmers, rock fishers and watercraft users to inform mitigation strategies and intervention design. For example, the survey revealed that not all people who fish on rocks identify themselves as rock fishers, which has implications for messaging and engagement channels. The data can be used to understand perceptions and behaviour of specific demographic groups in drowning blackspot areas.

The intelligence from the research has been used to inform a long-term public safety campaign to raise awareness about rips and to influence people’s behaviour about rips. Additionally, key results from the survey inform SLSA’s annual National Coastal Safety Report and coastal safety briefing documents.
ORAL PRESENTATION

GIS-BASED ANALYSIS OF THE RELATIONSHIP BETWEEN RISK PERCEPTIONS AND BEHAVIOUR ON HIGH-RISK ROCKY COASTS
Mr. Peter Kamstra¹, Mr. David Kennedy¹, Mr. Brian Cook¹
¹University of Melbourne, Carlton, Australia

Data 5, Salon 2, October 19, 2017, 1:30 PM - 3:00 PM

INTRODUCTION
Drowning on rocky coasts is a problem with global significance, but a particularly significant issue in Australia, where rocky coasts account for 19% of all coastal drownings (SLSA, 2015). The risk of drowning is predominantly framed as a consequence of waves washing over shore platforms, which sweep unsuspecting victims into the sea. Although the physical processes of waves washing over platforms are relatively well understood (Kennedy, et al., 2013), few studies have investigated which elements of the rocky coast environment are perceived as being hazardous, nor how those perceptions relate with environmental elements to produce risk.

METHODS
Using high-risk locations in coastal regions of Victoria and New South Wales, Australia as the case, this research explored the socio-environmental relations that produce risk. A relational understanding of risk emphasizes the interactions among socio-environmental elements and accommodates the ways in which understandings are co-produced by action. Relational thinking rejects that risk is a simple combination of physical and social elements and, instead, posits a spatial configuration of interrelated socio-environmental phenomena that is constantly changing. In particular, this research emphasizes the deeply contextualized understanding of socio-environmental relations that is developed through first-hand experience; in this way, a geographical understanding of risk as relational is combined with an appreciation for change over time.

AIM
The aim of this research was to open new possibilities for understanding and governing complex human-environment systems by using a mixed methods GIS-based analysis of socio-environmental relations – developed through experience – that affect behavior in high-risk locations. Spatio-temporal data was collected from recreationalists wearing a GPS and combined with video data, qualitative risk perceptions and coastal data in ArcGIS to permit a mixed methods GIS-based analysis of socio-environmental relations that affect behavior in high-risk locations.

RESULTS
Results from this interview-mapping process were collated, analysed, and mapped using ArcGIS. In doing so, we discovered that perceptions of risk are related to their affective attachments to space. We also found that the probability of rock fishers spending time in areas mapped as high-risk decreased as their length of experience on the coast increased. The implications of understanding how spatial factors shape perceptions of risk in terms of behaviour in high-risk locations opens new possibilities for understanding and governing human-environment systems. We suggest coastal risk policy needs to include spatial understandings of risk, with the aim of accommodating the element-perception and temporal perceptions that produce risk in dynamic coastal environments.
MODELLING AND PREDICTING DROWNING RISK ALONG THE GIRONDE’S OCEANIC COAST: RETROSPECTIVE AND PROSPECTIVE OBSERVATIONAL STUDIES

MD Eric Tellier¹,² MD, PhD Marion Bailhache¹,² MD Bruno Simonnet¹, MD, PhD Louis-Rachid Salmi¹,²

¹CHU de Bordeaux, Bordeaux, France, ²INSERM, ISPED, Centre INSERM U1219, Bordeaux, France

INTRODUCTION
In France, a national study about drowning is conducted every three years, registering all cases of drowning leading to a hospitalization or death, from June 1st until September 15th. In 2012, 576 drowning occurred on seashore, including 43 drownings implying 11 deaths on beaches of Gironde, in the Southwest part of France. Gironde’s oceanic coast is a 126-km-long sand beach; the main touristic areas are watched during summer, but bathing season can begin in April and last till mid-October. Most drownings are related to rip currents, shown by Castelle et al. to be controlled by wave conditions, tide levels and local topography. To orient prevention and surveillance strategies, our study aimed to create a risk prediction model of drowning along Gironde’s coast, based on weather and marine forecasts.

METHODS
Retrospective derivation cohort data were collected from the emergency call centre of Gironde, and meteorological data came from MétéoFrance, the national weather forecaster. The study period was April, 1st till October, 31st, from 2011 till 2013. Prospective validation cohort data and forecasts up to three days were collected from the same sources, for the same months in 2015 and 2016. We used a logistic regression and a zero-inflated Poisson model to quantify the risk. Variables selection was done on the retrospective cohort, and we assigned for each model a threshold to stratify the risk of drowning (“low” and “high”).

RESULTS
The retrospective sample included 117 days with at least one drowning event (272 events reported), within a total of 538 days without missing data. Air and water temperatures, wave factor, wave direction, nebulosity and holidays were positively associated with drowning probability. Prospective validation was performed on 405 days without missing data, covering 181 drownings reported during 84 different days. The regression logistic model had an area under the ROC curve (AUC) of 0.79 (95% confidence interval: [0.77–0.87]); 171 days were classified at high risk, among which 67 at least one drowning event occurred. With 21 events missed in 14 days, the predictive positive value (PPV) was 39%, and the negative predictive value (NPV) 94%. The zero-inflated Poisson model had an AUC of 0.83 ([0.79–0.88], PPV: 37%, NPV: 97%) and missed 14 drowning events in 7 days. There were no statistical differences between the 1-, 2- and 3-day forecasts.

CONCLUSION
Our models show that environmental conditions are good predictors of drowning risk along the Gironde’s oceanic coast. They could help prevent drowning by broadcasting warning messages up to three days before a day at risk. A more detailed study of the missed drowning events is needed to comfort the models, and to predict the risk depending of the hours of the days and the tide level, which could be more informative for beach patrols.
INTRODUCTION
Disaster is “a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community’s or society’s ability to cope using its own resources” (IRF).

Brazil has one of the largest aquatic areas in the world leading to one of highest rates of drowning deaths—6,000 people yearly (2014). The country has more than 8,000 km of coastline, and navigable rivers make up to 35,000 km. This, coupled with the pleasant climate, makes drowning one of the major risks, especially in areas not surveilled by lifeguards. In fact, 75% of all drowning deaths occur in open fresh water, places where surveillance is lacking.

Why this drowning daily burden is still outside the disaster topic?

At Rio de Janeiro beaches, lifeguards frequently manage large crowds. From 1972 to 2015, the Fire Department of Rio de Janeiro (CBMERJ) Lifeguard Service made approximately 286,000 rescues and treated 10,800 victims in the Drowning Resuscitation Centers. Though much less death occurs in lifeguard’s areas, these are where most preventive actions, rescues and first aid occur. Although prepared to face extraordinary circumstances, like holidays, beach events, carnival, and summers vacations, it’s not unusual to be overwhelmed.

AIM
This research aims to show drowning as a disaster and how similar crowded events can have extremely different outcomes based on beach users’ behaviour.

MATERIALS
Two mass events at the peak summer with more than 3 million people on beach on-going users at Rio de Janeiro city were selected. Pope’s visiting in 2013 and a city holiday in 2015. Variables evaluated were: preparation of human and material resources used to patrol, people and their purpose to attend, their alcohol use and overall behaviour as a risk factor, environmental conditions, rescues conducted and outcomes.

RESULTS
During Pope’s visit, since the original venue was inland, there was no contingency plan for rescues along the beach. The last-minute relocation of the venue left lifeguards with just a few days to be prepared. A total of 130 lifeguards, 27 speedboats, personal watercraft, and inflatable rescue boats, 3 ambulances (2 advanced), 2 helicopters (one rescue and one medical) and 1 Drowning Resuscitation Center were allocated for the event. Three million people full dressing for Church and no alcohol use attended 4 km of Copacabana beach along 2 days. The weather was clearing, the surf was rough (1.5m high), the rip currents numerous. There were 302 rescues, 37 medical attendances, no deaths and no patients requiring CPR.

During City holiday preparation allocated 560 lifeguards, 27 speedboats, personal watercraft, and inflatable rescue boats, 5 ambulances (2 advanced), 2 helicopters (one rescue and one medical) and 3 Drowning Resuscitation Centers. 180 voluntaries lifeguards joined the effort along the day. Three million people with intention to bath attended the 45km-long stretch of beaches in this particular day. The environmental conditions were similar to Pope’s event. There were more than 2,000 rescues, 135 medical attendances and 4 deaths by drowning.

DISCUSSION
Author will present what benefits come from including drowning as a disaster topic.
REAL-TIME LIFEGUARD ACTIVITY REPORTING: A DESCRIPTIVE ANALYSIS OF A LINKED COMPUTER-AIDED-DISPATCH DATASET OF LIFEGUARD ACTIVITY FROM NEWPORT BEACH, CALIFORNIA

William Koon¹, Michael Halphide², Dr. Ali Rowhani-Rahbar¹, Dr. Linda Quan¹,³

¹University Of Washington, Seattle, United States, ²Newport Beach Fire Department - Marine Operations Division, Newport Beach, United States, ³Seattle Children’s Hospital, Seattle, United States

BACKGROUND
Detailed, valid and reliable data on lifeguard activity are needed for managers, researchers and government decision makers. However, knowledge about ocean lifeguard activity and effectiveness is mostly anecdotal or experiential, derived from rescue counts with little consistency and varying accuracy.

In January of 2015, Newport Beach Lifeguards began reporting all lifeguard interventions and interactions with the public in real-time via a Computer-Aided-Dispatch (CAD) system. Data from this system can be linked to other EMS, weather, and ocean condition data collection systems to provide insight into lifeguard activity and guide decision-making. Newport Beach Lifeguards, a branch of the Fire Department employing 245 ocean lifeguards, patrol 10 kilometers of ocean coast. Peak summer beach visitation can exceed 100,000 patrons per day; lifeguard rescue rates frequently exceed 50 rescues per hour.

OBJECTIVE
To describe the CAD lifeguard data collection system, lifeguard activities, and identify various ways this data can be used to promote evidence-based decision-making.

METHODS
The Lifeguard CAD system uses software to document lifeguard interventions with beach patrons. Lifeguards call in via radio or closed circuit telephone; a dispatcher records details from the intervention (time, location, type) on the computer in real-time; and coordinates adequate responses to incidents. Data for lifeguard interventions from 2015 and 2016 were linked with lifeguard work schedules in order to describe the frequency, trends and variation of lifeguard activity over time. The Geographic Information Systems tool SaTscanTM was used to detect geographic clusters of lifeguard preventative actions (verbal warning by a lifeguard to a beach patron regarding an aquatic hazard or danger), rescues, and responses to major and minor medical incidents.

RESULTS
A total of 423,071 unique lifeguard interventions were recorded in the CAD system during the two-year study period. Of these, the majority (54.8%, 232,065) were preventative actions, 1.9% (8,046) were ocean rescues, 0.94% (3,986) minor first aid incidents, and 0.12% (519) major medical calls. Most lifeguard activity occurred during summer months, weekends, and afternoons, although high rescue counts continued into September and October when lifeguard staffing was reduced. SaTscanTM identified statistically significant spatial clusters of rescue activity and major medical aids in specific locations on the beach, while preventative actions and minor first aids occurred throughout the geographic area.

DISCUSSION
The Newport Beach CAD system provides intensely detailed lifeguard activity data that shows lifeguards mostly provide primary drowning prevention (preventative actions) as well as secondary drowning prevention (rescue). The unique temporal and spatial clustering of each type of intervention shows the need to further define factors that contribute to their frequency and location.

CAD data recorded in real-time by a dispatcher is assumed to have increased validity and reliability compared to previous data collection methods where activity was retrospectively self-reported by the lifeguard. Utilization of this new system for ocean lifeguards presents exciting opportunities for research and evidence based operational improvement. For example, strategically allocating additional staff to areas where rescues are statistically more likely to occur may allow for higher levels of preventive actions, potentially increasing lifeguard effectiveness by decreasing the occurrence of rescue. While specific results from this analysis may be location specific, methods of collecting and linking CAD lifeguard activity data can be may be duplicated and utilized elsewhere.
BIG DATA AND ADVANCED ANALYTICS - NEW TOOLS FOR DROWNING PREVENTION

Mr. Mark Lindsay

1Water Safety New Zealand, Wellington, New Zealand

Poster Day 1, October 17, 2017, 8:30 AM - 5:00 PM

Big Data has been defined as “high volume, high velocity, and/or high variety information assets that require new forms of processing to enable enhanced decision-making, insight discovery and process optimization”.

Big data, integrated information and advanced analytics have been long recognised as essential business tools to help understand market dynamics, unlock process efficiencies and gain insights into competitive advantage. How can these rapidly evolving tools and technologies be utilised to understand the complexities of the drowning problem? How can they help create more effective and cost efficient drowning prevention outcomes?

Water Safety New Zealand is embarking on an ambitious programme to unlock the drowning prevention potential of data. This presentation will examine the building blocks of a successful ‘integrated big data’ strategy that creates new insights and collaborative possibilities for water safety organisations nationally. The end goal is an information system that enables drowning risks to be recognised, managed and, ultimately, prevented.
According to the WHO, drowning claims one life every 11/2 second worldwide. International data severely underestimates the actual drowning figures, even for high-income countries. On top of that, epidemiologic data accounts for only 6% of the problem because non-fatal drowning is still not registered in all countries. Almost all drowning victims are able to help themselves or are rescued in time by bystanders or professional rescuers. Studies reveal that in areas where lifeguard services are fully operational, less than 1% of all persons rescued by lifeguards need cardio-pulmonary resuscitation (CPR) and 0.3% of the rescues resulted in the death of the victim (0.34%).

The ‘Drowning Chain of Survival’ comprises five life-saving steps for lay and professional rescuers. The steps of the chain are: Prevent drowning, recognize distress and call for help, provide flotation, remove from water and provide aid care as needed. Unfortunately, and probably for cultural reasons, all actions and media campaigns are focusing merely in providing rescue and first aid education or care, instead of preventing the event from occurring.

Data was collected during 5 summer seasons (4 months long each) from 2010 to 2015 by lifeguards on duty at a 6 km beach, in the South of Brazil, State of Santa Catarina. This beach is a touristic venue for the estimated 40,000 residents and 80,000 people attending the beach on the crowded days. The lifeguard service is provided by military firefighters (CBMSC) with 3 fixed towers and 30 lifeguards, from sunrise to sunset (8 am/pm). All prevention actions, rescues and first aid, and environmental conditions are reported online on a daily basis.

Preventive reactive actions comprised 1,563,300 (99,9%). Only 2,044 (0,1%) involved recognizing people in stress/distress and rescues. From those needing to be rescued, 355 (0,02%) needed medical assistance due to some respiratory symptoms. Cases categorized by drowning grade (2) were: Grade 1–n=234 (54%), Grade 2(22%–n=78, Grade 3(6%–n=22, Grade 4(2%–n=7, Grade 5(1%–n=4, and Grade 6-n=10(10%). So, only 14 of the 2044 rescue cases (0.7%) needed resuscitation.

The historical misconception that drowning means death fully demonstrated in our culture by poems, music, and tales is probably a major reason behind the difficulties to count the burden. We are just seeing the tip of the iceberg and urgently need to look for the problem as a whole. For each rescue made there were 765 reactive preventive actions, mostly whistling to a bather in imminent danger. For each medical assistance provided there were 5 other rescues that did not need any further assistance. In a fully operational lifeguard system all those actions can be reported, but data collection, where it exists, usually sits at a local or regional level and rarely reaches a national dimension, even in developed countries.
The Surf Life Saving Australia (SLSA) National Coastal Safety Report details the organisation’s holistic approach to drowning prevention via the Total Service Plan and the National Safety Agenda while providing an annual review of findings pertaining to coastal drowning deaths.

It recognises that drowning is only part of the analysis that informs sound decision-making regarding coastal safety. This report also features vital information about the Australian community and how they interact with the coast. Such evidence is crucial in understanding how Surf Life Saving may need to adapt to carry on meeting community needs, while also acting to increase people’s resilience to coastal hazards.

Detailed analysis is used to deliver evidence-based drowning prevention and resilience-building initiatives, including the Beach Drowning Blackspot Reduction Program. SLSA is committed to using its limited resources to achieve the greatest reduction in drowning. Key outcomes include:

- providing evidence to inform best practice;
- delivering capacity and capability statistics, including rescue and preventative actions, to stakeholders;
- capacity building and development of partnerships through sound decision making; and
- behaviour change and injury prevention through analysis of research findings.

At the core is data, including existing material such as population and drowning data, rescue statistics and operational data, as well as coastal risk assessments. SLSA also uses new data, for example, an annual National Coastal Safety Survey, which explores attitudes and behaviours of the Australian public regarding the coast and safety. In collaboration with stakeholders, the Coastal Safety team analyses this information to identify and prioritise national safety issues and priorities as well as drowning blackspots.

With 12 years (2004-16) of drowning data now collected, SLSA is reviewing the trends, initiatives and findings to look at the changes that have taken place during this period. The objective is to identify future trends and potential strategies and initiatives that can be implemented to address coastal drowning deaths. The strategy will be achieved through a multifaceted approach including:

- research and data;
- the National Safety Agenda framework;
- operational delivery, including distribution of resources and services; and
- public education

This presentation will include an epidemiological analysis of 12 years’ coastal drowning death trends. Currently the 12-year average number of coastal drowning deaths in Australia is 97 and the rate per 100,000 population is 0.44 per year.

The national rates and demographics during individual activity types undertaken when coastal drowning deaths occur will be examined in detail.
USING SMR MAPS TO VISUALISE GEOGRAPHICALLY VARYING DROWNING RISK.

Mr. Robert Andronaco1,2 Dr. Bernadette Matthews1
1Life Saving Victoria, Port Melbourne, Australia, 2RMIT University, Melbourne, Australia

Poster Day 1, October 17, 2017, 8:30 AM - 5:00 PM

BACKGROUND
Descriptive epidemiology concerns time, place and person. Fatal and non-fatal drowning statistics are most commonly reported based on time, place and person, however there are very few analyses or illustrations of how drowning risk rates vary geographically. From a geographical or spatial epidemiology perspective, descriptive analysis is an essential preliminary exploratory task. This task is commonly performed using standardised mortality ratios (SMR) maps.

AIM
To illustrate how standardised mortality ratios (SMRs) can be calculated using geographically distributed drowning event data in order to articulate geographical variation of drowning risk rates.

METHODS
Drowning event data for Victoria, Australia and the whole of Sri Lanka were used to create a series of SMR maps. Drowning event totals were provided for each of the two study areas using different approaches. Victorian cases were geo-referenced to the exact location and aggregated into Local Government Area (LGA) units, while Sri Lankan counts were provided in aggregate form based on district average counts.

The Victorian cases total 529 incidents and 496 cases by residence at time of death from 1st July 2000 to 30th June 2012. Only cases categorised as closed and unintentional within the National Coroners Information System (NCIS) were used for this study.

Sri Lankan drowning event counts were only available from 2001-2006 and 2009-2010. These counts were averaged out over the ten year period to provide an estimate of 860 drowning events per annum across the country. Sri Lankan Districts were approximated using the same approach as the overall country estimate, but applied to each individual region.

RESULTS
Mapping the calculated SMRs shows that 44 of 80 (55%) Victorian LGAs have a higher relative risk (RR) rate for incident locations within that LGA, given the overall Victorian rate. The rate is similar when examining residential location at the time of death. 35 of 80 (44%) LGAs exhibit excess risk ratios for both incident and place of residence, while only 17 of 80 LGAs (21%) have either an incident or place of residence relative risk ratio greater than one.

The Sri Lankan SMR map shows that 48% (12/25) of the districts have a value >1. This represents the excess risk values and indicates that these districts all have a relative risk ratio greater than the overall country risk ratio. The highest relative risk district in Sri Lanka is Puttalam (1.71) in the west-northwest. Of the other excess risk values, a cluster of 5 excess risk districts are clearly visible within the southwest to south-southeast.

CONCLUSION
SMR maps are effective in articulating varying relative risk rates associated with the geographical distribution of drowning events. Mapping this enables drowning prevention specialists to focus their attention on understanding significant geographical variation of rates and possible etiological factors.

RECOMMENDATION
It is recommended that SMR maps be used more frequently as preliminary exploratory visualisation tools, in order to examine geographical variations associated with fatal and non-fatal drowning and injury event counts, across adjacent regions within more expansive areas larger regions such as states and countries.
BACKGROUND
According to the police, there have been 319 drownings during the period from May to September 2016 in Poland. In comparison - 366 people drowned in the same period in 2015. Therefore, the analysis of the period of several years shows a downward trend.

DATA
More accurate data is collected for the West Pomerania Province, where drowning analysis is made on the basis of data from police, WOPR and media resonance. Nationwide, 38 drownings in the period from 1 January to 30 September in West Pomerania constitute only 8.12%. West Pomerania Province is an attractive tourist destination, especially in summer. It has a 185km coastline of the Baltic Sea, 172 lakes of more than 50ha, several large rivers and hundreds of small reservoirs.

During summer this Province is visited by more than 1.5 million tourists from Poland and more than 400 thousand from abroad. Most of these people choose to relax at the water. 19 drowning in the months of July and in the whole region, compared with 145 drownings in the country, constitute 1.31%. 38 people drowned in August 2016, 15 people of which drowned before the summer season – to June 15.

In the period from 15 June to 31 August 2015 there were 22 drownings, while after the season to 16 September - 1. In the summer peak, i.e. July and August, 19 people drowned in West Pomerania Province - 18 men and 1 woman. These events were mainly related to people aged over 30 - 18 cases and 1 under 30. Out of 38 drownings recorded from the beginning of the year, 32 were men and 6 women, including one minor. The average age of men is over 45 years of age, and women - 48. The average age of the victims in a season (22 people), i.e. from 15 June to 15 September was 58.94 years for men and 78 for women.

FINDINGS
A detailed statistical analysis in comparison to the spatial distribution of the water areas, causes of death and the special circumstances was made in the publication. Indicated relationships enable to develop operational plans related to the development of the security system in the region. (T. Zalewski 2010 Assumptions for the strategy of development of the water safety system on the Polish Baltic coast. Journal of Coastal Research)
National population-based data on cottage drownings are scarce. Such deaths represent at least 5% of immersion fatalities in Canada.

METHODS
Using structured questionnaires, data on immersion and trauma deaths were collected prospectively from coroners during 1991-2013 as part of national surveillance for all water-related injury deaths. Risk factors were assessed for immersion deaths in/around cottages and cabins, including activities, personal, equipment, environment, and accompaniment. The Canadian population averaged about 30 million during surveillance.

RESULTS
There were 11,915 water-related injury deaths during 1991-2013, including 11,280 immersions with drowning and/or hypothermia, 584 trauma, 39 other and 12 unknown. 543 deaths occurred in/around cottages/cabins compared with 2042 in/around homes.

Activities: 28%(n=150) aquatic activities in water, 24%(n=128) falls into water during activities near water, 39%(n=211) boating, 7%(n=39) other known activities, 2% unknown (n=13). Only 2 deaths occurred during bathing, few compared with homes where 77% occurred in consumer hazards, mainly bathtubs, pools, and hot tubs.

Personal factors: Victims were 86% male and most were youth and adults. Infants <1-year-old accounted for only 1 death at cottages compared with 57 at homes, toddlers 1-4-years old 34 deaths at cottages compared with 344 at homes. Medical conditions included seizure disorder/epilepsy 3% (n=18), as compared with 18% at homes, mental disabilities 2% (n=12), depression 2% (n=10), alcoholism 7% (n=36), physical disabilities 1%(n=6), dementia 1%(n=4), diabetes 3%(n=13), and acute medical condition such as cardiac 1%(n=6). Among 438 fatal immersion victims ≥15-years-old, 49%(n=215) of fatal immersions were alcohol associated, including 73%(n=153) >80mg%, 17%(n=36) below the limit, 11%(n=23) alcohol suspected, and 35%(n=155) zero. 2% were of aboriginal ethnicity. In 23%, swimming ability was an issue, with 25% non/weak swimmers.

Environment and trends: Of deaths involving cottages 95%, occurred in lakes and rivers, and only 1% in bathtubs, hot tubs and swimming pools. This was the reverse of the situation in homes. The vast majority of cottage drownings, 84%, occurred in Ontario and Quebec. There Has been little improvement in Ontario, while in Quebec the trend was downwards.

Supervision/accompaniment: For child victims 1-14-years old, 55% were alone, 25% with minors, 14% with an adult, and 5% with adult(s) and minors. Rescues in outside bodies of water: These included carrying 20%, swimming 7%, wading 8%, rowing 12%, reaching 1%, talking 1%. CPR and/or rescue breathing were done for 32% of victims.

CONCLUSION
Deaths in cottage environments are a fifth of the number in homes; however, given the relative frequency of time spent at cabins versus homes risk is high per unit of exposure time. Excepting infants, victims included nearly all age groups of children, youth and adults. Unlike home drownings, cottage immersions occur predominantly in natural bodies of water, lakes and rivers, and uncommonly in built environments. Main activities are aquatic, falls into water associated with activities such as playing and walking near water, and boating. Alcohol is involved in half of deaths, more than for homes. Prevention should target barriers preventing falls, safe boating, safe swimming, and taking holidays away from cottages near water at vulnerable ages.
HOW MUCH CAN WE LEARN ABOUT DROWNING IN TANZANIA FROM SECONDARY DATA SOURCES?

Mr. Tom Mecrow¹
¹Royal National Lifeboat Institution, Poole, United Kingdom

METHODS
Existing data will be identified via a comprehensive systematic review of grey and published literature and data sources including those in the public domain and privately held.

Potential local data sources will be systematically reviewed by a Tanzanian research institution, through local contacts and knowledge.

Appropriate data extraction forms will be created to standardise data collection, and a data acquisition plan be developed.

FINDINGS
Data will be analysed and findings presented to a local stakeholder group consisting of policy makers and practitioners in Tanzania. The stakeholder group will draw conclusions on the strength of the secondary data for decision making and drowning prevention programming in Tanzania.
Data is key to validating drowning prevention initiatives locally, regionally, nationally, and internationally. It is hard to collect this data from low and middle income countries and in rural areas of many developed countries. The definitions of data are contested, and the methods (if any) vary from an industry perspective. For many non-profit based reporting agencies, the collection of data is too expensive to invest in new technology or to pay for extensive manual entry. Too time consuming, inconsistent, and too expensive options leads to an incomplete and difficult telling of the real story. In a developed country one drowning with no morbidity at one pool is an incident but a string of drownings with no morbidity at a series of local pools is a trend our industry cannot identify. Limited by these factors it’s too difficult to collaborate across entities to empirically validate prevention programs and expand that progress based on hard data.

To allow any private or public organization to enter the details of a drowning event electronically so the data can be shared and analyzed across the industry. We are interested in Drowning resulting in a fatality, drowning with morbidity, drowning without morbidity, and track drowning prevention programs. Different implementation methods will be used in low, medium, and high income regions.

Target - Drowning with No Morbidity and with Morbidity
- Public and Private Corporation that operate pools, waterparks, lakes and waterfronts etc.
- Search and Rescue, Emergency Medical Services, local government agencies.
- Remote communities and their governing bodies and community groups (Indigenous, and rural communities)

Drowning resulting in Fatalities:
- Public Health Authority
- Coroner Services
- Rural Communities (rural areas and low to middle income countries)

Training:
- Licensing Bodies (Lifesaving Society or Red Cross) Training bodies, Public and Private Pools
- Local Governments (installation of barriers signage and transportation policy)
- Public Service Announcements
- Public and Private Corporation

METHODS
1. Collect Sample reports from targets to determine the common body of data collected across the target groups.
2. Create a data collection portal that allows the target groups to manually enter or upload historical data to a shareable data warehouse.
3. Establish a transparent set of rules that define how the data is being consolidated and becomes searchable and can be analyzed.
4. Target groups have the ability to analyses the data and generate reports for all target groups.

The British Columbia urban and rural lifesaving community will be used as a proof on concept.

RESULTS
Target groups can use data to improve their operations, compare their programs, and lobby for more resources. Having access to fast, current, searchable, and collaborative data will be the stepping stone for the global drowning prevention community reduce drownings locally, regionally, nationally, and internationally.
Digital data collection is secured, fast and flexible system by which almost every type of data can be collected. Through this system, data can be collected anywhere in the world. It provides opportunity to modify the survey questionnaire at any time during the survey. Data can be exported to Microsoft Excel, STATA, R, or SPSS for analysis.

This study was designed to investigate the feasibility of digital data collection in large-scale community survey in low income setting country. A large scale community based survey was designed to explore the drowning situation in southern part of Bangladesh. 21 sub-districts, approximately 90,000 household and nearly 4,05,000 population were included in this survey. REDCap (Research Electronic Data Capture) survey software built tablet device was used to collect data through face-to-face interview. Total 50 data collectors, 12 supervisors and 4 area coordinators were involved in the field level data collection process.

To evaluate the feasibility of this digital data collection process, an exploratory study was conducted. Interview was conducted at field data collectors as well as at central level organizational personnel. Structured pre-tested instrument was used for collecting the information. We assessed the feasibility, survey cost, time management and data quality of digital data collection.

Among the respondents, 98% of them said, digital data collection is feasible and convenient rather than paper format. Among them 96% said, it required less time during data collection. It was also found that, data collection was 25% less in digital data collection considering the questionnaire printing and data entry. Data quality was found better in comparison to paper based data collection. This system provided opportunity to monitor data quality in a regular basis and eliminate the error of data entry.

Digital data collection is feasible and convenient, it required less time and resources. So, the benefit of digital data collection needs to disseminate more in low- and middle-income countries where resources are low.
Globally, drowning accounts for over 370,000 deaths every year. The true extent of the burden of drowning in low and middle income countries is however less clear. This is because of a lack of population-based data to quantify the burden. The Saving of Lives from Drowning project in rural Bangladesh is trying to fill this gap. The project conducted a baseline census of over 1 million individuals in rural Bangladesh in 2013, and collected population-based data on both fatal and non-fatal injury outcomes.

The objective of this study is to describe the current burden and associated risk factors for both fatal and non-fatal drownings for all age groups in rural Bangladesh.

A household census was carried out in 51 unions of rural Bangladesh between June and November 2013, covering 1.17 million individuals. Information on fatal and nonfatal drowning events was collected by face-to-face interviews using a structured questionnaire. Fatal drowning events were recorded over one year recall period, while non-fatal events were recorded over a 6 months’ recall period. Descriptive analyses were done to describe fatal and non-fatal drowning outcomes by age, gender, and other demographic and socio-economic characteristics. The characteristics of each fatal and non-fatal drowning outcomes were further described by the external cause, intent, location, and body part affected. Fatal and non-fatal drowning-specific mortality rates were estimated per 100,000 population.

Fatal and non-fatal drowning rates were 15.8/100,000 per year, and 318.4 100,000 per 6 months respectively, for all age groups. The highest rates of fatal (121.5/100,000 per year) and non-fatal (3057.7/100,000 in 6 months) drowning were observed among children 1-4 years. These children had higher rates of fatal (13 times) and non-fatal drowning (16 times) compared with infants. Males had slightly higher rates of both fatal and non-fatal drowning. Individuals with no education had 3 times higher rates of non-fatal drowning compared with those with A-Level/higher education. Non-fatal drowning rates increased significantly with decrease in SES quintiles, from the highest to the lowest.

Drowning is a major public health issue in Bangladesh. Age is a major determinant of both fatal and non-fatal drowning. Other risk factors of non-fatal drowning include lack of education and low socio-economic status. Effective interventions are needed to reduce the burden of drowning in Bangladesh.

This study was funded by Bloomberg Philanthropies
Drowning is still an area of great concern in Kenya but at large it remains publicly neglected. According to KLF drowning data based on media reports from 2010 to 2017, drowning ranks 2nd after road accident in death mortality.

Secondary data from Reelforge media monitoring company was contracted by the federation to collect and analyze drowning data from print media, radio and TV stations.

RESULTS
- In 2010 data reported in print media was 790 deaths, radio reported 1240 deaths while TV reported 520 deaths.
- In 2011 data reported in print media was 1180 deaths; radio reported 1370 deaths while TV reported 856 deaths.
- In 2012 data reported in print media was 1372 deaths, radio reported 1546 deaths while TV reported 1057 deaths.
- In 2013 data reported in print media was 1510 deaths, radio reported 1735 deaths while TV reported 1120 deaths.
- In 2014 data reported in print media was 1630 deaths; radio reported 2090 deaths while TV reported 1200.
- In 2015 data reported in print media was 1790 deaths; radio reported 2324 deaths while TV reported 1349.
- 2016 and 2017 data will be present at the WCDP 2017.

RECOMMENDATION
A scientific drowning data collection is urgently required in order to establish the extent and magnitude of the drowning problem in Kenya thus KLF appeals for funding for drowning mortality research and data collection.

DISCUSSION
A paradigm shift is essential more than ever before in ways drowning is handled from a family level, community level National and international level. It’s high time that Kenya and the world in general stop treating death by drowning as a lesser death.

CONCLUSION
It’s time for the government and the relevant authorities concerned to take up the responsibility of drowning prevention and adopt the national water safety strategies/plans already submitted.
Unlike developing countries, in NZ most people who drown (70%) are adults aged over 25 years (WSNZ, 2017). Working adults are a difficult group to reach for delivery of water safety education, and little is known about how close their perceptions of water competency match their actual competencies to prevent drowning. The international ‘Can you Swim?’ intervention (Moran, Stallman, Kjendlie, Dahl, Blitvich, Petrass, et al., 2012) began by researching the perceived and actual level of aquatic competence with undergraduate students. It has since been extended to simulated open water and clothed swimming (Moran, 2014; Moran, 2015; Kjendlie, Pedersen, Thoresen, Setlo, Moran, & Stallman, 2013). There is a gap in knowledge, however, for perceived and real competencies for the high risk adult male population, and in open water situations.

This study aims to report on the reality of competency and risk, and compare it to the perception, in an adult population, in particular to explore the relationship between:

- perceived and actual water competencies in closed and open water
- opinion on the risk of various open water scenarios
- self-competency in open water environments, and
- ability to assess risks in open water environments.

Target Group: Adults in the workforce in Auckland

The study involves 38 adults from 5 workplaces in Auckland. It extends the ‘Can you Swim?’ project comparing perceived and real competencies internationally (Moran et al., 2012) to a high risk of drowning population group. Participants completed a pre- self-complete questionnaire to explore self-perceptions of competence in closed and open water environments and their perception of risk.

A practical two-part test was undertaken with participants being tested in their competence to complete an entry, an exit, a fast 25m swim, a 5-minute swim and a 5-minute stationary float, in the pool and open water settings. Participants then completed a further questionnaire reflecting on perceptions of competence and risk.

Results were entered into SPSS for analysis. Ethnicity was reasonably reflective of the NZ population, most were NZ European (65%), followed by Maori (15%), Pasifika (6%), and Asian (3%). There were slightly more female participants (53%), and the ages were spread evenly over the working age groups. Most (89%) had lived in NZ for 10 years or more. At the beginning, most (65%) thought they could swim well, and one half estimated they could swim more than 200m. Most thought they could float easily (73%). Significantly females perceived greater swimming competence than males. Females were more likely than males (77%, n= 14 vs. 50%, n=8) to report they could swim well, and were significantly more likely (females 72%, n=13 vs. males 25%, n=4) to report they could swim more than 200m (χ2 (2) = 11.919, p = 0.003).

Practical testing showed significant decline in swimming competencies from the pool to the open water. One half (52%) could swim 200m or more in the pool in 5 minutes, however no one could achieve 200m in open water (t(33)=6.465, p ≤ 0.000). The paired sample test also showed significant decline in the open water 25m swim (t(33)=5.338, p ≤ 0.000).

Practical testing of actual water competencies showed that perceptions were not always the same as actual competencies. Participants perceived realistic estimation for swimming competence in a pool, but not for open water. Most participants underestimated their competence to float. Despite these lower actual competency levels, at the end of the course participants perceived significant improvement in competence.

This study highlights the need to introduce an education component to assess personal competency in water safety programmes. Further research is recommended in developing this component.
This paper will present the average rescue time for a Danish lifesaving organisation, the North Zealandic Lifesaving Organisation and practically evaluate the data collection standard that has been developed in the paper “Proposal for a standard for measuring the average rescue time in surf lifesaving” by Herrmann et al. (201X).

The purpose of enhancing the understanding of lifesaving response times is to make recommendations based on data that can improve response times with aim of improving both rescue effectiveness and cost efficiency.

The methodologies used to develop the proposed standard for measuring the average rescue time in lifesaving is the Statistical Value Chain (Herrmann et al. 2013) and the Drowning Timeline (Szpliman et al. 2016).

The rescue time is an aggregation of the recognition time and the operation time. The recognition time is measured from when the drowning incident starts until the lifeguard recognises the incident. The operation time is measured from when the lifeguard has recognised the drowning incident until the lifeguard is at the drowning victim.

As the actual data are sensitive, all the data has been normalised. The key results are:

- Roughly 50 % of the total average rescue time is spent recognising that an incident takes place and the other ~ 50 % is spent on operation time.

- It can be speculated that a few hours of recognition education and training can improve the rescue time relatively more than if the same money for that education and training were spent on faster boats.

- The measured average rescue time for the organisation is different from the expectations of both the management and the lifeguards of the organisation:
  - Both the average measured recognition time and the average measured operation time were twice the time expected by one of the lifeguard managers.
  - On average the measured recognition time of lifeguards was greater than their own expected recognition time by a factor of 1.7. The largest difference was a factor of 20.
  - On average the measured operation time of lifeguards was greater than their own expected operation time by a factor of 1.5. The largest difference was a factor of 4.5.

- Giving the management and lifeguards a more accurate picture of the current performance of the organisation will allow a less biased and more efficient optimization of the lifeguarding service.
  - The coefficient of variation of the measured recognition time is ~ 142 %
  - The coefficient of variation of the measured operation time is ~ 69 %

- These above variations suggest that there is a noticeable difference between the lifeguards measured recognition time and also their measured operation time. These variations can be an indication that some lifeguards use a more efficient technique for recognising an incident than other lifeguards. Transferring knowledge from the better performing lifeguards to the less performing lifeguards can support an optimization of the organization’s average rescue time.

- This work is done as a partnership between Q2M2 and the North Zealandic Lifeguarding Service and supported by the Danish Council for Greater Water Safety.
Accurate data is vital for producing evidence-based drowning prevention interventions. Local variations in drowning risks can influence the effectiveness of interventions.

Information on local drowning deaths between 2010 and 2014 were collected from the Avon Coroner’s Court in Bristol. Information on the age and sex of the casualty, the date and location of the drowning, and the activity that casualty was engaged in prior to drowning were recorded. Data was categorised using the taxonomy developed by the National Water Safety Forum for their Water Incident Database (WAID) so that it could be compared to national-level data.

There were 59 drowning deaths recorded in Avon area between 2010 and 2014 and an additional 10 Avon residents drowned whilst on holiday or working abroad. Of the 69 deaths, 22 were recorded as suicide suspected, 39 were recorded as accident suspected or natural causes, 1 was crime suspected and in the remaining 7 cases either the cause of death was not ascertained or an open verdict was recorded.

Accidental drowning rate was highest amongst 75-79 year old males in rivers (2.6 per 100,000), followed by 15-19 year old males in rivers (1.6 per 100,000). Other groups that had a drowning rate of 1 per 100,000 or higher include 65-69 year old males in canals and aqueducts (1.5 per 100,000), 75-79 year old females in rivers (1.1 per 100,000), 30-34 year old males in rivers (1.1 per 100,000), and 45-49 year old females in ponds (1.0 per 100,000).

Accidental drowning rates for males was between 1.0 and 2.5 per 100,000 from age 15 onwards. Males were 3.2-3.5 times more likely to drown than females (depending on whether non-accidental deaths are included).

Alcohol was suspected as a risk factor in 15 % of all drowning deaths, and 24 % of accidental drowning deaths. Drugs were suspected as a risk factor in less than 3 % of all cases. Men were at greater risk of drowning with alcohol as a factor than women. The age groups of men most at risk of alcohol playing a role in drowning deaths were 60-69 and 40-45.

Based on this information, RLSS Avon and North Wiltshire is looking at ways to refocus a “Don’t Drink and Drown” campaign to target older men instead of university students who were the original target audience. Additionally, the team responsible for the project are supporting RLSS Somerset to replicate the study in the adjacent region with the intention to collaborate on common interventions where possible.

Non-targeted or poorly targeted education programmes are an inefficient use of the limited resources available to drowning prevention organisations. By considering drowning risks in the local context, regional variations in risk can be considered and focused interventions can be used to target the greatest risk factors first.
Drowning incidents are provoked by identifiable causes and behaviors, which have been investigated in Italy through joint research between National Lifeguarding Society (NLS) and National Institute of Health (NIH). The present paper illustrates the result of seven years of research.

The research started as an epidemiological one through the analysis of death records provided by the Italian National Institute of Statistics (ISTAT). According to these data, in Italy drowning incidents have been drastically reduced in number: from about 1300 per year (in the ’70s) to 400 (at the end of the ’90s). This good trend has broken off and the figure (400 casualties per year) has remained stable until presently (2016) as a difficult statistic to reduce. About half of them occur in the sea during summertime.

Unfortunately, these data were not very informative as they did not identify the incident location (i.e. sea, lake, river, swimming pool or the bathtub). Through research on the web and in newspapers and cross-referencing the data with other local information to interpret occasionally unreliable reports, we have reconstructed a map of drowning on the Italian coast, thereby identifying the communities where drowning incidents take place.

By cross-referencing frequency and continuity over time of drowning, we have built a ‘drowning indicator’, capable of evaluating the local risk of drowning and identifying ten tracts of the Italian coast where drowning incidents are most likely and identifying two beach types – out of seven characteristic of the Mediterranean Sea – which present a particular geomorphology and considerable risk. These are rip currents dominated beaches and “artificial beaches” (where hard defenses -seawalls, groynes and the like – have been built up to protect the beach from erosion).

Further information has come from lifeguard cooperatives, controlled by NLS, in order to identify the final causes of drowning and their distribution on the coast.

All this information has been gathered in order to build a solid basis on which to propose a National Drowning Safety Plan, according to WHO guidelines.
According to the World Health Organization (WHO) every year 359,000 people die through drowning in the world, and it is the third leading cause of mortality, representing 7% of the world total.

In response to the absence of official records in Spain collecting information on the magnitude of the problem or the national peculiarities of deaths caused by drowning, Royal Spanish Lifesaving Federation (RFESS), since 2015, carries out a National Report of Drowning to count the number of drowned persons and make classifications for subsequent analysis and elaboration of measures to be adopted. In this way, data collection is elaborated as an important method to gain knowledge about the preventive measures which must be taken in order to reduce the number of fatal water accidents in our country.

To know about and report on the number of deaths caused by drowning in Spain.

To rank the factors and areas of risk, unfavorable age ranges, exposure levels and type of accidents that take place in water spaces of our country.

To establish a classification of guidelines to be adopted as timely prevention measures to prevent deaths through drowning.

To make a comparison over the years to check the effectiveness of the preventive measures taken and to develop new considerations.

Information is collected from written and digital press cutting through internet search engines, and using the following keywords: drowning, drown death, missing and corpse.

Collected data is ranked according to statistical parameters allowing for the preparation of timely analysis. These parameters are as follows: age, date of the accident, time, sex, nationality, place of the accident (beach, river, ocean, lake, pool…), regions, existence of lifeguard service, developed activity, and type of space (public or private). Collected data is then shown in tables and statistical graphs in numbers and percentages of each variable.

Results of the National Report of Drowning in 2015 and 2016 show that every year we exceed 400 deaths by drowning. The highest number of deaths by drowning is in Spanish males over 45 years of age on unguarded beaches in Andalucía, Canarias, Cataluña, Galicia, Comunidad Valenciana y Baleares. In addition, specific data from other interior areas of Spain with different characteristics are offered too.

The high number of deaths caused by drowning forces us to publish reports that raise awareness within society and involve public administrations in the effort to reduce the number of fatal water accidents in our country. An accurate count of the number of people drowning each year is very important, especially when it comes to involving government and citizens in preventing future fatal water accidents.

It is impossible to manage what is not measured. Therefore, data statistics help to know what the best preventive measure is in each moment, by counting accurate data that will help to analyze certain situations, develop specific programs or campaigns, monitor their success and help with the allocation of the resources at our disposal.
PREVENTION
During 1991-2010, more than 1200 Aboriginal peoples in Canada died of drowning and cold, and other water-related injuries such as trauma. Immersions accounted for 98% of deaths, and trauma 2%. The activities associated with immersion deaths included boating 39%, non-aquatic activities such as walking or playing near water or on ice 22%, aquatic activities such as swimming and wading 18%, ice and land transport mainly snowmobiles 18%, and bathing in bathtubs 3%. Overall, recreational activities accounted for about 55%, daily life/subsistence 35%, and occupational 5%.

During 1991-2010, more than 1200 Aboriginal peoples in Canada died of drowning and cold, and other water-related injuries such as trauma. Immersions accounted for 98% of deaths, and trauma 2%. The activities associated with immersion deaths included boating 39%, non-aquatic activities such as walking or playing near water or on ice 22%, aquatic activities such as swimming and wading 18%, ice and land transport mainly snowmobiles 18%, and bathing in bathtubs 3%. Overall, recreational activities accounted for about 55%, daily life/subsistence 35%, and occupational 5%.

We will talk about Aquatic Immersions, Aquatic Incidents, and non-aquatic incidents and the research we have found for Aboriginal populations.

Rural and remote environments require specialized safety knowledge. It is important to train and employ trusted Aboriginal members of communities as Water Safety Instructors and/or lifeguards, particularly persons with expert knowledge of local bodies of water used for recreation and daily life (Rousell & Giles, 2012; Giles et al, 2007; Giles et al, 2010; Rich & Giles, in press). Such individuals should possess or be willing to learn both traditional and current knowledge, equipment and practices, and display culturally safe communication and leadership skills when involved in training of other local peoples. Non-Aboriginal and non-local water safety instructors can recognize Aboriginal peoples’ knowledge and skills, by inviting their participation in water safety training. Such endorsement of local leadership and skill could be a strong contributor to ensuring broader dissemination of water safety messages and information to aboriginal communities.

The Canadian Red Cross is in its 5th year of running an Aboriginal Swim program to help educate and train aboriginal populations in Water Safety and Leadership training programs.

In conclusion, a balanced and comprehensive approach to injury prevention is generally most effective, such as use of Haddon’s injury matrix, with attention to personal, equipment and environment factors for the pre-event, event and post-event phases of incidents during the main aquatic activities.
A Study to Examine the Influence of Ethnicity on Pre-teens Swimming and Water Safety in Canada

A study commissioned by the Lifesaving Society, Canada’s leading organization responsible for drowning prevention, has found tweens (aged 11-14) who are new to Canada are five times more likely to be unable to swim than their Canadian born classmates. The study also found that despite this, 93% of new Canadian tweens say they participate in activities in, on or around water.

The research study was conducted in April 2016, to better understand the attitudes and behaviours of Canadian tweens around swimming and water safety, both new Canadians and those born in Canada. The study builds on important research commissioned by the Society in 2010 which found that new Canadian adults were four times more likely to be unable to swim than those than those born in Canada. Results suggest that water safety risk is higher for new Canadian tweens than those born in Canada; and even more so for tweens who have been here for less than five years, who are up to seven times more likely to be unable to swim than those born in Canada.

The results of the study confirmed observations from 2010 research, that families coming to Canada often have different knowledge or experiences around issues of water safety and the importance of learning to swim. This research was initiated to focus specifically on tweens, to gain insight into the best ways to communicate to them about water safety and to motivate them to learn to swim.

The study focused on a population of respondents born in Canada and respondents from the Chinese, South Asian, Southeast Asian, and Middle Eastern and Muslim communities who were not born in Canada.

Research objectives included:
- Measuring the extent of new Canadian and born-in-Canada tween participation in water-related recreational activities and understanding their swimming abilities and behaviours
- Understanding the attitudes of new Canadian and born-in-Canada tweens toward swimming, water safety, independence and risk taking
- Determining the key barriers to new Canadian and born-in-Canada tweens learning to swim and taking swimming lessons
- Determining the key motivators to learn to swim and what messages could increase all tweens’ interest in improving their water survival skills via Swim to Survive+

The study was conducted on behalf of the Lifesaving Society by Gadd Research and McCullough Associates.

The data was collected between March 29th 2016 and April 18th 2016. The total sample was 657 Canadian residents between the ages of 11 and 14. Of the total respondents, 297 were born in Canada and 360 were not born in Canada. They are referred to as ‘new Canadian tweens’ throughout the news release. (Results of a probability study with a sample size of 297 are considered accurate within +/- 5.69 percentage points, 19 times out of 20. Results of a probability study with a sample size of 360 are considered accurate within +/- 5.17 percentage points, 19 times out of 20).
REMOTE ABORIGINAL SWIMMING POOLS – PHOTOVOICE RESEARCH

Miss Lauren Nimmo¹, Miss Amanda Juniper¹, Miss Stephanie Enkel¹

¹Royal Life Saving Society WA, Perth, Australia

Prevention 1, Salon DE, October 17, 2017, 11:00 AM - 12:30 PM

BACKGROUND
Aboriginal Australians are over-represented in drowning data in Western Australia. These communities also face a significant burden of health and overall poorer outcomes than other Australians. Research has shown that having swimming pools in remote Aboriginal communities can contribute to overall improvements in health; however social benefits have not previously been studied. The Remote Aboriginal Swimming Pool program (RASP) is a unique and fully funded initiative run by the Royal Life Saving Society WA in six remote communities in north-west of Western Australia. Dedicated pool managers live and work in each community to deliver swimming and water safety programs. These communities are located in the north-west of Western Australia, have small transient populations and are very remote with the closest town site sometimes 470km away.

AIM
This study aimed to gather feedback from local members of these communities to determine the effectiveness of the RASP program while assessing its effect on health, well-being, school absenteeism as influenced by the No School No Pool policy and overall community cohesion.

METHODS
Research was conducted in three remote communities with a swimming pool using a combination of unique qualitative and quantitative methods. Photovoice activities were conducted with 49 school children to explore their perspectives on the swimming pool, identify key drivers for participation in activities at the pool and highlight social benefits associated with pool use. Children took a total of 109 photographs with captions describing what they liked and did not like about the pool, as well as what they found interesting.

Overall, 27 yarning interviews were conducted with 40 community members including parents, school staff, community support workers and general members of the community. These interviews explored their experiences of the swimming pool and its programs through story-telling.

Linked daily school and pool attendance data was also collected for 48 children to determine the effectiveness of the No School No Pool policy implemented in each community to reduce the rate of school absenteeism.

FINDINGS
The research showed that the swimming pools are highly valued by communities with most members utilising the facility. Children were identified as the main users of the pool, while adult males had low rates of attendance.

Community members identified a number of benefits to the program including improved health, improved hygiene, decreased crime, improved swimming capabilities, increased physical activity, improved social interaction and cohesion leading to enhanced community well-being.

The swimming pool was also seen as an effective incentive for school attendance among primary school aged children through the No School No Pool policy.

CONCLUSION
Swimming pools in remote Aboriginal communities have significant roles to play in reducing many of the challenges faced by these groups such as social and emotional health and well-being issues, poor health, a lack of community cohesion, high rates of school absenteeism and unemployment. This research showed that the swimming pools are highly valued and well utilised within the community. It also highlighted the success of the RASP program achieving its aims with many flow on effects and benefits experienced in each community.
ORAL PRESENTATION

AN INVESTIGATION OF WHY MĀORI (INDIGENOUS PEOPLES OF NEW ZEALAND) ARE DROWNING DESPITE THE IMPORTANT CULTURAL CONNECTION TO THE WATER

Dr. Anne-Marie Jackson¹, Ms. Samantha Jackson¹

¹Ngāti Whātua, Ngāti Kahu, University Of Otago, Dunedin, New Zealand

Prevention 1, Salon DE, October 17, 2017, 11:00 AM - 12:30 PM

Last year, I was with my family collecting seafood at a local customary food gathering spot in Otago. Prior to gathering, we checked the tides and the weather and made sure we had the appropriate gear with us. We have collected from this area for many years and we know the spots; where to go and where not to go. We know the catch limit. We only collect enough for a feed. When we arrived at the beach, as part of our cultural practice we said a Māori prayer to thank the God of the Ocean for allowing us to enter into his domain and collect seafood.

On this particular day there was another Māori family collecting seafood as well. There were four adults approximately 100 metres off shore, in water thigh deep, collecting seafood. There were three children playing on the beach, at a good estimate, the children were 10, 7 and 2 years old. The three of us who were collecting seafood finished in about 10 minutes as we only took enough for a feed (50 cockles between us).

Once we had finished and I was walking out of the water and back towards the beach, I noticed that the two older children had run down along the beach and left the youngest child alone. Other family members were in the car about 50 metres away. I watched the 2 year old child walking along the beach and into the water where the adults were. I started yelling out to the child and to the adults as well. The mother waded back from 100 metres and was obviously distressed at the potential of what could have happened.

In New Zealand (NZ), the fourth highest cause of unintentional death is drowning (ACC, 2014). In 2012, Māori (indigenous peoples of NZ) comprised 23% of drowning fatalities, although, Māori constitute 15% of NZ’s population (Water Safety New Zealand, 2012, p. 3). However, water is of cultural significance to Māori.

There is a lack of published research that focuses on Māori drowning or Māori drowning from a Māori perspective (Haimona & Takurua, 2007; Karapu, Haimona, & Takurua, 2007). This research examines why Māori are drowning despite the important cultural connection to water. Kaupapa Māori theory and methodology (an indigenous research methodology) was utilised to interview 20 participants from the Māori water safety sector. Preliminary results from this research will be presented which highlight key themes of: cultural connection and disconnection; survival and swimming skills; and differences in age and gender. This research will provide important information for policy development in working with indigenous communities.
In New Zealand, Maori, Pasifika and Asian populations are over-represented in the drowning statistics (1), and the WaiWise and WaiTurama water competence programmes (2) have been developed specifically for youth in these ethnicities, with the aim to increase safe participation in aquatic environments. The two programmes focus on water competencies, water safety attitudes, behaviour and knowledge for open water environments.

The aim of this presentation is to report on the learning outcomes and comparisons after completion of community water competence education programmes aimed at preventing drowning and developing safe recreation in open water within Maori, Pasifika and Asian youth.

Twelve community groups with a total of 171 individuals completed one of two water competence programmes, WaiWise (N=118) or WaiTurama (N=53). Both programmes begin with classroom sessions, and then develop practical skills in a swimming pool, before moving to the open water environment.

A written questionnaire was completed prior to the programme that sought information on their current level of aquatic recreation, perceived water and rescue competency, water safety knowledge, and attitudes and behaviours around water. Participants were then asked to complete a written questionnaire at the completion of the programme for comparative purposes.

Of the total participants (N=171), most were male (60%), aged between 15 and 29 years (81%), and of Maori (44%), Pasifika (36%) or Asian (10%) ethnicities. All participants completed the pre-survey and 124 participants completed the post-survey.

Following the intervention more participants thought they were ‘good or very good’ swimmers (54% pre vs. 65% post). Significantly more participants thought they could rescue others safely (49% pre vs. 82% post) and significantly more had swum their estimated swimming distances in open water (53% pre vs. 77% post). Improved opinions toward water safety were evident with participants showing significantly more positive attitudes towards not swimming outside the patrolled flags at a surf beach (69% pre vs. 80% post) and not drinking beer while fishing (63% pre vs. 80% post).

Perceived swimming distances improved significantly more in WaiWise (35% pre vs. 47% post), while remaining unchanged for WaiTurama (15% pre vs. 15% post), for participants who estimated they could swim more than 25m. While significant differences were shown pre and post intervention for rescue competence, rescue knowledge and survival knowledge, surprisingly greater competence was evident in the shorter WaiTurama programme.

Participants self-reported increased confidence in and around water (94%), improved swimming ability (88%), increased practical water safety skills (93%), improved knowledge of water safety (93%), improved beach safety knowledge (89%), and improved boat safety knowledge (94%) after participation in the programme. One limitation of the study was that there was no practical testing, this has been implemented for further interventions.

Results reported by participants in community water competence programmes (WaiWise or WaiTurama) have shown significant improvement in perceived water competence as a result of the intervention, showing that interventions targeting those most at risk, delivered within the community setting, can be effective.
INTRODUCTION

Rivers are the leading location for unintentional fatal drowning in Australia. Alcohol is known to be a risk factor for drowning however the extent of its role in unintentional river drowning has yet to be explored. To develop more effective drowning prevention strategies, a greater understanding of the risk factors at specific aquatic locations, and the role of alcohol, are required.

AIMS

To examine the prevalence of alcohol and its contributory role in unintentional fatal drowning in Australian rivers to inform strategies for prevention.

METHODS

Cases of unintentional fatal river drowning in Australia, from 1-July-2002 to 30-June-2012, were extracted from the Australian National Coronial Information System (NCIS), an online registry which records information on all sudden and unexpected deaths. Cases of unintentional fatal drowning in rivers were determined by using the location coding of ‘stream of water’ within the NCIS. Cases were also included if the location as discussed in the police report and/or finding document satisfied the following definition: “. . .a natural waterway that maybe fed from other rivers or bodies of water draining water away from a ‘catchment area’ to another location. . .” and “. . can vary in water flow, length, width and depth...” River drowning cases with positive alcohol readings found through autopsy or toxicology reports were retained for analysis. Discrete analysis was conducted on cases with a Blood Alcohol Content (BAC) of ≥0.05% (0.05 grams of alcohol in every 100 millilitres of blood).

RESULTS

Alcohol was known to be involved in 314 cases (40.8%), 279 recorded a positive BAC, 196 (70.3%) recorded a BAC of ≥0.05%. Two-fifths (40.3%) of adult victims had a BAC of ≥0.20%. Known alcohol involvement was found to be more likely for victims who drowned as a result of jumping in (X²= 7.8; p<0.01), identify as Aboriginal and Torres Strait Islander (X²= 8.9; p<0.01) and drowned in the evening (X²= 7.8; p<0.01) and early morning (X²= 16.1; p<0.01) hours.

DISCUSSION

The number of people who drown with alcohol in their bloodstream is concerning and challenging for prevention. To assist with the prevention of alcohol related river drowning, improved data quality, as well as a greater understanding of alcohol’s contribution and consumption patterns at rivers (especially those <18 years of age) are required.

CONCLUSION

Alcohol contributes to fatal unintentional drowning in Australian rivers. Although prevention is challenging, better data and exposure studies are the next step to enhance prevention efforts.

ACKNOWLEDGMENTS

This research is supported by the Royal Life Saving Society – Australia to aid in the reduction of drowning. Research at the Royal Life Saving Society – Australia is supported by the Australian Government.
TARGETED CAMPAIGNS TO IMPACT AT-RISK GROUPS – DON’T DRINK AND DROWN

Mr. Lee Heard¹

¹The Royal Life Saving Society Uk, Worcester, United Kingdom

On average 400 people drown in the UK each year. In 2015 20 per cent of all adult accidental drowning victims had alcohol in their bloodstream*. When focusing on a specific age demographic over the period between 2012-14 on average 38 per cent of 18 to 21-year-old accidental drowning victims had alcohol in their bloodstream. In 2015 this increased to 67 per cent* highlighting a need to direct efforts to the prevention of these activities.

The outcome of these efforts is RLSS UK’s Don’t Drink and Drown campaign which runs every year through December, a significant timeframe for alcohol related drowning. The campaign targets geographical areas that present a high risk, usually involving a high percentage of students in attractive areas for the night time economy.

The simple campaign promotes social responsibility to highlight to drinkers to act responsibly near water, looking after themselves and their peers. Through educational messages such as planning routes home, staying in well-lit and high traffic areas and sticking together.

In 2016 targeting the campaign in high impact areas resulted in active engagement through face-to-face campaigning to 10,755¹ individuals accompanied by media stats that achieved a reach of 73,551,809; a marketing saving of £261,413. From the outset, the campaign was designed to ensure that people were on the ground, personally highlighting the issue but those supporting the campaign were backed with dedicated media on a national level as well bespoke regional media. This approach increased the attention, increasing the understanding of the messages.

But how it is achievable to pull the resources over an expansive area to deliver a Don’t Drink and Drown campaign? The answer is simple…through collaboration. Although Don’t Drink and Drown is an RLSS UK campaign, it was delivered in partnership with a wide range of organisations including night time security firms, universities, councils, blue light services, water safety partners through to RLSS UK’s dedicated volunteers. Each local campaign was different to the next as key organisations in that area pulled resources and ideas to engage the right partners to target their audience. Uniquely this campaign was delivered on a budget of less than £1000 to RLSS UK again highlighting the importance of partners either contributing financially or through benefit in kind.

*National Water Safety Forum Water Incident Database (WAID) of which RLSS UK is a member. Data is used from 2012-2015, including accidental and natural cause records only. Adults aged 18 years+. Alcohol records are suspected or confirmed cases, based upon Coroners and emergency service records, court records.
Research conducted by Royal Life Saving Society Australia into a 10 year analysis of drowning deaths in 2014/15 identified that a total of 2804 drowned in Australian waters. Of these, 1932 were males over the age of 15. 1 in 4 of these males had alcohol within their system that contributed to the cause of their drowning death. There were a further 32% of these cases where alcohol was not recorded in toxicology reports or police reports making RLSSA presume that the issue of alcohol in drowning deaths may be even greater.

The research also identified that 75% of these drowning deaths were locals to their location of drowning with the 35-55 year old age bracket having the highest proportion of drowning numbers. It also identified that unintentional falls, swimming and recreating and fishing and boating were the most common activities prior to their drowning death.

With support from the Federal Government, Royal Life Saving is working to reduce alcohol related drowning deaths in Australia. The campaign aims to raise awareness of the dangers associated with drinking in and around waterways.

The ‘Men and Alcohol’ campaign was established through a series of market research activities consolidating in a 2 day forum. The forum brought expertise from Maritime and Road Safety Campaign Managers, other alcohol and water safety campaigns, marketing expertise in men’s health and reaching out to older males, social media and communication experts to develop the campaign strategy. In April 2017 the program was launched over the Australian Easter School Holiday period and included the following:

- National Branding and Tag Line – “Don’t let your mates drink and drown”
- National Media Release with spokespersons in every state/territory
- Newspaper advertisements throughout the country
- A 12 week social media strategy
- Television and Radio Advertisement
- Pull Up Banners, Fact Sheets and Flyers
- Dedicated Campaign Website
- Advertising in Pubs and Clubs in Target Area

An early review of the campaign activity (3 weeks) identified that there was an audience circulation of 4,318,434 through media interviews and a total of 266,454 social media users reached. Further evaluation into the TV and radio advertisements, pubs and clubs advertisements and campaign website will be presented at the conference. The campaign will be expanded through to the end of 2017 and into the New Year with the further placement of television and radio advertising and the possibility of a drug related campaign where relevant. (Pending further research)

The Royal Life Saving Australia’s Men and Alcohol Campaign is leading drowning prevention measures by engaging with Australian men between the age of 35-55 within the Australian community to inform, educate and increase the awareness of alcohol related drowning deaths and what can be done to reduce drowning deaths.

ACKNOWLEDGMENTS
Research and program development at the Royal Life Saving Society – Australia is supported by the Australian Government.
ORAL PRESENTATION

BUILTEncrENVIRONMENTAND DROWNING MORTALITY: HISTORICAL STUDY OF THE DEVELOPMENT OF THE BUILT ENVIRONMENT AND ITS IMPACT ON DROWNING

Dr. Carolyn Staines¹, Prof Joan Ozanne-Smith¹
¹Monash University, Melbourne, Australia

Prevention 2, Salon DE, October 17, 2017, 1:30 PM - 3:00 PM

BACKGROUND
The Australian state of Victoria underwent a marked reduction in drowning deaths over the period of its development, reducing from 53.5 deaths per 100,000 in 1863 to 0.8 deaths per 100,000 population by 2000. While part of this reduction was associated with the development of a culture of water safety, and improvements in water survival skills, these factors did not begin to gather momentum until the 20th century. Yet by the end of the 19th century, drowning deaths rates had reduced to less than 20 deaths per 100,000. This suggests the presence of other factors affecting drowning mortality.

The WHO Global Report on Drowning identifies 10 strategies to prevent drowning. Of these, Strategies 1, 7 and 8 are, at least in part, concerned with the built environment. In view of this identified importance of the built environment, a study was conducted to examine the part that this factor may have played in changes to drowning mortality in Victoria in the 19th and 20th centuries.

OBJECTIVE
This study focused on examining the ways that the built environment, and its development, may have impacted on drowning mortality in Victoria, Australia, during the 19th and 20th centuries.

METHOD
To determine the circumstances of drowning deaths occurring in the 19th and 20th centuries, Victorian coronial inquest records were accessed for all drowning deaths occurring in a sample of years (1863, 1883, 1906, 1925, 1950 and 1973). The information extracted from these records was analysed thematically to address the research objectives. Additionally, newspaper archives (paper based and electronic) were searched for articles relating to drowning or water rescue incidents.

A review of historical literature was also conducted to identify general historical information regarding the built environment, and its development, and population and migration patterns. This included primary, secondary and grey literature sources.

OUTCOMES
It was found that the built environment could contribute to both the cause and prevention of drowning mortality. In both centuries, many deaths occurred in water hazards that were associated with human activity (e.g. waterholes, wells, dams, pools) while others were prevented by changes to the built environment, such as reticulated water supply and building of bridges and safe places to swim.

RELEVANCE
It is likely that many of the challenges faced by Victoria during its development have relevance to communities currently in their developmental phase. The findings of this study have the potential to inform drowning prevention in these communities. Providing a picture of the circumstances that occurred in Victoria may help to identify potential hazards and solutions associated with the development of their built environment.
ORAL PRESENTATION

ROCK-BASED FISHER SAFETY: A DECADE ON

Dr. Kevin Moran¹

¹University of Auckland, Auckland, New Zealand

Prevention 2, Salon DE, October 17, 2017, 1:30 PM - 3:00 PM

BACKGROUND
In the 10 years from 2006 - 2015, 7% of all New Zealand drowning fatalities were the consequence of land-based fishing activity. In 2006, a rock-based fisher safety campaign was launched on the west coast of Auckland to combat a spate of surf-related fisher drowning incidents. Findings of the initial survey and the first five years of the study (2006-2011) have been previously reported.¹, ²

AIMS/OBJECTIVE
The aims of this presentation are:
To report on a decade of safety promotion that has focused on rock-based fishers understanding and practice of water safety principles, and
To ascertain whether any positive attitudinal or behavioral changes have been effected.

METHOD
The target group were fishers engaged in recreational land-based fishing from the rocky foreshore of Auckland’s west coast, a region of high risk because of its isolation, its exposure to strong surf, and changeable weather, water and tidal conditions.

A cross sectional study was undertaken at the end of each summer safety campaign at high risk fishing sites on Auckland’s rugged west coast - a coastline within 30km of metropolitan Auckland’s city centre. Participants in the annual surveys were either fishing at the chosen sites or in transit to and from the site. The annual surveys were anonymous, designed to be completed on site, and take a maximum of 10 minutes to complete. The questionnaire was produced in English, Mandarin and Korean. The survey data gathering took place during the summer season and included several peak holiday weekdays and weekends.

RESULTS
The results of the successive years (2016-2015) suggest that, while transience and diversity in the population are still characteristics that make them a difficult group to target with safety education messages, several changes in their demographic composition have taken place, notably greater frequency of visits to the site where surveyed. Fishers were predominantly of Asian ethnicity (52%), male (91%) and most (51%) were aged between 30-44 years. In 2015, 43% of fishers reported never wearing a lifejacket. In 2006, almost three quarters (72%) of fishers never wore a lifejacket (2015, 43%) and only a small proportion (4%) often/always wore one (in 2015, 40%).

DISCUSSION
This study is unique in drowning prevention literature in that it has been able to report on the impact of a safety intervention annually over 10 years since its inception. Initial emphasis on finding out what fishers knew, thought and did about safety has been able to shift safety messages in a reflexive way to influence behaviours most likely to put fishers at risk of drowning. Some messages (such as the wearing of lifejackets) have been persistent, dominant, and worthy of perseverance. Other messages (such as not going down the rocks to retrieve a snagged line) have appeared more resistant to change.

CONCLUSION
Trends reported in this decade-long study suggest that improvements in some attitudes and behaviours, notably the wearing of lifejackets, have had a beneficial effect on fisher safety and a reduction in drowning fatalities. Continued ways of improving fisher safety are discussed.
Although the overall number of drownings in the province of Québec, Canada has steadily declined in recent decades, drowning is still the leading cause of accidental deaths among children up to 12 years old. Between 2000 and 2013, 11 out of 18 fatal drownings in lifeguarded aquatic settings involved children who were part of a group.

There are a number of factors that increase the risk of accidents with groups of children, the first one being that it is harder to identify swimmers at risk or in distress in a crowd, and easier for children to evade supervision and break safety rules. Supervision was reported to be significantly affected by the children’s and caregivers’ age, the number of children for whom caregivers are responsible and the children’s swimming abilities.

The presence of lifeguards does not replace the need for close and constant caregiver supervision. Approaches were developed to raise awareness about close and constant supervision by caregivers for groups of children in aquatic settings.

A practical guide, following recommendations made by the Quebec Coroner’s Office, was produced with the contributions of the Association des camps du Québec, the Canadian Red Cross, the Ministère de l’Éducation et de l’Enseignement supérieur (Quebec Government) and the Quebec Branch of Lifesaving Society Canada. This guide is intended for anyone involved in the supervision of groups of children during aquatic activities.

A training and an online course were developed to help these people implement the guide’s recommendations regarding their roles and responsibilities during aquatic activities and outings. It provides useful information about safety measures for managers and attendants in camps, day camps, schools and day centres, as well as for lifeguards, caregivers and aquatic facility managers.
RAISING THE PROFILE OF RLLA: WATER SAFETY AWARENESS CAMPAIGNS THROUGH RADIO AND NEWSPAPER IN LESOTHO

Mr. Motlatsi Mokala², Dr. Rebecca Sindall¹

¹RLSS Commonwealth, Worcester, United Kingdom, ²Royal Lesotho Lifesaving Association, Maseru, Lesotho

ORAL PRESENTATION

Prevention 3, Oak, October 17, 2017, 1:30 PM - 3:00PM

Through his attendance at WCDP 2015 in Penang, Motlatsi Mokala from Royal Lesotho Lifesaving Association (RLLA) began to understand the value of effective lifesaving organisations in low and middle income countries. At the RLSS Commonwealth’s Emerging Leaders Workshop, he attended a session on data and the preparedness of countries for drowning prevention intervention. He recognised that Lesotho is not ready for large-scale drowning prevention interventions and that his project should focus on increasing awareness of the work of RLLA in Lesotho. This would help to position RLLA as a go-to organisation when large-scale drowning prevention interventions became more feasible.

He planned to contact media outlets to publicise the aims and activities of RLLA. He wrote letters of introduction to local radio stations and arranged meetings to discuss the role of RLLA and the feasibility of radio interviews on the subject. He successfully arranged four two-hour slots on radio to discuss not only the role of RLLA but also basic water safety messages. This awareness-raising activity resulted in double the number of attendees at RLLA activities. Additionally, after having heard the radio slots, several local newspaper journalists have attended RLLA activities to write articles.

The increased attendance at RLLA activities and the continued links with the media has increased awareness and involvement with RLLA, both of which put them in a stronger position to run and support future large-scale drowning prevention programmes.

This paper will focus on the project carried out by Motlatsi in Lesotho and the partnerships that have been created through his attendance at WCDP 2015 and the RLSS Commonwealth Emerging Leaders Workshop. These various partnerships (including remote mentoring, extended formal networks, and informal collaboration) assisted him to overcome challenges to run a successful media awareness campaign.
Drowning is an important public health and public safety burden needing attention at the local level as part of a state to local to national system. This presentation will include historical and current assessment, program development investigation experience and data driven approaches. It will include bringing these program elements to inform prevention practice, systems and policy changes. It will include why and how the local and state public health systems can and should be more involved in drowning prevention.

One tool to be presented is the Environmental Health (EH) investigation and process for reviewing all drowning incidents in public health permitted and inspected facilities. There are ~1,800 such facilities in King County. In past years, Mr. Gomez investigated many such pool, spa, water parks and open water cases which informed experience, prevention practice changes and this presentation. He serves as consultant to the EH team on new case investigations. To the extent time allows he continues to investigate cases at open water sites.

Annually for over thirty years Mr. Gomez has reviewed and worked with his staff and interns from the University of Washington to review each and every drowning from the previous year in Dr. Martin Luther King Jr. County. This becomes an annual summary which is released to drowning prevention partners and media. It includes a five year rolling summary that informs trends, factors and emerging and ongoing concerns. It was learned through this review that for a three year period in 2011-2013 no child drowned in all of KC!

This annual and five year rolling summary informs a speaking points document for law enforcement, first responders and others that will speak to media and community on drowning cause and prevention. Mr. Gomez himself has done over 100 media interviews. This work will be presented.

Another element of public health work that will interest attendees at the World Conference is the Seattle-KC Child Death Review (CDR) System. Mr. Gomez has previously supervised and helped develop the CDR protocol and system in current use. Related to drowning, CDR reviews each drowning fatality of children under 18 years of age. This includes cases from infants in bathtubs to older children and teens, open water swimming and boating situations. It also includes pool, spa and water park cases. CDR has led to policy and system changes. For example, when a specific body of water was determined to be the site of numerous child drownings, that site was determined to not be a safe place to swim through CDR. CDR advocated with the Seattle Mayor’s Office and Seattle City Council which led to prohibition to swimming in that body of water. Since then no child has drown there since 1999.

CDR was also useful in identifying that Asian and Asian-Pacific Islander children were over-represented in drowning. That led to Seattle Children’s Hospital leading work to prevent future deaths. This led to remarkable decreases in similar deaths and a paper published in the Journal of Injury Prevention.

This presentation will describe how and why local health departments can be leads or support assessment, education, coalition work, development of state and local board of health rules and regulations for swimming pools and water parks. It will also describe current and emerging concerns and work efforts such as swim beach safety improvements.
NOVEL SIGN REDUCES AQUATIC RISK-TAKING AMONG NATIONAL PARK VISITORS

Dr. Deborah Girasek¹

¹Uniformed Services University Of The Health Sciences, Bethesda, United States

BACKGROUND
Drowning is a leading cause of injury death, particularly for males. In many countries, rivers are the primary bodies of water in which such fatalities occur. Little research, however, has focused on the prevention of river drownings.

SETTING
This study took place in two national parks in the eastern United States. A high volume river runs through a gorge between the two parks, which produce a strong undercurrent. Most years it is the site of several drownings, which often involve young men. In addition to media outreach and personal interaction, the parks rely heavily on signage to communicate the dangers of water entry to park visitors.

METHODS
For research purposes, a simple sign was developed to communicate the fact that water entry is illegal and could result in a fine that exceeds $200 US dollars. Every other day, for approximately eight weekends from late July to mid-September, the new sign was displayed in addition to the park’s standard warning signs. The experimental sign was displayed at each park’s entrance, on the trail that leads to the water and on a sandy portion of the river’s shoreline. Two cameras, programmed to take still photos every ten minutes during the day, were installed in trees near the sign’s riverbank locations. Each camera’s focus was intentionally blurred to prevent identification of park visitors who were photographed. When the data collection phase of the study was over, all images were reviewed. The number of people on the beach and in the water was recorded for the first image in which they appeared. Other environmental data, such as air temperature, water level and dew point were also recorded. Logistic regression was used to determine whether the novel sign was associated with any change in the likelihood of visitors entering the river.

RESULTS
Images taken on days when the experimental sign was covered, were approximately three times more likely to show visitors in the river. Higher air temperatures and larger numbers of visitors were also independently associated with water entry.

CONCLUSIONS
Those responsible for visitor safety in recreational areas that feature water hazards should consider posting signs that emphasize the legal and financial consequences of water entry, since those risks may be perceived by young men as more plausible than drowning.
The “Respect the Water” campaign (RTWc) is a national campaign run in the UK by the Royal National Lifeboat Institution (RNLI) each summer since 2014. After three years of warning about the danger of cold water immersion (CWI), particularly cold shock (1), and given that 40% of those who find themselves in the water had no intention of entering it, in 2017 it was time to educate the public about what to do when they fall in. As most (c.60%) die in the first minutes of immersion, it seemed sensible to focus the advice on this period.

Floating relies on the buoyancy of the human body. On average, the body has a relative density (0.985 g/cm³ [0.945 g/cm³ on inhalation]) that is less than water (fresh 1.0 g/cm³, salt 1.025 g/cm³, both at 4 °C) causing the body to float and is the reason why it is easier to float in salt water. The average human floats because, whilst bone and muscle are denser than water, fat and the air in the body (gut, lungs) are less dense than water. A lung full of air increases buoyancy; the cold shock response causes an inspiratory shift in end-expiratory lung volume, this increases buoyancy. Very thin and muscular people are less buoyant; they also tend to be fitter with a smaller cold shock response. Less fit, fatter individuals who are likely to have the larger cold shock response should, because of their body fat, find it easier to float. Everyday clothing tends to float, or be neutrally buoyant and can also trap air thereby increasing buoyancy.

The cold shock response lasts 1-2 minutes. Just about the worst thing to do during this period is raise the arms or start swimming; lifting the arms out of the water makes the rest of the body (e.g. the airway) submerge. Also, any air in the clothing can be lost up the arms if they are raised. Unfortunately, people are “activated” on CWI causing them to start swimming and swim faster (19%) than they would in warmer water. Those who swim immediately on immersion often fail quickly because they find it impossible to co-ordinate swimming with their uncontrolled breathing. Also, the wave splash caused by swimming increases the risk of aspirating water, and tensing the musculature can expel air from the lungs, reducing buoyancy.

People who regain control of their breathing before trying to do anything during CWI have better survival prospects. This could be floating or, if not quite possible, the smallest amount of sculling commensurate with keeping the airway clear of the water. Holding onto something buoyant is also beneficial. Therefore, on CWI people should fight the natural urge to thrash about or swim fast as doing these things: a) increases the chance of drowning; b) increases the strain on the heart; c) accelerates skin cooling, increasing cold shock; d) allows air escape from the clothing. Instead, it is preferable to “Float First” until breathing is back under control.

This scientific evidence underpinned the 2017 RTWc marketing strategy. The campaign primarily targets 16-39 year old men as they consistently over-represent in drowning figures, and access advertising across cinemas, online, radio, posters and media partnerships with websites such as Lad Bible. This multi-channel approach is needed as young people consume media in a fragmented way; however, in 2016 9.2 million 16-39 year old men in the UK were calculated to have seen or heard the campaign at least 11 times. The high level of reach and message frequency has resulted in a 10% increase in campaign awareness at a national level in the past two years.

Critically, this year’s message to ‘fight your instincts’ is already helping save lives. Since the campaign began on May 25th 2017, four people have told the RNLI they remembered to ‘float first’ from RTWc advertising when struggling in the water and this helped save their lives. One example from a young man who remembered the RTWc advert from a cinema visit: "I was being washed further back, when I remembered seeing your video as an advert. I then lay on my back, and allowed myself to get my breath back as I needed to conserve my energy and not fight the water. I thank the RNLI for saving my life.”
WATCH ME NOT YOUR PHONE – A NEW CAMPAIGN TARGETING DISTRACTED PARENTS

Miss Lauren Nimmo

Royal Life Saving Society WA, Perth, Australia

Prevention 4, Salon DE, October 17, 2017, 3:30 PM - 5:00 PM

Young children are at the highest risk of drowning and aquatic injury in Western Australia (WA). For every child aged 0-14 years that drowns in WA, seven are hospitalised following a non-fatal drowning incident, many of which experience long term health outcomes as the result of brain injury. With over 11.1 million visitations recorded each year at public swimming pools in WA and new issues arising in relation to parental supervision of young children at these facilities it is important to continue to develop safety programs and messages to prevent drowning and injury.

The issue of screen-time and distraction among parents has been identified by the WA aquatics industry as a significant issue that is affecting parental supervision and safety at public swimming pools. Unfortunately most incidents involving young children happen in the short time that parents are distracted. A recent review of toddler drowning deaths in WA found that a lapse in adult supervision was a factor in almost all drowning deaths with majority of incidents occurring in the short time (2-5 minutes) that the parent was distracted.

In response to this concern a new campaign was developed as part of the Watch Around Water public swimming pool supervision safety program. During summer, public swimming pools throughout Western Australia implemented the new campaign to encourage community members visiting their centres with young children to put down their phones and focus on safety.

The ‘Watch me not your phone’ campaign was developed in partnership with advertising agency 303 Mullen Lowe and used an innovative and unique approach to engage with parents when they visited the local pool. It was developed based on the idea that when you take a child to a pool, their life is in your hands. So let’s put the pool’s WIFI password in the child’s hands.

As part of the campaign development we had a group of children write down promises they wanted their parents to make to them to keep them safe when at the pool. The children were then photographed holding these messages which formed the basis for the new campaign messaging.

As many pools offer free WIFI, the concept evolved to use these messages as the WIFI password. Each week it changes, so parents have to type in a new password and be faced weekly with another reason as to why they should be watching their child rather than be on their phone. By targeting parents at the time that they are distracted, this will encourage them to put down their phone and get into the water with their children. This was accompanied by posters of the children that wrote the password to be placed around the centre with the tagline ‘the only message you should be reading.’

This campaign has been very successful in educating parents about the dangers of being distracted while supervising children at public swimming pools. It has received significant media coverage and interest internationally and is a great example of a unique approach to preventing drowning.
HOW MUCH? USING FORMATIVE RESEARCH AND BEHAVIOURAL THEORY TO DEVELOP A CHILD DROWNING PREVENTION CAMPAIGN

Ms. Melissa Denehy¹, Ms. Justine E Leavy¹, Ms. Gemma Crawford¹, Ms. Lauren Nimmo², Ms. Jonine Jancey¹

¹Collaboration for Evidence, Research and Impact in Public Health (CERIPH), Bentley, Australia, ²Royal Life Saving Society Western Australia, Mount Claremont, Australia

Drowning prevention is a priority issue for children under five and the development of evidence-informed drowning prevention strategies is required. The literature supports a multi-faceted and tailored approach to drowning prevention that is underpinned by theory and robust evaluation. Mass media campaigns offer a way to reach large population groups; however, few are informed by behavioural theory. This paper describes the findings from a research-practice partnership that undertook formative research to guide the development of ‘This Much?’ a Western Australian child drowning prevention campaign using a theory based approach.

METHODS

The ‘This Much?’ mass media campaign was implemented as part of a suite of strategies in Keep Watch, a health promotion program that aims to reduce the incidence of drowning among children aged less than five years in Western Australia. Seven focus group interviews were conducted (n= 57) with caregivers of children under five in metropolitan and regional areas. Open ended questions were posed to determine message comprehension, acceptability, attractiveness and perceived influence. Qualitative content analysis was conducted using constructs from the Health Belief Model and Social Cognitive Theory as a framework.

RESULTS

Most participants believed young children were at risk of drowning in less than one inch of water. Simple messaging, visual and aural message depiction, repetition, and using multiple message senders raised caregiver awareness about the water depth a child could drown in. Message comprehension was high, and considered relevant and believable. Other people, the perceived riskiness of a location, and individual characteristics of the child influenced supervision.

CONCLUSION

This study is one of few examples in drowning prevention that has used formative research and behavioural theory to explore and develop a message for a child drowning prevention media campaign. The findings provide a valuable starting point for understanding possible messages and their delivery. Future research should test messaging with the target group to increase perceived susceptibility, behavioural capability and self-efficacy, encourage observational learning, and explore the impact of different message senders.
DEVELOPMENT OF A COMMUNICATION FRAMEWORK TO FACILITATE TRANSLATION OF RESEARCH INTO NATIONAL AND REGIONAL HEALTH DROWNING REDUCTION POLICY IN BANGLADESH.

Ms. Madeleine Dodd¹, Dr. Jagnoor Jagnoor¹, Dr. Aminur Rahman², Dr. Olaf Werder³, Dr. Kamran Ul Baset², Professor Rebecca Ivers¹

¹The George Institute For Global Health, University of Sydney, Australia. ²The Centre for Injury Prevention and Research, Bangladesh. ³Department of Media and Communications, University of Sydney, Australia

Prevention 4, Salon DE, October 17, 2017, 3:30 PM - 5:00 PM

BACKGROUND
In Bangladesh drowning has become the leading cause of death for children aged 1-4 years, 156.4 per 100,000. In other areas of child health, effective policies and programs have seen the under 5 mortality rate drop from 150 per 1000 live births to 38 per 1000 live births. Bangladesh’s success in child health demonstrates that effective engagement of policy-makers can inform the adoption and implementation of evidence-based policies. Through the use of a knowledge-translation framework designed for lower-middle income countries (LMICs) the Bhasa program will test the impact this framework has on the adoption and implementation of drowning reduction policies in Bangladesh.

AIMS/OBJECTIVES
Through the analysis of qualitative data from policy-makers and other key-stakeholders, design a communication framework that guides the adoption of policies and leads to the application of drowning reduction programs.

METHODS
The Bhasa program is a drowning reduction initiative being implemented in Bangladesh. Qualitative tools will be used to interview key stakeholders from the relevant government Ministries to identify effective research to policy-maker communication methods.

In-depth interviews with policy-makers will be used to determine their current understanding of drowning in Bangladesh as well as barriers and strengths of past research to policy-maker dialogue. Additionally, past policy-briefs and media sources will be reviewed to assess the impact they have had on drowning reduction policies.

Interviews will be conducted in March and April by researchers from The George Institute for Global Health and CIPRB. Data analysis will be completed by May 2017. This project will use knowledge-translation framework designed by Jacobsen et al.

RESULTS
Data for this project is not yet available because the data collection is not due to commence until March 17, 2017. Qualitative data will be divided into themes that identify existing barriers between researchers and policy-makers and strategies that can be used to strengthen long term engagement between these parties. Data from literature and qualitative interviews will inform the Bhasa knowledge-translation framework.

DISCUSSION
By using in-depth interviews and evidence-based frameworks, this study aims to facilitate ongoing engagement between the CIPRB, policy-makers and other key stakeholders, to ultimately lead to the adoption of drowning reduction policies.

CONCLUSION
Long-term programs that change behaviours related to water safety are essential for improving child health in Bangladesh. This study aims to identify the most effective ways to communicate findings from the Bhasa program that will lead to the formation of policies that will increase water safety for children in Bangladesh.

ACKNOWLEDGMENTS
This study is funded by the Royal National Lifeboat Institution.
INTRODUCTION
Over half of all unintentional flood-related drowning deaths between 2004/05 and 2014/15 were caused from driving through floodwaters (Australian Water Safety Council, 2016), with rivers indicated as a leading location for vehicle-related drownings in Australia (Peden et al., 2016, under review). Thousands more are rescued every year on the roads, many underestimating the depth and velocity of the water, believing their vehicles to be large enough to drive through or perceiving pressure from passengers and/or a need to go to work or get home (Hamilton et al., 2016). To reduce the incidence of people driving through floodwaters, Royal Life Saving Society – Australia developed a video infographic to highlight the dangers of driving through floodwaters and safety tips to reduce the risk. Partnering with Griffith University, a pre- and post evaluation of the effectiveness of the video in changing people’s attitudes and beliefs toward driving through floodwaters was undertaken.

METHODS
This study adopted an online three-wave non-controlled pretest-post-test design. Australian licensed drivers (N = 201, male = 41, female = 160; Mage = 34.10) self-reported their demographic and psychological variables (intention, attitude, subjective norm, barrier self-efficacy, risk perception, anticipated regret, perceived susceptibility, and perceived severity) at baseline (T1), immediately post-intervention (T2), and at a one-month follow-up (T3). Messages in the video infographic were developed based on psychological theory and empirical evidence, using data on causal factors derived from coronial records and the findings of behavioural research.

RESULTS
Results indicated that men had significantly higher intentions and attitudes and significantly lower barrier self-efficacy, risk perception, anticipated regret, perceived susceptibility, and perceived severity with respect to driving through floodwater than women. Statistically significant time x gender interaction effects were also found; attitude and subjective norm were significantly lower between T1 and T2 for both men and women but scores between T2 and T3 remained significantly lower for women only. In addition, perceived susceptibility and perceived severity scores were significantly higher in women across T1 and T2, with the difference maintained at T3. In contrast, there were no differences in scores across the three time points for men.

CONCLUSION
Despite awareness campaigns such as ‘Turn Around, Don’t Drown’ and the Australian State of Queensland’s ‘If It’s Flooded, Forget It’, people continue to drive through floodwaters, causing loss of life, risk to rescuers, and damage to vehicles. In an attempt to change people’s driving behaviour during floods, the video infographic and its messages were developed for the current study based on psychological theory and empirical evidence, using data on causal factors derived from coronial reports and the findings of behavioural research. Preliminary findings indicated that the infographic was effective in reducing individuals’ positive attitudes and social pressure to drive through floodwaters immediately after viewing the video with some evidence to support that the effects, at least for women, persisted one-month later. Future research is needed on the long-term impact of driver behaviour when faced with the option of driving through floodwaters, especially in men. The current research is novel and innovative and has the ability to influence the development of more effective drowning prevention public awareness and education messages in the future.
MYTHS ABOUT DROWNING BEHAVIOR CREATED AND PERPETUATED BY THE MOVIE AND TV INDUSTRY

Dr. John Fletemeyer
Aquatic Law and Safety Institute

Prevention 5, Oak, October 17, 2017, 3:30 PM - 5:00 PM

Approximately 1,000 movie and television scenes featuring drowning and drowning behavior were identified and analyzed for accuracy. All but a few were grossly exaggerated and misrepresented a drowning event by portraying a victim violently panicking, thrashing water and yelling for help. Some even showed victims miraculously recovering from clinical death following a couple of rescue breaths from a bystander. In reality, actual behavior and outcome seldom if ever presents this way.

Over a four-year period and with the aid of several college student assistants, 406 individuals were randomly selected and shown a three minute “Bay Watch” scene involving a drowning victim that was the subject of a seriously inaccurate portrayal of a drowning event. After seeing the scene, the respondents were directed to select one of three choices— the scene was “accurate,” “fairly accurate,” or “inaccurate.” 56% of the respondents selected either the accurate or fairly accurate choice.

In addition to showing individuals the “Bay Watch” drowning scene, respondents completed a five question survey created to determine if they could accurately identify several behaviors associated with drowning. The results found that 68% could not identify the behaviors commonly associated with a drowning event. From the sample consisting of 406 individuals, a sub-sample was identified consisting of 42 individuals that reported having formal lifeguard training. This sub-sample was compared with the larger sample and only 13% as opposed to 56% were not able to identify behaviors associated with drowning.

Findings from this study reveal that the movie and TV industry may be responsible for creating and perpetuating myths among the public about drowning and that when translated to the reality of real life drowning events, may represent a significant underlying reason why so many fatal drownings are unrecognized, especially among adults supervising children. Distractions (reading, talking on a cell phone, socializing, etc) of a supervising adult is cited by the CDC as one of the major contributing causes of drowning among toddlers. Findings from this study suggests that not knowing how to accurately recognize drowning behavior may be another significant contributing factor responsible for fatal drownings, especially among children.

