

resolving prior to physician visit, and physician availability. Facilitators of appropriate behaviour: Team personnel explaining to the parents the importance of physician visits at time of injury and a team protocol that enforces physician-based management.

**Conclusions** Concussion awareness is improving but there are still gaps in hockey parents' and players' understanding of management. Understanding beliefs, barriers and facilitators of proper concussion management behaviour may assist with reducing the consequences that can arise due to mismanagement.

## Drowning and Water Safety

Parallel Tue 1.6

### 265 POOL FENCING BYLAWS AND DROWNING RATES AMONG CHILDREN

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**Background** The majority of fatal drownings in Canada occur in natural bodies of water; however private backyard pools are consistently the most common setting where children under 5 years of age drown. A number of studies conducted primarily in Australia and the United States have provided evidence that pool fencing reduces the risk of drowning among children. No long term analysis of pool fencing and municipal bylaws as a factor affecting the risk of childhood drowning in Canada has been published.

**Methods** Using a multi-level ecologic study design, the drowning death rate in Ontario municipalities with isolation fence and gate legislation was compared to that in municipalities with less or no legislation. Individual level descriptive analysis was conducted using data collected from files at the Ontario Provincial Coroner's office for all children under the age of 5 who suffered drowning deaths in private backyard pools over a fifteen year period. Drowning death rates were calculated per 100 000 population. Denominators for rates were yearly estimates of population under the age of 5 for each municipality. Poisson regression methods were used to estimate relative risks and 95% confidence intervals. Additionally, univariate analysis was conducted and descriptive statistics were reported to summarise the characteristics of childhood backyard pool drownings.

**Results** During the study period, 54 children under the age of 5 drowned in a private backyard pool in Ontario. The highest death rate was found among 2 year olds (0.9 per 100 000) and the male to female ratio was 3.5:1. The majority of children (61%) drowned after accessing an unobstructed pool directly from the residence. (Results of Poisson regression to be updated).

**Conclusions** The results of the study demonstrate the need for isolation fencing bylaws that do not allow direct access from the building, and do not allow fences to be "grandfathered" under existing legislation.

### 266 SWIMMING ABILITY AND DROWNING PREVENTION – DO THEY HAVE SOMETHING IN COMMON? A NORDIC CASE STUDY

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**Background** In 1996 the Nordic Countries defined the term swimming ability. A person can be said to be able to swim when he, after being immersed in water, can swim continuously for 200 metres, of which at least 50 m on backstroke. Since then the countries have been collecting data concerning swimming ability statistics. Drownings are one of the leading causes of death worldwide (WHO 2015). The first poster concerning the topic was presented in the World Conference on Drowning Prevention in Potsdam in 2013. The updated data will be presented in 2016 aiming to find correlation between swimming ability and drowning rates (1996–2016) within the Nordic Countries.

**Methods** Each country has been collecting their own data. There is variation in data collecting methods. Data has been collected in different years (2011–2013) depending on country-specific policies. A table has been created to clarify the findings.

**Results** The highest rates in swimming ability came from Iceland, 95% of the children and 96% of the adults can swim and the lowest rates came from Norway, 50%, no data available for adults. (Sweden 92%, no data for adults; Denmark 79/66%; Finland 72/68%). The highest drowning rates came from Finland, 2.3/100,000 and the lowest from Iceland 0.62 (Denmark 1.3, Norway 1.03, Sweden 0.84). There are some indications of a correlation between swimming ability and low drowning rates.

**Conclusions** The swimming ability of a nation seems to play an important role for drowning prevention but there are other important factors (e.g. alcohol abuse, cultural differences, falling through the ice) not related to swimming ability. However, these other factors related to drownings do not decrease the importance of swimming ability, vice versa. The co-operation within the Nordic Countries is special and needs to be emphasised more. While the rest of the world is having difficulties in defining swimming ability and self-rescue skills, a closer look at the Nordic numbers is recommended.

### 267 TWENTY YEARS OF PFD NON-WEARING AND WEARING AMONG CHILD AND YOUTH BOATING IMMERSION VICTIMS IN CANADA

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**Background** Boating is the most frequent activity for water-related immersion deaths in Canada. Central in immersion/drowning is non-wearing of personal flotation devices (PFDs). Although most boating victims are adult males, wearing and compliance with regulations was assessed for children 0–14-years-old and youth 15–19 victims of immersion deaths. Indigenous were compared with other ethnicities.

**Methods** Annual Red Cross collection of 1991–2010 Canadian coroner data by structured questionnaire. Analysis included activity, purpose, personal, equipment, environment factors.

