DROWNING DEATHS IN OLDER PEOPLE

A 10 year analysis of drowning in people aged 50 years and over in Australia.

www.royallifesaving.com.au

Supported by

Australian Government

EVERYONE CAN BE A LIFESAVER

Royal Life Saving

ROYAL LIFE SAVING SOCIETY - AUSTRALIA

Royal Life Saving Society - Australia

Royal Life Saving is focused on reducing drowning and promoting healthy, active and skilled communities through innovative, reliable, evidence based advocacy; strong and effective partnerships, quality programs, products and services; underpinned by a cohesive and sustainable national organisation.

Royal Life Saving is a public benevolent institution (PBI) dedicated to reducing drowning and turning everyday people into everyday community lifesavers.

We achieve this through:

- Advocacy
- Education
- Training
- Health promotion
- Aquatic risk management
- Community development
- Research
- Sport, leadership and participation
- International networks

We are guided by the values of: Safety, Quality, Integrity and the Humanitarian tradition and have been serving the Australian community for over 119 years.

Printed copies of this document are available upon request. Please contact:
P.O. Box 558 Broadway
NSW 2007 Australia
Phone: (02) 8217 3111
E-mail: info@rlssa.org.au

Royal Life Saving Society – Australia specifically acknowledges the key contributors of this report: Amy Peden and Ana Catarina Queiroga, and would also like to acknowledge the assistance of the National Coronial Information System (NCIS) and the support of the Australian Government.

Funding of this project was provided by the Australian Government.

Australian Government

Suggested citation:

Queiroga, AC & Peden, A (2013) Drowning Deaths in Older People - A 10 year analysis of drowning deaths in people aged 50 years and over in Australia. Royal Life Saving Society – Australia, Sydney

www.royallifesaving.com.au

DROWNING DEATHS IN OLDER PEOPLE

A 10 year analysis of drowning in people aged 50 years and over in Australia.

CONTENTS

DROWNING DEATHS IN OLDER PEOPLE: AN OVERVIEW

Supported by
Australian Government

EVERYONE CAN BE A LIFESAVER
Royal Life Saving
ROYAL LIFE SAVING SOCIETY - AUSTRALIA

25%
FEMALE

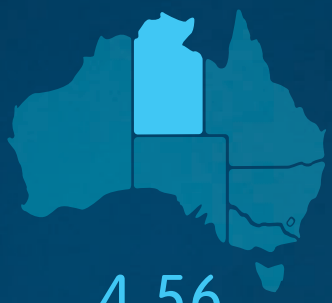
75%
MALE

1,072 PEOPLE AGED 50 YEARS AND OVER DROWNED IN AUSTRALIAN WATERWAYS BETWEEN 2002 AND 2012

75% WERE MALES

THE PREDOMINANCE OF MALES AS DROWNING VICTIMS WAS MORE EVIDENT IN THE EARLY YEARS (50-59 YEARS) OF THIS AGE GROUP

AFTER 90 YEARS OLD, DROWNING DEATHS WERE HIGHER IN FEMALES



4.56
NORTHERN TERRITORY

NEW SOUTH WALES REPRESENTED 40% OF ALL DROWNING DEATHS (N=425)

NORTHERN TERRITORY WAS THE STATE / TERRITORY WITH THE HIGHEST RATE OF DROWNING PER 100,000 POPULATION (4.56 COMPARED TO THE NATIONAL AVERAGE OF 1.63)

OLDER PEOPLE MOSTLY DROWNED WHERE THEY LIVED (78%)

A SIGNIFICANT FRACTION (41%) DROWNED IN MAJOR CITIES, MOSTLY IN SYDNEY, BRISBANE, MELBOURNE AND PERTH

35%
INLAND WATERWAYS

27% OF ALL DROWNING DEATHS IN OLDER PEOPLE OCCURRED IN RIVERS, CREEKS OR STREAMS AND 8% IN LAKES, DAMS OR LAGOONS

OCEANS/HARBOURS WERE THE SECOND HIGHEST LOCATION FOR DROWNING IN OLDER PEOPLE REPRESENTING 20% OF ALL CASES

BATHTUBS AND SPA BATHS WERE THE ONLY LOCATIONS WHERE MORE FEMALES DROWNED COMPARED TO MALES

113 DROWNING DEATHS OCCURRED IN RESIDENTIAL SWIMMING POOLS

22%
WATERCRAFT

18%
FALLS

WATERCRAFT REPRESENTED 22% OF ALL DROWNING DEATHS AND FALLS 18%

WHILE ROCK FISHING, MOSTLY MALES DROWNED (95%)

93% OF ALL DROWNING DEATHS RESULTING FROM RESCUE ATTEMPTS WERE MALES

EXECUTIVE SUMMARY

This report encompasses a 10 year analysis of drowning deaths in people aged 50 years and over in Australia and has been produced to describe the outcomes and recommendations resulting therefrom.

Taking a life stages approach is one of the key priority areas for drowning reduction as proposed by the Australian Water Safety Council (AWSC) in the most recent Australian Water Safety Strategy (2012-2015). By looking in detail at the specific drowning circumstances for a particular age group, evidence-based prevention and reduction methods can be proposed, and therefore expected to be more effective after implementation.

In Australia, from 1 July 2011 to 30 June 2012, 103 people aged 50 years and over drowned – a number that represents just over one third (36%) of all drowning deaths observed in that period. This proportion of drowning is mirrored across the last 10 financial years (1 July 2002 to 30 June 2012), with drowning deaths in people aged 50 years and over accounting for 36% of all drowning deaths experienced in Australia across this period. Due to continually high numbers of drowning in older people the problem has been recognized as a key issue needing immediate and sustained action.

With that in mind, the underlying study detailed in this report aimed to gain an enhanced understanding of the scale of drowning in people aged 50 years old and over in Australia across a period of 10 financial years, as well as the circumstances of the incidents and the impact of demographic and lifestyle factors on drowning of older Australians.

The Australian Bureau of Statistics (ABS) population estimates were used to determine rates per 100,000 population for an age group, gender and State and Territory. Information for this report about drowning cases has been collected from State and Territory Coronial Offices, the National Coronial Information System (NCIS) and media reports. It has been collated and analysed by the Royal Life Saving Society - Australia.

Between 1 July 2002 and 30 June 2012, there were 1,072 people aged 50 years and over who drowned in Australia waterways. Over the 10 financial years, males accounted for 75% of all drowning deaths in older people. The predominance of males as drowning victims was larger in the early years of the age range (50 – 59 years).

It is expected that an increased number of falls are associated with ageing and the data detailed in this report shows that most drowning deaths of people aged 85 years old and over occurred after a fall into the water.

New South Wales was the State with the most drowning deaths followed by Queensland and Victoria, with 425, 233 and 139 deaths, respectively. However, when examining data per 100,000 population, the rates were higher in Northern Territory (4.56) followed by Tasmania (3.02) and New South Wales (1.94) – with a National average rate of 1.63.

Older people largely drowned where they live with 78% of drowning victims registered as non-visitors. In remote areas more males drowned in comparison to women, with 90% of all drowning deaths in those locations being males.

Rivers, creeks and streams were the main locations for drowning in people aged 50 years and over for the 10 financial years, with 289 cases (27%). Of all drowning deaths in rivers, creeks and streams, 22% were people aged 55-59 years old that were mainly using watercraft (22%) or were involved in a non-aquatic transport accident (19%). Bathtubs and spa baths were the only locations where more females drowned when compared to males.

It is interesting to note that even in older age, Australians engage in a lot of different aquatic activities as shown by the diversity of activities immediately prior to drowning. Watercraft incidents were the main cause of drowning deaths in older Australians over the 10 years (22%), followed by falls (18%). Frequently, incidents also resulted from swimming and recreating in inland waterways (20%). Falling into water was the main activity in the Australian Capital Territory, Tasmania and Victoria. The use of watercraft was the main activity in New South Wales, Queensland and Western Australia, while swimming and recreating was the main activity in the Northern Territory and South Australia. Activity was unknown in 14% of all drowning deaths suggesting some people aged 50 years and over were alone when they drowned.

Of all drowning deaths, 37% were known to involve alcohol and 30% to involve drugs. Even though males continue to constitute the major percentage of alcohol-related drowning deaths (69% of all cases), the gender difference in alcohol-related drowning cases was smaller than the gender difference in drowning incidents not involving alcohol. Similar results were found for drug-related drowning deaths. The top 5 activities immediately prior to drowning in alcohol-related drowning deaths were, from highest to lowest, falls, watercraft, swimming and recreating, non-aquatic transport and bathing. With drugs a distinct trend was observed. Falls were responsible for about 20 more cases of drug-related drowning deaths compared to alcohol-related cases. The second highest activity for drug-related drowning deaths was swimming and recreating, followed by watercraft, unknown activity, and bathing.