Even among lifeguards, drowning events are sometimes missed. Failing to follow surveillance guidelines such as the 10/20 rule is often credited for this but perhaps as important, is failing to accurately identify a victim in the early stages of drowning.

Results of this study indicate the need for better public education programs focusing on how individuals actually drown and not how it is portrayed in the movies. In addition, lifeguard training programs must identify more effective methods to teach how to recognize a drowning event, especially involving children who drown silently. Text books and instructors often rely on figures and photos of drowning behaviors and the effectiveness of this reliance is suspect. Drowning events captured on video should be added to classroom and lifeguard training curriculum.
IMPROVING THE SAFETY OF BACKYARD SWIMMING POOLS IN AUSTRALIA - THE PASSING OF RIVER PARRY WILL NOT BE IN VAIN

Mr. Paul Reynolds

Prevention 5, Oak, October 17, 2017, 3:30 PM - 5:00 PM

On 30 December 2015, River Parry (aged 20 months) was at his grandparents’ address in Fisher, in the Australian Capital Territory. He was visiting with family members from Perth, Western Australia, and was due to begin his return journey the following day. The residence in Fisher was a standard 4 bedroom dwelling, and the rear yard contained an unfenced back yard swimming pool that had lapsed into a state of disrepair after the pump had failed and heavy rains had filled it with run-off, making the water cloudy and the bottom of the pool indistinguishable.

Following a misunderstanding that led to a short period of accidental non-supervision, River was able to access the rear yard and fell into the pool. Shortly after, River’s mother noted his absence, and family members began to search for him. River’s aunt used a pool scoop to check the bottom of the murky pool water, locating him a short time later on the bottom of the swimming pool. Resuscitation was attempted by family members; however tragically, River was unable to be revived.

A short time later, police were notified of the incident, and were called to the Canberra Hospital where River had been transported by ambulance. I attended the location and met his distraught family, where I resolved to do everything in my power to prevent an incident of a similar nature from occurring again.

In the ACT, police officers investigate a death such as River’s on behalf of the Coroner for the ACT. The Coroner may hold an inquest if the cause and manner of a death are unknown, or if an issue of public safety arises. As there was no dispute over the manner and cause of River’s death, the matter was set to be dispensed with. As I continued to research the requirements for pool fencing as well as identifying the dangers posed to the very young as well as the elderly, I pushed hard for an inquest to be held. I was able to convince the Coroner, and the matter was set down for inquest in November 2016.

As I continued my research, I established the staggered approach that had occurred in the ACT in regards to pool fencing over the years had led to gaps in the standards that were applied. This, coupled with the lack of retrospective powers to enforce new standards, had created a ticking time bomb. I further established that the matter had been addressed in 2011 following the inquests into the death of three infants in near identical circumstances in a 6 month period; however the matter appeared to have lost momentum and stalled. These issues were not unique to the ACT, and I identified similar issues throughout Australia, despite numerous Coronial recommendations.

In an effort to bring an analytical argument to what was often a highly emotive issue, I obtained reports issued by the Australian Government outlining the ‘statistical value of a human life’. These reports placed an estimated dollar value on a human life, used for quantifying the value of lives saved through improvements to infrastructure, or roads etc. The approach was ground breaking, and clearly articulated the savings in dollar value that changes to pool fencing requirements would bring. I also found examples in other countries where addressing these shortfalls had led to a direct reduction in the number of deaths, as well as coronial recommendations from other states and territories.

A significant milestone in the investigation came when I approached Royal Life Saving Australia for assistance. The CEO of the Canberra Branch, Cherry Bailey, was equally as passionate as I was on the issue, and we formed a strong working relationship between our agencies.

At the conclusion of the inquest, the Coroner labelled the investigation as ‘exemplary’, and adopted the majority of my recommendations as her official findings. As a result, the ACT Government has recently issued a statement saying they are reviewing requirements for pool fencing, and have supported all the Coroner’s findings.

I hope that I can share the knowledge and experience I have gained, as well as promote the benefits of collaboration between invested agencies in working towards a common goal.
FIVE WATER SAFETY MESSAGES CUSTOMIZED FOR DIFFERENT AQUATIC SCENARIOS

Dr. David Szpilman\textsuperscript{1,3}, Colonel Fabio Braga\textsuperscript{1,3}, Major Antonio Schinda\textsuperscript{1,2}

\textsuperscript{1}Sobrasa - Brazil, Rio De Janeiro, Brazil, \textsuperscript{2}Fire Department of Parana - Lifeguards, Brazil, \textsuperscript{3}Fire Department of Rio de Janeiro - Lifeguards, Rio de Janeiro

ORAL PRESENTATION

Prevention 5, Oak, October 17, 2017, 3:30 PM - 5:00 PM

BACKGROUND
Drowning is a major public health problem in Brazil where 6,000 people die yearly. In 2014, drowning was the second leading cause of death for aged 1 to 9. Freshwater venues were responsible for 75\% of all deaths, and most frequently at rivers and dams. Preventive education is the most effective action that can be taken to reduce these figures but messages need to be tailored to each venue, risk group and specially be easy to remember.

AIM
The aim of this research was to identify the 5 most relevant preventive messages for different scenarios or water activities where drowning occurs.

METHOD
Drowning experts from the SOBRASA were invited to participate electronically and select drowning scenarios and water safety messages. A summary concerning death by drowning for each scenario was provided. A place for expert rationale input to each recommendation was available. The Delphi method, a structured and interactive communication technique was used in 3 rounds: 1) propose all possible drowning scenarios and related water safety messages; 2) Identify overlapping and propose new messages; 3) Score all messages from 1 to 5 for each particular scenario and rank them in 3 levels of importance. The top priority level rank was set to 4 and above and was used to summarize the 5 most important water safety messages. Where overlapping of top messages for more than 4 scenarios occurred, those messages were selected as general.

RESULTS
Twelve experts voluntarily contributed to the 3 rounds of the Delphi process through a 7 months period. Twelve scenarios/activities were identified:

- general,
- ocean beaches,
- rivers,
- waterfalls,
- inland waters (lakes/ponds/dams),
- pools,
- flooded waters,
- in and around-house,
- fishing,
- boats and water crafts,
- surfing and board craft sports,
- water transportation.

Experts’ selection of water safety top priority messages (>4 points) varied in number from 5 to 14. Messages overlapped in 27\%. Each scenario/activity and their top 5 messages were demonstrated and summarized in an educational flyer where a hand with 5 fingers stands. For example, the top-5 messages to pool safety are:

- Pay 100\% attention to your children; keep them within arms’ reach, even when a lifeguard is on duty.
- Occlude the access to pools using fences and self-locking gates.
- Ought to learn how to act.
- Lifeguard on duty.
- Suction- Avoid it–Provide ways to turn off the pump and have an anti-hair drain.

CONCLUSION
To be effective, water safety messages need to be tailored and simple. This study was able to identify 12 different aquatic scenarios/activities and their top-5 priority water safety messages. The result is a tailored tool with powerful content that allows lifeguard services to launch different prevention campaigns fitted to each scenario or water activities. Still an evaluation of the power of each message needs to be scientifically tested to prove relevance.
DROWNING PREVENTION CAMPAIGNS IN SPAIN

Dr. Ana Mª Domínguez Pachón¹, Miss Jessica Pino Espinosa¹, Mr. Alberto García Sanz¹, Miss Rosa Herrero Simón¹, Dr. Francisco Cano Noguera¹,²

¹Royal Spanish Lifesaving Federation (RFESS), San Sebastián de los Reyes, Spain, ²Murcia University (UMU), San Javier, Spain

Prevention 5, Oak, October 17, 2017, 3:30 PM - 5:00 PM

INTRODUCTION

Every year, more than 400 people die by drowning in Spain, deaths that are caused by imprudence or even by lack of awareness about the water environment dangers, deaths that could be avoided if necessary accident prevention measures had been taken, but what do we mean by accident prevention?

Accident prevention can be defined as: “the set of measures that are taken individually and/or socially, from public or private initiatives, to avoid as far as possible that the harmful non-intentional facts occurs, or diminish the harmful effects of them, if we cannot avoid it”, ie. in aquatic environments this is a set of measures that help to minimize the effects of events that could be harmful to the aquatic environment user.

Among the different prevention measures we find the Royal Spanish Lifesaving Federation (RFESS) campaigns.

OBJECTIVES

• To decrease drowning deaths in our country
• To raise awareness about aquatic environment dangers
• To increase user’s knowledge in accident prevention
• To know and interpret laws/regulations in different aquatic facilities
• To improve the image of a lifeguard as a authority figure
• To provide tools to avoid accidents or reduce their incidence
• To know how to act in case of emergency
• To create a ‘lifesaving culture’

CAMPAIGN TYPES

Among prevention campaigns launched by RFESS we find mainly two types:

• Face to face activities: workshops (rescue, first aid, ...), lifesaving schools, lifesaving courses, activities in conjunction with other activities.
• Dissemination activities: videos, printed campaigns, social networks, prevention measures.

TARGET GROUPS

Drowning prevention is everyone’s task, so accident prevention campaigns are aimed at any population sector regardless of age, sex or social status. However, most of our activities are directed to children because:

• It is a high risk population
• Activities aimed at children affects more people: Children transmit knowledge and acquired habits to adults around them.
• Lifestyles and attitudes toward aquatic environment set at an early age will be maintained throughout whole life.

FUTURE WORK

Achieving a real change in population aquatic environment perception is an enormous task that requires the involvement of public and private administrations to launch initiatives that really achieve their objective:

• National and international drowning prevention campaigns
• Unification of signs and current legislation
• Create a national drowning registration
• Inclusion in education system
In June 2016, the Lifesaving Society launched Family Swim to Survive, as a pilot program in the province of Ontario. Family Swim to Survive is a program for families. It uses the same skills and principles as Swim to Survive, but was designed for families, not just children. The participants learn 3 skills: to roll into deep water, to tread water for 1 minute and to swim 50 meters. The program allows family members (parents/guardians and children) to participate in the Swim to Survive program together and to create a comfortable learning environment for families, some of whom might be new to Canada and may have no experience with survival swimming and water safety.

For the pilot program, municipal affiliates were provided with a poster, informational ‘buck slips’, a guide to assist in programming Family Swim to Survive as a non-registered drop-in or for registered lessons and suggested instructor/student ratios. The timing for the pilot program coincided with the fact that Canada had welcomed 30,000 Syrian refuges into Canada in 2016. In fact, Statistics Canada projects that the new Canadian population will continue to rise, reaching between 25% and 28% by 2031. This means that at least one in four people living in Canada could be foreign born.

Participants in the pilot included 19 municipalities from across the province. Those new to Canada/new to the community were targeted. Municipalities offered the program in a number of different ways including drop-in during recreational swims, scheduled lessons and a one-time special event.

In September 2016, a survey about the program was implemented to all municipalities who participated in the pilot program. Specific questions were asked to understand the scope of the participation (the number of pools that offered the program), how the program was promoted, feedback on the Society’s promotional materials, type of participants in the program (children only, adults only and families), feedback from the instructors/staff and suggested changes for the future as well as intention to offer the program in the future.

The response was very positive with 93% of affiliates agreeing that the program was a positive experience for their community and 92% intending to offer the program in the future. There was also excellent feedback about the promotional materials and suggestions for scheduling and use of the promotional materials.
The problem with too much fear: Testing the interaction between fear appeals, message framing and visual metaphors

Adrian Cossu1,2,3

1University of Waterloo, Waterloo, Canada, 2City of Mississauga, Mississauga, Canada, 3Lifesaving Society Ontario, Toronto, Canada

Prevention 5, Oak, October 17, 2017, 3:30 PM - 5:00 PM

In Canada, recreational activities account for 60% of all drowning fatalities (LSS, 2012). The question follows, how can we influence people to adopt safe behaviours while engaging in recreational activity around the water? One popular method for altering or maintaining behaviours is through the use of fear appeals. Unfortunately, such appeals can be problematic. If they create too fearful a response, they compromise their own efficacy. Humour has been promoted as one possible solution to mitigate these effects (Mukherjee & Dubé, 2012). However, in many cases, humour may be inappropriate to use in combination with fear appeals (e.g. if humour makes light of a serious issue such as death). In response to this problem, this study turns to the use of visual metaphors.

This study uses Elaboration Likelihood Model (ELM; Petty & Cacioppo, 1986) and Protection Motivation Theory (PMT; Rogers, 1983) as a framework for understanding persuasive communication. It tests the relationship between fear, message framing, protection motivation and use of visual metaphors. It was hypothesized that visual metaphors will function largely like the use of humour. In particular, visual metaphors will interact with high-fear and consequently lead to increased persuasion.

Results suggest that those who reported being able to swim longer distances were less likely to intend to wear a life jacket [F(3,171)=5.17, p=0.002]. Practitioners should keep this in mind when designing public health messages by drawing attention to the flawed logic which leads to overconfidence. With respect to promoting life jacket use, practitioners might design a message which shows that being a strong swimmer may not be enough to save you from drowning. Regression suggested that two significant predictors help form intentions to wear a life jacket [F(12,164)=13.35, p<0.001]. Those who focused on barriers to wearing a life jacket formed weaker intentions to wear a life jacket. Also, those who reported consuming alcohol more frequently while boating were less likely to intend to wear a life jacket.

Males and females differed significantly in many of their responses. Males (M=5.50, SD=1.70) were less likely to intend to wear a life jacket than females (M=4.50, SD=1.83); t(167)=3.50, p=0.001. A possible explanation is males rated perceptions of severity and vulnerability as lower as well as rating response costs higher when compared to females. New Canadians (n=13) reported significantly lower scores for self-efficacy (M=5.48, SD= 1.18) than those who have lived in Canada for more than 10 years (M=6.17, SD=0.78); t(167)=2.94, p=0.004.

This author of this study recommends that more research on new Canadians is warranted. Practitioners should continue to target new Canadians as a group in need of water safety training even with something as simple as how to wear a life jacket. However, this study fell short of meaningful findings about visual metaphors and their interaction with fear appeals. Visual metaphors did not add a persuasive benefit and did not mitigate defensive responses which may be caused by excessive fear. The authors make a number of recommendations for practitioners who use the posters or magazine adverts to encourage lifejacket use.
HOW DID WE ACHIEVE A REMARKABLE MULTI SECTORAL SURVEILLANCE BASED REDUCTION IN TODDLER IMMERSIONS DURING THE 1990’S: WHAT LESSONS FOR THE FUTURE?

Dr. Peter Barss¹,², Ms. Shelley Dalke¹, Ms. Jane Hamilton¹

¹Canadian Red Cross Water Safety Program, Ottawa, Canada, ²Division of Occupational and Environmental Health, School of Population and Public Health, University of British Columbia, Vancouver, Canada

Prevention 5, Oak, October 17, 2017, 3:30 PM - 5:00 PM

BACKGROUND
Toddler immersions appear to be a 1990s success story for Canadian drowning prevention. The story is reassessed to indicate paths towards target zero.

METHODS
Using structured questionnaires, immersion data were collected prospectively from coroners during 1991-2013 in a multisectoral national surveillance program for water-related injury. Incidence trends and evolving risk factors among 1-4-year-olds were assessed, including activities, personal, equipment, environment, and accompaniment.

RESULTS
Trends: During the first 15 years of surveillance and interventions, incidence fell from 2.9/100,000/year in 1991-95 to 2.1, 1.4, 2001-2005, slowing to 1.1 in 2006-2010, 1.3 in 2011-2013. Boating and aquatic activities fell the most, falls and bathing less so. Comparing indigenous ethnicity with non-indigenous and unknown using changes in numbers as proportions of group totals, during the first four 5 year periods, indigenous 46%, 29%, 9%, 9% vs non-indigenous 22%, 24%, 22%, 19%, vs unknown 62%, 26%, 7%, 1%.

Comparisons and costs, first five years: Improvement was observed, significantly less, for older age groups, other injuries of 0-4-year-olds, and drowning of 1-4-year-olds in United States. Surveillance costs were $1600C/toddler death averted, $20/life year saved, return $620/dollar invested ($1.00US=$1.50C1994).

Activities: Of 621 deaths, 73% (n=455) occurred from falls into water, mainly playing/walking near water. Aquatic activities accounted for 11%, bathing 9%, land transport 4%, boating 3%. Girls drowned a bit less from falls and boating and more from bathing. 81% drowned playing or walking near or in water, only 1% swimming. Comparing indigenous (n=119) and non-indigenous (n=338), falls 71% vs 74%, aquatic 12% vs 10%, bathing 6% vs 9%, land transport 5% vs 5%, boating 6% vs 2%.

Personal: 67% male, 61% indigenous. 27% (n=119) of known ethnicity (n=459) and 19% of all (n=621) were indigenous/aboriginal.

Environment factors: Respecting 55 falls, 41% into pools, 23% flatwater such as lakes/ponds, 13% moving water such as rivers/streams, 12% artificial bodies dugouts/reservoirs/sewage lagoons/ditches/culverts/canals, 2% hot tubs. 55% drowned in/around home, 10% aboriginal reserves, 5% cottages, 6% parks/campground/marinas. Ice factored in 9%, water temperatures 12%<10C. 67% occurred during daylight and 9% twilight/darkness. 76% were from the Prairies and Ontario combined. Comparing indigenous with non-indigenous, swimming pools 4% vs 40%, lake/pond 47% vs 16%, river/stream 25% vs 12%, artificial bodies 5% vs 14%, bathtub 6% vs 9%, ocean 4% vs 1%. Current factored in indigenous 17% vs 7%.

Indigenous deaths occurred June/July/August 46% vs 56%. Ice factor in indigenous 13% vs 7%. Indigenous at home 15% vs 66%, at least 50% indigenous at reserves.

Supervision/accompaniment: 87% toddlers were alone (65%) or with minor(s) (22%). In 27% no adult supervision, 19% momentary absence, remainder unknown. Indigenous vs non-indigenous alone 44% vs 67%, minors only 44% vs 20%.

CONCLUSION
Declines in toddler immersions, especially indigenous peoples, were impressive during 1991-2005. This has slowed. Actions are indicated for falls into water. Supervision should be a supplement to elimination or barriers for hazards such as pools. Adult bathtubs should be avoided, and not used without constant adult accompaniment. For Indigenous peoples, prevalent child caregivers suggest a need for subsidised community daycare, as well as barriers for play areas or homes near water. Toddler drownings should be considered unacceptable - target zero is within reach.
ORAL PRESENTATION

THE CANADIAN SAFE BOATING COUNCIL: IMPROVING BOATING SAFETY IN NORTHERN CANADA

Ms. Jean Murray¹

¹ Canadian Safe Boating Council

Prevention 6, Salon DE, October 18, 2017, 11:00AM - 12:30 PM

Boating safety in Canada is a challenge: we have the world’s longest coastline (243,000 km), 2 million lakes and rivers, a harsh climate, cold water even during the peak boating season, and a huge diversity of boating conditions and boaters.

The Canadian Safe Boating Council is a charitable, volunteer-run organization that brings a wide range of partners and stakeholders together to promote boating safety. We run safe boating campaigns; conduct research; provide boating safety resources to boaters and the public; offer cold water training; hold an Annual Symposium; run the annual Canadian Safe Boating Awards; collaborate with international partners; and liaise with government on boating safety issues.

Perhaps our greatest challenge lies in Northern Canada, where harsh conditions, vast distances, expensive safety equipment, limited infrastructure and minimal Search and Rescue services are compounded by language differences and cultural interpretations of safety messages, in the remote indigenous communities throughout the region.

The CSBC is taking the first steps towards working with local partners and communities to improve boating safety in the North:
• our first ever Annual Symposium in Yellowknife in 2016
• community-based research on attitudes towards wearing lifejackets and boating safety challenges in 2016
• Operation Life Preserver, a three year project starting in 2017, involving an educational program for youth and residents, increased lifejacket availability and operator competency research.

Key partners in these efforts include the Canadian Rangers, the Canadian Coast Guard, Transport Canada and local communities.
FACTORS ASSOCIATED WITH LIFE JACKET USE AMONG ADULT SAILORS IN THE US: ASSESSING ADDITIVE IMPACT OF RISK ON WEARING BEHAVIOR

Natalie Spitzer¹, Maile Thayer¹, Wendy Chow¹, Thomas W. Mangione¹

¹JSI Research and Training Institute, Inc., Boston, MA, Brookline, United States

Prevention 6, Salon DE, October 18, 2017, 11:00AM - 12:30 PM

BACKGROUND
In 2015, drowning accounted for 68% of the 626 recreational boating related deaths in the United States. Although life jackets are estimated to prevent at least 50% of drowning deaths, approximately 85% of drowning victims were reported to not be wearing life jackets, and overall wear rates among adult boaters has remained consistently low across most boat types. Sailboats, particularly day sailors, have a noticeably higher wear rate, however.

OBJECTIVE
Given the high risk of boater drowning, the preventative capabilities of life jackets, and the relatively low rate of life jacket use among adult boaters, the purpose of this study is three-fold: to identify key factors related to life jacket wear among adult sailors of two major types of sailboats by boater demographics, boat characteristics, and environmental conditions; to analyze the association between the presence of multiple risk factors and life jacket wear rate among adult sailors; and to assess similar trends in the additive impact of multiple risks associated with life jacket wear rates in other boat types.

DESIGN
This study uses observational survey data collected during the summer months of 1999 – 2015 from 124 selected study sites across 30 states in America. Of the 692,912 boaters observed, 44,741 were adult sailors.

RESULTS
The overall life jacket wear rate was lower among adult sailors in cabin sailboats (13.3%) compared to day sailor sailboats (50.9%). Adult day sailors were observed to wear life jackets at higher rates than cabin sailors in all measured demographic, boating, and environmental circumstances. Sorting observed life jacket rates by water temperature, boat size, and wind speed accounted for a 21.7% range in life jacket wear rates in cabin sail boaters, while sorting by boat size, number of people on board, and wave height accounted for a 38.7% range in life jacket wear rates among adult day sailor boaters. Results of this study also demonstrate that the proportion of sail boaters (of either type) wearing life jackets follows a statistically significant positive linear relationship with the number of boating risks present. This trend is similar to findings for other types of boats.

CONCLUSION
It appears that adult boaters are modifying their life jacket wearing behaviors dependent on how risky they perceive their boating situation to be.

IMPLICATION
The results of this study suggest that boaters are aware of the connection between life jacket use and drowning prevention and are most likely to wear life jackets when boating in perceived unsafe conditions. However it is important for boaters to wear life jackets in all situations in order to prevent drowning in unpredictable accidents since many occur under circumstances that are not noticeably risky.
ORAL PRESENTATION

START BOATING – A BOATING COURSE FOR NEW CANADIANS

Ms. Barbara Byers¹

¹Lifesaving Society, Toronto, Canada

Prevention 6, Salon DE, October 18, 2017, 11:00AM - 12:30 PM

Boating is a popular activity in Canada - 46% of Canadian adults participate in recreational boating activities. This popular activity contributes to a steep price in both drownings and pressures on SAR resources.

While boating-related drownings have declined since the mid-1990’s, data from the Lifesaving Society’s Canadian Drowning Report – 2017 Edition, indicates that on average 119 Canadians lost their lives per year while boating (2010-2014), similar to the average number in the 5 year period before (2005-2009) at 123 deaths per year. Boating related fatalities represent 26% of all drowning fatalities (2010-2014). Almost all of these deaths are preventable as 80% of those who drowned were not wearing a lifejacket and in 40% of the cases, alcohol was involved.

Small open boats, both human and small outboard powered, are the highest, at-risk category for drowning. Inexpensive and readily accessible, they are often entry level boats for most new and therefore ‘under-educated’ boaters. Adding to that is an emerging risk factor, an influx of large numbers of New Canadian immigrants, unfamiliar with water for recreational use but eager to assimilate themselves into the North American lifestyle including boating.

Start Boating for New Canadian boaters was created by Lifesaving Society Ontario and Playsafe Productions, for a cross Canada launch. Education is targeted directly to the new small boat operator with specific components designed for each popular small vessel type - canoe, kayak, Stand Up Paddleboard (SUP) and small outboard powered boat. To address the issue of those new to Canada, the initial launch of Start Boating was in 6 languages.

Start Boating for New Canadian boaters is delivered on line, streamable and linkable from a variety of partner web sites. In addition to online access, the programs will be available on cable network broadcast and direct distribution. Promotion of Start Boating is through a comprehensive variety of marketing activities including a PR Media launch, print ads, articles, advertising and through the marine industry and multicultural welcome centres.

The program was launched in July 2017. Qualitative research was conducted in late Spring 2017 with New Canadians who had been in Canada for less than 5 years and whose first language was Mandarin, Cantonese, Tagalog, Hindi, English and French.

The research was designed to obtain feedback from New Canadians who were novice boaters, to ensure the Start Boating videos were communicating the intended boating safety information effectively and to identify opportunities for improvement prior to final production of the videos. As well, the research was designed to determine if the material was being delivered in a culturally and linguistically relevant manner in order to best reach the target audience.

The videos include information on trip planning, carrying and knowing how to use essential safety equipment and safe boating practices. The goal for the target demographic is to learn, retain, and execute safety procedures such as how and who to call for help if it is required and how to survive until help comes. It is critical that the information delivered be understandable and applicable in order for the program to produce favorable safe boating outcomes.

The research indicated that the intended messages were well understood and communicated in an appealing, inviting way. The desired consumer response was largely achieved. Novice boaters felt they learned a great deal of information, they intended to apply what they learned, felt more confident that they can boat safely and have higher intent to participate in boating than they did prior to viewing the videos. As well they had positive responses to the conceptual approach of family oriented “story videos”, supplemented by on-demand, self-selected breakaway videos. More information: www.startboating.ca
ORAL PRESENTATION

A 10 YEAR ANALYSIS OF BOATING AND WATERCRAFT DROWNING DEATHS IN AUSTRALIA

Stacey Pidgeon¹, Alison Mahony¹, Justin Scarr¹
¹Royal Life Saving Society Australia, Broadway, Australia

Prevention 6, Salon DE, October 18, 2017, 11:00AM - 12:30 PM

BACKGROUND

In Australia, boating is the second leading activity contributing to drowning behind swimming. Reducing boating and watercraft related drowning deaths is Goal 9 of the Australian Water Safety Strategy 2016-20. This research analysed all unintentional drowning deaths in Australia related to boating and watercraft that occurred between 2005-06 to 2014-15.

AIMS

• To conduct an in-depth analysis of boating and watercraft drowning incidents over a 10 year period
• To increase understanding of the risk factors contributing towards boating and watercraft drowning deaths among men
• To provide recommendations to support new and existing boating and watercraft-related drowning prevention strategies.

METHODS

All unintentional, fatal drowning deaths in Australian waterways related to boating and watercraft incidents between 1 July 2005 and 30 June 2015 were included. Data is sourced from the National Coronial Information System. Exclusions from this data include drowning deaths as a result of suicide or homicide, from natural causes, shark and crocodile attack, or hypothermia where known. Definitions of boating or watercraft are consistent with the Australian Water Safety Strategy 2016-2020. Boats are: ‘powered boats including wind or motor-powered vessels, boats, ships and personal watercraft e.g. boats, jet skis, sail boats, yachts, catamarans’. Watercraft are classified as: ‘non-powered recreational equipment such as vessels that are rowed or paddled e.g. rowboats, surf boards, kayaks, canoes, stand up paddle boards, body boards, wind surfers, skin boards, inflatable rafts and inflatable boats without motors’. For this study, kayaks, canoes and surf skis are combined as ‘paddle-craft’ due to similar vessel characteristics. Data was cleaned in Microsoft Excel and data analysis was conducted using SPSS Version 24. Descriptive statistics were utilized, as well as chi squared analysis (p<0.001).

RESULTS

Between 1 July 2005 and 30 June 2015, 473 people drowned whilst participating in boating and watercraft activity (0.21 per 100,000 population), representing 16.5% of all drowning deaths during this period. Men accounted for 91.8% and people aged over 65 years made up the highest proportion. Absolute numbers of boating drowning deaths decreased, whilst numbers of watercraft drowning deaths increased over the same period. When analysed by boats or watercraft and age; watercraft drowning deaths mostly occurred among those aged 25 – 34 years (20.7%). Most boating drowning deaths occurred among those aged 35 – 44 years (19.2%). Ocean or harbour locations were the leading location (51.9%) and 21.9% occurred in a river location, 63.5% were locals to the location where they drowned, 27.8% occurred when fishing. Only 8.2% were wearing a lifejacket at the time of death. Of those not wearing lifejackets, 14% had lifejackets on-board at the time. Alcohol was present in 26.2% of cases, with 58.8% over the legal limit for operating a motor vehicle, 30.3% involved drugs, with 31.3% being illegal. Most drowning deaths occurred in powered boats under 5 metres and in paddle-craft (kayaks, canoes, surf skis).

DISCUSSION

This study shows a slight decrease of boating and watercraft related drowning deaths over time, suggesting that prevention efforts and legislation in Australia are making a difference. Interestingly, whilst powered boating drowning deaths appear to be decreasing, results suggest that non-powered watercraft drowning deaths are rising. Alcohol concentration was high among those with a pre-existing medical condition, and men aged 18-24 years were most likely to consume large quantities of alcohol prior to or during boating and watercraft activity. The number of lives lost when using small powered boats and paddle-craft are of high concern. Greater public awareness of the legislation and consequences of being under the influence of alcohol and drugs when operating a vessel needs to be urgently addressed, especially of skippers who are responsible for the operation of their boat and all on-board.

CONCLUSION

This report confirms that men, alcohol and lifejacket wearing remain key issues. Emerging factors include drug use, the increase of watercraft-related drowning deaths, older adults and more people drowning in relative proximity to where they lived, as opposed to being a visitor. Men accounted for over 90% of boating and watercraft drowning deaths, therefore efforts to raise awareness among men should continue. This research provides further evidence towards the development of prevention strategies to improve boating and watercraft safety.

ACKNOWLEDGEMENT

Research at the Royal Life Saving Society – Australia is supported by the Australian Government.
FACTORS ASSOCIATED WITH LIFE JACKET WEAR AMONG ADULT CANOEERS AND KAYAKERS IN THE UNITED STATES

Ms. Maile Thayer¹, Miss Natalie Spitzer¹, Ms. Wendy Chow¹, Dr. Tom Mangione¹

¹Canadian Safe Boating Council

Prevention 6, Salon DE, October 18, 2017, 11:00AM - 12:30 PM

BACKGROUND
Drowning is the most common known cause of death in recreational boating. Although life jackets can prevent drowning fatalities, wear rates generally remain consistently low for all boat types. Canoes and kayaks each account for less than 4% of all recreational boating participation, yet they are consistently associated with some of the highest boating-related death rates annually (12% and 11%, respectively).

METHODS
This observational study collected data from 1999 to 2015 across 124 study sites from 30 states in the U.S. Life jacket wear rates were calculated for 11 dichotomized risky and non-risky environmental conditions, boater demographics and boat characteristics, stratified by boat type using Chi-square tests for equality of proportions. A count variable based on number of risks was created for each boater, and Cochran-Armitage trend tests were run to test for linearity in life jacket use. Univariate simple linear regression and Chi-square tests led to a choice of 3 illustrative variables each for canoes and kayaks. These variables were represented in a tree diagram, detailing the additive impact of each factor.

RESULTS
The overall life jacket wear rate was lower for canoers (27.4%) compared to kayakers (76.3%). Kayakers had a higher wear rate than canoers when compared among all boater, boat, and environmental characteristics observed. For both canoes and kayaks, characteristics that were considered risky had statistically significantly higher life jacket wear rates, compared to its non-risky alternative. As the number of risks in the risk count variable increased for both canoes and kayakers, life jacket wear rate did too. Results from trend tests show a highly statistically significant linear trend. The three illustrative explanatory variables selected for canoers were wave height, child presence, and water temperature. These 3 variables alone accounted for a range of 17.5% to 67.3% (49.8% spread) in life jacket wear rate from 0 to 3 risks. For kayakers, the three illustrative explanatory variables chosen were wave height, water temperature, and air temperature. These variables produced wear rates from 65.8% to 95.7% (29.9% spread) from 0 to 3 risks.

CONCLUSION
Life jacket wear rates for canoes and kayaks are very different and should be treated as such in promotional efforts. This study shows that boaters seemingly conduct a mental assessment of risk to determine whether or not to wear a life jacket. As the number of risks increases, the life jacket wear rate increases. These results have important implications for future efforts to promote life jacket use.
ORAL PRESENTATION

UTILISING SPATIAL ANALYSIS TO DETERMINE GEOGRAPHIC AREAS WITH EXCESS RISK OF DROWNING IN INLAND WATERWAYS IN VICTORIA, AUSTRALIA

Mr. Robert Andronaco1,2, Dr. Bernadette Matthews1

1Life Saving Victoria, South Melbourne, Australia, 2School of Mathematical and Geospatial Sciences, RMIT University, Melbourne, Australia

Prevention 8, Salon DE, October 19, 2017, 11:00 AM - 12:30 PM

INTRODUCTION

Inland waterways account for over a third of drowning deaths in Victoria and nationwide. Previous research identified two Victorian rivers (Murray River and Yarra River) as the top three drowning blackspots of all rivers in Australia. The Murray is Australia’s longest river, running 2,508km and intersecting several states, while the Yarra River spans 242km. While epidemiological studies highlight characteristics associated with drowning victims, few ecological investigations have been undertaken into geographical impacts. Geographical ecological analysis coupled with risk factor analysis, provides a flexible analysis framework to determine priority drowning treatment areas. This study applied spatial analysis tools within an ecological analysis framework.

AIMS

• To identify Local Government Areas (LGAs) within Victoria with inland waterways that have a high relative risk of drowning.
• To utilise spatial analysis to inform drowning prevention strategies for inland waterways.

METHODS

Unintentional fatal drowning incidents reported in Victoria, Australia from 2002 to 2012 were extracted from the National Coroners Information System (NCIS). Incident and residential locations from NCIS drowning case events were individually georeferenced, then aggregated into the area in which the event points lies. Events were then spatially joined and summed to the area in which the point event was located.

Relative risk ratios or standard mortality ratios were determined using population distribution per area of analysis. Additional analysis utilised the sum of waterway lengths within Victorian LGAs. Relative risk ratios were used to formulate a local ratio of actual events versus expected events. The expected figure is calculated based on the underlying distribution of the denominator (i.e. population, LGA area or river length) within each particular study area compared to the whole study area distribution and case counts.

The result is a ratio comparing how many cases have occurred within a particular area or region given the distribution of events for the whole of Victoria. Values <1 signify the LGA had less fatal drowning events compared to other areas, given the LGA's underlying population distribution and the overall Victorian distribution of drowning events. Values >1 signify the area experienced a ratio of events greater than would have been expected or ‘Excess Relative Risk’ (ERR).

RESULTS

A total 21 (26.3%) of 80 LGAs in Victoria had ERR of an inland drowning incident using underlying population density. When factoring deceased place of residence, 14 (17.5%) of LGAs were considered at ERR.

Using the secondary analysis approach, the Yarra River was considered as having the highest ERR when taking into account not only the frequency of incidents but also the length of waterway. One particular segment of the Yarra River, within Metropolitan Melbourne, was much higher compared to all other Victorian river segments.

This study demonstrated alternative methods of analysis to determine drowning risk. Relative risk ratios by population and waterway segment length provided ecological analysis approaches highlighting LGAs with drowning ERR. This enables targeted approaches to drowning prevention strategies.

ACKNOWLEDGMENTS

This research was conducted as part of the Inland Waterways Drowning Prevention project by Royal Life Saving Society – Australia, funded by the Australian Government.
OPERATION ALIVE (AUTOMOBILE SUBMERSION: LESSONS IN VEHICLE ESCAPE): PUBLIC EDUCATION TO PREVENT DROWNING IN SUBMERSED VEHICLES

Dr. Gordon Giesbrecht¹
¹University Of Manitoba, Winnipeg, Canada

Prevention 7, Salon 3, October 18, 2017, 1:30PM - 3:30 PM

Every year, 350-400 people die in submersed vehicles in North America with these deaths accounting for up to 10% of all drownings. Vehicle submersion has one of the highest fatality rates of any type of single vehicle accident. Most of these incidents are survivable, since vehicles usually hit the water in an upright position causing, at most, non-disabling injuries; in these cases, drowning results from either ineffective, or no, self-rescue actions by the victim(s).

Three major contributors to these preventable drownings include: 1) a prevailing public understanding that you should let the vehicle fill with water to equalize pressure and enable opening the door(s) (escape is highly unlikely in this scenario); 2) the tendency to use cell phones to call emergency dispatch from the sinking vehicle (since exit from a sinking vehicle is only possible within the first minute, this valuable time is wasted on an emergency response process that cannot get rescue units to the site in that short a time); and 3) emergency dispatch operators have traditionally used protocols that focus on locating the incident for deployment of emergency response teams, rather than focusing on instructing the caller how to exit the vehicle quickly.

Operation ALIVE, is a research and knowledge translation program that addresses these major contributors in order to decrease the incidence of vehicle submersion drownings. A series of five research projects has led to scientific publication as well as a multi-disciplinary partnership to develop educational programs, websites and handouts stating the following simple evidence-based action message. “If your vehicle is in water, don’t panic, do not touch your cell phone and remember: SEATBELTS off; WINDOWS open or broken; OUT immediately; CHILDREN first, from youngest to oldest.” This message has been adopted and promoted by various agencies including the Lifesaving Society, Canadian Red Cross, motor vehicle departments, various provincial and state agencies, and drowning prevention societies.

Given that these messages are not yet prevalent throughout society, and many vehicle occupants will still call emergency dispatch, it is important that the emergency dispatch protocols be changed. To this end, we have developed two new emergency dispatch protocols for “Vehicle in Water” and “Vehicle in Floodwater” which were adopted by the International Academies of Emergency Dispatch, whose protocols are used by 60% of the English-speaking world and many other languages. In both protocols, as soon as the dispatcher determines a vehicle is in water, the usual ‘location-based’ procedure switches to an ‘exit-advice’ strategy. The protocol quickly leads the caller through the “SEATBELT, WINDOW, OUT, CHILDREN first” process. There have been media reports of drivers remembering this advice, acting accordingly and surviving. As time progresses, we expect to also hear of cases where emergency dispatchers save lives of occupants who call from within sinking vehicles.
PREVENTION OF DROWNING IN SINKING VEHICLES: A NEW AUTOMATIC WINDOW OPENING DEVICE

Dr. Gordon Giesbrecht¹, Mr. Michael Percher, Mr. Pierre Brunet, Mr.Yanik Richard⁵, Mr. Gerren McDonald², Mr. Aram Amassian³, Dr. Marion Alexnder¹, Ms. Alixandra Bellemare¹, Mr. Yash Rawal¹

¹University Of Manitoba, Winnipeg, Canada, ²University of Winnipeg, Winnipeg, Canada, ³King Abdullah University of Science and Technology, Thuwal, Saudi Arabia, ⁴Operation ALIVE, Winnipeg, Canada, ⁵Cysca-Sysacom, Repentigny, Canada

Prevention 7, Salon 3, October 18, 2017, 1:30PM - 3:30 PM

INTRODUCTION

Every year, about 400 people die in submersed vehicles in North America, accounting for up to 10% of all drownings. In most vehicle submersion scenarios, the only way to survive is to exit through the windows, which need to be opened or broken, within about one minute of contacting the water. Because stress can interfere with memory and execution, many lives could be saved if a system could sense that a vehicle is in water and then automatically open the side electric windows.

The Automatic Window Opening System (AWOS; patent protected) was designed to sense when a vehicle is in water and to open the side electric windows, but only if the vehicle was in an upright position. The AWOS system consists of a Detection Module (DM), housed in the engine compartment, and a Power Window Control Module (PWCM) housed inside the driver’s door. The DM contains a Water Sensor, a Level Sensor and a Microcontroller Unit which implements system algorithms. The Level Sensor provides the angular orientation of the car using a 3-axis acceleration sensor and prevents automatic window opening if the car is outside the orientation range (initially set at ±20° in the roll axis and ±30° in the pitch axis). The system was set to delay opening by 2 seconds after the proper attitude thresholds are reached. Settings for Delay, and Roll and Pitch thresholds can be adjusted via AWOS system software.

METHOD

The AWOS system was installed on two cars (2003 Chevrolet Malibu, 2003 Hyundai Elantra) and one SUV (2005 Ford Escape). All fluids were drained from the vehicles. Four manikins were placed in the seats and a 27 kg weight was secured on the trunk floors to simulate fuel. A crane was used to place vehicles in a lake either by lowering them straight down into the water (static tests) or by swinging the vehicle into the water to produce forward movement (dynamic tests).

In both static and dynamic tests, the windows opened immediately and effectively when the vehicles landed upright in the water. Each vehicle was then lowered in the inverted position. The cars took much longer to roll upright (Malibu, 32 s; Elantra, 48 s) than the SUV (Escape, 6 s); this difference is mostly because the increased height of the SUV results in; a) greater buoyancy, and b) its motor produces more rotational torque. In all inverted immersions, the windows did not open unless, and until, the vehicles had rolled upright.

RESULTS

The Automatic Window Opening System successfully sensed when vehicles were in water and activated all side power windows to open. If a vehicle landed upside down, or at a very steep angle (both of which place windows under water) the system did not engage until an upright and level position was attained. This system can be easily installed during vehicle assembly or the secondary after-market. It has great potential to decrease drowning deaths in sinking vehicles by automatically providing an exit at a time when it is likely that occupants will be panicked and unlikely to think of the correct survival sequence, which includes exiting through an open window as quickly as possible.
ORAL PRESENTATION

THE LIVED EXPERIENCE OF RESCUING PEOPLE WHO HAVE DRIVEN THROUGH FLOODWATER: UNDERSTANDING CHALLENGES AND IDENTIFYING AREAS FOR PROVIDING SUPPORT

Mr. Jacob Keech¹, Ms. Stephanie Smith¹, Ms. Amy Peden²,³, Prof Martin Hagger¹,⁴,⁵, Dr. Kyra Hamilton¹,⁴

¹Griffith University, Brisbane, Australia, ²Royal Life Saving Society, Sydney, Australia, ³James Cook University, Townsville, Australia, ⁴Curtin University, Perth, Australia, ⁵University of Jyväskylä, Jyväskylä, Finland

Prevention 7, Salon 3, October 18, 2017, 1:30PM - 3:30 PM

INTRODUCTION

Drowning is a major public health issue and risk increases with floods. Intentional driving through floodwater is a risk factor for flood-related drowning. Prior research from our lab has examined driver motivations for entering and avoiding floodwater (e.g., Hamilton et al., 2016). However, many people still drive into floodwater and require rescue. For example, in the 2015-16 financial year, the Victorian State Emergency Service was involved in 1,165 road rescues (State Emergency Service Victoria, 2016), and in 2017, Queensland State Emergency Service conducted 108 floodwater rescues in a 24-hour period during a severe weather event (RACQ, 2017). The current study, aimed to identify the key challenges faced by flood rescue operators in conducting this kind of rescue and to identify targets for supporting flood rescue operators in their important role.

METHODS

Semi-structured qualitative interviews were used to gain an understanding of the lived experience of Australian flood rescue operators (N=8; e.g., State Emergency Service) who had previously rescued a driver who had driven through floodwater. Data were analysed using thematic analysis based in an interpretivist approach.

RESULTS

Four key challenges emerged from the experiences of the flood rescue operators:

• The involvement of non-trained personnel;
• Information provided by emergency telephone operators varies between rescues;
• Behaviour of people during a rescue complicating the job for rescuers;
• People sightseeing floods or flood rescues or ignoring closed roads providing sources of distraction and frustration.

Drawing upon the accounts of the flood rescue operators as well as theory and empirical evidence from behavioural science, we suggest the implementation of five key strategies to assist flood rescue operators in navigating the identified challenges:

• Development of training and protocols for non-flood rescue emergency personnel;
• Implementing a standard operating procedure for emergency telephone operators;
• Providing training around strategies for flood rescue operators dealing with non-compliant rescues;
• Educating the public regarding driving around to spectate floodwater and flood rescues, compliance during rescues, and passengers that are most challenging to rescue;
• Increasing compliance with road closures in floods.

CONCLUSION

The findings provide valuable insights into the challenges faced by flood rescue operators in rescuing those who have driven through floodwater. Implementation of the proposed strategies has the potential to increase efficiency of rescues and reduce fatalities occurring due to driving through floodwater.
ORAL PRESENTATION

COLD WATER BOOT CAMP: A PUBLIC EDUCATION PROGRAM TO PREVENT DROWNING IN COLD WATER

Mr. Ted Rankine², Mr. Alan MacPherson², Mr. Ian Gilson³, Ms. Stephanie Rankine², Dr. Gordon Giesbrecht¹

¹University Of Manitoba, Winnipeg, Canada, ²PlaySafe Productions, Keswick, Canada, ³Canadian Safe Boating Council, Toronto, Canada

Prevention 7, Salon 3, October 18, 2017, 1:30PM - 3:30 PM

Immersion in cold water (<15°C) increases the risk of drowning considerably. Of >400 drownings per year in Canada, 10-15% occur in cold water. Mortality rates for boating incidents increase from 9-10% in 20-25°C water to 60% in water under 10°C. Cold water immersion is a risk in open water (e.g., from recreational boaters to commercial fishers) and frozen waterways (e.g., snowmobilers, skiers and ice fishers who are either on foot or in/on vehicles).

There are several contributing factors to cold water-related drownings:

- Physiological responses to cold include: a sudden gasp reflex followed by hyperventilation, which could lead to drowning from water inhalation, or inability to coordinate swimming movements; cold incapacitation as cooling of muscle and nerve fibers decrease strength and coordination; and finally, hypothermia, a stage that takes more than 30-60 minutes, a time that is only possible if flotation is available.
- Psychological effects of giving up, or panic can cause inappropriate actions leading to drowning.
- Many water travelers don’t wear flotation because they under-estimate the dangers of cold water immersion either because they feel they will never be exposed to cold water, or they are unaware of the dangers of cold water.
- Other water travelers overestimate the impact of cold water and do not wear flotation because they mistakenly feel they cannot survive cold water for more than a few minutes even with flotation. The authors believed that there was a need for realistic, detailed and accurate programs to educate about the dangers of, and ways to avoid drowning in, cold water.

www.coldwaterbootcamp.com, a web- and DVD-based public education program was developed from 2007-09 with free access for the general public to make them more aware of cold water risks in an effort to increase lifejacket wear. However, water safety instructors who include cold water immersion in their programs (e.g., Lifesaving Society, Red Cross, military, law enforcement etc.) were quick to adopt the materials into their teachings. Topics included: human thermophysiology; mechanisms of heat loss; phases of cold water immersion; prevention of drowning and hypothermia; and rescue, assessment and treatment of drowning and hypothermia victims. Cold Water Boot Camp centred on Dr. Gordon Giesbrecht’s work on hypothermia with a goal to bring the ‘1-10-1 Principle’ into general public and professional awareness.

In order to better equip potential instructors with the background of cold water immersion, a deeper understanding of rescue and rewarming techniques and a variety of additional teaching materials, a second more advanced program, www.beyondcoldwaterbootcamp.com was developed between 2010-2011. It featured similar topics, but with more background and detail. This program included downloadable PowerPoint presentations, lectures and handouts for instructors to use with their students.

Both programs were produced in Canada and the United States. Over 12,500 DVDs of the Cold Water Boot Camp program were delivered, primarily to instructors who would teach multiple classes each year on a continuing basis. When the Beyond Cold Water Boot Camp program was released, another 10,000 DVDs were delivered to a similar group. With the move toward downloadable content from the second website, in the first year there were more than 5,000 new visits per month.

Material from these two programs is used extensively in North America and there has been a lot of positive feedback from teachers, leaders and the general public that they feel the information is new, accurate, and valuable, often with examples of how the information affected positive and even life-saving actions by victims and/or responders.
THE EFFECTIVENESS OF LIFE JACKET LOANER BOARDS IN THE PRESENCE OF RISKY CONDITIONS IN WASHINGTON STATE

Dr. Thomas Mangione¹, Ms. Maile Thayer¹, Ms. Wendy Chow¹, Dr. Linda Quan²,³, Ms. Elizabeth Bennett³

¹JSI Research & Training Institute, Inc., Boston, United States, ²University of Washington, Emergency Medicine Department, Seattle, United States, ³Seattle Children’s Hospital, Seattle, USA

ORAL PRESENTATION

BACKGROUND
Drowning while engaging in recreational boating is a risk that can largely be mitigated by wearing a life jacket. However, research has shown that it is very difficult to make changes in wearing behavior through educational and promotional campaigns alone (non-mandatory regulation approaches). The U.S. national trend over the past fifteen years has been a relatively stable level of voluntary life jacket use by adults at about a 10% average for all types of boats excluding personal water craft (PWCs). In most states in America life jacket use on PWCs is mandated.

METHOD
One interesting and growing approach to try to increase life jacket use is the installation of loaner boards situated near boat put-in locations. A loaner board makes life jackets of various sizes available for boaters to borrow who have forgotten to bring one with them. It is largely unknown, however, how effective loaner boards are to increase life jacket use, particularly for adults.

RESULTS
Our study demonstrates that loaner boards increase life jacket wear rates. The study was conducted at 34 sites across Washington State (15 sites with loaner boards). At loaner board sites adult wear rates were 6.2% higher than for non-loaner board sites (18.2% versus 12.0%). Although all age groups showed increased wear rates, the largest increases were for adult boaters. We also compared how adult wear rates were impacted by the presence of up to eight risky conditions—small boat length, windy conditions, cold air temperatures, cold water temperatures, strong current, poorer weather, a child present on board, and engaging in fishing or a towed activity. When loaner boards were present, as the number of risks went up, the wear rates increased as well, but when no loaner board was present, wear rates did not increase as the number of risks increased. Loaner boards, therefore seem to play an important “reminder” role as boaters assess the risky conditions that are present; they seem to encourage boaters to put on a life jacket whether it be to use the life jacket they already have on the boat or to borrow one off the loaner board. And this encouragement seems to be more effective as more risks are present.
RESPECT THE RIVER - A NATIONAL INLAND WATERWAYS DROWNING PREVENTION PROGRAM

Mr. Craig Roberts¹

¹Royal Life Saving Society Australia, Broadway, Australia

Prevention 8, Salon DE, October 19, 2017, 11:00 AM - 12:30 PM

BACKGROUND

Inland waterways such as rivers, creeks and streams, are common areas for recreation. Such recreation can be undertaken in the water such as boating and swimming, and within public spaces alongside these waterways such as fishing and walking. In 2014 a research study was conducted by RLSSA of ‘Drowning deaths in Australian rivers, creeks and streams: A 10 year analysis.’ 735 people drowned in rivers, creeks and streams, accounting for 25% of all drowning deaths experienced in Australian waterways across this ten year period.

AIMS

With support from the Federal Government, Royal Life Saving is working across Australia to promote safe aquatic recreation and prevent drowning in inland waterways.

METHODS

The Respect the River campaign was developed and launched on Sunday 25th October 2015 on the banks of the Murray River at Albury. To date the following initiatives have been established:

- National Communication and Branding – This is designed to assist in the effective management and implementation of the IWDPP through the delivery of clear and consistent messages. Specifically this includes:
- Awareness - Individuals and communities are aware of the high number of drownings that occur in Inland Waterways.
- Know the Risks - Individuals and communities know the hazards associated with Australian rivers when swimming or recreating.
- Remember to take action - When Individuals and communities enjoy Australian rivers they remember to take safety precautions.
- Open Water Initiative (Primary Schools) - Royal Life Saving has developed the Open Water Experience to provide primary school children (Years 5 and 6) with the opportunity to acquire relevant skills and knowledge to participate in recreational activities in our open water environments.
- Further Research - As part of the Respect the River campaign, RLSSA has conducted deeper analysis of the drowning cases known to have occurred in the Murray River from 2002/03 until 2014/15.
- Community Events - The Community Engagement Days are designed to engage local aquatic users face to face along their local Rivers in an attempt to educate them about the Campaign and its objectives. Over 100 days have been attended thus far.
- Open Water Audits & Improvement Plans Royal Life Saving has undertaken risk assessments along rivers, lakes and dams and provides land owners such as Councils with compliance reports and improvement strategies.

RESULTS

Taverner Research was commissioned by Royal Life Saving Society – Australia to conduct a quantitative survey of individuals who lived within 50km of the Murray River. The research was conducted to obtain benchmark data to determine the reach and efficacy of the Respect the River campaign launched in November. The research report following the launch of the Respect the River Campaign revealed that the number of people who were aware of the Respect the River Campaign had increased by 28%.

CONCLUSIONS

The Royal Life Saving Australia’s Inland Waterway Drowning Prevention Program is leading drowning prevention measures to better understand the risks of Australia’s Inland Waterways and engage with the Australian Community to inform, educate and up skill users. The Presentation will include how this program can be used in other nations to help improve civic engagement, reducing inland waterway drowning and consulting partnerships in for drowning prevention.
ADAPTING TO LOCAL ISSUES: EVALUATION OF WATER SAFETY EDUCATION PROGRAMS MODIFIED FOR THE INLAND WATERWAYS DROWNING PREVENTION PROJECT

Ms. Rhiannon Birch¹, Ms. Grace Strugnell¹, Ms. Melissa Laird¹, Ms. Kate Simpson¹, Dr. Bernadette Matthews¹

¹Life Saving Victoria, South Melbourne DC, Australia

Prevention 8, Salon DE, October 19, 2017, 11:00 AM - 12:30 PM

INTRODUCTION
Inland waterways account for over one third of drowning deaths in Victoria and Australia-wide. Furthermore, people in Victoria’s regional areas are almost twice as likely to drown as those in major cities. To address this issue, Life Saving Victoria adapted two school-based water safety education programs to specifically address these issues in Victoria; targeting children aged 5-14 years and touring regional communities determined to be at ‘excess risk’ for drowning. The Open Water Learning Experience (OWLE) and Sink or Swim (SoS) waterway safety education programs were designed to align with the Victorian school Health and Physical Education curriculum. They each deliver the same key messages designed to empower children to keep themselves and others safe in a range of aquatic environments. The 2-hour OWLE comprises engaging, practical activities delivered near a school’s local waterways including rivers, lakes and beaches. The interactive 1-hour SoS presentation is delivered at schools and focuses on enhancing students’ knowledge, to help prevent involvement in dangerous situations, accidents and drowning.

AIMS
To evaluate the effectiveness of targeted education programs to deliver key water safety messages to primary school aged children.

METHODS
The two programs were delivered to students attending schools in inland regional Victoria. Students participating in either program in 2016 were invited to complete a Water Safety Quiz comprising closed- and open-ended questions to illicit changes in knowledge, awareness and intended behaviour. Teachers completed an online self-report questionnaire to determine reasons for participation and perceived changes in students’ water safety knowledge.

RESULTS
Feedback was received from 282 students (aged 7 to 13 years) from 17 schools and 152 teachers from 98 schools across inland regional Victoria. The Water Safety Quiz revealed that following either program, 80.9% (n = 232) of students had learned something new. The key learnings identified were: lifesaving and survival skills including rescue of self and others and basic emergency response actions (n = 93; 33%); being prepared and safety preventative actions (n = 90; 31.9%); and to never swim alone and always with adult supervision (n = 72; 25.5%). In addition, 88.3% (n = 249) of students said the program made them think about being more careful around water. The most common intended safety behaviours were: to read water safety signage (n = 242; 85.8%); to wear a lifejacket when boating, jet skiing and kayaking (n = 234; 83%); and to check the depth of water before entering (n = 231; 81.9%). Almost every student correctly identified a ‘lifejacket’ information sign (n = 265; 94%) and a ‘No Swimming’ prohibition sign (n = 253; 89.7%). Teachers primarily enrolled their students in the programs to provide them with general water safety knowledge (91.3%) and to link with their school’s swimming program (42.7%). Every teacher would recommend these programs to other schools, typically because they felt their students’ water safety knowledge improved (99.4%) and that they developed the skills and confidence regarding water safety they expected (98.6%).

DISCUSSION AND CONCLUSION
These programs demonstrate a successful programmatic response to the need for inland waterway safety education in Victoria. The students demonstrated excellent knowledge of appropriate behaviours and actions to take as a result of the water safety, lifesaving and emergency response skills taught.

ACKNOWLEDGMENTS
This research was conducted as part of the Inland Waterways Drowning Prevention project by Royal Life Saving Society Australia and funded by the Federal Government.
For many countries, drowning is amongst the leading causes of unintentional death, with inland waters being the site of many of these fatalities. A subset of inland water drownings are associated with dams and other hydraulic structures; and like swimming pools and supervised beaches, these are location specific and therefore provide the opportunity for prevention beyond general strategies.

The Canadian Dam Association (CDA) published Guidelines for Public Safety Around Dams (2011) in order to provide dam owners and regulators with a consistent guide to good practice to address hazards associated with dams and their operation. The Guidelines include a methodology to assess risk, as well as criteria guiding the selection of appropriate risk controls that encompass; warning systems, physical barriers, operational procedures and public education.

In order to support the implementation of the CDA Guidelines a database documenting over 200 fatalities, and a similar number of near misses requiring rescue, associated with dams in Canada has been prepared. Information was sourced primarily from print media, with judicial or other technical reports being referenced where available. Supplementing the Canadian data is a select number of international cases where key learnings have been derived from drownings associated with dams in other jurisdictions. The comprehensive database is unparalleled internationally.

Analysis of the data, and a review of individual case studies, has improved the understanding of the risk factors influencing drownings associated with dams and other hydraulic structures, leading to the identification of strategies to further reduce risks. These strategies provide direction to stakeholders with an interest in drowning prevention, including dam owners, regulators, communities and other organizations; and point to opportunities for collaboration in reducing risk exposure. The paper presents the data as well as strategies for drowning prevention within the context of the CDA Guidelines for Public Safety Around Dams and work carried out by Ontario Power Generation.
According to the WHO drowning is a neglected public health threat claiming 372,000 lives per year worldwide, 40 persons per hour. In Brazil, almost 1 million drown and 6,000 die by drowning each year. Between 2010 and 2012, 1,043 people died in Paraná State (3.32 per 100,000 pop). The Paraná State has 199,307,922 Km² extension and a population of 10,439,601 (IBGE-2010).

Paraná’s inland waterways are the stage for several nautical activities, swimming, bathing and fishing. The main rivers crossing the state where most drowning cases occur are: Parana, Paranapanema, Iguacu, Tibagi, e Piquiri. The state also has 100 km of coastline.

OBJECTIVE
Study the profile of drowning deaths in Paraná state between 2010 and 2012, to assist the development of a more effective drowning prevention campaign.

METHODS
Drowning death cases were compiled from two datasets: DATASUS (National Health System) and SISBM (Fire Department events System). Data regarding the sex and age of the victims, the location and aquatic setting, the time of the year and activity immediately before drowning, were selected.

RESULTS
Between 2010 and 2012 there were 1043 drowning deaths in the state. A total of 650 of this could be analysed. Summer was the time of the year where most drowning deaths occurred. Data showed prevalence of deaths: in the age group 15-19 yr (17.54%); 47% on weekends; 90% were males; 92% in inland waterways; swimming and bathing (49.53%) and fishing (15.53%). Regarding specific aquatic setting, data shows that deaths occur mostly in rivers (54%) and dams (34%). Troubles while swimming (29%), entering deep water (18%) and falling from watercraft (16%) were identified as the main activities immediately before drowning.

IMPLICATIONS
The analysis of the Paraná’s drowning profile allowed identifying the geographical locations and aquatic settings that need more investments in water safety. The circumstances of the incidents also provide useful information regarding the application of specific preventive measures that can be scaled up to inland waterways across the country. With that in mind, SOBRASA BOD developed the campaign RIVERS+SAFE grounded on 5 main measures. White waters: Don’t enter and while boating use a lifejacket. Rivers: don’t enter water above knee depth or use a lifejacket. Sudden increase in depth may occur. Supervision: at all times by someone able to help. Never enter the water under the influence of alcohol. If in danger, remain calm, float and ask for help. Don’t swim against the current. If you’re going to help, don’t enter the water, call 193, reach for floating material and wait for professional help.
BEHAVIOURAL INSIGHTS: CASE STUDIES HIGHLIGHT HOW EVIDENCE IS USED TO SHAPE DROWNING PREVENTION STRATEGY

Mrs. Pamela Simon¹, Mr. Shane Daw¹, Ms. Sarah Anderson¹

¹Surf Life Saving Australia, Bondi Beach, Australia

BACKGROUND

If 70% of watercraft users think there is no chance to some possibility (a ‘3 in 10 chance’) of being injured, how do we convince them to wear a lifejacket? Or, if rock fishers are not involved in clubs and do not read fishing magazines, then how do you reach them? Surf Life Saving Australia (SLSA) identified a need to undertake behavioural insights research to answer these questions and many more.

Through its Total Service Plan framework, SLSA recognised the need to understand the behaviours, attitudes and knowledge of high-risk demographics in the top four national coastal safety issues—rip currents (swimming), boating, rock fishing and unpowered watercraft. These four issues represented 54% of coastal drowning deaths in 2016. Males are the high-risk demographic for each issue, in particular:

- Rip currents: males 15–39 years (Australian residents, Australian- and overseas-born)
- Boating: males 40–69 years (Australian residents, Australian-born)
- Rock Fishing: males 25–64 years (Australian residents, Australian- and overseas-born)
- Watercraft: males 25–64 years, surfers and body boarders (Australian residents, Australian-born)

METHODS

SLSA engaged Ipsos Social Research Institute, to undertake the research project. The main aims were:

- to build on existing understanding of the key targets’ knowledge, attitudes and behaviours;
- inform the development of a behaviour change framework; and
- refine communications plans for target segments.

The research included a qualitative component (focus groups and interviews, including in languages other than English) and a quantitative element (online surveys). This methodology enabled Ipsos to use the discussions from the focus groups and interviews to shape the subsequent surveys to include any issues or queries that emerged from the conversations. Additionally, several concepts for media campaigns were tested through the focus groups.

The research provided detailed information about:

- market segmentation;
- attitudes and behaviours;
- risk perception;
- safety strategies, including checking conditions, lifejacket usage, safety equipment and choice of swimming location and more;
- information needs and sources; and
- communications channels.

The project provided a behaviour change framework for each issue, including a new or more nuanced understanding of the market segmentation within each demographic. The intelligence is used to inform mitigation strategies, public engagement programs and communication plans.

RESULTS

The results have seen SLSA rethink the demographics for swimmers and helped refine the key target for communications about rip currents. Similarly, for rock fishers the importance of high or low involvement levels in driving behaviour and safety practices became evident. The researchers identified clear communications channels for each activity. The findings from the research suggested that SLSA refine existing communications strategies, particularly for swimmers and rock fishers.
Fatal drowning events are often reported as lead news items in the media. News media exposure has been shown to influence people’s health behaviours and help set the public and policy agenda. Importantly, news media coverage has the potential to increase public awareness and influence attitudes. Accordingly, analyses of the quantity and nature of media coverage of fatal and non-fatal drowning is important. This study examines how news media report and frame fatal and non-fatal drowning in Western Australia (WA).

METHODS
WA coronial data will be extracted and retrospectively matched to news items for two periods: 01 December 2014 – 31 March, 2015 and 01 December 2015 – 31 March, 2016 (southern hemisphere summer). Generic MediaWatch monitoring reports of print and online media will be collated for the period including: data source (print/digital), media timing (date, day, time), section, page, and/or web-link, headline and article summary (water source/location, activity, demographics). Articles will be selected for inclusion and analysis using key words e.g.: drowning, fatal, non-fatal, near drowning, drowning death, drowning fatality. Where permissible, Boolean searching within terms will be used, allowing the combination of search terms to enable enhanced targeting of more specific areas.

Content analysis will be used to inform a framing analysis. All stories will be viewed and systematically coded in terms of content and framing. The coding categories have been developed by the research team and coding conducted independently by two research assistants. Any discrepancies will be reviewed and resolved through consensus between the coders and research team. To test the reliability of coding, a percentage of stories will be coded by a second researcher to determine inter-rater reliability.

RESULTS
The results of the study will be presented using two categories: publication source and news story message content together with sub-categories; negative, positive and neutral focus. Frequency and type of message will be presented as well as the spokesperson used.

DISCUSSION
News media coverage is usually dependent on an issue or event exhibiting news value such as impact of risk and/or a fatal outcome (1); this is particularly pertinent to drowning prevention. The pervasive influence of news media is an important mass reach tool for the dissemination of drowning prevention messages to the general public and priority populations, specifically at high risk times, such as summer. The findings of this research will add to drowning prevention and provide recommendations on how best to engage news media to portray positive educative drowning prevention messages.
The Northern Territory of Australia covers 20% of the total land mass of Australia, however, contains only 1% of Australia’s population. The “NT” as it is referred to, has a young, diverse, multicultural population and 30% of the population is indigenous. The majority of indigenous people are located in remote communities and outstations. The Northern Territory has one of the highest drowning rates in Australia.

The Water Safety Awareness Program (WSAP) was established in 2002 as a part of a five point plan to reduce drownings in the Northern Territory. The Program was and continues to be funded by the Northern Territory Government. The administration and delivery of the Program is undertaken by Royal Life Saving Northern Territory. The Program consists of five free water awareness lessons for parents and carers who reside in the Northern Territory and have children under the age of 5.

The Program seeks to deliver four key messages to Parents and Carers. The four key messages are:

- Supervision
- Restrict access
- Water familiarisation
- CPR awareness

The Program is inclusive to all members of the Community; water safety messages and information should be accessible to all parents and carers with children Under 5. The Program is adapted to cater for the needs of indigenous communities and people.

WSAP consists of five sessions. The Program’s five sessions are focused on messaging to parents and carers and developing a child’s confidence and ability in the water. In addition, general water safety awareness and rescue techniques are taught to parents and carers.

This presentation will examine the effectiveness of the Program. Have the drowning prevention messages been received and understood by parents and carers? Has the Program given parents and carers a greater awareness of water safety in children under 5? Are parents and carers empowered by the program to develop their own children’s water confidence?
BACKGROUND
Drowning kills 17 Brazilians each day, much of them (75%) in freshwater venues, where the prevention messages have great difficulty to reach the public. The best prevention campaign is the one that would be tailored to this venue, groups at-risk, easy to remember and particularly being able to be repeated over and over along friends and family.

The aim of this proposal “A RAP song on drowning prevention” was to hit deeply the public with the fact “drowning is better to prevent than trying to cure”. Other objectives were to deliver a few messages on how to prevent and react appropriately.

WHY RAP MUSIC?
Rapping (or emceeing) is “spoken or chanted rhyming lyrics”. The components of rapping include “content”, “flow” (rhythm and rhyme), and “delivery”. Rapping is distinct from spoken-word poetry in that it is performed in time to a beat (external meter). Rapping is often associated with and a primary ingredient of hip-hop music, but the origins of the phenomenon can be said to predate hip-hop culture by centuries. Rapping can be delivered over a beat or without accompaniment. Stylistically, rap occupies a gray area between speech, prose, poetry, and singing. The word (meaning originally “to hit”), as used to describe quick speech or repartee, predates the musical form. So, RAP is deeply present among our ancestral and may be easy to listen, like and absorbed.

THE CONTENT
All drowning prevention messages used in SOBRASA's campaigns were listed. The 5 most important water safety messages from the list were picked and used to create the RAP song lyrics. SOBRASA's motto was also included highlighting that prevention is the top priority intervention: “to save is to prevent”.

The 5 messages selected were:

- Pay 100% attention to your children; keep them within arms’ reach, even when a lifeguard is on duty.
- Always choose places were lifeguards are on duty.
- Always obey the warning signs and flags.
- If caught in danger, stay afloat and wave for help.
- Try to help others without getting yourself in water.

The Refrain was "to save is to prevent", “water at the bally danger ahead" “better prevent than cure” and “prevention is to help lifeguards help you”.

CONCLUSION
For the drowning community expanding its mission and saving more lives involves finding new and innovative ways to spread water safety messages. The music is an underutilized tool in the drowning field. One of the benefits of this tool is that it provides information and education on prevention at low cost. The sharing principle of the Internet allows the value of a single music to be multiplied, increasing the benefit while maintaining the costs. Music may be an excellent way to deliver water safety messages and especially a strong way to make people aware of the importance of prevention rather than trying to mitigate. It is cheap, interactive, gets easily in people's heads and tends to reverberate over and over if carefully tailored to the at-risk group.
We follow the tragic statistics of drowning trauma in the State of Espírito Santo and throughout Brazil. In 2011 alone, 151 unintentional deaths occurred in the state of Espírito Santo (354,7055 hab). In Itapemirim the last death was on January 10, 2013, a 16 year old male from São Paulo. Recently, appalling accidents occurred in odd domestic scenarios such as buckets. Even with a reduction in number of deaths over the last decade, it’s crucial to prioritize prevention and study the effectiveness of preventive interventions in reducing water incidents. In this sense, we began to plan the implementation of the campaign “KIM na Escola”, by Sobrasa.org.

The project focuses on Drowning Prevention, providing students between the ages of 5 and 12 years with fun and interactive information on how to behave around aquatic environments. We will always seek to evolve, evaluating children and prevention studies in Brazil and in the world.

METHODS
The program has several banners and illustrative materials that aid in the application of the adopted preventive methodology, among them are: Drowning Chain of Survival, Preventive actions from Kim at the school comics and from Pool +Safe. In addition, it includes a drowning prevention educational plan to be spread throughout one year, allowing the city to adapt its contents to the curriculum of the scholar year, respecting the schools’ calendar.

In total, 7,087 children enrolled in 35 different schools and 12 kindergartens will participate in the project. To improve the method used to evaluate knowledge acquisition, a questionnaire, designed by the KIM at School experts’ group, with 5 questions addressed to the children was applied during the visit. It should be completed and results inserted into spreadsheets, enabling future studies and actions to prevent drowning.

RESULTS
Children learn by interacting positively and multiplying information to parents. Responses to the questionnaire are being compiled and the full analysis will be detailed during the presentation.

A preliminary analysis of the verbal survey applied during the visits indicates that: 95% of the children totally interacted and answered the questions, 75% had some doubt, and often end up going according to the majority of colleagues and another 2% have attention deficit.

CONCLUSIONS
We believe that multiplying preventive interventions is the best way to prevent drowning. We levelled our actions along with Kim at School national campaign. With detailed evaluations of the campaign effectiveness it will be possible to progress and provide increasingly better solutions for the prevention of drowning and safety of our children.

The project aims to deliver the KIM at school comics and its banner to each school.
Fiji is a tropical pacific country of 300 islands. Fijians practise a broad range of aquatic cultures, and have unique ways of knowing-about-water. The country has many dynamic aquatic environments, fast and slow flowing rivers, oceans, lagoons, surf, and inter island travel. This diverse environment fosters economic opportunities such as transport, food production, hospitality, music song and dance, bathing, and recreation. Many Fijians go into the water to bathe, to fish, to cool off, and to travel on water. Children use the water regularly, often daily, for recreation.

Fiji does not have systemised swimming and water safety programs, but there is some education in school health and physical education curriculum. There is a small community of sport swim clubs, and three public pools that provide Australian and New Zealand programming. However, the typical Fijian is generally not educated in water safety and rescue techniques, or in energy conserving ways of swimming.

Changed social dynamics in village communities, climate change, rising economic prosperity enabling more free time, and urbanisation are influencing both potential, and actual rate of drowning and water accidents.

Some schools offer swimming lessons and sport swimming, but generally, in instances where swimming and water safety skills are learned, they are acquired by mimicry and experience in natural water – learned, not taught. The Fiji national water safety council has been formed and a National Water Safety Plan is being developed to address the WHO’s 10 recommend actions to prevent drowning.

The Shane Gould Swimming Project delivers drowning prevention programs in Fiji since 2005, working from ‘bottom-up’ community model, responding to cultural needs and environmental variations, and through the use of existing Fijian aquatic knowledge. This is a project initiated and conducted by Olympian Shane Gould and her husband Milton Nelms and locally trained instructors.

They have identified two distinct population groups in Fiji, each with their own attitudes and values toward using the water and their resultant swimming skills and approaches, to Fiji’s ever present and dynamic aquatic environments.

Drawing on their expertise in performance swimming, learn to swim program design, and learning from Fijians in natural water contexts, Shane and Milt describe how these groups are identified. One group is characteristically over confident and unaware of dangers. The other group tend to avoid water or just have partial immersion experiences. We relate successful methodologies created for Fijian peoples for teaching and learning swimming and water safety. These methodologies are transferable to any social culture and physical environments.
Drowning is among the 10 leading causes of death among children and young people in every region of the world, with children aged under 5 years disproportionately at risk and males twice as likely to drown as females. Over half of casualties are aged under 25 years (1). In Italy, little is available from official data sources to analyse such incidents from the epidemiology and prevention point of view.

The objective of this study was to assess injury surveillance of drowning and near-drowning in Italian swimming pools using websites as a primary resource of information for these events.

Italian websites were browsed for the period January 2008 – December 2016 with the purpose of analysing unintentional injury events occurring in swimming pools in Italy. A search was carried out using the web search engine Google and the keywords ‘Drowning’ and ‘Risk of drowning’. On the basis of the collected information, the recorded events were split up for geographical location of the sport facility, age and gender of the injured person, leading cause of the event and assistance received. Chi-square test was used to compare data by gender. The analyses were performed using the statistical software STATA 9.2. Data of 380 unintentional injury events were collected and 64% of them were related to children aged 0-15 years.

The highest incidence (87%) was measured in Summer, probably due not only to the higher number of people attending swimming pools in that season, but also to the higher sensibility of the media in such period for this type of unintentional injury events. The higher number of events occurred in the North of Italy and can be associated both with a greater diffusion of swimming pools in these regions and to a higher sensibility of the media of these regions in this matter.

Consistent with international literature, males are more likely to drown than females attributable to a higher exposure to aquatic environment and riskier behaviour such as swimming alone, drinking alcohol before swimming alone and boating.

The “≤4” and “5-15” age classes showed the highest incidence of injuries. The mortality rate we found in these classes is in accordance with the data reported in the literature referring to swimming pools. Most of the incidents that did not receive any kind of assistance (67%) occurred in domestic pools where the highest mortality rate (45%) was measured. For this kind of pools, lifeguard assistance was never provided.

REFERENCES
Flooding is among the most frequent emergencies that put the population at risk of drowning. The characteristics of the Italian and European territories when in presence of weather phenomena such as violent storms, may also put the population at risks of flooding.

The Italian Swimming Federation (FIN-S) Life Saving Division is a recognized agency by the Italian government as Volunteers Association of National Guard with particular focus on dealing with water risks. Among necessary actions to protect populations at risk from natural events, it is important to inform and educate them on good practices.

Between 2013 and 2014, FIN-S has conducted a media-campaign to encourage more than 800 Authorized Swimming Schools spread across the national territory to use such good practices. This campaign began on December 19, 2014 during the national FIN Day “Population safety during water emergencies” in collaboration and financial support with the Department of Civil Safety – Prime Minister Presidency.

In each SNF site, where the initiative was active, informative posters were displayed. In the meantime, the teaching staff of FIN-S illustrated the behavior to be followed to the attending population while also distributing a specific flyer. The flyer included the following information:
- summary of the National System for Civil Safety
- summary of the activities of the FIN-S
- poster on good practices to follow in case of flooding

The poster exhibits 12 visual signs, divided into 3 sections
- at home and at workplace
- on the road
- after the flooding

The poster was presented during the annual meeting of the Commissions of International Life Saving Federation of Europe (ILSE) in January 2015, and the Board of Directors of ILSE has subsequently requested permission from FIN-S to be adopted.

REFERENCES
1. Manuale di salvamento – FIN-S Edizione 2013
Drowning is a major public health problem in Brazil where 17 people die daily. Freshwater venues are responsible for 75% of all deaths. The extensive hydrographic network is used all year round mainly to highlight daily living activities such as transportation and work and expose the population to one of the highest rates of drowning deaths in the world.

Preventive education is key to reduce drowning, but “You can lead a horse to water, but you can’t make it drink”. So, the major challenge to reducing drowning is convincing people that it can happen to anyone, so they are eager to learn about and adopt preventive behaviours.

This work aims to call people’s attention to the possibility that everyone can drown if the environment overwhelms their ability/skills to cope with the event. Hopefully people will change their risk perception and behaviours to look for prevention and avoid drowning.

**METHODOLOGY**

At two meetings, experts on drowning and swimming education gathered and discussed, aiming to pinpoint the critical factors affecting the risk of drowning. This task force was the basis used to build a table that could easily impact the general public to the possibility of drowning and its most important factors including the swimming skills, water float ability, the risk analysis and rescue training, and different aquatic scenarios.

**RESULT**

The risk perception involves essentially 4 topics.

1. Swimming skills - stratified into 4 levels (I-low to IV-high) based on yes or no: water adaptation, swim one stroke, swim more than one stroke, swim 4 strokes.
2. Water float and respiratory control ability - stratified into 3 levels: No water float, basic floating (ability to float vertically), and advanced floating (ability to float vertically and in dorsal position and respiratory control).
3. Drowning risk perception and rescue training – yes/no.
4. Aquatic scenarios - stratified into 3 levels: Swimming pool, lakes and dams, and rivers/beaches.

Considering all 4 factors described, a drowning risk level was attributed and colors associated: High (red), medium (yellow) and low (green).

**DISCUSSION**

A “drowning risk perception table” has a number of variables. Authors focused on making it as simple and visual as possible to reach the lay public. All variables that didn’t greatly affect the public perception were left out. Aquatic scenarios for example, could be further stratified and explored, e.g. rivers with strong flow vs slow flow, but this would only divert public’s attention from the main topic. The main goal was to easily depict that for example, a person can have a low risk at the pool, medium risk at lakes and still have high risk at beaches and rivers. The risk table calls attention to the fact that everyone can drown, even a proficient swimmer, so it’s crucial to be aware of prevention tips for each scenario. Future studies need to be conducted to test this model, including a larger number of stratification levels for a more accurate risk level calculation.
INTRODUCTION
Drowning is a global public health challenge (1). With many nations experiencing an ageing population (2), effective drowning prevention strategies targeting older people will be needed (3).

AIMS
Undertake a systematic review of international fatal drowning literature of older people to describe the epidemiology, risk factors and strategies for prevention. Gaps in the published literature will be identified and recommendations made.

METHOD
A systematic review was undertaken of peer reviewed papers published between 1980 and 2015. Databases searched included Medline, PubMed, Scopus, Science Direct, PsychInfo, SportDiscuss, Web of Science. Initial search terms used were ‘drown*’ limited to English, Portuguese and Spanish language, human and a published date range between 1 January 1980 and 31 December 2015. Search terms were then refined to include ‘drown*’ and ‘older’, ‘elder’ ‘senior’ ‘geriatric’ ‘ageing’, ‘aged’, ‘frail’ and were limited to peer-reviewed publications.

RESULTS
Search results returned 5,694 papers. All papers were extracted into EndNote and duplicates (n=3,343) removed leaving 2,351 references. After a title and then abstract review 255 papers remained for full text review. After reviewing full texts 38 papers were included in this systematic review. Eighteen papers discussed epidemiology, 20 identified risk factors and 9 proposed strategies for prevention.

Rates ranged from a low of 0.2 per 100,000 population for those aged 65 years and over in Turkey, to a high of 28.8 per 100,000 population in people aged 80 years and over in Guandong province, China. Risk factors identified included males, ethnicity, rurality, increasing age and alcohol. Strategies proposed were personal flotation device (PFD) wear regulations, education, further research, upskilling of the at-risk population and engineering measures.

DISCUSSION
There were a large number of papers identified which had information about older people drowning, however few provided specific rates for older people or clarifying the population (i.e. numbers) from which the information was collected. The age groups used to discuss older people were also not consistent. A wide range of risk factors were found, some contradictory. The identification of risk factors would benefit from exposure studies. There is a need for more studies describing specific prevention strategies for older people that have been implemented and their effectiveness evaluated.

CONCLUSION
To prevent drowning there is a need to understand the risk factors for all ages, while there is good information for younger people there is limited information about older people. Given the global ageing population there is an urgent need to better understand how older people drowning deaths can be prevented. This systematic review is the first step in this process and has identified gaps in the published literature to date around the epidemiology, risk factors and strategies for the prevention. A lack of action in this area will prove to be an impediment to overall reductions in drowning mortality.

ACKNOWLEDGEMENTS
This research is supported by the Royal Life Saving Society –Australia to aid in the reduction of drowning. Research at the Royal Life Saving Society – Australia is supported by the Australian Government.
Aquatic Safety Audits- a software application

**WHO UNDERTOOK THIS RESEARCH?**
The Royal Life Saving Society Canada has undertaken this research by investigating mechanisms to enhance safety in public aquatic facilities.

**THE ISSUE**
There was no uniform method to conduct safety inspections of aquatic facilities nor an efficient method to collect and then upload this information to the operator.

**AIMS OF WORK**
To establish a collection strategy, a standard to evaluate this information and a method to efficiently report on the findings.

**TARGET GROUP**
For the most part the public, aquatic facility operators and government were the target markets. This was focused first as a provincial action but became national.

**WHAT DID YOU DO?**
Various regulations and operating standards were reviewed, standards for inspection were created, a checklist built for various aquatic venues, a software program and template created and hardware was purchased to build a system for the efficient and accurate reporting of various recommendations designed to enhance safety.

**BENEFITS**
Safety is enhanced at aquatic facilities as an outside party conducts the audit and creates a written report.

**CHALLENGES**
Financial support required for the use of the software and purchase of a tablet. Technical support minimal.

**CONCLUSION**
Most aquatic facilities have undergone an aquatic safety audit and conduct repeat audits every five years. It is not possible to estimate the number of interventions that have been eliminated as a result of these safety audits.

**DESCRIPTION OF POSTER**
This session will review the aquatic safety audit process, the fee structure, the checklist system that was built and the software application and reporting system that supports this process.
Water safety management is a complex and comprehensive subject. Especially in situations where water safety is complementary to other activities, this could be difficult to approach. An example could be when teaching a subject which does not include water safety, but is conducted near or on water. Water safety management is always the foundation for accident prevention in, on and around water.

This model will possibly make the approach a bit easier. The centre, or turning point, in this model is the point where drowning occurs, where someone disappears below the surface. Everything done before this occurs is regarded as a safety issue; everything that occurs after this is regarded as an emergency issue.

The safety part is described in four steps
- Water competence; which is an expression of the manager’s qualifications, which are regarded as preconditions for instigating into the activity
- Prevention, this includes health and safety issues, risk assessment, safety procedures and documentation.
- Surveillance where the central topics are; being close to the activity, knowledge of adequate rescue equipment and ability to use it in quick response to early signs of trouble
- Rescue follows the well-known saying, “reach, throw, row, go”, with focus on rescuing people that are alive and generally don’t need any after-care or first aid.

If this fails and someone disappears from the surface and drowns, it becomes an emergency. What ever happens from now on, one cannot deal with the situation alone. The emergency services are needed. Coping with this situation is described in the following four steps.
- Emergency action plan – This is a tool for making a proper approach to the situation.
- Search – refers to the procedures for fixing the point of disappearance, narrowing down the search area and if possible do a search.
- Resuscitation – refers to the first aid procedures on recovering the drowned person.
- Organisational action plan – are the routines that go into action as soon as one has alerted ones superiors or company management.

A common reason for avoiding water related activities is a fear of the responsibility for other people in a water environment. This might be a significant obstacle for doing water related activities.

It is not only safer, but also much more tempting to go into water related activities when you are competent and feel that what you are doing is safe. This applies to the participants and the teacher alike. The model covers everything from safety at the scene to possible lawsuits if something, against all odds, should go wrong.

The point is, this model does not reduce the importance of dealing with emergencies but gives an increased focus on simple procedures for avoiding accidents.
INVESTIGATING THE CORRELATION OF ALCOHOL USE AND AQUATIC INJURY AND DROWNING: A SYSTEMATIC REVIEW

Dr. Kyra Hamilton¹,², Mr. Jacob Keech¹, Ms. Amy Peden³,⁴, Prof. Martin Hagger¹,²,⁵

¹Griffith University, Brisbane, Australia, ²Curtin University, Perth, Australia, ³Royal Life Saving Society - Australia, Sydney, Australia, ⁴James Cook University, Townsville, Australia, ⁵University of Jyväskylä, Jyväskylä, Finland

INTRODUCTION

Drowning accounts for 7% of all injury-related deaths making it the 3rd leading cause of unintentional death worldwide (WHO, 2014). There is a strong association between alcohol consumption and recreational aquatic activity (e.g., swimming, boating) and risk of drowning, with reports indicating alcohol as a contributing factor to approximately 30% of all drowning deaths (Royal Life Saving Society – Australia, 2016) and 26% in rivers (Peden et al., 2017). The true extent of alcohol-related drowning is likely to be higher as alcohol is not routinely ascertained during autopsy. Furthermore, many non-fatal injuries occur as a result of alcohol use and aquatic activities. For this reason, studies examining alcohol as a risk factor for drowning may be underestimating the magnitude of this concern to public health, and failing to identify the factors associated with this risky behaviour. We aimed to conduct a systematic review of studies reporting drowning deaths and injury occurring as a result of alcohol use while engaging in recreational aquatic activities, including both intervention and correlational research aimed at changing and understanding this behaviour.

METHODS

English language peer-reviewed literature published until June 2016 was searched using Scopus, PubMed, PsycINFO, SPORTDiscus and CINAHL. Search strategy was used were: (alcohol OR drink* OR intoxicant*) AND (drown* OR swim* OR “aquatic sport”* OR watercraft OR watersport* OR water-sport* OR “water sport”* OR boat* OR sail* OR diving OR windsurf* OR kitesurf* OR raft* OR wake* OR surfing OR surf OR surfer OR yacht* OR “jet ski”). Included articles provided information on fatal and non-fatal drowning and injury that occurred under the influence of alcohol and while engaged in recreational aquatic activities.

RESULTS

After removal of duplicates, title and abstract were screened for 6,175 records. Full-texts were screened for 256 records. Reference lists of reviews and other relevant articles were screened, identifying no additional articles. In total, 73 studies were included (57 on prevalence and/or risk factors, 14 on understanding alcohol use, and two on prevention strategies). Prevalence rates for alcohol involvement in fatal and non-fatal drowning varied greatly. Males, boating, not wearing lifejackets, and swimming alone, at night and at locations without lifeguards were risk factors for alcohol-related drowning. No specific age groups were consistently identified as being at risk, posing a challenge for prevention. Anti-alcohol legislation and changes to the minimum legal drinking age were proposed as drowning prevention strategies, with limited evidence of effectiveness.

CONCLUSION

Overall, alcohol consumption is known to increase drowning risk. While prevalence rates vary, we identified that on average 38.9% and 40.2% of fatal and non-fatal drowning, respectively, involved alcohol. Current findings indicate a lack of awareness of the impact of alcohol on drowning risk and this should be a consideration for drowning prevention advocates in the future. Future research must employ a consistency in study design to allow comparison between studies, including confirming an appropriate BAC for determining contribution for aquatic-based incidents. The development, implementation, and evaluation of strategies based in psychological and behavioural theory to reduce alcohol-related drowning and aquatic injury are a priority to reduce further loss of life.
BACKGROUND

Alcohol-related drowning among young people remains a significant issue within the Western Australian (WA) community. Our society highly values outdoor and aquatic activities, with swimming and surfing rated in the top five recreational activities each year. This mixed with a strong drinking culture among young people creates an increased risk of drowning and a decreased ability to respond to the associated hazards.

Drowning is the third leading cause of premature death in WA. A review of drowning data revealed that 41 young people aged 15-24 years drowned in WA between July 2003 and June 2013. Of these, 30% were contributed to alcohol with average blood alcohol content in victims of 0.123%, almost 2.5 times the legal limit for driving. In addition, 99 young people aged 15-24 years (3.2/100,000 population) were hospitalised.

METHODS

In response, the Royal Life Saving Society WA created the Don’t Drink and Drown program to educate young people about the risks and dangers associated with drinking alcohol in, on and around the water. The program uses a number of innovative strategies to engage with young people to promote safe alcohol and water safety messages, including social media and youth events.

Each year over 10,000 high school graduates congregate in high numbers at several “hot spots” to celebrate the end of school. The combination of groups of young people, binge drinking and hot warm weather creates a situation where drinking and swimming becomes a common occurrence. Each year, 26 of our youth volunteers attend Leavers events held at Rottnest Island and Dunsborough in the South West of the state to promote the Don’t Drink & Drown program. Volunteers utilise methods of peer-to-peer health promotion to facilitate a range of activities for school leavers encouraging safe drinking and water safety behaviours in a fun, engaging and educational manner.

As part of Leavers, the Don’t Drink and Drown program holds its annual Meelup Beach Day. This is an alcohol and drug free event provides fun and unique activities for the school leavers to enjoy, including an inflatable aqua playground, underwater photo booth, DJ’s and beach volleyball. In addition, there are a number of creative social media strategies employed to encourage ongoing engagement with the program following the event.

In November 2016, over 6,000 school leavers attended the Meelup Beach Day event and participated in the activities. The event gained significant social media attention through Facebook and Instagram. One video post on Facebook reached 390,074 young people, had 200,000 views, 1,100 shares and 492 comments. This has enabled us to provide ongoing information to young people regarding water safety and responsible alcohol consumption through a youth-appropriate medium.

CONCLUSION

This event is a great example of how to effectively engage with young people – a typically difficult group to influence - to discuss alcohol and water safety issues in a fun and entertaining environment.
Our community awareness team is out there educating members of the community about the importance of surf, beach and aquatic safety all year round. Away from the beach, Surf Lifesaving Queensland (SLSQ) continues to work hard in the community to promote surf safety education and awareness as a crucial part of breaking the drowning cycle. Each year SLSQ delivers a range of programs which aim to change behaviors and save lives through education and an increased understanding of our key beach safety messages.

In fact, SLSQ educates more than 720,000 people about surf safety each and every year. This front line approach to safety allows the public to make informed, and potentially lifesaving, decisions before even stepping onto a beach.

Through targeted programs, educational resources, school and community visits and an increasing presence at selected events, SLSQ is ensuring that high risk groups and the general community can benefit from our comprehensive and engaging surf safety messages. Regardless of the program, location, presenter or audience, the overarching message is always the same – prevention is better than cure, and educated swimmers are safer swimmers.

Whilst SLSQ’s community awareness initiatives are aimed to educate all members of the community, various programs have been developed to target high-risk groups that include:

- Children aged 5-11 years old
- 18-25 year old males
- Seniors (+55)
- Rural population
- International tourists
- Domestic tourists
- Non-English speaking populations

QHealth Beach Safe Schools Program
- The Queensland health beach safe schools program delivers vital surf safety messages to primary school children via classroom surf education sessions from volunteer surf lifesavers. Each year the program travels to schools across Queensland, educating students on how to stay safe on our beaches.
- We also give them the opportunity to join qualified lifesavers on the beach to learn vital lifesaving skills.

Beach Safe Program
- In 2009 Surf Lifesaving Queensland developed the Gold Coast Beach Safe program.
- In 2016 this program included a welcoming service at the Gold Coast, Cairns and the Sunshine Coast Airport, as well as a range of Surf Fun Clinics and other activities along Queensland’s busy beaches.
- The primary focus of the Beach Safe Program is to educate domestic and international tourists visiting Queensland during the summer months about beach safety.