**Results** Among 2678 recreational and daily living boating victims during 1991–2010, included were infants less than 1 year old 4, toddlers 1–4 years old 18, 5–14 year olds 57 and youth 15–19 years old 219. By sex, all 4 infants were male, 13 toddlers male and 5 female, 40 of 5–14s male and 17 female, and 198 youth male and 21 female. 20% of 0–14-year-old victims were properly wearing a PFD, compared with 11% for youth 15–19 years. For 35% of child boaters, there was reportedly no PFD present, representing a violation of current legislation, and for another 27% it was unknown whether a PFD was present. Hence as many as 62% were in violation. For indigenous children, in 63% no PFD was present, and for 17% unknown, i.e., as high as 80s in violation, compared with other ethnicities where 21% were not present and 26% unknown. Concerning youth, for 40% no PFD was present, and for 28% unknown, hence as high as 68% in violation. Among indigenous youth, 58% had no PFD present and 36% unknown, i.e., as high as 92% in violation. For other ethnicities, 41% had no PFD present and 26% unknown. 33% of 0–14-year-old non-indigenous victims were properly wearing a PFD, and 13% of 15–19-year-olds. Not a single aboriginal victim 0–19 years was properly wearing a PFD during the 20 year period, compared with 18% for other ethnicities. 25% of victims 0–14 years were alone or with minors only. For the remaining 75%, at least one adult was present. For 15–19-year-olds, 20% were alone or with minors only, 65% with at least one adult and 13% with others. Of the 17 victims 0–19 years alone at the time of the incident, only one was wearing a PFD. For 0–14 year olds with an adult, 25% were properly wearing a PFD, and for 15–19 year olds, 13%.

**Conclusions** Wearing of a flotation device was low among all child and youth immersion victims. Non-wearing was markedly lower among indigenous victims. Special effort is needed to address non-wearing and lack of compliance with regulations among indigenous peoples of Canada.

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#### THE TOTAL SERVICE PLAN: CASE STUDIES HIGHLIGHT HOW EVIDENCE IS USED TO SHAPE POLICY AND INFORM INTERVENTION STRATEGIES

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**Background** In an effort to reduce drowning deaths Surf Life Saving Australia (SLSA) has created the Total Service Plan to develop the national coastal safety strategy. A central tenet of the plan is that SLSA is a knowledge and research hub with a focus on nationally significant issues and programs.

Key items included in and driven by the plan are:

- Research and data
- National Safety Agenda
- Operations, including distribution of resources and services
- Public education

The Total Service Plan is created using an iterative process of data analysis and review to identify coastal safety issues of national importance. It follows the public health model and is aligned with international risk management principles.

**Methods** At the core of the plan is the data, including existing material such as population and drowning data, rescue statistics

and operational data, as well coastal risk assessments. SLSA also uses new data, for example, a recent National Coastal Safety Survey, which explored 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. The issues and blackspots identified through this process form SLSA's National Safety Agenda.

Monitoring and evaluation is built into the Total Service Plan. Each component is reviewed, evaluated, revised and updated as new evidence and data become available. Every program or project is regularly assessed and improved upon or discontinued as the case may be.

**Results** The National Safety Agenda influences and prioritises lifesaving operations, including services and equipment allocation, such as introducing lifesaving patrols during the wet season in Darwin, NT, to reduce drowning deaths and decrease the incidents of box jellyfish stings and crocodile attacks.

It also drives public education including evidence-based mitigation strategies, communications campaigns and pilot projects. For example, funding a community education project in Wanneroo, WA, to build residents' knowledge and awareness of specific water safety hazards to help increase their resilience to coastal hazards and ultimately reduce drowning deaths.

**Conclusions** This presentation will investigate case studies from the Total Service Plan to show how SLSA uses evidence to ensure lifesaving services and assets are located in areas of need and appropriate public education programs and mitigation strategies are in place to address coastal safety issues and known drowning blackspots.

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#### EVOLUTION OF THE CHILD DROWNING PREVENTION PROGRAMME IN THAILAND

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**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 6.8 to 11.5 between 2004 and 2014. The Child Drowning Prevention Programme in Thailand has been implemented since late 2006 with the goal of reducing the child drowning death rate to 5.0 by 2018. The Objective of this study is to develop the standards for the operations of the Child Drowning Prevention Programme 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.

**Results** After implementing several of such measures, the child drowning death rate declined constantly from 11.5 in 2005 (the first year of programme implementation) to 6.8 in 2014. But gaps were noted at the local or community level, such as the lack of continuity, encouragement and operations of in all aspects of