Additionally, older people, and specifically people aged 65 years and over, are characterized by the increasing incidence of underlying medical conditions. The extent to which pre-existing medical conditions predispose to drowning risks remains unknown and deserves further investigation. In Australia there were 352 cases of drowning deaths in people aged 65 years and over where known underlying medical conditions were present, 68% of all people aged 65 years and over in the dataset.

People aged 50 years and over, particularly in early age stages, may respond to aquatic situations by reliance on skills gained earlier in life and consequently overestimate their current abilities. The differences in activities and locations among age stages of older people underscore the need for a differential approach towards drowning prevention for these different stages of life.

The results from this study identified a number of issues that will need to be tackled when developing and implementing an overarching drowning prevention strategy for this age group, and that, at the same time, will guarantee that the specific needs and lifestyles of older people in Australia are taken into account.

Key findings that need consideration are:

- Within this age group there is a huge diversity in culture, skills and life experience.
- Changes over the last 10 years in income may impact on recreation, location and mobility of older people
- Increased life expectancy, countered with the increased use of medication is expected to impact the level of exposure to aquatic risk factors.

Additionally, some data needs to be further investigated to extend the drowning prevention evidence base as a means of producing effective drowning prevention interventions for older people. Examples include understanding the burden of males in younger age groups (50-59 years) and the role of alcohol, drugs and underlying medical conditions in drowning deaths of older people.

RECOMMENDATIONS

This report makes the following recommendations designed to reduce drowning deaths in people aged 50 years and over in Australia:

Create, implement and evaluate a national public awareness campaign targeting known drowning hazards and risks for older people. The awareness campaign could target the role of underlying medical conditions in drowning, high risk activities for older people and strategies to reduce these risks or the role of alcohol and drugs in drowning.

Encourage participation in aquatic activity as a way of providing older people with water safety skills while at the same time improving their health and well-being in a low impact setting.

Continue to work with the National Coronial Information System (NCIS), State and Territory Coronial Offices and police to improve data collection on drowning deaths for the purposes of enhancing our understanding of factors influencing drowning deaths in those aged 50 years and over.

Explore the presence and impact of underlying medical conditions on drowning in older people.

Create and implement interventions targeting older people and specially males and the use of watercraft.

Further investigate the burden of males in younger age groups (50-59 years old), including levels of physical activity, risk taking behaviours.

Further investigate the role of alcohol in drowning, including social and cultural factors.

Further investigate the role of employment status on drowning deaths in older people, and explore aquatic recreation patterns whilst employed compared to in retirement.

BACKGROUND

Royal Life Saving Society – Australia's (RLSSA) programs, products and services are underpinned by research and a commitment to continual improvement. Furthermore, Royal Life Saving's research provides reliable and evidenced-based information on water safety issues concerning all Australia's waterways and aquatic environments with high drowning risk.

In 2012, RLSSA has again shown great leadership in developing the fourth Australian Water Safety Strategy (AWSS) for 2012-2015 [1]. The Australian Water Safety Council (AWSC) is an industry driven lobby group representing the key water safety organizations in Australia, officially formed in 1998, that strives to work more closely with State Governments and stakeholder groups. To address the number of people who drown in Australia each year the Australian Water Safety Council (of which RLSSA is the convenor) has developed a number of strategies. In the AWSS 2008-2011 [2], the Australian Water Safety Council introduced an overarching goal of reducing drowning deaths by 50% by the year 2020. The most recent strategy (AWSS 2012-2015) maintains its focus and commitment to achieving this aspirational goal and identified the need to move towards the reduction of the number of older people who are drowning.

Therefore, drowning deaths in older people have already been recognised not only by the community but also by stakeholders and government agencies, as an important issue to address and within Australia, RLSSA's challenge has never been greater. The updated Royal Life Saving National Drowning Report 2012 statistics revealed that 103 people aged 50 years and over died from drowning in between 1 July 2011 and 30 June 2012. This represents just over one third of all drowning deaths. The scale of drowning within this life stage is of extreme concern and requires immediate and sustained action in order to achieve a 50% reduction in drowning deaths in that age group by 2020.

Public awareness of the dangers of water still appears to be very low. It is clear that more needs to be done in effectively reducing drowning in older Australians.

Several elements underpin many of the goals of the AWSS 2012-2015 one of which comprises continual research and development that will guide policy and practice. Taking that into account, RLSSA conducted a 10 year study, described in this report, into the circumstances leading to the drowning of people aged 50 years and over. A 10 year analysis of this kind allows us to identify drowning patterns, by understanding the risks, hazard exposures and protective factors inherent to each stage and thus allowing us to provide the crucial level of quality analysis required to inform and propose future drowning prevention measures, specifically targeted towards key demographics.

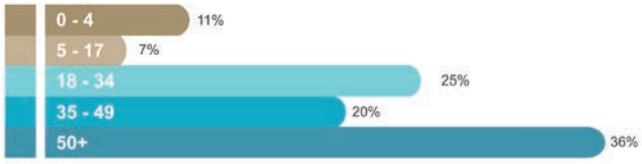
Australia and many other developed nations have become ageing populations. In 2001, 28% of the Australian population was estimated to be over 50 years old and 33% in 2011 [3]. Population projections suggest a heavier concentration in the ages 50 years and over and smaller increases or slight declines in the younger ages in subsequent decades. The ABS estimates that by 2051, 42% of the population will be over the age of 50 years.

The number of older people is increasing and Baby Boomers are moving or living close to where they holiday. It is likely that a greater number of Australians will be exposed to aquatic environments which may result in an increased number of drowning deaths if prevention strategies are not effectively implemented.

Reported numbers of drowning deaths in older people have been consistently high over the years with few studies having been conducted into the circumstances of these drowning deaths. From a comprehensive research study into the circumstances surrounding drowning deaths of older Australians undertaken in 2006 [4], RLSSA developed a water safety skills and education program for older Australians called the "Grey Medallion". The program aims to educate older Australians about water safety and assist them to develop practical skills that can be used to assess risks in aquatic environments and participate safely in aquatic activities. The impact of these programs is still not well understood but a comprehensive analysis of the 10 years of drowning deaths in older people, such as the one detailed in this report, is crucial to enhance our knowledge and provide solid evidence for future drowning prevention interventions.

The age groups within the broader category of "older people" allows for the examination of active compared to less active older people, to look at the variety of drowning circumstances across the age range and to compare the activities of those pre and post retirement age (65 in Australia and in many other high income countries). People are working longer and/or contributing to the community via volunteer pathways which impacts their daily life, leisure time and exposure to drowning hazards.

Figure 1: Drowning deaths by age group for Australia, between 1 July 2002 to 30 June 2012 (N=2,965)



A literature review was undertaken to obtain information on drowning deaths of older Australians, and to examine factors that contribute to these incidents. This cannot be seen as a systematic review but seeks to identify key issues that will be of importance in informing the development of strategies and policies to prevent drowning deaths of older people.

Purpose

The purpose of this short review was to gain an increased understanding of:

- Drowning deaths of older people in Australian (aged 50 years and over);
- Risk factors for falls in older people around water;
- Current demographic and lifestyle trends of older people; and
- Benefits associated with water based exercises for older people.

Methods & Results

Using MeSH terms (drowning or near drowning[5]* or immersion or submersion) and (aged or middle aged or elderly), a search of PubMed for relevant articles on drowning in older people was undertaken on the 5th February 2013. Only articles about the epidemiological analysis of drowning in adults were considered relevant.

Additionally, articles regarding activities frequently related to drowning of older adults, such as falls into the water, were also searched (using the terms accidental falls combined with age and risk factors) and included, as long as they provided important information about risk factors for drowning in this age group. Australian Bureau of Statistics (ABS) publications were also examined to obtain information on current and expected lifestyle trends and changes of older Australians, particularly as they enter retirement age. An examination of the headings, abstracts and full documents, was used to identify relevant information to include in this report based on the criteria of drowning in older people. A search of the reference lists from relevant articles and publications was also undertaken to identify other potentially relevant studies.