Little Lifesavers Program
- The Little Lifesavers Program is a great introduction for children aged 5 to 11 into Surf Lifesaving. Throughout the program, children will have the opportunity to participate in a wide range of games, sports and educational activities to teach them how to stay safe at the beach.

Beach to Bush Program
- The Breaka Beach to Bush Program offers students in regional areas an introduction to surf lifesaving and the vital surf safety skills required to stay safe in an aquatic environment. Qualified surf lifesavers visit classrooms across the country to deliver surf safety lessons using lifesaving equipment.
BACKGROUND
In Thailand, drowning is the number one cause of death among children under 15 years of age, whose drowning death rate ranged from 5.9 to 11.1 per 100,000 child population between 2006 and 2015.

OBJECTIVE
To evaluate the measures for the management of high-risk water sources in communities by installing warning signboards and easily available water safety devices for child drowning prevention.

METHODS
This evaluative research was conducted in two types of communities: one with the installation of warning signboards on water safety and advice for assisting drowning victims and making simple water safety devices that could be acquired in the community such as empty plastic 1-gallon containers, empty plastic water bottles, long sticks, and ropes, and the other without any water safety signboards or devices. Data were collected using a questionnaire and an interview form, and then analyzed to determine percentages and standard deviations; and ANOVA was also performed.

RESULTS
The residents in the communities with the water safety measures for high-risk natural water settings by installing warning signboards had a higher average score on knowledge, understanding, and perception about drowning risks than that in the communities without such measures. However, the difference was not statistically significant. In the communities with such measures, 68.75% of the people realized that warning signboards were useful for child drowning prevention, while 87.07% regarded the water safety devices as useful for reducing drowning risk – the difference being significant, compared with that in the communities without such devices.

DISCUSSION AND CONCLUSION
The management of high-risk natural water settings undertaken by the community by installing warning or advice signboards and making available water safety devices made of locally available materials is regarded by community members as useful and effective in reducing child drowning risk.
BACKGROUND
Communicating water safety information with diverse local, regional, and national audiences is an ongoing challenge for water safety organisations. In New Zealand, national water safety campaigns typically deliver key messages to wide audiences over the peak summer period. However, patterns of water use and the demographics of water users vary substantially between areas and some groups are not being effectively engaged by national campaigns or traditional media. Furthermore, some high-risk users may be more likely to come across information through other sources, such as social media.

AIM
If information on the users of specific sites or areas is known, education strategies can be more effectively tailored. Water safety organisations collect statistics on fatal and non-fatal incidents throughout New Zealand; this includes age, gender, ethnicity, residence, activity, and causal factors leading to incidents. Ten years of incident data has been analysed at a considerable number of beaches in order to understand water users’ demographics and typical level of resilience.

METHODS
At Titahi Bay, a small embayed beach on the west coast of the Wellington region, this information was used to develop a new community water safety education strategy. Rescues at Titahi Bay most commonly involve persons aged 11 to 15 years (43.6%), 16 to 20 years (20.5%), and 21 to 30 years (12.8%). In addition, the largest proportions of rescues were of people residing in the surrounding suburb (48.4%), elsewhere in Porirua City (16.1%) and elsewhere in the Wellington region (25.8%). Furthermore, the most recent fatal drowning incident involved a 24 year old male from the local area. As such, an initiative targeting local young people through online platforms was recommended.

In response, short videos were produced by volunteers from Titahi Bay Surf Life Saving Club, supported by Coastal Research Ltd, every Friday during the 2016/17 surf lifeguarding season. These videos outlined the forecast beach and surf conditions for the upcoming weekend, and included the forecast temperature, wind strength, wind direction, tides, wave height, as well as relevant water safety advice. Messages from nearby Mana Coastguard and Porirua City Council were also included in some videos. The reports provided people with useful information for planning their weekend (for example, whether the conditions would be suitable for swimming, surfing, or boating), thereby better engaging the audience than a video solely focused on safety.

FINDINGS
The videos were uploaded to Titahi Bay Surf Life Saving Club’s Facebook page, and shared with a wide range of local community pages, as well as by individuals within the community. Each video reached an average audience of over 2,100 people, which is considered significant in the context of a community of approximately 7,800 residents. There is further potential to expand the reach of these videos, as well as other community engagement strategies, such as through partnerships with local schools.

The beach and surf conditions reports will be continued at Titahi Bay for the 2017/18 season. Furthermore, other surf lifesaving clubs are being encouraged to implement similar initiatives where evidence indicates it is appropriate to their local context.
SUCCESS PROJECT ABOUT DROWNING PREVENTION BY VOLUNTEERS IN THE COMMUNITY, NAKHON RATCHASIMA PROVINCE, THAILAND.

Mr. Chanchai Supawerakul¹

¹Buddha Dhamma Hook31 Foundation, Nakhon Ratchasima, Thailand

BACKGROUND

Nakhon Ratchasima province is the largest province of Thailand. It has the second highest number of population (the first highest number of population is Bangkok). Its main areas are agricultural. Its statistical death of drowning that usually occurs in rural areas and natural water sources is in the top 10 provinces of Thailand.

OBJECTIVE

To reduce the drowning in Nakhon Ratchasima Province.

METHODS

This project was started in 2012. It has been built by a network of Merit Maker team comprising many sectors. This project has been based on the revision of existing experience and the own cost. This project was started from one team in the urban and then was expanding to rural areas until it was completely covered the 32 districts in 2015. There are educations about safety on water for communities, skills about helping people from drowning, survival skills on the water when drowning and, skills for CPR. In addition, there are using the resources that are easy to find out in the area, build up communities’ network team to manage high-risk water sources and, installing warning sign with first aids for helping people from drowning.

RESULTS

According to the study, it is found that the number of children, who died from drowning (0-14 years) in Nakhon Ratchasima at the beginning of the year 2012, were 40 children (8.4). In 2013, there were 36 children (7.5) who died from drowning. In 2014, there were 23 children (4.8) who died from drowning. In 2015, there were 21 children (4.4) who died from drowning. The number of dead children from 2012 – 2015 has been decreasing because of the good cooperation between a network of Merit Maker (32 teams of Nakhon Ratchasima) and management 90 places high-risk water sources.

DISCUSSION AND CONCLUSION

Death from drowning can be prevented by creating a network Merit Maker team in the area, using the simple methods that focus on skill training for children and managing about environmental water resources under resources of the area.
BACKGROUND
Drowning is a recognised leading killer among the children aged 1-17 years in Bangladesh. To prevent early childhood drowning, the Centre for Injury Prevention and Research, Bangladesh (CIPRB) developed Anchal (community crèche) programme in 2005 and since then CIPRB has been implementing the programme in different districts of Bangladesh. Study findings shows that Anchal is an effective intervention for preventing childhood drowning among the children aged under 5. Currently through Saving of Lives from Drowning (SoLiD) in Bangladesh and Bangladesh Anchal and SwimSafe (BASS) projects 1,640 Anchals are in place in three sub-districts of Bangladesh. The objectives of the Anchal are to provide institutional supervision and early childhood development stimulations (ECD) to the children. A local trained caregiver supervises 20-25 children, 9 to 59 months old, during 9 a.m. to 1 p.m., six days a week. Although it was found effective for childhood drowning prevention, several challenges were noticed during its implementation phase. The study was conducted to identify challenges and means to overcome those to improve the Anchal activities.

METHODS
Two focus group discussions (FGDs), one with the Anchal care givers and the other with the parents of the children who participated in the Anchal programme; and three in-depth interviews were conducted with one Anchal caregiver, one supervisor and one trainer. In each FGD there were 8 participants. A three-member group of anthropologists were recruited to conduct the FGDs and in-depth interviews. During FGD and in-depth interview sessions one of the anthropologists conducted the interviews, another anthropologist was engaged in audio recording and also taking hand notes, the other one was responsible for overall management of each interview session. After field testing a series of prompts were finalised by the authors separately for the FGDs and in-depth interviews. These prompts were used during interviews. Prior to each interview, informed consent was obtained from the interviewees and permission was obtained for audio-recording. All interviews were conducted in Manohardi sub-district, one of the intervention areas, during November 2015. Transcripts of the audio-recordings were prepared in native language (Bangla); the analysis was done in thematic areas by examining the transcripts and hand notes. The last 10 years of documents were also reviewed to identify challenges.

RESULTS
The study findings showed that decay of knowledge and skills after 2-3 months of training, lack of formal certification and inappropriate selection of women as Anchal caregivers, enrollment of small children (less than 12 months) were the important challenges. Reluctance of parents to send children at the Anchal in proper time, failure to engage children in various early childhood development (ECD) activities, ineffective conduction of parents and community leaders meeting by the Anchal caregivers, insufficient accommodation and poor supply of logistics for children were also the important challenges. The suggestion for improvement were to recruit caregivers as per standard criteria, provide them with refresher training at three month intervals, train them on effective conduct of parents and community leaders meeting, provide formal certificate and ensure regular supply of logistics.

DISCUSSION AND CONCLUSION
The challenges identified in this study need to be addressed by utilizing the suggestions obtained from the FGDs and in-depth interviews to make the Anchal intervention more effective in preventing childhood drowning in rural community of Bangladesh.
BACKGROUND

Drowning is the first cause of death in children who are under 15 years old in Surin province, a province located in the North East of Thailand. Death rates in years 2012 to 2016 between 7.9-14.3 per 100,000 children who are below 15 years old. The main factor is that most of children do not know how to swim; therefore, they have no skill to help themselves while drowning. In addition, there is a few standard pools in local communities. Many schools have no swimming program for students. This has led to a significant increase in number of children drowning this period.

OBJECTIVES

Our survival swimming team try to find out how to prevent children from drowning. We have discussed and considered of the easiest way to take into action. In 2014, a number of drowning children below 15 years were 28 cases. The place where drowning occur are community ponds. We found that 14.3 percent of children can swim and 85.7 percent of children cannot swim and all of them have no skill in survival swimming. The factor leads to drown is that 46.3 percent of them play in the risk water with friends, 42.86 percent of them was drops in the risk water, 7.14 percent of them was catch the fish and 3.57 percent of them was help their friend who drowning. The main point we focus on is how children can float in the water and have a right skill to help people or their friends from drowning since there are not many standard swimming pool available. Mobile pool which is given from a supporter is an alternative way. We adapt survival swimming curriculum for trainer and children. The trainer taught children in easy steps and used simple equipment to help children floating in the water such as plastic bottle. This saves time and is not dangerous while training in mobile pool. We plan the best practice school model in local communities. This is important because our team must review and train ourselves to have expert skill in order to teach children. Children who have good skill can train another child. More than 80 percent of students who pass 15 hours of survival swimming curriculum can float in the water. The longest hour some children can float is 4 hours. The important technique is that they need to learn the right way of how to breath by mouth, how to keep air in lung, make right position and use empty plastic bottle (1,000 ml) when floating in the water. By the knowledge management from team network corporation from Hospital, Health station, School, Local administration and other volunteers which work in Province, district and sub-district, we learn how to be a good teamwork to help children.

CONCLUSION

Today, we have the best practice in school and set a leader student to be a coach helper and also help friends in survival swimming program. Moreover, we have developed a survival swimming program for 500 trainers from every district, co-operate in school program. All of this is a concrete success that all school can apply; teach in the process of teamwork and to solve the problem of drowning in Surin. The 7 years of success, between 2010-2014, is our pride. Everyone voluntarily helps children from drowning. The goal is to reduce death rate of drowning to be lower than 6.5 per 100,000 children who are below 15 years old within 2018. Children can be able to learn survival swimming in primary school, float in water, and know how to help people who drowning.
UNDERSTANDING STAKEHOLDERS’ PERCEPTION TO CHILD DROWNING PREVENTION INTERVENTIONS IN RURAL BANGLADESH

Dr. Shirin Wadhwaniya, Dr. Kamran Baset², Ms. Shumona Sharmin Salam³, Rabiu Awal Chowdhury, Jasmin Khan, Dr. Olakunle Alonge¹, Dr. Adnan Hyder

¹Johns Hopkins International Injury Research Unit, United States, ²Center for Injury Prevention Research, Bangladesh, ³International Center for Diarrheal Disease Research, Bangladesh

BACKGROUND
Drowning accounts for 42% of childhood mortality among 1 – 4 years old in Bangladesh. There is a need to understand supervision practices and the perception of various stakeholders to potentially effective interventions for childhood drowning prevention in Bangladesh. Such understanding will enhance the successful implementation and impact of childhood drowning interventions in Bangladesh and similar LMICs. The Saving of Lives from Drowning (SoLiD) project was implemented in seven rural sub-districts of Bangladesh to assess the effectiveness of two child drowning prevention interventions – playpen and crèche between 2013 and 2015. Nearly 100,000 under-five children received either playpen (plastic or wooden) or were enrolled in crèche or receiving both interventions.

OBJECTIVE
The objective of this study is to explore and gain an in-depth understanding of the acceptability and perceptions of different stakeholders about crèche and playpen interventions.

METHODS
Qualitative research methods including 16 focus group discussions and 16 in-depth interviews were conducted with parents of children who are receiving interventions, community-level workers who are involved in delivering these interventions and community leaders.

RESULTS
Preliminary analysis revealed that the respondents reported using a range of supervision practices: 1) directly restricting child’s movement; 2) using tools that increase awareness of child’s movements; 3) creating a barrier around water bodies or around the house; 4) direct supervision of children; and 5) creating fear of water among children.

Acceptability and utilization of playpen was found to be mixed – use declined with time. Some found it useful and some others felt it as difficult to keep child in it. It was easier to use for younger children and shorter period; parents discontinue use when the child was 18 – 19 months of age. Families found plastic playpens attractive, lighter and these were easier to move as needed, compared to wooden playpens. Many respondents felt that playpens were unaffordable but few were willing to purchase.

Acceptability and utilization of crèche was found to be high. Caregivers reported benefits such as safety, injury prevention, education, cognitive and psychosocial development of children. Some younger children took a while to get settled in the crèche. Compared to other methods of supervision there was a strong preference for crèche. However, fewer community members were willing to financially support crèches.

CONCLUSION
Acceptance, favorable perception and utilization of crèches was high. This was less so for the playpens, except with use for very young children. Willingness to pay for either intervention was low.

FUNDING
This study was funded by Bloomberg Philanthropies.
INTRODUCTION
Reports from the Korle-Bu Teaching Hospital indicate that, drowning is the leading cause of accidental deaths among children between the ages of 10 – 19.

In order to come up with an acceptable framework for drowning prevention, the development of drowning prevention frameworks should be "culturally appropriate", meaning there is no one-size-fits all approach towards a framework for drowning prevention.

OBJECTIVE
Felix Foundation has adopted culturally specific approaches to help reduce drowning in the country. Among such approaches include the Aquatic Survival Program (A.S.P) and the Community Sensitization Program (C.S.P).

METHODS
The primary aim of the A.S.P is to save lives by training teachers and students on locally designed water safety messages and where feasible, basic self-survival and rescue skills. Since the inception of the program, we have trained more than 40,000 people in more than 300 schools.

The Community Sensitization Program (C.S.P) addresses the deficit in the ASP by expanding its boundaries beyond the schools to reach out to people within the local communities such as market women, non-school going children, drivers on the street, among others. The CSP educates people on how to save lives without putting their own lives in jeopardy. To date, more than 2,500 Ghanaians have benefited from this program.

CONCLUSION
Major recommendations on the way forward as suggested by one of The Maatschappij tot Redding van Drenkelingen’s (MRD) Handbook on Drowning (2014) is to develop approaches which are similar to interventions used to reduce early child mortality such as immunization, breast feeding and oral rehydration therapy. According to the MRD, drowning interventions should be no different. This means that, drowning prevention lessons should also be introduced to people at a very tender age.

In Conclusion, the typical Ghanaian perspective of drowning prevention is encouraging the banning of people from entering into water. However, experiences from the past have shown that such approaches are not helpful. The Foundation therefore places more efforts on the harm minimization approach where people are educated on water safety.
THE IMPLEMENTATION OF ADMISSION STANDARDS IN PUBLIC SWIMMING POOLS

Ms. Nathalie Vallieres¹

¹Lifesaving Society Ontario and Ryerson University, Ottawa, Canada

Poster Day 3, October 19, 2017, 8:30 AM - 5:00 PM

BACKGROUND

Admission standards or specific child: guardian ratios for public pools have been endorsed and promoted by the Ontario Ministry of Health and Long Term Care (MOHLTC) to prevent recreational water injuries and fatalities. However, the voluntary adoption of these admission standards in Ontario has not been evaluated.

AIM

Therefore, the aim of this study was to explore the implementation of these admission standards in Class A public pools.

METHOD

An online survey was developed and disseminated to Class A public pool operators in Ontario. Frequency distributions were used to describe the results.

FINDINGS

All respondents have some form of admission standards integrated into their operations, with 68% using child: parent ratios that exceed the minimum MOHLTC’s recommendations. The majority of operators (87%) felt that admission standards have a positive impact and there were no known increases in water-related incidents post-implementation.

Many owners/operators (78%) would support their enactment into the pool regulations. The findings from this study highlight the promise of utilizing admission standards to prevent or, at the least reduce, the burden of injury related to recreational water use in Ontario. While the results are encouraging, it is recommended that further research be conducted as this was an exploratory study only.

The research has been published in the Environmental Health Review http://pubs.ciphi.ca/doi/pdf/10.5864/ehr.2016.593
INTRODUCTION
In Brazil, 1 million almost drown and 6,000 die by drowning each year. More than 65% occur in rivers, lakes and dams where no supervision by lifeguards exists. In view of this tragic reality, it is fundamental to create resilience mechanisms for these places, with municipalities as central actors in order to improve the management of drowning risks and take subsequent actions in their geographical area.

OBJECTIVE
To evaluate the impact of SOBRASA’s prevention tools with the potential to develop a new concept called ‘Drowning Resilient City’.

METHODS
For this study, the drowning prevention tools developed by SOBRASA’s BOD members and their impact were analysed. SOBRASA gathered a package of prevention and risk management programs in water settings, and offered them free of charge to the Municipal Civil Defence Manager. At the request of the city mayor, SOBRASA will conduct an analysis of the risks identified in the city’s drowning contingency plan to identify which actions are most needed and beneficial. If the municipality approves the actions proposed, a good practices protocol will be signed between the 2 institutions.

RESULTS
In 2016, 60,000 people participated in the “Pool+safe” program, 15,000 in the “Kim at school”, 7,000 surf-safe, 250,000 in the “waters+safe”, 1,500 in the activities of a surf lifesaving club, and 2,000 in the “Dive+safe”. Other prevention tools analysed were the: “Drowning in Brazil annual bulletin, 3 cartoon videos regarding water safety, comics regarding fresh water and flooding safety, prevention tips manual, flyers, brochures and banners (online for free download), 7 online free courses, educational games online, aquatic emergencies course, safety signage, lifesaving championships, technical meetings, 2 symposia, 5 Facebook pages/groups with a total of 20,000 subscribers, 2,000 followers on Instagram, 3,500 people member affiliated to SOBRASA.

DISCUSSION
The tools used/provided by SOBRASA have reached a relevant number of people. However, the programs are currently being implemented by volunteers, in an isolated manner, without the direct support of the states and municipalities. It’s important that policy makers and enforcers understand that drowning is a Civil Defence problem, supported by the Federal Law 12.608 which establishes the National Policy for Civil Protection and Defence: “It is the responsibility of the Union: (...) IV - to support the States, Federal District and Municipalities mapping the risk areas, identifying threats, susceptibilities and vulnerabilities and disaster risk and in other prevention, mitigation, preparation, response and recovery actions”.

By engaging civil defence managers, directly responsible for risk management of other types of disasters, but not yet drowning, drowning reduction will have a greater impact on the society.

CONCLUSION
SOBRASA’s drowning prevention tools should be used by all municipalities in a planned programme called “Drowning Resilient City”, through the management of the risks identified in the drowning contingency plan as a civil defence program, supported by current legislation.
INTRODUCTION
Drowning has become a leading killer of children globally, especially in LMICs in Asia. Interventions that reduce the rate of child drowning in Asian LMICs are needed. This study presents comprehensive, cost-effective, and scalable methods in which organizations can address this issue in Indonesia, the world’s fourth most populous country.

METHODS
Between 2015 and 2017, a drowning prevention organization called Swimdo implemented intervention programs in Indonesia. These programs consisted of survival swimming, water safety, CPR training, community surveying, and daycare.

CONCLUSION
Swimdo found that most children in Balinese communities do not know how to swim, that these communities are open to the implementation of drowning prevention programs, methods for implementing these programs are cost effective, and that current drowning data concerning the region are insufficient and must be supplemented.
**PROPOSAL OF BEACH RISK ASSESSMENT METHOD OF JAPAN**

Dr. Toshinori Ishikawa\(^1,5,\) Takahiro Kazama\(^1,\) Dr. Yoshihide Nakagawa\(^2,\) Dr. Shinich Aoki\(^3,\) Dr. Shuji Tanaka\(^4,\) Dr. Tsutomu Komine\(^5,\) Akira Nakayama\(^1\)

\(^1\)Japan Lifesaving Association, Minato-ku, Japan, \(^2\)Tokai University Emergency Medical Center, Japan, \(^3\)Osaka University, Japan, \(^4\)Kokushikan University, Japan, \(^5\)Chuo University, Japan

Poster Day 3, October 19, 2017, 8:30 AM - 5:00 PM

**BACKGROUND & OBJECTIVE**

There are a lot of drowning accidents and injuries occurring on bathing beaches in Japan. In recent years, from 1,500 to 3,000 drowning accidents including unconscious victims have occurred every year. Also, first aid was carried out 10,000 to 25,000 times. In order to reduce drowning and injury, beach users have to truly understand the potential risks and prevention methods with local governments and lifesavers' cooperation. In this study, a multi-lateral beach risk assessment method to understand these was proposed.

**METHOD**

This method was studied based on the ILSE risk assessment method. The ILSE method is composed of an evaluation of Hazards & Risks [HR] and Beach Management [BM]. Although the ILSE method was mostly adaptable to Japan, the Japanese characteristics regarding the drownings, injuries and the beach management had to be considered. Thus, the characteristics were clarified using the analysis of lifesaver reports and our experience. Then, additional factors and items were proposed, and these evaluation guidelines which matched the Japanese characteristic were set.

**RESULTS**

The number of the HR has 18 factors that consist of 6 factors proposed by us along with 12 factors proposed by ILSE. In Japan, although principal outbreak factors of drownings are the rip current, same as other countries, it is followed by offshore wind. Because most beaches are eroded, there are some beach cliffs which have potential risks for shore use. The countermeasures against Tsunami are required. In addition, a majority of first aid cases mainly involve jellyfish stings. Therefore, ‘the strong wind direction’, ‘the beach topography’, ‘Tsunami’ and ‘dangerous organisms’ were added as factors.

The BM consists of 13 items which include 5 items proposed by us. In the personal drowning factors, the drowning connected to alcohol changes annually from second to fourth place preceded by the lack of swimming skills. Then, there are many young age victims, so the water safety education is required. Thus, ‘the regulations and rules regarding alcohol’, ‘the provision of the water safety education’ were added as items.

These situational factor guidelines were set as possible quantitatively and a definite reference of prior studies. Also, the evaluation of the HR set five phases (Very high, High, Medium, Low and Very low) from the combination of Harmfulness and Probability of each with three phases (High, Medium and Low). It was proposed by ILSE. As an example, in the case of occurrence of a permanent strong rip current, the Harmfulness is High. So, if Lifesavers set the bathing area to avoid it, the Probability is Low, and then the HR is Medium. The BM set three phases (Satisfaction, Neutral and Dissatisfaction) as well. The concept of a safe bathing beach is proposed by the result of a comprehensive evaluation of the HR and the BM.

**CONCLUSION**

The multi-lateral beach risk assessment method was proposed. In fact, the validity of this method was confirmed on some beaches, and it could help risk reduction after having clarified the risk factors of these beaches.
BACKGROUND AND AIM
The study aimed at identifying behaviours associated with dermatological lesions caused by solar radiation in military lifeguards that might impact the prevention of such injuries.

METHODS
It’s a descriptive, exploratory study with a quantitative approach conducted in 40 lifeguards of the Alagoas’s Military Fire-fighter Corporation. The participants were randomly selected and the study consisted on a structured questionnaire. Data collected included: socio-demographic info, behaviours and attitudes towards sun exposure and skin medical examination. All participants were males, 55% have been lifeguards for an average of 6 to 20 years. Most (61%) participants were aged between 31 and 40 years old. Regarding the educational level: 45% have a higher degree (complete or not), 40% secondary degree and 15% basic degree. Considering the behaviours and attitudes towards sun exposure, 50% mentioned using correctly a sunscreen cream, reapplying 2 to 5 times a day. Of the remaining 50%, 23% don’t use sunscreen at all and 27% use it inappropriately. When asked, all mentioned they knew the risks of sun exposure without protection; 68% recognize they need to apply sunscreen 15 min before exposure and 72% mentioned they use other protective equipment (such as long-sleeved shirts, sun glasses and Australian cap). The reasons pointed for not using sun screen were: 62% by own choice, 21% forget to reapply and 17% feel uncomfortable using sun screen lotion and therefore only use protective clothing mentioning it’s enough. The incidence of dermatologic lesions caused by solar radiation as clinically observed were: Actinic keratosis (2.5%); Leucoderma gutata (20%); Freckles (22.5%); Lentigo (92.5%); Wrinkles (65%); Melanocytic Nevus (60%); Melanocytic nevus with alteration of A, B, C or D (5%); Melasma (15%); and Poikiloderma of Civatte (5%).

CONCLUSION
The results show that the educational level plays an important role in the behaviours and attitudes towards sun exposure of the military lifeguards since the ones with higher educational level had less dermatological lesions on their skin and mentioned being more cautious when surveyed. The male resistance to use sunscreen lotions is a cultural gender-related trait that needs to be addressed in preventive strategies. Dermatologic lesions expected to develop with aging and appear only after the age of 40, such as wrinkles and lentigo, were present in all lifeguards.

Further research is recommended to fully understand the burden of this problem in lifeguards, including females, and associated protective behaviours that should be enforced by preventive efforts. The authors would like to thank SOBRASA for the scientific support provided.
SUCCESS PROJECT ABOUT DROWNING PREVENTION BY VOLUNTEERS IN THE COMMUNITY, NAKHON RATCHASIMA PROVINCE, THAILAND.

Mr. Chanchai Supawerakul

1Buddha Dhamma Hook31 Foundation, Nakhon Ratchasima, Thailand

Poster Day 3, October 19, 2017, 8:30 AM - 5:00 PM

BACKGROUND

Nakhon Ratchasima province is the largest province of Thailand. It has the second highest number of population (the first highest number of population is Bangkok). Its main areas are agricultural. Its statistical death of drowning that usually occurs in rural areas and natural water sources are in the top 10 provinces of Thailand.

OBJECTIVE

To reduce the drowning in Nakhon Ratchasima Province.

METHODS

This project has been starting since 2012. It has been built by a network of Merit Maker team comprising many sectors. This project has been based on the revision of existing experience and the own cost. This project was started from one team in the urban and then was expending to rural areas until it was completely covered the 32 districts in 2015. There are educations about safety on water for communities, skills about helping people from drowning, survival skills on the water when drowning and, skills for CPR. In addition, there are using the resources that are easy to find out in the area, build up communities’ network team to manage high-risk water sources and, installing warning sign with first aids for helping people from drowning.

RESULTS

According to the study, it is found that the number of children, who died from drowning (0-14 years) in Nakhon Ratchasima at the beginning of the year 2012, were 40 children (8.4). In 2013, there were 36 children (7.5) who died from drowning. In 2014, there were 23 children (4.8) who died from drowning. In 2015, there were 21 children (4.4) who died from drowning. The number of dead children from 2012 – 2015 has been decreasing because of the good cooperation between a network of Merit Maker (32 teams of Nakhon Ratchasima) and management 90 places high-risk water sources.

CONCLUSION

Death from drowning can be prevented by creating a network Merit Maker team in the area, using the simple methods that focus on skill training for children and managing about environmental water resources under resources of the area.
BACKGROUND

Unintentional drowning and aquatic-related injury is a leading cause of death and hospitalisation among adolescents aged 10-19 years in Victoria, Australia. Between 2000/01 and 2014/15, there were 43 fatal drowning incidents, 105 hospital admissions and 132 emergency department visits for non-fatal drowning in this age group. Therefore, ideal methods of engaging adolescents in water safety and emergency response to reduce drowning incidents should be determined. A review of existing delivery methods for water safety and emergency response education in Victoria identified that face-to-face methods are inefficient and unsustainable, particularly in regional areas. Life Saving Victoria subsequently developed the Everyday Lifesaver App; an interactive digital game-based app that teaches water safety and emergency response to secondary school students.

AIM

To determine the effectiveness of a digital game-based instructional method for providing water safety and emergency response knowledge and actions to students aged 12 to 14 years (Years 7 and 8).

METHOD

From the App’s launch in October 2015 until April 2016, technical analytics were obtained for the number of downloads from the iTunes Store and Google Play and the number of learning game plays. In addition, a trial of three instructional interventions among Year 7 and 8 students was undertaken to evaluate the effectiveness of the App. Three schools were each assigned a unique instructional intervention method with educational content remaining the same. Students’ knowledge of emergency response/water safety and competency performing CPR were assessed. Interventions included:

- App Group (AG) – App completed in class, with assessment one week later;
- Practical Group (PG) – Practical session completed in class, with assessment one week later;
- Control Group (CG) – Assessment without completing the App or practical training.

Qualitative and quantitative measures evaluated the App’s impact through a survey of school teachers following completion of the App in-class, and a focus group with students, parents and teachers.

RESULTS

Technical analytics revealed the App was installed on over 800 devices by people from approximately 96 organisations including an estimated 70 Victorian schools. It was played by over 12,000 people, including over 5,000 school students. The instructional intervention study revealed that students who completed the App (AG) demonstrated similarly high knowledge of the key steps in the Emergency Action Plan (DRSABCD) and water safety as those with practical training (PG). On average 77% of AG students answered all ten knowledge-check questions correctly, similar to PG (84%) and higher than CG (57%). Overall 88% of AG students felt more confident to perform CPR following playing the App. However, whilst they performed similarly to PG when delivering chest compressions, and far better than CG (44% AG, 50% PG vs 3% CG); they demonstrated poor skills when delivering rescue breaths (PG = 27%, AG = 1%, CG = 0%). The ten focus group participants provided positive feedback including that the App was enjoyable, engaging and educational and that it developed the skills and knowledge they expected. All nine school teachers surveyed would recommend the App to someone else. They all agreed that: they would use the App again; students were engaged; it was a quality e-learning program; and the content was appropriate for students’ abilities.

DISCUSSION AND CONCLUSION

The Everyday Lifesaver App is an innovative instructional method demonstrated to provide adolescents with foundational awareness and knowledge of water safety and emergency response. Whilst students who completed the App demonstrated a similarly high level of knowledge of the key steps in the Emergency Action Plan (DRSABCD) and water safety, they were less competent when performing practical skills. Reasons for this may include limitations in App design and the classroom environment (e.g. muted devices, working in groups).

The results of this evaluation will inform development of the next update of the App which include:

- Review, update content related to checking for breathing and delivering rescue breaths to improve practical outcomes;
- Investigate opportunities to enhance the digital platform to include additional safety content and key messaging, i.e. fire and flood safety;
- Identify opportunities to develop first aid content, with an aim to provide students with a pathway to an accredited Provide First Aid qualification.

The App is widely available online at www.everydaylifesaver.com.au and on the App Store and Google play for mobile devices.
BACKGROUND
By providing in time first responder services among the injured it is often possible to minimize the progress of severity and long-term morbidity or mortality. Like many other countries emergency health care system in Bangladesh is not well established especially rural areas. Research findings established that community based adolescents and young adults are suitable candidate for providing first responder services effectively in Bangladesh. In Bangladesh drowning is the major contributor for death among the children aged 1-17 years. To reduce the burden of child death due to drowning CIPRB developed “SwimSafe” program in 2005 and later in 2012 first responder program was incorporated as part of SwimSafe program. Besides swimming teaching among the children the community volunteers also provided first responder services in the community.

OBJECTIVE
The objective of this paper is to describe the results of the volunteer based first responder services for the management of the drowning casualties during 2012 and 2015 in the rural communities of Bangladesh.

METHODS
Community swimming instructors mostly adolescent aged between 16 and 25 were selected as first responder volunteer. Training manual and trainers were hired from the International Drowning Research Centre (IDRCB). During the training special focus was given in management of drowning causalities management. All trainees had sufficient access of manikins for the practice of CPR. The volunteers were also trained about keeping a record for any first responder services. For collecting any drowning related information a structured questioner was used.

RESULTS
During 2012 and 2015 a total of 2305 volunteers were trained as first responder, among them 986 (43%) were male and 1,319 (57%) were female. The volunteers provided first responder services among 6,774 injured, of the injured 184 causalities were rescued from the water. After the rescue volunteers immediately checked consciousness level of the drowning victims. Based on the primary assessment of the consciousness level volunteers immediately provided CPR among the 31 casualties, of these causalities 22 (71%) survived and 9 (29%) ended with fatality. 54 casualties who had presence of breathing were treated with keeping recovery position. Rest of the rescued casualties were checked for ABC and recommended for taking rest. A total of 41 causalities were referred to the health facilities after providing first responder services.

CONCLUSION
First responder program is an effective program for the management of the drowning causalities. Developing countries like Bangladesh where drowning is a problem in rural communities, by developing community first response system it is possible to minimize the drowning related mortality, morbidity.
IMPROVING SIGNAGE AT SUPERVISED AQUATIC FACILITIES THROUGH DESIGN

Mr. Kelly Carter

1Lifesaving Society - Alberta and Northwest Territories, Edmonton, Canada

Poster Day 3, October 19, 2017, 8:30 AM - 5:00 PM

BACKGROUND

In completing an environmental scan of aquatic signage throughout Canada and internationally it has become evident that there are vast differences and approaches to the design and placement of signage around water. The results of the environmental scan include a lack of design standards not just internationally but locally and lack of standardized messaging.

METHODS

The environmental scan also considered the size, placement, and immediate recognition of the content and messaging included on signage.

RESULTS

Results found that it common practice for government health departments to include mandatory requirements that identify specific statements for inclusion on health warning signs around water. It is noted that in many cases these required statements are noted to be long and the effectiveness of them questionable.

This session highlights the results of our environmental scan and shares insights including recommendations to improving the effectiveness and placement of signage around aquatic environments to further drowning and injury prevention efforts.

Future research will be needed to evaluate the effectiveness of different types of signage and messaging in both supervised and unsupervised aquatic environments.
STEREO CAMERAS FOR MEASURING COASTAL CURRENTS AND OTHER PROCESSES

Dr. John Porter¹, Mr. Jim Howe²

¹3SRM Inc., Honolulu, United States, ²Ocean Safety International, Kaneohe, United States

Poster Day 3, October 19, 2017, 8:30 AM - 5:00 PM

BACKGROUND

Drowning prevention is a major public health issue at certain location both within the US and Internationally. A critical component of any drowning prevention program is accurate and timely information regarding ocean current movement in the surf zone and near shore waters environment. A variety of methods can be used to measure coastal waters movement but the most common approach is to use personal observation by trained and skilled observers. The use of remote sensing technologies is a developing area in the field of injury prevention that is anticipated to expand current observation capabilities significantly.

AIM

This talk will discuss new imaging methods being developed to remotely measure and map out coastal ocean water movements. As part of a NOAA SBIR grant, the 3SRM company developed several camera-imaging techniques that use feature tracking to measure coastal currents. The approach borrows from techniques developed in diverse scientific and engineering disciplines. Prototype systems were used to collect field observations in Hawaii during 2014. In 2015 an experts meeting (scientists and ocean safety experts) was held at the University of Hawaii where the exploratory measurements carried out by the 3SRM company were discussed. The experts found that the novel imaging techniques offered promise and recommended further development of the beta system.

During 2016 work focused on development of hardware and software to enhance the beta system. Four methods for observing coastal currents were developed during this time period. They include a cell phone approach (MMCell), a single camera on a pan-tilt (MM1PT1), two cameras on one pan-tilt (MM1PT2), and two cameras on two separate pan-tilt systems (MM2PT2). The MMCell and MM1PT1 offer the ability to measure coastal current measurements with moderate accuracy. The MM2PT1 and MM2PT2 offer the ability to measure coastal currents, wave heights, and coastal erosion using stereo vision techniques.

Validation and demonstration measurements are being carried out in 2017. These include measurements in Hawaii and selected locations in U.S. coastal surf zones and near shore waters. In order to test the new technology measurements are carried out in diverse environments including locations with well-defined surf spots (with adjacent deep channels) and beach break locations (with less clearly defined currents). Measurements are tested in both foam covered and foam free waters. The coastal current measurements are validated using a GPS logger mounted on a human subject who drifts in the current and wave systems.

Efforts are being made to provide the remote observations system in an efficient and easily deployable manner. The measurement system is being optimized for compatibility for public information dissemination via a variety of media platforms. This effort is being carried out via collaboration with individual ocean safety and coastal communities to ensure compatibility with existing public information distribution systems and local requirements.
RESCUE
BACKGROUND
Factors that are believed to predict outcome guide drowning rescue protocols and decision-making but few have been well studied.

OBJECTIVE
To identify which factors known to rescuers at the drowning scene predict favourable outcomes.

METHODS
Systematic review and meta-analyses

To identify drowning studies, PubMed, Embase and Cochrane Library were searched (1979–2015). Studies were included if they were cohort or case–control studies that used outcomes of survival and/or neurological outcomes to evaluate at least one of the following scene factors: submersion duration, victim’s age, water temperature, salinity, emergency services response time and witnessed event. Studies were not restricted based on language or setting. Studies were excluded if the study (i) design lacked a comparison group (e.g. case reports, case series), (ii) contained insufficient information to calculate a relative risk (RR) and the required data were unavailable after contacting the author(s), (iii) reported only highly selected patient treatment groups (e.g. those receiving invasive ventilation or extracorporeal membrane oxygenation), and (iv) was published as an abstract only or in conference proceedings. Two reviewers independently screened articles for inclusion, extracted data, and assessed quality using GRADE. Variables for all factors, including time and temperature intervals, were categorized using those used in the articles.

Relative risks were calculated for each factor in each study. Random effects meta-analyses, study heterogeneity and publication bias were evaluated.

Results: Twenty-four cohort studies met the inclusion criteria. The strongest predictor was submersion duration. Meta-analysis showed that favourable outcome was associated with shorter compared to longer submersion durations in all time cutoffs evaluated: ≤5–6 min: risk ratio [RR] = 2.90; (95% confidence interval [CI]: 1.73, 4.86); ≤10–11 min: RR = 5.11 (95% CI: 2.03, 12.82); ≤15–25 min: RR = 26.92 (95% CI: 5.06, 143.3 involving 15 studies involving 1,697 victims). Favourable outcomes were also seen with EMS response times of < 9 minutes compared to > 9 minutes (RR = 2.84 (95% CI: 1.08, 7.47 in two studies involving 377 victims) and with salt water compared to fresh (RR=1.16 (95% CI: 1.08, 1.24 in two studies involving 2163 victims).

No difference in outcome was seen based on victim’s age (12 studies involving 3,975 victims compared children < 3 or <5 years of age with those older), water temperatures (3 studies involving 1,495 victims compared drowning in very cold or cold waters versus warm waters), or witnessed drownings (4 studies compared 2,140 victims).

Most studies (16/24) evaluated each factor alone rather than using multivariate analyses. Multivariate analysis more accurately shows the relationship between the factor of interest and outcome by controlling for confounders that obscure that relationship. Usefulness of predictors in life/death decision-making should be based on multivariate analysis.

CONCLUSION
The most reliable and strongest predictor of outcome was the victim’s estimated submersion duration. Increasing submersion duration was associated with worse outcomes. Submersion durations <5 min were associated with favourable outcomes, while those >25 min were invariably fatal. This information may be useful to rescuers and EMS systems deciding when to perform a rescue versus a body recovery.
BACKGROUND
The surveillance process can be described as observing, recording and making an assessment of the water area that is being surveyed. In terms of time, surveillance is the primary component of the lifeguard’s job.

AIM
The objectives of this study were to identify if lifeguards’ detection rates, visual search, time to detect hazards, mental demand, effort exerted, and perceived performance changed throughout the eight-hour shift duration.

METHODS
An eye tracker was used to detect lifeguard eye movements while watching five minutes of animated footage projected onto a large screen at four points during their normal eight hour shift whilst wearing a Finapress system to measure cardiovascular (CV) variables.

RESULTS
Detection rates remained similar across trials suggesting that an eight-hour shift does not have a negative impact on detection performance. However, the eight-hour shift experienced by lifeguards may ‘buffer’ the learning effect, resulting in similar levels of performance over time rather than improved performance. Lifeguards produced a more erratic scan path (more fixations of shorter duration) in trial four than trial one. Mental demand, effort exerted and perceived performance were all higher in trial four compared to trial one. Lifeguards felt their detection performance improved over the course of the day, but that they had to expend more effort and undergo higher mental demand to achieve this. The perceived workload data showed no trends with performance; those achieving higher detection rates did not feel they had higher mental demands, were putting in more effort or achieving higher levels of performance.
BACKGROUND
Swimming is a popular activity for both adults and children. Lifeguard surveillance is a vital task in maintaining the safety of these pool bathers, and while drownings in lifeguard-supervised areas are incredibly rare incidents in the U.K, the effects can be devastating. In psychology, visual search is a well-researched topic which often focuses on the difficulty of detecting a target in an array of distractors. In recent years, researchers have started to explore visual search in applied domains, including areas such as airport security and driving. However, one applied domain that remains relatively under-researched is that of the lifeguard. Of the few studies that have explored lifeguard-surveillance skills, researchers have either used highly naturalistic tasks or tightly controlled laboratory studies. Unfortunately, the former studies suffer from a lack of control, making it difficult to conclude anything, while the latter studies use extremely artificial stimuli, which makes it impossible to generalise findings back to the pool or beach environment.

The current study aimed to investigate lifeguard search in a highly-controlled manner, yet using naturalistic and dynamic stimuli, bridging the gap between the formative research studies that have been previously undertaken. Video-clips were filmed in a swimming pool with 3, 6, or 9 swimmers. In a third of the clips, no incident occurred. However in the other two thirds, one of the participants would feign a drowning incident. These incidents were either one of two scenarios, a conscious drowning with a swimmer displaying the instinctive drowning response (Pia, 1974) or an unconscious drowning with a swimmer face down at the surface of the water. These clips were shown to groups of participants who differed in their level of lifeguard training. They were asked to press a button to indicate that they had detected a drowning target. Eye movements and response times of participants were recorded.

RESULTS
There was evidence for lifeguard superiority of visual-search skills in detection of a drowning swimmer, with lifeguards eliciting faster response times compared to control participants (4215 ms vs. 5064 ms, p < 0.05). There was also marginal evidence that lifeguards were more accurate in their responses to drowning-present trials in low and intermediate set sizes (p < 0.05). Differences between the drowning types were also apparent, with unconscious targets being looked at sooner (1623 ms vs. 2123 ms, p < 0.001), and receiving the fastest response time (4100 ms vs. 5175 ms, p < 0.001). A gradual increase in drowning detection speed was evident with the increase of the number of swimmers (4207 ms, 4717 ms and 4984 ms for set sizes 3, 6, & 9 respectively, p < 0.001). The total amount of time spent looking at these targets followed a similar trend across set sizes, with a decrease in the percentage dwell time given to targets as the amount of swimmers in the pool increased (38% vs. 37% vs. 34% for set sizes 3, 6, & 9 respectively, p < 0.05).

DISCUSSION
These results demonstrate the positive impact of lifeguard training and experience in search and surveillance skills, with superior detection of drowning victims. The informative nature of different types of drowning is also highlighted, with unconscious drownings being very informative once detected. Conscious drownings take longer to spot and to respond to, possibly due to the overlap of their features with distractors (e.g. drowning targets and normal swimmers make similar movements). These results offer new insights that may lead to novel training tools in the future.
Human information processing (HIP) models inform how the autonomic nervous system generates rapid psycho-physiological and bio-mechanical responses during a casualty’s acute stress pre-fatality drowning event. When a drowning person experiences actual or perceived suffocation, initiated by freshwater or saltwater respiratory submersion or immersion impairment, the sympathetic division of the autonomic nervous system triggers the IDR, an observational research-based categorical constellation of body movements and positions.

35 filmed instances of pool and open water drownings and rescue events were downloaded to a Windows 7 computer with an IntelCore 2.40GHz processor. Employing Adobe’s video editing program, a frame by frame analysis permitted IDR’s whole image constellation variables to be isolated separately into single image frames and full sequence clips.

During the 2014 summer season ten pool environment video clips of 60 seconds duration were individually shown at pretest to 170 study participants. Six near drowning clips of 10 seconds length were imbedded and interspaced randomly twice at the beginning, middle, and end of each 60 second clip and projected at 30 fps. As a control, 4 projected clips of 60 seconds without images of near drowning persons were also shown.

76% of the lifeguards and 89% of the non-trained lifeguards were unable to detect the randomly imbedded drowning person’s video clips. Study participants were randomly assigned to either an experimental treatment group or the naïve control group.

This study’s hypothesis proposed that the 2 part treatment protocol would significantly increase the experimental groups’ drowning person recognition performance.

85 treatment participants attended a LgHIP group lecture. The psycho-physiological bio-mechanical determinants of the IDR and the naïve misconception beliefs about drowning person’s behaviors were provided to the treatment group. The lecture was then followed by an adaptation of On Drowning (1970) that visually illustrated the water crisis difference between the instinctive drowning response (IDR) and a swimmer in distress (SID).

The second part of the treatment protocol used an adaptation of Flash Recognition Training (FRT) to present Gestalt perceptions of drowning persons. An LCD projector showed the treatment group various single and multiple pool and open water FRT drowning images. Over 4 weeks the treatment group attended a 15 minute FRT session, three times per week. The exposure lengths of drowning person’s images duration was reduced weekly from 1 second for week 1; to 1/30 second for week 2; then 1/60 second during week 3, and finally 1/75 second for week 4.

At post-test, both groups were individually shown ten new pool environment video clips of 60 seconds duration. 10 second near drowning clips of 30 fps were again randomly placed at beginning, middle, and ending of each clip (N = 6), and 4 clips did not contain images of near drowning persons.

90% of lifeguards and 83% of non-lifeguards detected new randomly presented drowning person clips which supported the research hypothesis. 74% of the lifeguard control group and 86% of the non-lifeguards were unable to recognize the drowning person’s video clips.
Surf lifesaving organisations and local government authorities spend a considerable amount of human and financial resources providing surf lifeguarding services on New Zealand beaches; to ensure the greatest return from this considerable investment, it is essential that current and future resources be utilised as efficiently and effectively as practicable. A surf lifeguard supervision model has therefore been developed to determine surf lifeguard service requirements for specific sites, based on the calculated risk. The recommended changes to surf lifeguarding services are currently being implemented in the Wellington and Auckland regions.

The surf lifeguard supervision model is based on the analysis of data from over 52,000 patrols, and uses the calculated probability of rescue as a proxy for determining surf lifeguard service requirements. The model first investigates the influence of environmental factors, specifically beach morphology and wave energy, on the probability of rescue. Secondly, the model considers the influence of water use on the probability of rescue.

Using the mathematical relationships established between environmental factors, water use, and the probability of rescue, a base surf lifeguard to water user ratio of 1:25 was modified in proportion with the calculated risk to determine required surf lifeguard to water user ratios. Critical thresholds for the provision of surf lifeguarding services were also established, based on the calculated environmental hazard, to determine the lower limit at which a service can be considered a cost-effective risk management strategy. This leads to the recommendation of site-specific minimum surf lifeguarding season lengths, patrol hours, number of surf lifeguards, and their required competencies.

The surf lifeguard supervision model represents a significant change in the way surf lifeguarding service provision is determined in New Zealand, and its implementation brings a number of organisational, logistical, and political challenges. For example, the shift from region-wide minimum season lengths and hours to site-specific minimums has required volunteer Surf Life Saving Clubs, who deliver surf lifeguarding services on weekends, to adjust their service delivery while keeping their volunteer members engaged.

This analysis has also identified the need for weekday services, which are staffed by paid surf lifeguards and partly funded by local government authorities, to move towards a more flexible service delivery model. In particular, the management of peaks in water use may require the creation of an on-call system to employ additional surf lifeguards as required. This creates challenges for Surf Life Saving New Zealand and Surf Life Saving Northern Region, who need to provide certainly to their employees, while also being responsive in times of elevated risk. Questions regarding the responsibility for operational decision-making, and how the variance in service level is funded and communicated to the public, must also be resolved.

While the shift towards an evidence-based model of surf lifeguarding service delivery brings a number of challenges, it is nonetheless considered essential to ensure the risk of drowning and injury on New Zealand beaches is reduced as far as practicable.
Many global beaches are characterized by the presence of narrow and concentrated seaward flowing rip currents that extend from close to the shoreline, through the surf zone, and varying distances beyond. It is now well established that rip currents are the leading deadly hazard to recreational beach users as each year they cause hundreds of drowning deaths and tens of thousands of rescues on beaches worldwide. However, they are inherently complex natural systems that can exist on both planar beaches and those with alongshore three-dimensional morphology; lack morphologic expression, occupy distinct deeper channels or flow against hard structures; be both transient or persistent in occurrence and location; exhibit both mean and unsteady flows; vary depending on the angle of wave approach; and can be confined within the surf zone or extend well beyond the breakers.

Building upon a growing body of rip current literature involving numerical modelling and theory together with emergence of dense Lagrangian field measurements, we develop a robust rip current type classification that provides a relevant framework to understand the primary morphological and hydrodynamic parameters controlling surf-zone rip current occurrence, dynamics and hazards. Three broad categories of rip current types are described based on the dominant controlling forcing mechanism. Each category is further divided into two types owing to different physical driving mechanisms for a total of six fundamentally different rip current types: hydrodynamically-controlled (1) shear instability rips and (2) flash rips, which are transient in both time and space and occur on alongshore-uniform beaches; bathymetrically-controlled (3) channel rips and (4) focused rips, which occur at relatively fixed locations and are driven by hydrodynamic processes forced by natural alongshore variability of the morphology in both the surf zone and inner shelf zone; and boundary-controlled (5) deflection rips and (6) shadow rips, which flow against rigid lateral boundaries such as natural headlands or anthropogenic structures.

For each rip current type, flow response to changes in hydrodynamic and morphologic forcing magnitude can be addressed. We also demonstrate that in the real world, rip currents form through a mixture of driving mechanisms and the discrete rip types defined in fact form key elements in a wide and complex spectrum of rip currents on natural beaches.

Building on recent intensive experiments on rip current escape strategies involving GPS-equipped drifters and swimmers and the first numerical model of bathers escaping from a rip current, the optimal rip current escape strategies will be discussed. These swimmer escape strategy studies however do not fully replicate real world scenarios as they do not assess the critical social and psychological elements of how people will actually react to being caught in a rip current and the varying rip current types and flow conditions they may encounter.
Rip currents, which are sea tides that can carry swimmers into deep water beyond the breaking points, pose an immense security risk to beachgoers around the world. In Korea, rip current forecasting is divided into four warning levels: notice, watch, warning, and danger. However, the numerical results are represented by current vectors, and an additional process is necessary for converting these vectors into a predictive model.

The primary goal of this study is to present a method that illustrates how to convert numerically simulated vectors into a rose diagram and how to divide this diagram into four warning levels for rip currents. The proposed method was validated by analyzing the correlation between warning indexes calculated from the present approach and those obtained from the NERiPs (NEarshore Rip Current Prediction System).

The study was conducted at Haeundae Beach located in Busan, Korea. Different from the NERiPs, which is simply used to forecast the warning levels by the incident-wave conditions, this wave-induced currents model considers morphological effects.
Rip currents have been identified as the primary hazard associated with drowning and rescue from drowning at surf beaches. Rip current distress data is limited, however. Many rip-related incidents occur in areas where there is no one to document them. One measure of the magnitude of the hazard is to identify the proportion of rescues from drowning performed by surf lifeguards which are caused by rips, as this serves as a proxy for the relative percent of swimmers who experience distress from rip currents versus other causes. It also provides an approximation of the percent of drowning deaths at surf beaches that can be associated with rip currents.

The United States Lifesaving Association (USLA) has collected data from professional lifeguard agencies protecting natural bodies of water in the United States since 1960. This data includes the number of rescues from drowning performed and reported by professional lifeguards. From 1995 forward, this data has also included the primary cause of distress that led to the need for rescue. The leading cause has consistently been rip currents.

The USLA has published online the data it collects from lifeguard agencies since its first website was developed in 1997. The statistics have been used in a number of beneficial ways, including public education, lifeguard training, news media reporting, and scholarly research on rip currents. Unfortunately, publishing the raw data has inadvertently led to misinterpretation and resulting misreporting by authors of scientific papers.

The USLA has consistently reported, based on the data it has collected, that rip currents are attributable to over 80% of rescues from drowning at surf beaches. Nevertheless, two researchers published a letter in the journal Natural Hazards stating that their own review of USLA data indicated that just 36.5% of reported rescues from 2000 to 2009 were due to rip currents (Gensini and Ashley, 2010). Clearly, this is a wide variance.

Later, relying in part on USLA data, another group of researchers reported in the journal Natural Hazards and Earth System Sciences that from 2005 to 2011, rip currents were involved in 53.7% of the total rescues reported in the United States, 57.9% in the UK and 49.4% in New Zealand. They noted that, “The range 49–58% is much lower than 80–89% traditionally cited” (Brighton et al., 2013).

Understanding the prevalence of rip currents in swimmer distress and drowning death is critical to preparing rescuers, educating the public, and funding research. Underreporting may lead to complacency about the hazard. Getting the data right is, therefore, essential.

In an effort to correct the scientific record, this presentation will utilize over 20 years of rescue reporting data from more than 140 U.S. lifeguard agencies to fix a proper proportion of rip current involvement in over one million reported rescues. It will also explain how the USLA hypothesizes the number of drowning deaths associated with rip currents each year in the United States.
Surf lifesaving organisations and other emergency services conduct searches for missing persons along the New Zealand coastline following immersions and suspected fatal drowning incidents. However, there is currently limited understanding of how near shore currents influence the location of missing persons, and responders end up covering large areas or searching based on local knowledge or ‘gut feel’. This project is therefore investigating the dynamics of topographic headland rip currents and how these influence the location of patients in the water.

The findings will be used to assess the drift patterns of patients both on top of the water and submerged within the water column. The data will be used as a reference for future searches and rescues undertaken in the areas surveyed. Dangers and associated risks to public safety will be better understood and the information made available to the public.

METHODS
The project involves measuring headland rip current dynamics across a range of different swell, tidal and wind conditions throughout a 6 week period on selected beaches; these were determined using existing risk profiles carried out by Surf Life Saving New Zealand. The method used will set a data standard for future research on additional sites around the country and develop a library of information on coastal drift patterns.

Data collection involves collaboration between Surf Life Saving New Zealand lifeguards and New Zealand Coastguard Federation personnel to carry out the deployment and retrieval of GPS drifters, which are simple and easy to use. They can easily replicate a swimmer within a rip current due to their weight and drifting nature. A selection of the GPS drifters were submerged in the water column to replicate the drifting behaviour of a body in the benthic currents; this was compared to the drifting behaviour of the GPS drifters floating on the surface in the same location.

RESULTS
To date, preliminary results from some of the GPS drifters have indicated some major variances in the current lifeguard understanding of where particular rip currents were travelling within the inshore littoral zone of the beaches surveyed. Although final results are not available at the time of abstract production, these will be delivered at the World Conference on Drowning Prevention in October 2017.
Rip currents are the number one hazard on Australia’s coastline. They are a factor in at least 19 deaths per year and account for more deaths per year than sharks, floods and cyclones combined (Brander et al., 2013).

Surf Life Saving Australia’s (SLSA) annual national coastal safety surveys revealed that most Australians view rip currents as dangerous. However, participating in swimming and wading (where rip currents may be present) is not seen to be hazardous. Additionally, two-thirds of beachgoers are not able to identify a rip, and two out of three people who think they can identify a rip, cannot do so correctly.

Young males (15–39 years) are highly represented in the drowning statistics and are a key target group for rip-current-related interventions. SLSA undertook behavioural insights research to better understand this group’s perception of rips and what motivates them to follow water safety procedures.

Intelligence from the research was used to inform a five-year public safety campaign to raise awareness about rips and to influence people’s behaviour. The campaign’s objectives are:

- Awareness shift: when it comes to identifying a rip, you don’t know what you think you may know.
- Mindset shift: most swimmers, including you, cannot correctly identify a rip.
- Desired behaviour change: swim between the red and yellow flags wherever possible.

The research findings suggested young men believe they know enough about coastal safety and they are doing enough to remain safe. A key recommendation was to challenge this belief and highlight people’s lack of knowledge about rips. The market segmentation developed from the research helped refine the target group for the campaign to focus on the largest group with ‘average’ swimming ability and experience.

The males that the campaign targets are over-confident when it comes to identifying rip currents. The campaign is designed to challenge their beliefs and behaviour by creating self-doubt and attacking their confidence. The result is a campaign intended to disrupt people’s thinking about rips. It dispels common myths associated with beach safety (that only poor swimmers or tourists drown in rips) and highlights that young males are most likely to drown in a rip.

SLSA recognised that the disruptive approach needed to be accompanied by educational material to help people improve their skills and resilience to the hazard. The campaign includes videos showing how to identify rips and how to escape from them.

The initial indications from the post-campaign analysis indicate the approach is effective at decreasing over-confidence and increasing intention to swim between the flags. The presentation will include detailed results once they are available.
Saccades are rapid eye movements that shift along the lines of sight and volitionally bring elected visual objects of interest into the fovea for sensory store examination and cognitive processing. Saccade sweep scanning requires lifeguards to focus on and evaluate all people distributed throughout their surveillance area.

Inattentional blindness (IB) is the incapacity to notice a fully-visible person or object within a viewer’s perceptual field while the viewer’s attentional choice or a required prescribed strategy directs attention to something or someone else in the visual field.

This study sought to determine if teaching lifeguards to follow prescribed highly structured bather scanning surveillance techniques contributed to IB during patron surveillance. While prescribed lifeguard pattern scanning techniques are mentioned in several American lifeguard training manuals, currently neither evidence-based rationales nor empirical data supports using prescribed scanning patterns techniques.

During the 2015 summer season a pilot study questionnaire with a Likert scale was administered to 210 USA northeast seasonal certified lifeguards working at 6 urban, suburban, and rural worksites. The pretest questionnaire had 6 discrete categories “Never – Always” each with quantifiable percentage response. Bather surveillance scanning questions examined if sampled lifeguards: formed mental notes of patrons; high-risk guests were identified; 4 alphabet and/or 4 geometric scanning patterns, or a multi-stage scanning technique were used; 4 IDR recognition and response scanning rules were followed; the Invisible Gorilla and/or the On Drowning videos were viewed; lifeguards looked for persons’ flailing in the water, grabbing water, or climbing a ladder; believed no two drowning persons movements were alike; learned drowning person’s movements were as different as snowflakes; and read drowning victims didn’t go to victim school.

After initial questionnaire completion, 60 second long video clips were individually shown to 210 study participants. 83% were unable to detect drowning persons and 92% of this group neither had viewed On Drowning nor Invisible Gorilla or YouTube® video clips of drowning persons.

105 participants were assigned to the treatment group and 105 people to the control cluster. The treatment group attended a human information processing LgHIP Protocol©™ lecture on the psycho-physiological/bio-mechanical determinants of the IDR; viewed DVDs of the Invisible Gorilla and a modification of On Drowning; participated in a discussion of behavior vs. trait surveillance; and examined the saccade sweep scanning critical signal equal distribution technique vs. prescribed highly structured bather pattern scanning methodologies. At post-test, the treatment group members were individually shown ten new pool environment video clips of 60 seconds duration.

Post-treatment data showed 94% of the treatment group correctly identified randomly presented instances of drowning persons. 78% of the control group was unable to recognize new drowning person’s behaviors.

Data from this study illustrates IB can occur when lifeguards are required to follow prescribed lifeguard pattern scanning techniques. IB can be avoided when a lifeguard’s working memory is not compromised by diverting their attention from equal expectancy saccadic sweep drowning person scanning to structured bather pattern scanning methodologies, hindering visual search processing of perceivable visual stimuli information.

ORAL PRESENTATION

SAUSAGE SWEEP CLEANING©™: A CRITICAL SIGNAL EQUAL FREQUENCY DISTRIBUTION COUNTERMEASURE TO INATTENTIONAL BLINDNESS INDUCED BY PRESCRIBED LIFEGUARD PATTERN SCANNING TECHNIQUES.

Dr. Francesco Pia

1Pia Consulting Services & ATLAS International, Larchmont, United States

Rescue 3, Salon F, October 17, 2017, 3:30 PM - 5:00 PM

INTRODUCTION

Saccades are rapid eye movements that shift along the lines of sight and volitionally bring elected visual objects of interest into the fovea for sensory store examination and cognitive processing. Saccade sweep scanning requires lifeguards to focus on and evaluate all people distributed throughout their surveillance area.

Inattentional blindness (IB) is the incapacity to notice a fully-visible person or object within a viewer’s perceptual field while the viewer’s attentional choice or a required prescribed strategy directs attention to something or someone else in the visual field.

RESEARCH QUESTION

This study sought to determine if teaching lifeguards to follow prescribed highly structured bather scanning surveillance techniques contributed to IB during patron surveillance. While prescribed lifeguard pattern scanning techniques are mentioned in several American lifeguard training manuals, currently neither evidence-based rationales nor empirical data supports using prescribed scanning patterns techniques.

INSTRUMENT

During the 2015 summer season a pilot study questionnaire with a Likert scale was administered to 210 USA northeast seasonal certified lifeguards working at 6 urban, suburban, and rural worksites. The pretest questionnaire had 6 discrete categories “Never – Always” each with quantifiable percentage response. Bather surveillance scanning questions examined if sampled lifeguards: formed mental notes of patrons; high-risk guests were identified; 4 alphabet and/or 4 geometric scanning patterns, or a multi-stage scanning technique were used; 4 IDR recognition and response scanning rules were followed; the Invisible Gorilla and/or the On Drowning videos were viewed; lifeguards looked for persons’ flailing in the water, grabbing water, or climbing a ladder; believed no two drowning persons movements were alike; learned drowning person’s movements were as different as snowflakes; and read drowning victims didn’t go to victim school.

After initial questionnaire completion, 60 second long video clips were individually shown to 210 study participants. 83% were unable to detect drowning persons and 92% of this group neither had viewed On Drowning nor Invisible Gorilla or YouTube® video clips of drowning persons.

METHODS

105 participants were assigned to the treatment group and 105 people to the control cluster. The treatment group attended a human information processing LgHIP Protocol©™ lecture on the psycho-physiological/bio-mechanical determinants of the IDR; viewed DVDs of the Invisible Gorilla and a modification of On Drowning; participated in a discussion of behavior vs. trait surveillance; and examined the saccade sweep scanning critical signal equal distribution technique vs. prescribed highly structured bather pattern scanning methodologies. At post-test, the treatment group members were individually shown ten new pool environment video clips of 60 seconds duration.

RESULTS

Post-treatment data showed 94% of the treatment group correctly identified randomly presented instances of drowning persons. 78% of the control group was unable to recognize new drowning person’s behaviors.

Data from this study illustrates IB can occur when lifeguards are required to follow prescribed lifeguard pattern scanning techniques. IB can be avoided when a lifeguard’s working memory is not compromised by diverting their attention from equal expectancy saccadic sweep drowning person scanning to structured bather pattern scanning methodologies, hindering visual search processing of perceivable visual stimuli information.
BACKGROUND
Drowning is a public health problem of global significance and enormous impact, yet it is preventable. According to the Drowning Prevention Chain and strategies to reduce drowning proposed by the International Life Saving Federation, one of the factors for drowning is the lack of supervision or surveillance, and the main measure proposed to address this factor is the extension of lifesaving services.

Lifeguard services are highly dependent on the ability and effectiveness of the people who comprise them – first responders, rescue watercraft operators, paramedics, service coordinators, and mainly lifeguards. However, the training of lifeguards is very diverse in terms of duration, level of demand and skills worked, depending on the countries or regions. It also varies depending on whether people are preparing to work in swimming pools or in natural aquatic spaces.

There is also very different local, state and national legislation regarding the minimum training requirements that a person must meet as a lifeguard and who are the competent bodies to certify first responders.

METHOD
We conducted a comparative study of 26 lifeguard certification programs from the most respected institutions in 19 countries on 4 continents. This study reviewed the didactic objectives, duration, contents, methodology and marks of evaluation of the programs.

RESULTS
Most of these programs are based on the development of skills and knowledge that can be grouped into four areas: physical fitness and swimming, prevention, rescue and first aid and resuscitation techniques, which are consistent with the role and responsibilities assigned to lifeguards in the certification guidelines of the International Life Saving Federation and main providers of lifeguard services worldwide. Nonetheless, significant differences were found with respect to duration, methodology and evaluation systems of the programs. This study seeks to highlight those differences, in order to generate a debate which may ultimately help to align lifeguard certification programs.

In addition, the analysis of the distribution of teaching hours and content among the different areas show a clear predominance of training in rescue techniques and first aid and resuscitation techniques, despite all guidelines emphasizing that the primary responsibility of lifeguard services is prevention (2). Also, evaluation systems are strongly focused in physical fitness and first-aid competence, with little if any attention paid to candidates proving their practical competence in prevention activities (3).

We propose more research of content and redistribute the workload of the courses. Further research is proposed on the suitability of redistribution of contents and teaching hours of lifeguard certifications programs towards prevention skills, as well as on the development of competency-based learning of prevention skills.
The analysis of data on drowning victims in Germany, annually collected from 2007 until 2014 allowed us to draw several conclusions for the requirements of a rescue swimmer. First it was possible, combined with statistical data from the federal statistical office, to identify the body dimensions of a typical drowning person. These body dimensions show an obstacle for young rescue swimmers which has to be taken into account since they have to handle a heavy weight of approximately 77kg to 97kg.

The statistical data also show where the drowning occurs, like in pools, lakes, rivers or the sea. These environments have their own special characteristics like their dimensions or water flow, in case of a river. On average, we took into account that a drowning person has approximately 3-5 minutes before death. We can therefore determine what a rescue swimmer must be able to do to successfully rescue a victim before death in these different environments. For example, to rescue a victim in the middle of a public pool with a length of 25m and a width of 12.5m requires that a rescue swimmer can run a distance of 12.5m and swim 6.25m to minimize the time to the victim. Using a swimming velocity of 1.4m/s performed during a local championship as a reference for the swimming speed, the minimum required speed of running can be calculated with an overall time limit of 3min. Then the speed of running was again compared with the performance of young runners during a local championship.

The result for this pool environment is a slow running speed for rescue swimmers which can be achieved easily. Also for the other environments the swimming and running speeds of a rescue swimmer were determined to compare the swimming and running speeds with the local championship data. The information about the body dimension of a drowned person, the physical effort a rescue swimmer has to perform and the special characteristics of the environments help to propose a new evaluation structure for rescue swimmers in Germany. The new evaluation structure is based on an “easy to difficult” principle within four education levels focusing on the different environments.
ORAL PRESENTATION

QCPR LIVE FEEDBACK DURING LIFEGUARD CPR TRAINING: MEASURING THE EFFECT ON CPR PERFORMANCE AND CHANGES TO THE LEARNING EXPERIENCE

Mr. Michael Dunn

1Royal Life Saving Society UK, Worcester, United Kingdom

Rescue 3, Salon F, October 17, 2017, 3:30 PM - 5:00 PM

INTRODUCTION

RLSS UK has been working with Laerdal Medical to determine the utility and impact of a new Quality Cardio Pulmonary Resuscitation (QCPR) application, connecting to a Bluetooth sensor that fits into new or existing Little Anne manikins, which provides live feedback to the learner and/or trainer as part of a resuscitation training session. This QCPR solution has the potential to remove many of the barriers (financial and geographical) that have restricted access to QCPR training for the majority of learners in the drowning prevention community.

OBJECTS

The objectives of this research study were:
Observe the effect that the QCPR solution has on learning and teaching practices.
Determine impact that providing live feedback (via the QCPR solution) has on learner performance.
Determine the direct (improving access to training) and indirect (cost savings) consequences of adopting the QCPR solution into training curricula.

POPULATION

RLSS UK supported this research through its established training network. 90 RLSS UK pool lifeguard trainers were equipped with up to 3 QCPR sensors and access to the QCPR applications through the app stores.

METHODS

The QCPR solution was used during the delivery of pool lifeguard courses (5 day), and ongoing training for qualified pool lifeguards. Use of the devices during pool lifeguard courses was split between (a) use as a learning aid throughout the course, and (b) an assessment at the end of the course. The trainers and lifeguards were asked to complete a questionnaire after each session.

RESULTS

The QCPR solution was shown to be an effective learning/training aid that supported lifeguards to develop high quality resuscitation skills. An unexpected outcome was the positive effect on learner motivation. In recording the overall QCPR score of the trainee and qualified pool lifeguards, the research has provided an insight into the high level of CPR competence achieved through accessing programmes of CPR training frequently and often.
Seasonal lifeguard service suffers from high employee turnover which contributes to a lack of consistent skills through the workforce. There is a need to quickly and efficiently train an entire lifeguard service staff to the minimum skill level that the agency demands. To do this, an agency must develop a progressive training curriculum that touches on the department's mission and culture, established water rescue practices, and multi-layered drowning prevention tools. However, the biggest challenge is to get the entire workforce performing at proficient levels of competence. To do this, it is imperative to incorporate automaticity and overlearning through deliberate practice drills.

Automaticity is the ability to perform skills without occupying the mind with low level tasks. Overlearning is the theory that practicing newly acquired skills beyond the point of initial mastery leads to automaticity. Deliberate practice focuses on the repetitive performance of cognitive or psychomotor skills, moving rescue skills into muscle memory which allows the rescue team to improvise and adapt to the changing situation of the aquatic incident without compromising the care of the victim.

By training with automaticity and overlearning, there is improvement in response time and reaction speed, allowing the rescue team to synchronize their actions and work as a professional team.
INTRODUCTION
Several surveillance strategies have been recommended, aiming to improve the identification of persons in distress and response time. The Protection Rule 10/20 (Ellis & White, 1994), recommends scanning the area of responsibility every 10 sec. allowing 20 sec. to respond. The Protection Rule 30/120 for open water settings (Fenner et al, 1999) suggests 30 sec. to identify an emergency and 120 sec. to respond. Griffiths (2000) recommends that lifeguard scanning strategy, position and mental rehearsal of rescue episodes – should be changed every five minutes.

AIMS
The aims of this study were to a) observe life guards at selected aquatic facilities in Poland, b) to analyze surveillance behavior, and c) to identify risk factors preventing timely response.

METHODS
During 45 minute periods, 29 lifeguards at 7 facilities were observed on two occasions (58 observations). Video cameras were placed discreetly and the lifeguards were not informed that they were being observed. A specific, single lifeguard was the focus of each observation. The simulated drownings were staged between 5-15 m. from the guard being observed. One of the simulations was performed by an adult, the other by a youth. The video recordings were subsequently uploaded to a computer for observation and analysis by a panel of life guard instructors. The simulated drownings imitated the “instinctive drowning response” as described by Pia (1974).

RESULTS
None of the 58 simulated emergencies were identified and no response was initiated. Video analysis showed no visible signs of any recommended systematic scanning strategy. Only 28% of the observed guards faced the pool more or less all of the time, 41% some of the time and 31%, never. During the simulated emergency, the guards were assembled at one place in 41 of the 58 trials (70%), i.e. not distributed in such a way as to cover the entire facility. They were occupied with non-guarding behavior (chatting, using mobile phones, eating, etc.). At none of the facilities were the lifeguards observed or coordinated by a supervisor. Risk factors for failure to respond were; non-observance of the pool area, no supervision, failure to distribute guards around the swimming area, and being occupied with non-guarding behavior.

DISCUSSION AND CONCLUSIONS
Although all of the lifeguards were qualified, there was a marked lack of normal surveillance behavior. No coordination or supervision was observed. A work ethic appropriate for a situation with inherent risk and designated responsibility was absent. Whether this relates to poor training or lack of supervision, should be the subject of further investigation.
INTRODUCTION

Despite evidence that immediate rescue and initiation of resuscitation plays a vital role in determining the outcome of a drowning victim, research on bystander rescue interventions remains limited.

OBJECTIVES

- To explore bystander rescue interventions in fatal drowning incidents in Canada; and
- To describe the characteristics of rescuers who drowned while attempting to rescue another person.

METHODS

A retrospective analysis was conducted using data collected for fatal drowning incidents occurring in Canada between 2005 and 2012. The primary outcome variable was a fatal drowning event in which a lay bystander attempted a rescue. Independent variables considered for multivariable logistic regression were: age and sex of drowning person, province, body of water, urban versus rural incident location, time of year, type of activity, purpose of activity, accompaniment, number of drowning persons involved in the incident and ice conditions.

RESULTS

During the study period, 3,656 people died as the result of an unintentional drowning incident in Canada. In 1460 cases, a rescue was attempted by a lay bystander. In 590 cases the decedent was accompanied at the time of the incident but no rescue was attempted. The regression model identified significant differences in the characteristics of rescue intervened compared to non-intervened incidents. 71 bystanders fatally drowned while attempting to rescue another person.

CONCLUSIONS

Even when present, lay bystanders do not always attempt a rescue, and when they do, the most common rescue type is a high-risk, contact rescue. A tragic outcome of this is that some bystanders who attempt a rescue fatally drown during the attempt. Drowning prevention initiatives should include interventions related to safe rescue techniques for lay rescuers.
DROWNING FATALITIES AND RESCUE ATTEMPTS IN THE WATERS OF AMSTERDAM: WHO, WHEN AND WHERE

Guido Reijnen

1Forensic Physician and Resident Pulmonology; Public Health Service, department of forensic medicine, Amsterdam, the Netherlands, and pulmonology department Rijnstate Hospital, Arnhem, Netherlands

Rescue 4, Salon F, October 18, 2017, 11:00 AM - 12:30 PM

BACKGROUND

Amsterdam is well known for its canals. Unfortunately, several people drown in the canals every year. We examine who drowns, when and where.

METHODS

Who drowns in Amsterdam? Data from the register of forensic medicine (Formatus) were used to compare the demographic data of fatal drownings from the canal district with those from the rest of Amsterdam. Rates of death by drowning were calculated using data from Statistics Netherlands (2006–2015).

When do people drown in Amsterdam? Data of rescue attempts from the fire department of Amsterdam (2011–2015) were used to establish when people drowned in Amsterdam.

Where do people drown or nearly drown in Amsterdam? Data of rescue attempts from the fire department were combined with the Formatus data of drowning fatalities.

RESULTS

Who drowns in Amsterdam? The majority of those who drowned were men (82%). A high percentage of the people who drowned were under the influence of alcohol or drugs (up to 55%). No children drowned in the canal district during the study period. The majority of those who drowned in the canal district (67%) were not official inhabitants of Amsterdam; hence tourists and homeless people. Male inhabitants of Amsterdam appeared to have a 81% higher risk of accidentally drowning than male inhabitants of other parts of the Netherlands.

When do people drown in Amsterdam? Forty seven percent of rescue attempts in the canal district occurred on Saturday and Sunday night between 0:00 and 6:00. No specific hot times could be defined for other parts in Amsterdam.

Where do people drown or nearly drown in Amsterdam? Most rescue attempts took place in the canal district whereas there occurred relatively few fatal drownings. The situation in the canal district is in contrast with the rest of Amsterdam, where there are more drowning fatalities compared with the number of severe drownings.

CONCLUSION

Given the high number of rescue attempts in the canal district and the remaining drowning fatalities, further prevention is necessary and should be focused on hot times and hot spots in the canal district on Saturday and Sunday (0:00–6:00 am).

ACKNOWLEDGMENTS

This project was funded by the City of Amsterdam.
BACKGROUND
The incidence of drowning in Australian waterways remains high with 280 drowning deaths between July 2015 and June 2016 (RLSSA, 2016), almost all in locations without a lifeguard presence. Less than 4% of Australia’s beaches are patrolled by lifeguards/lifesavers and the majority of drowning deaths occur more than 1 km from the nearest Surf Life Saving service, typically on unpatrolled beaches or outside of patrol areas and times (SLSA, 2016). While increasing the presence of lifeguard, lifesaving and emergency services is the most effective intervention, it is logistically unrealistic to have trained lifeguards ‘everywhere’.

In the absence of lifeguards, the only form of rescue often lies with informal lifesavers – ‘bystanders’. The term ‘bystander’ describes any member of the public, be they family, friend or stranger, attempting to rescue someone in distress (WHO, 2014). However, bystanders are not necessarily trained or experienced in water-based rescue and often place themselves at risk (Franklin & Pearn, 2010; 2011). It is not uncommon for the bystander ‘rescuer’ to drown. On beaches, about 5% of Australian coastal drowning deaths are bystanders attempting rescues (SLSA, 2016). Unfortunately, little quantitative evidence exists about the circumstances and factors contributing to a successful or unsuccessful bystander rescue, both from the perspective of the rescuer and rescuee. This lack of information hinders development of messaging to ensure the safety of people involved in bystander rescues.

AIM
This study describes results from a pilot project funded by Surf Life Saving Australia (SLSA) to specifically examine bystander rescues. The aim was to gather quantitative and qualitative information from a sample of people involved in bystander rescues to assist in future development of an evidence-based intervention targeting bystander rescues. The ultimate goal is to reduce drowning deaths by providing future bystander rescuers and rescuees with greater skills, knowledge, and awareness to implement correct decision making in a rescue situation.

To understand the ‘who, where, when, why and how’ characteristics of bystander rescue incidents, an online survey was developed targeting bystanders who had performed a rescue in coastal waters, inland waterways and pools and those who have experienced assistance from a bystander in these environments. An online survey link was promoted via media release and disseminated through a variety of personal and organizational social media outlets including SLSA, AUSTSWIM, UNSW Sydney, James Cook University.

METHOD
As the survey was launched in late May 2017, only the methodology is described in this Abstract. The survey consisted of approximately 35 questions, including multi choice, tick boxes, Likert scale and short answer responses in two parts: Part A for Bystander Rescuers; and Part B for Bystander Rescuees. Participants were able to fill out one or both parts depending on their experiences.

Survey questions documented respondent demographics, water safety experience, number of rescues involved in, with a focus on details about their most recent rescue including; swimming ability, location, time of day, relationship with bystander/victim, causation, motivations for rescuing, how the rescue was performed, outcome, and reflections on the rescue; what they learned, their confidence levels and rescue capacity. Respondents had the opportunity to provide contact details for a follow up interview to obtain more detailed information about their bystander rescue experience.
BACKGROUND
The island of Kauai in the remote state of Hawaii has over 50 miles of beaches but only nine lifeguard stations. Drowning is the leading mechanism of injury-related death on the island, surpassing motor vehicle crashes. Most (81%) drownings occur in the ocean, and the majority (77%) of ocean drowning victims are visitors. In 2008 concerned Kauai residents began placing public rescue tube (PRT) stations at beaches around the island, and over 230 are now deployed. The primary intended use of PRTs is to provide floatation and stabilize persons in distress until a lifeguard or other first responder intervenes. Interest in deploying PRTs has grown across the state of Hawaii, although little is known regarding their perception and use among the public and first responders.

OBJECTIVES
To survey reactions to the presence of PRT, including a) device awareness and utilization, and sense of safety and risk taking for Kauai beach goers, and b) experience, effectiveness, and concerns for Kauai first responders.

METHODS
Beach goers were interviewed in 2015 by volunteers from a philanthropic group (n=185), and in 2016 by a contracted marketing agency (n=400). Self-administered questionnaires (hard copy and online) were collected from Kauai lifeguards and fire department personnel in 2015 (n=65). IRB approval and data analysis was conducted by the Hawaii Department of Health.

RESULTS
Visitors comprised about two-thirds (68% or 397) of the 585 interviewed beach goers, including 343 (59% of the total) from other US states. About 62% of the beach goers had noticed the presence of PRTs at the start of the interview, although that proportion was significantly higher among residents (90%) than visitors (50%). After being shown a photographic image of a PRT, 86% responded its intended use was as a rescue/floatation device. Eighty-five percent of respondents either “strongly” (39%) or “somewhat” (46%) agreed with the statement “seeing a PRT station at the beach makes me feel safer”. Only 4% reported the presence of PRTs would make them inclined to take more risks (e.g. swim or surf in bigger waves); 46% responded they would be less inclined, and 50% reported PRTs would have no influence on their risk-taking behavior. Only 1 of 61 first responders did not “agree” that PRTs were effective in promoting safety messages. Nearly all “agreed” that they welcomed PRT stations on Kauai (97%), and would recommend them in other communities (100%). However, 37% had concerns regarding PRTs, most commonly the possibility of a rescuer putting themselves at risk of drowning.

CONCLUSION
Kauai beach goers generally notice PRTs, correctly interpret their intended use, and report an enhanced feeling of safety in their presence. PRTs are also well received by Kauai first responders, despite concerns over possible “double drownings”. However, no such incidents have occurred in their 8 years of deployment on Kauai, while their use has been documented in more than 100 rescues to date. PRTs are a promising adjunct to ocean safety, particularly where the ideal of on-site first responders is limited or lacking.
THE CHARACTERISTICS OF SURFERS AS BYSTANDER RESCUERS IN EUROPE

MD Ingvar Berg¹, Lifeguard Instructor Bart Haveman¹, MD Mischa Goetinger¹, MD Dion van de Schoot¹, MD Ognjen Markovic¹

¹Surfing Medicine International, The Hague, Netherlands

INTRODUCTION
Trained surfers are often bystander rescuers for drowning victims near surf areas. They are in the water voluntarily, also in difficult conditions, have a flotation device, and can recognize drowning early and hereby prevent it. Also, they are present in the beach and water safety culture, and educate close ones around them about the ocean. Research showed that even on lifeguarded beaches, surfers have an added value and conduct rescues on a regular basis. We conducted a survey on the level of basic first aid and lifeguard training of surfers, and rescues done by surfers in Europe.

OBJECTS
Describe the characteristics of surfers as bystander rescuers, the level of training of surfers, and past involvements in lifesaving incidents in Europe.

METHODS
We conducted an online survey on health perceptions in surfers. Questions addressed preference of way of communication, training, educational level and needs, and past involvement in lifesaving incidents. We conducted a sub analysis on the characteristics of surfers as bystander rescuer, the level of training of surfers and past involvement in lifesaving incidents in Europe.

RESULTS
1770 surfers responded, of 24 different countries within Europe. Only 14.3% of all novice surfers completed a lifeguard course, gradually rising to 53.8% in expert surfers. The experience of the surfer was associated with having rescued someone (Odds ratio 1.98 /year [1.797-2.175] 95% CI*). Also, having some sort of training (CPR, or lifesaving training) was associated with having rescued someone (Odds ratio 1.888 [1.517 - 2.350] 95% CI*). Of all respondents 38.5% felt they had saved someone from drowning while surfing. Almost all intermediate and experienced surfers reported to have rescued swimmers from drowning, compared to few rescues in novice surfers.

CONCLUSION
Surfers are potential lifesavers all year round, and almost all experienced surfers in our survey have rescued someone from drowning in their life. Only 27% of all respondents completed a lifeguard course. The experience of the surfer, as well as having received some kind of training were both associated with having rescued someone. Targeting surfers as bystander rescuers, and educate them about drowning and basic life support could rapidly spread the knowledge to urban as well as remote communities all around the world. Training surfers as bystander rescuers cannot only prevent drowning by safety awareness for surfers and early recognition of the drowning victim, but also improve outcomes by starting drowning resuscitation including rescue breaths as early as possible.
BACKGROUND

Technology surrounding Unmanned Aerial Vehicles (UAVs) continues to develop at a rapid pace. Their capability continues to increase, whilst at the same time the costs of these assets is becoming more accessible. Within Surf Life Saving there has been much interest in this technology over the last few years, including the publication of a Surf Life Saving Australia (SLSA) discussion paper Remotely Piloted Aircraft (August, 2015), the formation of a Remotely Piloted Aircraft (RPA) Working Group at a national level (first met in April, 2016), and UAV trails conducted in four States.

AIM

The key issue put forward in SLSA’s discussion paper (August, 2015) was:
“Clearly defining the problem that we need solved is crucial to ensure the beneficial use of RPAS”.

METHODS

SLS has conducted investigations, demonstrations, participated in forums and conducted inquiries into the use of RPAs with a range of industry experts into their potential uses. Many questions resulted from this work. This presentation will provide answers to these questions which have been gathered through a two year partnership and comprehensive trial of many types of UAVs in NSW by Westpac Little Ripper Lifesaver Pty Ltd and Surf Life Saving New South Wales (SLSNSW). This presentation will define the key issues around UAVs as follows:

- Coastal drowning is occurring away from primary patrolling zones, often in difficult to access locations.
- Providing greater surveillance capacity and capability of aquatic locations.
- The need to make aerial surveillance more accessible to a greater number of lifesavers/lifeguards.
- Providing an efficient, cost effective and safe tool to enhance shark management in line with Government strategy.
- Provide a rapid first response tool to gather enhanced actionable intelligence for unconfirmed sightings/ incidents from which to better inform a manned response.
- Providing a remote preventative lifesaving tool, allowing lifesavers/lifeguards to access at risk members of the public quickly and safely to provide communication and advice.
- Capability integration for service support in flooding events

FINDINGS

The trial developed a highly advanced UAV deployable marine rescue pod that automatically inflates on contacting the water and is capable of supporting up to 4 people. Partnerships to advance technology have been established with major organisations and educational institutions involved in unmanned aircraft, robotics and artificial intelligence. An algorithm has been developed for use on the UAVs to automatically detect people, surfers and dangerous marine animals enhancing the visual detection capability of a UAV. The trial was conducted in consultation with the Australian Civil Aviation Safety Authority.

Through the trial, Westpac Little Ripper Lifesaver and SLSNSW have shown that UAVs can contribute to solving some of the challenges faced in preventing drowning by increasing surveillance, remote communications and intervention capability forming a crucial piece of the drowning prevention puzzle.

Previous trials have investigated advanced military grade options. The findings of this 2 year trial show that the greatest opportunity for lifesaving with UAVs exists in the form of less complex but still technologically advanced UAVs providing more eyes, more often in more places to reduce drownings.
DRONES MAY BE USED TO SAVE LIVES IN CARDIAC ARREST DUE TO DROWNING

Dr. Andreas Claesson¹, Professor Leif Svensson¹, Dr. Per Nordberg¹, Dr. Mattias Ringh¹, Professor Mårten Rosenqvist¹, Dr. Therese Djärv¹, Mr. Jens Samuelsson², Mr. Olof Hernborg³, RN Pehr Dahlbom³, Mr. Anders Jansson³, Dr. Jacob Hollenberg¹

¹Karolinska Institutet, Center For Resuscitation Science, Stockholm, Sweden, ²Swedish maritime organisation, Göteborg, Sweden, ³Tylösand Surf Lifesaving Club (SLSC), Halmstad, Sweden

Rescue 5, Cypress, October 18, 2017, 1:30 PM - 3:00 PM

BACKGROUND
Drowning leading to out-of-hospital cardiac arrest (OHCA) and death is a major public health concern. Submersions with duration of less than 10 minutes are associated with favourable neurological outcome and nearby bystanders play a considerable role in rescue and resuscitation. Drones can provide a visual overview of an accident scene, their potential as lifesaving tools in drowning has not been evaluated.

AIM
The aim of this simulation study was to evaluate the efficiency of a drone for early recognition of a submerged possible drowning victim in comparison with standard procedure.

METHOD
This randomized simulation study used a submerged manikin placed in a shallow (<2 meters) 100x100-meter area at Tylösand Beach, Sweden. A search party of 14 surf-lifeguards (control) was compared to a drone transmitting video to a tablet (intervention). Time from start to contact with the manikin was the primary endpoint.

RESULTS
Twenty searches were performed in total, 10 for each group. The median time from start to contact with the manikin was 4:34 minutes (IQR 2:56-7:48) for the search party (control) and 0:47 minutes (IQR 0:38-0:58) for the drone-system (intervention) respectively (p<0.001). The median time saved by using the drone was 3:38 minutes (IQR 2:02- 6:38).

CONCLUSION
A drone transmitting live video to a tablet is feasible, time saving in comparison to traditional search parties and may be used for the early recognition of submerged victims at a beach. Drone search can possibly contribute to earlier onset of CPR in drowning victims.
LIFEGUARD DRONE USE: THE IMPLEMENTATION OF DRONES FOR SHARK TRACKING AND SWIMMER SAFETY

Marine Safety Chief Joe Bailey¹

¹City of Seal Beach Marine Safety, Seal Beach, United States

Rescue 5, Cypress, October 18, 2017, 1:30 PM - 3:00 PM

BACKGROUND
In March of 2015 the Seal Beach Lifeguard Department started to receive reports of Great White sharks in the Surfside beach area. The Department purchased a drone to confirm and monitor the shark activity as it was a new phenomenon in the area.

OBJECTIVE
To check the size of the sharks in the area and the type of activity as this information was required to comply with our shark policy.

DISCUSSION
This is a new technology for the Lifeguard service that worked well for the purpose intended. We did run into some pitfalls with the FAA rules and the different technologies. The presentation will include; why we started using a drone, some of the limitations, FAA rules, drone policies and procedures, tips and tricks for using a drone in lifesaving and a discussion on other uses.

CONCLUSION
I presented this topic at the fall 2016 USLA meeting and it was well received. I was encouraged to submit this to the WCDP 2017 as some thought it might be of interest to the group. This presentation is limited to the Seal Beach Marine Safety Departments experience using a drone and possible future uses.
BACKGROUND

Commercially available ‘off the shelf’ drones have become hugely popular and are seen in all aspects of our daily lives. These machines perform a variety of functions from basic Aerial Photography to more complex Aerial Surveys. However, while these machines provide us with very a flexible mission platform, the type of drone to be used for Emergency Management must be chosen carefully. Due to the limited flight time and limited payload, the flight must be carefully managed in order to maximize search time and search area. These drones use a generic app interface, which will not allow for an effective and efficient aerial search to be completed. Having a specific search and rescue interface, with an array of rescue specific functions, will allow commercially available drones to be used effectively in these environments, helping to save more lives whilst reducing the risk to personnel. The pitfalls of using these machines in Rescue situations are numerous; for example, limited field of view, unrealistic expectation of drone ability, lack of autonomous search patterns and an inability to share victim location. While autonomous flight can also be a huge advantage the pitfalls must be carefully controlled so that required search areas are fully completed. Drones will not solve all of our problems, but they certainly will make our lives as rescue personnel much easier.

AIM

I propose to answer the following questions:

• How can drone technology be applied to everyday lifeguarding?

• How, with limited budgets, can these machines be incorporated into daily lifeguard services with minimal risk to public and necessary training for personnel?

• What are the pitfalls of using these machines for Rescue purposes?

• What are the solutions to these problems?

• Results of our dynamic field testing here in Ireland.
Non-swimming children continue to drown with even the best supervisors including parents, guardians, and on-duty lifeguards present. Life jackets in swimming pools are slowly becoming increasingly popular, with more organizations encouraging life jacket use. Life jackets are the seatbelt of the water. They are protective and save lives when worn, but similar to the seatbelts, resistance is met in terms of use.

There are still many questions and concerns about life jacket use and life jacket requirements at swimming pools. Life jackets are an important drowning prevention strategy in all bodies of water, including swimming pools, for children who cannot swim. This transition of life jackets into swimming pools is similar to the transition of car seats and air bags in cars, but life jackets may be even more effective in saving lives. Additionally, data strongly suggests voluntary use of seatbelts is not nearly as effective as mandatory use and that education alone is not enough to protect children in the car or similarly, in, on, or around water.

The Note & Float program requiring non-swimmers to be “noted” (identified with a wristband or necklace) and “floated” (required to wear properly fitting U.S. Coast approved life jackets) is one of the most underutilized, yet nearly sure-fire drowning prevention strategies. New exclusive evidence-based research of swimming pools that received life jackets through the Note and Float Life Jacket Fund, initiating the Note & Float program will be presented.

Case studies demonstrate surprising results of life jackets in swimming pools across the United States, not just to prevent drowning, but also unexpected positive results of a life jacket requirement for swim lessons, pool attendance, lifeguard satisfaction, marketing, and guest services. This session will also address many questions, concerns, and myths about life jackets in swimming pools, including fears of life jacket dependency and customer satisfaction.

Simple implementation strategies and recommendations for life jacket policies, requirements, and programs at swimming pools will be provided based on experiences from existing Note & Float facilities and research findings.
BACKGROUND
This presentation would focus in on the work done on one the committees of the Model Aquatic Health Code produced by the Centers for Disease Control and Prevention in the United States and updates that have taken place.

AIM
The focus will be on the Lifeguarding / Bather Supervision Technical Committee. The work of the Lifeguarding / Bather Supervision Technical Committee will include lifeguard qualifications and training, staffing of lifeguards and attendants, provision of lifeguard equipment and placement requirements, safety training (CPR, AED, etc.), first aid equipment and facilities, and guidance for unguarded facilities.

METHODS
The Technical Committee examined existing technologies and methodologies in the appropriate jurisdictions of their respective committees. The Technical Committees determined the scientific basis, if any, for existing recommendations and criteria; identified scientific information gaps; and outlined data that were needed to support future science-based revisions.

FINDINGS
The final product was intended to be a performance-based Model Aquatic Health Code (MAHC) that is national in scope, data driven, and created using the best available science and engineering practices. Serving as Vice-Chair of this committee the presentation would explain the behind the scenes work and the outcomes. The Model Aquatic Health Code is updated every two years to review any new science or changes that could be made to make the code as current as possible. This presentation will review the changes made since the original version was completed.
WHO UNDERTOOK THIS RESEARCH?
The Royal Life Saving Society Canada has undertaken this research by investigating major aquatic incidents and drownings at supervised sites over twenty-five years.

THE ISSUE:
There was no consolidation of data from these incidents and no resulting change to policy or training because no organization actually tracked this data nor came forward on a consistent basis to offer recommendations to aquatic facility operators.

COMMUNITY PARTICIPATION:
Many of the operators who suffered these losses came forward and helped confirm the details and often helped deliver the presentations and recommendations.

TO GATHER DATA, DETERMINE SIMILARITIES IN THESE INCIDENTS, AND FORMULATE RECOMMENDATIONS THAT WILL REDUCE DROWNING AND WATER-RELATED INCIDENTS. OFTEN REGULATORY CHANGE, OPERATIONAL MODIFICATION AND EDUCATION WERE THE RESULT.

TARGET GROUP:
For the most part the public, aquatic facility operators, and government were the target markets. This was focused first as a provincial action but issues became national.

WATER RELATED INCIDENTS WERE REVIEWED AND SEVERAL SELECTED AS REPRESENTATIVE OF SEVERAL KEY ISSUES. RECOMMENDATIONS WERE FORMULATED AND PASSED ON TO OPERATORS. THESE REAL LIFE SITUATIONS SHOWED HOW INCIDENTS CAN REALLY HAPPEN AND THE LEARNING THAT CAN RESULT. THIS LEARNING RESULTED IN CHANGES TO REGULATION, PROCEDURES WHICH IN TURN REDUCED THE FREQUENCY OF THESE INCIDENTS.

MONITORING:
Drowning statistics for supervised facilities where the focus of our work. In addition unsupervised sites were also examined and standards developed.

FINDINGS
Change is slow and so some improvement has occurred.
Benefits: Real life examples have visually shown supervisory staff that incidents can occur and the review of these incidents has helped shape policy and regulatory revision thereby enhancing safety in aquatic facilities.
Challenges: The fear to share with others and be judged along with the legal implications of data sharing has been challenging. By reinforcing that they can help others to perhaps change the way they do things and save a life has helped.

CONCLUSION
There have been several policy and regulatory changes. A new admission standard for aquatic facilities imposing more responsibility on the guardian is one major change.

DESCRIPTION OF SESSION
This session will review major aquatic-related incidents that have occurred in supervised facilities in Canada over the past twenty years in a variety of aquatic settings including swimming pools and waterfronts. Representative cases will be reviewed in detail and with the help of diagrams and photographic resources; the circumstances of each incident will be identified. Discussion will then centre on the lessons we have learned as a result of these incidents and the regulatory, guidelines and operational changes we have made to enhance safety and reduce the likelihood of this type of incident from re-occurring.
BACKGROUND
Most fatal drownings worldwide occur in open water. Between 2005 and 2014, 41% of the 35,355 fatal drownings in the United States and 55% of the 888 drowning-related deaths in Washington State were in natural-water settings. In recreational water settings, most drowning victims were in the water, swimming or wading. While specific U.S. Coast Guard (USCG) approved flotation devices could protect weak or non-swimmers; others that do not meet life-saving safety design standards may provide a false sense of confidence and could increase the risk for drowning. Although life jacket use for boaters has been widely promoted and has been associated with decreasing 50% of deaths in boating-related drowning incidents, strategies to prevent non-boating related open-water drownings have not been well explored. Different types of flotation devices are used in many recreational water settings, from USCG-approved life jackets to inflatable toys. In this study, we describe the rates of life jacket and other types of flotation device use among swimmers at open-water settings overall, and by age and gender. Efforts to increase use of life jackets while swimming have been a major focus of Washington State’s drowning prevention strategy. Understanding patterns of flotation use might identify new opportunities for promoting use of safer flotation devices.

METHODS
We conducted an observational survey of swimmers and waders during the peak summer swimming season of July and August 2014. Ten non-lifeguarded sites throughout Washington State, including 3 rivers and 7 lakes, were selected based on (a) being publicly-designated swim sites, (b) being popular with high swimming activity, and (c) having suitable areas for making observations from shore. Observations were conducted during 4-hour periods, mornings and afternoons, on weekends. Trained observers evaluated swimmers/waders using flotation by age group, sex, type of flotation used (life jacket versus substandard flotation, e.g. water wings, noodles, inflatables) and, to evaluate the association with supervision, for children <6 years, being within arm’s reach of an adult. In addition, wind, water, and weather conditions were collected for each time period.

RESULTS
Of 1,967 swimmers/waders observed, 37% used some type of flotation device. Use rates, especially of life jackets, decreased with increasing age. Children <6 years had the highest use of some type of flotation (140/212, 66%) and the highest use of life jackets (50.5%). Children <13 years were more likely to use flotation devices and life jackets compared to teenagers (13-17 years) (RR 9.14, (4.92, 16.98)). In the <13 age group, boys were more likely than girls to wear life jackets (RR 1.47, (1.18, 1.83). While teenagers and adults used some type of flotation (29.5% and 23.5%), they rarely used life jackets (2-3%). Boys <6 years of age who were further than arm’s length of an adult were more likely to wear life jackets than girls (66.7% vs 37.8% respectively).

Rates of use of ‘substandard flotation’ were similar among all age groups, ranging from 15.6% for children <6 to 25.9% for 6-12 year olds, 26.5% for teenagers and 21.3% for adults. Their use was greater among females in most age groups. Water wing use was more common among young children whereas pool toys, inner tubes and floating objects were mainly used by swimmers or waders older than 5 years of age.

CONCLUSION
Flotation devices were frequently used for recreational wading and swimming in open water by all age groups. Life jacket use was limited to children <13 years of age. Given the high use rate among all age groups, development and promotion of use of flotation devices that provide safety as well as fun for all age groups could potentially decrease open-water drowning rates.
BACKGROUND
Brazil is a big country with a multitude of aquatic scenarios, and people around the country go to these locations for relaxing, swimming and refreshing, especially during the hottest days. Aquatic venues in Hotels, Water-Parks, Beach-Clubs, Clubs and gyms are an attraction for people during summertime. According to Szpilman, D. (2015), in Brazil: 44% of all drowning deaths occurred concentrated in just 4 months, during the summer season (December to March). This indicates the impact of preventive campaigns could be improved if they are implemented immediately before this period. The risk of death in a pool is estimated to be 1 for every 12,782 swimming pools in a year. Considering the average cost of R$ 210,000,00 for each drowning death in Brazil, an average expenditure of 28 million per year is estimated only with the cases of drowning in swimming pools. This is just the tip of the iceberg, since the reality of different states of country is not known to lack of a registry system and consistency on data collection where it exists. The multitude of venues with swimming pools for collective use makes it hard to have a comprehensive view of the problem.

AIM
Having a report form template to be used by all aquatic venues with collective pools is a good tool to gain access to comparable data on drowning deaths across the country, allowing the efficient deployment of preventive and rescue resources.

METHODS
The purpose of this work is to test a Pool Accident/incident Report Form for Brazilian Collective Pools and analyzing the data for a 3 months period during summer season. Data is being collected from December 15, 2016 to March 15, 2017. The number of occurrences will be registered from 14 different collective pools among hotels, water parks, beach club and gyms from three different regions, the states of Santa Catarina, São Paulo and Bahia. The template is an adaptation of Fielding, R. (2015), North American and Canadian Red Cross model and the CBMSC (Santa Catarina Fire-Fighters Military Department) Beach and Pre-hospital Care reports. The report allows differentiation among three aquatic areas: Open Water, Water-Parks and Swimming Pools and Spas), and includes information regarding the location, characteristics of the victim, lifeguard profile, rescue details and first aid performed. The form is on multiple-choice format.

FINDINGS
The complete analysis of data collected by applying this report template will be showed during the presentation. The information gathered so far allows drawing a preliminary profile of the occurrences at collective swimming pools in Brazil. It also warrants standardizing the information contributing to the improvement of the preventive efforts and establishment and enforcement of new policies and legislation. Results will be depicted on a map pointing the countries’ black spots for pool accidents/incidents. Ultimately, this standardization will allow a more reliable comparison with studies from other countries and data to be crossed with factors such as socio-economic parameters of the victims.
DEVELOPING AND SUSTAINING A LOW RESOURCE RESCUE UNIT IN GHANA, WEST AFRICA

Mr. Felix Uzor

Rescue 7, Salon 3, October 18, 2017, 3:30 PM - 5:00 PM

BACKGROUND

Ghana is located on West Africa’s Gulf of Guinea. It has a total land area of 238,533 km and an estimated population of 23,478,000. Just under half the population lives in the rural area. The capital Accra is located on the Atlantic coast. Males in Africa have the highest drowning mortality rates in the world. Whilst countries like Mozambique, Somalia, and Burundi appear to bear the burden in Africa, there are no reliable figures to compare. In Ghana, one article reported drowning to be the highest cause of accident-related deaths for 10-19 year olds. While there may be an absence of accurate data, drowning on beaches during public holiday is a common occurrence. One news outlet (myjoyonline) reported 9 bodies washed ashore at two beaches in Accra after the Easter festivities, with the blame firmly on the state and absence of any proactive institutional intervention. In 2015 over 150 died when torrential rains flooded the capital causing an explosion as people sheltered at a petrol station. This year 20 students died at a popular tourist waterfall. There is no coordinated institutional response to proactively deal with the devastating effects of drowning in Ghana.

METHODS

In 2015 Felix travelled to ISLA headquarters and spent several weeks touring lifeguard facilities, after which a plan was made for a basic 3-day training course in Accra. In November of 2016, ISLA deployed 10 volunteers to conduct ISLA’s largest open water course to over 125 participants. The 3 days training provided an introduction to both theoretical and practical components of open water lifeguarding such as lifeguard operations, aquatic injury prevention, and basic open water rescue. Participants included representatives from Ghana Navy, Fire, Police, Marine Corps, Ambulance Service, Ghana Lifesaving and Diving Association and National Disaster Management Organisation (NADMO). Abilities and experience were very diverse with some never even swimming in the ocean before, or even being past the outside surf break. Teaching basic swimming rescue skills & rescuer scene safety became a major part of the training course. This was the first Basic Open Water Lifeguard course in the country and the participants and instructors, pushed themselves past their limits. A total of 8 ISLA’s International Open Water Lifeguard Certificates were awarded, but all participants came out better stronger and more informed. The enthusiasm, determination and commitment of the training has continued. The following month the Ghana National Aquatic Rescue Unit (GNARU) was formed, an alliance of agencies participating in the training, and the first beach lifeguards deployed in December 2016. Since then volunteer lifeguards have been deployed every public holiday to 6 of the most populous beaches in Accra. To date no fatalities have been reported during these periods.

Built on a model of donated equipment and training from ISLA, volunteer lifeguards (largely public service personnel), contributions of food and water from resort owners, and coordination by Felix impact is being made and unnecessary loss of life significantly reduced.

FINDINGS

Building capacity – the starting base in Ghana is low. Only 8/125 participants successfully passed the 3 days ISLA programme. However, through regular practice knowledge and skills are improving.

Demand outstrips supply – Lifeguards are currently deployed to 6 beaches, the request for more beaches to be covered and beaches to be staffed regularly increases. At some beaches the numbers are unmanageable with a ratio of over 5000:12 lifeguards.

Viable business model – Lifeguards are deployed on a volunteer basis, resort owners make a contribution to feeding, some beaches have no obvious businesses to approach. Contributions vary with most resort owners unwilling or unable to contribute beyond immediate food and water.

Resourcing ongoing training and coordination - a more viable business model needs to be found to meet core operational costs that builds on the volunteering spirit but does not undermine contributions so far. Volunteers should receive expenses, uniform and regular training. Coordination is time consuming and undertaken solely by Felix in a voluntary capacity, while simultaneously trying to run two businesses.

Low public awareness and personal accountability around beaches. Despite the achievements of the School Aquatic Survival Programme, knowledge and understanding of water safety is still low amongst the general public. Alcohol and swimming is still a major problem/concern.
BACKGROUND
In 2016, Hong Kong Amateur Swimming Association (HKASA) was confident that the Cross Harbor Race would grow in scale to become an iconic event of Hong Kong. Swimmers were split into Racing and Leisure Groups. In the Race, the 1,500-meter Race saw around 2,700 people swim across the Victoria Harbor – 300 swimmers up from 2015. Unfortunately, two swimmers in her late fifties and his mid-forties were drowned and lost their lives in New World Harbor Race 2016. Both the victims were taking part in the Leisure Group, which was for slower swimmers. Some local media questioned why only 10 extra lifeguards had been added when the field had expanded so much. HKASA spokesman explained that lifeguard boats had been posted at 30-meter intervals so that each section of the swim would be covered. Both Victims were belonged to the Leisure Group in the Race, which mandated that every individual wore an orange Safety Tow Float. Besides, the weather was reportedly warm and sunny with temperatures floating around 27 Degrees Celsius (80°F).

After the Race, HKASA (the Organizer) and New World Development Company Limited (the Title Sponsor) issued a statement expressing their “deepest sorrow” over what they called a tragic accident. “The swimmer was rescued but attempts to resuscitate him failed and he subsequently passed away”, the Statement said. The Organizer and the Title Sponsor offered their sincere condolences to the bereaved family.

Local media reported that the man who died was rushed to hospital after being pulled unconscious from the water by a rescue boat. A woman thought to be in her 60s was separately pulled unconscious from the water. She died after intensive care for three days in hospital. The Organizer and Title Sponsor expressed again their sincere condolences to the family of the 2nd Leisure Group swimmer. They kept in contact with the two families of the deceased, and provided them with financial assistance and support.

METHODS
Although not a sanctioned FINA [Fédération Internationale de Natation] event, the relevant international organization released a statement, noting that they “will be conducting a thorough review of the incident and the overall safety and organization of future outdoor mass participation events.” As of June 30, 2017, findings of FINA review are not available. Therefore, the Researcher has written a comprehensive study report about 10,000 words.

FINDINGS
His study revealed:
- Guarding Services were inadequate for the Swimmers of the Leisure Group in New World Harbor Race 2016 - When the swimmers were dispersed due to the erratic sea conditions. Neither the Canoe Life Guards nor the Life Guards on board Inflatable Rescue Boats and/or Rescue Skis could effectively monitor over 2,000 swimmers along the prescribed 1,500 meters long Course.
- Entry requirements for the New World Harbor Race 2016 did not ensure the proficiency of swimmers of the Leisure Group - Prolonged time of completing the Race shed light to the proficiency of the swimmers of the Leisure Group. Two fatal accidents also substantiated that the Victims were not suitable for swimming on the sea conditions of the Race Day.

At the end of the Study Report, the Researcher makes the following recommendation:
- Readiness for Open Water Swimming
- Coverage of Life Guarding Services in Open Water Swimming

Findings and recommendations of this study would contribute to the wide body of knowledge in drowning prevention as well to the professional practice of life guarding.
BACKGROUND

Coastal areas are always considered for high incidence of drowning as people exposed to water bodies for daily living and recreation. The southern coastal district Cox's Bazar is famous for its sandy beaches, and has become a popular tourist destination over the last decade. Incidences of fatal drowning among the tourists and local communities are very high. Most of the tourist oriented countries have professionally trained lifeguards to ensure the safety of tourists on the beach, however prior to the introduction of the SeaSafe lifeguard programme there were no trained lifeguards on the beach in Cox's Bazar. In July 2014 with the support of Royal National Lifeboat Institution (RNLI), UK CIPRB has been implementing new full time lifeguard services in Cox's Bazar beach. Besides the lifeguard services in the beach, the program is delivering water safety education among the school children, community people and among the tourists. Recently, survival swimming teaching program for the children aged 4-12 years was also added as a part of the SeaSafe project.

OBJECTIVE

The objective of this paper is to describe the impact of the SeaSafe project over the period of two and half year.

METHODS

From the beginning of the project different monitoring tools, reporting forms were developed for the SeaSafe project. For this study all sorts of reports such as daily incidence report, monthly report, quarter report, school education daily report, incidence report were analysed.

RESULTS

The SeaSafe Lifeguard project started in 1st of May 2014 with 10 fulltime lifeguards, gradually the number increased and currently a total of 21 full time lifeguards are working under the SeaSafe project. Since beginning lifeguards rescued 190 lives from the water, provided first aid among 27 causalities. The lifeguards were also found 15 lost children and gave them to the proper authority.

Under the school safety education program, a total of 158 primary and secondary schools were covered and 29,624 school children were oriented on water safety messages.

Under the beach awareness program lifeguards have been providing water safety awareness messages among the tourists. Over the project period over 267,000 tourists were provided water safety awareness messages. Under the SwimSafe program 3,000 community children aged 4 -10 years are planned to train survival swimming lessons in over the next 3 years. In a recently installed swimming pool about 130 children were trained for survival swimming lessons and about 300 children are under enrolment.

SeaSafe lifeguards rescued over 130 people from a flash flood. Among them 45 were female, 65 were children and 20 aged people. Among the female 15 were pregnant women.

The SeaSafe lifeguards were also participated in a deep sea rescue after a fishing boat capsized. They rescued 5 alive people in the deep sea struggling with the waves over one hour.

CONCLUSION

SeaSafe lifeguard project has huge impact in the local community as a significant number of community children and adults were oriented on water safety messages and rescued from different situation.
BACKGROUND
Design innovation in recent years has provided many products and systems to aid drowning prevention; these range from high performance lifeguard rescue boards to search and rescue drones. While there is no doubt that this solution has an important place in drowning reduction they are primarily designed by and for the developed world. Many low resource communities, where nine out of ten drowning incidents are taking place, are unable to afford or maintain this type of equipment.

AIMS AND OBJECTIVES
Over the last year the RNLI’s International Department has undertaken a project with the aim of providing low resource communities access to affordable and sustainable lifesaving equipment.

TARGET
A range of stakeholders have been involved in the project including low resource communities, lifesaving organisations and Non-Government Organisations in Africa and Asia, as well as United Kingdom (UK) students, academics and industry.

IMPLEMENTATION
As a small part of a larger long-term project, we examined the development of three equipment resources which seek to enable communities to produce equipment themselves, with an emphasis on sustainability through utilising locally available resources and production methods. The resources include a throw line, a lifeguard rescue board and a unique piece of public rescue equipment named the ‘Bottle Buoy’.

EVALUATION
As well as the obvious potential to help save lives in the target communities, the projects’ benefits have been wide-ranging. The three equipment production resources have been effectively used during development to produce a rescue board now in use by Lifeguards in Cox’s Bazaar, throw lines now used by Bangladesh Fire and Civil Defense and the ‘Bottle Buoy’, after successful functional testing, is now undergoing contextual testing in conjunction the Centre for Injury Prevention and Research, Bangladesh (CIPRB)

Unexpected outcomes include a small sewing shop entrepreneur from the UK spreading her expertise through the creation of a production resource for a throw line and the creation of possibly the first Bangladeshi solo custom surf board manufacturer.

DISCUSSION
The project so far has delivered some significant benefits but has also offered considerable challenges educationally, ethically and practically, these include the barriers of differing cultures and languages, issues with design validation, and the reliability and availability of information.

As we move forward, with three further items of equipment, we look to draw on the lessons from the first stage of the project which has informed the creation of a ‘low resource equipment design process’ that will now be used to streamline design of future products and refine the development process. A new logical framework and the development of a specific suite of monitoring and evaluation tools will ensure that the project continues to move towards its’ goals. Needs identification, contextual testing and effective dissemination of the resources remain significant future challenges.

ACKNOWLEDGEMENTS
Bournemouth University, United Kingdom; The Little Sewing Company, United Kingdom
Centre for Injury Prevention and Research, Bangladesh
ARTIFICIAL BEACHES: HARD DEFENCES AND BATHING SAFETY

Dr. Dario Pezzini1
1Società Nazionale di Salvamento - Italy, Via Luccoli 24/4, Italy, 2GNRAC, Genova, Italy, 3University Pisa, Pisa, Italy

BACKGROUND
Hard defences (seawalls, groynes and the like) frequently bring about drowning events in Italy as in the rest of the world.

METHODS
Six morphological beach types have been identified on the Italian/Mediterranean coast, 4 of which present dangerous rip currents. The variables affecting the sea bottom in the nearshore are numerous (sediment granulometry, wave regime, breakers and surf zone amplitudes, etc.). Unfortunately, men have added their own by building hard structures to defend beaches from erosion, thereby altering the circulatory regime in the nearshore. The nearshore is also the ‘bathing zone’, where most people bathe and drowning accidents are more numerous (90% of accidents occur within 30 - 40 m from the shore). As to beach protection, hard structures have not always produced efficacious outcomes, but in regard to modifying the circulatory model in the bathing zone, they have been too successful by provoking lethal dangers to swimmers. In long tracts of the Italian seashore, where rip currents were typically absent, rip currents have been artificially caused.

METHODS
From the beginning of the project different monitoring tools, reporting forms were developed for the SeaSafe project. For this study all sorts of reports such as daily incidence report, monthly report, quarter report, school education daily report, incidence report were analysed.

FINDINGS
As to the results of our research, two points are paramount:
Hard defences provoke different outcomes in different beach types (depending on sea bottom slope, direction of dominant winds, wave regimes, etc.);
The dimensions of hard structures are essential in order to foresee eventual outcomes (groyne length or spacing between subsequent groynes, for instance).
In no plan to defend a beach through hard structures was the cost of human life considered. These costs – monetarily huge – are incommensurable from an ethical point of view. 15 – 20 cases per summertime (out of about 50 drowning accidents because of rip currents) occur in Italy on account of artificial structures.

CONCLUSION
The aim of our present research – in the outline of a national water safety plan – is to render binding the obligation to take these costs into consideration.

The present paper briefly illustrates the outcomes of the research being conducted by SNS (National Lifesaving Society, Italy), in collaboration with GNRAC (Universities and Government Agencies Coast Researchers Association), ISTISAN (Higher Research Institute of Health Ministry).
BACKGROUND
Surf Life Saving New South Wales (SLSNSW) recently concluded a major drowning prevention project through the New South Wales (NSW) Government’s Ministry of Police and Emergency Services Water Safety Blackspot Fund. This project, known as ‘Project Blueprint’, delivered comprehensive research into the risks associated with coastal environments that may lead to drowning and how best to minimise these risks. Now in its final year, the project has conducted research into the risk of drowning and injury at every accessible beach and rock platform in NSW.

METHODS
The project utilised internationally standardised risk management processes, applied to the context of drowning prevention, together with the International Life Saving (ILS) Federation’s Drowning Prevention Chain to deliver localised drowning intervention plans addressing the specific local needs of communities and minimise the risk of drowning in each Local Government Area (LGA) visited.

FINDINGS
To date this research has been used to deliver outcomes in each of these areas, including:
- To support the delivery of education and awareness programs to high risk communities such as Sydney’s Inland Western Suburbs
- Modified access to improve exposure to standardised aquatic warning signage and also discourage access to extremely hazardous location and encourage access to more suitable locations.
- Identification of inconsistent approaches to the provision of warnings by different land management authorities.
- An Emergency Marker Systems for coastal areas to improve emergency response..
- Efficiencies in lifeguard services across the State, including providing lifeguard services at new locations or extending to duration which existing services patrol.
- Auditing of existing public rescue equipment and identification of potential locations.

Through this presentation the outcomes of this research will be expanded upon, provide specific examples and case studies, and also discuss some of the issues that have been faced as a result of working with communities and other organisations throughout this research.
BACKGROUND
Personal watercraft (PWC) are used extensively by lifesaving and rescue personnel around the world in aquatic environments. The PWC has become a revolutionary and proven piece of rescue equipment in both patrol/prevention and rescue/response applications.

AIM
This presentation will trace the development of personal watercraft from their recreational beginnings into effective rescue tools for use by lifesaving personnel and agencies. It will document the early stand-up models, their impact on potential water safety applications, and the pioneering work of the Hawaiian lifeguards in developing the use PWCs for surf rescues.

The focus of the presentation will be on the development of the effective use of personal watercraft for rescues in surf conditions by lifeguard agencies in the State of Hawaii, with emphasis on risk management principles as applied in the ocean environment.
BACKGROUND
Ocean beaches are dynamic settings where changes in ocean conditions can increase the risk of drowning. Lifeguard familiarity and experience dealing with different factors in the beach environment have provided the key to anticipating rescues and allocating appropriate rescue resources in order to prevent drownings. Few studies have evaluated associations between environmental conditions and rescue frequency.

In 2015, Newport Beach Lifeguards in California, USA, began reporting all lifeguard interventions in real-time via a Computer-Aided-Dispatch (CAD) system. This data collection method provides the ability to link and explore the relationship between measured environmental conditions such as wind, waves, or tides, and lifeguard rescue frequency.

OBJECTIVE
To investigate the association of wave height and tidal water level changes with the frequency of ocean lifeguard rescues using records collected in real-time with a Computer-Aided-Dispatch system in Newport Beach, California.

METHODS
All ocean lifeguard rescues recorded by Newport Beach Lifeguards in 2015 and 2016 were linked by time and location to weather and ocean variables contained in other historical databases maintained by the National Weather Service, the National Oceanic Atmospheric Administration, and Surfline®. We performed separate multivariable analyses using mixed effects negative binomial regression to evaluate the total effects of wave height, mean water level (primarily set by tidal elevation), and rising vs. falling water level, on the occurrence of ocean rescue in the study location, controlling for confounding variables identified through the use of Directed Acyclic Graphs.

RESULTS
Newport Beach Lifeguards made 8,046 rescues during the study period. A concave relationship was identified between rescue frequency and wave height; rescue frequency increased as waves got larger, but then decreased in large surf. The effect of tidal level variables on rescue frequency varied significantly by geographic section of beach. Rescue occurrence was more likely during lower water levels on two sections of beach, and more likely during higher water levels on one section of beach. Rising water levels were associated with increased rescue frequency in one section of beach, but were not associated with the occurrence of rescue in the other two sections. In all regression models, alpha parameters indicated high levels of heterogeneity in the results.

DISCUSSION
Wave height, water level, and water level direction were statistically associated with rescue frequency, but the environmental factors included in the analysis did not account for most variation in rescue frequency. This new information has practical implications for lifeguard operations. Evidence for increased rescue frequency in certain environmental conditions allows lifeguard supervisors to appropriately staff the beach and allocate resources for times when rescue occurrence is more likely. Although specific estimates of association between environmental variables and rescue frequency identified in this study may not be generalizable to other beaches, operational and training implications of the findings may be of value to lifeguard training and response in other settings.
PORTUGUESE LIFEGUARD’S PERFORMANCE IN AQUATIC RESCUE - EXPLORATORY STUDY

Ms. Olga Marques1,2, Mr. Henrique Gouveia e Melo3, Mr. Nuno Leitão1, Mr. José Palacios4, Dr. David Szpilman4, Mr. Luís Rama2

1Instituto De Socorros a Náufragos; Faculdade de Ciências do Desporto e Educação Física, Universidade de Coimbra. Centro de Investigação do Desporto e da Atividade Física (FCDEF/CIDAF), Portugal, 2Faculdade de Ciências do Desporto e Educação Física, Universidade de Coimbra. Centro de Investigação do Desporto e da Atividade Física (FCDEF/CIDAF), Portugal, 3Autoridade Marítima Nacional, Portugal, 4Brazilian Lifesaving Society - SOBRASA, Medical Director, Brasil, 5Grupo de Investigación en Actividades Acuáticas y Socorrismo, Facultad de Ciencias del Deporte y la Educación Física, Universidad de A Coruña, España

Rescue 8, Salon F, October 19, 2017, 11:00 AM - 12:30 PM

BACKGROUND

In compliance with the European recommendations, the Lifeguard (LG) became a regulated professional activity in Portugal in 2012, demanding proper physical and psychological preparation. This study aims to evaluate and monitor the skill level of Portuguese LG on performance of a rescue in ocean beaches. Drowning literature supports, depending on several factors: i.e. water temperature, age of the victim, and other that a framework of 6 to 10 minutes would avoid irreversible neurological impact, leading to a favorable outcome to a drowning victim.

METHOD

86 LG (69 males and 17 females) and 57 volunteers victims (37 males and 20 females) participated in this study. During a working day the LGs fulfill two rescue-simulated situations: at beginning and at the end of the workday. The LG using the rescue-tube, runs a total distance of 100 meters covering 50 meters in front of his tower, changes direction at right angles and runs more 50 meters. Then he enters in the water and puts on flippers, swimming a distance of 50 meters and return to land towing the victim. The volunteer victim simulates to be unconscious. The total and each time lapse of the protocol were monitored. The environmental conditions (weather and water temperature) and the characteristics of the beach (location, sand type, current strength, amplitude (height) of the wave), and his total training sessions at the beach during the LG certification course were also documented.

RESULTS

The results showed that 91,9% were able to perform the rescue in less than 6 minutes, and only 2,3% exceeded 10 minutes. There were no significant differences between 2 events. An inverse relationship between the number of ocean beach training sessions during the LG course and the time spent in the rescue (AM p=0,018; PM p=0.006) was found.

CONCLUSION

The large majority of the LG that participated in this study demonstrated the readiness to conduct a full rescue in less than 10 minutes. Study demonstrated that more emphasis on ocean beach training in the syllabus of the LG course sessions were important decisions to the result of this excellent LG performance. The requirements of the physical condition should be demanding for any aquatic environment but focus and adapted to the specific needs where LG intend to work.
Most recreational activities involve risk which is managed by a combination of individual choice and provider management. Coastal beach recreation is popular but injuries can occur. In particular, spinal injuries can occur when bathers are thrown by waves, or erroneously dive into shallow water. Victims may be thrown by waves when they are intentionally riding the waves or even when they may be standing, sitting or walking.

Personnel at coastal beaches take actions that can both potentially increase or decrease the incidence and severity of coastal spinal injuries. The effects of beach replenishment, artificial reefs, and on-site education efforts are surveyed and evaluated for their effect on the incidence and severity of potential spinal injuries reported at the scene of the incident.

Beach replenishment is an ongoing government activity believed to be related to spinal injuries. Artificial reefs are significantly affected by existing policy. A body of literature suggests that relevant asymmetries of information are reduced by education efforts. These three policy alternatives are evaluated for their empirical contribution to the apparent severity of injuries and the incidence of aquatic spinal injuries. Two limited dependent variable approaches are used, an ordered dependent variable and a count approach.

Four models, and appropriate sensitivity analyses, are presented. The policy variables of interest are not statistically significant at traditional thresholds in the four primary models. In sensitivity analyses, the coefficient related to beach replenishment is statistically significant in eight of the sixty specifications. To the extent that policy-makers may consider alternatives consistent with the alternative hypothesis of an effect, the effect of timing of beach replenishment is discussed.
CONTRIBUTION REGARDING ENHANCEMENT OF ABILITY IN SELF AND MUTUAL RESCUE BY JLA AFTER GREAT TSUNAMI IN 2011

Takayuki Matsumoto¹,², Dr. Toshinori Ishikawa¹,³, Youjiro Sato¹, Takahiro Kazama¹

¹Japan Lifesaving Association, Minato-ku, Japan, ²Seijo Gakuen, Japan, ³Chuo University, Japan

Rescue 9, Salon F, October 19, 2017, 1:30 PM - 3:00 PM

BACKGROUND

Japan Lifesaving Association (JLA) is a non-profit organization that was initiated in 1991 with the aim to reduce the number of drowning deaths in Japan to zero. JLA is working on not only drowning prevention, but also the education and the sports to contribute to society. Also, JLA is involved at approximately 200 beaches which are supervised by 133 lifesaving clubs. On the other hand, the northeastern Pacific coast of Japan was hit by a great tsunami that was generated by a great earthquake on March 11, 2011. The maximum inundation height was 19.5 m, the tsunami reached more than 5 km inland on the plain area, and the maximum run-up height measured 40.4 m. As a result, the coastal area was severely damaged and there were a lot of fatalities. Up to the 8th of March 2016, the total number of fatalities was 15,894. Especially, we have to note that the outbreak factor of death of over 90% was due to drowning. In order to reduce the risk of a tsunami disaster, not only the structure maintenance such as tsunami breakwaters, but also comprehensive tsunami countermeasures to prevent drownings are necessary in the high risk areas caused by the tsunami.

AIM & TARGET

In order to contribute to the enhancement of the ability in self and mutual rescue to survive during a tsunami, JLA has started to positively provide water safety skills and BLS skills nationally for the general public after the great tsunami.

METHOD

The water safety curriculum was developed by JLA Academy which was launched in 2011 as a new educational field. This curriculum consists of practical skills of 150 minutes and lectures of 110 minutes to gain self-rescue skills. The practical skills are composed of some survival swim, usage of flotation devices and elementary rescue techniques etc. The lectures provide education regarding knowledge and survival skills under several natural conditions such as shores, beaches, rivers and ponds. Also, to reduce fatalities, mutual rescue skills by BLS are necessary for accidents. Therefore, JLA nationally provided this program together with the BLS method. On the other hand, from 1,500 to 3,000 drowning incidents including from 10 to 30 unconscious victims have occurred every year on beaches which were supervised by lifesavers. Especially, young age groups under 19 years old have accounted for approximately 50% of drowning incidents. Through this action, JLA is increasing communication to the general public, from children to adults, on “how to avoid drowning”, “what to do if drowning”, and “what to do if you find someone drowning”.

RESULT

As a result, by 2016, JLA and JLA instructors had carried out the self and mutual rescue training for a total number of 61,554 people including 33,319 people who obtained water safety skills and 28,235 people who obtained BLS skills.

DISCUSSION

Looking to the future, JLA will continue this project along with deepening the cooperation of the government under the long-term strategy.
DEVELOPING A RELIABLE SOLUTION FOR REMOTE EMERGENCY ALARMS

Mr. Adam Weir, Mr. Andy Kent
Surf Life Saving New South Wales, Belrose, Australia

BACKGROUND
The Surf Life Saving New South Wales (SLSNSW) Emergency Response Beacon (ERB) project has been operating from 2009 with the initial development of portable radio operated ERB systems. The project was conceived to provide an emergency notification system for the general public that could be easily deployed at identified drowning blackspots in a coastal environment.

THE NEED
Recommendations through SLSNSW research project “Project Blue Print” completed in 2016 identified 27 possible locations across the New South Wales coastline where a remote emergency alarms/beacon could assist in drowning prevention by decreasing response times by early notifications to remote incidents.

WHAT IS ERB?
The original ERB design (2006) was a basic two-way radio placed in a yellow box and deployed to a another area on a beach generally 500m - 1km away from the patrolled area, it could be used by members of the public to alert lifeguards to an emergency situation at the other end for the beach. Through Research and Development SLSNSW have dramatically improved the technology and capability of the ERBs.

RESEARCH AND DEVELOPMENT
SLSNSW contracted CNG Systems Ltd in May of 2014 to review the current Emergency Response Beacon project to provide a Next Generation ERB system that could provide enhanced functions capabilities with new technologies and software available. CNG conducted a thorough research assessment of all relevant equipment and technology in the market and conducted a development project to ascertain the specific functions, technology and capabilities required for a SLS operated system. As a result, CNG developed a 52 page Engineering Specifications Document outlining all research, findings and development. These specifications now provide SLSNSW the options to approach land managers with a viable solution to deploy ERB’s.

HOW DO ERB’S WORK NOW?
An ERB is designed to notify (when activated) local lifeguard assets, lifeguard supervisors and the SLSNSW State Operations Centre simultaneously to ensure a coordinated fast response to what previously were remote unpatrolled areas of the coastline. the ERB’s now use mobile data with satellite backup to ensure when activated by a person in need the call will be answered.

DEPLOYMENT
The initial workshop testing took 4 months and field testing took a further 6 months with Wollongong City Council Lifeguards and the system proved to be extremely reliable. As a result 4 ERB’s have been deployed thought-out NSW. The ERB’s all connect with the SLSNSW State Operations Centre and multi local assets to ensure a quick response to an emergency.

Each ERB is mounted on permanent standard compliant safety signage.
BACKGROUND
New technologies become part of our everyday lives now easier and quicker than ever. In the professional world, new tools are designed and introduced into our work routine on a daily basis, sometimes without thoroughly evaluating if these bring about an improvement. When it comes to water safety and rescue it is yet to decide if some of these tools can improve the performance of lifeguards.

AIM
The aim of the present analysis is to evaluate one of the latest developed technological devices in the open water rescue area - jet-powered rescue boards. We evaluated their utility and applicability, and analysed if they can be considered as a real improvement to minimize time in the drowning chain of survival.

FINDINGS
Regarding the latest technological devices in the area, the drones or UAVs could be considered amongst the most innovative. These vehicles are successfully being used in SAR operations, and pilot tests have been carried out in beach rescue services. UAVs, are able to offer long distance and quick access to flotation devices, but don’t go further.

Some other remote control propelled devices used, floating robots, reach considerable distances and have been designed for tasks such as, being launched from a beach shore and being able to reach, in a short period of time, a person who has been caught in a rip current.

These remote control devices, however, face a series of regulatory and operational issues regarding safety that make their deployment as new rescue tools more difficult.

On the other hand, the jet-powered rescue board has been developed on the basis of the rescue surfboard, a tool that has been used in beaches all over the world for more than a century. The significant technical improvements made on the design of the rescue boards include electric engines powered by batteries, which have small propellers within the turbines, similar to those of the jet skis, the size and the shape of the boards has also been upgraded but is mainly still the same today.

This means that the techniques that lifeguards will have to apply in its use will also be the very similar. However, they will benefit from the extra propulsion to paddle faster or go against the flow easier, as well as minimizing rescue time. When technological innovations are used to improve existing products or tools, already proven efficient, their introduction becomes easier and often more successful than when we try to find a use for new technological devices just to promote their use.

CONCLUSION
During a 6-month period, tests were carried out, in different scenarios, with variable sea conditions, types of victims and ability levels of the participant lifeguards. The present study shows the data obtained in this first comparison between the use of propelled and conventional rescue boards. Our data shows that jet-powered rescue boards should be considered as a rescue device from which open water rescue could truly benefit nowadays.
Backbone injuries in the context of water activities often lead to severe impairment. In most cases head-forward shallow water diving is the mechanism of trauma. In the majority of them, usually young male, the patient’s cervical spine is impaired.

Spinal cord impairment at level of C4 or above often causes permanent respiratory insufficiency. The rescue of such patients demands several special techniques. Many aspects have to be considered as rescue varies from the usual-procedures ashore. Since the probability to encounter a patient with possible spinal injury is rare, the expertise how to act is rare as well in the rescue teams.

Since lifeguards are specialists in attending to patients in water there is the necessity to instruct water-rescue specialists in the technique of backbone-protecting rescue. The German Life Saving Association (DLRG) has developed a step-by-step instruction to enable rescuers to offer a patient-centered care for this special group of patients.

The system is established in training of lifeguards and paramedics in the DLRG and will be presented to the audience in detail. Moreover, a number of different devices for the backbone-protecting water-rescue have been tested according to buoyancy and tilt stability as important factors of suitability for water-rescue.
BACKGROUND

Worldwide, more and more people are practicing sports to have fun, to exercise, for competition or health purposes. Aquatic sports are included in the top list of riskier sports, as the environment per se carries a possibility of death by drowning if the person gets in trouble or unconscious in water and is not rescued in time. Not only are the aquatic sports linked to a higher risk of death, but so are all other sports practiced over the water (e.g., hang-gliding) and on ice (outdoor skiing or skating). Whatever the reason for being in the water, there is a higher possibility of drowning leading to death if the individual is unable to cope with the water situation, which may be caused by an inability to stay afloat and get out of the water or by an injury or disease that may lead to physical inability or unconsciousness.

The competitive nature of sports is a frequent pathway leading the competitor to exceed its ability to cope with the environment or simply misjudge its physical ability and get him at risk of drowning.

After the American swimmer Fran Crippen, 5 time medalist of open water international competitions, died at age 26, during an open water 10km swimming marathon at the World Cup in Fujairah in 2010, a lot of attention has been paid on what are the risks and how to provide safety to competitors.

This abstract briefly points a few very important considerations about the rescue and medical operations and how the safety was provided during the 2016 Olympic Games aquatic marathon in Rio de Janeiro—one of the most dangerous sports of the Games. This event was just recently formally introduced to the Olympics in Beijing 2008. With 10K open water swimming and takes approximately two hours - a great endurance test, both physically and mentally, for the athletes.

In 2016, the marathon took place at the Copacabana Beach, first time the event happened in ocean open water. It took place in a specific part where smaller surf constitutes safer conditions to athletes and makes the supervision by lifeguards an easier task to accomplish. The event lasted 2 days, with competitions by gender, and with no more than 30 athletes in each one. Besides the athletes, more than 150 professionals were working on the water, on boats and water platforms to judge (FINA), to supervise (volunteers in kayaks), to transport (Marines), for media coverage (journalists), to rescue (lifeguards), and to feed the athletes (coaches), all coordinated by a lifeguard head supervisor.

By definition drowning is “the process of experiencing respiratory impairment from submersion or immersion in liquid”. So, any simple splash of water in the athletes’ airways while swimming can constitute a drowning, but is that severe? Does it progress? Do we care?

This presentation will show what the drowning risk factors are for athletes and staff working at the aquatic marathon, how to be prepared to prevent, rescue and provide basic and advanced life-support and finally the result of the rescue and medical attendance at the event.
Beaches in the United States and around the world have enormous economic, social and recreational value. In the United States, Houston (1966, 2013) placed the value of beaches at 1.2 trillion annually and in Florida, Murley (2003) reported that the 825 miles of sandy beaches had an annual impact of 41.6 billion in revenue at that time. The economic value of beaches, particularly those devoted to public recreation is highly dependent on the aesthetic quality of the beach. However, over half of America’s beaches are considered severely eroded, putting this critical resource at risk.

Beach sand nourishment programs are increasingly used to protect coastal development and recreational beaches from the impacts of erosion and to maintain beaches as rates of sea-level rise increase (Table 1). Beach sand nourishment projects are generally believed to be the most effective soft armoring method for mitigating the impact of erosion and consequently for helping to maintain and enhance the recreational value of beaches (Gill, et al., 2006) (Figures 1, 2).

Sand for projects comes from two sources; terrestrial quarries and from offshore (canals, ports and borrow pits). Sand is deposited on the beach by hydraulic pumping (Figure 1) or truck haul and then spread over the beach with a variety of heavy equipment including dozers, backhoes, and graders (Figure 2). Both the physical characteristics of the sand deposited and the methods used for the nourishment must typically meet strict engineering specifications regarding the potential mobilization of the sand and environmental standards related to preserving water quality and nesting habitat for endangered or threatened species such as sea turtles and/or shorebirds.

It has only recently been considered (Chester, 2013) that such highly perturbed beach morphologies may negatively impact the safety of some re-nourished recreational beaches. Although ample anecdotal evidence (some of which will be presented here) and National Ocean Lifeguard statistics suggest that beach nourishment and the accompanying morphological changes in the beach contribute to an increase in serious aquatic accidents and drownings, there has not been sufficient research conducted to firmly establish and quantify these impacts (Fletemeyer, 2014). Such research is necessary to develop protocols for project design, implementation and monitoring to reduce the risks to beach.

Rip currents are responsible for at least 100 fatal drownings on American beaches every year (Lushine, et. al. 1999, Lushine, 2011) and flash rip currents are often the most deadly because they materialize quickly, unexpectedly, and sometimes during moderate surf conditions (Slattery et al., 2012, Fletemeyer, 2017). On Delray Beach, following a beach nourishment project in 2008, the number of “flash” rip currents significantly increased from three identified over the 120 day pre-nourishment monitoring period to observations of rip currents on 22 out of 100 days following the completion of the nourishment program (Figure 6). In a majority of the cases during those 22 days, multiple rip currents were observed along the 3.8 km mile study area. Fletemeyer reported that rip current drowning events are more likely to occur during moderate surf conditions because bathers are more likely to enter the water than during times when the surf is heavier and appears more ominous looking.

In addition, a significant increase in sand compaction reduced the infiltration of sea water and consequently further increased wave backwash. Sand compaction data was collected using a cone penetrometer (as shown in Figure 3) from Delray Beach, John U. Lloyd Park Beach, and Ft. Lauderdale Beach. This data showed that shear compaction values doubled following nourishment. When combined, these conditions promoted flash rip currents during moderate and heavy surf environments and consequently represented a public safety hazard.

In conclusion, several significant morphological changes in beaches have been documented following beach nourishment projects (Piatkowski, 2002). We believe that these changes could be elevating the probability of rip current formation on recreational beaches and may have contributed to the increase in accident rates being reported by lifeguards on some recently nourished beaches. These physical changes include:

Steeper beach profiles (Dean 2002), (Piatkowski, 2002), (Kraus, 2005), (Fletemeyer, 2010), (Hearin, 2014). Escarpment barriers forming at or near the high tide line (Fletemeyer, 2010, Schmitt et al., 2003). A narrower beach planform (Dean, 2002), (Piatkowski, 2002), (Hearin, 2014). A significant increase in sand compaction and hardness (Nelson, et. al. 1987), (EAI 1987), (Ehrhart and Roberts, 2001), (Fletemeyer, 2010). A significant change in the nearshore bathymetry (Dean, 2002), (Hearin, 2014). A higher incidence of plunging waves breaking closer to shore (Hearin, 2012).

Despite evidence cited above, the authors believe that caution is necessary when correlating beach nourishment with an increase in serious accidents and drownings. Following the completion of a nourishment program resulting in a widened beach, a larger bathing load is to be expected. Consequently, this factor may partially account for more accidents. Nevertheless, considering the increased reliance on nourishment to solve beach erosion problems and the economic importance of beaches to coastal communities, the authors believe that the subject certainly warrants further research.

In the future, beach nourishment policies and designs should include measures devoted to promoting beach safety, including the reduction of escarpments and minimizing the likelihood of rip current formation (Sullivan, 2017). At the very least, until more research on this subject is completed, warnings signs should be strategically placed on beaches that have been recently nourished.
Rescue boats are part of basic equipment of water rescue forces on all continents. Lifeguard use of boats in Poland is regulated by legal acts. Every watering place or place which is used for swimming must be protected by lifeguards who should have rowing boats – at least one for every 100 m of coastline. Lifeguards using these boats have a duty to protect people bathing and swimming in designated water areas, as well as providing them with effective help in case of an incident.

Based on observation, little rowing or rowing-motor boats seem to be useful with the crew needing to get to the victim as soon as possible, put them onboard, provide first aid and transport them to a safe place. A vessel is characterized by the ease of moving away from a beach, big transverse stability, comfortable access to a victim in the water, surface on the deck to conduct first aid and the ability to reach shore quickly in order to use further land communication.

As a result of 9 years of research, an innovative multipurpose boat „Laura” has been created, using the best qualities of vessels used in lifeguarding. More effective assistance is provided when lifeguards use “Laura”.

The goal of this study is to analyse the effectiveness of rescuing drowning people using the innovative rescue boat Laura in the comparison those currently used by lifeguards. The research concerns economic efficiency related to:

- reaching an injured person by a boat,
- pulling aboard conscious or unconscious person,
- providing first aid onboard,
- reaching shore and transporting an injured person ashore.

For the evaluation of the selected boats used in water rescuing following tests has been conducted:

1. Rowing a distance of 100 m, based on the International Life Saving Federation rules by one person, respectively on all of the rowing boats (with the rest break)
2. Pulling aboard a conscious person (simulated) and a dummy (pretending to be a unconscious person) in three weight categories (50 kg, 70 kg, 90 kg)
3. Conducting pretended rescuing actions onboard on the conscious and unconscious person in three weight categories (50 kg, 70 kg, 90 kg)
4. Rowing on the distance of 100 m, based on the International Life Saving Federation rules by one person, respectively on all of the rowing boats with a load – injured person in three weight categories (50 kg, 70 kg, 90 kg)
5. Transport of the injured person (conscious and unconscious) ashore (beach, bridge) by two people (lifeguard onboard and a waiting lifeguard ashore)

Before conducting the efficiency tests, every tested person was evaluated in the maximum oxygen uptake progressive test (VO2 max) conducted by the rowing ergometer Concept2-C. Tests were conducted until the examined person’s refusal or the moment when he couldn’t have followed the set loading. In parallel, constant recording of the heart rate (HR) was provided using Polar S8000 RX sport testers. Additionally, in the last 30 seconds of every exercise degree, 20 µl of the arterialized blood from the earlobe was taken in order to determine the concentration of lactate. Lactate was determined using the reagents from EKF Diagnostics (Germany) and the lactate analyzer Biosen S-line (Germany).

Basing on the results of the respiration progressive test, designated the physiological tresholds of V1 and RCP. Seven days after the maximal oxygen uptake evaluation, the examined people were conducting tests with an interval of one day (every day using a different type of the boat). During the tests recording of HR the values of HR determined on the VT1 and RCP tresholds during progressive tests. This allowed to specify the amount of time spent in each of the intensity zones, expressed as a percentage of the duration of the test. Following that, the evaluation of the effort was possible.

In order to evaluate the effectiveness of using innovative rescue boat „Laura”, in comparison to currently used ones, the meta-analysis (quantitative synthesis of results) has been used. The effect size has been presented in the quantitative scale, common for the whole research.
RESCUE EQUIPMENT: ITS CONTRIBUTION TO A MORE EFFICIENT, FASTER AND SAFER SURF RESCUE.

Mr. Dimitrios Loupos\textsuperscript{1}, Mr. Evangelos Tsampazis\textsuperscript{2}

\textsuperscript{1}Aristotle University of Thessaloniki, Greece, School of Physical Education & Sports Science, Department of Physical Education & Sports Science, Thessaloniki, Greece, \textsuperscript{2}Lifeguard Academy of Northern Greece, Thessaloniki, Greece

Poster Day 2, October 18, 2017, 8:30 AM - 5:00 PM

AIM

The aim of the research is to distinguish differences between the use of rescue tube with fins and rescue board during a rescue and try to define scientifically proven guidelines and rules for the use of each piece of equipment.

METHOD

The research sample study includes 18 male (ages 21-22) lifeguards that took part in 2 different rescue scenarios. Rescue scenarios were set with the victim located 150m away from the lifeguard and 50m from the shore.

1st scenario: 150m run, 50m swim and 50m towing (vertical).

2nd scenario: 180m swim and 50m towing (diagonal).

The 2 fastest rescue techniques in a surf rescue with equipment, using fins with rescue tube or with rescue board (Barcala-Furelos et al. 2016) were compared in each rescue scenario.

During the following two days the subjects, after random selection, performed the rescues with full rest after each performance. Rescue times were recorded as well as lactic acid blood concentration after three minutes of the rescue. The trial was conducted under similar conditions.

Sea condition: waves about 0.80 m and wind speed of 20Km/h.

Water temperature: 24-25C

STATISTICAL ANALYSIS

All analyses were performed using SPSS 24. The following tests were conducted:

- Descriptive statistics (mean+std deviation)
- Paired sample test

RESULTS

Table 1. Mean ± Std deviation (time minute:second) statistical indicator level of significance

<table>
<thead>
<tr>
<th>Vertical rescue</th>
<th>Run–Board (Vertical)</th>
<th>Run–Tube &amp; Fin Vertical</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Rescue Time</td>
<td>02:55 ± 00:13</td>
<td>02:57 ± 00:14</td>
<td>-1.333</td>
</tr>
<tr>
<td>Beach Run Time</td>
<td>00:40 ± 00:04</td>
<td>00:34 ± 00:04</td>
<td>4.553*</td>
</tr>
<tr>
<td>Swim to Approach Time</td>
<td>00:41 ± 00:05</td>
<td>00:44 ± 00:04</td>
<td>-1.234</td>
</tr>
<tr>
<td>Towing Time</td>
<td>01:32 ± 00:11</td>
<td>01:34 ± 00:10</td>
<td>-1.959</td>
</tr>
<tr>
<td>Blood Lactic Acid (mmol/l)</td>
<td>7.8 ±2.6</td>
<td>8.1 ±2.9</td>
<td>-1.188</td>
</tr>
</tbody>
</table>

*p<.05

Table 2. Mean ± Std deviation (time minute:second) statistical indicator level of significance

<table>
<thead>
<tr>
<th>Diagonal rescue</th>
<th>Board (Diagonal)</th>
<th>Tube &amp; Fin (Diagonal)</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Rescue Time</td>
<td>04:20 ± 00:36</td>
<td>05:12 ±00:32</td>
<td>-5.134*</td>
</tr>
<tr>
<td>Swim to Approach Time</td>
<td>02:47 ± 00:22</td>
<td>03:32 ±00:24</td>
<td>-4.725*</td>
</tr>
<tr>
<td>Towing Time</td>
<td>01:34 ± 00:14</td>
<td>01:43 ±00:07</td>
<td>-3.134*</td>
</tr>
<tr>
<td>Blood Lactic Acid</td>
<td>8.4 ±3.8</td>
<td>9.3 ±3.6</td>
<td>-4.978*</td>
</tr>
</tbody>
</table>

*p<.05

Significant statistical differences were recorded between beach run time and all variables of the diagonal rescue.

DISCUSSION CONCLUSION

From the results we deduce that the total time of a rescue is completely relevant to the condition of the sea, the distance between the victim and the lifeguard (as well as the number of patrons) and the type of the rescue equipment used. In any rescue situation, the lifeguard must be aware of the best rescue scenario and equipment for each particular case, as from our research we concluded that the predominance/appropriateness of one piece of equipment to another is defined by the particular circumstances of the rescue.
THE LIFEGUARD SHORTAGE IN THE UNITED STATES AND THE IMPACT ON SAFETY

Mr. Mike Espino¹

¹YMCA of the USA, Morro Bay, United States

BACKGROUND

The presence of lifeguards allows aquatic facilities to safely deliver impactful aquatic programs in their community. However, during an improving economy, competition is high for quality staff, especially young adults. In addition, waterparks and multi-attraction facilities, the number of which is increasing, require significantly more lifeguards than a traditional pool. The combination of these two realities affects the number of lifeguards available in the community for aquatic facilities to hire. Not having enough lifeguards to staff an aquatic facility can have impact on safety, programming, and community relations.

METHOD

There has been no solid research that has shown the impact of the lifeguard shortage in the United States. However, there has been a steady stream of local and national media reports and articles over the past several years that have highlighted lifeguard shortages throughout every region of the United States. A review of these reports, along with discussions with aquatic and human resource directors, yielded anecdotal evidence that confirms the shortage and provides insight into the causes of the lifeguard shortage as well as concerns regarding the impact of safety as a result of the shortage.

RESULTS

All analyses were performed using SPSS 24. The following tests were conducted:
- Descriptive statistics (mean+std deviation)
- Paired sample test

In addition to impact on programming quality and community relations, such as shorter pool hours, less programming opportunities, and poor reputation, the following are some of the strategies that aquatic facilities are employing to deal with the lifeguard shortage, all of which have safety concerns:

- Closing portions of the facility. Such closures can pose a serious risk if there are not adequate controls to restrict access to the closed portions of the facility.
- Larger lifeguard surveillance areas. Increasing the size of a lifeguard’s area of responsibility can set up a lifeguard to fail if the individual cannot see, let alone reach within designated times, all the areas of their assigned zone.
- Longer shifts for lifeguards. Research indicates that optimal vigilance cannot be maintained for more than 30 minutes. The failure to provide a rotation and break system may result in fatigue, loss of focus, and ineffective surveillance of swimmers in the water.
- Using less qualified lifeguards. A person trained in shallow water lifeguarding does not have the functional expertise to lifeguard in a facility with deep water. A person with basic water safety training does not have the training to recognize and prevent water emergencies or perform a swimming rescue.
- Using no lifeguards. Posting a sign stating “No Lifeguard on Duty” or “Swim at Your Own Risk” is an insufficient safety precaution. This encourages a false sense of safety for both the aquatic facility and its patrons.
- Replacing lifeguards with aquatic safety technology. Aquatic safety technology systems are not designed to replace continuous lifeguard surveillance, though they can assist lifeguards in their surveillance duties.

CONCLUSION

Aquatic facilities need to assess the impact a lifeguard shortage may have on their operations. Developing strategies to attract qualified lifeguards can lessen the impact and still provide a safer aquatic environment for patrons, program participants, and the community.
In Brazil, there are approximately 1,300,000 aquatic rescues per year in the beach, rivers, dams, waterfalls, swimming pools and natural disasters such as floods, flash floods and overflow. Of these 6000 are deaths. The rescue of these victims is mostly done by teams of lifeguards who work together with different experts in the aquatic environment, such as: divers, aircraft crew, fast-water teams, boat crews and pre-hospital and volunteers with aquatic emergency training. The greatest challenge in the aquatic environment is communication between rescue different teams. The standardization of communication is critical to the success and efficiency of each rescue. SOBRASA has been using hand signals between lifeguards since 1997. Recently (2012) the International Life Saving Federation (ILS) established hand signals to communication at lifesaving position statement - LPS 12. The day-to-day work of lifeguards demonstrated the need for better communication between professionals in aquatic rescue. The aim of this study is to present the similarities and differences in the use of hand signals proposed by ILS and SOBRASA.

METHODS

The research was based on the analysis of in use signals in several aquatic rescue specialties such as: lifeguards ILS reference service, diving, aircraft rescue service, fast rescue service and craft operators. After collecting all the signs and their meanings in use by all water rescue services, the consensus among experts determined which signals should be included, modified, or excluded to attend everyone in a unique way.

RESULTS

All the eight hand signals recommended by ILS were included:
Signal 1(modified) - request for assistance to the lifeguard inside the water. It was clarified that only used to request help, but the decision belongs to the lifeguard in the dry area. When the arm is held upright it means rescue aid, and when it is waved it signals that the lifeguard will require full support including advanced life support(ambulance is on call).
Signal 2 - Victim submerged (maintained). Last point seen to start the search.
Signal 3(ILS modified) - Lifeguards signal that everything is okay or under control. A second gesture was added for greater distances or difficult visual conditions for the same purpose.
Signal 4(ILS) - Signs the urgency to make a rescue and point the direction.
Signal 5(ILS) - Signals that the lifeguard should move away from the Incident Commander(IC) who is signal at dry land.
Signal 6(ILS modified) - Signals that the lifeguard should approach the IC. Added on mode the urgent to come fast(up-down arm).
Signal 7 and 8(ILS) - Signals that the lifeguard must move in the direction indicated.
Signal 9(included) - Lifeguards question the situation or need to IC instruction.
Signal 10(included) - Signals that the lifeguard should stop where it is.

CONCLUSION

All 8 signals recommended by ILS were kept with minor modifications, adding 2 new signals. The modification and creation of this new hand signal was tested in practice in the city of Rio de Janeiro during the last lifeguards graduated, demonstrating clarity, ease of learning and good results in real communication in safety and rescues.
A MODEL OF BRAZILIAN SURF CLUBS

Corporal Rafael Oliveira1, Corporal Noé Batista1, Tenent Fabio Fregapani1, Soldier Eduardo Barcelos1, Life Guard João Mello1, Life Guard Alexandre Gallo1, Dr. David Szpilman1, Mr. Guilherme Oliveira1

1SOBRASA / FLORIPA SLSC, Florianópolis - Praia Mole, Brazil

Poster Day 2, October 18, 2017, 8:30 AM - 5:00 PM

INTRODUCTION

In order to reduce the number of drowning deaths by establishing a regional incident preventive culture, a proposal was made to create the FLORIPA Surf LifeSaving Club, a Brazilian model of Surf Clubs, similar to the beach clubs in Australia and New Zealand. The Surf Clubs were the ground for those who wanted to enjoy and have fun on the beach.

OBJECTIVE

The presentation is meant to create a consistent identity of the Brazilian Surf LifeSaving Clubs, with the main goal of reducing the number of drownings through education, sport and culture.

METHODOLOGY

This work is based on the qualitative research of descriptive data collected from the report of coordination meeting, field research and meeting attendance reports or actions of FLORIPA Surf LifeSaving Club (FLORIPA SLSC), where they established (1) the guidelines of the Strategic Planning 2015/2019 (mission: To reduce the number of drownings; vision: To be recognized in the practice of Sports Life Saving and values: Collective Work, Harmony, Cooperation and Discipline), (2) Tactic Planning 2015/2016 (Monthly Meetings and Actions on Demand), (3) the Organizational Structure (physical structure, human and material resources).

The data on the 1st year of Floripa SLSC existence was analyzed: the average number of meetings (Σtotalpublic / nºofmeetings), the profile of the participants and the number of certifications and associations issued.

RESULTS

After the inauguration, based in Aragua Center in Mole Beach, on Florianópolis City, Santa Catarina State, the coordination group, encompassing 6 members all operating voluntarily and philanthropically, held 6 meetings with an average audience of 20 participants among adults and children. The activities always took place on Saturday mornings and had a mix of sports and educational activities with a maximum duration of two hours.

The monthly meeting attendants were mostly Lifeguards and Surfers, seeking to improve knowledge and lifesaving techniques. The total number of new members raised at these meetings was twelve (averaging two per event). There were also three on-demand training sessions. Participants consisted mainly of instructors from Surf and SUP (Stand Up Paddle) schools, from several states in the South and Southeast regions of Brazil. Through these sessions we reached out to twenty-nine instructors trained or certified by programs such as Surf-Saving, First Aid and Life Saver. We also carried out the SOBRASA Pool+Safe program, empowering and certifying sixteen Pool Life Guards and Life Savers.

CONCLUSIONS

The coordination of FLORIPA SLSC concluded that the Monthly Meetings should focus mainly on expanding prevention projects such as Surf-Saving and First Aid, and on-demand actions, as this way the information about drowning is diversified and it’s tailored to a specific audience, either surfers or beach goers and laypeople, giving greater visibility to the project and its mission, reaching its main goal. Also, sports activities should be focused on preparing athletes for lifesaving competitions, through specific programs of personal physical training. Finally, the coordination group is pleased with the 2nd year’s results achieved and believe this could work as a model for other surf clubs to be established in Brazil.
DEVELOPMENT OF A NEW RESCUE TUBE

Mr. Alexandre Tadeia¹, Mr. António Janeiro, Mr. António Mestre, Mr. António Silva, Mr. Carlos Ferreira, Mr. Carlos Vieira, Mr. Daniel Meco, Mr. João Lança, Mr. José Anjos, Mr. José Viegas, Mr. Leonardo Springer, Mr. Marco Galamba, Mr. Marcos Henriques, Mr. Nuno Gomes, Mr. Rodrigo Costa, Mr. Vítor Santos

¹Portuguese Lifesaving Federation (fepons), Coruche, Portugal

Poster Day 2, October 18, 2017, 8:30 AM - 5:00 PM

OBJECTIVE

This study compared the use of the rescue tube and the torpedo buoy with the objective of creating a new rescue tube that can combine the advantages of both and eliminate the disadvantages of the rescue tube. To this end, we used the experience of sixteen experts, all Portuguese lifeguard instructors, who simultaneously are lifeguard coordinators. Thus it was hoped that the conclusions would allow an evolution of the current rescue tube, which would allow the lifeguards to better execute the rescue techniques and provide greater safety for the victim and the lifeguard.

METHOD

The study was started with the collection of all previous studies on the subject. A questionnaire was then created for the sixteen experts on the advantages and disadvantages of the torpedo buoy and the rescue tube, and what details they considered important to improve on the rescue tube. After the results of this first questionnaire, where 16 details were obtained to improve on the rescue tube, a second questionnaire was developed on what they considered to be the most important issues to improve in the rescue tube, of the 16 listed.

ANALYSIS

All analyses were performed using SPSS 24. The following tests were conducted:
- Descriptive statistics (mean + std deviation)
- Paired sample test

RESULTS

After the two surveys, the following results were found:
- Details on Improving the rescue Tube: Importance
  - The durability of the material: 14%
  - The cable should be more buoyant: 12%
  - Tighter seam zone between rescue tube and cable and / or carabiner: 12%
  - Placing more handles for the possibility of transporting more victims: 9%
  - Greater buoyancy of the rescue tube: 8%
  - Color change because it is easily lost in the surf zone: 8%
  - Increase the number of rings to attach the clipper: 8%
  - Easier grip for the clipper: 8%
  - Better ergonomics: 6%
  - Stainless steel or aluminum clipper: 6%
  - Place velcro on the strap to better handle: 3%
  - Greater material flexibility: 2%
  - Longer line to tighten better on a castaway with large abdominal or thoracic perimeter: 2%
  - Possibility of placing a pocket mask in a hard case: 2%
  - Belt strap: 2%
  - The strap could be attached to the back of the belt: 0%

CONCLUSION

The main items to be improved in the rescue tube, in order of importance, are its durability, the buoyancy of the cable, greater resistance between the floating part and the cable, the existence of side handles, buoyancy, a color which allows a better location, the placement of more rings to close the clipper, greater ease in closing the clipper, better ergonomics, a lighter and sturdy clipper, a velcro system to hold the strap, greater flexibility, longer length of the floating part, Possibility of placing a pocket mask and possibility of having a belt strap. After these conclusions, the data were sent to production, having created the design of the new rescue tube, which can now be produced. Part of the sales will be donated to the Portuguese Lifesaving Federation (FEPONS) for investment in prevention projects. So this new rescue tube will not only save lives directly, but also through prevention.
DEVELOPMENT OF A TRAINING MODULE FOR THE MANAGEMENT OF COLD WATER INDUCED HYPOTHERMIA DELIVERED VIA A MOBILE TELE-SIMULATION UNIT

Mr. Cody Dunne¹, Dr. Michael Parsons¹

¹Faculty of Medicine, Memorial University of Newfoundland, St. John’s, Canada

Poster Day 2, October 18, 2017, 8:30 AM - 5:00 PM

BACKGROUND

Newfoundland and Labrador (NL) has one of the highest provincial rates of drowning, largely due to the proximity of rural communities to bodies of water. (1) Factor in the province’s cold climate (average NL’s freshwater temperature is below 5.4°C) (2) and the prevalence of winter recreational activities among the population, there exists an inherent risk to the population of ice-related injuries and subsequent hypothermia. Due to the relatively short period of time that humans maintain consciousness once submersion in frigid water occurs, quick recognition and management by bystanders is critical to the injured person’s survival. However, barriers such as geography, distance from health centres, cost and access to qualified instructors often limit training available to those areas.

Combining simulation-based education with distance education technology may present a solution to this problem. Currently, there is development of a mobile tele-simulation unit (MTU) ongoing in NL. This portable device is a simulation lab that can be transported anywhere in the province and used to connect learners to facilitators in larger centres through tele-communications (video/audio conferencing) software. The MTU goal is to provide sophisticated training in rural areas without the logistical challenges normal to this type of opportunity. Originally designed for deployment to rural communities for medical procedures training, partnership with the MTU and the medical community could see an innovative mode of providing public education about aquatic and first aid emergency management in the areas where these emergencies occur.

OBJECTIVES

- Develop a training module focused on proper pre-hospital rescue/assessment/management of cold water induced hypothermia, as well as introductory aquatic rescue techniques.
- Develop an objective-structured evaluation tool for rescue/assessment/management of cold water induced hypothermia.
- Present an innovative method of providing practical public education opportunities to rural communities.

TARGET

The module will train individuals to recognize and treat symptoms of cold water induced hypothermia. This training will benefit the general population, but specifically target higher risk groups including individuals in northern & rural coastal areas of Newfoundland and Labrador, where training is limited but water-related and winter activities are plentiful.

METHOD/IMPLEMENTATION

The module consists of pre-learning reading, a practical simulation experience and a debrief/post-scenario didactic teaching session. Learning objectives and the rescue/assessment/management techniques presented in the module were included following a literature review of relevant material. The development of an objective-structured checklist allows facilitators to evaluate the learner’s performance against standard expected action. This way, each learner who completes the training has their experience focused on the same key components. The simulation is designed to encourage learners to build on the background knowledge presented in the pre-learning reading, while also enabling them to be creative in how they achieve the objectives of the scenario. The practical component concludes with a debriefing session and a brief didactic teaching session to reinforce the learning objectives. Suggested areas of focus for the teaching session include ice safety, basic water recovery and the management of a deteriorating person. The debriefing session should be structured to review the simulation and discuss areas where the learner(s) faced obstacles or differed from the expected actions.

Besides offering in-situ training in the aquatic environment, the MTU partnership assists in overcoming many barriers to accessible training. Most notably, if no on-site mentor is available, a mentor located in a larger centre can connect with learners and evaluate the module’s practical component while providing real-time feedback. Coordinating offerings of this training module with other medical training deployments of the MTU maximizes value to rural communities. Future phases of this research should involve evaluation of the module and its effectiveness at meeting learning objectives.

CONCLUSION

This project discusses development and implementation of a training module to be both beneficial and feasible to deliver to individuals in rural settings. The module educates learners on risks of water activities, safe water principles and rescue/assessment/management of an individual suffering from cold water induced hypothermia.
The Nova Scotia Lifeguard Service (NSLS) was formed in 1973 due to startling drowning trends at provincial parks in Nova Scotia, Canada. Originally only a handful of beaches, the NSLS now supervises over 20 sites. Since its inception there has not been a drowning during supervised hours at an NSLS beach. Additionally, the NSLS boasts 18.1 million people supervised, 4,132 document rescues, 1,497 community service projects and 1,167 different employees (NSLS Annual Report, 2014).

Since early 2000s the NSLS has been using a weighted screening system for hiring. This system was constructed by the NSLS staff and used lifeguarding experts from across Canada to refine the process. Using the screening information, the NSLS tries to identify the best lifeguards for each waterfront or surf location. The screening is done in person and scores are determined for the following: application, interview, a written test, a 500m swim, a 50m in water carry and a 3.2km run. The physical scores are competitive amongst staff while the remaining areas are scored independently for each applicant. Each applicant receives an overall score and is then sorted by geography for hiring.

All the NSLS lifeguards are subject to performance appraisals at mid-season and the end of the season. These appraisals include both physical and technical lifeguarding skills and are meant to help the lifeguards improve by identifying areas from improvement. Additionally, the end of season evaluation includes a recommendation about future employment.

The initial study looked at the correlation between the hiring criteria and the end of season evaluations. Now the data has been looked at deeper to see the patterns that emerged over time.
Beach safety can be improved primarily through the provision of trained lifeguards on targeted beaches, especially in current tourism hot spots such as Negambo, Kalpitiya, Mt Lavinia, Matara and Galle and also in emerging tourism areas such as Arugam Bay, Passikudha and Trincomalee on the East coast.

The Sri Lankan Tourism Industry with guidance and services of the Life Saving Association of Sri Lanka with the support from Surf Life Saving Australia has the opportunity to build a tourism based drowning prevention system “from the water up”.

Importantly, building “Safer Beaches in Sri Lanka” will provide an opportunity for tourism to be developed as well as local benefits such as employment for Sri Lankans.

IMPLEMENTATION

It was proposed to implement this project in four (4) phases.

1. Information Phase – 2012 (Completed)
   This first phase will include a range of information sessions that will inform tourism industry sector across Sri Lanka and engage with relevant government departments and agencies.

2. Pilot Phase – To be implemented in late 2012. (Completed)
   It is proposed this second/pilot phase will be through the Jetwing Hotels group, a leader in the tourism industry in Sri Lanka and who have shown some initial interest in and support for the concept. Activities of this phase will include:
   a. Training of Jetwing staff
   b. Inclusion of beach safety information and images in Jetwing promotion such as web sites, tourist brochures and at each hotel.
   c. Monitoring and evaluation that will include collection of data on beach use, guest surveys and operational records.

3. Large Scale Planning – 2013 (Completed)
   In 2013 large scale planning took place to investigate and cost the full implementation of beach safety as a tourism growth and development tool. This phase included research in Sri Lanka and internationally to ensure the perceived benefits can be realized.

4. Full Implementation – implemented in 2014 following feedback from the first three phases and following allocation of appropriate budget levels. ( In progress)

5. Monitoring and Evaluation – Implemented in 2014 as a continuous improvement process. ( In Progress)

STANDARDS

The beach safety services shall operate to the beach safety standards as promoted by the LSASL and consistent with those of ILS and SLSA.

Standards will be monitored through the following methods.
1. Supervision by appointed Supervisor
2. Observation by Water Safety Manager Jetwing Yala
3. Random checks / service audits by Water Safety Manager Jetwing Yala
4. Community feedback through Council

Safety signs and flags will be in accordance with ISO 20712 international standards.

COMMUNITY DEVELOPMENT

The creation of a “Safer Beaches in Sri Lanka” will not only benefit tourism but importantly will provide an opportunity for the introduction of a range of community building outcomes in addition to those already provided by LSASL. These could include some of the following.

• Leadership development through trainers/instructors
• Youth leaders development
• Sporting opportunities
• Children / youth participation activities; e.g. Nippers
HOW WE INCENTIVISE LOCAL COMMUNITIES TO OPERATE THEIR OWN INSHORE RESCUE BOATS IN IRELAND

Mr. John Leech¹

¹Irish Water Safety, Galway, Ireland

BACKGROUND
The Community Rescue Boats Ireland (CRBI) are a nationwide group of independent voluntary rescue boats which are trained and administrated by Irish Water Safety (IWS). They are normally declared as a resource and make themselves available to the Coast Guard, who respond to emergencies in their area of responsibility on a 24/7/365 basis. These stations have traditionally been set up following drowning tragedies in their communities.

AIMS
As a result of our work and submissions to the Department of Finance, our Government now runs a scheme for these stations to allow them to apply for refund of their Value Added Tax (VAT) which is 23% in Ireland. This means that the state essentially supports their efforts financially by almost a quarter. The scheme was established in 1985 and was modified to allow stations based on our inland waterways avail of the refund in 2013. Our argument was that 62% of drownings occur at inland waterways sites and that we needed to do more to address this issue.

CONCLUSION
IWS administers this scheme on behalf of the Government through the Revenue Commissioners in the Department of Finance. In addition, IWS trains their boats crews and coxswains as well as advising them on their establishment and operation and through two annual seminars that we run for them. There are currently sixteen such stations operating in Ireland and we take our standards from the International Maritime Rescue Federation.

To qualify for the scheme, they must pass an annual inspection on their station, boats and crews in particular regard to the quality of the station, operational readiness, training, qualifications and equipment.

Since it was introduced in to the inland CRBI stations we have seen a decrease in the number of drownings.
Lifeguard practice has evolved tremendously over the past 20 years, and so has its most recent generation. Current lifeguard candidates are digital natives, they use on a daily basis a great deal of visual data and infographics to communicate and absorb information. Visual learning aids are known to improve data assimilation [1]. Visual learning helps acquire skills faster and more efficiently. Thus minimizing the learning process, from awareness to understanding, ultimately, an effective and unconscious replication.

Rescue is a response to an incident/accident involving foremost people, or materials, freeing them from danger or harm [3]. It is by definition a set of unpredictable events (ocean conditions, weather, victim, lifeguard, equipment, ambulance service, etc.), all with different variables that combined render a rescue possible.

A research was conducted under the Instituto de Socorros a Náufragos (ISN) lifeguard course, similar to the International Life Saving Federation (ILS) lifeguard learning methodology, under the European Resuscitation Council 2015 guidelines, to develop a visual learning aid and an on-the-job flow of events reminder.

Learning on rescue is a comprehensive task, when you add water rescue procedures, and the subsequent on land or on boat rescue procedures beginner lifeguards and the majority of those who recycle the course hesitate on the correct sequence of procedures. Lifeguard courses teach basic life support, in water rescue skills and other relevant information, nevertheless most lifeguards do not retain this vital knowledge shortly after.

How can this be improved?
BACKGROUND/INTRODUCTION
Many drownings and injuries have occurred at sea bathing areas in Japan. To reduce these incidents, we developed the Multilateral Beach Risk Assessment Method for bathing areas.

AIMS/OBJECTIVES
In this study, we confirmed the validity of this risk assessment method by applying it to 2 beaches, namely Wakasawada and Niijima-kurone beaches.

TARGET
Our targets of this Beach Risk Assessment Method are for local coast administrators for each beach. And we hope these assessments will be utilized towards beach safety.

METHODS
In this method, the safety of a bathing beach is decided by the result of a comprehensive evaluation of ‘Hazards & Risks’ and ‘Beach Management’ which equals more than a total score of 80%, together with no High Risk factors and dissatisfaction items. The score of the Hazards & Risks was set from 0 to 4 points, it corresponds to Very High Risk, High Risk, Medium Risk, Low Risk and Very Low Risk. On the other hand, the score of the Beach Management was set from 0 to 2 points, it corresponds to Satisfaction, Neutral and Dissatisfaction.

RESULTS
Evaluation of Wakasawada beach
At Wakasawada beach, there are some beach cliffs formed by beach erosion. Thus, a previous area of beach cliffs has not only a deep topography, but also these areas are not visible from the lifesaver’s tower. Also, temporary rip currents develop around some groins and detached breakwaters. In addition, permanent rip currents develop along a fishing port. Although this area is not a swimming area, some people swim in this area due to influence from the BBQ site which is located behind it. Therefore, the harmfulness of these factors was evaluated at Medium Risk or at High Risk. However, lifesavers are carrying out some measures against these problems.

The score of the Hazards & Risks was evaluated at 80%, as it is not Very High Risk. About the Beach Management, although alcohol was prohibited in the bathing area, beach users disobeyed this rule. The bathing area was very large, the offshore distance was 800 m. In addition, some marine activities such as sea kayaking and fishing boats can operate in the bathing area. But they have a good lifesaving system, rescue equipment and water safety education. Therefore, the score of the Beach Management was evaluated at 94%.

Discussion of Wakasawada beach
As a result, Wakasawada beach was evaluated as a safe beach, but we pointed out some risk items regarding rip currents. Against these risks, we proposed risk mitigation measures such as patrol systems, watching techniques, an awareness method using sign boards and effective water safety education.

Results/Evaluation of Niijima-kurone
In another example, Niijima-kurone is a small beach, between two groins where wave, current and beach topography conditions are very stable. Furthermore, they have a good lifesaving system, rescue equipment and cooperative framework with public emergency organizations.

Discussion of Niijima-kurone
The result at Niijima-kurone beach was evaluated at a score of 96% for Hazards & Risks, 92% for Beach Management, no Very High Risk factors, no Dissatisfaction items. This beach was evaluated as a very safe beach.

CONCLUSION
Finally, the adaptability of the beach risk assessment method was confirmed based on the results of the 2 beaches. After this assessment, we reported results to local coast administrators. They immediately shared these problems with stakeholders and started to improve the situation. As this assessment process reaches other areas, we plan to assess two more beaches in Japan.
This report of experience intend to describe a methodology applied in a team of Portuguese lifeguards, to improve the lifeguard communication of safety rules to the bathers of the aquatic spaces where this team worked. Being consensual at a worldwide level that the lifeguard should make this communication quickly and clearly, it was found that sometimes it was necessary to carry out the same communication to the same bather several times during the day. Thus, the goal was to create a methodology for the lifeguard communication of safety rules to bathers, which could be applied by the lifeguard, in the same way in all situations, from a first warning to the repeated warnings to the same bather.

After reading the varied world bibliography on lifeguard communication with bathers, the following principles were established: 1 - The communication should be fast and clear; 2 - It should explain what the danger is; 3 - It should explain the alternative. In addition, it was verified by direct verbal questionnaire that the lifeguards did not have an equal methodology, and that each used a different approach. Thus the coordination of the lifeguard team decided to create a standardized methodology, based on the following principles:

1. Verbally greet the bather;
2. Explain which security rule are infringing and the alternative;
3. Explain the reason for the safety rule;
4. Verbally confirm that the bather has understood the explanation;
5. Appreciate the collaboration and / or verbally say goodbye to the bather.

After the methodology creation, this was explained to the lifeguards on the monthly training, repeated over a period of several months.

After applying the methodology, the lifeguard coordination has visually verified, that the time spent by the team in each situation in which it was necessary to communicate a safety rule to a bather was smaller, that this communication was carried out uniformly throughout the team and that bathers received the communication well. In addition, the lifeguard coordination also found in a visual way, that the situations in which it was necessary to communicate repeatedly, safety rules to the same bather, were managed in a less aggressive way. These results were later confirmed through a survey to the lifeguards of the team (n=12), where the following results were obtained:

**QUESTIONS**

- Do you consider that the lifeguard communication of security rules to bathers, through the 5-step method, contributes to a FAST communication with them? 100%/0%
- Do you consider that the lifeguard communication of security rules to bathers, through the 5-step method, contributes to a CLEAR communication with them? 100%/0%
- Do you consider that in situations where it is necessary to communicate repeatedly on the same day, safety rules to the same bather, using this methodology, they are managed in a less aggressive way? 75%/25%

It was concluded that the application of this methodology brought great improvements in lifeguard communication of safety rules to bathers, making it faster, clearer and less aggressive, according to the lifeguard coordinators and the lifeguard team.
INTRODUCTION
The efficacy of Cardiopulmonary Resuscitation (CPR) is a required skill for Lifeguards (LG). Survival in cardiac arrest is widely dependent on the quality of the thoracic compressions and ventilations performed. CPR training should be done in a regular base in order to ensure efficacy. The European Resuscitation Council Guidelines (2015) indicate that CPR providers should ensure chest compression of adequate depth (at least 5cm but no more than 6cm) with rate of 100-120 compression min⁻¹, in a cycle of compressions/ inflations (30:2). Considering that rescue is a demanding effort, the resulting fatigue could influence CPR application.

OBJECTIVES
To monitor impact of a simulated rescue in the quality of the CPR applied after simulated rescue on beaches by professional lifeguards in distinct moments of the summer season.

TARGET
Our targets of this Beach Risk Assessment Method are for local coast administrators for each beach. And we hope these assessments will be utilized towards beach safety.

METHOD
29 LG, 6 females and 23 males of 27.7±6.1 and 23.0±3.1 years old respectively, were volunteer to participated in the study. The anthropometric and biographic characteristics of the sample were controlled. The participants were fully informed about the aims, experimental protocol and procedures of the study and gave their informed consent. The Ethics Commission of the Faculty of Sport Sciences and Physical Education of Coimbra University approved this study. In the beginning and at the end of summer season (3 months apart) an experimental rescue followed by a CPR application were conducted at the beach LGs were on duty.

After the evaluator’s signal, the LG ran 25m, swam 50m, dived, rescued an immersed dummy (unconscious victim simulation), applying 10 inflations, and started the trailer to land. Upon reaching the land, the LG lifted the fins and the rescue belt. Afterwards, the rescuer applied 5 minutes of CPR according to the drowning CRP protocol (30:2). A monitored Resusci Anne Simulator (Laerdal®) and CRPmeter (Laerdal®) were used to access the quality of the compressions and breaths. A heart rate monitor (Polar®Rs800Cx, Finland) and portable lactate analyzer (Lactate Pro2®Arkray) were used to measure Heart Rate (HR) and lactate before and after towing, and just after the end of CPR.

RESULTS
A small however not significant, increased in the total time spent in the rescue and a higher percentage of correct initial insufflations were observed at the end of the season. Comparing the begging with the end of the season similar HR values after the rescue was observed, but a significant decrease in the lactate was shown. In both moments of the study HR after the CPR showed to be significantly lower when compared to that observed just after the rescue. Comparing the two moments, after CPR application the HR and the lactate concentration did not differ. Considering the CPR performance and comparing the beginning with the end of the season the percentage of good compressions with adequate depth decreases significantly.

CONCLUSION
Although the time rescue was consistent over the summer season, the quality of the CPR decreased. This finding supports the need for regular CPR training over the Life Guards’ activity period.
Personal Watercraft (PWCs) are high performance apparatus, equipped with powerful engines, propelling machine and crew weighing hundreds of kilos, with great acceleration at high speed and in difficult maneuvers. These features drive the use of these machines in competitions and recreational use and also make them highly versatile and efficient in rescue and drowning prevention services, even with adverse navigation conditions. On the other hand, the same characteristics, associated with lack of training and irresponsibility in driving, can carry a high risk of serious accidents, many of which are fatal, even for those who work saving lives.

OBJECTIVE
To demonstrate the importance of the use of adequate personal protective equipment by the PWC teams, so that they can carry out their work with an adequate level of safety.

METHOD
Using field research and statistical data of accidents involving PWC crews in Brazilian territory, considering the proportion of serious injuries in different parts of the body of the victims. The study of 07 cases of PWC accidents involving lifeguards was also carried out, in which the correspondence with the proportion of injured body parts in sports and leisure drivers was observed, with the exception of the absence of head and trunk injuries in the lifeguards, since they were wearing helmet and lifejackets at the time of the accident. Such a conclusion pointed out that these equipment fulfills the expected function of protection, and that there was still a need for protection for upper and lower limbs.

The unit of the Fire Department of the State of São Paulo, Brazil, responsible for the bathers protection service, has included in its set of individual protection equipment for PWC operators, composed at that time only by helmet and life jacket, the long neoprene suit of 2 mm, a pair of neoprene boots and gloves for driving. After this fact, there were no accidents with injuries among lifeguards.

CONCLUSION
At the end of this work, it is concluded that the correct use of the above mentioned personal protective equipment fulfills its objective of improving the safety of the lifeguard when he is conducting a rescue boat, which allows strongly recommend to all lifeguard service Which operates with watercraft to provide and encourage its use among its members, keeping them safer while performing the missions.
INTRODUCTION
One of the most crowded holiday destinations in Brazil is in Porto Alegre, the capital of state of Rio Grande do Sul, South Brazil. Torres is a small city, located in the border of states Rio Grande do Sul e Santa Catarina. Today, with a population of 33,686 permanent inhabitants, Torres is an important tourist centre. Unlike the rest of the state’s coast, which is uninterrupted sandy beach, Torres boasts four high rocky formations standing in the sea. This unique cliff gives the city its name, in Portuguese meaning “Towers”. The Guarita State Park enforces rules to protect this unique scenario. Annually, over 30,000 tourists come to enjoy this beautiful place. These vertical columns are almost 40 meters high and contain several caves created by the action of the waves over the years, locally called furnas. These rocky formations rise up from the sea creating an impressive scenario, that is very dangerous and together with a long sand beach characterize a dangerous scenario for drowning. Victims included 7 people in the last 4 summer seasons, according to research by the local Military Fire Department, responsible for patrolling the area. The propose of this study is to show a Project of Coastal Management to Prevent Drowning in the region by focusing on actions to decrease drownings.

METHODOLOGY
This study is based on the analysis of cases of rescues and deaths by drowning in the aforementioned region using reports from local Military Fire Department during 4 seasons, starting 2012/2013 and finishing 2015/2016. The focus was to recognize the exact place that incidents occurred, tag the dangerous place and make recommendation regarding prevention and response to drowning cases, based on the Drowning Chain of Survival.

RESULTS AND DISCUSSION
Analyzing the total number of occurrences, including rescue and deaths, indicates that the national strategy from SOBRASA to PREVENT is on target as numbers are decreasing at a good rate of 26.9% when compared to the season 2012/2013 (204 cases) and 2015/2016 (55 cases).

In viewing the regional map, it is helpful to see where the deaths happened to make plans to reduce the number of drowning cases. After analyzing the occurrences and the map of the situation of drownings in the region this study proposes some recommendations to Project of Coastal Management such as points to advertise and banners to PREVENT, access to the beach, tracks, and dangerous places, places for distribution of folders and information, parking, as well as Life Guard Buoy and Life Guard towers at the beach.
LIFEGUARD JUDGEMENT: USE OF FINS

Mike Melenchuk¹

¹Lifesaving Society, Nova Scotia, Canada, New Minas, Canada

Poster Day 3, October 19, 2017, 8:30 AM - 5:00 PM

Lifeguards in waterfront and surf environments have a variety of tools at their disposal. One of those tools are swimming fins. The choice to use, or not use, fins is largely left to individuals to determine. Since each lifeguard has different abilities, using the same guidelines for everyone is problematic.

In an attempt to answer the question, “At what distance does it become better to use fins versus swimming without them?” we collected data from lifesavers to help them understand when they should choose to employ the use of fins.

We collected three numbers from each lifesaver to help us provide more clear guidance: swimming speed with fins, swimming speed without fins and time to don fins. Additionally, demographic and experience was collected from each lifesaver to help determine if there is some training that will provide an advantage in rescue situations.
Beach-goers often carry a tote bag to the beach or other waterside location for items such as towels, swim wear, sunscreen, snacks, drinks, reading materials and the like. A reluctance nonetheless exists to be seen carrying a life preserver, life jacket or life vest on such excursions. Unfortunately, this is true despite the fact that many drownings take place at beaches and along other waterside locations where the availability and quick use of a simple flotation device would save lives.

Variously configured flotation devices have been developed over the years that are intended to be tossed, thrown, extended or otherwise delivered to a person in peril of drowning, but few such devices are available at most recreational beaches. The United States Lifesaving Association (USLA) recommends that any floatable item, such as a styrofoam cooler, be thrown to a potential victim, but such coolers are now being banned because the styrofoam often crumbles, littering the beach.