Epidemiology of drowning of older people

According to the latest National Drowning Report from Royal Life Saving Society – Australia [6], there were 284 drowning deaths in Australian waterways between 1 July 2011 and 30 June 2012, of which 97 were of people aged 55 years and older. This represents 34% of the overall fatal drowning burden in Australia and represents an increase of 13% on the 5-year average. An article published in 2010 [7] reported similar trends with an increase of 19% of fatal drowning among people aged 65 years and over in the USA, between 2000 and 2007. The 2012 report from Royal Life Saving Society – Australia [6] also emphasized the differences in drowning deaths of older Australians in gender, location and activity being performed immediately prior to drowning.

Despite the high numbers of drowning deaths in this age group, most studies on the epidemiology of drowning around the world focus on children, adolescents and young adults [8-10]. As a result, the circumstances surrounding fatal drowning in the older population are largely unknown and need to be further investigated. Nevertheless, it is widely recognised that the characteristics of drowning episodes, such as risk factors and exposure to hazards, vary greatly by age and, naturally throughout a person's life, along with the physical, emotional and social development stages. Therefore, different prevention strategies may be needed for different age groups [11].

The AWSS 2012-2015 [1] identified several factors that may be contributing to drowning in this age group or that need to be countered in prevention measures, such as: 1) a third of the population aged over 55 years live outside of major cities; 2) changes in income and the impact of this on recreation, location, mobility; 3) working longer and/ or contributing to community via volunteer pathways; 4) life expectancy, countered with increased use of medication; 5) increasing numbers living outside residential care; 6) diversity in language culture, skills and life experiences; 7) the changing role of older people, particularly grandparents, as carers of children.

In Australia [6], falls into the water was the single most common activity immediately prior to drowning in people aged 55 years and over, accounting for 22% of all drowning deaths in that age group. Additionally, when considering the broader definition of older people used for this report (50 years and over), watercraft incidents outnumber falls, contributing to 22% of all drowning deaths in older Australians, while falls accounted for 18% of drowning deaths. Thus, identifying the risk factors for falls and watercraft incidents will most certainly provide vital information for the development of strategies to prevent drowning in older Australians.

**The term near-drowning was searched even though the authors are aware that this is not the most current recommended term to define drowning incidents not resulting in death. Since 2005, it has been recognized by the World Health Organization [5] that a new definition of drowning should include both cases of fatal and non-fatal drowning, with three outcomes: death, morbidity and no morbidity. However, the term near-drowning is still listed in The National Library of Medicine as a MeSH term to describe the non-fatal immersion or submersion in water, and was therefore included in this search in order to consider relevant articles published before the use of the new definition, as well as more recent ones not using the recommended definition.*

Falls around water

There has been little research surrounding older people and falls around aquatic environments. Nevertheless, effective measures to prevent falls in older people are likely to be suitable, with minor adjustments, to any set of circumstances. The World Health Organization has published a comprehensive report [12] regarding the risk factors for falls among older people and listing some effective measures to prevent those falls. According to that report, the risk factors are categorized into four dimensions:

1. Biological (like age, gender, race, chronic illness, as well as loss of physical, cognitive and affective capacities),
2. Behavioural (use of multiple medications, excess alcohol intake, lack of exercise, inappropriate footwear),
3. Environmental (poor building design, slippery floors and stairs, looser rugs, insufficient lighting, cracked or uneven sidewalks), and
4. Socioeconomic (low income and education levels, inadequate housing, lack of social interactions, limited access to health and social services, and a lack of community resources).

The main protective factors for falls in older age are thus related to behavioural and environmental modification. A key ingredient to encourage healthy ageing and avoiding falls is a behavioural change to healthy lifestyles. There is an extensive body of evidence on the causes of falls and how to prevent falls in older people [12-14]. Non-smoking, moderate alcohol consumption, maintaining weight within a normal range in mid to older age, and playing an acceptable level of sport protect older people from falling [12]. Environmental modifications include home modification and age-friendly design in public environments. Older people should be open to changing their lifestyle and environment to make it less prone to falls. Even though a falls prevention program should be tailored to personal characteristics, activities and locations, if older people are aware of the risk factors this may help them in choosing healthier lifestyles and minimising their risk.

A report published by RLSSA in 2006 [4], which examined the circumstances surrounding drowning deaths of Australians aged 55 years and over, using data available from ABS and NCIS database, focus groups and telephone interviews, showed that whilst falls in older people are a risk factor for drowning, the participants in the focus group were not worried about having falls themselves and generally accepted it as an aspect of getting older. Hence, to counteract this, the effectiveness of known strategies to prevent falls should be transmitted and reinforced to people older than 50 years old, as an important way to reduce drowning risk in older people.

Demographic and lifestyle trends of older people

It is well documented that Australia's population is ageing [15], due to sustained low levels of fertility combined with an increased life expectancy at birth. Population projections estimate that Australians older than 55 will represent 30% of the population by 2021, compared to 24% of the population in 2006. When people aged 50 years old and over are included in the age group of older Australians, the proportion of the population in that age group is even higher, with 40% of the population in 2006 in that age group. Over the 10 year period of this report, there was a 20% increase in the Australian population over 50 years old and it is expected to increase at a faster pace in the near future. Parallel to that, as the first cohort of people from the Baby Boomer generation has already turned 65, there are growing tendencies for that generation to settle where they holiday – usually coastal locations and riverside communities, after retirement. So, by the conjunction of these two factors it is likely that a greater number of older Australians will be exposed to aquatic environments, which may result in an increased number of drowning deaths in this age group if prevention strategies are not effectively implemented. Water safety education and awareness is essential to make people aware of their limitations, as well as prepare and train them to provide help when an incident occurs.

Benefits associated with water based exercises for older people

There is a growing body of evidence on the health benefits of physical activity and exercise [16,17]. Reported health benefits of light intensity exercise and an active lifestyle for older people include:

- Improved bone health, and reduction in the risk of osteoporosis
- Improved postural stability,
- Increased flexibility
- Increased speed and range of motion

Even though the health benefits of physical activity are well documented for middle-aged and elderly people, few reports summarize the results of evidence grading of water exercise. Trying to bridge that gap, some researchers have recently studied the impact of aquatic exercise on the health and well being of older people, as well as on their water safety skills and self-confidence in and around water.

A systematic review of Randomized Controlled Trials [18] reported that aquatic exercise had a small but significant effect on pain relief and related outcome measures for musculoskeletal diseases. Warm water and buoyancy are responsible for blocking pain receptors and enhancing blood flow which aids in muscle relaxation [19]. Other researchers [20-23] reported that aquatic exercise elicits significant improvements in cardiorespiratory fitness, muscular strength, flexibility and agility, body fat and total cholesterol. Additionally, aquatic exercise may also encourage older people to become more active thereby improving their quality of life.

By aquatic exercise, researchers mean walking in all directions, stretching and various exercises and conditioning performed with the feet grounded on the floor of a swimming pool, therefore excluding swimming.

Programs like this are likely to have a duality of purpose by aiming to reduce drowning and increase health and well being. While the impacts of this training program are not fully known, there are still other questions that need to be answered to further understand the problem.

Interestingly, the focus group participants in the study conducted by Royal Life Saving Society – Australia [4], were receptive to the idea of aquatic based exercise programs to improve health and fitness, and reduce falls, and recognised the need to have more information about water safety (both for themselves and for those in their care, particularly grandchildren). The study also reported that the majority of people agreed that most drowning deaths are preventable, all people should be taught water safety, resuscitation and first aid, and all children should be taught how to swim. Of concern, some believed that not all people needed to wear a life jacket on a boat, that it was acceptable to drink alcohol on a boat and acceptable for people to hold their breath under water.

Additionally, the report identified a number of barriers as to why Australians were unable to get to aquatic venues or participate in aquatic activities; being availability/ accessibility of venue/ transport, lack of motivation and lack of time/ too busy, the three most common. This research identified a number of areas that need to be incorporated into drowning prevention strategies for older Australians. With that in mind, Royal Life Saving Society – Australia developed the Grey Medallion as an initiative in response to the findings of the Older Australian Aquatic Safety Report [4].

The Royal Life Saving Grey Medallion is a water safety and lifesaving skills program for older people aimed at reducing drowning rates and encouraging healthy, independent and active lifestyles. The program endeavours to teach participants a range of personal survival techniques, provide them with skills to deal with an emergency situation and to develop confidence and competence to enjoy aquatic exercise and other water based activities safely.

There are four main components of the program:

- Water Safety Knowledge
- Resuscitation and Emergency Care
- Aquatic Exercise
- Personal Survival and Lifesaving Skills

Even though the impact of the program is yet to be fully known, consistent drowning prevention strategies such as this are most certainly of great value in reducing drowning risk in older Australians and well as preparing them to act when an incident occurs.

KEY FACTS:

- Falls are the main activity being undertaken immediately prior to drowning by older people
- Gentle exercise, including water based exercise, can improve health and fitness in older people and help prevent falls, which is of key relevance to drowning prevention strategies in this age range
- Water safety education is imperative for the prevention of older Australian drowning deaths

Aims of the study

- To gain an enhanced understanding of the scale of drowning in people aged 50 years and over in Australia in the last 10 years
- To gain an understanding of the circumstances of drowning deaths in people aged 50 years and over and propose recommendations for prevention

Methods

Information for this report has been collected from State and Territory Coronial Offices, the National Coronial Information System (NCIS) and media reports. It has been collated and analysed by the Royal Life Saving Society - Australia.

Royal Life Saving uses a media monitoring service (both electronic and print) all year round to identify drowning deaths in the media. This information is then corroborated with information from the NCIS, police and Royal Life Saving State and Territory Member Organisations before being included in this report.

All care was taken to ensure that the information is as accurate as possible. Please note that the figures from more recent years may change depending upon the outcomes of ongoing coronial investigations and findings. This report contains information correct as at 22 April 2013. As of this date, 87% of cases included in this study were closed.

Exclusions from this data include: suicide, homicide, deaths from natural causes, shark and crocodile attack, or hypothermia where known. All information presented is about drowning deaths or deaths where drowning was a factor (e.g. car rolled into the water and a person drowned).

The operation of a boat is classified as 'watercraft'. Non-aquatic transport relates to forms of transport not primarily intended for use in the water such as cars, motorbikes and tractors, among others.

An intrastate tourist is defined as someone who drowned in a postcode that was 100km or more away from their residential postcode, but was within the same State or Territory as their residential postcode. The distance between the two postcodes was calculated using Google Maps. An interstate tourist is defined as someone who drowned in a postcode that was in a different state to where their residential postcode was. An international tourist was someone who had a residential postcode as being from overseas and drowned in an Australian postcode.

Rates per 100,000 population for an age group were determined using Australian Bureau of Statistics (ABS) population estimates from the last month of a particular financial year, for example June's 2003 statistics were used for the 2002-03 financial year rates.

A Blood Alcohol Content equal to or above 0.05 mg/l was considered contributory. Additionally, for the purposes of this study, all prescribed medication were considered to be legal. The abuse of prescription drugs (i.e. recorded at toxic levels) or illicit drugs such as cannabis and methamphetamine were considered illegal drugs.

Until 2013, much of Royal Life Saving's literature with reference to "older people" related to people aged 55 years and over. However, in the process of undertaking this research, the definition of older people was expanded from 55 years and over to incorporate people aged 50 to 54 years. This allowed greater segmentation within this broad age range and, with Australia's ageing population, allowed us to examine drowning hazards and risks within an age group that is likely to increase in size across the next 20 to 50 years.

DESCRIPTIVE EPIDEMIOLOGY OF DROWNING

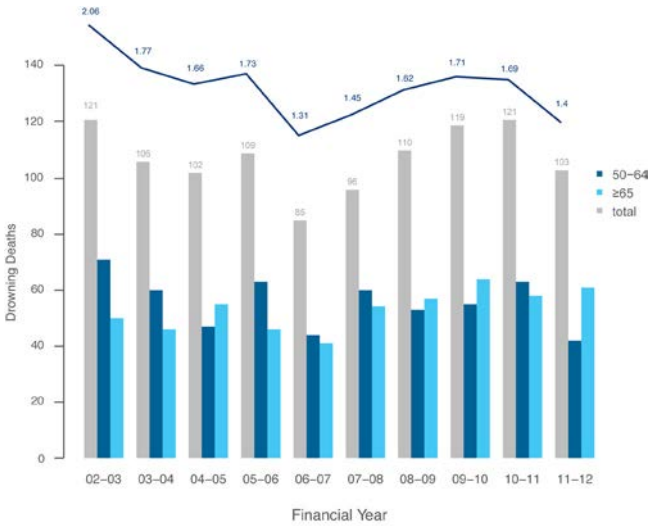
Who Drowns?

Between 1 July 2002 and 30 June 2012, there were 1,072 people aged 50 years and over who drowned in Australian waterways.

Drowning deaths in this age range reached a maximum in 2002-2003 and 2010-2011 with 121 drowning deaths in each year. This was 36 more deaths than the lowest number of deaths recorded in the period of the study, 85 in 2006-2007 (Figure 2). Figure 2 also shows the rate of drowning deaths per 100,000 population. Examining the drowning rate offers a more balanced look into the burden of drowning for people aged 50 years and over.

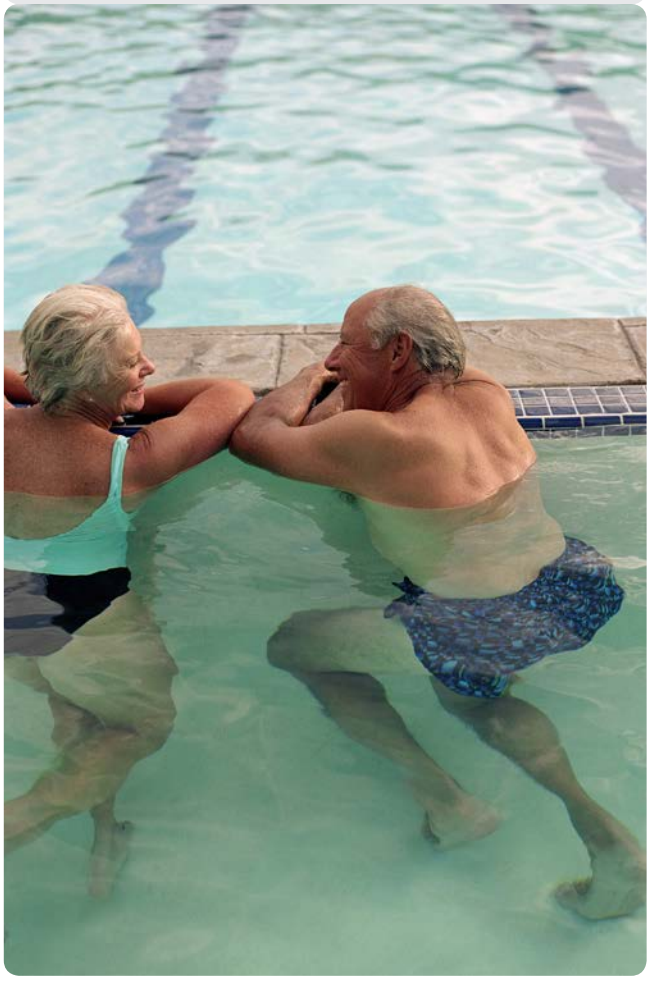
The number of drowning deaths in older people in 2011-2012 was 4% lower than the 10 year average. When examining the rate of drowning deaths per 100,000 population, a 15% decrease to the 10-year average rate of drowning deaths per 100,000 population in that age group in Australia was seen. This was mainly due to a 20% increase in population numbers of people aged 50 years old and over in Australia over the 10 years, combined with a decrease of 15% in the total number of drowning deaths.