A lightweight, rugged and easy-to-carry beach bag, termed the Lifesaving Beach Bag for Water Safety (US Patent # 9,533,744 B2, January 3, 2017), is well suited to serve a primary function as a tote for containing and transporting items useful during an excursion to a beach or other waterside location. Should an emergency arise necessitating the rescue of a person in peril of drowning, the bag’s contents can be jettisoned, enabling a quick collapse of the bag as a chain of hinged flotation elements that compact to an essentially flat flotation device well suited to serve a secondary function of keeping afloat the person in peril who forcefully grasps the flotation device, The rescuer can then tow the person toward shore by pulling a tether, slung over the shoulder, and securely connected on the other end to the flotation device. The rescuer will don a US Coast Guard-approved life vest that serves as the bottom element of the Lifesaving Beach Bag and can be quickly removed from its Velcro attachment. All too often the rescuer will drown while trying to save a child or another person at unguarded beaches or other water bodies. The Lifesaving Beach Bag ensures that the rescuer will not drown being secured in a life vest with the victim having their own flotation device and separated from the rescuer by the lengthy tether. In essence, the Lifesaving Beach Bag allows an ordinary person to serve as a lifeguard when one is not available and carry out a rescue while not endangering their own life.
The aim of this paper is to propose a standard for measuring the average rescue time in surf lifesaving. Hence data is central to this paper. It is estimated that at a global plan is spent more than 500 million USD on surf lifesaving. A certain part of this money or resources are allocated to the “rescue phase” of the drowning timeline. However, to the knowledge of the authors there exists no standards worldwide to measure the average rescue time of a surf lifesaving service. This makes it difficult to evaluate how efficiently resources spent on the rescue phase of the drowning timeline are used. Furthermore, without the ability to evaluate the efficiency of the resources spent on the rescue phase it seems impossible to suggest data based and cost-effective changes to improve the average rescue time further.

To be able to evaluate the efficiency of the resources spent on the rescue phase of the drowning timeline, it is necessary to have a standard which is a) consistent and b) gives a realistic and trustworthy measure of the average rescue time. The methodologies used to develop the proposed standard for measuring the average rescue time in lifesaving is the Statistical Value Chain (Herrmann et al. 2013) and the Drowning timeline (Szpillman et al. 2016).

The proposed standard defines:

a) the area of primary responsibility for a lifeguard station,
b) that tests that are used to calculate the average rescue time are unwarned tests,
c) the minimum requirements for safety staff and equipment used in the testing incidents,
d) a total randomization across all variables, such as beaches, lifeguards, equipment, weather conditions etc., and
e) third party verification of the test results.

It is important to stress that from a societal perspective the rescue time cannot stand alone. A lifeguarding service reduces the overall pre-hospital rescue time, compared to when no lifeguard service is present. In Denmark, the pre-hospital rescue time can take from 10 to 30 minutes and even more depending on the distance to the nearest ambulance service or other relevant emergency services.

In a partnership between Q2M2, The North Zealand Lifeguarding Service, and the Danish Council for Greater Water Safety developed this standard for measuring the average rescue time in surf lifesaving and we would like to present this to the international lifesaving and lifeguarding community.
Since 2002, the Ottawa Drowning Prevention Coalition has coordinated efforts to prevent water-related injuries, incidents and drowning, through various strategic awareness campaigns in the National Capital Region. The coalition is comprised of: the Ottawa Paramedic Service, Ottawa Police Service and Ottawa Fire Services, the Ontario Provincial Police (OPP), the Children’s Hospital of Eastern Ontario (CHEO), the Ottawa Hospital, Lifesaving Society, Canadian Red Cross, City of Ottawa Parks and Recreation and Ottawa Public Health, The Boys and Girls Club, Dovercourt Recreation Association and Accora Village.

The Coalition has developed a multi-pronged community-based approach to engage citizens, increase public awareness about drowning risks and safe behaviours to reduce drowning. Firstly, a media plan has been developed that consists of seasonally scheduled events in response to data that reflects an increase in water-related incidents in those seasons. Media relations reminds residents of the dangers in and around the water seasonally during spring thaws and swift water, as well as events for residents to encourage 4-sided fencing for their pools and cottage safety. Our message is about the importance of vigilant supervision of swimmers in back yard pools and we encourage the use of the On Guard tag initiated with the Ottawa Coalition and now produced by the Lifesaving Society. Through these events, we are seen as the local body of knowledge for the media concerning drowning prevention.

The Coalition uses many other initiatives to reach the public. The Ottawa Public Health Unit moderates discussion groups where Coalition members are available to answer questions throughout the day on their Parenting Ottawa FaceBook Page. Donations this year will fund a campaign through CHEO and the OPP to educate parents of children who come to CHEO and have experienced water-related incidents. In another campaign, the On Guard tag is handed out to cottagers to encourage ongoing supervision of swimmers.

We can stop drowning in our community by understanding that drowning is a world-wide epidemic, by following drowning prevention efforts around the world, and the work of the World Health Organization. The Ottawa Drowning Prevention Coalition sees that success will happen through a community-based approach using multiple strategies grounded in a theory of changing behaviours around the water. We maximize our success by partnering with community stakeholders to ensure our approach is tailored to each community in the Ottawa region. We collect data on regional trends from the Ontario Provincial Police, the Ottawa Police and Paramedic Services, the Ottawa Hospital, CHEO and Lifesaving Society Drowning Reports.

The Coalition is now adopting the priority of the World Health Organization (WHO) to get communities and their public health units to participate in its global approach to immunizing against the drowning epidemic.
RLSS UK – the drowning prevention charity has recently celebrated its 125th anniversary, which is a great achievement. Our future success cannot be based purely on history; it must be prepared to adapt, be flexible and tailor its service and messaging in order to achieve its long established goal of saving lives and preventing drowning.

OUR CHALLENGE

Our transformation journey began in 2014 and it was launched through the publication of a new business plan positioning us as the Drowning Prevention Charity for the UK. A decision taken by a strategic planning group including staff and trustees. The decision was the easy part. The challenge was to achieve the paradigm shift required to deliver the plan. Many leaders have tried and failed to move organisations forward by ignoring the principles of successfully shifting a paradigm. A paradigm is an organisation’s culture; ‘the way things are done’, it is multifaceted and there is no single solution.

OUR APPROACH - ELEMENTS OF THE CULTURAL SHIFT

Structure – A review of our staffing structure to service Drowning Prevention in the UK and Ireland saw the introduction of regional Drowning Prevention Co-Ordinators. These appointments allow us to build our business plan objectives into local Drowning Prevention plans. This needed to be supported at the Governance level ensuring our governance codes, constitution and articles allowed the flexibility to enable the change.

Systems – Digitalisation was also a challenge for a traditional organisation with complex systems and records; however, the customer expectation for digital services is now a given. Therefore, investment to satisfy commercial partners was essential.

Advocacy – We worked with local MPs in 2014 after drownings near our HQ. By leveraging local advocacy of the Drowning Prevention message, we established an APPG for Drowning Prevention within UK Government. This was well received by our Members/Volunteers and converted many from the purist ‘lifesaving’ camp to be advocates of Drowning Prevention.

Communications – The challenge of making Drowning Prevention a common language. Drowning Prevention messaging has become a ‘golden thread’ that runs through all our publications and PR activity. Our themed campaigns are strongly underpinned by Drowning Prevention Challenges with vulnerable groups.

Partnerships – The WHO report has given all organisations working in the Drowning Prevention field a common goal and its challenge to countries to create local plans has helped us advance work in the UK. Our position as The Drowning Prevention Charity has influenced our impact within the group and created an acknowledgement of our expertise and created an appetite to partner with us nationally and locally.

WHAT WE ACHIEVED

In conclusion, has our paradigm shifted? We are well on our way; our co-ordinators either lead or sit on all the Water Safety Partnerships across the UK and our branches are all working on local plans. Our membership is now comfortable with Drowning Prevention messaging and we are constantly acquiring new credible partners. It takes more than a change of words to change a culture which can ultimately influence the number of lives we save.
This presentation will focus on the use of marketing as an educational tool to change skills, attitudes and behaviours so that drownings are prevented.

A number of marketing campaigns will be presented that were specifically aimed at preventing drownings and aquatic accidents - prevention campaigns that were aimed at placing less demand on rescue services and treatment facilities in hospitals.

The number of drownings in Ireland is not much lower than the number of road deaths, yet the tight budgetary constraints within the water safety domain mean that cost effective marketing initiatives and stakeholder partnerships have become an essential element to delivering Irish Water Safety’s awareness campaigns to the public.

The focus on educating a demographic - that is not necessarily interested in swimming and lifesaving - with initiatives that encourage them to learn water safety best practices will also be outlined.

Marketing initiatives appropriate to specific at-risk groups such as to children will be explored as will collaborations that successfully deliver water safety information into local communities. Related media initiatives will be included.
Yasin Sseguja joined the RLSS Commonwealth’s Emerging Leaders Workshop at WCDP 2015, Penang, from RLSS Uganda. Through his involvement at the conference, he learnt that his effectiveness as a water safety and rescue skills teacher did not have to be hindered by the lack of high-cost rescue equipment available in Uganda. At the Emerging Leaders Workshop, he developed a plan to teach primary school children in and around Kampala water safety messages, and when a swimming pool was accessible, basic survival skills such as floating, moving through the water and climbing out of the water unaided.

The majority of schools do not have swimming pools and so the focus is on teaching the Aquatic Survival Programme Stage 1 water safety messages. After initial frustrations at the slow progress being made on the project, he spoke with other African participants at the Emerging Leaders Workshop and decided that the project could be accelerated by increasing the number of instructors involved. With the support of RLSS Uganda, he trained five Aquatic Survival Instructors, resulting in a team of six. The Instructors work in pairs in up to three schools simultaneously.

Travelling to the schools can be challenging, particularly when teaching takes place in rural schools. This increases both the costs and the time taken to teach the water safety messages. However, it is considered a worthwhile investment as the drowning risks for rural children are perceived to be higher than for urban children. This is in part because swimming in local rivers, lakes and dams is a common source of entertainment for rural children.

To date, the team has taught in approximately 70 urban primary schools and 25 rural primary schools.

Yasin has received support from Workshop participants from other African countries on how to improve his project and overcome challenges. He has received online coaching from RLSS Commonwealth volunteers on how to carry out basic monitoring of his project with a view to attracting funds to support the project in the future.

This paper will focus on the project carried out by Yasin in Uganda, and the partnerships that have been created through his attendance at WCDP 2015 and the Emerging Leaders Workshop which have enabled him to overcome challenges to run a successful water safety messaging campaign.
The International Life Saving Federation (ILS) has joined forces with the International Surfing Association (ISA) to establish a universally recognized surf and Stand Up Paddle (SUP) instructor specific water safety accreditation and improve the safety of surf instructing worldwide.

For decades, many surf and SUP instructors around the world have provided instruction for people wanting to learn how to surf or stand up paddle. The standard of water safety in these lessons has varied tremendously due to the wide variety of water safety training courses and course content that is available.

In an effort to ensure a degree of quality of instruction, the International Surfing Association (which like the ILS is recognized by the International Olympic Committee) has created a standardized course for surf and SUP instructors. Those who meet the standard and agree to follow ISA guidelines are accredited for a two-year period. The ISA recently approached the ILS to request the ILS’s expertise on the water safety training. The ILS and ISA have reached an MOU agreement and rolled-out the ISA/ILS International Surf and SUP Instructor Aquatic Rescue and Safety Course in 2017. This water safety accreditation course is endorsed by the International Lifesaving Federation (ILS) and all participants will receive a joint accreditation by the ILS and the ISA.

The aims of this course are as follows:

- Establish a global minimum standard for Surf/SUP instructors water safety accreditation as the current water safety requirements vary from country to country. This will translate into a transportable safety accreditation that will benefit traveling coaches.
- Complement the ISA Coaching and Instructing Program Courses that currently require all ISA accredited instructors to hold a valid, recognized water safety accreditation
- Promote water safety world-wide
- Enhance the value of the ISA Coaching Certification and provide more opportunities to our program participants.

This presentation by Alex Reynolds of the ISA and ILS Rescue Commissioner Peter George will explain how the system will work and highlight how both the ISA and ILS are contributing to increased water safety world-wide with this course and for surf and SUP instructors.
AN ALLIANCE ON LIFESAVING SPORT CAN MAKE ALL THE DIFFERENCE—CDMB AND SOBRASA

Mr. Fábio Martins¹, Mrs. Danielli Mello¹, Mr. Cyro Coelho¹, Mr. Jefferson Vilela¹, Mr. Ricardo Alves¹, Mr. Felipe Pereira¹

¹SOBRASA, Rio De Janeiro, Brazil

METHODS

A comparative analysis was made between the years 2014 (the first Brazilian participation in military lifesaving sport, in which there was no partnership between CDMB and SOBRASA) and 2016 (in which there was a partnership between CDMB and SOBRASA). The number of participants in the selective and world-wide ranks, number of participating institutions, number of participated events, number of medals, number of world records achieved, media and prevention actions were identified. The results were presented in absolute and relative values.

RESULTS

2014:
- 1 military institution
- 1 media
- 4 athletes (2 men and 2 women)
- No arbitrage course
- No camping training
- 1 world medal
- No world records achieved
- 4 participated events in sea
- No participated events in swimming pool
- No prevention action

2016:
- 14 military institution (1400%)
- 21 media (2100%)
- 73 athletes (57 men, 16 women) (1825%, 2850%, 800%)
- 25 participants in arbitrage course
- 71 participants in camping training
- 8 world medals (800%)
- 2 world records achieved
- 14 participant events in sea (3500%)
- 18 participant events in swimming pool
- Prevention actions: 17 participants trained in aquatic emergency and 1 participant as manager in government Project “Sport's Strength” by Ministry of Defense and SOBRASA project “pool+safe”.

CONCLUSION

It is expected that this partnership between CDMB and SOBRASA will improve the development not just at military forces but lifesaving sport as a whole, with greater visibility through adding new institutions, production of medias and training more people with the function and ability to multiplier the lifesaving sport way and messages. Furthermore, young people from the Ministry of Defense’s project “Sport’s strength” (around 20,000 kids across the country) could be part of prevention projects, such as the SOBRASA “pool+safe” project, helping reduce the number of drownings in Brazil.
Refugees and internally displaced persons (IDPs) are at increased risk of illness and injury (including drowning) when they are displaced from their home communities. This displacement results in changes to their exposure to water and the risks faced. These may include: changes to available sources of water; changes to activities in and around water; and changes to the frequency of interaction with water.

White Nile State is currently home to approximately 110,000 refugees and IDPs, 80% of whom are housed in a series of camps. These people live in a precarious situation where often the only consistent supply of water is the Blue Nile River. The population is highly transient and approximately 60% of the refugees/IDPs are children, many of whom are unaccompanied and therefore extremely vulnerable.

Drowning has been identified as an issue in the camps and as such, easily accessible sections of the river are policed. This means that people are forced to use less safe areas of the river. Working as a technical partnership for UNICEF, a water safety education programme was taught to 134 adult instructors in four camps in White Nile State. These instructors went on to teach over 1,500 children in the first round of teaching in UNICEF’s Child Friendly Spaces.

This programme was well-received and UNICEF are keen to replicate the programme in other refugee/IDP camps. However, their focus is not on drowning prevention. The refugee/IDP camps are a source of great tension and conflict between refugee/IDP population and host communities. UNICEF recognise that finding common ground between refugee/IDP populations and host communities is an opportunity for peace-building. As such, water safety lessons that incorporate refugee/IDP and local children act as a bridge for increased community cohesion.

This paper will consider the use of water safety lesson as a peace-building activity and the ways in which this can provide access to highly vulnerable and underserved populations. It will also highlight the challenges associated with working in refugee/IDP camps.
DISSECTING SUCCESSFUL PARTNERSHIPS IN THE FOR-PROFIT AND NOT-FOR-PROFIT WORLDS

Ms. Rebecca Wear Robinson¹
²Lioness Protects Llc, Clarendon Hills, United States

Partnership 2, Oak, October 18, 2017, 1:30 PM - 3:00 PM

BACKGROUND
The WHO has identified that drowning is a multi-sectoral issue which requires using strategies in tandem with other public health agendas for maximum effectiveness. WHO has further recommended that a global partnership for drowning prevention should be established. What is missing is an analysis and explanation of how successful partnerships are created and sustained at international, national, and local levels; and how public, private, and governmental partnerships are fostered successfully.

APPROACH
In this presentation, we will identify some of the most successful partnerships in the for-profit and not-for-profit worlds and use them as our case studies in order to: break down commonalities in approach; identify areas where partnership could pose a threat to the autonomy of each organization; examine how successful partnerships have leveraged the strengths of each partner while compensating for weaknesses; and look at why partnerships fail. Particular attention will be paid to successful partnerships which integrate both for-profit and not-for-profit organizations, increasing financial viability.

AUDIENCE RESOURCES
- Attendees will have a better understanding of why, and how, to seek out and assess potential partnerships.
- Provide a framework for identifying potential partners, in the form of a take-away worksheet.
- Assessment of strengths and weaknesses of organization and analysis of how to leverage strengths while identifying partners which compensate for weaknesses, in the form of a take-away worksheet.
Vanessa Eugene, a professional lifeguard and a volunteer with St. Lucia Lifesaving Association (SLLA) learned about the impact that a survival swimming programme could have on drowning rates on the island of St. Lucia, after she attended WCDP 2015 in Penang. As a participant at the RLSS Commonwealth’s Emerging Leaders Workshop, she developed a project plan to teach Grade 3 students water safety messages and basic survival skills such as floating, moving through the water and climbing out of the water unaided, using the Swim to Survive programme. She received technical support on the programme from the Lifesaving Society Canada.

Vanessa arranged meetings with government ministers to obtain permission for the Swim to Survive course to run through schools. This required building relationships between SLLA and the appropriate ministries, work which was slowed by the change of government after the election. She identified and worked with local swimming coaches to ensure that when the programme was agreed and started, there would be sufficient trained instructors to teach all Grade 3 students in the country. The programme is expected to start at the beginning of the 2017 academic year.

To test the programme, she ran a pilot course with 12 children. During this course, she spoke to many of the parents whose children were participating and discovered that there was also a lack of knowledge of water safety and swimming skills amongst adults. In particular, parents had not considered the risks of leaving children unattended around water and were unsure what to do if their child was in trouble in the water.

With this in mind, she decided that the Grade 3 programme should be adapted for an adult audience so she could teach adults basic survival skills as well. Additionally, there was a need to educate parents on water safety and the role that they played in preventing drowning, particularly amongst children. For this, she put together a safety awareness video which focussed on beach safety in St. Lucia. This highlighted the situations that may arise at the water’s edge when parents were not paying attention to their children.

This paper will discuss the project carried out by Vanessa in St. Lucia, and the numerous partnerships (with other lifesaving and swimming organisations, government ministries and schools) that have been created through her attendance at WCDP 2015 and the RLSS Commonwealth Emerging Leaders Workshop. These various partnerships (including remote mentoring, extended formal networks, and informal collaboration) assisted her to overcome challenges to run a wide-reaching drowning prevention campaign.
BACKGROUND
In Thailand, drowning is the number one cause of death among children under 15 years of age. In this age group, there were 10,923 drowning deaths between 2006 and 2015, most of which occurred in natural water settings.

OBJECTIVE
To encourage and urge the implementation of all child drowning prevention measures in a continual manner.

METHODS
According to a gap analysis of the implementation of the Child Drowning Prevention Program, communities did not carry out the program continually; some undertook only one measure, not covering various risk factors, resulting in a minor decline in the drowning rate. Thus, to resolve such problems, in 2015, the Department of Disease Control, Ministry of Public Health, began using the “Merit Maker for Child Drowning Prevention” strategy and designated the creation of Merit Makers as a key performance indicator of the Ministry. The strategy was expected to promote the implementation of all child prevention measures continually by multidisciplinary teams, through community participation and the use of local resources.

The Merit Maker strategy comprises 10 elements or key measures for child drowning prevention, i.e. policy, management, situation and data, risky water setting management, child center operations, knowledge dissemination, survival swimming training, CPR training, public communications, and research or monitoring/evaluation.

RESULTS
In 2015 and 2016, 1,084 teams of Merit Makers were established in 67 of all 76 provinces across the country. The teams could manage to have safety measures in place in 4,165 risky water settings (getting fences or warning signs installed and making water safety devices available), set up drowning prevention programs in 3,553 child development centers, organize monthly knowledge dissemination sessions on drowning prevention at 3,504 health centers/communities/schools, generate 7,226 survival swimming instructors, train 151,787 children aged 6–14 years in survival swimming, train 48,366 community members or children on CPR, organize 3,660 sessions of public communications, and conduct 73 research or monitoring/evaluation activities.

CONCLUSION AND DISCUSSION
The Merit Maker approach is a process for promoting the implementation of a drowning prevention program in a sustainable manner at the local level. That is because the communities are made aware of the problems and then implement the program, using multidisciplinary teams and local resources in resolving the problems by the communities. The process helps the communities to have a sense of belonging; and so they feel committed to running the program on a continual basis.

RECOMMENDATIONS
As there is no government budget for implementing the Merit Maker strategy, it is essential to organize motivational activities such as national forums to give plaques or certificates of recognition to the communities that have been running the program.
THE CANADIAN DROWNING PREVENTION COALITION: A FRAMEWORK FOR ACTION

Dr. Steve Beerman1,2, Dr. Tessa Clemens2,3
1University of British Columbia, Nanaimo, Canada, 2Canadian Drowning Prevention Coalition, Ottawa, Canada, 3York University, Toronto, Canada

INTRODUCTION

The World Health Organization’s Global Report on Drowning - Preventing A Leading Killer identified actions to prevent drowning. One of the ten actions is to coordinate drowning prevention efforts with those of other sectors and agendas. The Canadian Drowning Prevention Coalition was formed in response to this call to action. For the past two decades, there has been a robust drowning mortality data collection and reporting system in Canada. The Coalition was formed in 2016 with the goal of addressing gaps in our understanding of the drowning problem in Canada and leading the development of the Canadian Drowning Prevention Plan.

METHODS

This Coalition brings together multi-sector stakeholders in the Canadian drowning prevention effort including representatives of the national, provincial and territorial government, non-government organizations, academics, members of industry, citizen engagement groups, media, and others. The Canadian Drowning Prevention Coalition is led by a steering committee. The steering committee guides the work of the Coalition as it seeks to establish and implement a multi-sectoral and multi-year plan to reduce drowning in Canada that is consistent with the WHO Global Report on Drowning. There has been learning from the other nations who have undertaken National Coalitions and National Plans. The mandate of the steering committee is to ensure that the Coalition provides an effective and inclusive leadership community.

In the fall of 2016, the steering committee identified 13 potential Key Focus Targets for drowning prevention in Canada. Coalition participants and members of the Canadian public participated in a prioritizing activity and 8 key focus targets were selected for the first edition of the Canadian Drowning Prevention Plan. The steering committee appoints technical working group leaders for each key focus target and provides a template and timeline for action and impact. Drawing inspiration from the vision zero approach to road traffic safety, the long-term aspirational goal of the Canadian Drowning Prevention Coalition is for zero drowning deaths in Canada in 50+ years.

RESULTS

Achieving representative multi-sectoral engagement in the Coalition is an ongoing challenge. Initial recruitment yielded participants from 13 non-government organizations, 3 government organizations, 3 industries, and 2 academic institutions. There is an over-representation of non-profit organizations and an under-representation of individuals and organizations from marginalized communities such as Indigenous peoples, and new Canadians. Similarly, these groups are under-represented on the steering committee. Initial recruitment of the steering committee yielded participants from 4 non-government organizations, 2 industries, 2 academic institutions, and 1 government organization. 528 Canadians participated in the prioritizing activity. The top five key focus targets identified as highest priority were: children 1 to 4 years of age (selected by 77%), new Canadians (selected by 65%), unexpected falls into water (selected by 60%), young adult males (selected by 57%), and water transport related drowning (selected by 37%).

CONCLUSIONS

The process of creating a multi-sectoral drowning prevention coalition in Canada has revealed important learnings. A key challenge in the early stages of this process is engaging representation from all stakeholders, including marginalized populations. Stakeholder participant engagement has been challenging. This challenge has been influenced by the low resource nature of this project.

The energy and passion for a collaborative effort for drowning burden reduction is high within stakeholder participants. It is more challenging to engage governments, organizations and individuals who are not a direct stakeholder and or have not been directly impacted by the drowning tragedy. Focused approaches are the most effective outreach. Connecting communities to the tragic burden of drowning or the heroic life saving efforts of rescues, will continue. Transforming the National Government view of the Canadian drowning burden from recreational focused safety to a public health effort, will require a long term, evidenced led approach.
INTRODUCTION
The World Health Organization’s Global report on drowning recommends that all countries aim to develop a national water safety plan. The Canadian Drowning Prevention Coalition was therefore formed to lead and facilitate the development of the Canadian Drowning Prevention Plan. The Plan serves as an education and advocacy tool, and an action plan to reduce drowning in Canada. For the past two decades, Canada has had a robust Canadian drowning mortality data collection and reporting system. This system has highlighted at-risk populations, settings, and trends. The Canadian Drowning Prevention Plan brings together high quality Canadian drowning data and action plans for impact.

METHODS
Technical working groups were formed around key focus targets for drowning prevention in Canada. The mandate of the technical working groups is to create recommendations for high impact actions for drowning prevention in one of the key focus targets. This work takes a public health approach to the drowning problem in Canada. Within a public health framework disparities and inequities in Canadian drowning mortality need to be reduced, while being culturally respectful and making a commitment to learn from marginalized communities.

RESULTS
The Canadian Drowning Prevention Plan contains the reports of the technical working groups on each key focus target. The key focus targets were identified based on Canadian drowning data. Key results from this data include the following: in Canada, drowning is the leading cause of unintentional injury death among children 1-4 years of age. People who are new to Canada are four times more likely to be unable to swim than people who were born in Canada. Over a 20-year period (1991-2010), 1951 people drowned in Canada as the result of an unexpected fall into water. In Canada, young adults 20-34 years of age consistently have high unintentional drowning death rates relative to other age groups, (an annual average of 1.6 per 100,000 in 2009-2013).

Water-related deaths in Canada are more frequently associated with boating than any other activity. Drowning in the Aboriginal population has been reported to be 6 times higher than the Canadian average, and as much as 15 times higher in children. Drowning rates are highest in the Yukon, Northwest Territories, and Nunavut. Approximately 1% of all unintentional water-related fatalities in Canada occur under lifeguard/instructor supervision and approximately 6% occur during occupational activities. Based on this, the following eight key focus targets were selected to be included in the first edition of the Plan; (1) children 1-4 years of age; (2) new Canadians; (3) unintentional water entry; (4) young adult males; (5) water transport related drowning; (6) Indigenous peoples; (7) Northern Canada and rural areas and cold water immersion (8) drowning in supervised settings.

CONCLUSION
Each section of the Canadian Drowning Prevention Plan includes data and analysis on situational awareness, goals, and action steps. The Plan is dynamic and will change as often as every six months to reflect progress. This presentation will provide an overview of the current data and the first edition of the Canadian Drowning Prevention Plan.
In 2010 New Zealand’s water safety sector constituted a fragmented group of organisations providing a diverse range of functions.

The national peak body, Water Safety New Zealand (WSNZ) struggled to get traction due to a weak national mandate, sector politics, turf protection and spasmodic support.

The New Zealand government stepped in to lead a process of sector-wide reviews and reforms. Their involvement both assisted and provided challenges in creating a more cohesive, aligned sector.

After several false starts, the sector has now collaboratively developed a national Water Safety Strategy to 2020.

Central government has not increased funding for the sector, but a better focus and utilisation of existing funding and resources within the framework of the national strategy is starting to show results. With endorsement from the sector, WSNZ is leading the delivery of a set of collaborative drowning prevention priorities. This includes a sector capability review that will identify overlaps and gaps in functions and service delivery with a view to establishing a more sustainable and future-focussed sector. This emerging cohesion has been based on open engagement and robust debate to develop trust between agencies.

Gaining appropriate central government support for drowning prevention is now a priority for this collaborative process.
On average 400 people drown in the UK each year with a further 200 people taking their own lives in water. The search and rescue services in the UK are some of the best in the world but even they cannot reach everyone.

The National Water Safety Forum (NWSF) representing key agencies including Marine Coastguard Agency, RNLI, RLSS UK, RoSPA, British Sub Aqua, Canals and River Trust and the Fire and Rescue Service was established over 12 years ago and in that time has seen many examples of excellent collaborative work to reduce drowning and make activities in and around the water as safe as possible. With the advent of the WAter Incident Database (WAID) as the NWSF’s national database, we now have detailed evidence about water related fatal incidents in the UK. This has helped us to respond to the World Health Organisation (WHO) report that recommends each country has a National Water Safety Plan. Our evidence indicates that 44% of the fatalities occur amongst individuals that had no intention of entering the water; a stark reminder that it is not just participants of traditional water related activities who find themselves in trouble.

In 2016 the NWSF launched The UK Drowning Prevention Strategy to central Government through the support of the Minister for the Department for Transport. This document set out the strategy, the themes and methods in order to reduce UK drowning by 50% by 2026.

But what does this mean at a local level? Can a National Strategy be pulled across local and bespoke issues?

The answers to these questions relied on each organisation providing a directive to their local units and branches in order to pull the experts together that understand their drowning risk. Through localised Water Safety Partnerships collaborations have developed that begin at their inception with a focus on data and risk mapping.

A local focus has generated bespoke strategies that target risky environments and at-risk populations. The partnerships link back to their umbrella organisations to formulate a response to the wider UK Drowning Prevention Strategy but the success of interventions has been the result of collaboration and a sharing of ideas and thoughts at the heart of the issue.

OUTCOME AND LEARNING

This presentation will evaluate the effectiveness of working from a national strategy through a mechanism of bringing together local stakeholders to deliver bespoke local plans at a sub-national level.
BACKGROUND
Drowning is a leading global killer, responsible for 360,000 deaths annually (WHO 2017). This is on a similar scale to diseases such as diarrhoea and measles, a generation ago. But drowning is currently a ‘silent epidemic’, unrecognised and under-resourced, particularly in low and middle-income countries where over 90% of all deaths occur, and where it frequently represents the leading cause of child injury and mortality.

However, through coordinated action and investment, drowning is preventable by using a range of solutions, including supervision, skills training and community education. While efforts to raise drowning and drowning prevention as a key health and development issue have been advancing, progress remains too slow. There is an urgent social, economic and moral need to take action.

In 2014, the World Health Organization (WHO) undertook the first global assessment of global drowning. For the first time, the scale and geographic distribution of a highly preventable public health challenge was revealed, one that had never been targeted by a strategic, global prevention effort. The assessment sets out current knowledge around drowning and drowning prevention, and called for a substantial scale-up of efforts and resources, internationally, to reduce an intolerable death toll, particularly amongst children and adolescents.

In their report, the WHO set out clear recommendations to address drowning. The report has become a key document for governments and policy makers around the world, raising much needed awareness of the global scale of the drowning issue, impacts on its victims, and opportunities for action. One such recommendation is that countries establish national drowning prevention (water safety) plans.

WHAT ARE DROWNING PREVENTION PLANS
A drowning prevention plan sets out the main principles, goals, objectives, actions and coordination mechanisms for reducing and preventing fatal and nonfatal drowning. These plans (sometimes called strategies or policies) may focus on drowning generally – or if data, political and/or community pressure dictates, on a specific aspect of drowning, for example swimming pool drowning deaths’ WHO Preventing drowning: an implementation guide 2017

WHY ENDDROWNINGS.ORG
To date, very few countries have developed a comprehensive and evidence based drowning prevention plan. Enddrowning.org will offer good practice and showcase practical examples to support those looking to develop a drowning prevention plan. The examples are varied to ensure they are relevant across a range of different contexts and country settings. The site aims to become a community of practice to generate emerging knowledge and facilitate discussion between interested parties. In short, the platform aims to be a one stop shop for those designing and implementing drowning prevention plans.

HOW THE WEBSITE WORKS
The WHO has recommended a seven step process when developing a drowning prevention plan. Each ‘step’ on the website includes a number of ‘approaches’ that can be chosen for a particular context or environment. Once an ‘approach’ has been chosen a number of practical ‘methods’ can then be selected which can be applied to achieve that approach. Some of the ‘methods’ are illustrated with case studies to help bring to life situations where they have been successfully implemented.

WHAT’S NEXT
The website will go live in December 2017. Alongside enddrowning.org, work is now underway to prioritise and target countries that would benefit from a comprehensive drowning prevention plan. There’s ongoing exploration to see how best the drowning prevention community can support priority countries design and implement their plans in situ or remotely, such as a technical task force, a peer to peer network or south to south consultancy.

WHO’S INVOLVED
A global advisory group was formed in 2015, made up of government representatives, UN agencies, development and water safety experts and academic institutions. The group meets every six months and has a number of working groups in place looking at specific areas of activity.

ORAL PRESENTATION
CREATING A COMMUNITY AND GOOD PRACTICE FOR THE DESIGN AND IMPLEMENTATION OF DROWNING PREVENTION PLANS
Mr. Steve Wills¹, Ms. Caroline Lukaszyk¹
¹RNLI, ²Georgia Institute for Global Health
Partnership 4, Salon 3, October 19, 2017, 1:30 PM - 3:00 PM

METHOD
WHAT ARE DROWNING PREVENTION PLANS
WHY ENDDROWNINGS.ORG
HOW THE WEBSITE WORKS
WHAT’S NEXT
WHO’S INVOLVED
DEVELOPMENT OF A NATIONAL MULTISECTORAL ACTION PLAN ON DROWNING PREVENTION IN THE PHILIPPINES

Mr. Jonathan Guevarra, Dr. Maria Rosario Sylvia Uy, Dr. John Juliard Go, Dr. Gerardo Medina

1Department of Health Promotion and Education, College of Public Health, University of the Philippines Manila, Ermita, Philippines
2Department of Health, Philippines, San Lazaro Compound, Sta. Cruz, Philippines
3Office of the Representative in the Philippines, World Health Organization, San Lazaro Compound, Sta. Cruz, Philippines

INTRODUCTION
Drowning is a serious and neglected public health threat claiming the lives of 372,000 people a year worldwide. More than 90% of these deaths occur in low- and middle-income countries. This death toll is almost two thirds that of malnutrition and well over half that of malaria – but unlike these public health challenges, there are no broad prevention efforts that target drowning (1). In the Philippines, an average of 2,681 deaths annually was recorded in the National Civil Registry from 1980 to 2011 (2). In 2011, reported drowning deaths was 3,656 (3.9/100,000 population) and data shows that drowning was common in age group 1-19 years. Drowning ranked 4th among age group 1-4 years, 2nd among age group 5-14 years and 7th among age group 15-19 years (3,4). Drowning is a public health issue in the Philippines that must be addressed by a multisectoral group.

AIM
To develop a multisectoral action plan on drowning prevention in the Philippines

TARGET
Different age groups

METHODS
A core group was formed and monthly meetings were conducted in preparation for the consultative meetings. Five consultative meetings and a public hearing were held from February to October 2016.

RESULTS
The consultative meetings were attended by representatives from various national government institutions, non-government organizations, civil society groups and the academe. Through the consultative meetings, the national drowning data was presented and utilized in developing the multisectoral action plan on drowning prevention in the Philippines.

DISCUSSION
The tireless efforts of representatives of different institutions and organizations paved the way for the development of a multisectoral action plan on drowning prevention in the Philippines. The goal is to reduce drowning mortality in the Philippines by 50% by the year 2026. To achieve this goal, five specific objectives were developed: (1) To strengthen multi-sectoral collaboration on drowning prevention (2) To enhance interventions on drowning prevention especially in high risk groups (3) To strengthen implementation and enforcement of policies and regulations on drowning prevention (4) To increase public awareness on drowning prevention (5) To improve evidence and data on drowning. Specific strategies were identified for each objective to be implemented by the group in the next 10 years.

CONCLUSION
Drowning is not a problem of the health sector alone. A comprehensive strategy through a multisectoral approach is needed in order to address this public health problem.

ACKNOWLEDGEMENTS
The development of the multisectoral action plan was supported by Bloomberg Philathropies. and the WHO.

REFERENCES
May 2017 a unique kid’s lifeguard TV-series called “The Lifeguards” will broadcast on national television in Denmark. It will be the result of a partnership and cooperation between Surf Lifesaving Denmark, Tryg Foundation, TV Production Company Highwire and the Danish Broadcasting Corporation (license financed public institution).

The series consists of eight episodes featuring kids aged 11-12 years, aiming to become Denmark’s coolest lifeguard. A popular host and two judges host the series. Each episode includes a competition with lifeguard skill elements. In the first two episodes 20 kids compete for 12 slots to the Lifeguard Camp. In episode 3-7, 12 kids are divided into two teams, team red and team yellow. Each team live in their own tent camp and each day/episode have to meet the other team in a competition with lifeguard skills. Every evening points are given by the two judges, rewarding teamwork, sportsmanship, performance, courage and other important lifeguard characteristics. In the final episode, the team members from the team with the most point will have to compete against each other to find the coolest lifeguard.

The series is a result from cooperation between on one side a TV Production Company with experience to produce kid’s television and on the other side a professional lifeguard service. The oral presentation at WCDP 2017 will present key learnings from the interesting journey the cooperation took and highlight important challenges.

Surf Lifesaving Denmark and the Danish Swimming Federation have decided to develop activities inspired by the series and launch them when the program is broadcasted. The aim is to use the series to promote lifesaving culture widely in the population and engage new members in lifesaving clubs.

The presentation will show video clips from the series and discuss how the audience has received the series. Already before the series has been broadcasted, it has been decided to produce a second season to air in September. Also under construction is an app for smartphones. The app will aim at engaging the viewers into a lifeguard universe with great learning potential. The app and season two will also be incorporated in the presentation.

All together, the presentation will show new material that is unique. The expectations are high and it will be interesting to follow and share.
BACKGROUND

Despite great progress worldwide in water safety and drowning prevention, major challenges remain for MIC/LIC. One of the greatest is language. The chosen language of the ILS is English, but this can be a barrier to dialog, comprehension, and implementation in non-English speaking countries. This presentation will explore the challenges and a solution to making HIC updated education and resources available and customized to the MIC/LIC Spanish/Portuguese countries in Latin America.

Latin America, where Spanish and Portuguese language prevails, covers an area that stretches from Mexico to southern South America. It has an area of approximately 13% of the Earth’s land surface area and its population was estimated at more than 626 million (2015).

Out of a total Americas Region population of 851 million people, 68% now live in countries with an ILS Full Member Federation. This is good, but 58% of the population of the Americas Region lives in countries where the language is Spanish or Portuguese.

To address these issues, ILS Americas President B. Chris Brewster approved the creation of a Latin America Lifesaving Committee chaired by Americas and ILS Board Member Leo Manino-Argentina. This has resulted in improved information exchange among Latin American members, several new membership inquiries and applications. The group includes ten members of ILS Americas.

A great challenge in Latin America, like other areas with many MIC/LIC countries is a lack of reliable drowning data, which is needed to increase attention to the problem. If the problem cannot be easily described, few seem to care? Educational materials are scarce and most funding seems to be directed to response, rather than prevention.

ILS member federations in high income countries and the ILS itself have produced some excellent drowning prevention material, but most is available solely or primarily in English. This raises a special concern for the amount of drowning prevention knowledge being shared that is relevant to poor populations, deficient in their own education infrastructure, especially since this is where most drowning occurs.

The Latin America Committee cannot resolve all of these problems, but it can help to encourage that they be better addressed by the ILS and ILS members willing to assist. For the present time, CLAS offers the following:

- A fast and better communication among members by using WhatsApp, social media, and ILS-America website specific to Spanish speakers.
- Coordinate drowning prevention efforts among members and sectors and agendas within countries.
- Provide technical assistance to countries organizations.
- Education on water safety and first aid by producing and sharing Spanish materials.
- Developing a national water safety plan feasible to Latin American countries.
- Strengthening public awareness among Latin needs.
- One Latin America meeting every year to exchange information.
- Experts able to communicate the latest updates in the ILS and in drowning prevention.

AIM

This presentation will provide an insight to the collaborative approach of establishing an intraregional, international alliance dedicated to promoting drowning prevention in underserved areas facing barriers of language and funding.

More information available on https://www.facebook.com/CLASILS/
BACKGROUND
The Emerging Leaders Workshop was held in Penang to support Commonwealth members at the World Conference on Drowning Prevention 2015. The major output of the workshop was project plans designed by the participants for them to carry out drowning prevention projects in their home countries based on what they had learnt at the conference. Follow-up interviews with the participants were designed to keep track of the progress made in their planned projects, and where necessary provide further guidance on running those projects.

FINDINGS
To date, the workshop and projects have resulted in:

- A report on proposed changes to improve the inclusivity of the Commonwealth Lifesaving Championships based on a survey of 87 competitors and officials (UK)
- A report on the stakeholders involved in drowning prevention in Canada (Canada)
- Four two-hour slots on radio to discuss water safety and the work of Royal Lesotho Lifesaving Association, resulting in participation at practical water safety sessions doubling (Lesotho)
- Five new instructors delivering water safety lessons to approximately 9,500 primary school children (Uganda)
- Expected implementation of Swim to Survive programmes for Grade 3 school children in Edmonton, Canada and in St. Lucia in the next academic year (Canada, St. Lucia)
- One participant starting a PhD in Human Movement and Sport Sciences, focusing on drowning prevention and water safety (UK)

High income country (HIC) participants recognised that they had a strong support network within their country which helped to ensure the success of their projects. Low and middle income country (LMIC) participants had varying levels of support, but where support existed it was valued. This demonstrates the value of training individuals within drowning prevention organisations in areas such as project and volunteer management so that they can support others to plan and deliver more effective drowning prevention projects.

Where in-country support was limited, effective regional support networks formed naturally. This was a much more successful approach than formal twinning, which was trialled by Canada and St. Lucia. The value of informal regional networks was in the ability for people to support others in overcoming similar challenges and understanding context-specific issues on a regional level. RLSS Commonwealth, and other international bodies should develop these regional networks.

Furthermore, the value of follow-up interviews to monitor projects and to offer on-going support and guidance to participants as they run their projects was considered highly valuable. Interviewers were able to act as a sounding board for problem-solving, identify additional expert input that may help further the learning experience of the participants and generally act as a supporting figure in cases when the participant’s organisation was not in a position to do so.

CONCLUSION
Based on this experience, further professional development workshops and on-going mentorship will be hosted by RLSS Commonwealth, with the focus remaining on the needs of LMIC member organisations. These will include topics such as project management, volunteer management, and fundraising strategies.
The development of permanent community-based Life Saving Training Centers in the West of Ireland through local partnerships

Mr. Brendan McGrath

Irish Water Safety, Clarecastle, Ireland

Day 2, October 18, 2017, 8:30 AM - 5:00 PM

This presentation will outline the ongoing development of permanent community-based Life Saving Training Centers on the west coast of Ireland. The involvement and co-operation of other existing voluntary groups and Local Government Agencies will be highlighted by the presentation of two case studies. The vision of ‘no drownings‘ and ‘reduced incidents’ will be achieved through agreed education and training programs and central administration. Case Study 1 will outline the successful completion of one permanent Life Saving Training Center in a location with a population of 829 (2016 Census) and with seven interest groups already in situ. Case Study 2 will outline the current development of a center in a location with a population of 638 (2016 Census) and with twelve interest groups in situ. Charts will outline the associated costs for the two case studies and will show the breakdown of funding for each project.

The Local Authorities provide a lifeguard service on populated coastal beaches from June until September. During the off season, local safety provision and rescue is provided by a number of voluntary groups. Overall safety around the Irish Coast is monitored by the Irish Coast Guard. While this service is available on a 24/7 call-out basis, it has a limited permanent presence throughout.

The growth in open water activities throughout the year has led to the need for initial rapid response from suitably trained personnel. National and local lifeguard statistics show the number of rescues during the Summer months. Official statistics for out-of-season water-based incidents were not recorded until the current developments. Until recently these out-of-season rescues and incidents were carried out on an anonymous basis and were only acknowledged through word of mouth. As part of the development of the Life Saving Centers, statistics are now recorded. There is now recorded evidence for seven rescues during the 2016/17 Winter/Spring season. These statistics are now part of all efforts to gain support for the various projects.

A concern by IWS - Clare was that many of the local groups providing rescue response were poorly trained, had low membership, had poor succession plans, were badly funded and had, in some instances, a negative influence over other proposed developments. IWS - Clare was also concerned that, throughout Ireland, many coastal areas have young populations for whom water safety education is limited. IWS - Clare had the vision, influenced by developments in other parts of the world, of building permanent training centers in populated beach areas. These centers will be run by local residents.

Initially the plan was to source suitable buildings/sites as close to the beaches as possible. Big efforts were also to be made to bring existing sub-groups together, each with their own identities and structures, to develop positive synergies and generate economies of scale. Each center will have a different prime focus, depending on its location and specific needs, while the overall provision of education and training will remain a priority. Failures during early efforts (throughout a fourteen year period) highlighted issues to be overcome. These included opposition by local groups and environmentalists. Atlantic storms also caused problems with locations.

In 2014 personnel changes within the Local Authority combined with renewed local interests in providing modern facilities at our beaches due to our location within a major tourist initiative called the “The Wild Atlantic Way”. Contacts were made, meetings held and talking moved to the practical work of site identification, planning and fund raising. Our first Training Center was opened in 2015 by the President of Ireland and political dignitaries. Fund raising initiatives have ensured the first training Center is now debt free. Along with our ongoing annual teaching and training programs, our first center is now being used by local groups (eg scout troops, local schools etc). Arising from our meetings and involvements with the Local Authority our pre- Summer schools education program is now combined with Local Authority environmental programs to ensure a broader education about our coastal environment. Our second Training Center is at the planning application stage and will be complete early in 2018. In this second location, a voluntary off-season lifeguard group has been formed and is active from a training and rescue point of view. This group has performed seven crucial rescues during the 2016/17 winter season. A third Center is currently under consideration in co-operation with our Local Authority. We are in the early stages of negotiating with local interest groups and trying to overcome fears. A site has been identified in co-operation with the Local Authority.
INTEGRATING RESEARCH, ACTION, AND EMOTION INTO A GLOBAL STRATEGY

Ms. Rebecca Wear Robinson¹

¹Lioness Protects LLC, Clarendon Hills, United States

Poster Day 3, October 19, 2017, 8:30 AM - 5:00 PM

BACKGROUND

The WHO has recommended that “All countries should implement proven drowning prevention strategies, tailored to their own circumstances and risk groups.” They have further recommended engagement with a range of audiences to ensure effective, cost-effective, and sustainable solutions.

To effectively identify and engage each of the varied target audiences, we need a strategy for integrating and successfully leveraging existing resources with the higher level government and global agency-level efforts identified by the WHO.

APPROACH

In order to successfully combat drowning, we must change attitudes and behavior around water. To achieve this goal we must create a 3-legged stool, held together by a global strategy. The three legs of the stool are research, action, and civic engagement.

- Research provides data and analysis to identify recommended attitudes and behaviors around water, and creates the parameters for defensible assessment of program efficacy.
- Action translates research into both measurable programs to elicit desired changes in attitudes and behaviors through education and skills-based training, and into the development and implementation of policy changes within organizations and governments.
- Civic engagement campaigns communicate the prescribed changes in attitudes and behaviors to audiences targeted through research. Effective engagement includes judicious use of stories and real-life experiences to evince specific emotions and make people more amenable to education and awareness campaigns.

When the three components are leveraged together effectively, we are able to identify and reach target audiences and change attitudes and behaviors.

In this presentation, I will:

- Make the case for leveraging research, action, and civic engagement more effectively;
- Outline academic research demonstrating how and why humans change their attitudes and behavior, and the importance of utilizing emotions appropriately in civic engagement;
- Provide examples of images and stories being used in support of data to effectively change attitudes and behavior in the public health and social change fields. (Alan Kurdi photo, UN Women, Dove, Love Wins, DNA testing, Polio eradication)
- Examine where the same images and stories are being used to discourage behavior change or reinforce negative attitudes and behaviors and explore how to combat competitive exploitation of issues. (Alan Kurdi photo and refugee crisis)
BACKGROUND

The Northern Territory is home to many unique and spectacular waterways that entice Territorians and visitors alike to explore the great outdoors. Popular recreational activities such as swimming, fishing and a wide range of water based activities inspire many to experience the great Territory lifestyle; sadly the fascination with our waterways has resulted in the NT recording the highest drowning rate per head of population.

The Northern Territory Government is serious about reducing the number of drowning deaths in the NT and continues to support the great work the NT Water Safety Advisory Council (NTWSAC) has achieved to date, through the implementation of the NT Water Safety Strategy.

The NTWSAC was established in 2002 as part of the Northern Territory Government’s 5 point Water Safety Plan. One of the major requirements of the Council was to develop and implement a Northern Territory Water Safety Plan 2003 -2006 – Heads Up that focused on water safety education, research and data collection and standards.

The ongoing strategy 2008 – 2011 was aligned to the Australian Water Safety Strategy. This was followed by the 2012-2016 NT Water Safety Strategy, developed and implemented by the NTWSAC covering three key priorities in aiming to reduce the number of drownings by 50 per cent by 2020:

- Improving community awareness and water safety skills
- Targeting high risk locations and activities
- Focusing on key drowning challenges including regional and remote waterways

The underpinning Action Plan clearly reinstates the collaborative approach to water safety within the community which has proven invaluable. Our committed stakeholders and partners continue to share a dedication to improving water safety in the Northern Territory and have created a culture of respect and collaboration.

VISION

A safe and healthy lifestyle in and around water

Aspirational Goal
Reduce drowning deaths by 50% by 2020.

Enablers:
- Education & Training
- Advocacy
- Research (data)
- Collaboration & Partnerships
- Policy, Legislation & Standards
- Marketing & Communication
- Funding & Resources

2017 - 2021 Strategy to be released in early 2017
BACKGROUND
Drowning is the fourth highest cause of unintentional death in New Zealand. On average, 77 preventable fatal drowning incidents occur in inland and coastal waters every year. Coroners investigate fatal drowning incidents in New Zealand, and provide recommendations to help prevent the incidence of drowning under similar circumstances. Although Coroners’ recommendations are non-binding, they do provide impetus for change, particularly where highlighted by media.

AIM
Information used in coronial investigations has traditionally been provided by the New Zealand Police, who respond to drowning incidents and manage the response provided by a range of organisations, including surf lifesaving personnel. Surf Life Saving New Zealand is the primary organisation delivering surf lifeguarding services on New Zealand beaches, and has significant expertise that can help inform coronial investigations. However, a number of Coroners are either not aware of this expertise or do not actively seek advice from Surf Life Saving New Zealand.

METHODS
Surf Life Saving New Zealand is therefore proactively engaging Coroners, and providing detailed Coastal Drowning Reports following fatal drowning incidents on New Zealand beaches. The reports utilise a risk assessment framework to identify, analyse, and evaluate site hazards and any other factors that may have contributed to the incident; information from incident reports, discussions with relevant stakeholders, media reports, and any other sources is considered. The history of other fatal and non-fatal incidents at the site is also reviewed.

The Coastal Drowning Reports outline the causal factors contributing to the incident, which may include the environmental conditions, the person’s surf safety knowledge and competence in the water (or lack thereof), as well as the appropriateness and effectiveness of any existing risk management strategies. For example, existing water safety signage and the response of emergency services are reviewed. A range of risk management strategies are then recommended to reduce the risk of similar incidents occurring in the future. This may include the implementation of targeted surf safety awareness and education programmes, the extension of surf lifeguarding services, the installation of public rescue equipment, or the upskilling of local surfers to respond to incidents.

FINDINGS
The provision of Coastal Drowning Reports represents a significant contribution to the coronial process; the reports utilise a best-practice risk management framework that promotes an evidence-based approach to decision making. The reports provide Coroners and other water safety stakeholders with targeted recommendations, and ensure that lessons from past incidents are applied to reduce the risk of drowning and injury into the future.
THE AMERICAN RED CROSS AQUATICS CENTENNIAL CAMPAIGN

Dr. William Ramos¹, Mrs. Connie Harvey

¹Indiana University School of Public Health-Bloomington, Bloomington, United States

Poster Day 3, October 19, 2017, 8:30 AM - 5:00 PM

BACKGROUND

To honor 100 years of lifesaving and water safety as part of its mission, in May 2014, the American Red Cross launched the Aquatics Centennial Campaign. The goal of this 5-year campaign is to reduce the drowning rates by 50 percent in 50 communities where the drowning rate or the numbers of drownings are high. The communities were identified using by-county drowning statistics from the Centers for Disease Control and Prevention. The Red Cross is working with Licensed Training Provider partners (LTPs) to help them expand their existing swim lesson programs and to create “an ecosystem of water safety”. The intent is to make swim lessons available, accessible and affordable to at-risk community members and to reduce training costs for lifeguards and water safety instructors to establish the infrastructure needed to deliver the swim lesson program. Partnerships and collaborations are key to the success of this campaign:

- Red Cross provides the campaign vision, oversight and resources (such as a training system and curriculum for instructors and basic-level education, marketing and public awareness tools), and fundraises to cover expenses.
- Red Cross LTPs (state, city and county parks and recreation departments, community pools, Boys & Girls Clubs, YMCAs, Jewish Community Centers and colleges) execute the training in their communities.
- Donors help provide the funding to make the training affordable to those with a financial need.
- The University of Indiana, School of Public Health-Bloomington is conducting a research study to determine the effectiveness of water safety messages taught through the Red Cross Learn-to-Swim program.

RESULTS

As of December 31, 2016, the Centennial Campaign is underway with 50 partners in 86 communities at 194 aquatic facilities in 17 states across the nation. Through the campaign, we have:

- Delivered 41,347 sets of lessons (typically 8 30 to 45-minute classes) to children and adults, teaching them to learn the life skill of swimming.
- Developed 786 future lifeguards through Junior Lifeguarding.
- Trained 824 lifeguards, water safety instructors and lifeguard managers.
- Armed 2,857 parents and caregivers with water safety knowledge and skills.
- Collected research data on over 400 program participants
- Analyzed initial results revealing strengths and areas for growth in course safety messages

It is too soon to know if the goal of a reduction of the drowning rates is being realized; however, we know that through the Centennial Campaign, new participants from at-risk communities are being served.

DISCUSSION

The structure of the Centennial Campaign serves as a good model for mobilizing an effort with a big vision and goals. The Red Cross is helping bring significant resources so those working at the grass roots level can create the ecosystem of water safety to more of the communities that they serve. The research study that is integrated into this campaign will help inform the next revision of the Red Cross aquatics curriculum, which will benefit the more than 2.5 million children and adults who participate in the Red Cross Swimming and Water Safety training annually.
MEDICAL
ORAL PRESENTATION

ILS POSITION STATEMENTS

Medical 1, Salon 3, October 17, 2017, 11:00 AM - 12:30 PM

CHAIRPERSON

Peter Wernicki
Medical Advisor
United States Lifesaving Association

PANELISTS

Joost Bierens
Consulting-Governor
Maatschappij Tot Redding Van Drenkelingen

Natalie Hood
Medical Adviser
Surf Life Saving Australia

Paddy Morgan
University Of Portsmouth

Linda Quan
Professor
University Of Washington School Of Medicine

David Szpilman
Sobrasa - Brazil

Jonathon Webber
Surf Life Saving New Zealand
INTRODUCTION
Every year approximately 360,000 people die following asphyxial cardiac arrest due to drowning. Effective ventilation by surf lifeguards should be initiated as soon as possible to improve survival. The use of a supraglottic airway (SGA) may help deliver effective ventilations. SGAs are widely used by nurse anesthetists as a standard for airway management, but it is unknown whether surf lifeguards, who are often non-healthcare providers, can use an SGA effectively. SGA use by nurse anesthetists may be considered as a gold standard.

AIM
To compare the use of an SGA by surf lifeguards and nurse anesthetists.

METHODS
In a simulation study, surf lifeguards without healthcare background and nurse anesthetists were asked to insert an SGA (i-gelO2, size 4, Intersurgical) in a resuscitation manikin (AMBU Man ALS, AMBU) and perform ventilations. Tidal volume was analyzed via manikin software and time to ventilation was analyzed by video recording. A successful ventilation was defined as a volume of 0.5-0.6 L. An effective ventilation was defined as a visible manikin chest rise. Questionnaires on ventilating a manikin vs a patient were distributed to nurse anesthetists.

RESULTS
In total, 30 surf lifeguards (70% male, median age: 24 years (Q1;Q3: 21;27), lifeguard experience: 3 years (1;6)) and 30 nurse anesthetists (16% male, median age: 43 years (38;52), clinical experience: median 17 years (13;20)) were included. Mean tidal volume was 0.55 L (SD: 0.21) for surf lifeguards and 0.31 L (0.10) for nurse anesthetists (diff. 0.24, 95% CI 0.32-0.15, p<0.0001). The median time to ventilation was 20 sec. (15;22) for surf lifeguards and 17 sec. (15;21) for nurse anesthetists (p=0.39). Surf lifeguards and nurse anesthetists delivered 100% and 95% effective ventilations respectively (p=0.004) and 19% and 5% successful ventilations respectively (p<0.0001). Nurse anesthetists stated it was easier to ventilate a manikin compared with a patient (57%), while 33% stated no difference, and 10% stated it was easier to ventilate a patient.

CONCLUSION
In a simulated set up, there is no difference between surf lifeguards and nurse anesthetists in time to ventilation. All ventilations were effective in both groups, but surf lifeguards delivered ventilations with higher quality.
INTRODUCTION
Drowning remains a leading cause of unintentional death in the paediatric population worldwide. The ability to perform cardiopulmonary resuscitation (CPR) is an important part of the skill-set of lifeguards. Competency in the performance of adult CPR is a skill that receives a great deal of attention during training and recertification, but no previous studies have investigated lifeguard CPR in a paediatric context. Resuscitation in children requires modification to the techniques used in adults. These relate to compression depth, ventilation volume, hand placement, and when to leave the patient to summon help if alone. There is higher resistance to air-flow in the paediatric airway, and coupled with altered lung physiology in drowning, this can make ventilation more difficult. Excessive ventilation leading to gastric distension is not uncommon, and aside from increasing the likelihood of regurgitation, can further impede ventilation. Chest compressions delivered to children are frequently too shallow.

METHODS
The research design was a mixed method, cross-sectional study using a self-complete questionnaire followed by a practical skills assessment of CPR skills using a paediatric resuscitation manikin fitted with electronic data collection ability. Standard survey methodology and statistical analysis was applied. Surf lifeguards aged 16 years and over were invited to complete a written survey and a simulated test of 5 cycles of single-rescuer CPR on a manikin. Lifeguards with a health professional background were excluded from the study. Participants’ observed skills were assessed in accordance with the 2015 ANZCOR guidelines. The data collected from the manikin described the adequacy of compressions and ventilations, compression rate, and incomplete releases in addition to total compressions and ventilations delivered over five cycles of CPR.

RESULTS
A total of 244 participants were entered into the study. Over half (55.6%) had 2-5 years lifeguarding experience, and nearly three quarters (73.4%) had undertaken training within the last 6 months. Most CPR training did not include a paediatric component (53.1%). Lifeguards rated their ability to perform CPR on an adult as ‘highly effective’ or ‘effective’ in over-half (56.1%) of responses. Less than a quarter (23%) however gave this response when asked to rate their ability on a child. In the knowledge test, lifeguards correctly stated the recommended: compression to ventilation ratio (91.8%), compression rate (68.4%), time to deliver each rescue breath (60.1%), when to go for help if alone (68%), and that AEDs can be used on children (87.2%). More than three quarters (79.8%) responded that chest compression-only CPR should not be used in drowning. Less than half (41.8%) knew the correct chest compression depth in children. When asked which factor has the greatest impact on whether attempted resuscitation of a drowning victim will be successful or not, almost half (44%) of lifeguards correctly selected duration of submersion as the critical factor, whereas one quarter considered that time to application of an AED (24%) or quality of CPR (27%) were the critical factors. From the observed CPR skills, lifeguards correctly: checked for danger (80.3%), checked responsiveness (97.5%), sent for help (88.5%), opened the airway (81.1%), checked for breathing (94.7%), started CPR when told ‘not breathing’ (99.6%), used the correct compression/ventilation ratio (90.6%), and maintained the airway during ventilations (90.2%). Manikin data provided a mean compressions rate of 115.3/min, compression depth of 3.1cm, and ventilation tidal volume of 248.8mL. Almost half of ventilations were too little (45.4%), and around one fifth too much (21.9%). A quarter of compressions were too shallow (24.8%). The mean number of compressions delivered over 5 cycles was 137.4, and for ventilations 6.5.

CONCLUSION
The ability to perform CPR on a patient of any age is an important part of the skill-set of lifeguards. It is hoped that the results of this study will be used to guide future training interventions for not only lifeguards, but any first responder who is first on-scene where paediatric CPR is required. This study has identified some knowledge gaps, however overall performance of observed/technical CPR skills, that were largely ANZCOR guideline compliant, suggest that current adult-focused training methods could address these issues by providing paediatric-specific training. The use of electronic feedback manikins, which a previous lifeguard CPR study has already identified, is recommended.
INTRODUCTION

Laboratory research studies on emergency responder performance found there was significant variability in subjects’ appraisal of acute stress physiological and psychological responses during emergency incidents.

LITERATURE REVIEW

Researchers found natural body reactions to acute stress occurs within seconds after adrenaline enters the rescuer’s bloodstream. Acute stress can cause increased heart rate, and labored breathing. Pulse rate and blood pressure were objective physiological acute stress measures. Despite CPR certification some novice or inexperienced rescuers may misinterpret the physiological and psychological reactions to adrenaline. When individual perceptions are misconstrued, attention is directed away from fully assessing the casualty and can become an important element compromising effective CPR.

Pia (2003, 2014) hypothesized acute stress effects could compromise lifeguards’ performance during a CPR emergency. Since the complex effects of acute stress responses during lifeguards’ actual CPR/AED emergency response had not been reviewed empirically, the present study sought to determine if during the CPR emergency response, lifeguards’ subjective appraisal of physiological and psychological acute stress responses could lead to failures of proper action and effective team communication; whether an action deviated from established CPR/AED training protocols and EAP procedures; and if input, intention, and execution errors occurred in the CPR’s emergency response.

RESEARCH STUDY

The present study examined sixteen (16) cases involving lifeguards’ actions and inactions during actual CPR/AED emergencies. Pia used his decades of CPR subject matter knowledge and actual CPR treatment responses (>50), to study authenticated drowning investigation reports. The author’s blended expertise enabled the categorization of distinct errors made by novice and experienced lifeguards and lifeguard managers under acute stress conditions of time pressure, uncertainty, unfamiliar situations, and conditions of acute stress threats vs. challenges.

A pre-existing error taxonomy was not used to categorize errors after data was initially collected. Behavioral data was used to drive the study’s results by describing each error with a clear statement of deviations from established CPR/AED training protocols and EAP procedures. Each error was grouped into error types, and then placed into higher order cognitive and human factor error categories.

Subsequent analysis of these errors illustrated acute stress can disrupt lifeguards’ CPR attention and this attention diversion can exceed the limited capacity of a rescuer’s working memory. Prospective memory failures, forgetting to perform a planned action or provide attention at the appropriate time, constituted 62% of the acute stress emergency response failures.

SUMMARY

Currently acute stress field treatment variables are difficult to replicate in traditional skill-based training. Completing and following the acute stress countermeasures training module: Lifeguard Team CPR Operational Checklist®™ blends cognitive and human factor error categories with the stress inoculation (SIT) and stress exposure (SET) educational programs. SIT and SET evidence-based guides apply acute stress habituation training through conceptualization; skills acquisition/rehearsal; and application. This multi-faceted team approach can improve rescuers’ CPR performance by using the skills-rules-knowledge (SRK) framework. Team’s referral to operational checklist during CPR response will help avoid fragmentary memory retrieval cues, incomplete or inaccurate errors of selection, commission, or omission thereby lessening lifeguards’ vulnerability to CPR errors.
BACKGROUND

The physiology of drowning is complex and follows a timeline from initial submergence to hypoxic cardiac arrest and anoxic brain injury. Important issues for lifesaving personnel include establishing the ideal number of initial breaths, ventilation frequency, tidal volumes, ratio of ventilations to chest compressions, and effectiveness of gas exchange during rescue breathing with expired air and oxygen. Once a rescue begins, there should proceed an optimized choreography of resuscitation interventions that maximizes probability of survival. Interventions may be quantified by various parameters that should each correlate with changes in percentage survival.

METHODS

The Halifax Drowning Simulator is a large-scale computational model of human physiology developed for resuscitation research. It incorporates modules of mathematical equations that simulate lung mechanics, alveolar recruitment, pulmonary shunt, cardiac mechanics, blood circulation, cellular metabolism, respiratory gas exchange, and autonomic responses. Oxygen and carbon dioxide levels are calculated in blood and tissue compartments representing brain, heart, muscle, and splanchnic organs. Asphyxia and drowning result in physiological changes that include progressive hypoxia and hypercarbia, transition from aerobic to anaerobic tissue metabolism, bradycardia, cardiac stunning, and loss of cerebral autoregulation. Heart rate and myocardial contractility diminish with hypoxia, and respond in a graded manner to reoxygenation within a transitional phase of potential recovery. Oxygen debt calculated in the heart and brain represent measures of stress that are linked to epidemiological data through calibrated dose-response curves that correlate physiology with morbidity and mortality. Dynamical changes in physiological variables are used to predict changes in survival probability according to resuscitation interventions.

RESULTS

The model tracks a large set of physiological variables representing pulmonary mechanics, blood flow, respiratory gas kinetics, and cardiovascular responses. Heart rate and contractility decrease due to progressive hypoxia and down-regulation of tissue metabolic rates, which are coupled to cellular ATP levels. In the absence of rescue intervention, heart and brain oxygen debt levels rise over time, and are associated with sigmoidal curves that predict increased probability of brain injury and cardiac death. Resuscitation scenarios that incorporate airway opening, passive recoil inspiration, expired-air rescue breathing, oxygen ventilation, and chest compressions have been analyzed across the spectrum of apneic downtime.

Aspiration and atelectasis increase pulmonary shunt, which limits oxygenation of arterial blood. Four stages of potential recovery are described which depend on physiological state. Early ventilations with preserved cardiac function result in full recovery. Intermediate response times with CPR result in flattening of mortality curves, and partial recovery of cardiac and brain function. Responses to interventions become negligible beyond 20 minutes of untreated apnea. A wide range of resuscitation strategies can be explored and optimized through virtual experiments using this computational platform. Novel concepts to be introduced include cardiac boot-strapping, mortality reduction curves, and resetting of the asphyxia clock.

CONCLUSION

The model provides realistic insight into the physiology of drowning. Optimal resuscitation strategies can be explored and designed through interactive simulations. This computational approach represents a new paradigm in resuscitation science. It may lead to new directions in basic research, medical education, and computer-assisted guideline development.
BACKGROUND
Automated External Defibrillators (AEDs) increase survival rates of out-of-hospital cardiac arrests. In 2011, the Royal Dutch Lifeboat Institution (KNRM) received a donation to purchase 65 AEDs for each of their lifeboats. The efficiency of AEDs on lifeboats has not been studied yet. To explore the benefits of AEDs on lifeboats, all resuscitations by KNRM lifeboat crews since 2011 have been studied and the AED rhythm strokes have been analysed for quality purposes.

AIMS
Primary aims of our study were to evaluate in what circumstances resuscitations were performed by lifeboat crew members and to define the added value of AEDs on board the Dutch KNRM lifeboats. Secondary aim was to evaluate if AED rhythm strokes can be used to assess quality of resuscitations and their use for training purposes.

METHODS
In this study data was collected from all resuscitation incidents performed by lifeboat crew members of the Royal Dutch Lifeboat Institution (KNRM) in the Netherlands from January 7th 2011 until December 31st 2016. AED rhythm analyses were done manually, based on expert consent. To score quality on resuscitation, a scoring system was established based on the registrations of the AED rhythms. The scoring system was compared to the ERC Resuscitation Guidelines 2010; the guidelines applied at that time. The system contained a scale from 1 to 10, from “very poor” to “perfect”, using a variety of parameters, such as mean compression frequency.

RESULTS
The KNRM has been involved in 48 resuscitations. In 36 cases sufficient data is available for evaluation. Mean age of the victims is 44.9 years, 92% are male (n=33). Almost 83% of the resuscitations (n=12) take place in unfavourable (n=24), very unfavourable (n=3) or life-threatening dangerous (n=1) weather conditions: wind speeds up to 9 Beaufort and wave heights up to 5 meters. After the alarm call, it takes in average 20 minutes for the lifeboat crew to arrive on-site. Twenty-three victims had ROSC at any moment during the incident, only 2 victims survived. The KNRM AED’s were used in 11 victims. In 2 victims, an automated shock was delivered, but without ROSC as a result. The average time between alarm call and attachment was 43 minutes. The AED was used in 7 drowning victims.

QUALITY
The median “mean compression frequency of 117 was high-normal, the median “chest compression fraction” 67% and the median pre-shock, post-shock and non-shock pauses respectively 13, 5 and 8 seconds. Based on our scoring system, 1 resuscitation scored a “Perfect”. Three scored a “Good”. Three scored “Moderate”, 2 scored “Poor” and 1 scored “Very poor”.

CONCLUSION
The frequency of resuscitation and application of an AED by lifeboat crews is very low. This occurs under more difficult conditions, in a younger population and different population than most out-of-hospital resuscitation. The AEDs on KNRM lifeboats did not contribute to survival. In conclusion, AEDs are useful to evaluate resuscitation incidents afterwards and obtain valuable information about the quality of CPR which can be used for training purposes.
Pulse checks to determine whether or not to commence cardio-pulmonary resuscitation were removed from the International Liaison Committee on Resuscitation’s (ILCOR) basic life support guidelines in the year 2000. Instead rescuers moved to checking for signs of life.

Drowning is the process of experiencing respiratory impairment from submersion/immersion in liquid. This respiratory impairment typically leads to hypoxia, a lack of oxygen, which then causes the heart rate to slow, and progressively decrease to the point of an asystolic cardiac arrest. The debate will address whether or not lifeguards responding to a drowning event should be trained in pulse checks, and in situations of a detectable pulse, provide rescue breathing only, and not chest compressions, is a matter for discussion.

In a lively pro/con debate, Joost Bierens (pro) and Natalie Hood (con), members of the ILS Medical Committee will examine the contradicting evidence around pulse checks by lifeguards confronted with a drowning resuscitation scenario.
INTRODUCTION
Ventilation is a priority in drowning resuscitation. Over-the-head CPR (OH-CPR), i.e. with the rescuer located at the top of the victim’s head instead of alongside the victim’s torso, has been demonstrated to be superior when doing bag-valve-mask ventilation compared to standard CPR. The International Life Saving Federation recommends CPR using face-mask ventilation. It is currently unknown if OH-CPR using face-mask ventilation improves CPR quality. We hypothesized that OH-CPR is superior to standard CPR with face-mask ventilation among surf lifeguards.

METHODS
Surf lifeguards were trained in OH-CPR and standard CPR with face-mask ventilation and randomized to a crossover comparison on a manikin. CPR quality data were obtained from the manikin and video recordings. Interruptions in chest compressions were used as a primary measure of CPR quality. A sample size of 14 participants was needed to detect a difference of 1.5 sec in interruptions in chest compressions (SD: 1.7, alfa: 0.05 and power: 90%).

RESULTS
In total, 30 surf lifeguards (8 female, 22, male; mean age: 25 years) participated. No significant differences in interruptions in chest compressions were observed when comparing OH-CPR (mean SD: 7.5±1.4 sec) to standard CPR (7.4±1.4 sec, p=0.50). Moreover, no significant differences in tidal volume (0.42±0.2 vs 0.42±0.2 L), effective ventilations (visible chest rise; 97% vs 99%, p=0.17) and chest compression rate (104±9 vs 101±9 min-1) were found when comparing OH-CPR and standard CPR. OH-CPR reduced chest compression depth (difference: 3.3 mm, p=0.001) compared to standard CPR.

CONCLUSION
OH-CPR using face-mask ventilation is not superior to standard CPR and resulted in a slight reduction in chest compression depth. Standard CPR is therefore suggested to be the primary method of care in single rescuer CPR by surf lifeguards when face-mask ventilation is used.
INTRODUCTION
Databases on ocean lifeguard injuries are scarce and it is likely that available injury data on lifeguards underestimates the prevalence of musculoskeletal injuries in this population. Currently, the prevalence of injuries in California ocean lifeguards is unknown. The purpose of this study is to identify and describe musculoskeletal injuries present in California ocean lifeguards. This information will allow for specific injury prevention interventions to be examined in the ocean lifeguard population.

METHODS
Current California Ocean lifeguards 18 years or older who were members of the California Surf Lifesaving Association (CSLSA) were invited to participate in this study. The survey was conducted and created through Qualtrics online survey platform. An anonymous online survey link was sent out to all registered CSLSA members. Demographic information included age, gender, employment status (full-time or part-time), number of years employed as an ocean lifeguard, and the manner in which they physically train to maintain fitness for the job. Injury was defined as any job-related complaint of pain that affected the participant’s ability to physically train for or perform lifeguard duties. Data collection is currently in process. Descriptive statistics will be calculated for all demographic and injury data. Chi-squared tests with a significance set at p<0.05 will be used to analyze associations between demographics and the 10 most common injuries, across the sexes.

RESULTS
Results will include the percentage of participants based on sex, employment status, and the most common training activities lifeguards use to maintain fitness for the job, the mean years of experience, the mode of all other demographics, the 10 most common injuries sustained, the most common type of injury (for example, abrasion, dislocation, fracture, strain, nerve injury, sprain, tendinitis), percent of injuries for which a worker’s compensation claim was filed for, percent of injuries that resulted in an absence from work, percent of injuries that required surgery, as well as the most common surgical locations. Associations between demographics and the 10 most common injuries, across the sexes as well as differences between injured and non-injured lifeguards will also be included.

CONCLUSION
Conclusions will be determined after data analysis is completed.
ADVANCEMENTS IN THE MEDICAL ASPECTS OF RESCUE, FIRST AID AND RESUSCITATION

Miss Joanna Talbot1
1Royal Lifesaving Society Uk, Worcester, United Kingdom

Medical 4, Salon 3, October 18, 2017, 11:00 AM - 12:30 PM

BACKGROUND
It is widely known that the first few minutes following cardiac arrest are critical in order to give someone the best chance of survival; during these minutes Cardio Pulmonary Resuscitation (CPR) and an Automated External Defibrillator (AED) are vital.

Many Leisure Centre across the UK have chosen to have an AED as part of their First Aid provision for use on employees and general public. Places for People Leisure, a social enterprise operator manages over 100 Leisure Centres on behalf of Local Authority partners across the UK. They have installed AEDs in every centre they operate and ensure employees are trained and competent in their use.

Places for People Leisure have Lifeguards trained in CPR who receive monthly refresher training for both CPR and AED. In addition, they have First Aiders who receive annual training.

Throughout a 7-year period several customers stopped breathing (due to a number of medical conditions/accidents) and required urgent medical attention. Employees working for Places for People Leisure in each instance gave CPR and used an AED within the vital 2 minutes following collapse.

The current survival rate of customers suffering cardiac arrest is over 75% within Places for People Leisure. This outstanding survival rate is thought to be a result of immediate quality CPR and prompt use of an AED; all of which were delivered by employees that receive regular training and have the confidence to take action.

Dr. Anthony Handley, Medical AED Director for Places for People Leisure and Chief Medical Adviser for RLSS UK completes a full analysis of the AED data following an incident within Places for People Leisure.

OUTCOMES AND LEARNING
The session will discuss the full medical results and the analysis behind such outstanding success of life saving treatment within Places for People Leisure. A discussion will also take place on the benefit of training and ongoing training for skills such as CPR and use of an AED.

Submission by:
Joanna Talbot, Head of Product (RLSS UK)
Andy Read, Head of Health and Safety (Places for People Leisure)
INTRODUCTION
Lifesaving Society Korea (LSK) has made various efforts such as education, research, and promotion to prevent drowning accidents and activate first aid since 2008. In 2008, an Emergency Medical Service Act 14, education on life saving and first aid, related to the first aid, was revised to have local governments conduct CPR (cardiopulmonary resuscitation) and FA (first aid) training every year. In 2007, a School Health Act 9 paragraph 2, health education was newly enacted, so that it made every school conduct CPR and FA training for every student, and in 2013 the Act was extended. According to the legal foundations, LSK has conducted first aid education with local governments for many years.

PURPOSE
This study has a purpose that it researches to analyze of LSK’s CPR and FA training trends and then it is to research measures to make CPR and FA training more active. By analyzing LSK’s training times of CPR and FA for 5 years from 2012 to 2016, this research proceeds.

RESULTS
Last 5 years, LSK has trained total 7,393 times and 280,458 people. The training sessions/number trained were: 653/22,701 in 2012, 803/30,643 in 2013, 1,492/51,795 in 2014, 2,267/77,171 in 2015 and 2,678/98,148 in 2016. The numbers were low from 2012 to 2013, but they showed a high growth rate of 86% from 2014 based on the Sewol Ferry Disaster. From 2015, the numbers have grown a little.

Annual average of 62% the training objects are students and they are the most. CPR training took annual average of 96% part so it was more active than the FA training. In metropolitan areas, annual average of 99% of the training was conducted, and the training has been focused on the metropolitan areas for 5 years without the significant changes.

An annual average of 77% from the total number of training were conducted for free contracted out by local government. The number of Public health centers in metropolitan areas working with LSK and the participation showed an average growth rate of 39%.

This study considers that the training project through a public health center could significantly influence extension of the CPR and FA training. Thus, letting local communities extend the training could be another way to increase training for common people.

CONCLUSION
LSK has trained 13,481 child care teachers in last 5 years, and need to provide the CPR and FA training for child care teachers that has been emphasized since 2008. Because the Emergency Medical Service Act was revised recently, the CPR and FA training for kindergarten teachers and child care teachers is going to be compulsory in 2017. Thus, expanding training objects by preparing legal foundations could be another way to enlarge the training for common people.
INTRODUCTION/AIMS

Between 2010/11 and 2014/15 Surf Life Saving Australia (SLSA) lifesavers and lifeguards performed 65,798 rescues and treated 274,211 patients. This research examined the detailed incident records of 25,907 of those incidents. The aim of the research was to determine who was being injured, the types of injuries and illnesses occurring on Australian beaches and determine which types of incidents resulted in ambulance referral or required further medical treatment.

KEY QUESTIONS

1. Who is being injured on Australian beaches?
2. What injuries and illnesses are being treated by Australian Surf Lifesavers?
3. How common are injuries and illnesses?
4. Where are persons treated by surf lifesavers being discharged?

METHODS

SLSA's national database, Surfguard, was used as the source of information. First aid and resuscitation data from 1 July 2010 to 30 June 2015 was downloaded to an Excel file which was then analysed using common themes. This data set represents one of the world's best beach incident sources of information. In a literature review, no other data set covering the scope, time period or geographical diversity has been found.

The incidents were reviewed and those without a valid unique incident number were removed. These incidents were also checked and did not have any data associated with them. Blank fields were recoded to identify as missing data.

RESULTS

• Total of 25,907 incidents
• July 2010 to June 2015 analysed via Excel and relevant pivot tables run
• Incidents are most common during the summer and shoulder months. However, lifesavers are attending incidents right through the year.
• The majority of incidents occur between 8am and 6pm (89%). However, there is a small proportion of incidents occurring overnight, suggesting that SLSA call out teams are being utilised.
• Between 2011 and 2014 there was a 36% increase in incidents
• Males make up two thirds of those involved in incidents and young adults, 15-25 make up just under a quarter of those involved in incidents
• The majority of injuries and illnesses are not immediately life threatening, however there is the potential there for serious conditions such as respiratory, fractures and neurological
• Most people were injured when swimming or wading (29%)
• The majority of incidents were located outside, but near the flagged area (39%)

Of the injuries and illnesses identified, the most common injuries were open wounds (31%), soft tissue injuries (13%), fractures/dislocations (11%) and neurological injuries (9%). Of the incidents recorded 37% were referred to ambulance transport with a further 26% referred to a medical practitioner or hospital by their own transport. Of the patients referred to ambulance, 20% were for fractures/dislocations, 17% for open wounds, 11% respiratory emergencies and 6% cardiac emergencies.

CONCLUSIONS

The significant number of beach injuries and rescues performed each year by SLSA staff and volunteers has implications for their training, and resourcing requirements. The etiology of beach incidents reflects the importance that the beach plays in many peoples’ lives in Australia.
Infrared tympanic thermometers (IRTTs) are non-invasive devices, which are used to measure an individual’s temperature. They are a well-established clinical measurement technique for in-hospital use when a patient is expected to have a normal or elevated temperature (1). The commonly held assumption is that an IRTT measure correlates well to core temperature. Increasingly IRTTs are being used in the pre-hospital phase of care to guide treatment and prognostication; to guide the decision to admit to hospital in a post-drowning event and, for those with associated severe hypothermia, referral for extracorporeal membrane oxygenation with re-warming.

Although in trauma patients a correlation has been demonstrated between direct-contact (thermistor) tympanic temperature and a variety of traditional clinical core temperatures (2), their reliability has been questioned (3) and manufacturers suggest swimming and exposure to cold may affect the devices accuracy (4).

The aim of this study was to assess the accuracy of infrared tympanic temperature (TIRT) compared to rectal temperature (Tre) during and after cold-water exposure.

Following a favourable ethical review, six volunteers undertook a 45-minute immersion to the neck in 13°C water. Every 5-minutes, just after the previous measurement, the participants tilted their head to wet their left-ear for 10-seconds allowing measurement of TIRT in both dry (right) and wetted (left) ears. Following immersion, they were re-warmed using either self-paced bicycle ergometry in 22°C air, warm water immersion (40°C) or passive re-warming whilst in a survival bag in 22°C air.

Although Tre and TIRT wet & dry were strongly correlated from the fifth minute of immersion onwards, TIRT in both ears was lower than Tre (P<0.05). After 10-minutes of immersion onwards TIRT in the wetted ear was lower than the dry ear (P<0.05). By the end of the 45-minute immersion, mean (SD) Tre had fallen by 0.97(0.57)°C, TIRT in the dry ear by 1.42(0.57)°C, and in the periodically wetted ear by 3.1(0.49)°C; greater than the reduction in the other two measures (P<0.001). The mean differences between Tre and TIRT (Wet & Dry) were maintained throughout the first 20-minutes of re-warming and appeared only to be narrowing between Tre and TIRT(wet) after 25-minutes of re-warming. TIRT(wet) remained 2.8°C and 1.7°C lower than Tre after 30 and 45-minutes of re-warming in two of six tests, where Tre was either stable (37.3°C) or rising (37.7°C).

In conclusion IRTT underestimates core body temperature in an individual immersed in cold water, or recently recovered from the water, and can be exaggerated to the point where hypothermia is indicated in normothermic individuals whose ears have been wetted with cold water. This would suggest that if used for victims of a drowning event the measurement should be interpreted with extreme caution. Where a core temperature measurement is indicated, for prognostication and/or referral to specialist medical services, alternate methods of core temperature measurement should be used, e.g. Oesophageal or rectal probes.

ACKNOWLEDGEMENTS
The authors wish to acknowledge the assistance of our volunteers, and the technical support of Mr. Geoff Long and Mr. Danny White.
INTRODUCTION
Hypoxic blackout, also known as underwater blackout syndrome and shallow water blackout, is a distinct and preventable cause of drowning (1).

AIMS
This study aims to review cases of unintentional fatal drowning in Australia to identify risk factors to inform the development of advocacy and strategies for prevention.

METHODS
Cases of fatal unintentional drowning with information on breath holding prior to death in Australia were extracted from the Royal Life Saving National Fatal Drowning Database. Cases in this database are drawn primarily from the Australian National Coronial Information System (NCIS). Cases where hypoxic blackout (or similar terms) were mentioned in the cause of death field were included, as were cases where the coronial report or police report on the narrative of events leading up to the incident records pre-submersion hyperventilation or associated activities (such as free diving).

RESULTS
Between 1 July 2002 and 30 June 2015 (a 13 year period), there were 22 identified drowning deaths where hypoxic blackout was known to be a factor. All cases were of males, with 77.3% occurring in those aged 18-34 years. The most common scenarios were whilst swimming and recreating in swimming pools (both home and public) (45.5%) and whilst diving in ocean/harbour locations (40.9%). Of the 9 drowning deaths whilst diving in ocean/harbour locations, 5 occurred whilst spear fishing, with the remaining 4 whilst the victim was free diving. A contributory level of alcohol (≥0.05%) was known to be involved in one quarter of swimming pool drowning deaths. One third (33.3%) of all victims of hypoxic blackout in a swimming pool were known to have pre-existing medical conditions.

DISCUSSION
Hypoxic blackout drowning deaths in Australia take place in both public and private swimming pools and in the ocean and are all males. Deaths occur whilst victims are engaged in pre-submersion hyperventilation when swimming and recreating (sometimes under the influence of alcohol) and whilst spear fishing and free diving in ocean/harbour locations. Preventative strategies should include increasing awareness of the risk for those commonly implicated. Novel strategies will be needed; the use of signage has been proposed yet its effectiveness is unknown. Identification of those who drown due to hypoxic blackout is difficult in circumstances where the death is not witnessed.

CONCLUSIONS
Hypoxic blackout, while rare, claims the lives of an average of 2 people per annum in Australia. To prevent these deaths a range of organisations (governments, NGOs, diving groups) must work together. Those at risk of hypoxic blackout are clearly identified through the use of coronial data. It is hoped increased advocacy will help reduce this preventable cause of drowning.

ACKNOWLEDGEMENTS
This research is supported by the Royal Life Saving Society – Australia to aid in the reduction of drowning. Research at the Royal Life Saving Society – Australia is supported by the Australian Government.

REFERENCES
BACKGROUND
The YMCA of the USA (Y-USA) and the American Red Cross (Red Cross) have had a long history in their respective training programs of teaching course participants of the dangers of extended breath holding activities, and advocating that these behaviors—including hyperventilation preceding breath-holding—be prohibited. Despite efforts by the Y-USA, Red Cross and others to educate stakeholders, constituents and program participants about these dangerous behaviors throughout the years, deaths related to hypoxic blackout in the water are still occurring. At least 5 hypoxic blackout-related deaths have occurred at YMCA pools alone since 2008. At least 18 more swimmers have been successfully rescued after losing consciousness following extended breath holding. In the last few years, several highly trained swimmers and military swimmers have died in similar circumstances, which have been widely reported in the media. It was clear that more work was needed to increase the awareness of the dangers of hypoxic blackout to all audiences that we have the ability to reach.

METHODS
Initially, Y-USA and Red Cross partnered to develop additional strategies to increase the general awareness of the dangers of hypoxic blackout for all involved in aquatics, and increase the understanding of the responsibilities of different roles in the aquatics arena play to prevent and/or stop the dangerous behaviors. USA Swimming joined this partnership to provide a clear message to swim coaches, swimmers and parents that these dangerous behaviors are not acceptable, even in a training environment.

The first phase of this awareness campaign was the development of a joint statement on hypoxic blackout by the Red Cross, USA Swimming, and Y-USA. The statement, released in September 2015, established a common definition to be used by the three organizations. It reaffirmed the commitment to educate the audiences they serve as well as the public about the risks of hypoxia in the water, and serves as a foundation to help ensure that our respective organizations understand the risks, do not engage in—or do not allow—behavior that could result in loss of consciousness and death. This statement was shared with their respective memberships and distributed to media outlets.

The second phase of the campaign is on-going. The intent is to target a broad cross-section of stakeholders at all levels with appropriate guidance and messaging. This group of stakeholders includes but not limited to: local YMCA CEOs, local YMCA risk managers, Red Cross Authorized Providers, aquatics directors, lifeguards, lifeguard instructors, swim instructors, swim coaches, camp counselors, program participants, parents of swimmers, and YMCA members. The targeted strategies consist of short, concise messaging, and where relevant, embedded protocol as part of educational curriculum.

CONCLUSION
This level of collaboration of these leaders in water safety education in the United States to address a specific issue is unique. Having this common goal—and using common language—while leveraging the resources and relationships of each respective organization is sure to achieve greater impact to reduce drowning due to hypoxic blackout.
INTRODUCTION
Mouth-to-mouth (MTM) ventilation goes back centuries. The first gas analysis was conducted by Elam and Safar on volunteers in the 1950s. It was later recognized that gastric inflation risked regurgitation and aspiration. There has since been a search for the ideal tidal volume and breath timing, with debate over slow breaths versus fast breaths. Our goal has been to determine the optimal ventilation parameters for adequate oxygenation and minimum gastric inflation.

METHODS
We conducted a three-phase study into the physiology of rescue ventilation. This involved measuring mouth pressure profiles on an instrumented test lung, calculating victim blood gas levels based on expired air ventilation, and developing a predictive model of gastric inflation with an unprotected airway. We combined these components together to calculate the optimal parameters of rescue ventilation.

(1) Ventilation Pressures
The shape of actual mouth pressure profiles has never been reported in MTM ventilation. We interfaced a test lung (Michigan Instruments) to a custom-built data acquisition system comprised of pressure and displacement sensors, signal amplifiers, and a USB-based analog-to-digital converter. A soft cushioned face mask was used to simulate the victims mouth, and airway resistances and lung compliances were set. Health care students were recruited to perform simulated mouth-to-mouth ventilation, and asked to blow fast and slow to a metronome set for 0.5, 1.0, 2.0 sec inflations, with low and high volumes. We measured tidal volumes and mouth and alveolar pressure profiles.

(2) Alveolar Gases
We developed a predictive model of alveolar gas exchange during rescue ventilation by deriving equations of lung oxygen and carbon dioxide levels, and calculating alveolar gas exchange between rescuer and victim. The rescuer inhales fresh air and victim receives expired air. Gases pass through both dead spaces and mix in alveoli. The role of lung volumes, tidal volume, frequency, metabolic rate, and shunt were investigated. The target objective of ventilation was victim arterial oxygen saturation of 90 percent.

(3) Gastric Inflation
A predictive model of lung and gastric inflation was developed incorporating mouth pressure profiles from test lung data. Exceeding lower esophageal sphincter pressure LESP causes stomach inflation. Gastric volume equals integrated esophageal flow.

RESULTS
Mouth pressure profiles were acquired while volunteers blew into the test lung at various tidal volumes and durations. We derived theoretical relationship between lung ventilation and gastric inflation volume, which depends on mouth pressure, LESP, lung compliance, and airway resistance. Shorter breath times are inadequate for gas exchange, and longer times inflate the stomach. The theoretical optimal inflation time is close to 1.0 sec. Exhaled air MTM tidal volume is 0.7 litres for 90 percent arterial oxygen saturation. Fresh air ventilation requires at least 0.6 litres tidal volume. Larger tidal volumes are necessary for higher target oxygen saturations or presence of shunt.

CONCLUSIONS
Ideal MTM inflation time with exhaled air is close to 1.0 sec and 0.7 litre tidal volume. This achieves adequate oxygen exchange while minimizing risk of gastric inflation. These results provide a theoretical foundation for defining optimal rescue ventilation.
BACKGROUND
A patient was rescued from a North Island beach in New Zealand post a drowning event and underwent resuscitation on scene before being flown by helicopter to hospital. The patient was intubated, sedated and ventilated, and moved to the intensive care unit. The patient’s condition deteriorated with worsening signs of acute respiratory distress syndrome (ARDS) secondary to pulmonary damage from aspiration of water. Due to risk of ventilator induced lung injury (VILI), barotrauma and atelectrauma; the patient was moved to the Cardio Vascular Intensive Care Unit. Here the patient was placed on veno-venous extracorporeal membrane oxygenation (ECMO) for a few days. This allowed reduced ventilator settings while maintaining tissue perfusion. The patient survived and was discharged with no negative neurological sequelae after 46 days care. This was the first time ECMO has been used post drowning in

DISCUSSION
ECMO was first used in 1972. In a veno-venous model a cannula is placed in a large vein. The deoxygenated blood is then oxygenated outside the body before being returned to the right side of the heart. When the oxygenated blood then passes through the lungs it doesn’t matter if there is little or no gas exchange; the left side of the heart still receives oxygenated blood. ECMO therefore compensates for a V/Q or ventilation/perfusion mismatch.

There is little literature around ECMO and drowning. The findings of a small number of case studies, most centred on hypothermic pediatric patients, suggest a favourable outcome.

CONCLUSION
In summary, although there is only case study evidence at present, it appears ECMO is a safe intervention for drowning patients with ARDS, who are refractory to normal ventilatory suppor
INTRODUCTION

Envenomations caused by cnidarians occur due to the presence of defense cells (cnidocytes) in the body of the animals. The most frequent cnidarians in Southern Brazil cause mainly local phenomena, manifested by pain and erythematous plaques. REPORT OF CASE: on 05/01/2017, at 1:22 pm, one of the authors (JC) was activated to care for a 3-year-old female, in Guaratuba municipality, Paraná State, Brazil. She presented an erythematous and irregular plaque in the left forearm after contact with a jellyfish and intense facial angioedema, more pronounced in both eyelids and lips accompanied by facial flushing. The lungs bilaterally present vesicular murmur, with snorts and wheezes in the pulmonary bases, pink secretion in airways and dyspnea, with intercostal and furcula retraction and use of accessory musculature. The treatment was administered with adrenaline SC (0.1 mg / kg) and hydrocortisone EV (10 mg / kg) with significant recovery of the patient in a few minutes, and after total improvement of symptoms, she was discharged without complications.

DISCUSSIONANDCONCLUSION

The manifestations of anaphylactic shock and angioedema were very clear in this case and the communication should alert the professionals of the health teams working in the coastal areas to allergic phenomena, since the prompt care modified the prognosis of the patient.
DISASTER & CLIMATE CHANGE
The Centre for Research on the Epidemiology of Disasters’ report, “The human cost of natural disasters 2015: a global perspective”, showed that between 1994 and 2013, 6,873 natural disasters worldwide claimed 1.35 million lives or almost 68,000 lives on average each year. Additionally, 218 million people were affected by natural disasters on average per annum during the same 20-year period. Flooding accounted for 43% of all recorded events and affected nearly 2.5 billion people over those 20 years.

The report highlights that better research is urgently needed into how and why households and communities are affected by disasters. This research will provide an evidence base to inform disaster response, particularly in low-income settings. Without such micro-level research, future DRR and disaster prevention will be less effective.

The Sendai Framework for Disaster Risk Reduction 2015-2030 is an agreement which recognizes that the State has the primary role to reduce disaster risk but that responsibility should be shared with other stakeholders. It aims for “the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.”

It outlines seven global targets and four priorities for action. Drowning prevention contributes directly to Target A: Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality rate in the decade 2020-2030 compared to the period 2005-2015, and to Target B: Substantially reduce the number of affected people globally by 2030, aiming to lower average global figure per 100,000 in the decade 2020-2030 compared to the period 2005-2015. There are further links between drowning prevention and Target E: Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020.

This presentation will explore the role that drowning prevention organisations should play in reducing disaster mortality and the number of people affected by flooding. The presentation will consider the required shift from traditional lifesaving activities to an increased focus on flood risk assessment and evidence-based risk reduction interventions at a local, regional and national scale. The presentation will highlight the concerted effort needed from drowning prevention organisations to implement evidence-based interventions in collaboration with appropriate partners.
Earth’s climate is changing faster today than at any time in the past 10,000 years. The threats posed by climate change are legion; here I focus on one that is relevant to this audience – the possibility of stronger, historically unprecedented ‘superstorms’ along with storm surges that inundate low-lying coastal areas and increase drowning deaths.

Hurricanes and cyclones may not only become more intense and thus produce higher storm surges in the near future, but will form and move ashore on an elevated sea surface. The average level of Earth’s oceans is currently rising at a rate of over 3 mm per year. This rate is increasing due, in part, to increasing transfers of water into oceans from glaciers and ice sheets and, in part, to warming and expansion of seawater.

Scientists forecast that, by the end of the century, global sea level will be about 1 m or more higher by the end of this century than today. Yet over 600 million people, nearly 10% of the human population, currently live less than 10 m above sea level, many in burgeoning coastal megacities. That number will increase dramatically over the next 50 years, increasing the overall risk to people from extreme storms.

The number of people living at low elevations along coasts, and thus exposed to flooding from storm surges, is highest in Asia, particularly in China, India, Bangladesh, Indonesia, and Viet Nam. These countries will remain most vulnerable to extreme storms in the future. However, Africa will experience the highest rates of population growth and urbanisation in the coastal zone, particularly in Egypt and sub-Saharan countries in Western and Eastern Africa.

Appropriate education and effective cyclone warning systems and evacuation plans will be required to reduce the loss of life due to drowning in superstorms, especially in countries that do not have the resources to cope. Improvements to protective dykes, such as those completed in New Orleans after Hurricane Katrina, may lead to a false sense of security and actually increase the risk of damage and loss of life from future superstorms.
ORGANIZATIONS
Hellenic Lifesaving School (HLS) in cooperation with Hellenic Volunteer Lifesaving Team & Hellenic Lifesaving Club.
The Volunteer Lifeguards who participated in the Lifesaving- Rescue operations in Lesvos awarded for their effort from the Hellenic Ministry of Marine.

INTRODUCTION
A study regarding the Activity of Volunteer Team of HLS Lifeguards in order to provide assistance & rescue to hundreds of refugees (those people have lost everything and left their country of origin or habitual residence because of political reasons, rocked by war trying to seek sanctuary in Europe by boat). During 2015, Greek Islands have been arguably the most affected by the largest mass movement of refugee people across European since the end of the Second World War. According to the United Nations High Commissioner for Refugees (UNHCR), 850,000 landed on the Greek Islands, rate 20 times higher than this of previous year. Even though the passage from the Turkish Shore across the Aegean Sea is a distance of only four kilometers (2.5 miles), one of the narrowest waterways between Turkey & the European Union, a tragic world record is registered: the most refugee’s losses due to drowning per kilometer crossing from the Turkish coast to the Greek islands (45 deaths per kilometer).

AIM
The aim of this study is to evaluate the level of preparedness regarding Local Populations & Volunteers Rescuers in addressing massive rescue incidents
Main purposes of the present paper are the following:
• Raise awareness among local communities, supporting role with Local Authorities & Rescue Teams
• Create informational and educational campaigns for locals to become water smart and drowning prevention aware, in order to help themselves & refugees.
• Duty to sufficient lifeguard coverage to coasts streaming in mass influx of refugees
• Propose possible prevention strategies & techniques
• Seek to reduce the casualties caused by drawing & believes that “no one deserves to die at sea”

METHOD
Our Volunteer Team of HLS Lifeguards arrived in Lesvos Island on November 9th 2015, with 10 Volunteer Lifeguards/Lifesavers, off-road Lifesaving Jeep Vehicles, boat & rescue equipment while stayed until January 10th of 2016. All Lifeguards were experienced, trained, certified & worked as Professionals Lifeguards during summer time while they offered their help voluntarily in Lesvos. Every day we had continuous operation with three shifts of 8 hours each starting at 08.00a.m (08.00 – 16.00, 16.00-24.00, 24.00 -08.00) assisting the Port Authority and locals. We rescued and pulled hundred people ashore, helped children with special needs, under sock, dealt with incidents of hypothermia, pregnant women, injured people etc.

RESULTS
The Greek island of Lesvos has been under the spotlight in the media and worldwide as it is a central entry point for 500,000 migrants in 2015 alone. Of these 55% were male, 17% were female & 28% were children. A detailed analysis of the figures according to the UNHCR showed that 49% were Syrian, 21% Afghan & 8% Iraqi. Based on numbers given by International Organization of Migration (IOM), 758 migrants lost their lives in Aegean Sea in 2015, 30% were children.
Refugees Drowning Deaths explained as following:
• Use of inflatable vessels, engines & life jackets of inferior quality and condition.
• Boat operators are also refugees, trained on the spot, no previous experience operating a sea vessel.
• All boats are overcrowded & depart every 15-20 minutes regardless of weather conditions.
• Refugees are fully dressed and when they drop the water they immediately sink.

CONCLUSION
Effective training, coordination & elaborate preparation of locals and volunteers in cooperation with Rescue/Lifeguard Team will lead to a prospective reduction of deaths by drowning in refugees.
Played out year after year at Europe’s maritime borders, mass shipwrecks and migrant drowning have become an increasingly normalised spectacle. Since the beginning of the Arab Uprisings in 2011, more than 16,500 people are known to have died in the Mediterranean in their attempt to reach EU territories, turning the sea into the world’s deadliest border zone.

While EU institutions and member states reinforce securitisation policies and deterrence measures, including the externalisation of border enforcement to third countries, non-state actors have begun to directly intervene in the Mediterranean. Over the past few years, a ‘humanitarian fleet’ has emerged, composed of Search and Rescue (SAR) assets deployed by more than eight NGOs, including Doctors without Borders and Save the Children.

In the first five months of 2017, they account for about one third of all rescues in the international waters off the coast of Libya. In addition, the activist group ‘WatchTheMed Alarm Phone’, that I am part of, has sought to find other ways to make sea-migration less dangerous. Through our hotline for people in distress at sea, we have assisted more than 1,800 vessels in emergency situations over the past 30 months.

In my talk, I will show how non-state actors have prevented thousands of sea fatalities while becoming increasingly exposed to efforts by European states and authorities that seek to prevent and, at times, criminalise non-state SAR work.
The risks associated with drowning are affected by social and environmental factors that vary significantly with time and location. Therefore, drowning risk factors need to be understood at the local level to identify relevant risk reduction interventions. Good quality data on drowning at either a national and local level, particularly in LMICs, is often limited or non-existent.

In such cases, using the knowledge and experience that exists within a community is an effective way to access information about local drowning risks which can be used to develop appropriate interventions. A participatory approach involves the end users in the planning of an intervention from the start. Participatory methods equitably involve a cross-section of the community to draw upon local knowledge and experience.

The authors propose that a common set of participatory methods is used to identify drowning burden and risk at the local level, identify suitable interventions, and develop action plans. Using common open-source toolkits throughout the drowning prevention community allows easy comparative analysis of interventions and context specific risks.

Nile Swimmers have designed and developed a drowning risk assessment toolkit (DRAT) using participatory community approaches, including techniques drawn from the field of disaster risk reduction (DRR). The toolkit is used by focus groups that represent a cross-section of the community. These focus groups create a map showing important assets in the community and areas where water is accessed for different reasons. This map forms the basis of a risk map which identifies hazardous areas, areas that flood, and locations where people have drowned or been injured in the past. Further details can be added with information from semi-structured interviews with key informants.

The effects of the identified risks on different sectors of the community are discussed and prioritised by the community. The root causes are analysed to develop action plans that are owned by and can be implemented by the community.

The toolkit has been tested by Nile Swimmers to identify appropriate interventions in flood-prone villages in rural Sudan. The involvement of the community in all stages of the risk assessment, action planning and intervention implementation targets a number of the nine elements of the Core Humanitarian Standard (CHS) including:

Humanitarian response is appropriate and relevant.
Humanitarian response strengthens local capacities and avoids negative effects.
Humanitarian response is based on communication, participation and feedback.

This paper will consider the tools within DRAT, their application in Sudanese communities and the importance of working towards the CHS in the humanitarian field of drowning prevention.
Floods in Sudan have a significant effect on the most vulnerable people within the most vulnerable communities. According to a UN OCHA report dated 14 August 2016; torrential rain between June and August 2016 had caused about 114 deaths and affected more than 161,700 people. Additionally, 14,700 houses were destroyed and another 10,800 were damaged nationwide.

Flood safety interventions in Sudan are minimal and generally consist of government messages in newspapers warning which states can expect flooding in the coming days.

Using the Drowning Risk Assessment Toolkit (DRAT) developed by Nile Swimmers, risk assessments have been carried out in six communities in two states in Sudan in partnership with UNICEF. The collected risk data is being analysed as part of a World Health Organisation (WHO) Mentor-Violence and Injury Prevention (VIP) project.

This analysis will underpin the development of evidence-based flood safety interventions for peri-urban and rural communities vulnerable to flooding in Sudan. The designed interventions will take into account current best practice in the fields of drowning prevention and flood safety, as well as local context-specific considerations such as the availability of resources. The combination of the initial stages of DRAT and the subsequent analysis fulfils the requirements of 6SQuID, the Six Steps in Quality Intervention Development as described by Wight et al. (2015).

The developed interventions will be piloted in priority communities identified in partnership with UNICEF, which fulfils the fifth step of 6SQuID. Longer-term monitoring and evaluation is required to understand the effectiveness of the interventions.

This paper will consider the process of developing high-quality, context-specific and evidence-based flood safety interventions for use in Sudan and similar low and middle income countries where the burden of drowning in flood events is highest.
BACKGROUND

In recent years, due to climate change, massive rainfall occurs especially in monsoon season and this causes sudden flash floods, landslides, and thunderstorms. Recently, there was heavy rainfall in Cox’s Bazar district of Bangladesh that caused the death of several lives. Since 2012 with the support of the Royal National Lifeboat Institution (RNLI), CIPRB has been implementing the SeaSafe lifeguard program in the beach of Cox’s Bazar district. In 2014, the RNLI also provided flood rescue training among 10 lifeguards. There was a massive rainfall continued during the 1st week of July 2015 in Cox’s Bazar district, in that time the SeaSafe flood rescue team conducted a flash flood rescue and saved about 130 lives.

OBJECTIVES

The objective of this paper is to describe a rescue conducted by the SeaSafe lifeguards in Ramu Upazila in Cox’s Bazar district.

METHODOLOGY

In-depth interviews of the lifeguards, reports, and a videography were analyzed for this study.

DESCRIPTION OF THE INCIDENT

In the early morning, some community people came to the SeaSafe lifeguard station and shared about flash flood in their community. Some of the people successfully managed to go to the high land but over 100 people were still in the middle of the flooded area and the water was increasing in every minute. Most of the people were now in the top of their houses. No one in the area can move due to fast movement of the water. They had been waiting for rescue for several hours but nobody came. Just after getting the message, the SeaSafe lifeguard manager formed a team of 6 rescuers who received training during flood rescue training. The lifeguards reached the area about 9:00 AM.

RESULTS

Six lifeguards participated for the rescue operation with one rescue boat, four rescue tubes and rubber tubes, local community leaders supported providing long ropes. All six lifeguards participated and continued the rescue till the dark. The rescuers rescued over 130 people from the flash flood. Among the rescue, 45 were female and out of the 15 were pregnant women. About 65 children mostly below 10 years of age were rescued, among them, majority were girls. SeaSafe lifeguards also rescued 20 adults mostly age over 50 from the flood zone. The operation continued till the dark. No fatal drowning was occurred during the rescue.

CONCLUSION

Natural disasters like cyclones, flash flood, and thunderstorms became common in recent years in Bangladesh. In low resource setting like Bangladesh, community volunteers can be trained to conduct rescue during any emergency situation.
ORAL PRESENTATION

CAUSAL PATHWAYS OF FLOOD RELATED DEATHS IN AUSTRALIA

Ms. Amy E Peden¹, Associate Professor Richard C Franklin¹,², Professor Peter A Leggat²

¹Royal Life Saving Society - Australia, Broadway, Australia, ²College of Public Health, Medical and Veterinary Sciences, James Cook University, Townsville, Australia

INTRODUCTION

Globally, flooding is the most common of all natural disasters and drowning is the leading cause of death. Rivers are the leading location for drowning in Australia, with flooding playing a role.

Aims: Describe the incidence of unintentional fatal drowning in river floods in Australia between 1-July-2002 and 30-June-2012, identify risk factors through the use of causal pathways and propose potential strategies for prevention.

METHOD

This is a total population audit of all known unintentional river flood-related fatal drownings in Australia. Data is sourced from the Australian National Coronial Information System (NCIS). The involvement of flooding was determined through information presented in the narratives of the police and/or coronial reports. Where available, cases coded to ICD-10 were also identified as being flood-related if the external cause code X378/X38 was provided in the external data tab within the NCIS.

Results: 129 (16.8%) deaths involved river flooding, representing a crude drowning rate of 0.06 per 100,000 people per annum. Half (55.8%) were due to slow onset flooding, 27.1% flash flooding and the type of flooding was unknown in 17.1% of cases. Those at an increased risk were males ($\chi^2 = 9.9; p=0.002$), children ($\chi^2 = 7.6; p=0.006$), non-aquatic transport incident victims ($\chi^2 = 110.0; p<0.001$) and victims who were swept away ($\chi^2 = 73.3; p<0.001$). When compared to drownings in major cities, people in remote and very remote locations were 79.6 and 229.1 times respectively more likely to drown in river floods. Causal factors for falls into flooded rivers include being alone and alcohol (for adults). Large scale flash flooding in the state of Queensland in 2011 led to the deaths of 33 people in one flood event. These victims were swept away commonly drowning after being swamped in their home with no prior inundation warning. Victims of non-aquatic transport incidents were commonly the drivers of four wheel drive vehicles and were alone in the car, entering flooded rivers whilst attempting to reach their own home or a friend’s.

DISCUSSION

Flood related drownings are a rare but entirely preventable cause of death in Australia. Prevention must consider causal factors and strategies to be explored and evaluated include effective signage, early warning systems, alternate routes and public awareness for drivers.

CONCLUSIONS

Although periods of drought and flood are inevitable in Australia, fatal drowning does not have to be a by-product. Further research must evaluate the effectiveness of prevention strategies as well as garnering a greater understanding of risk and exposure.

ACKNOWLEDGEMENTS

This research is supported by the Royal Life Saving Society – Australia to aid in the reduction of drowning. Research at the Royal Life Saving Society – Australia is supported by the Australian Government.
INTRODUCTION

Drowning, a serious public health issue is the 3rd leading cause of injury-related deaths worldwide (WHO, 2014). Risk of drowning increases with floods. In particular, reports have shown that around 53% of flood-related deaths were the result of driving through floodwaters; with the use of personal vehicles, predominantly cars, to navigate flooded roads, the highest identified predecessor to flood-related drownings in Australia (Australian Water Safety Council, 2016; WHO, 2014). The alarming rate of such fatalities, despite mass media campaigns aimed at reducing the behaviour, has resulted in a national call for research into behaviours around floodwater: “Therefore, strategies that encourage appropriate response among the community before entering floodwaters are of vital importance” (Australian Water Safety Council, 2016, p35). While research by Hamilton and colleagues has provided emerging evidence for the factors that influence individuals’ decisions to drive through floodwater (Hamilton, Peden, Pearson & Hagger, 2016), research indicates that performing and not performing a given behaviour are not conceptual opposites and that different motivational pathways may guide people’s action and inaction decisions (Richetin, Conner, & Perugini, 2011). Exploring action and inaction behaviours is a useful line of investigation and supports the need for further investigation that is directed at both the ideal behaviour (intentionally avoiding driving through floodwater) as well as the unsafe behaviour (intentionally driving through floodwater). Our research has aimed at gaining a rich understanding of the unique experiences of individuals who, when faced with a road covered in floodwater, intentionally decided to drive through or avoided driving through the floodwater.

METHOD

Qualitative methods were used to gain an understanding of the psychological and behavioural factors informing driver behaviour during floods. Australian drivers who had intentionally driven through floodwater (Study 1, N=20) or intentionally avoided driving through floodwater (Study 2, N=23) participated in semi-structured interviews. Data were analysed using thematic analysis.

RESULTS

In Study 1, past experience, individual perceptions (e.g., situation perceived as different to warnings), and the social and environmental context (e.g., seeing other motorists driving through) emerged as major themes. Most salient was that although there was a common awareness of the risk posed by driving through flooded waterways, the decision to take this risk emerged as being heavily reliant on one’s ability to construct a sense of self-efficacy in the lead-up to the incident. In Study 2, drivers identified a range of advantages (e.g., didn’t damage car), disadvantages (e.g., inconvenient, but not so terrible), barriers (e.g., perceived urgency to reach destination), and facilitators (e.g., making plans and using existing plans) to avoiding driving through floodwater. Normative influences were also important to the behavioural decisions influencing drivers through a sense of normative expectancy, approval of significant others, and a moral obligation to the safety of others.

CONCLUSION

The emergence of salient psychological and behavioural factors adds to understandings of driver behaviour around floodwater hazards. Current findings have implications for the direction of future research and can inform intervention targets and development of prevention strategies for effective behaviour change, saving lives otherwise lost to Australian waterways.
In December of 2015, the UK’s two major winter storms, Desmond and Eva smashed the North West and North East within a few days of each other. 5,200 homes were immediately affected with rainfall at 150mm and 125mm; six times the months UK average. With another storm heading only a few days away an immediate life threat was issued by the Government to protect the population in York city. The threat, a flood barrier was about to be breached that would devastate another 3,000 homes. Lives were at risk and life was already been lost.

The government had sent in both the Fire and Rescue Service and the Military. Next was the volunteers!

The lifesavers would be put to the ultimate test in not just using their life saving skills, but to face communities who had lost everything, small civil unrest encounters, personal stress, welfare issues and the intense media interest.

What did Surf Life Saving GB Flood Response Units face? What were the lessons learned in a western developed country? How did the volunteers integrate with the professional services? Were they prepared? Finally what was the volunteers’ experience?

Adrian Mayhew’s presentation will cover how the teams operated and share the positive and negatives volunteer’s faced. How the charity managed those impacts and how now to improve community safety and preparedness for flood impact.

Surf Life Saving Great Britain was founded in 1955. Our Chief Patron is H.R.H The Duke of Edinburgh.
BACKGROUND

In 1953, Europe faced one of the biggest storms in recent times. A North East storm with big spring tides forced coastal flooding within the UK Eastern seaboard and the northern countries of Europe. Thousands of lives were lost and many infrastructures damaged.

Today, population has increased which means increased risk and increased preparedness. The UK governments risk assessment to the country puts coastal flooding as the second highest threat. Only recently a major hurricane in the USA almost affects over 60 million people.

Project “FloodEx 2009” looked at an inter-nation response consisting of 5 countries using a mixture of volunteer and professional flood responders. In September 2015, a UK Fire and Rescue Service team along with Surf Life Saving GB Flood response team prepared to deploy to support North Carolina during Hurricane Joaquin.

AIM

Adrian Mayhew shares the lessons learned from that project and how the USA, EU have developed interoperability in what is called a “Level 5” response in “team typing” and “Unit typing” through the European Response Mechanism. He will also discuss what is required for future developments to enhance capability for major flood impact.
DYING TO HELP? BYSTANDER PERCEPTIONS AND KNOWLEDGE OF SAFE RESCUE ASSISTANCE

Dr. Kevin Moran¹, Mr. Jonathon Webber², Ms. Teresa Stanley²

¹University of Auckland, Auckland, New Zealand, ²Watersafe Auckland, Auckland, New Zealand

Swimming 1, Salon 1, October 17, 2017, 11:00 AM - 12:30 PM

BACKGROUND

The problem of rescuers drowning when attempting to help others has been described as the aquatic-victim-instead-of-rescuer (AVIR) syndrome. From 1980-2014, 87 persons drowned in New Zealand while attempting to rescue others, all incidents occurred in open water and most (80%) fatalities were male. While bystander rescue has been promoted as a way of preventing drowning, little is known about the knowledge base that informs potential rescuers or what educational interventions might offer as a way of reducing bystander risk of drowning in emergency situations.

AIMS /OBJECTIVES

The aim of this presentation is to report on two sequentially developed studies, the first of which focussed on public understanding of rescue safety and their capacity to rescue someone in difficulty in the water. The second study focussed on an educational intervention aimed at addressing the rescue knowledge shortcomings found in the initial study.

TARGET GROUP

The target group were adult members of the public.

METHOD

The first study consisted of a cross sectional survey of visitors (N = 415) to a large cultural festival held annually in Auckland. A brief, self-complete anonymous questionnaire sought information on their swimming, rescue and first aid competencies, and their knowledge of rescue safety.

In the follow-up study, caregivers (N = 467) enrolled in a family water safety program were given copy of new resources on rescuer safety and invited to take part in a pre- and post-program survey that sought information on their level of understanding and perceptions of their rescue competency. A written questionnaire was given out prior to the commencement of the in-water sessions with their children. Participants were then asked to complete a follow-up survey upon completion of the water safety program.

RESULTS AND DISCUSSION

Results of the initial study suggest a poor understanding of safe rescue technique. Many indicated they would jump in and rescue a victim (47%), while less than one third (30%) would get flotation to the victim. Significantly more males responded that they would jump in and attempt a rescue (males 55%, females 40%).

Results of the second study suggest that entry levels of understanding of rescue safety prior to the water safety program varied considerably. While two thirds of respondents correctly agreed for the need to shout “Are you okay?” to the person in the water, less than a quarter (23%) correctly disagreed that waving arms and shouting for help were normal signs of someone drowning. After education using the 4Rs rescue safety resource, significant differences were evident in respondents’ understanding of rescue safety but this did not translate to greater confidence or disposition towards performing a rescue.

CONCLUSION

Gaps exposed in would-be rescuers knowledge of safe rescue techniques and misconceptions about their ability to cope with an emergency drowning incident suggest that ongoing promotion of education in safe bystander rescue technique is a worthy goal. The findings of the follow-up study suggest that the 4Rs Aquatic Rescue resources have provided sound safety knowledge upon which to base future education and safety promotion in emergency rescue activity.
BACKGROUND
Children aged 0 – 14 years account for 15% of all drowning deaths in Australia, therefore reducing drowning among this age group is a high priority in the Australian Water Safety Strategy (1). Children aged 5 – 14 experience the lowest drowning rate before rising again in adulthood; this is when the location for drowning changes from a domestic environment to the open water, emphasizing the importance of learning swimming and survival skills in childhood. The Australian Water Safety Council developed minimum competencies within the National Swimming and Water Safety Framework, referred to as the ‘Benchmark’ (1). The ‘Benchmark’ target is 100% of children achieving key skills before leaving primary school (approximately 12 years old): swim 50m freestyle; 25m survival backstroke; scull, float or tread water for two minutes (1). It is estimated that 20% of Australian children cannot swim 50m or stay afloat for two minutes by this age (2, 3). Barriers to accessing swimming and water safety programs include cost of instruction and pool entry, cost of transport and cultural factors (3).

AIMS
To examine achievements of swimming & survival skills among Australian children attending private swimming lessons
To provide a situational analysis or ‘snapshot’ of what children are learning in private swim lessons, at what age they are achieving key skills in comparison to the recommended ‘Benchmark’ skills
To investigate achievement levels in relation to demographic factors and participation on a national level

METHODS
This research is based on a sample of assessment records of children aged between 0-15 years obtained from a database of private swim schools in 4 Australian states. Data was provided & cleaned in Microsoft Excel and analysed in SPSS. This research is not representative of all children participating in private swimming and survival lessons in Australia. All individual and swim school information was de-identified. Information was captured each time a child was assessed for a single skill. Where a child was assessed multiple times, the highest skill achieved was analysed to avoid duplication (e.g. freestyle 25m & freestyle 50m).

RESULTS
A total of 62,353 individual children were included in the database, 50.6% males, and average age of 7 years. All children were attending a 30 minute lesson weekly, 94.4% were from major cities and 60.8% of children were from higher socio-economic areas (4), 79.1% pay $15.50 per lesson. The key skills of freestyle, backstroke, survival backstroke, treading/sculling and rescue skills were analysed by age. The average age for achieving 50m freestyle was 9.2 years, 50m backstroke is at 9.8 years, 25m survival backstroke at 10.4 years and 25m breaststroke at 10.4 years. Results show that 60% of 12 year old children in this study could swim 50m freestyle and backstroke, 76% could swim 25m survival backstroke, and 32% could tread/scull/float for at least two minutes. This study revealed that swim schools are predominantly teaching freestyle and backstroke related skills with lesser emphasis on water safety and survival skills.

DISCUSSION
The results confirm previous findings that when given the opportunity to learn swimming and survival skills on a regular basis, children can achieve or exceed the ‘Benchmark’ skills before they leave primary school irrespective of age, sex and socio-economic status. However, there are still some children not achieving for reasons unknown; further research is required in this area. Whilst children of all ages are achieving the benchmark skills, getting to this point requires considerable time, energy, resources and money over a sustained period of time by children and their parents, and even more so for the children not achieving.

CONCLUSION
This research provides a clearer picture of what skills Australian children are achieving as a result of attending private swim programs. This study provides a better informed position for advocacy and influencing policy towards compulsory swimming and survival lessons across Australia. The National Swimming and Water Safety Framework and the social context of swimming and water safety in Australia are discussed in other papers.

ACKNOWLEDGEMENTS
Research at the Royal Life Saving Society – Australia is supported by the Australian Government.
INTRODUCTION

Worldwide, epidemiological data indicate children are a high-risk group for drowning. Whilst children in low- and middle-income countries are at disproportionate risk, children aged 0-14 years in high-income countries, including Australia, have also been identified as a priority for drowning prevention interventions. Significant progress has been made in understanding toddler drowning, although there is a lack of empirical evidence regarding the drowning risk and protective factors for post-toddler age groups.

Teaching school-age children basic swimming, water safety and safe rescue skills has been identified as one approach to decrease drowning in this age group. To date however, most studies have depended on self-reported estimation rather than objective measurement of children’s swimming competency. In Australia, studies have relied on child or family member reports, therefore our understanding of the level of children’s physical swimming skills is speculative.

AIMS

To establish children’s self-perceptions of their swimming competency and parent perceptions of their children’s swimming competency; and to directly measure the swimming competency of children to determine the accuracy of child and parent self-reported perceptions.

METHOD

Two valid and reliable self-report questionnaires (one specific to parents, the other for children) were used to obtain data on perceptions of aquatic competency. To ascertain the accuracy of both the children’s perceptions of their swimming competency, and parent perceptions of their child’s swimming competency, five practical swimming skills that corresponded to the questionnaires were assessed. These tests addressed individual swimming and survival skills considered fundamental to swimming and water safety programs.

RESULTS

A total of 625 Grade 5 and 6 (age 10-12 years) primary school children (51% male, 49% female) completed the practical testing. Large variation was observed in swimming and water safety skills, for example, the actual distance children swim was diverse (mean = 150m ±121.8 Standard Deviation; Range = 0-300m). In contrast, children demonstrated similar levels of competency on their front and back (mean=2.6 and 2.8, respectively; maximum score of 5). Children’s self-classification of their swimming competency compared with the actual distances swam demonstrated inconsistencies in the accuracy of children self-reporting their abilities. In 61% of cases, the perceived swimming competency self-reported by the child and the parent matched. Further analysis will enable matching of the perceived competency (children and parents) with the actual competency as determined from practical testing.

DISCUSSION AND CONCLUSION

This study was the first to provide empirical evidence of the actual swimming competency of a large sample of primary school children in Victoria, Australia. It is evident from this research that a substantial portion of children do not have the level of swimming competency expected of children leaving primary school to assure their safety around water. Some children and parents do not have the capacity to accurately identify the child’s level of swimming competency and hence some of these children are vulnerable. Competence in swimming and water safety, combined with accurate perception of competency, is important as a drowning prevention strategy. Outcomes from this study could inform future aquatic programs to enhance both competency and accuracy of perceptions.
BACKGROUND

For decades, aquatics education focused on swimming skill progressions to prevent drowning but without a clear definition of basic water competency. The American Red Cross Scientific Advisory Council (SAC) Aquatics Sub-Council surveyed other national and international organizations' requirements for deep water use. It defined basic water competency skills needed for water safety and survival as:

- **Entry** – with total submersion
- **Recovery** to surface and remain at least 1 minute (floating or treading)
- **Orientation** – position to be able turn 360 degrees and orient to exit
- **Propulsion** – level off and move on front and/or back position for at least 25 yards
- **Exit** from water

Water competency is influenced by conditions of the aquatic environment (water temperature, movement, depth, clothing, distance, etc.) into which the person may be introduced. Demonstration of skills in one aquatic environment may not transfer to another.

In 2013, this definition was adopted by the SAC. Since then, the American Red Cross has integrated the concept and definition holistically in its Aquatics training and public education efforts to reach the various audiences served.

RESULTS

This initial definition of water competency has provided a set and sequence of skills that constitute an objective performance baseline for American Red Cross aquatics training, which provides a clear threshold goal for educational programs and students learning to swim and be safe in and around water.

The integration of the basic water competency definition throughout our educational and training provider network as well as outreach to the general public outreach has helped:

- Realign the skills and knowledge in the American Red Cross Learn-to-Swim program for children and adults such that these skills can be achieved within the levels before enrollments begin to drop.
- Inform parents of what it means to be able to swim and track their child’s progress with a Swim app.
- Establish a standardized basic swim test implemented by management and lifeguards at aquatic facilities throughout the United States and for prerequisite skills for entry into higher-level Red Cross training.
- Provide the basis of market surveys to measure the public’s understanding of what it means to be able to swim.
- Serve as a clear and understandable set of skills for use with the media in water safety and drowning prevention stories.
- Guide policy recommendations and goals in initiatives, such as the Red Cross Aquatics Centennial Campaign.

DISCUSSION

This definition of water competency has been integrated into knowledge and skills attained through participation in our training programs. This basic definition has been succinct and easy to present verbally and in print for training professionals, outreach to the general public and raising awareness through the media. The concept of water competency continues to be refined and expanded beyond skills, addressing knowledge and complex behaviors. Our incorporation of water competency swim skills provides a template of how to incorporate these expanding concepts. Expanded definitions/concepts may be more challenging to explain, use and integrate into educational materials and across all audiences.
INTRODUCTION
A variety of factors affect the learning of beginning swimming skills. The age of children generally affects progress, rate of learning and, in any given period of time, the final result. The level at which they start is at least as important as age. Age and starting level are intricately related. Other things being equal, as children get older, they accumulate experience which is advantageous to learning. They start at a higher level of ‘readiness’. Thus on average, six year olds start at a higher level than five year olds. This is not always the case and many five year olds are already ahead of those one year older, suggesting the influence of exposure/experience.

AIMS
The aims of this study were to examine the effects of age, gender, teaching frequency and starting skill level on the learning of beginning swimming skills. Learning was described by final achievement level and progress.

METHOD
One hundred and thirty seven (137) five and six year old children from 13 different kindergartens participated in the study. One hundred sixteen (n=116) met the inclusion criterion of fifty percent or more participation. Eighteen hours of instruction was conducted, either once or twice per week with half of the children in each frequency group and equal numbers of each gender. The teaching progression of 25 skills also served as the assessment tool. A single head instructor made all decisions about success on any skill item. Instruction was conducted by assistants and coordinated by the head instructor. Starting level was assessed on the first day of instruction. Final achievement was considered to be the total number of items mastered (0-25). Progress was considered to be the number of items mastered minus the number indicated by the starting level. Goodman-Kruskal’s gamma coefficient was used to correlate starting level, age and teaching frequency with both final achievement and progress. The influence of gender was calculated by Cramer’s coefficient.

RESULTS
Almost no relationship was found between gender and either final achievement or progress. The Cramer correlation coefficients were 0.09 and 0.04 respectively. The actual levels achieved were nearly identical. Teaching frequency also related poorly (gamma 0.20 and 0.11 respectively). Age related moderately to achievement and progress with gamma coefficients of 0.38 and 0.29 respectively. The learning curves were parallel and both the starting level and the final levels were approximately two points on the assessment scale greater for the six year olds than for the five year olds. Start skill level related quite well to both achievement and progress with gamma coefficients of 0.87 and 0.75 respectively.

DISCUSSION AND CONCLUSION
That final results related poorly to gender was expected. A poor relationship to teaching frequency might be explained by the low number of subjects and/or that once and twice per week were not sufficiently dissimilar. Starting level clearly related highly to both final result and progress. This confirms the conventional wisdom that every effort should be made to increase the level of readiness before formal teaching commences.
In 2007 the International Life Saving (ILS) adopted the Position Statement for Swimming and Water Safety Education. This ILS Position Statement noted that "evidence is rapidly accumulating that a basic level of water safety knowledge, coupled with a basic level of swimming skill (often called survival swimming) is sufficient to prevent most drowning episodes”.

Again in 2007 ILS adopted the broad definition of swimming in a water safety context as being “a person should be able to know how to and actually move in water using any mode of propulsion that maintains head above the water.” In adopting this broad definition ILS noted that further guidance was needed on what is meant by the term “basic level of swimming skill” (since re-titled ‘basic aquatic survival skill’) that would lead to a person having an improved level of water safety skill.

Swimming & water safety education was a theme of enquiry during the World Conference on Drowning Prevention 2011 in Vietnam. A Position Statement was developed and approved by the ILS Education Committee in 2012.

In November 2014, the World Health Organization (WHO) released the first comprehensive report on drowning – the WHO Global Drowning Report: Preventing a Leading Killer. The report's focus was on drowning in low and middle income countries among children and young people. It identified the global burden of drowning as among the 10 leading causes of death of children and young people in every region of the world, with children under 5 years disproportionately at risk and males twice as likely to drown as females. Ten actions that can help prevent drowning were identified in the report. The third action was to “Teach school-age children basic swimming, water safety and safe rescue skills.”

Swimming ability, or lack thereof, has been the cause of much debate among the drowning prevention community, whether as a risk factor in drowning or as a protective factor in preventing drowning. Throughout the debate research has pointed to increases in risk taking behaviour, while others have described the potential benefits as a population wide strategy but urged further studies to establish a clear link to drowning prevention. An absence of swimming skills has been identified as a contributing factor in drowning in minority groups in High Income Countries (HICs).

In 2008 the World Report on Child Injury Prevention rated a set of interventions according to the strength of evidence supporting their potential impact on reducing drowning. The report stated the need for intervention studies to measure the effectiveness of swimming lessons in preventing drowning prior to recommending them as a drowning prevention strategy more widely.

Several studies describing drowning risk factors in children in low and middle income countries (LMICs) identify the absence of swimming skills as a significant drowning risk factor. Those same studies and others have proposed teaching school aged children basic survival swimming skills as an intervention to prevent drowning in children over 5 yrs of age.

Research presented at the World Conference on Drowning Prevention 2011 showed a significant reduction in drowning risk in Bangladeshi children as a result of teaching survival swimming skills, coupled with community drowning risk reduction programs, delivered in a structured and well supervised manner. The basis of this intervention is further described in a report by The Alliance for Safe Children and UNICEF.

In the WHO Global Report on Drowning, evidence was provided on the effectiveness of drowning prevention programmes in low and middle income countries. The SwimSafe programme – a regional, basic swim skills training program operating in Bangladesh, Thailand and Viet Nam was cited as an example. Specifically, the study of SwimSafe Bangladesh was reported as demonstrating a significant reduction of drowning following basic swimming and water safety training for children aged 4-12 years.

Some Governments and many NGOs are actively promoting the use of survival swimming as a drowning prevention intervention in LMICs, further reinforcing a need for clear guidance on the nature and format of programs in basic aquatic survival skill.

The Position Statement (attached) is a first draft of a revision to the Position Paper developed and approved by ILS Education Committee - 06/11/2012. New research has been incorporated into this draft of the Position Statement including but not limited to the 2014 WHO Global Report on Drowning. Numerous papers, posters and workshop discussions informed the development of this position statement.
BACKGROUND
While drowning continues to be a leading cause of unintentional injury death in the United States, access to swimming, an evidence-based prevention strategy, is not available to some populations because of preferences or requirements for single gender water recreation. Facilities, agencies and governmental bodies in Seattle and King County USA have worked together over ten years to increase availability of and access to single gender water recreation opportunities.

METHODS
Initially, single gender swims for women only were offered as part of private swim rentals in partnership with community organizations that serve women who needed to swim in single gender environments. Women were surveyed to assess satisfaction and features that were important to them. In addition, a focus group was held to determine what would facilitate access and what would be barriers to participation. At the same time, a diverse group of stakeholders including pool managers, community clinic physicians, hospitals, public health, community organizations and members from the community came together to educate policy makers and community pool operators about the importance of having single gender swim programs and how to create a welcoming environment. ChangeLab Solutions, a national public health policy agency, was consulted for legal review to help craft messaging that would help make single gender swimming acceptable. This included equity in access to water recreation.

RESULTS
In 2011, two public pools offered single gender swims through private rentals. City and independent pool policies did not allow single gender opportunities during public swim times. By 2016, the City of Seattle and one other city in King County passed policies allowing single gender swim programming, for both swimming lessons and water recreation. Seven pools in the county now offer single gender swimming to the public on a weekly or bimonthly basis, including two YMCA pools that waive membership fees for anyone wanting to attend. All but one pool offer both lessons and open swim times. One pool has to limit attendance due to the popularity of the class.

DISCUSSION AND CONCLUSION
The highly successful program and policy change was based on work at pool facilities and the public parks departments and advocacy by community organizations, user groups and health care organizations. Keys to success included careful messaging that was focused on health equity and the drowning prevention and physical activity benefits of swimming. Messaging related to equity and access has reinforced the policy change which has been challenged in both public jurisdictions that currently offer single gender swims. Offering both a men and a women’s single gender swim for equal amounts of time has been one way to address perceptions of unequal access. Pool managers worked together on how to address challenges such as safety risks when women wear loose, full length clothing, covering windows, culturally mindful staffing, allowing adequate time to allow for women (or men) to leave the facility before the other gender arrives, affordability, partnering with community organizations and clinics to promote classes, age of children allowed, and information in multiple languages.
From swimming skill to water competence: towards a more inclusive drowning prevention future with Red Cross Swim.

This presentation will demonstrate how the Canadian Red Cross will support the statement: from swimming skill to water competence.

Throughout Canada, there exists a variety of ‘learn to swim’ programs that range from safety focus to preparation for competitive and recreational water sports. The Canadian Red Cross has invested over 25 years of analysis of the circumstances of unintentional water related deaths in Canada. By analyzing the equipment, environment and personal factors in each death, we are able to identify a set of skills and knowledge that provide the opportunity to prevent water-related injuries and fatalities. Using the Haddon Matrix, Red Cross Swim organizes the content by skills and knowledge required to Prepare! Stay Safe! and Survive! an aquatic incident.

The Red Cross Water Safety Program is structured to teach all ages; Parent & Tot, Preschool, School Age, Teens and Adults. The focus of the program is to enable participants to develop the skills, knowledge and behaviours needed to support a water safe attitude while having fun in, on and around the water.

To support the development of a water safe attitude, the Red Cross Swim program includes many of the water competencies. Water Competence is defined as the sum of all personal aquatic movements that help prevent drowning as well as the associated water safety knowledge, attitudes, values, judgment and behaviours that facilitate safety in, on and around the water (Moran et al., 2016).

The most recent addition to the program is in alignment with a focus on water competence. Over a 20 year span, unintentional falls into water accounted for close to 20% of water related fatalities to address this circumstance, in 2014, Red Cross Swim started including specific water safety skills while wearing a light layer of clothing. This contributes to Water Competency as the swimmers will be taught the swimming skills and water safety knowledge required but if they were to still fall unintentionally into the water they would know what that experience felt like therefore have a better ability to prevent them from getting into a drowning situation.

The CRC has identified areas to improve on Water Competence: Clothed in Water for the variety of seasons – more exposure in swim lessons, inclusion of local Hazards by community and Coping with Risk – how to specialize recognition of the risks and avoid them through judgement and personal actions.

By improving the water competence areas within the Water Safety Program, the Canadian Red Cross will move towards a more inclusive drowning prevention future.
LEARNING TO SWIM: WHAT INFLUENCES SUCCESS? AN EXAMINATION OF DATA FROM AUSTRALIA

Associate Professor Richard C. Franklin1,2, Ms. Amy E Peden1,2, Mr. Sean Hodges3, Mrs. Nicole Lloyd3, Mrs. Penny Larsen1, Ms. Cherry Bailey3, Mr. Justin Scarr1

1Royal Life Saving Society - Australia, Broadway, Australia, 2James Cook University, Townsville, Australia, 3Royal Life Saving Society - ACT, Deakin, Australia

Swimming 2, Salon 1, October 17, 2017, 1:30 PM - 3:00 PM

INTRODUCTION

Teaching school-aged children basic swimming, water safety and rescue skills is a key drowning prevention strategy (1), however little research has been conducted into what children can achieve and what influences their ability to learn these skills (2).

AIMS

Using data collected from a school-based swimming and water safety program in Canberra, ACT, Australia this study aimed to explore if children can achieve the levels set out by the Water Safety Education Competency Framework and what factors influence or limit achievement of these levels.

METHODS

Data was collected for children 5-12 years from enrolment forms for the 2009-2011 Swim and Survive program, for children participating in the program. The enrolment form collected a child’s age, sex, postcode (used for remoteness and socio-economic classification), pre-existing medical conditions, home pool ownership and frequency of interaction with different aquatic environments. Data was also collected on children’s previous bad experiences around water which may impact upon instruction. This information was analysed against level achieved in the swimming program and chi-square and ANOVA analysis was conducted to determine factors deemed to have a significant impact on achievement.

RESULTS

There were 7,726 participants with the minimum data records required for analysis, 51.3% were female, 3.5% were Aboriginal and/or Torres Strait Islanders, 76.2% were from the public school system, 10.3% had some kind of pre-existing medical condition. Children more likely to achieve a higher level were older, female, attended private school, swam at least once a fortnight, had a swimming pool at home or visited a public swimming pool. Those less likely were Aboriginal & Torres Strait Islander, had a previous negative experience and swam less than once a fortnight.

DISCUSSION

Age has a major impact on a child’s ability to reach a new skill level; with each year a child ages showing a 2.5 times greater chance of achieving the minimum benchmark (Level 4 or above). Participation in aquatic activity also has an impact, with this study showing the more time a child spends in the water, the more likely the child is to achieve the benchmark. Extra support should be provided to Aboriginal and Torres Strait Islander children and public school attendees.

CONCLUSIONS

Swimming and water safety skills are vital skills that all children should learn. This study highlights factors that inhibit some children’s abilities to reach the minimum benchmark. This provides strength to the argument that educators and policy makers ensure all children receive compulsory swimming and water safety education during the primary school years.

ACKNOWLEDGEMENTS

This research is supported by the Royal Life Saving Society - Australia to aid in the reduction of drowning. Research at the Royal Life Saving Society Australia is supported by the Australian Government.

REFERENCES

BACKGROUND
Lifeguarding as a profession involves large periods of static inactivity and short bursts of excitement, high adrenaline and stressful action. Lifeguards have been shown to display similar personal qualities to those in the emergency services, perhaps based on the life and death, risky aspects of the job. A thrill-seeking personality type has been suggested to coincide with lower levels of trait anxiety, a characteristic likely to be beneficial for lifeguards who must react effectively in stressful situations. Despite the potential for high levels of psychological demand among the lifeguard profession, little research has been conducted to explore the levels of anxiety and emotion that lifeguards experience.

AIM
This study aimed to compare pre-competitive anxiety and emotional regulation techniques among lifeguards and non-lifeguards, in this case competitive swimmers.

METHODS
A sample of 100 participants (mean age 19.7 years) were conveniently selected from competitive University swimming events in the UK in 2013/14. Non-lifeguards (N=46; 21 males, 25 females) who were competitive swimmers and lifeguards (N=54; 33 males, 21 females) who were competitive swimmers and held a lifeguard qualification, were compared. The Emotion Regulation Questionnaire, Sport Anxiety Scale–2 and the Mental Readiness Form–3 were completed by participants as close as possible prior to their competitive event. A Pearson’s correlation was conducted to determine the level of agreement between the SAS-2 and MRF-3 subscales. Independent sample t-tests were performed between the questionnaire subscales to determine any significant differences between the lifeguard and non-lifeguard groups.

RESULTS
There was a significant correlation between the SAS-2 and MRF-3 subscales (r=0.36 to 0.73, p<0.01). On the MRF-3 subscales, non-lifeguards displayed significantly higher levels of cognitive anxiety (p=.01) and somatic anxiety (p=.02) than lifeguards. Similarly, on the SAS-2, non-lifeguards showed significantly higher levels of worry (p<.01) and somatic anxiety (p<.04) than lifeguards. However, neither questionnaire displayed significant differences in self-confidence between the two groups. The ERQ highlighted that non-lifeguards displayed less suppression than lifeguards (p=.07), a result approaching significance. When considering gender, no significant differences were observed, with the exception of female lifeguards who were found to use more suppression (p=.05). However, male non-lifeguards reported higher levels of cognitive anxiety (p=.01) and somatic anxiety (p<.01) than male lifeguards.

DISCUSSION AND CONCLUSIONS
Lifeguards demonstrated lower levels of precompetitive cognitive anxiety and somatic anxiety than swimmers, and also displayed more suppression than swimmers. Major differences between the two experimental groups were observed to be predominantly a result of the male responses, suggesting a greater difference between male lifeguards and non-lifeguards in pre-competitive anxiety. This study supports suggestions that lifeguards may demonstrate certain trait characteristics which contribute to them displaying less anxiety in stressful situations, enhancing their fit for the requirements of the job which necessitates anxiety management to support decision-making under pressure. However, it is still unclear if there is a natural personality trait amongst lifeguards drawing them to the lifeguarding role and influencing this reduced level of anxiety, or whether lifeguard training encourages the lifeguards to demonstrate lower anxiety levels when dealing with apprehensive situations.
INTRODUCTION
It is widely known that competitive sports are accompanied by pre-competition stress and anxiety. We also know that athletes can develop skills in forging stress into positive factors. The author of this paper set out to test changes in the feeling of anxiety and stress for young swimmers. Nearly 350 respondents took part every March in the National Championships.

OBJECTIVE
The purpose of this study was to prove whether there are differences in the perception of anxiety and stress, depending on the age of the athlete. The study also intended to answer the question of how the perception of anxiety and stress changes with increasing length of training. For this purpose, they studied swimmers (born in the same year -2000) who were tested for three consecutive years during the National Championships.

HYPOTHESES
With increasing age, level of anxiety and stress feeling decreases. Changes in the sensation of anxiety and stress depend on the gender of the athlete.

METHODS
Measuring the value of pre-competition anxiety in the study was made with SCAT questionnaire (Sports Competition Anxiety Test) handed out personally by the author of the study, or through trainers and completed 10-40 minutes before their start. SCAT test was translated and adapted for swimming by the author of the study and includes 15 questions, of which only 10 state the symptoms associated with anxiety. The five elements that are not included in the assessment were used to reduce the likelihood of internal error of respondents.

The results of the study were assessed using the key suggested by the author of the SCAT test. To assess the level of pre-competition anxiety, the author used all individual SCAT results. Participants were divided in the groups described by the level of perceived anxiety: to 16 points - group of low anxiety, a group of 17-23 points with average anxiety and from 24 points up, a group of high state of anxiety.

CONCLUSIONS
Relative anxiety experienced by competitors may be dependent on many factors, and these factors can be operated and evolve. In the context of research and a group of swimmers participating in the competition we found a direct relationship to gender and the result obtained from the SCAT test.

The results of statistical analysis of this study showed that the average value of the pre-competition anxiety index for swimmers of both genders did not change too significantly within three years of research. Nevertheless, it is worthwhile to repeat the study in 2017 and 2018 to verify the results obtained in the long term.
BACKGROUND

The Bangladesh Anchal and SwimSafe (BASS) Child Drowning Prevention Research included a community-based first response system, with CPR training. In the early BASS Child Drowning Prevention Research participants aged 10 years and over demonstrated that they could successfully learn CPR and retain the skills over time. This provides secondary prevention skills to children in high drowning risk communities.

A BASS Child Drowning Prevention Research activity provided children 4 years old and over, basic swimming and safe rescue skills. Follow-up research on the children showed that many conducted rescues. The average age of rescuer and rescuee was 9 years and 3 years respectively. Some rescues involved victims without a pulse and respiration. This demonstrated a need for children younger than 10 years old to be able to resuscitate young children.

AIM

The objective of this section of the BASS Child Drowning Prevention Research was to develop a group of young community first responders between the ages of 7 and 9 years to provide first aid and CPR in order to demonstrate whether first responders in that age group were able to provide emergency response in rural Bangladesh.

METHODS

Ten community swimming instructors (CSIs) were trained to teach first aid and CPR to children 7-9 years. The CSIs participated in a two-day intensive training-of-trainers activity. A standard first aid course, including CPR was taught to the children using child manikins following swim training in the SwimSafe program.

RESULTS

A total of 811 children age 7-9 years participated in the training programme. The male:female proportion was 51.2 percent and 48.8 percent. A total of 82.5 percent of participants passed the first aid and CPR certification process. Passing rates were similar for both sexes and the highest passing rates were noted in 7 year old boys (85.0 percent) and girls (87.0 percent).

CONCLUSIONS

Children aged 7-9 years old can learn the skills of first aid and CPR. Further research is needed to demonstrate that skills are retained over time and that once trained, these young children can provide successful first response activities in emergencies that include CPR.
A TWELVE YEAR RETROSPECTIVE ON MANITOBA’S NORTHERN & REMOTE WATER SMART PROGRAM

Dr. Christopher Love¹

¹Lifesaving Society - Manitoba Branch, Winnipeg, Canada

BACKGROUND
Since the summer of 2005 the Lifesaving Society - Manitoba Branch’s Northern & Remote Water Smart® Program has served First Nations, northern and isolated communities in Manitoba. Historically, the northern and remote regions of the province, especially First Nations communities, showed a statistically higher drowning death rate than the rest of the province; at times reaching approximately five times the national average. In an effort to reduce the toll of death and injury, a three part program was developed in a response to a request from the provincial government. For the first year of the program, the Society undertook to employ one instructor to provide Swim to Survive® survival swimming instruction, Emergency First Aid Training, and Pleasure Craft Operator Training (through the Society’s B.O.A.T program) in six northern communities. Since that time the program has expanded to the point where five to seven instructors and a program coordinator are employed and between 32 and 40 communities are visited every summer. More importantly, drowning deaths have declined in the targeted areas of the province, and the overall drowning rate has declined by over twenty percent.

AIM
The presentation will illustrate the lessons learned from the first 12 years of the program and how these lessons can be applied to other locations.
BACKGROUND

Drowning, a major public health concern, disproportionally affects children and minorities in Washington State. However, information on the design and implementation of water safety education programs is sparse. Community Health Educators from Seattle Children’s Hospital (SCH) designed and conducted a Water Safety Education and Lifejacket Giveaway Program for parents of preschool aged children from culturally and linguistically diverse backgrounds.

INTERVENTION

SCH partnered with Head Start early childhood education centers in Seattle, WA to recruit parents of children enrolled in Head Start Preschools. The program was designed employing Fishbein’s integrated model for behavior prediction and evidence-based water safety recommendations and behavior practices. The intervention consisted of a one-hour presentation to parents on risk factors for drowning; water safety tips; and information on local water recreation opportunities. Health Educators conducted the sessions using printed slides with pictures, translated text, and physical demonstrations with native-speaking Head Start interpreters in English, Spanish, Vietnamese, Mandarin, or Aramaic. Parents and children in attendance received free appropriate-sized lifejackets and practiced proper fitting.

PILOT EVALUATION

Evaluation of this program used mixed method measures to identify (i) safe water practices among participants; and (ii) facilitators and barriers of behavior change. Pre- and post-program surveys were administered immediately before and after the education programs. In 2016, follow-up phone surveys were used to expand on participant safe water behavior practices, skills, attitudes and intentions.

RESULTS

Pre- and post-program surveys were collected from 90 parents who participated in 2015 and 2016 programs. Pre-program survey: most parents (73%) reported confidence in keeping children safe around water, but 48 (53%) reported they did not know how to swim. Language group was associated with self-reported parent swim ability and confidence of keeping one’s child safe (English speakers OR 4.6 and 3.34, respectively). In post-program surveys, 87 parents (97%) reported feeling more confident keeping children safe around water as a result of the program; over 90% of parents responded “yes” to all questions regarding future intention to practice water safety behavior. Follow-up phone surveys, completed for 41 of 82 (50%) 2016 parents identified registration processes and lack of time as barriers to accessing swim lesson, and obtained recommendations for program improvement. The majority (62.7%) of a subgroup of follow-up respondents reported having used the lifejacket themselves, and 82.9% reported their children had used the lifejacket received.

DISCUSSION

Strategic use of health behavior theory in water safety education intervention design was helpful for constructing the program. The importance of multi-lingual delivery emerged in implementation and evaluation results. The role of partner Head Start preschools was critical to the program’s success in terms of logistics and participant recruitment. Limitations in the pre-post data restricted evaluation measures of the program’s effectiveness on self-reported safe behavior intention, self-efficacy and attitudes. Challenges in evaluating programs for this population include loss to follow-up and responses influenced by social desirability bias in post-program surveys. Findings relating to lifejacket use, perceptions of self-efficacy, barriers to behavior changes and the relationship between language and key variables will aid further program improvement for future delivery.
ADAPTING A SURVIVAL SWIMMING PROGRAMME: CHALLENGES AND SOLUTIONS FOR SUCCESSFUL DELIVERY OF ‘SWIM FOR SAFETY’ IN SRI LANKA

Ms. Jeewanthika Ekanayaka1, Mr. Asanka Nanayakkara2, Ms. Rhiannon Birch3, Dr. Bernadette Matthews4, Professor Samath Dhamminda Dharmaratne5, Mr. Mevan Jayawardena6, Ms. Liz Tesone7

1Dept. of Nursing, Faculty of Allied Health Sciences, University of Peradeniya, Peradeniya, Sri Lanka, 2Life saving Association of Sri Lanka, Mount Lavinia, Sri Lanka, 3Life Saving Victoria, Melbourne, Australia, 4Life Saving Victoria, Melbourne, Australia, 5of Community Medicine, Faculty of Medicine, University of Peradeniya, Sri Lanka/ Institute for Health Metrics and Evaluation (IHME), Department of Global Health, School of Public Health, University of Washington, USA, Peradeniya, Sri Lanka, 6Life Saving Victoria, Melbourne, Australia, 7YMCA, Melbourne, Australia

BACKGROUND
Drowning is the second highest cause of unintentional injury death in Sri Lanka, with a rate of 4.4 deaths per 100,000 population. Lack of swimming ability has been identified as a major contributor to drowning. In response, the Swim for Safety (SfS) programme was developed to improve students’ basic swimming and water safety skills.

The programme was conducted in Sri Lanka by Life Saving Victoria, in collaboration with Life Saving Association of Sri Lanka (LSASL), CandleAid Lanka and YMCA, the 12-lesson programme was delivered to 1285 school children aged 10-16 years between January 2016 to 2017, in Colombo, Galle, Rathnapura and Puttalum districts.

AIM
To evaluate the effectiveness of a SfS programme in Sri Lanka, including identification of perceived challenges and enablers for participation.

METHODS
The SfS programme was based on a proven ten-lesson survival swimming programme developed for Victoria, Australia. An iterative review process was used to adapt it for a Sri Lankan context via two trial programmes conducted in 2015 with feedback and interviews with swim teachers, monitoring student skill development, and LSASL adapting practical activities. The adapted programme was evaluated through a qualitative, semi-structured, interviewer administered questionnaire administered to 30 SfS swim teachers and lifeguards.

RESULTS
The review recommended the following changes to improve student skill and knowledge outcomes:
- increasing the duration to 12 lessons
- adapting lessons to suit risk-assessed open water environments
- increasing time spent on water familiarisation, floating and propulsion for the high proportion of non-swimmers
- localising the environments used in practical scenarios (e.g. reservoirs, wells).

Following programme roll-out 73.6% of enrolled students completed the programme in the study period. Focus groups revealed practical barriers affecting programme delivery including: a lack of public swimming pools; prohibitive booking costs for private pools; defining safe locations in open waterways; lack of trained personnel and support volunteers; and travel difficulties for families and staff. In addition, gender considerations and the ‘survival swimming’ focus, rather than ‘swimming as a sport’ were raised by some parents.

Many of the identified barriers were overcome through minimising costs by locating safe open water environments following risk assessments, and parent buy-in to transport groups to lessons. Provision of an achievement certificate and providing clear explanation of the purpose of SfS were additional motivators for participation. To accommodate the demand, additional programmes were delivered by coaches travelling from other districts, with assistance from extra volunteer lifeguards.

DISCUSSION/CONCLUSION
The programme’s successful implementation was facilitated by enormous interest among local families with demand commonly well-exceeding available places. Despite the practical challenges in delivering SfS, programme personnel and families are developing countermeasures to address the identified issues. Recommendations for future programmes include:
- promoting survival swimming as a crucial life skill to schools and parents
- increasing the number of trained teachers and volunteer lifeguards
- seeking cost effective solutions, particularly in securing swimming pools as programme venues.

ACKNOWLEDGEMENTS
South Asian Gateway Terminal for funding the programme
INTRODUCTION
In Vietnam, an average of 32 children per day die from drowning*, making it the leading cause of accident-related deaths amongst children (ages 0 – 19) in the country. The World Health Organization has suggested 10 actions to reduce drowning; among those recommendations is an emphasis on survival swimming skills and water safety education. In an effort to generate awareness as well as scaffold the development and implementation of widespread drowning prevention interventions, Swim Vietnam, an INGO based in Central Vietnam, developed a stand-alone water safety classroom-based education program. Through implementing this program, they have been able to increase their reach by over 1,000% since 2013. In 2016 Swim Vietnam expanded their program by partnering with Swim for Life Vietnam, an INGO also located in Central Vietnam. Together these organizations have refined the program, including the addition of an academic research component.

PROGRAM OBJECTIVE
The objective of the Water Safety Education (WSE) Program is to act as an intervention to educate youth in grades 1 to 5 (approximately ages 6 to 10) on the potential dangers associated with water, and provide strategies for remaining safe.

RESEARCH COMPONENT
While the program is clearly gaining traction in Vietnam, the INGO’s also saw the opportunity to bring in global academic experts on drowning prevention to measure the effectiveness of the WSE program as a stand-alone intervention. As such, Dr. William Ramos, Dr. Linda Quan and Dr. Aminur Raman are collaborating with the INGO’s to evaluate its capacity to convey knowledge about positive water safety practices and ultimately reduce youth drownings.

METHODS
The intervention program is delivered in primary and secondary schools through an interactive, 45 to 60 minute verbal and visual presentation. Information is conveyed by instructors who have received training to ensure consistency and reliability. Administration of an in-class computer based pre and post assessment provides a means for evaluating student learning outcomes. By assessing student knowledge acquisition, continued improvements can be made to the training and delivery of the WSE program to improve its efficacy. These data also provide critical information to the participating schools through comparative analyses.

DATA COLLECTION
Swim for Life Vietnam created and employed a cloud-based platform to host the pre/post assessment. This allowed for ease of implementation across schools in Vietnam, and gave access to real-time data. Reporting and analysis of learning outcomes was found to be more efficient through the use of such a platform.

RESULTS
Data acquired included a total sampling of N= 129,861 which was based on n = 10,725 pre-assessments with n = 19,136 post assessment completed in the follow up (note: some pre-assessment data was lost due to a cloud storage issue but may be available at a later date). Statistical averages were used as a mediator to understand a summary of the data. Demographic variables used for comparative analysis included: (a) name, (b) level/grade, (c) school, and (d) region. A Pearson Chi-Square test between the repeated measure scores indicated that there was a significant difference between the pre- and post-survey data in a positive direction (p = <.001). This provides support that the intervention is having an impact on improving overall knowledge about water safety topics presented. When the analysis was broken down further comparing scores by those who could be paired directly by participant name (n = 2282) an overall significance to the positive was also acquired (p = <.001). Analysis broken down by individual question showed that several were not significant towards the desired response. These questions will need to be examined for reliability and validity to see if they appropriately measure the corresponding intended safety message or if the messages themselves need restructuring.
BACKGROUND

Drowning is one of the leading causes of injury death in children aged 0-14 in Victoria, Australia (1). Whilst swimming and water safety lessons have been recognised as a drowning prevention strategy, research conducted by Life Saving Victoria (LSV) found that teachers estimated 60% of students aged 11-12 years could not swim continuously for 50 metres, and 40% could not float continuously for more than 2 minutes (2). The research also identified that schools encounter many barriers to offering such programs including: crowded curriculum; high demand on classroom time; and high cost of instruction and transport. Currently in Australia, not all children have access to swimming and water safety lessons and consequently a large percentage of children leave primary school without the skills and knowledge to be safe when in, on, or around water.

AIM

The Survival Swimming Program was an evidence-based program designed to address a gap in providing basic swimming & water safety skills and knowledge to primary students. Designed for delivery via primary schools as a ‘safety net’ option for 11-12 year old students most likely to miss out, the Program aimed to address the lack of swimming competency in this group, increase community resilience, reduce drowning death and injury in Victoria.

METHOD

Program content was developed based on a review of data, academic literature and approaches to swimming and water safety in Australia and internationally. Synthesis of this material resulted in a program, aligned to the Victorian school curriculum, which contained 10 sequential lessons designed to address the key elements of survival swimming. Two program trials were conducted and an iterative process was used to develop the Program, with each version undergoing rigorous evaluation including: swim teacher training pre-program; student practical assessment pre- and post-program; self-report surveys; and focus groups. The evaluation process was completed with a consultative peer review of the Program.

RESULTS

The Program has been successful in improving the swimming competency of participating students. For example, the proportion of students able to swim 50 metres continuously increased 11% and overall increases in CPR, lifesaving skills, confidence in water and lesson enjoyment (3). The impact of the program on non-swimmers was also significant: 56% swam at least 50 metres continuously, including 25% that swam 100-300 metres; and 50% completed a survival sequence whilst fully clothed (4). There has been overwhelming support for the Program from school teachers, swim teachers and parents all indicating that they would recommend the program.

DISCUSSION/CONCLUSION

Primarily targeted at those students with no or little swimming competency, the Survival Swimming Program is designed for use by the Victorian education sector and aquatic industry. The Program supports the goals of ‘survival swimming’ in that it provides students with the knowledge to keep themselves and others safe in, on & around water and ‘the skills to survive an unexpected fall into open (deep) water’ (5). Incorporating survival swimming skills and knowledge contributes to improved self-awareness, good decision-making and leadership, all aimed at building a student’s personal resilience.

Every child should have the opportunity to learn vital survival swimming skills regardless of location, physical capability, cultural background and socio-economic circumstances. The Program develops basic aquatic competencies and the foundational skills and knowledge taught through the Program are designed to further enable students to progress to ‘learn- to-swim’ programs.

REFERENCES

Parents and teachers have the responsibility to teach children those competences (i.e., skills, knowledge & attitudes) that are essential to move and behave safely in (a) water and (b) traffic. Therefore, diverse campaigns and school-based programs are often part of a broader health education or injury prevention approach. In our contribution, we will compare water and traffic safety education programs for primary and secondary school children focussing on motor skill tasks and risk communication in Flanders (Belgium) and the Netherlands.

The aim is to enhance practitioners' and researchers' knowledge on both motor and cognitive dimensions of water and traffic safety education, including objectives (O), teaching behaviour (T), learning behaviour (L) and learning outcomes (O). With respect to the analysis, special attention will be given to the triangular model with three interacting constraints: individual, task and environmental conditions as suggested by Langendorfer.

In current water safety programs, there is a lack of alignment from objectives over didactical approaches to learning outcomes. The objectives are often too vague and focusing on isolated aspects of water competence instead of combining skills, knowledge and attitudes. Until recently, water competence was often determined by the stroke and distance children can swim in a pool, thus missing all other relevant actual and perceived skills as well as transfer of context related to water safety. There also seems to be an underrepresentation of the ‘environmental constraints’ compared to traffic education, where the environment is explored in a more progressive curriculum and by clear instructional strategies. The comparison of these two areas (i.e. the aquatic and traffic environment) should lead to a more effective strategy for both motor skills facilitation and risk knowledge in safety education. Advice will be given for complementary research topics and designs in the pedagogic, sport and recreation sector because water safety education is relevant in each of these domains.
A STUDY ON THE EFFECTIVENESS OF PUBLIC SAFETY SWIMMING EDUCATION ON THE PREVENTION OF DROWNING

Mr. Eunho Shin¹

¹Lifesaving Society Korea, 1505ho, 2cha Is Biztower, 23, Seonyu-ro 49-gil, Yeongdeungpo-gu, Seoul, Korea, South Korea

Swimming 4, Salon 1, October 18, 2017, 11:00 AM - 12:30 PM

AIM
The purpose of this study was to research and develop a swimming safety education program as a systematic drowning prevention education program and thereby, verify its effectiveness. The swimming safety program was developed in cooperation with Lifesaving Society Korea.

METHODS
For this study, the elementary school children in Seoul and Goyang were sampled to be subject to the swimming safety education program for the period from April 23 to October 18, 2016; thereafter, the sample children were subject to a questionnaire survey.

FINDINGS
As a result of analyzing the data from the survey, it was found that subject children’s level of knowledge about the marine safety improved 44.1% after the education. Their survival skills decreased in case of ‘less than 5m moving distance’, but increased 8.9% in case of 25m moving distance or more. On the other hand, their floating skills decreased 21.6% in case of ‘less than 10 seconds,’ but increased 10.7% in case of 60 seconds or longer. 88% of the children were satisfied with the education program, and 71% of them wanted to learn about the swimming skills, and 70.4% of them wanted to participate in a swimming safety education program on the field.

CONCLUSION
The results of this study can be summarized as follows. First, the swimming safety education program helped to improve children’s level of knowledge about marine safety. Secondly, the swimming safety program could help to improve children’s survival skills by enhancing their capability to cope with a marine emergency. Thirdly, the swimming safety education program should precede the swimming education program. Fourthly, it is deemed necessary to bring up the marine safety specialists and operate a special marine safety education center for an effective swimming safety education. Fifthly, it is deemed necessary to spread the swimming safety education nation-wide, while building a groundwork for prevention of the drowning accidents.
AIM
The purpose of this study was to conduct a Delphi study in order to determine and prioritize future research questions in the area of drowning prevention education in the United States. While drowning injury and fatality rates remain largely unchanged in recent years in the United States, existing research has not developed a supportive foundation in order to identify and promote priority outstanding research questions. Results of this study give an in-depth analysis of priority research questions while providing framework for impactful future research studies and educational programming endeavors.

METHOD
This study will address the following research questions:
RQ1. What do experts in drowning prevention education in the United States identify as research questions needing to be addressed in future research?
RQ2. What priority can be assigned to each research questions on drowning prevention education in the United States?
Sub-RQ2A: What differences in priority exist between experts in practice and experts in scholarship?
RQ3. What themes are present across the identified priority research questions?

DESIGN & METHODOLOGY
This research employed a Delphi method to (1) survey experts to determine outstanding research topics needing to be addressed in the US and (2) seek a consensus on the rating of priority of each research topic. Following the consensus building, a qualitative cluster analysis was completed to highlight related themes among priority research questions, thus providing a framework for future research endeavors.

The Delphi method (a) allowed for complete anonymity of the participants, (b) provided the opportunity for participants to change their views and opinions during data collection process, (c) allowed for an in-depth analysis of the results of the study, and (d) allowed for follow up and validation studies to be completed (Skulmoski, Hartman, & Krahn, 2007). The procedures for the Delphi consensus building portion of the study were informed by the work of Falzarano and Genevieve (2013); Blackwood, Albarren, and Latour (2011); Plüddemann et al. (2010); Bulger and Housner (2007); and Katcher et al. (2006). The procedures for the post-hoc qualitative analysis of the results from the Delphi were informed by the recommendations of Kennedy (2004) who supported the use of qualitative post Delphi method follow up to enhance the applicability and external value of the results.

RESULTS
The results of the Delphi Brainstorming resulted in n=251 responses from n=74 participants. After a qualitative content analysis, n=101 research questions emerged. These research questions were then rated by participants based on their opinion on the priority of each research question. Results revealed 9 high priority research questions and 74 priority research questions. A qualitative cluster analysis was then completed and revealed that research questions represented six distinct groups: (1) Education and Programming Effectiveness, (2) Lifeguarding, (3) Aquatic Policy and Safety, (4) Surveillance, (5) Communication and Public Awareness, and (6) Socio-Cultural and Demographic Factors.
BACKGROUND

Approximately 100 people drown in New Zealand (NZ) annually, which is one of the worst records per capita in the developed world. Traditionally, swim education programs have emphasised learning classical swimming strokes (i.e., freestyle, backstroke, etc.). However, conventional measures of swimming ability may be inadequate when evaluating the skills needed to prevent drowning. A recent review signalled a shared desire among NZ’s water safety organisations to improve the teaching delivery of swimming and survival skills for children given that young people are particularly vulnerable.

AIM

We aimed to (i) assess water skill competency in NZ primary school children (aged 6 -11 years), and (ii) monitor the impact of a 10-week survival skills-focussed education program. Data collection is ongoing and preliminary results are presented here. Participants were 48 children (25 male, 23 female) who volunteered following advertisements circulated at primary schools. Survival skills competency was tested at a 25-m school swimming pool on three occasions; before and immediately after the program, and then 3 months afterward. For each testing session participants attempted seven tasks (see Table 1). The program involved ten 60-min swimming lessons delivered at a local swimming pool. The lessons included survival skills-focussed activities such as getting in and out of the water safely, putting on a lifejacket, swimming underwater, and treading water, alongside traditional learn to swim activities. In addition to the practical lessons, water safety information and basic survival skills were taught to the children at their schools.

Before the education program, the percentage of children achieving a high competency score was typically low (see Table 1). The task with the highest percentage of competent performers was the Propulsion task (38% at Grade 1) whereas the Quiz (15%) and the Perception task (6%) showed the fewest competent performers. In general, competency had improved after 10 weeks of survival skills education (e.g., Quiz and Bouyancy) but these improvements were modest and not statistically significant for all tasks.

RESULTS

This study reveals that NZ children lack a range of survival skills and that further attention to these skills by education providers is necessary. As reported previously, basic swimming competency was low; 62% were unable to swim for 5 minutes or 100 m continuously. However, there was some indication that education of survival skills can bring about improvements. Whilst such changes were modest and limited to certain skills, practitioners can build upon this evidence to better integrate survival skills teaching into their programs.

Table 1: Percentage of children achieving high competency grade (4-point scale) at different phases of the study. The seven competencies are adapted from NZ’s Water Skills for Life campaign (http://www.watersafety.org.nz). * denotes significant difference (p<0.05) from pre-test identified with Friedman’s N related samples tests.
INTRODUCTION
Most drowning occurs in open water. In cases of involuntary immersion, the victim is usually clothed. The ability to swim with clothing is not a given. Even when able to swim moderately well in a swimming costume, there is no guarantee that this will transfer to swimming with clothing. Especially with less skilled persons, the burden of clothing usually causes a decrement in skill.

AIMS
The aims of this study were to a) quantify the decrement in skill when adding clothing, and b) to follow the evolution of this decrement in a cohort, over a four year period.

METHODS
The skill profile which was evaluated was based on a 200 m. combined test which included deep water entry, swim 100 m. on the front, stop and rest for 3 min., swim 100 m. on the back, exit. The test was performed twice by each subject, randomly either first with clothes or first without clothes. The cohort of n=508 Grade 4 pupils, was followed for four years with repeat testing in Grade 6 and again in Grade 8. The difference in total score (max. 12 pts.) between with and without outer clothing, was tested using a paired t - test.

RESULTS
At the first data point (Grade 4), the difference in the total score for the combined test between with and without clothing was found to be non-significant. Many of the pupils were already nearly equally skillful with and without clothing. However, already at this point, those least skillful exhibited a greater decrement when adding clothing. At the second data point (Grade 6), these same children (now more skillful), exhibited a lesser and non-significant decrement when adding clothing. At the third data point (Grade 8, now even more skillful), they exhibited nearly identical scores with and without clothing. Over the four years, a growing number obtained a perfect score of 12 pts.

CONCLUSIONS
Although previous studies conducted within this same program had shown significant differences between skill levels with and without clothing early in Grade 4, most of the pupils in this study were of similar skill already by the end of Grade 4. Among less skillful children and youth, adding clothing seems to cause a decrement in skill, potentially causing an emergency episode. At any given criterion score indicating “can swim”, some children could swim without clothing but could not swim with clothing. As skill increases over time, there appears to be an increasing transfer of skill from without clothing to with; the decrement is reduced. By the time this cohort reached Grade 8 (12 yrs. old), and a considerably greater skill level, adding clothing caused no measurable decrement in skill within the framework of the combined test, for nearly all pupils.

Swimming in clothing should be introduced early. All skills taught should eventually be experienced also with clothes. At some skill level, learners will eventually perform as well with clothes as without. In a drowning prevention context, this should be the minimal level to which we aspire.
BACKGROUND
Water Safety New Zealand’s major policy roll-out in 2017 as the national standard for aquatic education for 5-13 year olds establishes fundamental skills for life-long water safety. New Zealand has one of the highest drowning death tolls in the developed world combined with a declining level of aquatic education through the school system. Water Safety New Zealand has major concerns around the long term correlation between this decline and drowning prevention. A step change is needed to prevent drowning deaths in New Zealand. Based on international research, learnings and best practice, ‘Water Skills for Life’ was developed to target 5-13 year old children, teaching foundational life-long water safety skills. The program goes right to the core to address drowning causation, ensuring children are aware of the dangers, can assess risk, make wise decisions and act using their learned and retained skills. It complements traditional swimming education whilst challenging the notion that learning to swim = water safety. The program teaches a broad set of twenty-seven core skills integrated into existing aquatic education programmes. It includes evidence-based education, with emphasis on those most vulnerable and at-risk communities, providing life long enjoyment in the water in a country where participation in water-based activities is a core part of the culture.

AIMS/OBJECTIVES
• Water Skills for Life to be the basis for aquatic education in schools.
• Strengthen curriculum requirements for aquatic education through Ministry of Education.
• All children learned and retained all the skills by 13 years old.

METHODS
• All aquatic training providers – Swim providers, Regional Sports Trusts, Councils, Schools, Teachers.
• Integrated into existing programmes, complements traditional swimming methods.

EVALUATION
• Competency sign-off and data capture by providers.
• All children have all the skills by 13 years old.

DELIVERABLES
• Life-long foundational skills and ability to stay safe in, on and around water
• A reduction in New Zealand’s drowning death toll

CONCLUSION
• Water Skills for Life – investing at the right end of the system
• Addresses drowning causation as the underpinning concept and the relationship between declining aquatic education and drowning deaths

ACKNOWLEDGEMENTS
• Swimming New Zealand, Advisory Group of New Zealand sector-wide experts
• International research and best practice
• Dr. Kevin Moran - 2015 New Year’s Honours awarded the Officer of the New Zealand Order of Merit (ONZM) for “services to water safety and lifesaving”.

ORAL PRESENTATION
WATER SKILLS FOR LIFE - FUTURE PROOFING DROWNING PREVENTION
Mr. Jonty Mills¹
1Water Safety New Zealand Inc., Wellington, New Zealand
Swimming 5, Salon 1, October 18, 2017, 1:30 PM - 3:00 PM
BACKGROUND

Drowning is a leading cause of injury death in children. Between 2000/01 and 2014/15, there were 34 deaths, and 265 hospital-treated non-fatal drowning incidents in children aged 5-14 years in Victoria, Australia. Recent coronial findings highlighted that water competency remains a risk factor in drowning in primary school aged children. This life stage is a critical time to learn new skills and lifelong behavioural patterns. Thus early provision of swimming and water safety education (SWSE) is critical, and primary school is the ideal setting to implement such initiatives.

Victoria currently has the lowest spend on school swimming lessons across all Australian Governments. There was limited scope for advocacy to change government policy in this area, given the lack of research to support anecdotal evidence indicating a decline in the provision of school-based SWSE and declining competency. Subsequently, Life Saving Victoria (LSV) embarked on an initiative to expand the evidence base and generate policy change in water safety.

OBJECTIVES

- To develop a framework for delivery of SWSE to primary school aged children across Victoria.
- To generate change in government policy resulting in mandated and funded SWSE in the school curriculum.

IMPLEMENTATION

Over five years LSV worked with stakeholders in education, aquatics industry, government and academia to investigate swimming competency in primary school-aged children. In 2011/12, we undertook research into estimated levels of swimming competency in this group. Teachers estimated 60% of students did not meet national competency levels. Barriers to schools providing SWSE were also identified.

Utilising preliminary findings, funding support was obtained from a philanthropic trust. We then conducted a Pilot Trial in regional Victoria in partnership with Federation University Australia to tackle identified barriers facing schools. Based on preliminary research findings, the Pilot Trial and in consultation with the coroner, a coronial recommendation was handed down “that swimming and water safety education should be a compulsory skill taught within the primary school curriculum”. With growing demand from the community for action, government funding support was obtained for a second Trial in Metropolitan Melbourne.

RESULTS

In 2016 the Victorian Government announced that swimming and water safety would be compulsory in the Victorian Curriculum. LSV submitted the Lifesaving in Schools program framework including a business case for government funding for SWSE. The objectives were achieved through an iterative approach, building on the evidence base through multi-sectoral collaboration.

DISCUSSION

Change in government policy to make SWSE mandatory in the curriculum has the potential to reduce drowning. Key learnings included:

- A staged approach to build the evidence base to enable findings to inform further research, source funding and engage the community.
- Stakeholder engagement to ensure practical and applicable solutions, as well as alignment with objectives of other state-wide initiatives and operational aspects.
- Adaptability and timeliness to fit within current issues or changes of government and make the most of opportunities (e.g. political, media).

CONCLUSION

An evidence-based, multi-sectoral approach was successful in bringing about policy change to address gaps in SWSE in Victorian primary schools.
BACKGROUND
Royal Life Saving Society Northern Territory received Federal funding to continue to expand on its goals for 26 remote indigenous communities through the Remote Swim, Survive & Strive Project. The Remote Swim, Survive & Strive Project delivers:
- the Royal Life Saving Australia Swim & Survive program
- Indigenous employment opportunities
- AUSTSWIM Mentoring program
- Lifesaving education and recreational sporting programs
- Indigenous aquatic training, VET in schools
- Assistance to establish learn to swim business models in remote communities.

Key facts at a glance from 2016
- 3,734 people participate in the Remote Swim, Survive & Strive Project
- 27 remote schools accessed the program
- visited 17 remote communities
- 19 indigenous people gained employment as a direct result of the project
- 2,483 students participated in Swim and Survive
- 2 students achieved a Level 6 through Swim and Survive – the highest award given this year
- 112 students achieved the national swimming and water safety benchmark of a level four and above
- The AUSTSWIM mentoring program saw 4 indigenous people gain their AUSTSWIM Teacher of Swimming and Water Safety
- 7 indigenous people aided the Remote Swim, Survive & Strive teams in delivering the Swim & Survive program in their local communities
- 220 people were trained and are now qualified in a range of qualifications such as Bronze Medallion, Pool Lifeguard, AUSTSWIM Teacher of Swimming & Water Safety Award and First Aid through the project.

Remote Swim, Survive & Strive Project allows students who live in remote locations, who do not have access to qualified swimming instructors, the opportunity to learn about being safe in, on and around the aquatic environment. An intensive five to ten day community visit plan is developed in consultation with the community, prior to any visits.

The project also identifies local indigenous people to participate in the indigenous AUSTSWIM mentoring program. This training allows local members of the community to become AUSTSWIM qualified swimming instructors who can potentially provide quality, ongoing swimming lessons to their community.

The intended outcomes of the Indigenous Advancement Strategy link to:
- Jobs, Land and Economy
- Children and Schooling
- Safety and Wellbeing
- Culture and Capability
- Remote Australia Strategies

This project links to a previous project of Indigenous Sport and Active Recreation and together they have been running since 2009. The project is based on a community development model with the key focus of strong partnerships and real results. An eight year evaluation of the project highlights how Royal Life Saving NT are working with remote communities to build a culture of water safety and the case studies are inspiring.
Physical literacy is an ever-increasing term utilised in human movement science but often with little clarity or deep understanding. At its core, it is a multi-dimensional construct with differing definitional and theoretical underpinnings; however, there is consistency on the essential constituent components of the construct. For example, virtually all definitions include competence in movement skills/sequences as core domain of the construct. Positive affect, usually expressed in terms of fun and enjoyment is also present. Motivational constructs such as confidence and self-competence are also commonly identified. Knowledge and learning the importance of movement as an essential condition of human experience – sometimes described as an embodied experience and finally, implicit are the social aspects of movement that have yet to receive as much attention to date.

Beyond definitions, there appears to be cross-sectoral interest in physical literacy, which interestingly brings together somewhat strange bed fellows: the sport sector, recreation, education and public health being the most prominent in the circle at the moment. It is clear that if one positions physical literacy as the necessary learning one undertakes to participate in lifelong physical activity, then there are implications for it across these diverse sectors, all of whom have some degree of vested interest in the promotion and provision of physical activity.

According to the perspectives of embodiment, the physical literacy journey is an inherent part of our identity and experience therefore has value in its own right. At the same time, other traditions see physical literacy as a means to achieve other ends, such as increasing participation in pursuits of human movement. These need not be mutually exclusive perspectives, but it may be that because the former tradition as tended to dominate the discourse in academic writing, a full consideration of the role that physical literacy plays in, for example, promoting positive health-related behaviours, has received far less attention.

Among some practitioners, it is clear that if physical literacy is in reality a gateway to health-promoting behaviours then it follows that physical literacy must also be a necessary determinant of health via its impact on the former. At present, there is no clear conceptual framework based on existing empirical evidence that links physical literacy to health, nor has an evidence-informed case been made for such a positioning.

In this presentation, we provide a generic framework positioning physical literacy as a strength-based health determinant, based on how professional communities (e.g., public health, education, public safety) might think about physical literacy in the context of drowning prevention. Next, we present a guiding framework for the design, implementation and evaluation of interventions targeting drowning prevention. While drowning behaviours have been shown to be linked to risk taking, problem solving, and aquatic competence, selecting the right kinds of educative activities is critical to ensuring individuals stay engaged and benefit from aquatic participation. The concept of “thinking movement” has been described before, where emphasis is placed not only on the importance of activity, but the combination of cognitive (e.g., problem solving) and movement based skills together as necessary for stimulating positive change in cognitive ability. Physical literacy offers great potential as a framework beyond thinking movement because it focuses not only on movement (motor skill) and physical activity, but also affective (fun) and motivational domains such as competence and confidence. The intersections of motor skill, positive affect and motivation are the core elements required to ensure individuals want to be active in aquatic environments and are critical for maintenance of physical activity and decreased likelihood of drowning across the life-course.
The Train the Trainer Leadership System is based on current education principles for training teachers/instructors, coaches, assessor/examiners and trainers. To summarize, the 5 main principles presented are: a broad-based 5 level curriculum based learning hierarchy for teaching and evaluation, 13 competency elements, adapted teaching methods to the learner’s needs, allows for multiple learning pathway and delivery methods, and provide mentorship opportunities and support.

The Lifesaving Society embeds the Mission, Vision, Values and Motto within the curriculum.
Mission: The Lifesaving Society works to prevent drowning and reduce water-related injury.
Vision: The Lifesaving Society serves all Canadians by providing information and skills that promote safety in, on, and around water. The Society is the Canadian authority in aquatic lifesaving and lifeguard education and training. The Society is a leader and a partner in the delivery of water safety education in Canada and around the world.
Values: Humanitarian principles are the basis of our organization. People are our most important resource. Our organization is dynamic and action-oriented. Our organization is based on mutual respect, trust and integrity. Our organization fosters innovation and creativity.

The curriculum is designed as a 3 dimensional cube matrix with 5 level framework of curriculum in a hierarchy for vertical development and on the horizontal plane allows for educational modules for depth of expertise at the same level.

The 5 level framework begins with Level 1 and 2 focused on beginner and experienced teachers/Instructors, coaches, assessors/examiners. Levels 3 and 4 are focused on beginner and experienced Trainers who train Teachers/Instructors coaches and assessors/examiners. At Level 5 are the National Trainers who train Trainers.

The 6 Areas of Expertise or streams are: Learning to Swim, Learning to Lifesave, Learn to First Aid, Learning to Lifeguard, Learning to Coach, and Learning to Manage.

The design focused on 13 core competencies; planning, evaluation, presentation skills, Lifesaving Society knowledge, curriculum knowledge, learner characteristics, health and safety, facilitation and mentoring, ethics and valuing diversity, communicating, teamwork and collaboration, problem solving and decision-making, and skill demonstration.

The support materials and references for each level of training were developed to include: Course Resource Manuals, Curriculum Performance Criteria and Course Guides.

Content of the Course Guides is organized with Purpose Statements, Learning Outcomes, Performance Requirements, Notes and References. Resources for development allow for flexible delivery of educational materials in the form of Power Point presentations, educational modules, handouts, Skype, e-learning opportunities, etc.

The administration and documentation for development and mentorship through the Leadership model allows for flexible delivery models including: courses, independent learning, and tutoring. This is documented through the use of Master Sheets, Individual Development Plans and Training Records.
In conclusion, the new Leadership System goals were to allow flexibility in program delivery and programming, modernize the competencies, increase accessibility to participants who have barriers to attending the traditional course format, and clearly define the performance criteria and expectations.
In 2014 the World Health Organisation (WHO) published its first ‘Global Report on Drowning’, which presented ten key actions to help prevent drowning. Action three recommended that school-age children are taught ‘basic swimming, water safety and safe rescue skills.’

Despite this recommendation there is little guidance on how such a programme can be implemented sustainably and to scale in low-income countries.

Since 2013 the Panje Project, supported by the RNLI, has been piloting the implementation of the Aquatic Survival Programme - a self-survival and rescue curriculum targeted at school age children - in Zanzibar, Tanzania. Initial ‘proof of concept’ testing suggests that the programme is effective at teaching basic swimming, water safety and rescue skills over a 15 lesson programme run in the ocean.

In 2015 the Panje Project began working with the Zanzibar Ministry of Education (MoE) to examine the feasibility of implementing the programme as part of the physical education curriculum. The MoE agreed to pilot the programme across 9 coastal physical education specialist schools throughout 2015 and 2016. The Panje Project provided ‘train the trainer’ training to school teachers, audited the implementation to ensure safety protocols were adhered to, and undertook necessary re-training. The RNLI provided technical guidance to the programme, and worked with a consortium of organisations* to develop audit tools and training guidelines.

This paper presents early evidence from the programme, summarising challenges and opportunities to implementing the programme at scale through the school education system.

*Working group consisted of the RNLI, International Federation of Swimming Teachers Associations, Nile Swimmers, Royal Life Saving Society Commonwealth, Royal Life Saving Society UK.
In 2015, Nile Swimmers established a partnership with the Ministry of Education in Khartoum State to include the Aquatic Survival Programme water safety lessons as an extra-curricular activity in government schools in the state. Master Instructors taught 112 school teachers, and then worked together to teach water safety messages to over 27,625 children from 78 schools by the end of 2016.