Figure 2 – Drowning deaths of older people aged 50 years and over by financial year and rate per 100,000 population, between 1 July 2002 and 30 June 2012 (N=1,072)



KEY FACTS:

- 1,072 people aged 50 years and over drowned in Australian waterways between 1 July 2002 and 30 June 2012
- 2002-2003 and 2010-2011 were the financial years with the highest number of drowning deaths in older people, with 121 drowning deaths respectively
- The rate of drowning deaths per 100,000 population has varied from a high of 2.06 in 2002-2003 to a low of 1.31 in 2006-2007



Gender differences and age groups

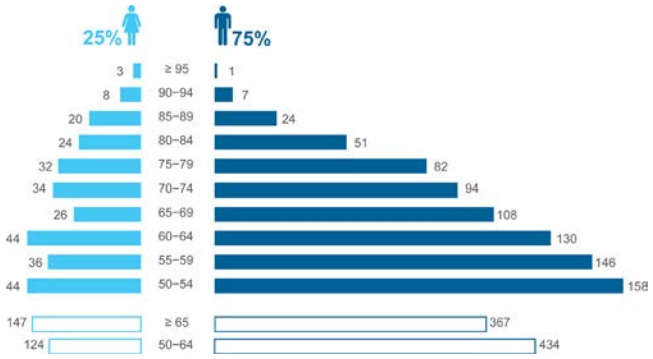
Between 2002-03 and 2011-12, males accounted for 75% of all drowning deaths (Figure 3). As can be seen in Figure 3, drowning deaths of females are relatively constant varying from 44 to 20, from 50 years to 89 years old, respectively, while the variation in males' drowning burden is larger (from 158 to 24, for the same age group, 50-89 years old, respectively). The predominance of males as drowning victims was more evident in the early years of the age range being studied (ages 50 to 59) with 78% of all drowning deaths involved males. This may be due to an increase in risk taking behaviour and exposure to drowning hazards in comparison to later ages that should be further explored. Conversely, females accounted for substantially lower percentages of deaths in all age ranges except after 84 years old, when the difference between genders becomes less significant. After 90 years of age, drowning deaths were higher in females than males. This might be due to an increased life expectancy at birth for females compared to males which results in higher numbers of females in the population at later ages (>80). The sex ratio decreases as people age further confirming that more females constitute the older age groups of this population group. On average, over the 10 year period of this study, the population of Australians aged 85 years old and over was mainly represented by females (86%, according to ABS [3]).

When looking at two age groups, one before and another after retirement (50-64 and ≥65 years old, respectively) it is obvious that a shift occurs. Even though drowning deaths in males were always higher than in females, for males the first age group is where the risk was higher, while in females the risk of drowning was higher after 64 years old.

As will be detailed in the next sections of this report, most drowning deaths in people aged 85 years old and over occurred after a fall into water. An increased number of falls is expected with ageing due to several factors already detailed in the background of this report. Although numbers are too small to establish clear patterns, there may be a gender related factor regarding falls and women that should be further investigated.

Further characterization of the location and activity immediately prior to drowning in early and late age groups will be detailed later in this report, and may also clarify the differences observed.

Figure 3 – Drowning deaths by gender and age group of older people aged 50 years and over, between 1 July 2002 and 30 June 2012 (N=1,072)



KEY FACTS:

- 75% of all people aged 50 years old and over who drowned in Australia in the 10 financial year period of this study were males
- For males the risk of drowning was higher before retirement age
- For females the drowning risk was higher after retirement age

WHERE DO DROWNING DEATHS OF OLDER PEOPLE OCCUR?

State and Postcode of incident

Figure 4 – Drowning deaths by incident postcode for older people aged 50 years and over, between 1 July 2002 and 30 June 2012 (N=1,072)

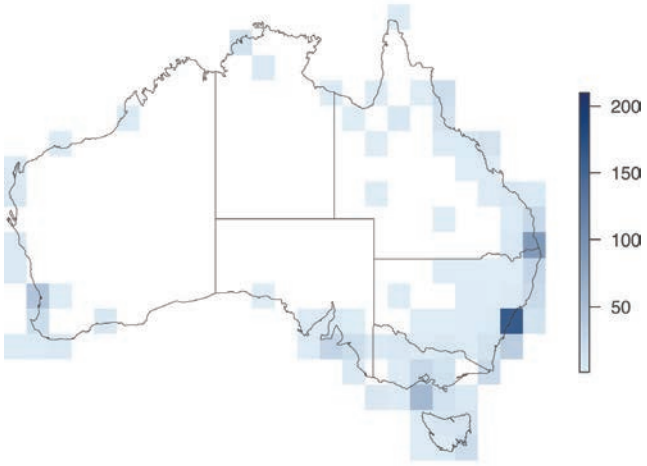


Figure 5 – Drowning deaths by gender and State for older people aged 50 years and over, between 1 July 2002 and 30 June 2012 (N=1,072); blue: males, grey: females.

New South Wales was the State with the most drowning deaths of people aged 50 years and over between 2002-2003 and 2011-2012, with 425 deaths (40% of drowning deaths in that age group, for that period). Queensland was the State with the second highest number of drowning deaths, with a total of 233, followed by Victoria with 139 (Figure 4).

When examining data on drowning deaths per State or Territory per 100,000 population, the highest rates were: 4.56 in the Northern Territory, 3.02 in Tasmania and 1.94 in New South Wales, followed closely by Western Australia with 1.93, while the average drowning death rate per 100,000 population nationally was 1.63 for the 10 year period of this study. Even though overall numbers of drowning deaths were higher in New South Wales, when considering the drowning rate per 100,000 population, in the Northern Territory deaths by drowning represented more than twice the deaths by drowning occurring in Australia's most populated state of New South Wales. The sex ratio of drowning deaths in older Australians was approximately 3 males for each female (Figure 5). The differences in drowning deaths by gender, compared to the national average, were greater in the Northern Territory with 9 males drowning for every female drowning death aged 50 years and over. Victoria and South Australia were the States where the gender difference was smaller, with a 2:1 male to female ratio. Additionally, when examining drowning rate per 100,000 population by sex, the Northern Territory had the highest rate for males (7.62), followed by Tasmania (4.72) and Western Australia (3.10). Interestingly, the highest rate of drowning deaths per 100,000 population per state for females was registered in Tasmania (1.45), followed by the Northern Territory (0.99) and New South Wales (0.95). This makes older men the main contributors for the high drowning rate per 100,000 population of 4.56 observed in the Northern Territory.

Of all drowning deaths registered, 2% corresponded to Aboriginal and/or Torres Strait Islander individuals. While not significant regarding the global burden of drowning of older Australians, this further confirms the relevancy of addressing this particular cultural group in drowning prevention interventions.

Regarding the visitor status, older people largely drowned where they lived or close by, with 787 (78%) drowning deaths registered as non-visitors over the 10 financial years, evidencing that most people are exposed to water in their local area and drowning prevention interventions should enhance older people's risk identification in their local area.

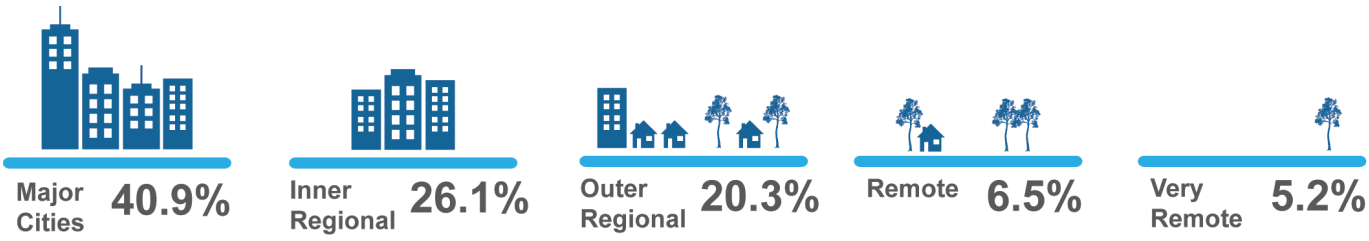
The sex ratio of drowning deaths was not the same for all categories of visitor status. Data reveals that, proportionally, older people drowning as interstate visitors or intrastate visitors were mostly males – 1:7 and 1:9 female: male ratio, respectively. The smallest sex ratio was observed for the category of non-visitors with 2 males drowning per each female.

KEY FACTS:

- New South Wales represented 40% of all drowning deaths (n=425)
- Northern Territory was the State with the highest rate of drowning per 100,000 population of the State (4.56), followed by Tasmania (3.02) and New South Wales (1.94)
- The National average drowning rate per 100,000 population was 1.63
- Northern Territory had the highest rate of drowning per 100,000 for males (7.62)

Remoteness Classification of Incident

Figure 6 – Drowning deaths by remoteness classification of incident location for older people aged 50 years and over, between 1 July 2002 and 30 June 2012 (n=1,062)*



Most drowning deaths occurred, as expected, in Major Cities, which accounted for 41% (Figure 6) of all drowning deaths of older people. However the high numbers observed in Inner and Outer Regional areas may be explained by lower cost of living and reduced access to drowning prevention and water safety education and information. As seen previously, most are non-visitors to Outer Regional and Remote areas where drowning deaths occurred, evidencing the need for specific drowning prevention strategies tailored to the risks and hazards in these locations. As depicted in Figure 4, Major Cities such as Sydney, Brisbane, Melbourne and Perth were the areas where most drowning deaths of older Australians occurred over the last 10 years.