There are distinct benefits to working in partnership with the Ministry of Education. The teachers are experienced at delivering lessons in the local context so their training is limited to the content of the lessons and does not need to cover how to teach and lead classroom activities. Furthermore, teaching through schools is an effective way to access large numbers of children in centralised locations.

The scheme is not without its challenges. Only 63% of the schools in Khartoum are government schools, whilst the remaining 37% are privately run. Accessing students in these schools will require agreements to be put in place between Nile Swimmers and each private educational provider. Additionally, 10% of school age children (age 5-13) are not in school in Khartoum state and therefore are missed by water safety messages that are taught exclusively through the school system.

Moving to a large scale is the next challenge. To ensure that all school children in the state are receiving water safety education, the scheme will need to expand to over 33 times the current size. To increase the sustainability of the programme, the next step is to convince the Ministry of Education that water safety education should be part of the core curriculum. This would require all government schools to teach water safety messages and cover the costs of these lessons within the school budget rather than using external funding sources. Curricula changes are made on an irregular basis and are difficult to influence.

In schools around the world, lifesaving and water safety activities are commonly positioned within sport. In Sudan, sport is often seen as a distraction from other subjects on the curriculum. However, religious education is a vital part of the Sudanese curriculum. Islamic scriptures place a high value on the skills of swimming, archery and horse riding which are deemed to be “godly” activities. Preliminary discussions suggest that water safety could fit within religious education, and therefore ensure its long-term sustainability in the national curriculum.

This paper will consider the benefits and challenges of working with the Ministry of Education in Khartoum, Sudan to teach water safety through government schools and the next steps required to ensure that the programme can run sustainability at a national scale.
Māori (indigenous people of New Zealand) have a strong relationship with the water. Many sayings and phrases include the term wai (water), such as: wairua (spirit), wai Māori (freshwater), ko wai koe (who are you?) and nō wai koe (where are you from?). However, despite this cultural connection to water, Māori are overrepresented in our country’s national drowning statistics each year (ACC, 2014; Water Safety New Zealand, 2017). In our most recent statistics for 2016, Māori made up 21% of New Zealand’s drowning fatalities, although, Māori constitute only 14% of New Zealand’s population. This has been a common trend for the last 5 years, where Māori account for 21-23% of the drowning statistics each year, despite only making up 14-15% of the nation’s population. The fourth highest cause of unintentional death in New Zealand is drowning, making us amongst the worst drowning rates in the developed world (ACC, 2014; Water Safety New Zealand, 2017).

There is very little published research that examines why Māori have high rates of drowning despite a cultural connection to water. In a report commissioned by ACC, Price Waterhouse Coopers state that although the overrepresentation of Māori in drowning fatalities remains unclear it “may reflect greater exposure to environments as Māori have strong cultural links with lakes, rivers and seas particularly as revered sources of food” (Price Waterhouse Coopers, 2009). Karapu, Haimona & Takurua (2007) suggest that although Māori have these strong cultural links with water, we “no longer have access to traditional knowledge and tikanga (practices) associated with water safety” (p. 133). Furthermore a disruption of traditional social structures through colonisation has resulted in limited “access to traditional ways of learning respect for water and the skills required for surviving in and around it” (Haimona & Takurua, 2007, p. 85). Finally, there is limited research that highlights the relevance of Māori water safety interventions.

This presentation will discuss my current doctoral research which examines Māori approaches to water safety through the oral narratives of three Māori communities I work with: Te Taitimu Trust in Hawkes Bay; Maripi Tuatini in Whanganui and; Hauteruru ki Puketeraki Waka Club in Otago. I will share the initial findings from surveying over 150 youth (both indigenous and non-indigenous) within the case study areas and their perspectives of Māori water safety. The aim is to explore how these three communities have (re) established their relationship to Tangaroa (Māori deity of the ocean and water) as the foundation and vehicle for understanding critical aspects of Māori water safety that may reduce the drowning rate.

Kaupapa Māori theory and methodology (an indigenous research methodology) was utilised in conjunction with critical discourse analysis to survey 150 youth in New Zealand from ages ranging between 11-21 years old.

Ultimately this presentation will share with the audience an indigenous Māori perspective to water safety and drowning prevention within an Aotearoa, New Zealand context.
INTRODUCTION

In Brazil, many people go to the beaches, rivers, lakes and pools for leisure and fun. The number of people using swimming pools has increased but still many don’t know how to swim and are not aware of the safety tips to prevent drowning. Recently, the methodology swim+safe has been developed valuing safety behaviors by promoting better adaptation to water before teaching any of the four swimming strokes. In the first class, the teacher makes the diagnostic evaluation of the students to verify their water competences, defined as the level of water adaptation considering the following: ability to stay afloat, tread water, control breathing and body awareness. Based on the results the teacher will adapt the following sessions to improve each student’s water competences and does a follow-up evaluation after 3 months, identifying the student progression and providing feedback on which contents the student needs to work harder.

OBJECTIVE

The aim of this study was to assess if the items proposed for testing water competences are suitable to evaluate the students enrolled in the program.

METHODS

The method used for this assessment was based on electronic survey of 19 people, among aquatic activities’ post-graduation teachers, of SOBRASA’s members and teachers that participated in the pool+safe Week. A questionnaire with 10 questions proposed by Vasconcellos (2013) evaluated the students’ competences using a progressive scale (0-10): very weak (0-2) and excellent (9-10). Results: Based on the results the questionnaire were improved and the final sequence of questions to test the students’ water competences enrolled in this program were: 1) ability to hold breath underwater for 10 seconds – repeat 3x; 2) ability to sink head in the water without fear, exhale (respiratory control) – 5x; 3) dive and catch an object at the bottom without goggles – 1 object at 1 meter depth; 4) change from dorsal to ventral position – 2x; 5) change from vertical to horizontal position without touching the bottom – 2x; 6) float in the dorsal decubitus position without floating aids – 30 sec; 7) ability to perform underwater displacement – 2m; 8) use arms and legs as propulsive segments on the surface to the edge – 3m; 9) vertical floating using arms – 30 sec; 10) Crouch, sink, and jump with hands out of the water – 2x.

CONCLUSION

The test will be applied and tested appropriately before wide implementation. It is important that the students develop aquatic independence in order to reduce their chances of drowning if in trouble in the water. The swim+safe program will continue to focus on encouraging safer behaviors around water and water competence as crucial tools to prevent drowning in children and young people.

Authors are grateful to SOBRASA for the scientific support provided.
IMPACTING INDIGENOUS SWIMMING AND WATER SAFETY

Mrs. Annette (Floss) Roberts¹, Jennifer Schembri-Portelli¹

¹Royal Life Saving NT, Darwin, Australia, ²AUSTSWIM, Melbourne, Australia

Swimming 6, Salon 1, October 18, 2017, 3:30 PM - 5:00 PM

BACKGROUND

AUSTSWIM, the Australasian Council for Teaching Swimming and Water Safety is the only ISO accredited (17024) swimming and water safety education organisation, advocating for community education in aquatics. Australia’s drowning prevention starts with education; AUSTSWIM licensed teachers of swimming and water safety impart knowledge, skill and understanding of waterways and enhancement of safer participation in, on and around water.

Recent research identifies that indigenous children have a higher drowning risk than non-indigenous children and unintentional drowning death of Aboriginal and Torres Strait Islander people occurs at a rate disproportionate to overall population levels¹,². For every fatality nine others are rescued, requiring medical treatment. The studies identified that culturally specific prevention strategies should be delivered to carers and peers of vulnerable age groups. AUSTSWIM undertook this project with an aim to present culturally appropriate teacher of swimming and water safety training to indigenous populations.

METHODS

AUSTSWIM produced a teacher training course specifically targeted to indigenous populations where learning methodology is sensory based, highly visual and practical in application; a ‘story time’, community approach is culturally appropriate and successful. Course resources are visual rather than text orientated; specific and culturally appropriate course presenters were identified and trained to deliver courses. Successful in its pilot phase the training now features as regular calendar events in Queensland, Northern Territory, South and Western Australia, Victoria and Tasmania.

AUSTSWIM’s project strategies closely align with Goals (7 and 10) within the Australian Water Safety Strategy (AWSC) (2016-2020) to ensure a high standard of accredited teachers of swimming and water safety to help reduce drowning deaths in high risk populations.

OUTCOMES

The majority of pilot program candidates reported satisfaction in completing the accreditation with high satisfaction expressed for peer assisted, mentor based theoretical and water-based practical elements. This modified education model improved the likelihood of successful competence and continuation in the aquatic industry. Over 88% reported a positive influence that they ‘pay the water safety message forward’ to their community and consequently initiated the importance to continue as a teacher of swimming of water safety. 52% volunteered within in the industry as either a mentor and or offered skill based activity for others in need.

CONCLUSION

Generated reports identified recommendations for refinement of modified approaches, materials, and processes that can support quality enhancement for teachers of swimming and water safety nationally and internationally. The development of AUSTSWIM’s Learning Pillars (knowledge, skill and understanding) continues to build a framework that clearly guides and defines what swimming and water safety means for teachers to embed drowning prevention strategies and teach a skill for life.

In an environment of steady domestic demand and growing international interest, AUSTSWIM seeks further evidence to build a sustainable and scalable aquatic workforce to enable the next generation of growth for continued drowning prevention strategies as identified by the World Health Organisation.

Further results indicated that monitoring and continuous improvement allows the organisation to ready itself to prepare for the next wave of best learning practice to ensure a skilled and knowledge workforce all teachers of swimming and water safety.

REFERENCES

2. Facilities, Programs and Services for Water Safety of Aboriginal and Torres Strait Islanders in Rural and Remote Australia. Royal Live Saving Australia 2008.
INTRODUCTION

In Vietnam, an estimated 32 children drown every day (Source: TASC: Drowning – A Public Health Emergency), making it a leading cause of death after infancy. In 2014, The World Health Organisation’s Global Report on Drowning recommended teaching school-age children basic swimming, water safety and safe rescue skills as part of ten key actions to prevent drowning. Since 2008, a number of small international organisations have been implementing such initiatives in Vietnam.

THE INGO SWIM PROGRAMMES

The INGO’s involved in the collaboration are Swim Vietnam, Hue Help, Water Safety Vietnam, Swim For Life Vietnam (part of Golden West Humanitarian Foundation) and the AWSOM project. They were founded individually in different parts of Vietnam over the past 10 years. Although the INGO’s were successful in their individual projects they found that working in isolation brought minimal results. Projects were successful at a district and provincial level but the organisations found it difficult to make a large scale impact at a national level.

Discussions of their similar aims, objectives and philosophies at the WCDP in Penang in 2015 resulted in the organisations collaborating to share resources and knowledge.

COLLECTIVE RESULTS

Independently, these organisations remain modest in size. Collectively, they represent an operation that spans the length of Vietnam with the following results:

- 45,460 children taught to swim
- 1,600 swimming teachers trained
- 30 teacher trainers trained
- 109,587 children given water safety education

WORKING IN PARTNERSHIP

Currently working together on:

- Knowledge sharing – By sharing teaching resources and teacher training courses, the organisations can learn from each other and develop a consistent approach nationally.
- National Policy Brief – Working together to produce a policy brief and recommendations on drowning prevention to the Prime Minister of Vietnam.
- Research Programme – The organisations are developing and expanding Swim Vietnam’s Water Safety Education programme in their respective areas and developing a research programme to evaluate its effectiveness across a significant sample. The research will contain 2 parts, the first will be an evaluation of student learning outcomes through administration of a pre and post assessment. The second will evaluate the effectiveness of the water safety classroom-based education and learn-to-swim programs in relationship to the actual reduction of drowning occurrences among the participants of the programs compared to our control group.

CONCLUSION

Collectively, the small international actors in Vietnam represent a significant effort to reduce drowning across the country. By working together in partnerships, these organisations are able to conduct meaningful research, share and develop resources and advise national government.
Western Australia’s Swimming and Water Safety (SWS) program will celebrate its 100th year of operation in 2018. The program remains effective and is well regarded by schools, parents and communities.

The Intern and Vacswim programs complement one another and provide access for children throughout Western Australia to a comprehensive swimming and water safety program. The Department of Education Western Australian (WA) swimming programs are the largest of its type in Australia.

Our national drowning figures in WA as represented in the Royal Life Saving Australia’s 2016 National Report have remained at zero for last three years for our age cohort, a testament to the success of our programs.

Our programs operate for 47 weeks per year delivering Intern and Vacation swimming instruction across 438 locations, to public and non-government school students. In 2015/16, enrolments exceeded 234 000 students.

More recently, the October 2016 and December 2016/January 2017 VacSwim programs provided instruction for 56,072 students and appointed 1,310 instructors and supervisors across 389 sites. The 2016 Intern program provided instruction for 177,878 students and appointed 2,172 instructors and supervisors across 300 sites.

The vast distances of Western Australia and the geographic isolation of many of the State’s communities present serious challenges for the equitable distribution of services to rural and remote areas.

Our goals and focus of the programs are to:
• provide high quality teaching of swimming and water safety skills;
• address the outcomes of the Australian Curriculum and deliver swimming state-wide; and
• provide access equitably across the state for all at pool and beach locations.

The VacSwim and Intern programs complement each other; the curriculum, teaching and assessment guidelines are the same for both programs. This facilitates a smooth transition between programs and promotes continuity.
BACKGROUND
The Nordic lifesaving group has for several years looked at swimming ability and its part in drowning prevention. Iceland has taken part in making the Nordic swimming definition in the past and has done studies on swimming ability of Icelandic children and they have passed the 200m. test in grade 5. Recently the Nordic group has tried to establish a new definition which would be more of a water competence (the ability to save oneself out of water in different situations). Icelandic children have been so fortunate to have a compulsory swimming lesson in all grades of the elementary school system since the middle of the last century.

AIM
The main aim of this study was to test the water competence level of Icelandic school children in the 5th grade, in accordance to the possible new Nordic swimming ability definition.

METHOD
Swimming test was carried out by 185 students from five different schools from different parts of Iceland. The research was a cross-sectional research divided into four tests; swimming 200 m (where of at least 50m swum on the back), the ability to jump into deep water, floating and treading water for two minutes with directional changes and rolling from prone to supine. Time was recorded for the 200m. swim but other tasks were measured with a passing or not passing grade.

RESULTS
The results showed that on an average the students were able to perform approximately 94% of all the tasks and 82% of students were able to perform all of the tasks. The task students seemed to have problem with was diving or jumping into deep water. Most of other tasks were passed by 95-98% of the students. There was a significant difference between test time in 200 m swimming and the ability to jump or dive into deep water.

CONCLUSION
The results indicated or gave vital information about the swimming ability of students in fifth grade in Icelandic elementary schools and gave good indication of their ability to pass the Nordic definition of being able to swim or in fact being "water competent". It is the believe of the research team the results indicate that good results in come from the fact that the students spend so much time in the water that they become “unconsciously competent”, which means that the students might be better prepared to save oneself out of various sudden and unforeseen situations. The results also indicate the importance for governments to increase swimming lessons for all students to lessen the unintentional drownings in the world today.
BACKGROUND
Taiwan, a beautiful island, is located in Asia and surrounded by the sea. There are also many rivers and lakes in Taiwan. The climate is tropical and subtropical with an annual average temperature of 22 degrees Celsius. Those perfect conditions make Taiwan a place with a perfect environment for water activities. With the increasing popularity of participation in water activities, the risk and the possibility of drowning increased as well. Since drowning death was listed as one of the top ten causes of death in Taiwan, the Taiwan government made many policies and conducted various strategies for the public, especially for students, to prevent drowning. The purpose of this study is to review the policies and strategies of the Taiwan government especially in school education.

METHOD
The content analysis method was conducted to implement this research. Researchers reviewed the water safety promotion policy and strategies at all levels of schools from 2000-2016. To improve students’ swimming skills, since 2000, the Ministry of Education, Sports Affairs addressed the importance of water safety to students and made swimming classes a required course for all students. In addition, Sport Affairs made a policy to subsidize schools who offered classes to teach students who did not know how to swim, held workshops on water safety and prevented drowning.

By implementing these policies, each student could be reached by water safety information and had an opportunity to learn to swim. In 2009, the Ministry of Education, Sport Affairs instituted a regulation regarding student swimming ability indicators which requires students, prior to graduating, to be able to swim: 15 meters at elementary school, 25 meters at middle school, and 50 meters at high school. The ability to self-rescue was also a must have indicator.

In 2010, the “Go Swim!” project was launched. Specific strategies included increasing the passing rate of swimming ability indicators, increasing sound and safe swimming facilities, improving swimming teacher effectiveness, and reducing drowning deaths.

DISCUSSION
Since 2000, the Taiwan government has conducted firm water safety policy through various strategies, especially targeting children and youth. According to a national survey (2009), 65% of schools in Taiwan provided swimming curriculum as part of the physical education courses in 2008. The pass rate of swimming capability in 2008 was 42%. In 2015, the pass rate has increased to 66.36%. In addition, the drowning mortality rate of students also decreased significantly. In 2005, the number of drowning deaths was 85; as of December 2016 the number has been reduced to 21.

CONCLUSION
The reason for most cases of drowning was that the victim was not familiar with water safety skills. By instituting different policies and implementing various strategies, the Taiwan Ministry of Education, Sport Affairs devoted abundant budget and power to promote water safety knowledge, skills and abilities. Based on the decreasing rate of annual drowning mortality, and the pass rate of swim capability, those policies and strategies through school system to children and youth have been effective.
OBJECTIVE
Danish municipalities are required to provide swimming lessons for pupils as part of physical education classes. However, current legislation provides only a broad framework for the practical implementation of swimming lessons. Hence, the provision by Danish municipalities varies significantly in terms of method of instruction, content and objectives. As a part of the Learning to Swim project, launched by the Danish foundation TrygFonden and the Danish Swimming Federation, it has been deemed necessary to explore how school swimming lessons are actually organised, prioritised and implemented in primary schools, while at the same time introducing alternative ways to implement school swimming.

METHODS
Qualitative interviews were chosen as the methodological approach for data collection, in order to achieve more nuanced insights into the opportunities and challenges associated with providing swimming lessons in Danish primary schools. 19 of 98 Danish municipalities took part in the study. 69 interviews were conducted with stakeholders at three levels: 1) Municipal/administrative level 2) School Management level) and 3) Swimming teacher level.

RESULTS
• The study resulted in four typical models for the organisation and implementation of swimming lessons: The Traditional (a half or whole year’s course),
• The Partnership (outsourcing and collaboration with the local swim club)
• The Intensive (a significant number of swimming lessons over a short period of time), and
• The Alternative (moving swimming lessons outdoors).

CONCLUSION
The most typical grade to commence school swimming is in 4th and 5th grade but some municipalities see potential in moving swimming lessons to earlier levels. Furthermore, school swimming lessons are challenged by scarce resources and the accompanying need to prioritise available funds. These challenges call for new sustainable initiatives that can be embedded in regular school curricula to achieve the long-term ambition of increasing the proportion of Danish children who are able to swim.
THE ADDED VALUE OF SWIMMING EDUCATION DURING SCHOOL HOURS FOR CHILDREN IN PRIMARY SCHOOL

Corry Floor¹, Prof. dr. Koen Breedveld¹

¹Mulier Institute, Utrecht, Netherlands

Swimming 7, Salon 1, October 19, 2017, 11:00 AM - 12:30 PM

BACKGROUND
The Netherlands is a small and densely populated country with a lot of water. Therefore, drowning is a big risk. Although drowning rates have dropped in recent years, each year still nine children under the age of 15 drown. Swimming education is an important measure to prevent children from drowning. Until the 1980s swimming education was mandatory for children in primary school in the Netherlands. However, the Dutch government cancelled this responsibility, due to most parents taking responsibility for swimming education before school swimming started and because of cost reduction. Municipalities in the Netherlands can still support swimming education; however, it is no longer mandatory.

OBJECTIVE
The objective of this study is to find out how many schools and municipalities still support swimming education for children in primary school, what (sociodemographic) characteristics they have and what their motives are to still support these lessons.

METHOD
Both quantitative and qualitative methods are used for data collection and analysis in this ongoing study. Questionnaires were sent to primary schools and all municipalities in the Netherlands. In total 856 schools scattered throughout the Netherlands responded. Of the 388 municipalities in the Netherlands 253 responded. To gain more understanding of the added value of swimming education in primary schools, in-depth interviews with policy makers and executioners of this policy are held.

RESULTS
The results of this research show that in the Netherlands 32 percent of the primary schools and 30 percent of the municipalities still support swimming education during school hours. Regarding urbanisation, in city areas more schools and municipalities support swimming education than in rural areas. One of the reasons is, that swimming abilities of children in larger cities (with large migrant populations) lag behind with national numbers. The most important reason not to support swimming education is financial. Costs for swimming education are high; if municipalities decide to stop financing then schools also stop the lessons.

Added values of swimming education are related to social inclusion of people living in poverty, who cannot afford taking private swimming lessons and/or people with (non western) ethnic backgrounds, who may attach less importance to swimming education. Furthermore swimming education during school hours is said to benefit children’s water safety, because they repeat swimming skills learned few years before. Both municipalities and schools indicate that they support giving children’s opportunity to learn how to swim, but that parents remain primary responsible to make sure their child can swim safely.

OUTCOMES
The outcomes of this research are part of a larger project called “NL Zwemveilig” [Water Safety in the Netherlands]. With this project, the development and use of an evidence-based program for swimming and water safety education is stimulated.
Water Safety education is very essential in the sports of swimming. Many people intend to learn how to swim without considering the safety measures and precautions involved or what need to be learned alongside swimming lessons. In Accra, the capital of Ghana where I reside, for example, personal research has shown that most individuals who know how to swim know less about the importance of water safety education. As a result, there have been countless events of water drowning incidents reported, mostly during beach holidays.

The 2015 Accra floods resulted from heavy continuous rainfall starting on 1 June 2015. The floods resulted in heavy traffic on the roads in the city and also a halt in commercial activities as markets were flooded and workers trapped. Mayor of Accra Metropolitan Assembly, Alfred Oko Vanderpuije described the flooding as critical. At least 25 people died from the flooding directly, while a petrol station explosion caused by the flooding killed at least 200 more people. The Kaneshie market and its surroundings were submerged, preventing vehicles from moving. Graphic Road, home to some automobile companies, was heavily flooded. The Toyota Ghana and Rana Motors showrooms were completely submerged.

On June 3, 2015, a GOIL fuel station near Kwame Nkrumah Interchange was burnt with people and vehicles in the vicinity. The fire also burnt a Forex Bureau and Pharmacy nearby. Over 200 people are feared dead and bodies were moved to the 37 Military Hospital. The hospital later announced they were unable to hold more bodies. The cause of the fire is yet to be determined. On 4 June 2015 the Mayor of Accra Alfred Vanderpuije, Member of Parliament for Korle Klottey, and the President visited the scene. President Mahama declared 3 days of national mourning for the victims affected by the flood and explosion. The government also released GH₵ 60 million to support victims.

Based on these inferences, we can boldly say that swimming and water safety education is very important to every individual in society. If most people had the knowledge of it, a lot of lives could have been saved from the June 3rd disaster in our Country.

Due to this and more, we the Swimming instructors with an undying passion for the sports of Peace Sail Ghana have over the years devoted our lives to swimming and water safety education around the region to reduce the occurrence of water drowning accidents by organizing various seminars and conferences within society among schools, organizations and individual lessons.
We know that lasting personal and social change comes about when we all work together. That’s why at the Y, strengthening community is our cause. Every day, we work side-by-side with our neighbors to make sure that everyone, regardless of age, income or background, has the opportunity to learn, grow and thrive.

In the United States, drowning is the second leading cause of death for children from ages five to fourteen years old, and it is preventable. At the Y, we teach over 1 million youth each year to swim in approximately 2,700 locations across the country. Teaching children how to be safe around water is not a luxury; it is a necessity.

The YMCA’s Safety Around Water program was created to make sure children learn essential water safety skills, which can open up a world of possibilities for them to satisfy their curiosity safely. The Safety Around Water program is a community based drowning prevention program designed to reach children at the highest risk of drowning and teach them two sequences to move across the water and exit the pool to enhance their personal water safety skills. The program focuses on any school-aged child who cannot jump into the water and safely exit the pool on their own and has not received formal swim instruction.

This session will provide details about the process the YMCA of the USA has worked through to develop a sustainable drowning prevention program across the United States. Information will be shared about the design and development from pilot refinement, to scaling. In addition, we will review the resources made available to YMCAs and their communities with the programming, and provide case studies demonstrating how YMCAs have worked in community wide collaborations and partnerships to bring change to high risk communities.
Norway has compulsory swimming in the primary schools, designated in the national curriculum. However, the program is not specified in detail. Lillehammer Community has emphasized their program for some years. They offer swimming instruction in Grades 2, 4, 6 and 8. Children receive a total of approximately 40 hours. Nearly 20 years ago, they created the position of Coordinator of Swimming, to govern all of school swimming in the community. The same person has filled that position from the beginning. Consistency has been achieved and creative measures have been introduced regularly. Parents and teachers are deeply involved.

Lillehammer lies on the northern shores of Lake Mjøsa, the largest lake in Norway, 117 km from north to south. Boat life, swimming, fishing, skating in the winter, are integral parts of local culture. It is no surprise that the community places great importance on water safety. Their swimming program is among the very best in Norway.

Vingrom Primary School lies within a few hundred meters of the lake. It is natural for them to be safety conscious. They have focused on a multi-disciplinary approach for a number of years and basic lessons in simple physics, chemistry, anthropology, cultural history, biology, etc. have been integrated with the swimming curriculum. In the pool they learn about gravity and buoyancy, resistance and propulsion, etc. In, on and at the lake they learn about coastal freshwater biology, the cultural history of the area, outdoor education, subsistence fishing, and more.

Vingrom School was the first in Lillehammer to integrate open water swimming into the school’s program. The School Swimming Coordinator, and the Head Master of the school, consider Vingrom as a model which the entire community can follow. As open water swimming became entrenched in their program, the children began to aspire to continue as winter approached. Grades 5 to 7 now swim outdoors until the winter season arrives and the lake freezes. They enjoy experiencing swimming with clothes, swimming in waves, swimming in gradually colder water. Should any of these children find themselves unexpectedly in cold, unruly water, they have experienced it before. It no longer poses the threat it might for others.

Special modules have been devised exploring each of the following themes: a) open water swimming, b) swimming in clothes, including the H.E.L.P. technique, c) swimming in cold water, d) use of the life jacket with a simulated fall from a small boat and re-entry, e) safety on the ice, personal safety and rescue of others, f) the culture of the Vikings; actually rowing a Viking boat, g) subsistence fishing and living from the lake, h) crossing a stream with current. Each of these modules is described and illustrated in this presentation. See also the poster series describing each of these modules.
INTRODUCTION

The World Health Organization has recently published a Global Report on Drowning, elevating its impact as a public health issue. Portugal is a country with a stretch of coastline that crosses the territory and it has several rivers and water springs and people contact with water in a daily basis. Thus, it’s crucial to address drowning as a public health issue through preventive measures in early ages at schools. The School Lifeguarding Club (SLC) project was developed to educate and prevent drowning among school-aged children and to associate the learning of rescue techniques in early stage with physical activity promotion. In this context, drowning prevention through projects such as the SLC can benefit the society by preparing and educating children to prevent drowning and react adequately if it happens.

METHODS

This is an ongoing case study of the SLC program, a school-based intervention in an elementary school in Caxias. A total of 67 children (35 boys), aged between 6-9 years are enrolled in this program. Once a week, children have a physical education class in a swimming pool. Further 3 visits will happen to teach children basic rescue techniques (Call for Help, Reach and Throw). The program contents include basic swimming techniques, safety signs and flags, lateral safety position, basic life support, rip currents awareness, entering and exiting the water, how to call emergency number, and basic rescue techniques such as reach and throw. The program duration is 148 hours. An initial evaluation was carried out, by direct observation of the children’s skills and, after 90 days, a follow-up evaluation of the same skills was carried out. At school, teachers were encouraged by the board to address the topic in formal or non-formal ways as part of the national campaign “Drowning Prevention Wall” promoted by Neptune Serenity. The National Lifesaving Institute (ISN) approved the study protocol. Children were informed about the objectives of the intervention and informed consent was obtained from their legal guardians.

RESULTS

The project was well received by the school board, teachers, staff, and parents. All children enrolled in the project remained after the 3 months. After 3 months of weekly pool sessions, children improved significantly the performance of immersion (90% at baseline vs. 100% at follow-up, p<0.05), eggbeater kick (75% vs. 98.3%, p<0.05) and dolphin (65% vs. 95%, p<0.05). Regarding the drowning literacy component of the program delivered at school, i.e., knowledge about the risks, drowning prevention behaviours and basic rescue techniques, children also improved their expertise in: call for help (0% vs. 96.7%), basic life support (0% vs. 96.7%), safety signs and flags recognition (0% vs. 29.5%), and performing a help request while in the water (0% vs. 35%).

CONCLUSION

Programs such as SLC seem to improve significantly the children literacy in drowning prevention, which will impact their behaviours and attitudes near water. This program will go on nationally and an update-study with data from a larger number of children will be conducted. The authors would like to thank SOBRASA for the scientific support.
BUILDING RIP CURRENT AWARENESS IN SWIMMING AND WATER SAFETY EDUCATION

Mr. Jared Wilson1

1AUSTSWIM, Baulkham Hills, Australia

Swimming 8, Salon 1, October 19, 2017, 1:30 PM - 3:00 PM

BACKGROUND

A greater percentage of fatal drownings in Australia occur at beach locations. Surf Life Saving Australia’s National Coastal Safety Report 2015 identified rip current awareness as a major gap in community education; indicating 50% of people recognise rip currents as somewhat risky while 41% rated rip currents at not very, or of no risk at all.

In Australia swimming and water safety education is primarily undertaken in controlled swimming pool environments offering little opportunity for students to gain knowledge, exposure, experience or training in controlled surf environments. Previous Rip Current Awareness case study presented at WCDP 2015, highlighted further areas of study was required to further explore gained learning and knowledge. This case study expanded the area of evidence to determine whether learning, framed with inquiry based questions, during the simulated open water environment class resulted in increased knowledge, skill and understanding of risk associated with open water activity.

AIM

The case study investigated whether specific rip current teaching resources and activity curricula were effective in improving school aged children’s knowledge, skill and understanding of rip current awareness and safety.

METHODOLOGY

The cross-sectional case study established two groups, a control and alternate group of primary school aged students aged between 7 and 10 years old with both groups participating in a 10-day intensive program. The control group (n= 8) participated in ‘standard’ swimming and water safety lessons, while the alternate group (n=6) undertook lessons which included the AUSTSWIM teacher utilising specific Rip Current Awareness educational resources and aquatic activity curricula (including the uRippa) built into the program.

Pre-and post-awareness information and skill competency assessment was gathered and collated from students in both groups. The Teacher of Swimming and Water Safety assessed the aquatic skill component while a pre and post questionnaire evaluated the base level of rip current awareness.

RESULTS

Observed and analysed case study outcomes indicated that awareness and knowledge of risk factors and skill in identification of rip currents improved in students who participated in the alternate case study group compared to the control group who undertook standard lesson of swimming and water safety lesson; with an average pre-program test result of 58% improving to an average post program test result of 89%.

CONCLUSION

This information is now being utilised by AUSTSWIM in the development of further training programs for teachers of swimming and water safety throughout Australasia with the purpose to instil awareness and provide knowledge on assessing risk in coastal locations.

*uRippa – a portable current simulator that creates a turbulent current in the pool
According to the Thai Ministry of Health, over 1,300 children drown each year in Thailand; and according to the WHO, drowning is an even bigger problem in many other Southeast Asian countries, e.g., in Vietnam over 3,000 children drown each year. The Chiang Mai International Rotary Club (CMIRC) decided to address this problem as one of its ongoing projects under the club’s principal service focus: “Protecting Children.” CMIRC set the goal of developing a program to reduce children’s drowning deaths first in Chiang Mai and in the future for all of Thailand. To accomplish this goal, CMIRC set out to identify instructors, develop a curriculum, plan an ideal instructional schedule, locate the most appropriate participants, build partnerships with municipal officials, and explore funding strategies.

Over the course of the past year CMIRC has raised nearly 200,000 Baht (Around US$6,000) to conduct survival swimming instruction for 3rd or 4th-grade students in all 11 public schools in Chiang Mai. In the process of doing 5 hours of pool-side and 10 hours of in-pool instruction with almost 400, 8 to 10 year old children, CMIRC learned a great deal.

CMIRC plans continued annual implementation of the Children’s Water Safety and Drowning Prevention Program for all Chiang Mai public school 4th grade students and to expand the program to neighboring communities. Over the next several years, CMIRC will use the Rotary national network of chapters and other volunteer service organizations to identify future program locations nationwide.

This presentation will describe the program in detail and describe the lessons learned over the past 18 months of planning, implementation, and evaluation, so that other groups in Southeast Asia and other developing countries can learn from CMIRC’s experience and perhaps implement survival swimming programs in their countries using the volunteer network resources provided by community service organizations such as Rotary Clubs, Lions Clubs, Kiwanis, etc.

PROGRAM DESCRIPTION

Focused on teaching children basic survival skills in the water. Target audience was non-swimmers from poor families. CMIRC provided all of the equipment that the children needed for these programs, including swimming suits, caps, towels, goggles, etc. CMIRC also paid the heavily discounted swimming pool fees and the greatly reduced swimming instructors’ fees. CMIRC identified a local, nationally known swim program: Kru Payu’s Swim. Kru Payu has over ten years experience teaching children with disabilities and children whose families do not have the means to pay for private swim instruction.

During the pilot year, CMIRC experimented using differing schedules, locations, and age ranges in an attempt to learn the most efficient way to “drown-proof” children.

The presentation will focus on the lessons learned about:
- Identifying and training instructors
- Choosing and adapting a curriculum to the needs and abilities of Thai 4th graders
- Finding the ideal instructional schedule
- Locating the most appropriate participants and getting them to and from our instructional facility
- Building partnerships with municipal officials working with poor children
- Funding needs and strategies
- Expanding the program regionally and planning to expand nationally.
LONG DURATION SWIMMING AND HOW TO TEACH IT IN VERY FEW ENCOUNTERS

Mr. Milton Nelms¹, Mrs. Shane Gould¹

¹Shane Gould Swimming Project

Poster Day 1, October 17, 2017, 8:30 AM - 5:00 PM

Drowning prevention agents need pragmatic methods to teach aquatic skills because education encounters with a community of people can be short and limited. In our experience, often only one or two lessons can be provided, so they need to be very effective. Many teaching projects in countries without the infrastructure of swimming information institutions and swimming pools, are not suited to progressive stage-based lessons with measurable outcomes e.g. 25 or 50 metres of a given style. Furthermore, many western lesson-models have competition style strokes as the standards (front or back crawl, breaststroke with timing of arms and legs, and rhythmic breathing). These styles require time and multiple visits to teach. These stroking styles require energy and fitness, with lots of practice in order to extend the swimming action into life saving durations.

We have developed a practical curriculum for very few encounters, which is effective and lasting. It is based on directing existing swimming skills learned from ‘experimental experiences’, toward a deep understanding of how the water and body interact.

Sensations of being in water generate emotions; fear of falling over, anxiety about interrupted breathing, and pleasurable enjoyment. Water emotions fall into two distinctions: stability and breathing. These can be used as both a diagnostic and teaching tool. Teaching/learning encounters can begin with the diagnostic ‘what are the existing capacities?’ and begin teaching from there. Water safety education is provided at the same time and a leader is identified to become the ‘captain’ to encourage practice. The principles of the curriculum are designed by Milton Nelms from over a lifetime working and lecturing in the swimming education industry in 17 countries with beginners to elites.

Lessons need to reduce fearful water emotions, so the learners need experiences in how to become in control of the environment. Three series of principled activities are taught:

1. Experiences of water physics and how to stand up
2. Calm and slow ambulation over deep water and emotional calm to make good decisions
3. Guided dis-orientation activities in 360 degrees – back, front, side, upside down

The visiting teacher leaves a protocol of activities that are illustrated, interesting and easily followed. It is our ethical obligation, to start, execute, and finish a lesson so that the swimmer fully understands their limitations, so that enthusiasm or overconfidence do not happen.

The presentation will include media, sketches, and video examples of real-world demonstrations of these single lessons in different natural swimming environments in Fiji.
INTRODUCTION
The Kenya Lifesaving Federation had identified survival swimming programs as one of the drowning prevention plans in its proposal on the national water safety plans submitted to the Kenya government. The survival swimming program to schools were approved and authorized by the Kenya government-Cabinet secretary ministry of education REF NO. MOE.HQS/1/2/3 and ministry of sports, culture and the arts REF NO. SD/A/87(75)

Prince Charlene of Monaco agreed to sponsor a pilot project in Kilifi –Kenya in partnership with the AMREF Kenya and Kenya lifesaving federation as executing agent.

OBJECTIVES
To save lives by teaching pupils and teachers on important water safety messages, swimming and rescue skills.

METHODOLOGIES
Instructions, demonstration in water, music, song and games
Use of local equipment, pictorial charts (RNLI/RLSS manuals) flip charts illustration
Land drill, Student participation in water, swimming in ocean water
First aid training
Mock swim gala competition

THE PROGRAM
The program had over 350 primary school pupils and 15 teachers from 12 different primary schools from low income communities who were taught survival swimming skills based on RNLI/RLSS survival swimming program guidelines. The program included both swimming pool teaching and open water beach teaching environments and took 30 days in total with each school taking a maximum of 15 days.

OUTCOME
Over 350 pupils were taught survival swimming; pupils and teachers had a better understanding of water environment, were able to swim a distance of 10 to 25 meters, survival float for 5-10 minutes and perform dry rescues using local available materials. They were also trained to swim and apply survival skills having trained and rescued others who were not part of the training.

EVALUATIONS
The program had a field visit by the KLF President. The training was conducted professionally as per the RLSS guide on survival swimming. The instructors delivered excellent teaching that achieved excellent performances from the pupils and the teachers. Most pupils were happy and well-motivated yearning for more skills and for program continuity.

RECOMMENDATION
KLF recommends similar programs be done nation-wide across Kenya and there needs to be an appeal for more funding/sponsorship of survival swimming program.

A thousand thanks to Princess Charlene of Monaco for funding this pilot project in Kilifi-Kenya.

CONCLUSION
The project was a total success and indeed a drowning prevention strategy that target a wider population with a permanent and lifelong cure for drowning.
IRISH WATER SAFETY’S ONLINE PRIMARY AQUATICS WATER SAFETY PROGRAMME (PAWS) FOR PRIMARY SCHOOLS

Mr. John Leech¹

¹Irish Water Safety, Galway, Ireland

BACKGROUND

In 2003, following two years of tenacious work with the Department of Education in Ireland, Irish Water Safety (IWS) finally had water safety accepted and recognised on the Physical Education Strand of the Primary School Curriculum. http://paws.iws.ie

It comprises of 11 levels/certificates and we have been working hard to develop it since then. Level 1, 2 and 3 are classroom based and should be delivered by the teacher once they have qualified as Land Paws Instructor. Levels 4 to 11 are water based and require a swim teacher or IWS Instructor to deliver them. The implementation on it has been slow and disappointing as schools continue to prioritise sport over the PAWS programme. Water Safety training for the teachers is essential if this programme is to be successful. IWS simply did not have the financial and Human resource to roll this programme out across the country. IWS offered in-service training in the form of an Aquatics Organiser and Aquatics Pool Assistant since 2003. However, we noted that the enrolment in the two course dropped considerably as soon as online training for teachers in other subjects was introduced. The teachers gave us feedback following a survey of the schools that they would prefer an online in-service course.

We have a number of resources developed to support the programme which can be viewed at http://paws.iws.ie/resources. Initially we developed a website to support the programme http://aquaattack.ie

AIM

This year following a number of years of being openly critical in the media about this lack of resource we have been awarded monies by our Government to develop an online in-service teacher course on water safety. We are developing it at present and it will be complete in February and ready for the teachers in 2017.

When we have this programme developed, it will allow the teachers to complete the courses in their homes which is what they want and yet still learn about water safety which they can then deliver to the children.

CONCLUSION

I feel that this programme can be used in low- and middle-income countries where the overwhelming majority of drownings happen to people who have close daily contact with water for work, transport and agriculture. I believe that this will in time
BACKGROUND
Adverse respiratory symptoms and disease have become international occupational health concerns among people working in indoor swimming pool environments (1,2). A variety of suspected bacterial and chemical contributors have been reported, with a range of names that have been used for respiratory conditions, including “lifeguard lung” and “hot tub lung” (1-3). People working in indoor swimming pools around the world may be at risk of developing such respiratory symptoms and disease, with a need for research and subsequent dissemination of findings to guide prevention efforts.

OBJECTIVES
1. Describe various respiratory symptoms and disease among swimming pool staff, including associated bacterial and chemical agents
2. Identify populations that are at greater risk of adverse respiratory health outcomes
3. Present recommendations for prevention, including risk assessment

TARGET
All indoor swimming pool staff

METHOD
A scoping review of peer-reviewed and grey literature was conducted to identify relevant studies and publications, with foci on “lifeguard lung” and “hot tub lung”.

RESULTS/DISCUSSION
Many respiratory symptoms and conditions were identified, including hypersensitivity pneumonitis and endemic granulomatous pneumonitis (1,4). Some biological factors associated with the development of symptoms and disease include endotoxin and nontuberculous mycobacteria, particularly mycobacterium avium complex (1,3). Chemical factors include disinfectant by-products of chlorine, particularly trichloramine (2,5). Individuals working more hours in indoor swimming pools may be at greater risk of developing respiratory symptoms and disease (1). Risk assessment measures were identified using methods from the Canadian Centre for Occupational Health and Safety (6). And, despite limited literature and the need for further research, a variety of recommendations for prevention were considered, including, but not limited to, the use of alternative disinfectants, water chemistry maintenance, considerations for HVAC designs, education and policy/guidelines.

CONCLUSION
The etiology of respiratory symptoms and disease in people working in indoor swimming pools is not well understood. Specific bacteria and chemicals have been found to be associated with adverse respiratory outcomes, but further research is needed to develop effective preventive interventions. In the meantime, several points of intervention may be targeted, including air, water, human behavior and policy/guidelines.

ACKNOWLEDGEMENTS
We thank Vanessa Wolff and Tom McKenna from the Canadian Union of Public Employees British Columbia for their feedback and support on this project

REFERENCES
(2) Jacobs, José H, et al., 2007, Exposure to trichloramine and respiratory symptoms in indoor swimming pool workers, 29/4, 690-698, European Respiratory Journal
(3) Sood, Akshay, et al., 2007, Hypersensitivity Pneumonitis-like Granulomatous Lung Disease with Nontuberculous Mycobacteria from Exposure to Hot Water Aerosols, 115/2, 262-266, Environmental Health Perspectives
(4) Falkinham, Joseph O, 2003, Mycobacterial Aerosols and Respiratory Disease, 9/7, 763-767, Emerging Infectious Diseases
(6) Canadian Centre for Occupational Health and Safety, 2009, Sample risk assessment form, Canadian Centre for Occupational Health and Safety
POCKET PATROL – AUGMENTED REALITY SURF SAFETY EDUCATION

Mr. Shane Daw ESM¹, Ms. Eveline Rijksen¹

¹Surf Life Saving Australia, Rosebery, Australia

Poster Day 1, October 17, 2017, 8:30 AM - 5:00 PM

BACKGROUND

Surf Life Saving Australia (SLSA) worked closely with Samsung Electronics Australia to explore how improvements in portable technology could help SLSA expand education and awareness about surf safety to reduce coastal drowning deaths. The result was a pilot program called Pocket Patrol—an augmented reality (AR) mobile application (the app) designed to educate Australian beachgoers about rip currents and other hazards.

The program is aligned to SLSA’s strategic plan, which includes considering the latest technologies to improve lifesaving, water safety and reduce incidents on the coast. Additionally, it links with SLSA’s National Safety Agenda—rip currents are the number one hazard on Australian beaches. There are 17,000 rips at beaches around Australia on any given day, presenting a significant safety risk to the millions of people who visit beaches around the country. Concerningly, two out of three beachgoers in Australia cannot accurately identify rip currents.

THE APP

Using the app, the smartphone screen shows an AR view of the beach, visually highlighting the position of rip currents, along with other potential hazards such as submerged rocks and shallow sandbanks. Pocket Patrol allows users to see the location of rip currents in real time at the beach before entering the water. It presents an invaluable learning experience.

THE PILOT PROGRAM

The pilot program ran at a number of patrolled Australian beaches during October and November 2016. Each day, on-duty lifeguards and surf lifesavers identified rips and other potential hazards and updated them in the Pocket Patrol app at the selected beaches. Along with the input from on-duty lifeguards and surf lifesavers, the mobile app used a combination of AR, GPS, Compass, Gyroscope and image recognition to visualise identified hazards. Using the camera view on their smartphone, the app allows users to see beach hazards overlaid on the beach as they see it through their phone.

In developing the app and running the pilot there were a number of safety considerations including:

• the frequency of updating information;
• highlighting that the app is not a replacement for a lifesaving service; and
• determining functionality and messaging for users outside of the trial zone.

In addition to developing the app, a virtual reality (VR) and 360 film were created so viewers could experience what it might be like to get caught in a rip in virtual reality. The purpose of the film is to provide a risk-free experience to educate people and ignite conversations about the importance of beach safety.

Pocket Patrol provides a good case study for water safety organisations working with industry to explore harnessing the latest technology for community education. This presentation explores the development of the concept, the collaboration process, and the pilot program.
Unfortunately, over the years we have had numerous drownings related to day care and day camp use of waterfronts and pools. Drowning is fast and can happen in seconds. Several inquests have highlighted the need for a training program for people who take children swimming such as parents, camp counselors, babysitters and caregivers.

The Lifesaving Society’s Safeguard training program is geared to guardians who accompany children to pools or waterfronts. The course stresses the responsibility and safety required when children are in their care in, on or around aquatic settings.

The Safeguard Program focuses on water safety awareness, accident prevention and the principles of aquatic safety supervision. Participants do not have to be able to swim to attend this 3-4 hour educational program and there are no prerequisites. Successful completion of the course is based on active participation in all sessions.

The course has 5 main topics; Safety Supervision, Site Analysis, Victim Recognition, Communication and Low-risk Rescue Knowledge and Skills.

The Safety Supervision component identifies strategies to supervise young children in, on, and around the water. Effective screening procedures for swimming ability, monitoring the children’s activities with head counts, buddy systems, use of life jackets and within arm’s reach practices. The Site Analysis component identifies the risks at the pool and waterfront/ocean environments. A list of the rules for the pool or waterfront is important to review before the visit. Site inspection checklists have been created as templates for per-swimming excisions. This will help the supervisor to prepare for emergencies or to avoid hazards or bring lifeguards if the environment requires a high level of supervision.

The Victim Recognition component focuses on strategies to position supervisors so observation and victim identification can be made more effectively. This section provides tips on verbal and nonverbal cues to identify children in distress and what to look for in the child’s behaviour or body position. Distressed or drowning victim’s behaviour is often not easily recognized as they may look like they are playing not struggling. Weak or tired swimmers can become victims within a short period of time. Young children need to be closely supervised to recognize any deterioration of swimming ability or control of movements in the water.

Communication is a key component to ensure that emergency services or a lifeguard response can be contacted quickly and leaders are aware of young children’s swimming ability, medical conditions or behavioural issues. It is also important the supervisors know who the emergency contact person is when an emergency occurs. If young children are changing leaders for supervision, communication needs to occur to ensure all pertinent information is transferred to the new supervisor.

Low-risk rescue knowledge and skills are important components to ensure a quick response in an emergency and not to put supervisors at risk. If the rescue response is beyond the supervisor’s abilities then a lifeguard would be alerted to intervene. Low risk rescues begin with talking then throwing an aid or reaching with an assist. Wading is another low risk rescue skill. Only competent swimmers or trained lifesavers should try deep water tows and carries. If a boat or water craft is available a rescue can be made by rowing or paddling to the victim to perform a rescue.

In addition to the training session it is recommended that supervisors should be readily identifiable by wearing a uniform or an ‘On Guard’ card. This identifies who is watching the children and monitoring their activities. The card is on a lanyard and is passed to another adult or guardian if taking a break.
OBJECTIVE
To create a national water safety instructor development program that is both flexible in delivery and meets the learning needs of the participants. This program has consistent delivery of content, supports learning across Canada and has been targeted at millennials specifically.

ABSTRACT
The Canadian Red Cross Swimming and Water Safety Program (SWS) revised its Instructor Development Program (IDP) after researching what works best as a method of learning for the current generation. This research suggests millennials learn best through a blended learning model.

In 2012, the Red Cross reviewed the delivery methodology of the IDP. The study clearly reinforced the existing classroom based IDP produced deck ready or mostly deck ready Water Safety Instructors (WSI). Stakeholders agreed the IDP was a program of high quality and continued to be competitive in the learn-to-swim/leadership market; however, they expressed support for a review of the data in order to enhance a flexible delivery option.

RESULTS
Results garnered from this study suggested that should a review of the IDP occur, it needed to focus on reducing program content, increasing quality and frequency of active learning, and refinement of performance criteria. These objectives could be achieved through exploring alternative program delivery and instructional methods, critically evaluating program content for relevancy and length against the performance criteria, and preparing and evaluating Water Safety Instructor Trainers (WSIT) and WSI mentors to execute quality active learning events.

Research showed, if participants of the WSI course were more engaged, if there was an opportunity within the content of the course for some of the learning to be completed online prior to the classroom setting, then candidates may be more successful and completely deck ready. Candidates could initially work on their own, at their own pace, and then the content would be reviewed in a classroom with a WSIT to complete the requirements of the learning cycle. The resulting studies and interactions with key stakeholders revealed the learning styles of the IDP candidates would benefit from such a model. The SWS team then spent three years developing a blended learning model curriculum with approximately 50% online learning and 50% classroom experiences. After careful review and extensive training for those involved in the delivery of this program, it was successfully launched in January 2016.

After a year of implementation, preliminary results obtained through conversations with Training Partners indicate successes in the program have led to a higher rate of completion for WSITs and WSIs, as well as flexibility in program facilitation. In 2016, the Red Cross delivered over thirty WSIT courses for approximately 300 candidates, of which, 100 were fully certified by December 15, 2016, and are now facilitating WSI courses. Approximately 19,000 WSIs were also trained. Without these new Instructors entering the field, Training Partners would not have been able to deliver 1100 Instructor Development Program courses across Canada. The new blended learning delivery model has been well received and seems to be working effectively, especially for millennials.
EVERYDAY LIFESAVER EDUCATION PROGRAMME

Miss Karin Brand, Mrs. Mona Lisa Wernesten

1Swedish Lifesaving Society, Bromma, Sweden

Poster Day 1, October 17, 2017, 8:30 AM - 5:00 PM

In this new Everyday Lifesaver Education programme SLS has educated 20 newly arrived refugees to become swimming instructors with enhanced education in lifesaving. Participants have, apart from a professional training, received mentorship and tools to be able to start-up their own swimming schools and SLSs Youth Lifesaver programme in exposed areas. A specially adapted swim school pedagogy package and lifesaving program has been developed to suit the target group.

Lessons learned from previous projects have taught us that it is not enough to only educate the students in the programme. Family members and relatives to the student will also be targeted with water safety information materials, which have been developed in a number of languages.

To give extra value and enhance integration to Swedish society, the “Everyday lifesaver education programme” will collaborate with organisations within the umbrella organisation Swedish Outdoors (Svensk Friluftsliv) to give students and their families’ possibilities to safely go out fishing, kayaking, skiing etc.
INTRODUCTION
There is no standard in water safety competence for students at teacher training colleges in Switzerland. At the end of college some have acquired swimming skills, others a certification from the Swiss Lifesaving Federation, and quite a few have never had any water safety education at all. The bfu – Swiss Council for Accident Prevention and the Swiss Lifesaving Federation want them to leave college with the ability to teach school-age children basic swimming, water safety and safe rescue skills (1).

AIM
To qualify graduates of Swiss teacher training colleges to teach safe water activities in pools and lakes.

APPROACH
Develop and test an educational programme in water safety competence with students in Swiss teacher training colleges. Draft a pilot programme with regard to the 20 competencies as presented by Kevin Moran (2) at the WCDP 2015 in Penang and to the Drowning Chain of survival (3). Including reflection on attitudes to water safety in self and others, rescue and self-rescue competencies and basic life support BLS/AED.

Make the supervision and organisation of a group in, on and around water the main theme of the programme. Make the students pass the programme in three days and provide certification by the Swiss Lifesaving Federation (rescue pool and lake, BLS/AED) for those who pass the test. Cover two modules with the programme: pool and lake. Test the programme with two groups of 12 students each in two different Swiss teacher training colleges in spring and early summer 2017. Conduct the programme in the test phase with approved experts from Swiss teacher training colleges, the Swiss Lifesaving Federation and the bfu.

Compile the results to a teaching aid. Submit the teaching aid to the sounding board of the Swiss Water Safety Plan and include results of feedback. Edit the final form – translate, print and disseminate. Support Swiss teacher training colleges that plan to implement the programme into their curriculum. Monitor the number of certificates issued by the Swiss Lifesaving Federation.

RESULTS
The results of the test phase – the process and content of the programme - will be presented at the WCDP 2017 in Vancouver.

CONCLUSION
From 2018, Swiss teacher training colleges will have at their disposal a teaching aide aiming at becoming a standard in water safety education. Further research is needed to show the protective value of the programme.

REFERENCES
THE WATERWISE ACADEMY: TEACHING WATER SAFETY TO UNDERPRIVILEGED CHILDREN IN SOUTH AFRICA

Mr. Andrew Ingram ¹

¹National Sea Rescue Institute

Poster Day 1, October 17, 2017, 8:30 AM - 5:00 PM

BACKGROUND

We estimate that each year in South Africa there are 2000 fatal drowning incidents of which 600 are children. We believe that 10 times more people suffer some form of hypoxic brain injury from non-fatal drowning incidents, with associated social and economic knock on effects as reported in various studies and scientific journals. We estimate that approximately 20,000 people suffer from fatal and non-fatal drowning each year in South Africa.

According to the South African Medical Research Council, those most at risk of drowning are children from disadvantaged communities with the highest incidence in fresh water, farm dams, swimming pools and rivers.

Our WaterWise Academy Instructors prevent drowning tragedies through education. We teach children, in the safety of their school classroom, how to avoid danger in or near water, what to do in an emergency, who to call for help, how to rescue a peer and how to do Hands On CPR. The interactive presentation is given on school premises at no charge. We have taught over 1 300 000 children since 2006 and currently teach about 300 000 children each year. Our 14 Instructors & 9 volunteer Instructors are based in South Africa visiting classes in needy communities.

CASE STUDIES:

Knysna April 2015:
Devon Dodd, a Grade 8 pupil at Oakhill school was surfing at Buffalo Bay near Knysna on South Africa’s East coast when he noticed a man in difficulty in a rip current. He paddled over to the man and getting off his surfboard he pushed it to themas who then climbed aboard. Devon then swam the board into the shallows helping the man to safely get off. The basic, but incredibly important peer rescue technique of getting floatation to the man but not allowing him to get close enough to grab the rescuer saved both rescuer and patient. The incident was captured by a photographer and clearly shows how the teenager saved a life. The peer rescue lesson is one of the most important WaterWise lessons, but in this case, Devon’s mother, a swimming teacher, had taught him the lesson.

George May 2015:
In May 2015 Levonia Koert, 11, a Grade 4 pupil at Diepkoof Primary, a farm school near George, was playing in a dam with her friend Christolene Juries, 8, when Christolene got into water that was too deep. Remembering the WaterWise safety lesson that she had been given by WaterWise Instructor Liza Wigley she looked for something to help pull her friend out. There was nothing that she could use. She then ran for help, as she had been taught, and her mother called 10177. When rescue teams arrived at the dam it was too late for Christolene. But Levonia survived. Without the WaterWise Academy lesson it is probable that Levonia would have gone in deeper to try and help her friend. Both children would then have drowned as has happened on numerous other occasions.

Oudtshoorn January 2016:
Daniel Ewerts and Kashief Esau both of Hoërskool Môrester in Oudtshoorn were at a local dam when a man who they knew as Uncle Sam, apparently under the influence of alcohol, went into the water. Almost immediately he slipped under the surface. Daniel and Kashief managed to get him out of the dam and with the help of their friend Jonathan Bruintjies they started CPR. Daniel was in a Waterwise class at De Jager Primary in 2014 and remembered the lesson - who to call for help and how to do CPR. When paramedic Riaan Botha from the Oudtshoorn ambulance station arrived on scene Sam was frothing at the mouth, but the children had got a pulse back. Sam was taken to the Oudtshoorn hospital and then transferred to George ICU in a critical condition. He has subsequently been discharged. Sam survived because the children knew how to do CPR and who to call for help.

CONCLUSION

The lessons that we teach are very simple. But if children are not taught the basics when it comes to water safety their lives are in constant danger. We have broken the lesson down into three main sections - up to Grade 4 or 9 years of age - we teach children to have a PLAN. The acronym helps Instructors teach children to P - prepare, L - look for danger, A - ask an adult to watch them swim and N never swim alone. We then teach them the dangers of Peer rescue and how to safely help a friend and what to do if this is not possible. All groups get taught the emergency telephone number 10177 which works from a landline and a cell phone. The older children get taught the above lessons and we add Hand-On CPR.

Spending one school period of about 40 minutes with children teaching them the basics of water safety … how to avoid danger in water, what to do in an emergency, how to safely rescue a peer, who to call for help and how to do Hands - On or Bystander CPR is currently not taught in the South African school curriculum. Our WaterWise Academy Instructors visit schools in disadvantaged communities where they are welcomed by school heads who understand the danger that their children face both getting to and from school and in their private lives. The poor communities that we operate in all ask for revisits from the instructors, which we do on an annual basis. We believe that this simple education is cost effective and makes a real difference in our communities.
This research sought to generate fundamentals and practices that provide new outlooks to aquatic education and strengthen its links with drowning prevention.

BACKGROUND

Our country conveys a large aquatic territoriality and an aquatic education rather restricted to most population. Furthermore, most proposals promote swimming as a sport as a synonym for water safety. Regarding the latest Global Report on Drowning the aforementioned aspects leave aside to associate skills, attitudes, values and knowledge as essential water safety contents.

This Research – Action was implemented in “Junior Lifeguard” Programs. Which are developed in some Elementary Estate Schools from Montevideo, Uruguay. Said interventions are co-managed between the National Secretary of Sports, the City Council of Montevideo and supported by the National Lifeguard Association of Uruguay.

WHY RESEARCH – ACTION?

This kind of research goes beyond a critical understanding of its study subject, it is committed to transform collective practices. For a start, we will analyze how to improve educative practices focused on processes that promote self adaptation to the aquatic environment and self evaluation. In other words, we will see the way cognitive and creative teaching styles impact to improve aquatic competences and the student’s perception of them. Secondly, the differences observed between children form critical contexts and favorable contexts.

IMPLEMENTATION AND METHODOLOGY

It was performed through Case Studies of five “Junior Lifeguard” Programs, targeting 11 and 12 year-old students. Each program implied sixteen to twenty four lessons. In order to improve teaching and learning processes, the most comprehensive possible perception of what was happening there was required. Different data collection methods were triangulated to achieve it including the water competence assessments record and a Researcher’s Diary. Said data was gathered since May, 2013 to September, 2014.

EVALUATION

On the whole, this work represented to us a great resource to evolve our understanding of teaching methodology, evaluation and children learnings. Therefore, it actually improved our practices. Culturally adapted it may bring out some new ideas to apply in other contexts as well.

FINAL THOUGHTS

We observed that as methodology changed so did behaviours. Concerning aquatic motricity, beyond children achievements, it allowed us to succeed in involving knowledge, attitudes and values in practical aquatic activities. Speaking about water safety, the ability to make decisions, to make a critical judgment of the environment; to identify and create the own possibilities, a certain optimal emotional state to act, based on experience and thinking are fundamental.

We found essential to integrate research and teaching to contribute to an education that takes into account prevention and personal fulfillment while building the link between the individual and the aquatic environment.
BACKGROUND
Recent research has suggested that floating first rather than swimming is a better survival option especially when clothed and the immersion unintentional (1). The water competency of being able to float is critical to maintaining the airway in a drowning situation yet little is known how well people can float or what their perceptions of their capacity to float are. In addition, little is known about the relationship of being swimming and floating competency. Whereas flotation activities are usually taught in the early progressions of learning to swim, ways of floating as a means of surviving a life-threatening immersion episode are not as commonplace in water safety education.

AIMS
It is the purpose of this study to:
1. Explore perceived floating competency via a pre-test questionnaire
2. Compare preconceptions of personal competency with post-test reflection on real and perceived competency
3. Determine real floating competency in a range of deep water activities of differing degrees of difficulty
4. Make recommendations on the teaching of flotation in water safety education

TARGET GROUP
Young adults

METHOD
The study design chosen for this latest phase of the Can You Swim? Project2 is a paired, repeated measures (test-retest) experimental design where the participants served as their own control. Participants in this study will be first year students (N = 70) enrolled in a sport, health and physical education undergraduate degree taking part in a first semester module on Aquatics. To minimise learning effects, testing will be completed in their first week of study prior to the commencement of teaching. Participants will complete a pre-test survey on their estimated swimming and floating competency, their previous experience and learning, and their confidence in being able to performing deep water flotation activity. They will then undergo a series of practical tests based on the water competencies developed in the initial Can You Swim? Project but will also attempt to perform a range of flotation activities of varying degrees of difficulty. Assessment of these tasks will be based on a subjective rating scale developed by the author in a previous study to assess flotation when wearing clothing.3
Upon completion of the practical work, students will re-evaluate their floating competency using a post-test survey.

RESULTS AND DISCUSSION
It is anticipated that the data gathered will indicate that many swimmers with good locomotive competency in the water have difficulty in remain stationary and maintaining the airway in deep water as a survival competency. It is expected that a pre-test/post-test comparison of data will demonstrate a disparity between self-estimated flotation and real flotation capacity with some participants overestimating their ability to float with minimal movement designed to conserve heat and energy.

CONCLUSION
It is anticipated that the findings of this study will help inform water safety advocates, teachers and instructors of the need to promote floating competencies and their realistic assessment of them in education programs and safety campaigns.

REFERENCES
Recent research has confirmed that most people overestimate their own personal aquatic competence (Moran, et al, 2011). Why is this? There are multiple reasons for this complex phenomenon. One is that many persons have learned to swim under controlled, quiet water conditions, e.g. a pool. However, it is well known that the vast majority of drownings occur in open water. Having learned in a pool and having limited or no experience in open water, one may assume that what they can do in a pool they can also do in open water. When this is not the case - often (Tipton, et al 2009, Kjendlie, et al 2013) the transition from pool to open water may be too great – a drowning episode may develop.

Another related reason is that their learning experience may have been lacking in challenge and measurable evaluation. The learner has simply not been put to the test. Can I swim 50m, 100m, 200m? Can I stop and rest? Am I as good in open water as in the pool? Am I as good as I think I am? You don’t know if you don’t try. Knowledge of, and the ability to, assess one’s own personal competence is considered an essential water competency (Stallman, et al, 2017).

What is the teacher’s role in this scenario? How should teaching be conducted to help learners avoid thinking that they have greater competence than they really have? There are many arguments for continuous evaluation. We will not explore them all. In the context of this discussion, the reason is simply to keep learners (and teachers) aware of where they really are on any scale of advancement, at any given point of time. How far have I come? What can I do and what can I not do? Your pupils should evaluate themselves and each other. Most importantly, each pupil must learn to evaluate himself, including asking her/himself certain critical questions; e.g. “CAN I REALLY STOP AND REST WHEN I GET TIRED?”

Teaching needs to include regular, on-going evaluation. Giving feedback is impossible without it. A measurable task is a learning task in itself and need not be looked upon as simply a test. It can be conducted in such a way that pupils focus on the challenge and its mastery. The teacher can combine routine measurable learning challenges with discussions regarding the need for knowing what you really can do. It should be pointed out, that it is easy to over-estimate one’s competence – and that many do, or that accomplishing something in a pool does not mean it can be done in open water. It is also highly effective to periodically challenge pupils to estimate their performance on some competence(s) before assessment and then to compare the estimate with the actual performance.

Open water can be simulated in many ways in a pool – in preparation for the real thing. Real open water experience can be built into a program at developmentally appropriate points in time.

Helping learners correctly estimate their competence is an essential part of our responsibility, and one of the essential competencies shown by research evidence to have protective value. It is at least as important as the other competencies.
Every year or every second year, at Vingrom School, a two day cultural/biological program is held which focuses on the lake. Various aspects of water safety are integrated into a biological and anthropological approach to local culture. In the former local culture, many inhabitants of the area lived off of the lake, primarily by fishing but also by transporting people and goods on the lake. By the very nature of this activity they were exposed to potential risk. They became adept at providing the sustenance they needed without putting themselves at risk. Some of these activities are repeated by the Vingrom School pupils.

On day one, the middle school children (Grades 5-7) participate in a fishing expedition, rowing out onto the lake with smaller row boats, also with a small outboard motor. They learn how to set nets, where best to set them, and other fishing lore.

The lower Grades (1-4) roam the shore in small teaching groups. They explore a nature trail along the shore line and discuss themes related to the biotope of the lake and its shore. They study the varied life of the shore line ponds and natural habitats of smaller creatures. They are introduced to the use of life jackets, donning and removing the jacket. They are also introduced to CPR, its need, use and technique.

On the second day the middle school children row out and harvest the catch, haul in the nets, row ‘home’ and remove the fish from the nets. Then these erstwhile fishermen and women wash and stretch out the nets and prepare them for drying and eventually folding and storage. All of this done in the spirit of the old fisher folk of the area.

They then turn their attention to the harvest. They learn to identify the trout, bass, pike and whitefish of the harvest, and they learn about the anatomy of the fish. All of the children are involved in preparing the catch and then in preparing the meal. The older children assist the younger children and they work in small teams with an adult assisting each team. The fish are cleaned and prepared for frying, smoking, or boiling. Fish soup and fish cakes are prepared. A smoking oven and an in-ground oven for cooking in aluminum foil are constructed. And finally, after all of the preparation, all enjoy a well-earned meal.

After this hearty meal, the middle school pupils who wish, swim and others choose to row the boats (both always popular). This free swimming session is carefully guarded and the children are introduced to the buddy system, each having responsibility for his ‘buddy’. The two day event is highly successful and all look forward to the next time.

---

**POSTER PRESENTATION**

**WITH LAKE MJØSA AS OUR DINING ROOM: LIVING OFF OF THE LAKE**

Mrs. Rannei Grimstad¹, Mrs. Bente Wainosdatter Horneman Laakso¹,²,⁴,⁵, Mr. Ebbe Horneman³,⁴, Dr. Robert Keig Stallman⁵,⁶,⁷,⁸

¹Vingrom Primary School, Lillehammer School District, Lillehammer, Norway, ²The City of Lillehammer, Lillehammer, Norway, ³Lillehammer Museum at Maihaugen, Lillehammer, Norway, ⁴Mjøsen Lange Foundation, Lillehammer, Norway, ⁵Norwegian Lifesaving Society, Oslo, Norway, ⁶The Lifesaving Foundation, Waterford, Ireland, ⁷Tanzanian Lifesaving Society, Dar es Salaam, Tanzania, ⁸Norwegian School of Sport Science, Oslo, Norway

*Poster Day 2, October 18, 2017, 8:30 AM - 5:00 PM*
Vingrom Primary School was the first in Lillehammer to integrate open water swimming into their compulsory school swimming program. It is now more widely recognized that learning to swim in a pool is not necessarily sufficient to provide protection in open water. Tipton et al (2008) showed that inexperienced lifeguards suffered a greater penalty than experienced guards when venturing from pool to open water and then to surf. Barwood et al (2007) have demonstrated that experience with cold water increases performance in cold water compared to those inexperienced. It is now accepted that experience in open water provides added protection. Given that by far the largest number of drownings occur in open water - open, cold water experience is very ‘cost effective’ for society.

At Vingrom School in Lillehammer, Grade 4 pupils have their first ‘formal’ exposure to open water. By this time, a majority of Lillehammer children can swim. Their exposure to open water is modest. By the time they reach Grade 6, the time they spend in open water is increased and the number who can swim approaches 100%. As this tradition grew at Vingrom, the idea of swimming in the lake once each week was launched by the pupils themselves. As the autumn proceeded, the children themselves decided to continue as long as possible. This is, in fact, a gradual acclimatization to cold water which has been demonstrated to offer considerable protection against cold shock and the subsequent risk of drowning.

These Grade 6 pupils were able to continue until shortly before the lake froze over, with a water temperature of ca. 3-5 0C. At more modest temperatures (still very cold for the uninitiated, approx. 10-15o C) many were able to complete a 200 m combined test nearly as well as in the pool. For more information see the abstract titled: “The Decrement of Skill with the Added Burden of Clothing: A Cohort Study – Four Year Follow Up”.

This tradition has grown to the point that within the school, other classes beg to join. In the city of Lillehammer, other schools are also now asking to join. A school tradition is moving towards becoming a city tradition. Expanding this program is intentionally done in a controlled way to guarantee the advance training of teachers and safety for all.

The Polar Bear Swim Club is showing the way!

REFERENCES

The Vikings had a history of not only exploring vast reaches of the seas of the Northern Hemisphere but also of celebrating a wide variety of sporting activities including several competitive activities in the cold water of the north. They are said to have competed at long distance swimming, swimming underwater and wrestling in the water. The goal of the wrestling appears to have been to drown one's opponent. Or as one historian relates, “If in a good humor, to almost drown your opponent”. In times of war, they were adept at swimming with a load on their back and with weapons. The Sagas relate stories also of swimming great distances in this cold water. Several of the Sagas relate swims of up to 30 km, and remember, the water is cold. The Swedish historian Bertil Wahlqvist relates many stories in his book “Wild Vikings in Play and Sport”, with a chapter specifically on swimming.

Vingrom Primary School is a smaller school on the outskirts of Lillehammer, in the village of Vingrom. They have been deeply involved in the Lillehammer Community compulsory swimming program for years. The school has evolved a passionate culture for water safety in its many forms. They have evolved several modules for open water safety of which this Viking boat module is one.

The Mjøsen Lange Foundation is a private social - anthropological and educational foundation established to promote Viking culture and especially to sponsor a 35 foot reconstructed Viking boat, maintained in Lillehammer, on Lake Mjøsa. The Vingrom Primary School has an advanced school swimming program, including swimming in Lake Mjøsa (the largest lake in Norway). These two have formed a cooperative effort with school classes learning about Viking culture while actually rowing the Viking boat Mjøsen Lange. Built into the program is the experience of leaping from the boat and swimming in cold water, returning and climbing aboard with assistance in a simulated man overboard exercise, as well as swimming a short distance to land (under well-controlled conditions).

The two lead authors of this poster are otherwise involved in promoting Viking culture. The lead author is the coordinator of the use of the Mjøsen Lange and otherwise lectures on Viking culture. Children are thrilled at hearing the colorful accounts of Viking life, made real by learning about the construction and operation of the boat as well as actually rowing the boat and manning the sail. What better way to promote aspects of water safety than to play Viking? The rich tales of these fearless warriors no doubt causes the children to relive the lives of their ancestors.
In Norway, where boating life is extremely popular, drowning as a result of falling from small boats is vastly over-represented. Only recently has legislation made life jacket use compulsory, though not in all circumstances and even where required, compliance is less than satisfactory.

Located within comfortable walking distance of Vingrom Primary School in Lillehammer, is a natural basin on the shore of Lake Mjøsa. This area is wooded and the school’s outdoor education center is located there. The basin has sloping shores and varies in diameter from ca. 25 – 50 meters, depending on the current depth of the lake. It is virtually a perfect swimming pool and also an ideal location for small boat practice, with easy access out into the lake through a small channel.

One of the water safety teaching modules practiced by Vingrom School includes rowing and otherwise maneuvering a small boat, exiting and entering the boat, both with and without a life jacket, and swimming the short distance to land. During this module, the H.E.L.P. technique is also introduced.

A variety of other life jacket competencies are introduced including selection of the correct life jacket, donning the life jacket both on land and in the water, swimming and survival float with the life jacket, and, as mentioned above, adopting the heat loss reducing H.E.L.P. position. Various swimming strokes are practiced and the pupils explore the intricacies of these with reference to ease of breathing and visibility as well as ease of swimming. The role of one’s individual skill profile is also considered in reference to selection of a survival stroke(s).

To enhance the adjustment to movement in the water with a life jacket, entering and exiting, etc., life jacket skills are introduced in the pool. The use of a life jacket implies a situation where one usually is also clothed. Swimming with clothes is also emphasized otherwise in the school’s program and goes hand-in-hand with life jacket use. Being both clothed and wearing a life jacket, considerably alters the challenge to survival. These skills are considered essential. The pupils are encouraged to consider the exercises in the pool as preparatory to the same skills in open water. That virtually all drowning occurs in open water is discussed and the children consistently look forward to taking skills launched in the pool, out into open water.

These children present role models to others, their families and friends, and life jacket use appears to be on the increase. This module has gained sufficient popularity that children from other schools are now asking to be allowed to participate. This is of course, the goal.
Another pedagogical module in the Vingrom Primary School’s water safety model is crossing a small stream with a modest current. Surrounding any body of water are numerous tributaries carrying water in or out. These can vary in strength and size in a short time. Heavy rain or unblocked ice at spring thaw upstream, can cause local change with little warning. While simply on the way home, along the shores of the lake, a stream which one can normally jump across, may suddenly require a more advanced approach. Training in crossing a stream with modest current provides these learners with an experience which reduces the risk of such a crossing. The optimal solution is to avoid such a stream. However, a small stream yesterday can be bigger today. One can be caught unawares.

Once again, Vingrom School has been alert to the possibility of using local natural facilities to promote water safety activities. Within a few hundred meters of the school is a small stream which runs down into Lake Mjøsa. It varies in strength and is monitored regularly to provide both a safe and exciting, though developmentally appropriate experience. This exercise is particularly popular and the pupils treat it like a ‘water park’ experience.

Skills taught include wading across at a point carefully selected for easiest crossing. They are equipped with a life jacket. Safety ropes are sometimes used to add drama while the challenge is in reality, insufficient to require ropes. The learners are coached and guided to return with adjusted technique. They quickly discover that it is most appropriate to keep both feet on the bottom and to proceed almost by “shuffling” across, carefully choosing their way. Keeping the center of gravity low helps to maintain balance and using a stick for support increases the ease of movement. Even in knee deep fast moving water, the second crossing is by self report, “easy”.

The exercise the pupils enjoy the most follows the above crossing. They wade out to the center of the stream at a point of appropriate depth (usually not more than about knee deep), sit facing downstream, lean back and allow the current to carry them down. Carefully chosen depth avoids too much depth but provides enough for a smooth ride. The pupils normally clamor for a repeat and are then able to focus on choosing their course, steering to avoid rocks, keeping their feet forward to fend off rocks when necessary, etc.

Carefully controlled conditions are provided and monitoring of the conditions immediately before beginning the program provides safe and developmentally appropriate challenges. Adult supervision is strengthened with assistants and or parents accompanying the class.
BACKGROUND
Since 2013 the RNLI has worked with a consortium of organisations to develop the ‘Aquatic Survival Programme’, a classroom-based education programme which aims to teach children 10 ‘key’ water safety messages. The messages are modified versions of those developed by the International Task Force on Water Safety Messages, made suitable for a low-resource environment.

In 2015 the programme was piloted in Ghana by the Felix Foundation, a Ghanaian NGO with a focus on water safety education and skills. The programme was taught across 100 schools in Accra, reaching approximately 32,000 children.

This study examines water use and the baseline and endline water safety knowledge of a sample of 4,280 students in Accra who undertook the programme. We also examined retention of water safety knowledge over a 1 year period.

METHODS
This research was conducted through the 2016 National Social Survey, a cost-shared survey aimed at obtaining public opinion 100 schools were selected for delivery by the Ghana Educational Services, and classes for delivery were selected by the school headmaster. The target age group for the messages was 7-14 years; however, there was variation above and below this age range due to mixing of older children in classes.

Random number tables were used to select 10 children in each class from the class register. The children were separated from the rest of the class and verbally asked a series of 14 baseline questions from a structured questionnaire. The answers to the questions related to the key learning points associated with each water safety message.

Demographic details about each child and their use of water over the previous 48 hours were also collected. Once the baseline data was collected the children were returned to class and taught the water safety messages. School teachers delivered the lesson to the children over a 45 minute period, under supervision from 2 trained instructors from the Felix Foundation.

The trainers and data collectors returned to the school approximately two weeks later to supervise another lesson. Prior to running the second lesson, the data collectors selected the same children from the class and conducted the same questionnaire.

In total, the project reached approximately 32,000 children. A sample of 4,280 children (13%) completed the pre/post questionnaire. Anonymised data is currently being analysed by the RNLI.

EARLY RESULTS
The study showed that 21% of participants in the survey had entered open-water in the 48 hours preceding the questionnaire. Most entries took place in the ocean, followed by swimming pools with 58.4% of entries being for play or exercise, while the remaining entries were for everyday activities, such as bathing and washing.

Only 2% of participants self-reported the ability to swim further than 25 metres. This is reflective of a lack of a formal swimming teaching structure within schools in Ghana and a lack of public swimming facilities. Post-intervention knowledge of water safety was significantly higher than pre-intervention knowledge.
WATER SAFETY AND SELF RESCUE

Mr. Jon Glenn¹

¹Swim England, Loughborough, United Kingdom

Poster Day 2, October 18, 2017, 8:30 AM - 5:00 PM

Water Safety and Self Rescue – A UK partnership between Swim England and the Royal National Lifeboat Institution (RNLI) providing children aged 7-14 with an opportunity to swim and learn to survive in open water: Swim Safe

In 2013 the RNLI and ASA identified that there was a gap in the UK’s swimming curriculum for the provision of opportunities for children to swim in open water as well as in public pools. It was agreed that between these two organisations they had the skills and the resources to provide these opportunities in the UK and created the Water Safety and Self Rescue programme. This also came in response to the ASA’s school swimming research which found that only 51% of children aged 7-11 were able to swim 25m and 52% of parents do not believe their child would be able to swim to safety if they were to get into danger in the water.

Water Safety and Self Rescue is a community lead programme which forms a standard part of child water safety education and would be made available to every child aged 7-14 in the UK and Ireland. Water Safety and Self Rescue is a pilot programme run and funded in partnership by the RNLI and the ASA. The programme teaches children between the ages of 7 and 14 years basic skills to stay safe, in and around open water. It is a practical water based programme provided free of charge using RNLI lifeguards and ASA qualified swimming teachers.

Water Safety and Self Rescue was piloted first in 2013 over four weeks in a tidal sea pool and 2300 children attended.

In 2016 the Water Safety and Self Rescue continued and expanded to over 16 sites around England and Wales to address different waterside topographies and scenarios, including tidal pools, beaches and inland lakes. The Lake Windermere programme also included partnerships with Land owners. The programme during 2016 reached over 16,000 children and an estimated 500 adults at 12 UK sites.
1 in 68 children (1 in 42 boys) are diagnosed with autism. Drowning is among the leading causes of death of individuals with autism. In 2009, 2010, and 2011, accidental drowning accounted for 91% total U.S. deaths reported in children with an ASD ages 14 and younger subsequent to wandering/elopement. 32% of parents of children with autism reported a "close call" with a possible drowning (National Autism Association, Lethal Outcomes in ASD Wandering, 2012).

More needs to be done to ensure that individuals living with autism have access to high quality swim instruction in order to reduce deaths from drowning. Canucks Autism Network has partnered with Red Cross to deliver adapted swimming lessons with specialized behaviour supports for individuals with ASD. This session will provide an overview of tools and strategies for supporting individuals with autism in swimming lessons.

In addition, Canucks Autism Network has partnered with a number of first responder groups to provide training on strategies for responding to elopement and drowning prevention for individuals with autism. This session will provide an overview of lessons learned in first responder training, and share examples of tools and tips that can be included in first responder training for drowning prevention.
A recent review of drowning deaths in Western Australia (WA) highlights that people from culturally and linguistically diverse (CALD) backgrounds are drastically over-represented in drowning data. Between July 2003 and June 2013, 38% of drowning deaths recorded in WA involved people born overseas. Of these, over half involved people from non-English speaking countries and had newly arrived to WA. Limited water safety awareness combined with alarmingly low participation rates in swimming and water safety programs were found to be the key factors contributing to this over-representation.

Many people from CALD communities have never had the opportunity to participate in swimming and water safety program that Western Australians take for granted. There is growing concern that these communities don’t access traditional swimming and water safety programs due to a number of cultural, financial and environmental barriers which means that they miss out on gaining essential swimming and survival skills.

The Royal Life Saving Society WA has developed a number of programs aimed at overcoming these barriers to participation among CALD communities to ensure that they have access to culturally appropriate swimming and water safety programs.

WOMEN’S ONLY SWIMMING
This program aims to enable women to address the concerns many CALD women had expressed about swimming in an environment where men were present, as this poses a cultural problem for them. The classes are led by female instructors where the women can feel at ease. In some cases classes are even held behind closed doors. Last year 321 women from various cultural backgrounds participated in the women’s only swimming program to gain valuable swimming and survival skills.

ACCESS AND EQUITY PROGRAM
This program addresses the barriers to participation and aim to improve access to swimming and water safety education for children aged 5-14 years in socially disadvantaged (low socio-economic, Aboriginal and CALD) communities. Children in identified communities are offered subsidised lessons and assistance with transport to these programs to encourage participation. Last year 746 children participated in the Swim and Survive Access and Equity program. Evaluation of the program showed a 21% increase in participant’s awareness of water safety at the end of the program and was a 52% improvement in their swimming and water safety skills.

SWIMWEAR GUIDE
Often swimming and water safety education is overlooked by new migrants and CALD communities due to barriers such as cost and availability, and for many women the issue of cultural modesty is extremely important. RLSSWA has worked closely with the Vietnamese, Chinese, Indian and African communities within WA to develop a swimwear guide to provide information about the options available to them to maintain culturally appropriateness and safety while in the water. The guide explains the suitability of the different swim wear options in a variety of swimming environments to ensure the women are aware of the risks associated with some of the more modest options.

These programs have all been successful in increasing participation among at-risk groups within the WA community through improved access to culturally appropriate swimming and water safety programs.

SWIM AND SURVIVE FOR ALL – WORKING WITH AT-RISK COMMUNITIES

Miss Lauren Nimmo1, Miss Jessica Cruikshank1
1Royal Life Saving Society WA, Perth, Australia

Poster Day 2, October 18, 2017, 8:30 AM - 5:00 PM

A recent review of drowning deaths in Western Australia (WA) highlights that people from culturally and linguistically diverse (CALD) backgrounds are drastically over-represented in drowning data. Between July 2003 and June 2013, 38% of drowning deaths recorded in WA involved people born overseas. Of these, over half involved people from non-English speaking countries and had newly arrived to WA. Limited water safety awareness combined with alarmingly low participation rates in swimming and water safety programs were found to be the key factors contributing to this over-representation.

Many people from CALD communities have never had the opportunity to participate in swimming and water safety program that Western Australians take for granted. There is growing concern that these communities don’t access traditional swimming and water safety programs due to a number of cultural, financial and environmental barriers which means that they miss out on gaining essential swimming and survival skills.

The Royal Life Saving Society WA has developed a number of programs aimed at overcoming these barriers to participation among CALD communities to ensure that they have access to culturally appropriate swimming and water safety programs.

WOMEN’S ONLY SWIMMING
This program aims to enable women to address the concerns many CALD women had expressed about swimming in an environment where men were present, as this poses a cultural problem for them. The classes are led by female instructors where the women can feel at ease. In some cases classes are even held behind closed doors. Last year 321 women from various cultural backgrounds participated in the women’s only swimming program to gain valuable swimming and survival skills.

ACCESS AND EQUITY PROGRAM
This program addresses the barriers to participation and aim to improve access to swimming and water safety education for children aged 5-14 years in socially disadvantaged (low socio-economic, Aboriginal and CALD) communities. Children in identified communities are offered subsidised lessons and assistance with transport to these programs to encourage participation. Last year 746 children participated in the Swim and Survive Access and Equity program. Evaluation of the program showed a 21% increase in participant’s awareness of water safety at the end of the program and was a 52% improvement in their swimming and water safety skills.

SWIMWEAR GUIDE
Often swimming and water safety education is overlooked by new migrants and CALD communities due to barriers such as cost and availability, and for many women the issue of cultural modesty is extremely important. RLSSWA has worked closely with the Vietnamese, Chinese, Indian and African communities within WA to develop a swimwear guide to provide information about the options available to them to maintain culturally appropriateness and safety while in the water. The guide explains the suitability of the different swim wear options in a variety of swimming environments to ensure the women are aware of the risks associated with some of the more modest options.

These programs have all been successful in increasing participation among at-risk groups within the WA community through improved access to culturally appropriate swimming and water safety programs.
INTRODUCTION
As a community member and local swimming instructor for (1) Tofino District; Parks and Recreation, (2) Ucluelet District: Parks and Recreation, and (3) Wickaninnish Community school, I am invested in sharing environmental education, swimming instruction and water safety with others. I wish to focus my research on sharing with coastal Nuu-chah-nulth First Nations, because I wish to give back to the people who have shared their homelands with me.

In ŭić-mał-ni: Sharing Drowning Prevention Education with Nuu-chah-nulth First Nations I will discuss the following - Chapter 1: Background, Research Questions, Thesis Framework, Scope, and Delimitations, Need or Significance, Chapter 2: Literature Review, World Health Organization Global Drowning Report, Royal Life Saving Society, Chapter 3: Research Methodology, Data Collection, Participants and Site, Data Analysis, Study Conduct, Chapter 4: Results, Chapter 5: Conclusions, and References.

I have completed my study using a 2 tiered approach: In tier (1) I worked alongside individuals within Nuu-chah-nulth First Nations to create culturally specific programming that was based upon community input. In tier (2) I was able to determine the effectiveness of the Swim to Survive program by conducting semi-structured interviews with local community members on how gaining these skills impacted the lives of the participants.

RESEARCH QUESTIONS
The proposed case study will incorporate aspects of curriculum development and implementation in that it will involve designing with local first nations groups, and adding components of a swimming and water safety program appropriate for use with children of the Nuu-chah-nulth First Nations. To do this, I will build on existing programs such as the Royal Life Saving Society Canada’s Swim to Survive program incorporating other existing curricula ŭić-mał-ni 3 concerned with recreational swimming, water safety, and survival in aquatic emergencies.

Questions to be addressed in association with the design components of this project will include the following:
1. (a) What is currently known about the attitudes towards recreational swimming and water safety among Indigenous Peoples in the coastal areas of the Pacific Northwest of Canada and the US?
(b) What data exists about the participation of First Nations children and adults in formal programs of instruction in swimming and water safety?
(c) What modifications (if any) are needed to current Swimming and Water Safety programs (i.e. Swim to Survive) in order to make them more accessible to children and adults in the Nuu-chah-nulth First Nations communities?

2. Having addressed the questions above through the creation of the swim program, the semi-structured interviews will focus on discovering the effectiveness of the program by asking interview participants [Nuu-chah-nulth community members]:
   (1) Do children swim unsupervised within coastal areas such as lakes, rivers, and the coastline?
   (2) Do you see value in drowning prevention education such as the Swim to Survive program taught within Nuu-chah-nulth traditional territory?
   (3) How do the children, and youth benefit from drowning prevention education?
   (4) What are the implications of drowning prevention education delivered to the Nuu-chah-nulth community members within Nuu-chah-nulth territory?
   (5) Do you wish to see an increase of drowning prevention education within the region?
In 2007 the Swiss Lifesaving Society (SLRG) submitted a petition to the Swiss Conference of Cantonal Ministers of Education (EDK) requesting the expansion of swimming instruction in state schools. At that time, the request was refused on the grounds of the high costs this would generate for the public authorities. The response also pointed out that teaching children to swim was not the exclusive task of state schools but also of parents and clubs/associations. Now, some 10 years later, the SLRG has achieved its political objective. Within the scope of the “Syllabus 21” project from 2010 to 2014 Switzerland’s 21 German-speaking cantons (out of a total of 26) developed a standard syllabus. In addition to swimming it also includes the topic of ‘water safety’. The objective is to teach pupils how to behave safely when in, on and near water and the correct procedure in emergencies.

This is a milestone for prevention of drowning in Switzerland. The first cantons have already introduced the new syllabus. The majority of the remaining cantons will be introducing it at the beginning of the 2017/2018 academic year.

This poster describes how the SLRG has influenced the political process which culminated in “Syllabus 21”; the competences which should be promoted; how the SLRG is supporting the syllabus’ introduction with comprehensive teaching materials as well as training courses for teaching personnel and where the key challenges lie.
According to the Ministry of Public Health of China, every year an estimated 57,000 people die of drowning, that means 150 people die from drowning every day in China. However, the actual figure is estimated at double this, as accurate figures are hard to collate in China. So, an estimated 300 people die from drowning every day in China.

“In China drowning is the leading cause of injury death in children aged 1 – 14 years...”. It also has been very difficult to find comprehensive statistics within China that gives an overall picture. Information that has been collated gives a very interesting albeit frightening picture:

With the 2nd child policy an estimated 20 million babies are expected to be born each year as opposed to 16.5 million currently. Linked to the baby boom in China, one expects the drowning death rate will now increase in line with the birth rate.

The traditional method of teaching babies to swim using neck rings has been a long established method in China. As far as we are aware pre-2008 all swim schools in China used the Neck Ring method. Even now, more than 70% of baby swimming facilities are using the Neck Ring method in first-tier cities (population more than 20 million).

To change this to more effective international methods is one of the challenges faced by CISTA. Water safety education and correct swimming teaching methods need to be at the forefront for swimming education providers.

Regulation is now required in China to ensure that standardization, quality and correct methods are being used by leisure providers. The formation of CISTA was for this very purpose. Too many swim schools are opening in China with Chinese owners who are looking for business ventures rather than quality of teaching and standards.

After initial training of the swimming teachers, follow-up, renewals and continual professional development structures are not in place. With no structured lesson programs & little or no lifesaving skills training for these swimming teachers, the fear is that international methods being used are only scratching the surface of what is required to really effectively reduce the drowning deaths in China.
BACKGROUND
The poor health outcomes of remote Aboriginal communities have been well documented, with children in these communities at a higher risk of severe skin, ear, eye and respiratory infections. In addition, childhood obesity continues to be a major public health issue with one in four Western Australian children being overweight or obese. This is even higher in regional and remote areas of the state. In addition, low levels of physical activity participation and poor swimming abilities contribute to higher rates of drownings in this at-risk population, with Aboriginal children drowning at a rate of two and a half times that of non-Aboriginal children. In addition, children living in regional and remote areas of WA are five times more likely to drown than those in the Perth metropolitan area.

A recent review of childhood drowning in Western Australia (WA) indicated that limited water safety awareness combined with alarmingly low participation levels in swimming and water safety programs as key factors for drowning among this age group. The Royal Life Saving Society WA (RLSSWA) has been working with Aboriginal communities to implement swimming and water safety and drowning prevention strategies to improve overall health outcomes of Aboriginal children and target their drastic over-representation in drowning statistics.