About 50-70% of all drowning deaths occurring in Major Cities, Inner Regional and Very Remote locations were males. The difference in drowning burden between males and females is larger in Remote and locations where 90% of all drowning deaths were males. Even though not so large, in Outer Regional areas, the sex ratio is still 1:5 (female: male), decreasing in the remaining locations, with smallest difference observed in Major Cities, where per each female drowning 1 male drowned.

** Please note that the incident postcode in 0.9% of all cases was classified as an offshore postcode and these cases have not been included in Figure 6.*

KEY FACTS:

- Older people mostly drowned where they lived (78%)
- A significant fraction (41%) drowned in Major Cities areas, mostly in Sydney, Brisbane, Melbourne and Perth
- 50 to 70% of all drowning deaths in Major Cities, Inner Regional and Very Remote locations were males
- 90% of all drowning deaths in Remote locations were males
- The smallest sex ratio was observed in Major Cities where per each female drowning one male drowned
- The highest sex ratio was observed in Outer Regional locations where per each female drowning 5 males drowned

Location at time of incident

Rivers, creeks and streams were the main locations for drowning deaths in people aged 50 years and over the 10 year period of this study, with 289 cases, followed by ocean and harbours with 219, and beaches with 179 (Figure 7).

This might be linked to a reduction in swimming/ motor abilities without the corresponding adjustment of behaviour close to and in the water. Not unusually, in early ages (50-54 years old) people are unaware of the diminishing capacity to cope with a dangerous situation involving water. They might be acting as if they were younger and placing themselves into situations they might have difficulty dealing with. Therefore, it is important to educate people, raising awareness of the main circumstances of death in and around water of older people.

Figure 7 – Drowning deaths by location of incident for older people aged 50 years and over, between 1 July 2002 and 30 June 2012 (N=1,072)

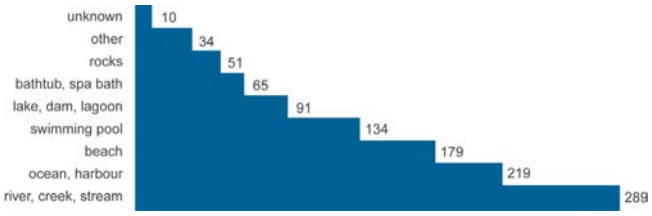
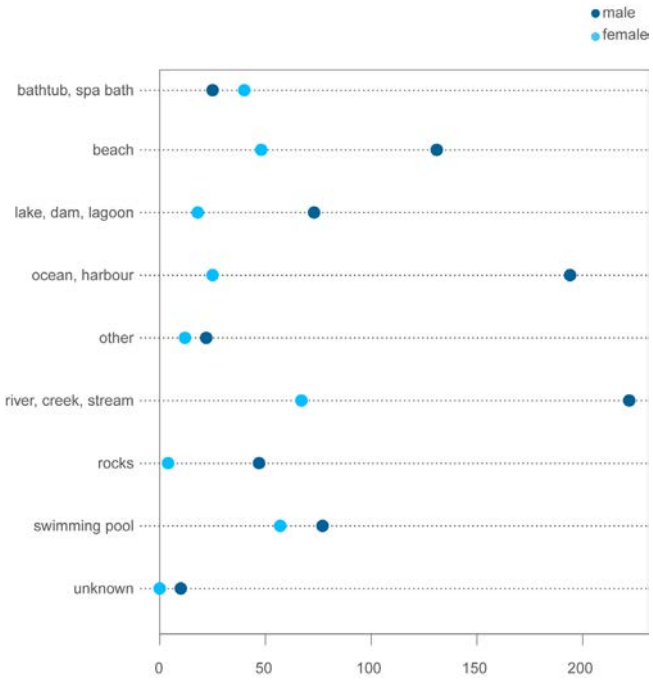


Figure 8 – Total number of drowning deaths of older Australians per location and gender, between 1 July 2002 and 30 June 2012 (N=1,072)



While rivers, creeks and streams were the main locations for drowning deaths of both males and females, with 222 males (20% of all drowning deaths) and 67 females (6% of all drowning deaths) drowning in those locations, the difference between genders is remarkably higher for rocks (12 males per 1 female) and ocean / harbour locations (8 males per 1 female) (Figure 8). The smallest difference that was observed was bathtubs, spa baths and swimming pool related drowning deaths. Bathtubs and spa baths were the only locations where more females drowned compared to males.

When examining the data per age group, rivers, creeks and streams represented 20-35% of all drowning deaths for each age group constituting the main location for drowning at all ages. The only exception was observed with people aged between 60 and 64 years old, where 27% of the drowning deaths occurred in an ocean or harbour setting, and less than 20% in rivers. Drowning numbers in swimming pools only start to be relevant, compared to other locations, after retirement, especially after 74 years old, representing 20-25% of all drowning deaths in each 5-year age group.

Additionally, as depicted in Figure 9, the locations that proportionally offered more risk of drowning in people before retirement age (50-64 years old) were rocks, beaches and ocean / harbour locations, while after retirement swimming pools and other locations such as ponds, canals, drains and tanks were the locations where more people over 65 years old drowned compared to people aged 50-64 years old in that location. Rivers, creeks and streams, although responsible for the highest toll in drowning deaths in older people, contributed similarly to drowning deaths in both pre- and post retirement age groups. Little difference was also observed in bathtubs and spa baths, as well as in lakes, dams and lagoons, evidencing that the risk factors for drowning deaths in these locations are not related to the age groups and their associated activities.

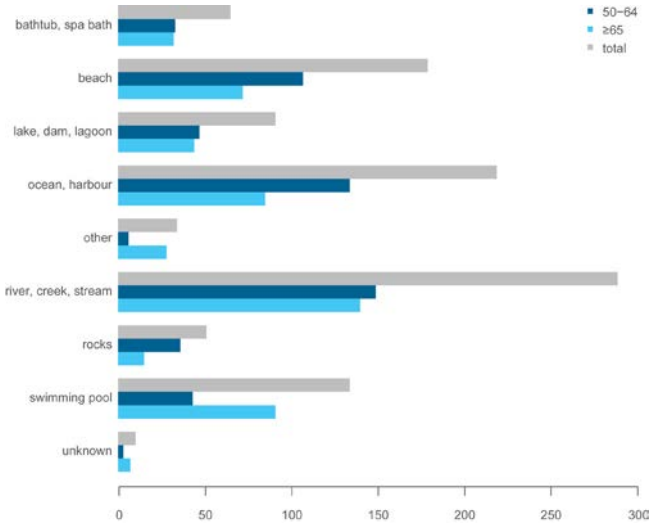
With respect to seasonality of drowning deaths some clear patterns were identified. In Spring and Winter, 64% of all drowning deaths occurred in bathtubs and spa baths, 32% in each season, while 62% of all drowning deaths on rocks occurred in Autumn and Winter (37% and 25%, respectively). On the other hand, drowning deaths in swimming pools, beaches and rivers, creeks and streams occurred mainly during Summer (41%, 37% and 34%, respectively).

It's also interesting to examine data by looking at the main activities prior to drowning for specific locations. For example, in rivers, creeks and streams 22% of all drowning deaths that occurred at those locations involved people aged 55 to 59 that were mainly using watercraft (22%) or were involved in an accident with non-aquatic transport (19%).

On the other hand, the age group in which more incidents occurred in lakes, dams and lagoons was between 50 to 54 years old (22%) when people were using watercraft (45%) (Figure 9). Frequently, incidents also resulted from swimming and recreating at those locations (20%).

Incidents occurring on rocks peaked at ages 60 to 64 years old (27%) while rock fishing in 86% of the cases. Drowning deaths in swimming pools occurred consistently throughout the age groups, with frequencies varying from 8-17% for people aged 50 to 89 years old. Home swimming pools were scenery to 113 drowning deaths in older people and public swimming pools to 12. Additionally, there were 34 deaths classified as having taken place at "other" locations. When examining these in detail, it is found that 9 of those drowning deaths occurred in ponds and 7 in canals or irrigation channels.

Figure 9 – Drowning deaths of older people aged 50 years and over by location (total numbers and between 50-64 and 65 and over), between 1 July 2002 and 30 June 2012 (N=1,072)

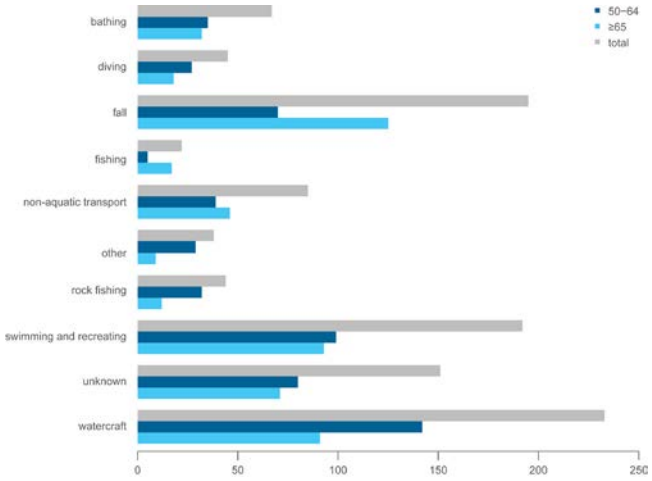


KEY FACTS:

- 27% of all drowning deaths in older people occurred in rivers, creeks or streams and 8% in lakes, dams or lagoons
- Ocean / harbour locations were the second highest location for drowning of people aged 50 years and over, representing 20% of all cases
- Bathtubs and spa baths were the only locations where more females drowned compared to males
- Residential swimming pools were the site of 113 drowning deaths and public pools 12 drowning deaths

Activity immediately prior to drowning

Figure 10 - Drowning deaths of older people aged 50 years and over by activity immediately prior to drowning (total numbers and between 50-64 and 65 and over), between 1 July 2002 and 30 June 2012 (N=1,072)



It is interesting to note that even in older ages, Australians engage in a variety of different aquatic activities. Analysis in Figure 10 shows that watercraft incidents accounted for 233 deaths or 22% of all drowning deaths of people aged 50 years and over during the 10 financial years of this study. Falls into water was the second most common activity immediately prior to drowning with 195 (18%) drowning deaths, closely followed by swimming and recreating with 192 (18%) drowning deaths. Activity was unknown in 14% of the cases suggesting people aged 50 years and over were frequently alone when they drowned.

It is interesting to note that watercrafts were the main activity immediately prior to drowning of older people before retirement age (50-64 years old), while falls, in accordance with studies reported in the literature, were the predominant risk factor for drowning in older people after retirement age (65 years old and over). Similarly, but less relevant in terms of total numbers, rock fishing and swimming and recreating were activities responsible for more drowning deaths of people aged 50-64 years old compared to older people aged 65 years and over.

When examining data by 5-year age groups, relevant differences are evident particularly for the age group 50-54 compared to people aged 55 years and over. About 25% of all drowning deaths of older people after using watercraft occurred in people aged 50- 54 years old. Additionally, 47% of all drowning deaths resulting from attempting a rescue occurred in the same age group. Not surprisingly, after 60 years old, there were no drowning deaths as a result of jumping in the water, evidencing that after that age people are either more cautious or aware of their reduced motor abilities, or both.

Drowning deaths related to bathing, diving, falls, swimming and recreating, and watercraft, were more uniformly distributed among older Australians aged 50 to 74 years old. For age groups over 75 years, the numbers of drowning deaths dropped in all categories however the numbers were too small to detect clear patterns. Curiously, fishing and rock fishing related drowning deaths occurred in higher numbers in age groups other than the early years of the age group in this study, peaking at ages 65-69 and 55-64 years old, respectively.

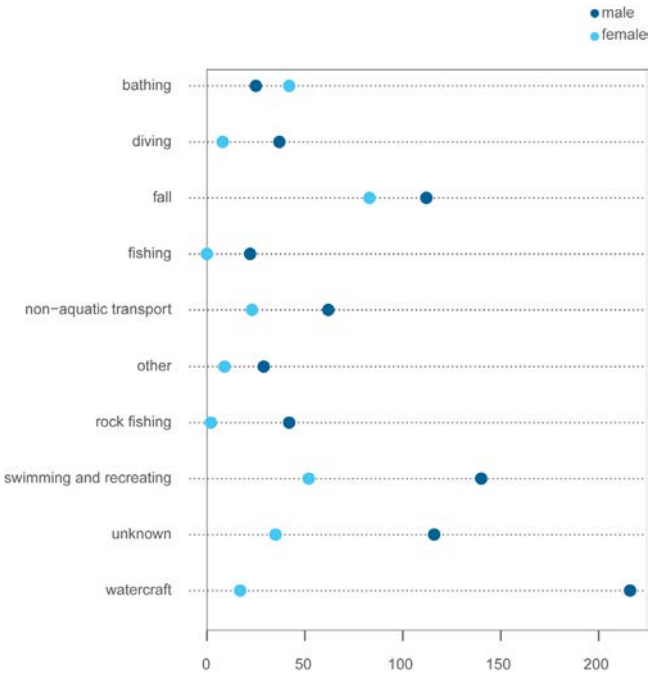
Watercraft was the activity immediately prior to drowning responsible for more than 20% of all drowning deaths of people aged 50-74 years old (per 5-year age group), accounting for 208 deaths. After 80 years old a clear shift is observed, with falls responsible for more than 40% of all drowning deaths (n=60). Swimming and recreating seems to be an activity being engaged in by older people no matter what age, meaning that everyone was similarly exposed to the risk of drowning, consistent with the stable contribution of this activity to drowning deaths (10 to 20% between 50 and 94 years old).

Falls was the leading activity immediately prior to drowning of older people in the Australian Capital Territory (n=2), Tasmania (n=17) and Victoria (n=39). In New South Wales (n=77), Queensland (n=53) and Western Australia (n=40) incidents involving watercraft were the most frequent. Additionally, swimming and recreating represented the main activity prior to drowning of people aged 50 years and over in the Northern Territory and South Australia, with 5 and 20 cases, respectively.

Drowning deaths resulting from swimming and recreation incidents occurred predominantly during summer with 91 cases (47%) of the 192 drowning deaths in that category. Furthermore, drowning deaths resulting from watercraft incidents and falls occurred consistently throughout the year with falls ranging from 20% in Winter to 30% in Spring and watercraft incidents from 22% in Winter to 28% in Autumn.

When examining the data in detail by gender, clear differences arise. Over the 10 years, no older female drowned as a result of fishing and jumping in the water, while 22 older males drowned after fishing (Figure 11). Furthermore, mostly males (95%) drowned as a result of rock fishing. Of all drowning deaths resulting from a rescue attempt 93% were males; and the use of watercraft accounted for the death by drowning of 216 males and 17 females.

Figure 11 – Total number of drowning deaths of older Australians per activity immediately prior to drowning, between 1 July 2002 and 30 June 2012 (N=1,072)



Swimming and recreating, the third most common activity immediately prior to drowning in older people, was responsible for the deaths of 192 people, 140 males and 52 females. Moreover, 63% of all drowning deaths involving females occurred after bathing, making this the only activity with a higher burden for women. Falls was the category in which the ratio of drowning deaths between males and females was smaller (43% females vs. 57% males).

Bathing was the only activity responsible for a higher drowning burden in women. The largest difference in sex ratio was observed for watercrafts in which 13 males drowned for each female. This small difference reflects the importance of the different activities being engaged in by older people at different periods of the year and age groups with similar impacts in the global burden of drowning of older Australians.

KEY FACTS:

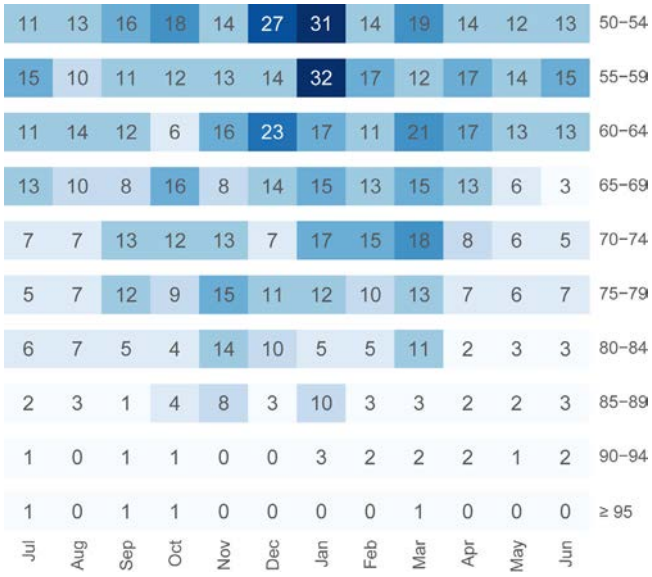
- Watercraft accounted for 22% of all drowning deaths and falls 18%
- Before retirement, older people were more exposed to drowning after using watercraft
- After retirement older people were more exposed to drowning after falling into the water
- Mostly males drowned whilst rock fishing (95%)

When do drowning deaths occur?