METHODS
Over the past seven years, RLSSWA has been working with swimming pools in regional WA to run the Go for 2 & 5 Regional and Remote Aboriginal Communities Swimming Program ‘Swim for Fruit’. The program is currently run in regional WA 18 pools including a number of remote Aboriginal communities. It aims to encourage children with a specific focus on Aboriginal children, to participate in regular physical activity at the pool by providing incentives for participation in lap swimming. Involved children are rewarded for their swimming efforts by receiving healthy afternoon tea following each session with the added benefit of encouraging healthy eating practices and educating children about nutrition.

RESULTS
Last year 4,357 children participated in the Swim for Fruit program, a significant increase from the previous year. This program has been successful in encouraging increased physical activity levels among children in these communities, well beyond their current activity at the pool. In addition, Swim for Fruit supports healthy eating by rewarding physical activity with nutritious food. Research is currently being undertaken to identify key motivators and barriers to participation while assessing its effectiveness in improving children’s levels of physical activity, knowledge of healthy eating and swimming skill development. Results from this research will be available at the conference.

CONCLUSION
This program offers a range of opportunities to change behaviours and environments by providing access to healthy food options not often available in these communities, encouraging increased consumption of fruit and vegetables and increasing participating in physical activity.
Swim for Safety and Water Safety training programs that are conducted in Sri Lanka cover basic survival swimming training lessons for children within the country. These training sessions or the lessons are designed and conducted by the Life Saving Association of Sri Lanka (LSASL). However, necessary technical support is provided by Life Saving Victoria (LSV) - Australia.

INTRODUCTION

Drowning is considered to be the second highest cause of accidental death in Sri Lanka. On average, recorded drowning incidents show that 855 people drowned each year from 2001-2006 and 2009 in Sri Lanka. When the numbers are combined with unrecorded drowning incidents, it is estimated that over 1,200 people drown each year. In most of these cases, it was observed that those drowning were preventable.

Lack of swimming ability within the population was identified as a major contributory factor. Hence, increasing swimming ability of individuals would be a key factor in addressing and preventing drowning deaths and injuries.

It was understood that ability to swim and behaving safely in and around water are skills that should be improved or developed in all individuals, irrespective of the location and socioeconomic status. In addition to increasing one’s safety in water, improving the ability to swim enables access to a range of water-based recreations and competitions whereby those individuals become well-being in their lives.

OUTCOME

1. Understanding of dangers in and around water
2. Swimming continuously for about 25m on front and/or back
3. Floating, sculling and treading water continuously for 1 minute
4. Completing a water survival sequence
5. Performing a talk, pull and throw rescue
6. Performing basic emergency response activity (DRSA)

The whole purpose of this Swim for Safety Program is to provide a 12 lesson x 1.5 hours teaching program that can be used to teach students basic swimming maintaining a steady focus on Water Safety skills. Each lesson is expected to be approximately one hour in duration. It is designed to be conducted in open water locations (rivers, bays and similar) or at swimming pools. The Swim for Safety Program lessons include a number of activities through which a student is expected to perform and practice out-of-water activities to help in acquiring basic swimming and Water Safety skills. The ultimate goal of the Swim for Safety Program is, for every student to learn and understand the basics of swimming and water safety skills.
Understanding the process of drowning from the beginning to the end will help establish interventions that can reduce such incidents. In order to end this, a group of researchers designed the Drowning Timeline after a process of discussion and consensus (1). This systematic model aims to identify the different stages of drowning and the actions that are taken in order, recognize and prevent drowning.

The drowning timeline is arranged into 3 phases. Pre-event, event and post-event.

The aim of this abstract is to show the power of the Drowning Timeline by analyzing a water incident with non-fatal drowning. As a simple universal example, we will use a cartoon of the Simpsons, available in this moment [Jan 2017] at https://www.youtube.com/watch?v=LS_6A2Dr6Gk&t=117s  (2)

The first phase called PRE-EVENT is divided into two actions; Prepare and prevent. Education at school and learning how to swim, correspond to the action of preparing the community at risk. At the figures you can see Maggie gets his preparation to react while taking swimming lessons (cartoon timeline 1:52)

However, the drowning incident is triggered when Homer Simpson decides to bathe on a solitary beach, without lifeguards and with strong currents without signaling. The incident originates in the absence of prevention. There were no active (signs of danger) or reactive interventions (lifeguards). (cartoon timeline; 2:25, 2:27)

Second phase (EVENT) was triggered when Homer is dragged by a current and a self-rescue failed while swimming against the rip current. The process of drowning begins as Homer suffers from respiratory difficulties at airways submersion. (cartoon timeline; 2:40, 2:46, 2:49)

At this point Maggie, who has been trained in swimming decides to enter in the water and rescue Homer. It is also the beginning of mitigation while getting his airways out of the water interrupting the process of drowning. (cartoon timeline; 3:19, 3:41)

The third phase, (POST-EVENT), Emergency Medical Services (EMS) provides medical care in the ambulance. (cartoon timeline; 3:46)

Maggie, who is part of the at-risk community (the children) has taken swimming lessons, but the trigger of the incident is the father’s decision underestimating the risk on a beach without any preventive actions (signs and lifeguards).

Authors will show, using an example Simpson’s cartoon, how to help to reduce the burden, understanding the triggers, actions and interventions at Drowning Timeline and how to use it.
INTRODUCTION
Swimming for Safety is a drowning prevention initiative operated by Hue Help, in collaboration with the Department of Education and Training (Vietnam) and the STA (UK). After the World Conference on Drowning Prevention in 2011, the STA supported Hue Help to run an initial pilot programme. The pilot involved training 36 school teachers from 10 schools, who then went on to train 1,200 school children to swim in open water. The programme was developed to meet IFSTA swimming standards.

THE MODEL
1. School teachers are trained to IFSTA standards in swimming teaching.
2. The trained school teachers teach the children in their school to swim, using carefully selected, risk assessed open water sites.
3. The schools are provided with the technical support, knowledge and equipment they need to run the programme.

SUSTAINABILITY
1. Working with the school system. The model allows school teachers who are already on a salary to deliver the lessons within their current job role. There is also scope to integrate the syllabus into the Vietnamese curriculum.
2. Open water. No swimming pool rental or maintenance costs.
3. Lessons learnt from the experience using the IFSTA experience in Vietnam are fed back to IFSTA, which helps develop the programme.

RESULTS TO DATE
The model has expanded considerably. The partnership between the STA, Hue Help and Department of Education and Training has developed. In recent years, the programme has been funded by Norwegian Church Aid (NCA/NAV) under a wider disaster risk reduction initiative, which has allowed it to develop and expand to several provinces. To date, the programme has trained 321 swimming teachers, 9,418 children and 17 teacher trainers across three provinces. The programme implements the World Health Organisations recommendation to teach school-age children basic swimming, water safety and safe rescue skills.

LIMITATIONS
1. Access to appropriate open water sites – that are clean, safe, and in the right location is a challenge.
2. Funding – despite being low resource, funding initiatives in Vietnam is an increasing challenge.

SOLUTIONS
To enable the model to expand, we have had to look at sustainable funding sources. We have founded The Vietnam Swimming & Lifesaving Company. VSLC, as a registered Vietnamese organisation, is able to provide international standard lifesaving training, swimming teacher training to meet a growing commercial demand, as well as support local schools to train swimming teachers. The organisation has a long term strategy of joining the IFSTA as a member. This model allows for income generation within Vietnam to support the training of the already sustainable structure of teaching swimming, land-based rescue and water safety knowledge through the school system.
The project is a card game (format and inspiration from Little Captain, presented by SNS at the WCDP 2015 in Penang, Malaysia), which is a mixture between Trivial Pursuit and Memory games, and consists of 54 cards, 27 of “questions” (blue color), and 27 of “answers” (13 NO, red back, and 14 YES, yellow back), with 27 different subjects (little monkeys, lifebuoys, various characters) each subject repeated twice on the YES cards and on the NO cards backs.

All the “question” cards consider different situations of safe or dangerous behaviors at water. If, for instance, a child thinks that the right answer (behavior) to the question asked and suggested by a “question card” is YES, he will seek, among all the card YES, the card with the back equal to the back of this “question card”; if he thinks NO, he will seek among all the NO cards. At the end, the winner is the player with more YES cards than the other players.

**AIM**

In conclusion, the game promotes the awareness of possible risks that can be encountered near the water and suggests virtuous behaviors not only in swimming or playing at water, but also in relationship with the water during everyday life, because often children don’t perceive dangerous situations.

**TARGET**

After a first version in Italian language, the will is to have an English version and a free application for P.C., tablets, smartphones, making the card game available for all children around the world. The card game will be posted on the IMRF webpage “Project/Education”, as done for other former SNS products (2 cartoons “AQUA”, trailer of “Little Captain”).
BACKGROUND
Drowning is a major issue in Vietnam where drowning is the major cause of death in children under the age of 18. Swim Vietnam was initiated in 2008 starting on a limited budget and helped by experienced foreign volunteers, the program has exploded over the last eight years.

Swim Vietnam has successfully taught over 18,500 children in swimming and water safety skills; 37,600 children given water safety education: trained 200 local swim teachers to international accreditation (AUSTSWIM & Royal Life Saving); built 8 pools and has a local management team.

AIMS AND OBJECTIVES
In the beginning our initial aim of the program was to provide children in Hoi An with basic swimming skills and water safety skills. Now we have developed swimming programs which are sustainable throughout Quang Nam province with the objective of eventually spreading throughout Vietnam.

TARGET
To expand making the program available to all children throughout Quang Nam Province in Central Vietnam by establishing new swimming pools and to assist the government in making the program available to all children in Vietnam.

We have developed over 200 local swimming teachers. Our target is to grow this number in the next year. We are currently up-skilling 17 teachers to become teacher trainers. We have established water safety education for primary schools in the region where we envision educating over 100,000 children in water safety principals over the next 3 years.

METHODS/IMPLEMENTATION
The program is run in cooperation with the Local Education Department of Hoi An and rural locations. The children attend a course of swim lessons as part of their school curriculum. Now, in its 9th year of the program, lessons are conducted by local swim teachers with volunteers mainly providing assistance in training workshops and courses for the team. We have a local management team in place, with the aim for the entire management structure to be local within the next few years.

RESULTS/EVALUATION
The program started by successfully teaching 300 children in 2008 and this has expanded to over 18,000 children in 2016. Children are assessed on the first and final days of their course so results are constantly monitored and shared with local government. Each year discussions are held with the government, teachers and volunteers as to how the program can be improved and grow. The program has reached its initial goals new targets are now in place.

DISCUSSION
This is one model for a sustainable swimming program. It has systems and strategies in place which could be replicated in other regions and possibly other countries. The key to this is local participation and support. The use of foreign volunteers can be very helpful in developing a local team of internationally trained swimming and water safety educators.

CONCLUSION
This program is a highly successful model for a charitable swimming program, locally self sustaining and can be set up utilizing a limited budget.

ACKNOWLEDGEMENTS
Paul Sadler Swimland, AOG World Relief, Saga, Water Skills For Life, Vietnam Swans, Rotary Hillary’s, AUSTSWIM
Drowning is among the 10 leading causes of death for children and young adults under the age of 25 years old. Numerous survival swimming programs have been created internationally to address this issue, however, children who have varying sensory needs, such as children who have Developmental Delay, or Autism Spectrum Disorder (ASD), have great difficulty participating in these programs as a result of the many environmental barriers present in aquatic settings (e.g. bright lights, cold water, loud noise). One such program teaches the necessary skills to survive an unexpected fall in deep water. These skills include a disorienting entry (roll in), treading water for one minute, and swimming 50 metres. The Lifesaving Society BC & Yukon Branch partnered with the Lifeguard Outreach Society and a private Occupational Therapy company, Enable Occupational Therapy Ltd., to create adaptations which will allow for the inclusion of individuals with varying levels and diagnoses in a swimming survival lesson with their typically developing peers.

We hypothesized that children with sensory processing challenges would be able to participate if the instructor was given training to provide appropriate accommodations and tools for differing needs and abilities. We defined “participate” as engaging in and actively attempting the skills that were being taught amongst their peers in an inclusive lesson.

An Occupational Therapist (OT) compiled a list of strategies that are commonly used in community and clinic settings when working with children who have developmental disabilities and sensory processing challenges. This list was adapted in conjunction with a Registered Kinesiologist, with extensive experience as a lifeguard and swimming instructor, including National Lifeguard instructor training. Participants of varying levels and diagnoses participated in a 2-day, 90 minute, session taught by an instructor who had received training on how to implement these strategies. 3 separate trials were conducted.

RESULTS
For trial 1, 7 of the 8 participants were able to complete the three skills (roll, tread, swim). 1 required a PFD in order to complete the skills. For trials 2 and 3, 6 of the 8, and 12 of the 14 children were able to complete the skills, respectively. The children who were unable to complete all three skills, experienced escalated anxiety regarding the disorienting entry. These children all required PFDs. All children who were not able to complete the disorienting entry, were still engaged in the instructor’s demonstration and observed their peers performing the skill. Although they were unable to roll in, they were able to assume the starting position (toes on edge, crouching position, hands on head). Therefore, they met our criteria for “participation” in the session.

DISCUSSION
All children were able to participate in the trials. Therefore, we support our hypothesis. Throughout these trials, video footage was obtained to create a training video for swimming instructors. The authors would like to see this training program shared internationally with all swimming instructors.
GLOBAL DROWNING
INTRODUCTION
Accidental drowning and submersion are a global public health problem that requires concerned efforts for sustainable prevention due to consequences of mortality, morbidity, disabilities, human suffering and economic costs. In Cuba, they are the third cause of death among all kinds of accidents for all ages. This is very important to take into account because Cuba has geographical characteristics that lend themselves to activity in recreational water settings, water sports and other risky activities that may increase this kind of incident. As a result, this work was motivated to enhance knowledge of the problem and allow planning of prevention strategies that will contribute to the drowning prevention.

OBJECTIVE
To identify the behavior of accidental drowning and submersion mortality in Cuba from 1987 to 2014.

METHOD
A descriptive study of deaths resulting from accidental drowning and submersion that occurred in Cuba from 1987 to 2014 was made. The information sources were databases of the National Medical Records and Health Statistics Bureau of the Ministry of Public Health (MINSAP) and the population estimates of the National Office of Statistics and Information (ONEI). The variables collected were: type of accident, age, sex and populations. The indicators included gross and specific mortality rates, annual average rate, percentages, reasons, standardized reason of mortality (REM), rates of years of potential life lost (YPLL) and years of potential and productive life lost (YPPLL).

RESULTS
Among the main results, it was observed that from 1987 to 2014, the total of accidental drowning and submersion deaths was 8,367, with an annual average of 298.82 cases. They represented 5.97% of total deaths in the country for all causes of accidents. The rates were in the range of 3.49 x 100,000 inhabitants in 1987 to 2.05 in 2014, for a reduction of 41.21 and a downward trend. The annual average rate was 2.68. However, the groups of 40-69 years old (subgroups 40-49, 50-59 and 60-69) showed an increase. The males (89.74 %) predominated over females (10.25 %) showing a quotient of 8.75. The REM was 1.16 in 1987 and diminished to 0.72 in 2014. This situation shows the need to continue strengthening measures to prevent this kind of accident.

CONCLUSIONS
Even though accidental drowning remains a public health problem in Cuba, a tendency of reduction has been observed. The magnitude of mortality from drowning will continue to diminish if adequate measures are taken into account, especially in the most affected groups of people.
INTRODUCTION
Drowning is a serious and mostly preventable injury-related cause of death. Low-and Middle-Income Countries (LMIC) represent 90% of total drowning deaths worldwide. There is a lack of epidemiological study of drowning in Nepal. The aim of this study is to describe the magnitude of drowning deaths in Nepal. It is anticipated that these findings will help to develop the drowning research and prevention interventions.

METHOD
This is a retrospective and descriptive study of police records for all drowning-related deaths in Nepal that occurred between 1st January 2013 and 31st December 2015. The Central Database of Nepal Police collects the reports of all unnatural deaths every day through their daily incident reporting system. It has information on the causes of these deaths. Data was extracted for all drowning incidents from the Nepal Police daily reporting system. A description of drowning case by geographical region, location of the incident, age and sex were extracted. In addition, descriptor variables like water bodies, months of drowning, and activities before drowning were also extracted and analyzed.

Rates of drowning were calculated for males and females separately using the total male population and female population of the country as the denominator respectively. The census data for 2011 of Nepal was used as the denominator to calculate the crude rate of drowning.

RESULTS
In total, there were 1,507 drowning deaths during the three years. Of these cases, three-fourths (76%) were male and more than half (53%) were under 20 years. Over one-fifth (22%) of the drowning deaths occurred in children under 10 years. The death rates from overall drowning were 2.95 for males and 0.92 for females per 100,000 population. Female drowning was common (32%) in early ages (under 9 years) and for males, it was high (31%) during the 10-19 years old.

The highest proportions of drowning deaths were reported in the period from June to August (44.3%). Natural bodies of water such as rivers (79%), ponds (8%) and water-filled pits (7%) were common places for drowning. People also died of drowning in some man-made water-containing bodies like canals, ditches, safety tanks, water tanks and wells. Drowning deaths were found to be varying with the geographical regions, it was very high (47.0%) in Terai (Lowlands) followed by the Hill (38.1%) and Mountain (14.9%).

Death rate varies with age i.e. children under five years and young adults aged 15 to 25 years have the highest drowning death rates (3.1 and 3.0 per 100,000 population respectively). Most of the drowning in early childhood occurred nearby, but outside the home while playing with friends or alone. Among the children aged 10-18 years, the majority (87.7%) of drowning deaths occurred in rivers, ponds, canals and water-filled pits.

Activities like swimming or bathing in rivers were the main causes of drowning for people aged 20-30 years. About 16% of total drowning deaths occurred in summer (April to July) while bathing and swimming. For males, bathing, swimming, playing in water and crossing rivers were leading causes of drowning deaths. In case of females, the majority of the drowning deaths (56%) occurred whilst crossing rivers, falling, bathing and suicidal jumps. In total drowning deaths, the proportion of suicide was 5.7% and it was high (12.4%) for the people above 25 years.

CONCLUSION
The burden of drowning in Nepal is hidden but considerable. Results suggest that children are highly vulnerable to drowning. Rivers were the common place of drowning in Nepal. This research found that while drowning deaths occur throughout the year; their incidence was highest during the summer and monsoon seasons. In summer, it is observed that more people go to the rivers, streams or other water bodies to have a cool bath without anticipating risks of drowning. Drowning often occurs as a result of the activities associated with daily life.

Consequently, there is a need for drowning prevention programmes targeting people of different age and sex including awareness about water safety for specific activities. In the case of children, construction of safe play areas, swimming skills, use of personal flotation devices (PFDs) and increased child supervision while exposed to water need to be applied. The drowning incidents reported to the Police within 24 hours were only used in the analysis. This might have resulted in an underestimation of true magnitude.
ORAL PRESENTATION

DROWNING BURDEN FROM 2002 TO 2015: IS THERE ANY PROGRESS IN PREVENTING DEATHS BY DROWNING OVER 13 YEARS IN BANGLADESH?

Dr. AKM Fazlur Rahman¹, Dr. Aminur Rahman¹, Dr. Saidur Rahman Mashreky¹, Dr. Salim Mahmud Chowdhury¹

¹Centre For Injury Prevention And Research, Bangladesh, Dhaka, Bangladesh

BACKGROUND

Drowning has been identified as one of the leading causes of death, specifically among children after infancy in Bangladesh from Bangladesh Health and Injury Survey (BHIS) conducted in 2003. Since then a number of initiatives have been taken by government, non-government and other sectors to reduce the drowning burden. Drowning prevention has been included in the priority agenda in the health sector program, and to monitor the progress in prevention of drowning deaths, another nation-wide survey was conducted named BHIS 2016 in partnership with Director General of Health Services and Centre for Injury Prevention and Research, Bangladesh.

OBJECTIVES

The objective of this study was to identify any changes in drowning burden specially drowning burden among children in Bangladesh over a 13-year period between 2002 and 2015. The findings of the study will ultimately help policy makers to revise the strategies for prevention of drowning to achieve SDGs by 2030.

METHODS

Analysis of BHIS 2003 and BHIS 2016 data was done to calculate the drowning rate in 2002 and 2015 respectively. National burden of drowning in terms of number of drowning deaths in 2002 and 2015 was also estimated utilizing the drowning rate. 95% confidence intervals for both age standardized rates and numbers were calculated to understand any change over 13-year period in drowning deaths. Proportion of deaths due to drowning among all deaths in all population, and in population segregated by age and sex was also calculated for the year 2002 and for the year 2015.

RESULTS

The proportion of death caused by drowning among all deaths in all population decreased by 13.86% from 2002 (2.38%) to 2015 (2.05%). The proportion of drowning deaths among children aged 0–14 years increased from 17.45% in 2002 to 14.91% in 2015, representing an increase of 96.25% over the 13-year period. The age-standardised drowning mortality rate decreased from 13.91 per 100 000 per year (95% CI 11.53 to 16.65) in 2002 to 11.70 (95% CI 8.27 to 16.09) in 2015. There was an overall 15.89% decline in drowning rate in all population over the 13 years, however, this change was not statistically significant. Among the 1-4 year children group the drowning mortality rate decreased from 93.35 (95% CI 73.19 to 117.40) in 2002 to 76.83 (95% CI 46.44 to 123.90) in 2015, by −15.89%, which was also statistical non-significant.

CONCLUSIONS

Although statistically non-significant, there was a decreasing trend observed in the drowning mortality in Bangladesh over the last 13 years. The progress in preventing deaths due to drowning is very slow. In addition to strong political commitment, strengthening of the drowning prevention program is urgently needed to address the drowning epidemic effectively in Bangladesh.
A COMMUNITY-BASED ASSESSMENT OF DROWNING RISKS IN THE RURAL VILLAGE OF BUTRI, SUDAN

Dr. Rebecca Sindall¹, Mr. Tom Mecrow¹, Mrs. Sabrina Kashif¹

¹Nile Swimmers, Khartoum, Sudan

ORAL PRESENTATION

Global Drowning 1, Salon 2, October 18, 2017, 11:00 AM - 12:30 PM

The World Health Organisation (WHO) data on global drowning rates is derived from extrapolating datasets from a small number of countries that conform to WHO death reporting standards. The African continent has only two countries, South Africa and Egypt, which meet these standards. As such, little is known about the epidemiology of drowning in Africa. There have been no publications on drowning in Sudan. This paper is a descriptive study of fatal drowning cases in the rural village of Butri in Al-Jazeera State, Sudan. Butri is a village of approximately 7000 people located on the banks of the Blue Nile.

A community risk mapping exercise was conducted with 12 residents representing a cross-section of the community. The risk mapping exercise required participants to draw a map of Butri with local landmarks and areas where people are known to access water frequently. Known drowning deaths were marked onto the map and information on the date of drowning, demographics of the victim and the activity of the victim was collected. Following discussion with community leaders, who highlighted the high profile of a drowning death and the impact that this has on collective memory, the recall period was set at 10 years, from 2005 to 2015.

Where possible, drowning deaths were confirmed through semi-structured interviews with relatives of the deceased. If relatives were unable or unwilling to speak about the drowning, community leaders with knowledge of the drowning were interviewed instead. No documentation recording cause of death was available.

Eleven drowning death were recorded over the recall period. The rate of drowning deaths over this period was 15.7/100,000 (95% CI, 8.3-27.3/100,000). All but one of the drowning deaths in the recall period were amongst adolescent males. The age of victims ranged from 13 to 30 years. In almost all cases, adolescent male drowning victims had entered the water for recreational purposes without informing guardians. Many victims were with peers at the time of drowning. In two cases, this led to multiple fatalities as peers attempted to help the initial victim and got into difficulty in the water themselves.

The average rate of drowning deaths in Butri between 2005 and 2015 was nearly twice as high as the WHO estimation for the African region (7.9/100,000) and nearly three times higher than the global rate (5.2/100,000). The use of water in Butri has changed significantly since the implementation of piped water in the village between 1996 and 2000. Whilst in the past, men and women had to use the water frequently for essential daily activities, these activities are now confined to the home, where the risk of drowning is substantially reduced. However, this has led to a change in social norms and behaviours. Swimming is no longer taught to children as a vital life skill as entering the water is considered unnecessary. Recreational activities in the water are now discouraged due to a fear of the water, particularly amongst older residents who clearly recall the higher rates of drowning before the introduction of piped water.
INTRODUCTION
As with other type of injuries, drowning is associated with tremendous public health burden. The non-fatal drowning incidents and immersion related injuries result in negative impact on the physiological, social and economic aspects of victims and the families. Thus there is a need to know the status, issues and way forward to address drowning in the country.

METHODOLOGY
The information was gathered through a secondary data approach as compared to primary data collection. Major stakeholders who deal with data related to drowning were identified. This was followed by approaching these agencies to obtain drowning data for the past year. After obtaining the data, the agencies were approached to obtain information on their methodology of recording drowning cases. Finally the data obtained from various agencies was compared as there could be elements of double reporting and repeating between agencies. Lastly, the agency with the highest drowning cases were used as a referral to determine the status and magnitude of the problem.

STATUS AND ISSUES
There are many agencies involved in drowning prevention both from the government and private sectors. Inline with it, there are many sources of drowning data collected by different agencies. The methodology used by the rescue agency in obtaining drowning data is based on rescue operations to which they were called in and responded. Therefore the numbers will be different as different rescue agencies respond to different drowning incidents. The fatality from drowning incidents are reported to the Royal Malaysia Police. Thus the figures on drowning deaths would be closer to the actual number. However there could be some variance if the death is not classified as due to drowning and recorded for other reasons which are possible.

An average of 296 deaths per year (Mean=296.4, SD=34.5) of children aged 0-19 years occur due to drowning in Malaysia. The average of drowning death rate is 2.92 per 100,000 children. The percentage of drowning death among children aged 0-19 years is about 47% from total all-age of drowning incidents for the past 10 year period (2002-2011). The average ratio of drowning (male to female) was 4:1 and children aged 5-11 years were the most at risk. As for drowning morbidity, the average is about 2.10 per year and showed a higher number in children aged 1-4 years. This also deserves due attention as drowning morbidity would create a tremendous public health burden. Most locations of all-age drowning reported occurred in rivers and sea/beaches and most drowning cases took place in Kelantan, Johor, Selangor, Sabah and Terengganu. There is a peak in number of children drowning during school holiday season.

WAY FORWARD
The setup of the National Water Related Activity Safety Council of Malaysia (MKAA) is in the right direction taken by the government. The next step is to get the council coordinating and moving the agenda on drowning prevention across the nation. A good start could be targeting the children as the vulnerable group through the existing system available within the school setup of curriculum clubs.
WHO estimates more than 81,000 people drown in the Western Pacific Region each year. Of these 30% are children under the age of 15, making it the leading cause of death, killing more children aged 5-14 than any other single cause.

In 2014, WHO launched the Global Report on Drowning Prevention, the Organization’s first stand-alone report on drowning. In addition to highlighting the largely neglected magnitude of drowning, WHO reviewed the evidence on risk factors, effective interventions and made ten recommendations that have informed the global drowning prevention agenda.

Approximately 22% of all fatal drownings occur in countries of WHO’s Western Pacific region and drowning prevention and response is a major priority under the first Regional Action Plan for Violence and Injury Prevention in the Western Pacific (2016-2020).

To further review the magnitude of drowning, preventative measures adopted and the readiness of regional member states to implement WHO’s recommendation, the Western Pacific Regional Office of WHO developed a standardized questionnaire and with the technical support of the Royal Life Saving Society - Australia, utilized it with national counterparts and stakeholders in select countries including Australia, New Zealand, Cambodia, China, Fiji, Kiribati, Mongolia, Palau, Philippines, Solomon Islands and Viet Nam to document examples of WHO’s recommended actions in regional member states, particularly low and middle income countries.

This presentation features key results and findings from that process and an introduction to new WHO advocacy and communication actions for scaling up drowning prevention in the Western Pacific Region.
ORAL PRESENTATION

STATUS OF DROWNING PREVENTION IN THE PHILIPPINES

Prof. Jonathan Guevarra¹, Dr. Richard Franklin²

¹Department of Health Promotion and Education, College of Public Health, University of the Philippines Manila, 526 Pedro Gil St., Ermita, Philippines, ²School of Public Health, Tropical Medicine and Rehabilitation Science, James Cook University, Australia

Global Drowning 2, Salon 2, October 18, 2017, 1:30 PM - 3:00 PM

INTRODUCTION

Drowning is the process of experiencing respiratory impairment from submersion/immersion in liquid. (1) In 2003 Philippine National Injury Survey, patterns of fatal and non-fatal injury by type of injury, gender and age were explored. Overall the fatal injury rate in childhood (0-17 years) was 58.9/100,000 children and drowning was the leading cause. For children after infancy (1-17 years), the rate of drowning mortality was 9.8/100,000; the next most common cause was Road Traffic Accidents (RTA) with a rate of 9.1/100,000. (2) In a retrospective review and analysis of published data on child drowning injury (1963-2003) in the Philippines, it was found that at least 3000 Filipinos of all ages die annually from drowning injury (0.43% of deaths) more than a third of which (35.6%) are children under 14 years. Mortality is highest among children ages 1-4 years compared to other age groups. Drowning mortality rates have remained largely unchanged from 1963-2003, belying its under recognition as a public health priority. The researchers concluded that drowning deaths disproportionately account for 5% of deaths for 1-4 year olds. It was recommended for better surveillance of child drowning deaths to guide policy formulation for its prevention and treatment in the Philippines (3) To date, there is no comprehensive research which documents prevention strategies being implemented by government and non-government agencies at the national or local level in the Philippines. This research aimed to find out the status of drowning prevention in the Philippines.

METHODOLOGY

Key informant interviews were conducted among government and non-government agencies involved in drowning prevention and water safety programs. Purposive sampling was undertaken to ensure all Key Informants are interviewed. Topic Guide was used and Thematic analysis was conducted with the qualitative data gathered.

RESULTS

Several activities on drowning prevention are being implemented by each agency covered by the study. These activities include situational assessment, capacity building, information dissemination, implementation of physical structures to prevent drowning, and rescue operation. However, these activities do not represent a complete picture of comprehensive program on drowning prevention since only a handful of key informants and organizations participated in this study. Nevertheless, we were able to have a glimpse of current efforts aimed at preventing drowning in the Philippines.

CONCLUSION

Developing a national multisectoral plan on drowning prevention will address the fragmented approach to drowning prevention in the Philippines. The individual effort of each organization involved in drowning prevention can be put in one comprehensive document which can be utilized by all drowning prevention key players.

REFERENCES

BACKGROUND
Drowning is the number one cause of death among children under 15 years of age in Thailand, taking into account all deaths due to infectious and non-infectious diseases. Child drowning death rate (per 100,000 child population) ranged from 5.9 to 11.1 between 2006 and 2015; the average number of annual drowning deaths was 1,092.

OBJECTIVE
To formulate a policy on child drowning prevention in Thailand.

METHODS
The operations of the Child Drowning Prevention Programme in Thailand during the period 2006–2014 were reviewed and then a gap analysis was conducted for use as a guide for developing the standards, or bridging the gap, for the operations of the programme. The Child Drowning Prevention Programme in Thailand has been implemented since late 2006 with the goal of reducing the child drowning death rate to 2.5 by 2022.

RESULTS
It has been found that the Ministry of Public Health is the lead agency in the implementation of the Child Drowning Prevention Programme in Thailand. In such efforts, a programme committee has been established comprising representatives from various public and private agencies; and policies on this matter have been issued for the operations in collaboration with other network members or partners. The policies include: teaching all children (>6 years) to be able to swim for survival; designating Child Drowning Prevention Campaign Day; distributing Maternal and Child Health Booklets containing the guidelines for drowning prevention; designating all health-care facilities as the sites for educating parents or child caregivers about drowning prevention; conducting drowning surveillance and investigation; supporting Health Promoting Schools using “Drowning Prevention” as a key performance indicator; integrating an action plan for drowning prevention and water rescue into the national emergency medical service system: developing a plan for enhancing water safety skills for school children (Ministry of Education); passing a law to regulate the labeling of baby bathtubs; and collaborating with local governments in child drowning prevention.

After implementing several of such measures, the child drowning death rate declined constantly from 11.1 in 2006 (the first year of programme implementation) to 5.9 in 2015 (or decrease about 50%). But gaps were noted at the local or community level, such as the lack of continuity, encouragement and operations in all aspects of the programme. Thus, to bridge the gaps, in 2015 the Ministry of Public Health adopts the “Merit Maker for Child Drowning Prevention” measure, aiming to identify the networks working on drowning prevention that covers at least six key measures, emphasizing community-based multi-disciplinary approach, resource sharing.

CONCLUSION AND DISCUSSION
Since the launch of the programme on child drowning prevention, policies and measures have been implemented, resulting in a constant reduction in child drowning fatalities. In such efforts, the Ministry of Public Health has also revised several measures so that they are more effective in the country in achieving the child drowning reduction goal (rate to 2.5 in 2022). Including the reduction of deaths from drowning in the 20-year national strategic plan.
SCALE-UP OF DROWNING PREVENTION INTERVENTIONS

Dr. Joan Ozanne-Smith1, Ms Katherine Tsigaridis1

1Department of Forensic Medicine, Monash University, Southbank, Melbourne, Australia

BACKGROUND
Drowning is a leading cause of death in most developing countries. Interventions, particularly survival swimming lessons for primary school-aged children and village creches for younger children have been proven effective in preventing drowning in large Bangladeshi trials. Scaling-up of these and other effective drowning interventions in low- and middle-income countries is the next challenge. The WHO Global report on drowning (1) identifies multiple prevention strategies and recommends research to demonstrate “scalability and sustainability for effective drowning prevention measures”. This paper takes a first step in that process.

AIM
To identify scale-up approaches for effective interventions, such as in health and education, to determine principles, methods and processes that may have application to drowning prevention.

METHODS
Scale-up is “the practice of introducing proven interventions into new settings with the goal of producing similarly positive effects in larger, more diverse populations” (2). A broad-based literature review was undertaken of ‘scale-up’ and related terms and ‘intervention’ using multiple databases for the period 2000-2016. Inclusion and exclusion criteria were established and the large number of resulting articles was progressively refined by screening initially on title, followed by abstracts and finally on full articles. Both authors read the final articles and independently extracted relevant information using an agreed tabulated format following initial review of the final articles.

RESULTS
Relevant articles fell into two major categories: theoretical frameworks, including qualitative studies and reviews (3), actual scale-up studies in progress or reporting intermediate or outcome measures, such as uptake of intervention, reduction in disease cases, school performance improvement and cost effectiveness. Most reported interventions were within the health sector (e.g. vaccines, malaria and HIV/AIDS prevention and treatment), followed by the education sector. Common principles included: choice of simple effective interventions; recognized targets (e.g. Millennium Development Goals; national plans); donor funds available; inter-sectoral collaboration; international agency involvement (e.g. WHO); economies of scale; human resource capacity; and community preparedness. For most interventions, existing infrastructure was utilized, such as in the health or education sector, or less commonly the transport sector.

DISCUSSION
The relative lack of scale-up literature for injury prevention, particularly drowning prevention, can potentially be explained by the scarce documentation of effective interventions (until recently). Also, effective legislative and enforcement approaches and infrastructure improvements, such as in road safety, may lessen the need for scale-up of approaches initiated at the community level. One of the key potential barriers identified for scale-up of drowning interventions is the relative lack of relevant infrastructure compared with other sectors.

CONCLUSION
On-going attention to the complexity of context and methods for effective scale-up will be required to fast-track drowning prevention in the developing world.

ACKNOWLEDGEMENT
Monash University School of Public Health and Preventive Medicine Vacation Scholarship Programme

REFERENCES
SAVING LIVES FROM DROWNING IN BANGLADESH: INTERVENTION ANALYSIS IN A COHORT STUDY

Dr. Olakunle Alonge¹, Dr. David Bishai, Dr. Shirin Wadhwaniya, Dr. Priyanka Agrawal, Dr. Aminur Rahman², Dr. Emdad Hoque³, Dr. Kamran Baset, Ms. Shumona Sharmin, Dr. Al-Amin Bhuiyan, Dr. Irteja Islam, Dr. Abu Talab, Dr. Qazi Sadeq-ur Rahman, Dr. Fazlur Rahman, Dr. Shams El-Arifeen, Dr. Adnan Hyder

¹Johns Hopkins International Injury Research Unit, , United States, ²Center for Injury Prevention Research, Bangladesh, , Bangladesh, ³International Center for Diarrheal Research, Bangladesh, , Bangladesh

Global Drowning 2, Salon 2, October 18, 2017, 1:30 PM - 3:00 PM

BACKGROUND

Drowning is a leading cause of injury-related deaths among children worldwide. In Bangladesh, two children die from drowning every hour, and drowning accounts for 42% of all deaths among children aged 1 – 4 years. There is scant evidence for the effectiveness of drowning prevention interventions for under-five children in low- and middle-income countries (LMICs).

OBJECTIVE

The objective of this study is to explore the large-scale effectiveness of enrollment in crèches or use of playpens or both for drowning prevention among children 1 – 4 years in Bangladesh.

METHODS

The study area included 51 unions, out of 83 total unions in seven rural sub-districts of Bangladesh. Children 9 – 36 months were identified via a baseline census and an active surveillance system, and enrolled into either a playpen-only, crèche-only or dual treatment intervention arm. Enrolled children were followed-up till their fourth-year birthday or administrative censoring, after a two-year implementation period (2013 – 2015). Incidence rates (IR) of drowning were estimated for children under different intervention arms based on person-time analyses. Standardized risk ratios (SRR) were used to compare the IR of drowning by age under each intervention arm with historical IR from 2006-2012. The drowning-specific mortality rates of drowning (MR) from the baseline census (in 2013) were also used to compare the MR under the different arms.

RESULTS

The overall drowning-specific mortality rate was 105.4 (87.5, 127.1) per 100,000 population per year for children aged 0 – 48 months at baseline. 70,102 children aged 9 – 36 months were enrolled in at least one intervention.

Initial study findings will describe the age-specific IR and SRR for children under the various intervention arms and offer suggestions for future research.

CONCLUSION

This study offers a community-based intervention to address the growing burden of childhood drowning in LMICs.

FUNDING

This study was funded by Bloomberg Philanthropies.
Global Drowning 3, Salon 2, October 18, 2017, 3:30 PM - 5:00 PM

ORAL PRESENTATION

BURDEN OF DROWNING, OPPORTUNITIES FOR DROWNING REDUCTION IN INDIA & VIETNAM

Ms. Caroline Lukaszyk¹, Dr. Jagnoor Jagnoor¹, Dr. Ha Nguyen², Prof. Rebecca Ivers¹

¹The George Institute For Global Health, Sydney, Australia, ²Centre for Injury Policy and Prevention Research, Hanoi School of Public Health, Hanoi, Vietnam

BACKGROUND

Of the 372,000 drowning deaths reported globally each year, over half occur in the WHO South-East Asian and Western Pacific regions [1]. High drowning mortality rates in India (6.4/100,000) [2] and Vietnam (7.6/100,000) [3] contribute to this burden. There is little known about the context surrounding fatal and non-fatal drowning cases in either country, nor on the resulting social or economic impact. Furthermore, it is uncertain which drowning prevention interventions have been delivered successfully/sustainably in either setting, or what challenges may be faced on intervention implementation/upscale.

AIMS/OBJECTIVES

1. Provide evidence of the burden, distribution and social impact of drowning in India and Vietnam
2. Explore enablers and barriers in implementing drowning prevention initiatives in India and in Vietnam
3. Identify promising drowning prevention interventions for implementation/upscale in India & Vietnam

TARGET

Quantitative aspects of the study will investigate the burden of drowning on a national level, across all age groups, in India and Vietnam. Qualitative aspects of the study will focus on high-risk populations within each country.

METHODS

Secondary analysis of national-level mortality/morbidity data from two sources will be performed; Indian Sample Registration System (SRS) 2014 and Vietnam National Injury Survey (VNIS) 2010. Within India, retrospective review of medical records for drowning admissions from selected health facilities will occur, with families and/or patients contacted for follow-up. In both countries, in-depth interviews and focus group discussions will be held with community members from high risk populations and stakeholders involved in drowning prevention activities. This study will be conducted from December 2016 to December 2017.

RESULTS

Through the analysis of SRS and VNIS data, drowning cases will be investigated by sociodemographic characteristics, identifying high-risk populations within each country. Follow-up of drowning hospital admissions within India will provide insight into the contextual factors surrounding drowning events and treatment sought. Qualitative research stages will investigate the current status of drowning prevention in each country and identify suitable drowning prevention interventions and potential approaches to their implementation. Early study findings will be presented at the WDCP 2017.

DISCUSSION

This study will provide a better understanding on the burden of drowning in India and Vietnam. By identifying enablers and barriers to the implementation of drowning prevention initiatives in each context, feasible initiatives and approaches to their implementation will be identified. Policy briefs presenting the outcomes of the study will be developed and distributed to policy makers and implementers. This study may be of use for identifying approaches to drowning prevention in other LMIC in the Asian region.

CONCLUSION

An in-depth understanding of the burden, context and outcomes of drowning-related mortality and morbidity is required to identify effective approaches toward drowning prevention. This study provides research to guide implementation/upscale of effective drowning prevention initiatives in Vietnam & India.

ACKNOWLEDGEMENT

This study is funded by the Royal National Lifeboat Institution.

REFERENCES

2. Gururaj,G., Drowning deaths in India, in WCDP. 2013: Germany.
INTRODUCTION
As drowning prevention interventions are being developed and tested, it is important to conduct economic evaluations of these interventions to identify interventions that can reduce drownings at the lowest cost, and to promote funding for the most cost-effective interventions. Development of economic evaluations requires scientific evidence on programs’ effect on drowning rates and comprehensive data on the cost of interventions and the economic burden of drowning to victims and society. The Savings of Lives from Drowning project in Bangladesh was implemented between 2013 and 2015, and it provides comprehensive data on cost of playpen and crèche interventions for nearly 100,000 children under the age of 5 years.

OBJECTIVE
The objective of this study is to evaluate the cost-effectiveness of the playpen and crèche intervention from a program perspective under the Savings of Lives from Drowning project in rural Bangladesh.

METHOD
An ingredients-based approach was used to capture all program costs classified by major category. Research costs were excluded and final cost data was inflation adjusted to 2015 BDT, and currency converted to 2015 $USD. Fixed costs were discounted at 3% and annualized using program experts’ advice on inputs’ life-time. The cost per participant was estimated as the annual average cost. The primary effectiveness outcomes were drowning deaths and DALYs averted among under-five children over one year implementation of each intervention. The data used for estimating the effects included records of 26,279 children aged 9 – 36 months who received crèche only, and 5,973 children aged 9-24 months who were enrolled into the playpen only. Cumulative Incidence Rate Ratios (CIRR) were computed for children under either intervention compared with historical drowning incidence from a 5 years’ surveillance data (2009 – 2012). Number of deaths averted were computed based on the CIRR. The deaths averted were then converted to years-of-life-lost (YLLs) using the WHO’s DALY calculation template, under the assumption that the average age of drowning is 2.5 years old, with a life expectancy of 71 years, and a standard 3% discounted rate for future years of life lost. Incremental Cost-Effective Ratio (ICER) was calculated by dividing the incremental cost of each intervention (compared to status quo) by incremental deaths averted.

RESULTS
The average cost per child in the crèche and playpen programs were $26 ($13-$34) and $30 ($20-$40), respectively. Initial study findings will describe the ICER for each intervention compared to the status-quo for a hypothetical population of 100,000 children aged 1-4 years.

CONCLUSION
This study demonstrates the cost-effectiveness of interventions for childhood drowning prevention in LMICs, and offers suggestions for future scale-up studies.

FUNDING
This study was funded by Bloomberg Philanthropies.
UNDERSTANDING THE HEALTH SYSTEM CHARACTERISTICS THAT INFLUENCE THE IMPLEMENTATION OF DROWNING PROGRAMS IN BARISAL, BANGLADESH

Dr. Jagnoor Jagnoor¹, Dr. Aminur Rahman², Dr. Kamran Baset³, Mr. Dan Ryan³, Mr. Fazlul Chowdhury², Ms. Caroline Lukaszyk¹, Ms. Aliki Christou¹, Prof. Stephen Jan¹, Prof. Lisa Harvey⁴, Prof. Fazlur Rahman², Prof. Rebecca Ivers¹

¹The George Institute For Global Health, Sydney, Australia, ²Centre for Injury Prevention and Research, Bangladesh, Dhaka, Bangladesh, ³Royal National Lifeboat Institution, Dorset, England, ⁴Sydney Medical School, University of Sydney, Sydney, Australia

BACKGROUND

To implement effective and sustainable drowning prevention initiatives on a population level, it’s necessary to understand the context of the local health system and its current approaches to addressing drowning. This entails investigating not only the services and initiatives that are offered but the underlying regulatory and governance arrangements characterizing the health system. Doing so will provide an understanding of barriers and enablers to these services, and the reasons for their utilization and perceived effectiveness within the community (or lack of).

Within Bangladesh, government services, local and international non-government organisations and international organisations provide a variety of services that play a role in the prevention of drowning. The influence of these services differs between districts and their sustainability and acceptability is varied. To achieve uniform implementation of standardized, effective drowning prevention initiatives across the district and nationally, a health systems approach is required.

AIMS/OBJECTIVES

1. To identify key stakeholders and factors that influence the current services within the Barisal system or factors that have the potential to influence future drowning prevention initiatives.
2. To determine what drowning-prevention and water safety initiatives are currently available or have previously been implemented, assessing their strengths and limitations, working through the systems – integrating health, environment, education, human resource and their components such as financing, governance/leadership, workforce and service delivery.

TARGET

Stakeholders involved with services associated with drowning prevention within the Barisal division of Bangladesh.

METHODS

In-depth interviews and focus group discussions will be held with stakeholders from services associated with drowning prevention. Examples include health service management, representatives from the Ministry of Health and representatives from non-government organisations and uni/multilateral organisations. Interview questions will investigate the current systems in place to prevent drowning incidence; barriers & facilitators to their use/operation and interactions between existing services, organisations & government departments involved.

RESULTS

The results will explore the systems approach and their role in drowning reduction such as system responsiveness (water related disasters), utilisation of information technology, financing, governance, services delivery and workforce. Network-mapping would be undertaken to understand the key stakeholders, factors and their inter-relationships to guide future interventions, particularly with respect to scale up and sustainability of drowning reduction action. Data collection is currently in process.

DISCUSSION

A number of barriers have been identified to limit service availability and service quality in LMICs, such as limited resources and fragmented communication between different sectors and organisations, leading to their operation in silos. This can prevent the initial implementation of effective services, and prevent their upscale and/or their sustainability. Results of this study will be of interest to all stakeholders involved and policy makers, both within the Barisal Division and across Bangladesh. This study is anticipated to inform a coordinated and comprehensive national and subnational level response resulting in a significant reduction in drowning at the national level.

CONCLUSION

An overview of the current capabilities of the health system in regard to drowning reduction will be generated. Current gaps in drowning prevention availability will be reported and effective, sustainable initiatives identified.
MAKING SENSE OF GLOBAL DROWNING DATA WITH DATA VISUALISATION TOOLS

Mr. Dan Ryan¹, Mr. Russell Hocken¹

¹Royal National Lifeboat Institution, Poole, United Kingdom

Global Drowning 3, Salon 2, October 18, 2017, 3:30 PM - 5:00 PM

BACKGROUND

The lack of data on the burden and descriptive epidemiology of drowning at national and global levels is a barrier for drowning prevention advocates, policy makers and practitioners. Whilst there are challenges to data classification and collection specific to drowning, scarcity of nationally representative data is a challenge for other health concerns, particularly in low and middle-income countries. Beyond the WHO Global Health Estimates, there are other attempts to address this gap through statistical estimates of burden by cause of death (1) or through subnational surveillance (2), however utilising these for analysis of drowning is not straightforward.

AIMS/OBJECTIVES

1. Identify publicly accessible data that can be used to understand the burden of drowning
2. Evaluate datasets for relevance and usability in understanding the burden of drowning
3. Develop practical guidance for interpreting datasets
4. Develop data visualisation tools allowing interpretation and exploration of global drowning data.

TARGET

The intention is to make this tool available for public use via the web, and therefore the target users are those with an interest in better understanding drowning using available data.

METHOD

Metadata and documentation from the Global Burden of Disease 2015, INDEPTH network cause specific data release 2014 and WHO Global Mortality Estimates were examined to determined suitability for analysing drowning burden. A range of data visualisation tools were built in Microsoft PowerBI using an agile approach to software development, using a range of use cases to generate specifications for analytical tools.

RESULTS

The tools allow for interrogation of several data sets by non-technical experts. This shows a significant difference in estimates between studies at the national level. Visualisation of data in this manner will highlights the uncertainties around drowning estimates but also allows users to access ‘best available’ data which, if used in line with the accompanying guidance can aid decision makers and advocates in articulating the burden of drowning across different geographies. The application will be tested with internal & external user groups throughout 2017 and we intend to make this application available online for use and feedback.

DISCUSSION

Existing mortality data sets offer some insight into the burden of drowning globally. This tool helps to interrogate this data from a drowning-specific perspective which is often challenging using available burden of disease tools and manual data manipulation. Whilst global estimates are relatively similar, individual country estimates can vary significantly. By visualizing these datasets it is possible to communicate these nuances to non-technical users in an engaging manner. Combined with a good understanding of the limitations of the underlying estimates this may facilitate more evidence-based approaches to drowning prevention programming and advocacy.

ACKNOWLEDGEMENTS

Force for Good team at JP Morgan Chase

REFERENCES

DROWNING PREVENTION AND THE SDGS: CONTRIBUTIONS, SYNERGIES AND INDIRECT BENEFITS.

Mr. Daniel Graham¹, Dr. Rebecca Sindall¹
¹Rapid International Development (RIDE), Leicester, UK

Global Drowning 3, Salon 2, October 18, 2017, 3:30 PM - 5:00 PM

On 25th September 2015, 193 world leaders committed to 17 Global Goals for Sustainable Development (SDGs) which aim to end extreme poverty, fight inequality and injustice, and fix climate change by 2030. These 17 goals are supported by 169 targets; progress towards the targets is measured against 230 indicators.

Whilst drowning is not mentioned explicitly in the SDGs, there are three main ways in which drowning prevention interacts with the goals. The first is those targets which drowning prevention programmes can specifically contribute towards. The second are those goals and targets that are not related to drowning prevention but will have an indirect impact on drowning rates. The third is those goals which drowning prevention can contribute to incidentally.

Drowning prevention programmes specifically contribute to targets 1.5, 11.5 and 13.1, which all relate to the loss of life in disaster hazard situations (including flooding), and target 3.2, which relates to under-5 mortality rates. In order to contribute directly to the SDGs, drowning prevention activities would need to shift focus to either disaster risk reduction and flood safety or to interventions that specifically target the protection of under-5s (such as CIPRB’s anchal scheme).

Progress toward Goal 2: Zero Hunger and Goal 6: Clean Water and Sanitation are likely to result in reduced exposure to water due to irrigation or water and sanitation schemes. This exposure reduction will affect drowning rates. However, these schemes are not the core work of drowning prevention organisations.

Additionally, there are several targets which drowning prevention can indirectly contribute towards at the goal level, though this progress will not be measurable against the target indicators. Within these goals there are potential synergies that may open alternative funding sources for drowning prevention projects. These include Goal 4: Quality Education, Goal 5: Gender Equality and Goal 8: Decent Work and Economic Growth. Examples of projects that may align with these goals include a project that teaches high-quality water safety messaging in primary schools (Goal 4), a project that focuses on giving women the skills to take up respected first responder roles in their community (Goal 5) or a project to teach pool lifeguards to work at hotel swimming pools (Goal 8). These synergies need to be considered on a project-by-project scale and care should be taken to ensure that adherence to these goals does not overshadow drowning prevention as the main aim of the work.
Research conducted by Royal Life Saving Society Australia into a 10 year analysis of drowning deaths in 2014/15 identified that a total of 2804 drowned in Australian waters. Of these, 1932 were males over the age of 15. 1 in 4 of these males had alcohol within their system that contributed to the cause of their drowning death. There were a further 32% of these cases where alcohol was not recorded in toxicology reports or police reports making RLSSA presume that the issue of alcohol in drowning deaths may be even greater.

The research also identified that 75% of these drowning deaths were locals to their location of drowning with the 35-55 year old age bracket having the highest proportion of drowning numbers. It also identified that unintentional falls, swimming and recreating and fishing and boating were the most common activities prior to their drowning death.

With support from the Federal Government, Royal Life Saving is working to reduce alcohol related drowning deaths in Australia. The campaign aims to raise awareness of the dangers associated with drinking in and around waterways.

The ‘Men and Alcohol’ campaign was established through a series of market research activities consolidating in a 2 day forum. The forum brought expertise from Maritime and Road Safety Campaign Managers, other alcohol and water safety campaigns, marketing expertise in men’s health and reaching out to older males, social media and communication experts to develop the campaign strategy. In April 2017 the program was launched over the Australian Easter School Holiday period and included the following:

- National Branding and Tag Line – “Don’t let your mates drink and drown”
- National Media Release with spokespersons in every state/territory
- Newspaper advertisements throughout the country
- A 12 week social media strategy
- Television and Radio Advertisement
- Pull Up Banners, Fact Sheets and Flyers
- Dedicated Campaign Website
- Advertising in Pubs and Clubs in Target Area

An early review of the campaign activity (3 weeks) identified that there was an audience circulation of 4,318,434 through media interviews and a total of 266,454 social media users reached. Further evaluation into the TV and radio advertisements, pubs and clubs advertisements and campaign website will be presented at the conference. The campaign will be expanded through to the end of 2017 and into the New Year with the further placement of television and radio advertising and the possibility of a drug related campaign where relevant. (Pending further research)

The Royal Life Saving Australia’s Men and Alcohol Campaign is leading drowning prevention measures by engaging with Australian men between the age of 35-55 within the Australian community to inform, educate and increase the awareness of alcohol related drowning deaths and what can be done to reduce drowning deaths.

ACKNOWLEDGMENTS
Research and program development at the Royal Life Saving Society – Australia is supported by the Australian Government.
2017 is the 150th Anniversary of the Confederation of Canada. A look back on the impact that drowning events have played in the formation of this nation, has correlations with the global drowning challenges. There are lessons for Canada and other nations.

These Canadian cases are smaller and have caused less mortality than some other global aquatic disasters. By highlighting these cases, I am not wanting to reduce the need for concern in nations and communities with much more frequent and tragic drowning disasters. These are case studies from our nation that do illustrate the global challenges for drowning risk reduction.

In a review of large scale disaster mortality in Canada from 1867 to 2017, there are illustrative cases that illuminate concepts we continue to find challenging, in Canada and in many nations. In the first 50 yrs of this nation, the most catastrophic and informative case study is the sinking of the Empress of Ireland in the St Lawrence River. RMS Empress of Ireland was an ocean liner that sank in the Saint Lawrence River following a collision in thick fog with the Norwegian collier SS Storstad in the early hours of 29 May 1914. Of the 1,477 people on board, 1,012 died. The number of deaths is the largest of any Canadian maritime accident in peacetime.

The data from this event is of high quality. That data clearly shows that women, children and those who traveled in the lower class, had a disproportionate mortality burden. The tragedy happened in fog and there was maritime regulation issues. There were national inquiries in Canada and Norway and blame was nationalistically assigned. There were a series of legal challenges. More concern focused on loss of property than lives.

The Ocean Ranger disaster represents new industry interacting with harsh environments. Ocean Ranger was an offshore drilling unit that sank in Canadian waters on 15 February 1982. It was drilling an exploration well, 267 kms east of St. John's, Newfoundland, for Mobil Oil of Canada, Ltd with 84 crew members on board when it sank. There were no survivors. 22 bodies were recovered from the North Atlantic. Weather conditions eliminated rescue efforts.

A Canadian Royal Commission spent two years looking into the disaster. The Royal Commission on the Ocean Ranger Marine Disaster found that the crew were not trained, the safety equipment was inadequate, there were no safety protocols for the supply ship, and that the platform itself had flaws. The Royal Commission concluded that Ocean Ranger had design and construction flaws, particularly in the ballast control room, and that the crew lacked proper safety training, survival suits and equipment. The Royal Commission also concluded that inspection and regulation by United States and Canadian government agencies was ineffective. In addition to key recommendations for Canada's offshore oil and gas industry, the commission recommended that the federal government invest annually in research and development for search and rescue technologies, such as improving the design of lifesaving equipment.

Determinants of drowning were established by these cases. In the shipwreck disaster like most aquatic disasters, women, children and disadvantaged persons carry a disproportionate burden. Drowning can occur close to safety but often involves very harsh conditions that reduce mitigation effectiveness.

In both cases the environment was extreme and involved people in extremely vulnerable situations. The need for extraordinary risk management planning, training and practices have become industry standards. Very limited post event impact is available to reduce drowning risk. Investments in primary and secondary prevention reduce these tragic events and their mortality impact.

Today, we have fewer primary industry and transportation accidents at sea. The inland burden of drowning continues to grow as a proportion of the total mortality. Weather forecasting and infrastructure are positive contributors. Policy, regulation and governance of drowning risks is most effective. Public education needs to be integrated with a suite of actions.

Drowning is behavioral and contextual in nature. Drowning mortality in the Canadian far north has an incidence risk 10+ times more than the national average. Understanding risk behaviors and context is a multi-factorial challenge. We can and must create more impactful interventions focused on our most at risk communities. Governmental coastal drowning reduction resources have been helpful.

We must improve resources for in-land drowning risk reduction. Canada is not homogeneous with wide variation of at-risk communities and populations. We must listen and understand the social and cultural context of drowning risk. We must learn more about social and socio-economic determinants of drowning to better target efforts for impact. We must think about everyone as equal to everyone else, regardless of where they live, how they live or pray and who they are. We have a lot of work to do to stop drowning for all Canadians. All lives matter.
In 2012 WHO estimated that 372,000 people died from drowning, which has made it the world’s third leading unintentional injury killer. Over half of all drowning deaths occur among those aged under 25 years. 91% of the drowning deaths of all ages occur in LMICs. The fatal drowning rate in LMICs is several times higher than the HICs. Although drowning occurs in all ages, studies suggest that children aged 1-4 years are at the highest risk of drowning globally. Children of the LMICs are the worst victim. In Bangladesh drowning is the leading cause of death among children 1-4 years (86.3 per 100,000 children-years) which is followed by pneumonia, malnutrition and diarrhoea.

In the HICs there is evidence of long term reduction of drowning. These reductions are due to piped water and reduced exposure to open water. The other factors include safety standards, policies and legislations. The interventions of HICs are not readily applicable in the resource constraint settings. However, some interventions in the LMICs which are developed considering the country context are appearing to be effective in child drowning prevention. A recent research showed that child drowning is also preventable in a low resource setting Bangladesh utilizing locally available low-cost resources. Two interventions – Anchal (community crèche) and SwimSafe (survival swimming teaching to children) were identified effective and cost-effective in preventing childhood drowning. A typical Anchal is a spacious room located in the house of a care-giver. The care-giver provides supervision of about 25 children aged 1-5 year-old 6 days a week within the hours of 9:00 a.m. and 1:00 p.m., the peak period when children are most at risk for drowning in rural Bangladesh. During this period, the care-giver addresses safety, development, hygiene, nutrition and other health issues of the children. The SwimSafe is a survival swimming teaching intervention for children 4 years and over. Trained community swimming instructors teach survival swimming to children in a local pond modified with submerged bamboo platform. In the similar settings these interventions could be applicable to prevent child drowning.

Data on drowning is essential for developing drowning prevention strategies, which is severely lacking especially in the LMICs. To improve the drowning situation in these countries a system of collecting data needs to be established. Moreover, all countries should implement proven drowning prevention measures considering their country context. All countries should have a national plan on drowning prevention. In order to achieve all these activities to prevent drowning a global partnership should be established.
In the second part of the 18th century (after 1750), the first community initiatives to prevent drowning and to rescue and resuscitate a drowned victim were taken by a wide variety of persons and institutions in several parts of the world. Unfortunately, much of the historically relevant documentation has been lost or is difficult to access. At the same time, complete consecutive documentations from the earliest periods until today are available in the rescue reports, statistical overviews and (inter)national books collected by Maatschappij tot Redding van Drenkelingen in Amsterdam. This society to rescue people from drowning has been founded in 1767 and is located in Amsterdam in the same building since 1846. In its earliest days, the Maatschappij was amongst the first and strongest advocates that drowning victims deserve proper rescue and resuscitation. Their resuscitation guidelines were distributed all over Europe for over 100 years while preventive measures were implemented all over the Netherlands. Since 1767, more than 7000 rescue situation have been rewarded by means of golden, silver or bronze medals. Each of these rescues is described in great detail in peer-reviewed reports. The available material provides a coherent, although biased, overview of the changes of common rescue techniques, resuscitation techniques and resuscitation equipment. Most interesting is the observation that story-telling by poems, personal convictions, undisputed historical attitudes, international correspondence between researchers and slowly growing scientific evidence resulted in permanent disagreements on the best revival techniques for more than 2 centuries. Techniques as rectal fumigation, stimulation by pain and foul-smelling chemicals, rubbing arms and legs, dripping cold water and manually duplicating thoracic movements were reported to be effective and became popular for a certain period of time. Only when mouth-to-mouth ventilation was developed in the middle of the 20th century, one international resuscitation standard was defined although by that time drowning resuscitation became an overlooked issue. An overview of the evolution of drowning rescue and resuscitation from 1767 onwards also depicts interesting examples of the great passion for humanitarian principles to save drowning victims, permanent commitment to strive for the best for drowning victims, and diligence in adapting to changes in the society.
Africa is said to have the highest rates of drowning of all the world regions (7.9 deaths per 100 000 population), although the South East Asian (7.4 per 100 000 pop) and Western Pacific (4.8 per 100 000 pop) regions experience more deaths from drowning in absolute numbers. These global figures do not include drowning deaths in the context of floods and water transport incidents, both of which occur with increasing frequency as the continent experiences the effects of climate change, rapid population growth, and increasing mobility. For instance a survey among fishing communities on Lake Victoria reported an annual drowning fatality rate of 502 per 100 000 population.

The bulk of these drownings happened in the context of transportation or small scale commercial fishing. Africa is the continent with the fastest growing population, and the most rapid rate of urbanization. Drowning data are still scanty, although there is now an increasing number of publications from African countries (Tyler MD, Richards DB, Reske-Nielsen C et al 2017). While the increased risk and the context in which drowning occurs in Africa are becoming better understood, what is not as well known is how the recommendations of the Global Report on Drowning (WHO 2014) are being taken up by the African countries which experience the biggest burden.

This presentation will look at the macro socio-economic factors that characterize African countries, and discuss how these factors will likely impact the uptake and successful implementation of the WRDP recommendations. Challenges and opportunities for the successful implementation of these recommendations will be explored and discussed.
Background: The Washington State Drowning Prevention Network was developed over 20 years ago to provide a forum for organizations to work together on preventing drowning. Examples of activities include an annual water safety day, life jacket loan programs, training and networking, data reviews, water safety and boating safety, access to educational information through the website www.seattlechildrens.org/dp, advocacy and media outreach. Meetings are held twice a year with in person, conference call and video teleconference options to facilitate participation. Emails are sent with education and information resources.

Methods: Members include police, marine patrol, emergency medical services officers, pool operators, park administrators, swim instructors, parents and family members of a drowned child or adult, public health officials, lifeguards, injury prevention specialists, coroners, hospital and injury prevention specialists.

The network is led by a children’s hospital, state and local health departments, Safe Kids and the state boating program. Activities are developed using the Spectrum of Prevention framework which includes individual education, community organization, organizational and policy change. Goals for 2016-18 include: educating families, youth and adults; increasing access to and use of life jackets; increasing the number of children who learn to swim; policy promotion and technical assistance; dissemination and coordination of drowning data; building partnerships for water safety and using consistent messaging.

Results to date include:

- Policy education and advocacy: These include a stronger boating under the influence law, mandatory boater education and mandatory child life jacket legislation.
- Development of the first life jacket loan program in the US: Washington State. There are now over 175 life jacket programs, many of which are coordinated by Network members. There is a centralized list of sites, google map, loan program information and standardized signage.
- April Pools Day: An annual water safety event conducted at local public and private swimming pools. April Pools Day promotes swimming, life jacket use, boating and water safety for families, reaching 2,000-5,000 persons a year and thousands more via media.
- Training programs in drowning prevention and water safety: These reach over 100 people a year. Evaluations assess satisfaction, usefulness and changes planned as a result of attendance.
- Drowning Prevention Update with links to resources locally and nationally.
- News clipping surveillance: Tracking and reporting on drownings reported in newspapers provide timely specific information on risk factors and drowning settings.
- Tom Warren Water Safety Award: annual recognition of outstanding programs and leaders in the state.
- Media and educational outreach: a coordinated one day annual media tour co-led by the state boating program resulting in numerous interviews with TV stations, newspapers and radio.
- Keys to the Network’s strengths are: shared leadership, a collaborative approach that respects and builds on the strengths of all members and a commitment to work on goals together – even pools and spas promote boating safety! Challenges include a lack of funding and support staff to consistently maintain activities and resource constraints of partner organizations. We believe this is the longest standing drowning prevention collaboration in the United States.
Launched on 14 December 2012, the primary objective of the Princess Charlene of Monaco Foundation is to save lives by putting an end to drowning.

Its missions are to raise public awareness about the dangers of water, teach children preventive measures and teach them to swim.

The World Health Organization estimated that 360,000 people drowned worldwide in 2015 (1):

- More than 40 fatalities every hour
- More than half the victims are under the age of 25
- Children under the age of 5 are the most affected

When a drowning is non-fatal, often the victim is left with severe aftereffects, in particular neurological.

A number of “Learn to Swim” and “Water Safety” programmes have been implemented around the world in order to fight against this scourge.

The Foundation’s actions are also based on the values of sport such as discipline, self-respect and respect for others, determination and team spirit.

The “Sport and Education” programme uses sporting activities as tools to contribute to the well-being and development for all children no matter their origin or circumstances.

From December 2012 through to December 2016 more than 307,000 people, mainly children, benefited from these three programmes in 30 countries (2).

Princess Charlene of Monaco Foundation
www.fondationprincessecharlene.mc
contact@fondationprincessecharlene.mc
Tel +377 98 98 99 99

Join us on Facebook:  

(1) Reproduced with the publisher’s permission – Fact Sheet N°347, May 2017, published by the World Health Organization
http://www.who.int/mediacentre/factsheets/fs347/en/

(2): Australia, Bangladesh, Burkina Faso, Canada, Chile, Dominican Republic, France, Gabon, Ghana, Greece, India, Indonesia, Kenya, Macedonia, Madagascar, Malaysia, Monaco, Morocco, Nepal, Nicaragua, Peru, Philippines, Senegal, Serbia, South Africa, Sudan, Tanzania, Thailand, U.S.A. and Zimbabwe.
# INDEX

## A

<table>
<thead>
<tr>
<th>Name</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abâcherli, Reto</td>
<td>317</td>
</tr>
<tr>
<td>Abarca, Claudio</td>
<td>211</td>
</tr>
<tr>
<td>Abouid, Bernhard</td>
<td>22</td>
</tr>
<tr>
<td>Achutegui, Alvaro</td>
<td>139</td>
</tr>
<tr>
<td>Achutegui, Juan</td>
<td>139, 170</td>
</tr>
<tr>
<td>Agrawal, Priyanka</td>
<td>337</td>
</tr>
<tr>
<td>Alexander, Marion</td>
<td>87</td>
</tr>
<tr>
<td>Alfonso, Natalia Y.</td>
<td>338</td>
</tr>
<tr>
<td>Alonge, Olakunle</td>
<td>446, 115, 336, 338</td>
</tr>
<tr>
<td>Alves, Ricardo</td>
<td>199</td>
</tr>
<tr>
<td>Amado, George</td>
<td>288</td>
</tr>
<tr>
<td>Amassian, Aram</td>
<td>87</td>
</tr>
<tr>
<td>Anderson, Sarah</td>
<td>32, 95, 137</td>
</tr>
<tr>
<td>Andrea, Giuseppe</td>
<td>101, 102</td>
</tr>
<tr>
<td>Andronaco, Robert</td>
<td>48, 85</td>
</tr>
<tr>
<td>Anjos, José</td>
<td>179</td>
</tr>
<tr>
<td>Aoki, Shinich</td>
<td>185</td>
</tr>
<tr>
<td>Ashrafi, Rabbya</td>
<td>113</td>
</tr>
<tr>
<td>Augusto, Rodolfo</td>
<td>177</td>
</tr>
</tbody>
</table>

## B

<table>
<thead>
<tr>
<th>Name</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bailey, Cherry</td>
<td>258</td>
</tr>
<tr>
<td>Bailey, Joe</td>
<td>151</td>
</tr>
<tr>
<td>Bailhache, Marion</td>
<td>34</td>
</tr>
<tr>
<td>Baldwin, Catherine</td>
<td>50</td>
</tr>
<tr>
<td>Barcala-Furelos, Roberto</td>
<td>13, 321</td>
</tr>
<tr>
<td>Barcelos, Eduardo</td>
<td>178</td>
</tr>
<tr>
<td>Barnsley, Paul</td>
<td>17, 251</td>
</tr>
<tr>
<td>Barss, Peter</td>
<td>42, 79</td>
</tr>
<tr>
<td>Baset, Kamran</td>
<td>19, 115, 336, 338, 339</td>
</tr>
<tr>
<td>Bassett-Foss, Michael</td>
<td>206</td>
</tr>
<tr>
<td>Batista, Noé</td>
<td>178</td>
</tr>
<tr>
<td>Beerman, Stephen</td>
<td>203, 205, 261, 344</td>
</tr>
<tr>
<td>Bellemare, Alexandra</td>
<td>87</td>
</tr>
<tr>
<td>Belton, Kathy</td>
<td>30</td>
</tr>
<tr>
<td>Bennet, Eddie</td>
<td>93, 149</td>
</tr>
<tr>
<td>Bennet, Elizabeth</td>
<td>90, 156, 256, 263, 348</td>
</tr>
<tr>
<td>Bennett, Tony</td>
<td>93</td>
</tr>
<tr>
<td>Berg, Ingvar</td>
<td>148</td>
</tr>
<tr>
<td>Bhuiyan, Al-Amin</td>
<td>46, 336</td>
</tr>
<tr>
<td>Bierens, Joost</td>
<td>13, 128, 219, 225, 267, 273, 321, 326</td>
</tr>
<tr>
<td>Birch, Phil</td>
<td>129</td>
</tr>
<tr>
<td>Birch, Rhiannon</td>
<td>92, 123, 252, 264, 266</td>
</tr>
<tr>
<td>Bishai, David</td>
<td>336, 338</td>
</tr>
<tr>
<td>Bjørnshave, Katrine</td>
<td>226</td>
</tr>
<tr>
<td>Blackwell, Alex</td>
<td>129</td>
</tr>
<tr>
<td>Blitvich, Jennifer</td>
<td>252, 263, 266</td>
</tr>
<tr>
<td>Braga, Fabio</td>
<td>75, 94</td>
</tr>
<tr>
<td>Brand, Karin</td>
<td>301</td>
</tr>
<tr>
<td>Brander, Robert</td>
<td>133, 135, 146</td>
</tr>
<tr>
<td>Breedveld, Koen</td>
<td>287</td>
</tr>
<tr>
<td>Brewster, B. Chris</td>
<td>135, 211</td>
</tr>
<tr>
<td>Brighton, Barbara</td>
<td>32, 39, 137, 230</td>
</tr>
<tr>
<td>Brügger, Othmar</td>
<td>302</td>
</tr>
<tr>
<td>Brunet, Pierre</td>
<td>87</td>
</tr>
<tr>
<td>Buckley, Graham</td>
<td>282, 322</td>
</tr>
<tr>
<td>Bulger, Sean</td>
<td>269</td>
</tr>
<tr>
<td>Button, Chris</td>
<td>270</td>
</tr>
<tr>
<td>Byers, Barbara</td>
<td>55, 82, 255</td>
</tr>
</tbody>
</table>

## C

<table>
<thead>
<tr>
<th>Name</th>
<th>Page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cairney, John</td>
<td>275</td>
</tr>
<tr>
<td>Calverley, Hannah</td>
<td>259</td>
</tr>
<tr>
<td>Cano Noguera, Francisco</td>
<td>26, 76</td>
</tr>
<tr>
<td>Cardoso, Patricia</td>
<td>157</td>
</tr>
<tr>
<td>Carmont, Tanya</td>
<td>324</td>
</tr>
<tr>
<td>Carswell, Emily</td>
<td>316</td>
</tr>
<tr>
<td>Carter, Kelly</td>
<td>125</td>
</tr>
<tr>
<td>Castaneda, Jairo</td>
<td>211</td>
</tr>
<tr>
<td>Castelle, Bruno</td>
<td>133</td>
</tr>
<tr>
<td>Cayres, Eric</td>
<td>157</td>
</tr>
<tr>
<td>Chavez, Daniel</td>
<td>211</td>
</tr>
<tr>
<td>Chen, Bo I</td>
<td>285</td>
</tr>
<tr>
<td>Chertudi, Aitor</td>
<td>139, 170</td>
</tr>
<tr>
<td>Chertudi, Leire</td>
<td>170</td>
</tr>
<tr>
<td>Chow, Wendy</td>
<td>81, 84, 90, 150</td>
</tr>
<tr>
<td>Chowdhury, Fazlul</td>
<td>339</td>
</tr>
<tr>
<td>Chowdhury, Rabiu Awal</td>
<td>115</td>
</tr>
<tr>
<td>Chowdhury, Salim Mahmud</td>
<td>329</td>
</tr>
<tr>
<td>Christou, Alikia</td>
<td>339</td>
</tr>
<tr>
<td>Chung, Celeste</td>
<td>256</td>
</tr>
<tr>
<td>Claesson, Andreas</td>
<td>150</td>
</tr>
<tr>
<td>Clague, John</td>
<td>239</td>
</tr>
<tr>
<td>Clavera, Nelson</td>
<td>211</td>
</tr>
<tr>
<td>Clemens, Tessa</td>
<td>18, 144, 203, 205</td>
</tr>
<tr>
<td>Coelho, Cyro</td>
<td>199</td>
</tr>
<tr>
<td>Conrat, Adilho</td>
<td>157</td>
</tr>
<tr>
<td>Cook, Brian</td>
<td>33</td>
</tr>
<tr>
<td>Cossu, Adrian</td>
<td>78</td>
</tr>
<tr>
<td>Costa, Rodrigo</td>
<td>179</td>
</tr>
<tr>
<td>Cotter, Jim</td>
<td>270</td>
</tr>
<tr>
<td>Coutinho, Claudia</td>
<td>172</td>
</tr>
</tbody>
</table>
INDEX

Cox, Kelly Anne 297
Crawford, Gemma 70
Cruikshank, Jessica 315, 319
Crundall, David 130
Cullen, Angela 297
Cumin, David 221

D
Dahlbom, Pehr 150
Dalke, Shelley 42, 79
Davis, Paul 259
Davis, Peter 211
Daw, Shane 32, 39, 95, 137, 146, 230, 298, 321
Dawes, Peter 13
De Martelaer, Kristine 267
De Quincy, Pete 142
Denehey, Melissa 70
Deng, Xiao 14
Dharmaratne, Samath Dhamminda 264

D'Hondt, Eva 267
Diniz Filho, Salvador 188
Djärv, Therese 150
Dodd, Madeleine 71
Domínguez 322, 324
Domínguez Pachón, Ana Mª 26, 52, 76
Dowd, Jill 97
Drul, Colleen 30
Duan, Leilei 14
Dudley, Dean 275
Duncan, Joan 212
Dunn, Michael 141
Dunne, Cody 180
Dykstra, Heather 29

E
Edwards, Terri 300
Ekanayaka, Jeewanthika 264
Ekchaloemkiet, Som 110, 203, 234
Elamin, Mai 200, 278
El-Arifeen, Shams 336, 338
Emgdio, Rogerio 24
Enkel, Stephanie 56
Enya Abla, Asamenu Emily 312
Espino, Mike 176, 233
Espírito, Kevin 265
Eugene, Vanessa 202

F
Falcon, Jamie 167
Fanzeres, Christiane 172
Fernandez, Georgina 325
Ferreira, Carlos 179
Ferretti, Emanuele 101
Fielding, David 50
Fielding, Roy 154
Finn, Kathleen 276, 299
Fitz-Clarke, John 223, 234
Fletemeyer, John 73, 173
Floor, Corry 287
Forrester, Jo 68
França, Jeferson 189
Franklin, Richard 12, 27, 28, 30, 59, 104, 146, 232, 245, 258, 333
Fregapani, Fabio 178
From, Neal 119
Funari, Enzo 51

G
Gadd, Jennifer 55
Galamba, Marco 179
Galanis, Daniel 147
Gallacher, Tabita Krogstrup 220
Gallo, Alexandre 178, 261
García Sanz, Alberto 26, 76
García Sanz, Isabel 26
George, Peter 198
Gerdmungkolgan, Suchada 110, 203, 334
Giesbrecht, Gordon 86, 87, 89
Gilson, Ian 89
Girasek, Deborah 67
Giustini, Marco 514
Glenn, Jon 313
Goettinger, Mischa 148
Gomes, Nuno 179
Gomez, Tony 66
Goto, Ralph 164
Gould, Shane 100, 135, 294
Gouveia e Melo, Henrique 166, 187
Graham, Daniel 238, 242, 243, 341
INDEX

Grandi, Romano 153
Griffiths, Tom 153
Grimstad, Rannei 271, 290, 307, 308, 309, 310, 311
Gudmundsdottir, Sigridur Lara 284
Gudmundsson, Hafthor 284
Guest, Duncan 130
Guevarra, Jonathan 209, 333
Guimarães, Heubert 121

Haddad-Junior, Vidal 236
Hagger, Martin 72, 88, 107, 246
Haiti, Renan 98
Halldorsdottir, Sigrun 284
Hallett, Helen 109
Halphee, Michael 363
Hamilton, Jane 42, 79
Hamilton, Kyra 72, 88, 107, 246
Hartley-Kite, Vicki 207
Harvey, Connie 217, 233, 253
Harvey, Lisa 19, 339
Haus, Brian 173
Haveman, Bart 148
He, Jerry 318
Heard, Lee 60, 207
Hearin, John 173
Hedegaard, Sven 192
Henriques, Marcos 179
Hernández-Sánchez, Mariela De Los Ángeles 327
Hernborg, Olof 150
Herrero Simón, Rosa 52, 76
Herrmann, Ivan Tengbjerg 49, 192, 104
Hocken, Russell 340
Hodges, Sean 258
Hollenberg, Jacob 150
Hood, Natalie 219, 225
Hoque, Emdad 336, 338
Horneman Laakso, Bente Wäinösdatter 271, 290, 307, 308, 309, 310, 311
Horneman, Ebbe 271, 290, 307, 308, 309, 310, 311
Hossain, Jahangir 124, 261, 234
Hossain, Mohammad Jahangir 45, 244
Hossen, Kabir 45
House, James 231
Howard, Christina 130
Howe, Jim 126
Hsu, Chiung Yun 285
Huband, Daymen 221
Hyder, Adnan 46, 115, 336, 338

I
Ingram, Andrew 303
Ishikawa, Toshinori 120, 168, 185
Islam, Irteja 336, 338
Ivers, Rebecca 19, 71, 337, 339
Iwersen, Michael 210

J
Jackson, Anne-Marie 57, 270
Jackson, Renae 227
Jackson, Samantha 57
Jafari, Maryam 263
Jagnoor, Jagnoor 19, 71, 337, 339
Jan, Stephen 19, 339
Jancey, Jonine 70
Janeiro, António 179
Jansson, Anders 150
Jayawardena, Mevan 264, 273
Jenkin, Gareth 235
Jones, Emily 269
Joshi, Rohina 19
Jost, Ulrich 171
Jull, Stephanie 314
Junge, Målfred 254
Junggren, Stephan 286
Juniper, Amanda 56

K
Kamstra, Peter 33
Kang, Dae Young 134
Kania, Job 47, 295
Kashif, Sabrina 200, 278, 330
Katchmarchi, Adam 269
Kazama, Takahiro 168, 185
KC Mani, Kulanthayan 331
INDEX

Keech, Jacob 75, 88, 107, 246
Kennedy, David 33
Kent, Andy 169
Kerdsomnuk, Sutep 114
Khalafallah, Hamid 200
Khan, Jasmin 115
Khanam, Mahruba 261
Kim, Hyemi 229
Kjendlie, Per-Ludvik 271
Kobusingye, Olive 347
Koch, Sofie 286
Komine, Tsutomu 185
Koon, William 36, 165, 2639
Kosiński, Michał 260
Kreitl, Beth 265, 282
Krogh, Kristian 220, 226
Kublick, Louise 31

M
Macleod, Ross 68
MacPherson, Alan 89
Macpherson, Alison 15, 1446
Madorno, Sandra 103
Madrigal, Leilani 227
Mahony, Alison 12, 15, 17, 20, 83
Mangione, Thomas 81, 84, 90, 156
Manino, Leonardo 211
Marin, Ricardo Pin 211
Markovic, Ognjen 148
Marling, Tobias 286
Marques, Olga 165, 187
Marshed, Bakhtim 277
Martins, Fábio 177, 199
Mashreky, Saidur Rahman 329
Massey, Heather 231
Matsumoto, Takayuki 168
Matthew, Jaybalan 16
Matthews, Bernadette 40, 85, 92, 123, 252, 264, 266, 273
Mayhew, Adrian 247, 248
McCarrick, Jak 133
McCullough, Tom 553
McDonald, Gerren 87
Mcgrath, Brendan 213
McGrath, Oisin 151, 447
McGuire, Tim 270
Meco, Daniel 179
Mecrow, Tom 43, 124, 160, 242, 243, 277, 312, 330
Meddings, David 21
Meier, Fabienne 302
Melbye, Mats 106
Melenchuk, Mike 181, 189
Mello, Danielli 24, 177, 199, 280
Mello, João 261
Menendez, Alvaro 211
Menezes, João Paulo 177
Merlich, Gustavo 35
Mestre, António 179
Michniewicz, Iwona 143
Michniewicz, Romauld 143
Mills, Jonty 272
Mogensen, John 192
Mohr, Detlev 224

L
Laird, Melissa 92
Lança, João 179
Lang, Ben 50
Larsen, Penny 251, 258
Lauridsen, Kasper Glerup 220
Laxton, Victoria 130
Leatherman, Stephen 191
Leavy, Justine E 70, 96
Lee, JooYong 134
Leech, John 183, 296
Leggat, Peter A 59, 245
Leitão, Nuno 156, 187
Lepine, Francois 64
Limjitrakorn, Thanyaporn 114, 451
Lindsay, Mark 37
Linnan, Michael 261
Lins, Maria 121
Lloyd, Nicole 258
Løfgren, Bo 220, 226
Loupous, Dimitrios 175
Love, Christopher 262
Low, Meagan 111, 132, 216
Løych, Jakob Braendgaard 220
Lucas Ledesma, Manuel 52,
Lukas, Michelle 325
Lukaszyk, Caroline 19, 208, 337, 339
INDEX

Mokala, Motlatsi 65
Mondick, Lindsay 289
Monteiro, Elaine 121
Moran, Kevin 048, 58, 63, 221, 250, 305138, 404
Morgan, Patrick 219, 231
Mulcahy, Nick 111, 132, 216
Müller, Christoph 305
Mundy, Allan 136
Murray, Jean 80

Percher, Michael 873
Pereira, Felipe 199
Pereira, João 236
Petrass, Lauren 252, 266
Pettigrew, Seamus 119
Pezzini, Dario 51, 162
Phillips, Chanel 279
Pia, Francesco 131, 138, 222
Pidgeon, Stacey 83, 251
Pinheiro, Ana 103
Pinheiro, Marcelo 35
Pino Espinosa, Jessica 26, 52, 76
Porteous, Anne 300
Porter, John 126
Powell, John 161
Price, Shelby 246

Quan, Linda 36, 90, 128, 156, 165, 219, 256
Queiroga, Ana 13, 24, 99, 104, 280, 321

Rahman Mashreky, Saidur 45
Rahman, Aminur 19, 23, 45, 46, 71, 113, 124, 160, 244, 261, 336, 338, 339, 345
Rahman, Qazi 336
Rama, Luís 166, 187
Ramos, William 217, 265
Rankine, Stephanie 89
Rankine, Ted 89
Rawal, Yash 87
Reid, David 230
Reijnen, Guido 145
Reilly, Jessica 221
Reynolds, Paul 74
Ribeiro, Eduardo 172
Richard, Yanik 87
Rijksen, Eveline 32, 39, 137, 298
Ringh, Mattias 150
Roberton, Dominic 192
INDEX

Roberts, Annette (Floss) 215, 274, 281
Roberts, Craig 61, 91, 342
Robinson, Rebecca Wear 201, 213
Roos, Karen 227
Rosenqvist, Mårten 150
Rotondi, Michael 18, 144
Rowhani-Rahbar, Ali 36, 165
Ryan, April 137
Ryan, Dan 19, 339, 340

S
Sabatini, Alessandro 102
Sakulrak, Saluckjit 114
Salam, Shumona 46, 115, 338
Saldanha, Rodrigo 157
Salih, Tilal 278
Salmi, Louis-Rachid 34
Samuelsson, Jens 150
Santos Cruz, Pedro 291
Santos, Vitor 179
Sato, Youjiro 168
Saunders, Colleen 16, 25
Savage, Paul 231
Scarr, Justin 212, 15, 17, 20, 27, 61, 83, 251, 258, 261, 281, 332, 342
Schembri-Portelli, Jennifer 281
Schinda, Antonio 75, 94, 118
Schuller, Renan 157
Scott, Tim 133
Seabra, Rui 13, 321
Sedain, Bhagabati 328
Seesink, Jeroen 224
Seghers, Garry 322
Seifert, Ludovic 270
Semptrots, Justin 13, 321
Sewduth, Dhaya 25
Shane, Michael 105, 155
Sharma, Anita 297, 318
Sharmin, Shumona 336
Shaw, Wendy 146
Shin, Eunho 268
Sibaja, Luis 211
Silva, António 179
Simon, Pamela 95, 230
Simonnet, Bruno 34
Simpson, Kate 92, 123, 252, 266, 273

Sindall, Rebecca 50, 65, 197, 202, 212, 238, 242, 243, 330, 341
Skaliy, Alexander 174
Skovgaard, Thomas 286, 310
Smicelato, Carlos 177, 188
Smith, Jenny 129
Smith, Perry 276, 299
Smith, Stephanie 88
Soons, Bart 267
Sou, Gryphon 159
Soulé, Bastien 17
Spitzer, Natalie 81, 84
Springer, Leonardo 179, 184
Sriwan, Stapon 113
Sseguja, Yasin 197
Stàrk, Mathilde 220
Staines, Carolyn 62
Stanley, Teresa 48, 58, 250
Starrenburg, Caleb 243
Steer, Di 195
Stempski, Sarah 256, 263
Stewart, Joanne 265, 282, 324
Stierl, Maurice 241
Strugnell, Grace 92
Sullivan, Andrea 173
Supawerakul, Chanchai 122
Sutherland, Alan 50, 112
Svensson, Leif 150
Sweeney, Roger 196
Symcox, Martin 129
Szpilman, David 13, 24, 35, 38, 75, 94, 98, 103, 118, 156, 157, 172, 177, 178, 187, 211, 219, 236, 280, 321, 387, 388

T
Tadeia, Alexandre 179, 186
Talab, Abu 336
Talbot, Joanna 228
Taliaferro, Andrea 269
Tamim, Hala 18, 144
Tanaka, Shuji 185
Tellier, Eric 34
INDEX

Tesone, Liz 264
Thawudom, Natthasak 293
Thayer, Maile 81, 84, 90
Thulin, Paula 257
Tipton, Michael 13, 68, 129, 231, 321
Trindade, Roberto 177
Tsampazis, Evangelos 175
Tsigeridis, Katherine 335

Werder, Olaf 71
Wernesten, Mona Lisa 301
Wernicki, Peter 219
Wight, Danny 243
Williams, Darren 160, 244
Wills, Steve 160, 208, 244, 312
Wilson, Jared 292
Wolsegger, Tanya 77
Wood, Fran 283
Wooler, Adam 132
Wutscher, Thorsten 140

X
Xavier, Rodrigo 157

Y
Yates, Julia 157
Ye, Pengpeng 14
Yovanna, Mayela 157

Z
Zalewski, Tomasz 41

U
Uhing, Tobias 171
Ukwatte, Hiran 182
Ul Baset, Kamran 45, 71
Underwood, Gary 161
Uy, Maria Rosario Sylvia 209
Uzor, Felix 115, 158, 312

V
Vallieres, Nathalie 117
van de Schoot, Dion 148
van der Linden, Theo 224
Vander Wekken, Suzanne 297
Vargas, Wanda 211
Vasconcellos, Marcelo 280
Vega Cid, Álvaro 52
Velasco, Bridget 147
Vichou, Chrysoula 240
Vichou, Venetia 240, 32
Viegas, José 179
Vieira, Carlos 179
Vieira, Luciano 99
Vilela, Jefferson 199
Vilhena, Rodrigo 157
Voaklander, Don 30

W
Wadhwaniya, Shirin 115, 336
Wagar, Terry 181
Wagg, Chris 194
Warton, Nicola 146
Webber, Jonathon 13, 219, 221, 250, 321
Wechselberger, Fred 44
Wechselberger, Paul 325
Weigand, Heidi 181
Weir, Adam 149, 163, 169
INTERNATIONAL LIFE SAVING FEDERATION WORLD CONFERENCE ON DROWNING PREVENTION

Every two years, the International Life Saving Federation brings together its member organisations and the world’s leading researchers, practitioners and policy makers to present and discuss the latest research and thinking in drowning prevention, lifesaving, rescue, water safety, lifesaving sport and related fields at the World Conference on Drowning Prevention (WCDP).

INTERNATIONAL LIFE SAVING FEDERATION WORLD CONFERENCE ON DROWNING PREVENTION 2017 ABSTRACT BOOK


© World Conference on Drowning Prevention 2017

This work is copyright. It may be reproduced in whole or part for study or training purposes subject to the inclusion of an acknowledgement of the source. It may not be reproduced for commercial usage or sale.

Reproduction for purposes other than those indicated above requires written permission from the International Life Saving Federation.

This document can be downloaded from the International Life Saving Federation Website at: www.ilsf.org

CONTACT DETAILS:

For further details please contact:

International Life Saving Federation (ILS)
Gemeenteplein 26
3010 Leuven Belgium
Telephone: +32 16 89 60 60
Email: info@ilsf.org
Website: www.ilsf.org
Flickr: www.flickr.com/photos/ilsforg
Facebook: www.facebook.com/ILSForg
Google+: plus.google.com/100131167778451488323

COVER PHOTOGRAPHY CREDIT:

Swim to Survive session in Wasagamack First Nation; July 2015
Northern Water Smart® Program; Melissa Anderson (photographer)

© Copyright 2015; The Royal Life Saving Society Canada – Manitoba Branch Inc.