When examining the month of incident per age group (Figure 12), a distinctive inverted triangle effect is observable. It is clear that higher numbers are observed during the Summer months, namely December, January and February for people aged 50-64 years old. As they aged, older people drowned more evenly throughout the year. The total numbers are too low to detect a correlation and also correspond mostly to falling before drowning and are thus not related to a seasonal activity in water.

The overall numbers of drowning deaths per season don't change as much as one would think, with numbers ranging from 342 (32%) drowning deaths in Summer to 208 (19%) in Winter.

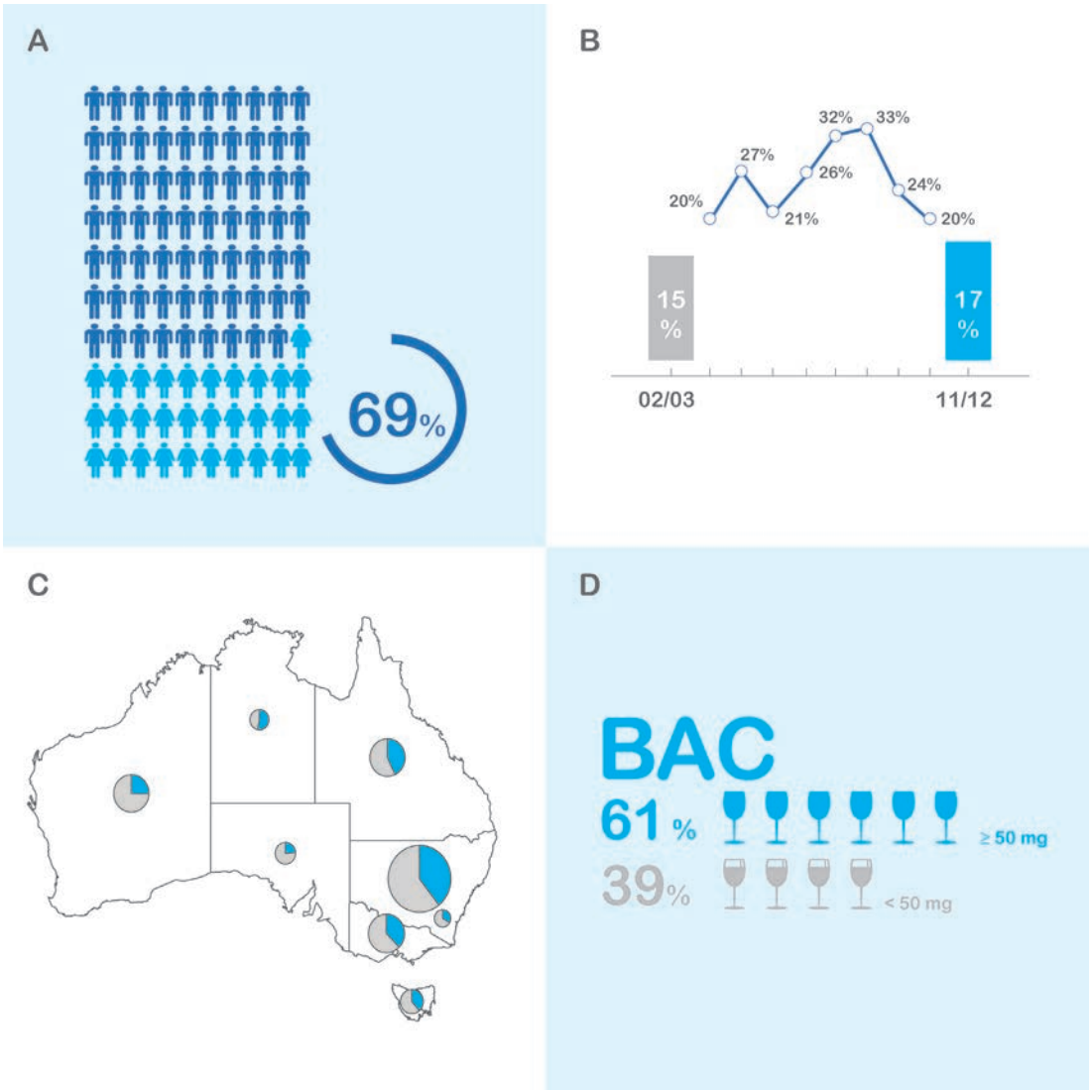
Figure 12 – Drowning deaths of older people aged 50 years and over by age group and month of incident, between 1 July 2002 and 30 June 2012 (N=1,072)



KEY FACTS:

- Overall numbers of drowning deaths in older people per season don't vary much
- In earlier age groups, older people drowned mostly during the Summer months
- After retirement, and especially after 75 years old, the differences in drowning deaths per month throughout the year are smaller

Figure 13 – Alcohol-related drowning deaths of older Australians: A) by gender; B) by financial year; C) by state; D) by Blood Alcohol Content (BAC), between 1 July 2002 and 30 June 2012 (n=669)



A total of 248 cases (representing 23% of all drowning deaths of older people over the last 10 years) were known to involve alcohol. The burden is likely to be higher as toxicology information is missing for 403 cases (38%).

Males constituted the majority of alcohol-related drowning deaths, with 69% of all alcohol-related cases (Figure 13A). Over the 10-year period of this report, the sex ratio didn't change much.

The smallest difference between genders was observed in 2004/05, when 63% of drowning deaths related to alcohol were males, and the highest difference was in 2005/06 with 78% of drowning deaths being males. Curiously, the gender difference in alcohol-related drowning cases was smaller than the gender difference in drowning incidents with no known relation to alcohol. This shows that, proportionally, there were more women drowning compared to men when alcohol was involved than when it wasn't.

Even though, the alcohol-related drowning deaths of older Australians did vary greatly over the 10 financial years (Figure 13B), a downward trend is clearly evident and the difference between 2002 and 2012 was only of 2 percentage points. Further investigation is needed to clearly identify the reasons for the downward trend registered since 2008/09.

When examining the data per state, as depicted in Figure 13C, it is clear by examining the sizes of the pie charts (one per state) that the State where more alcohol-related drowning deaths occurred was New South Wales with 102 cases, followed by Queensland and Victoria with 46 and 42, respectively.

When looking for the impact of alcohol-related drowning deaths compared to the total number of drowning deaths in each state (pie charts' blue slices and grey slices, respectively) clear differences between States and Territories are evident. In Western Australia and South Australia, a relatively small percentage (25%) of all drowning deaths (with available information about alcohol contribution) were alcohol-related. On the other hand, 53% and 43% of all drowning deaths in older Australians were alcohol-related in the Northern Territory and Queensland, respectively. Therefore, numerically, New South Wales was the State where most of the alcohol-related drowning deaths in older people occurred, but in the Northern Territory alcohol-related drowning deaths were responsible for a higher proportion of the total drowning deaths in that State.

The age groups in which more older people drowned in an incident where alcohol was involved were 50-54 and 55-59, with 58 and 61 cases, accounting for 48% of all alcohol-related drowning deaths.

Out of the 248 alcohol-related drowning deaths of older people, 151 (61%) cases corresponded to people with a Blood Alcohol Content above the Australian legal limit (≥ 0.05 mg/L), 104 males and 47 females (Figure 13D). The State where more cases with a BAC equal to or above the legal limit were registered was in New South Wales with 59 cases, followed by Queensland with 25 cases. However, when considering the total number of alcohol-related drowning deaths in each state to calculate a rate per state, a different trend clearly showed up. Northern Territory, Tasmania and Victoria were the States and Territories where a higher percentage of all drowning deaths were alcohol-related and with BAC above the limit; 25%, 25% and 22% of all drowning deaths in Northern Territory, Tasmania and Victoria, respectively, were alcohol-related and with a BAC above the legal limit.

Figures 14 and 15 represent the total number of drowning deaths known to be related and not-related to alcohol consumption, by activity prior to drowning and location of incident, respectively. We can observe (Figure 14) non-aquatic transport, being swept away and bathing were the only three activities prior to drowning in which the number of drowning deaths known to be related to alcohol was higher than those not related to alcohol. In women, the most common activities prior to drowning in incidents related to alcohol were falls (n=23), bathing (n=20) and swimming (n=9). In men, the main activities were watercraft (n=38), falls (n=37) and non-aquatic transport (n=20)

Figure 14 – Total number of drowning deaths of older Australians known to be related and not related with alcohol per activity prior to drowning, between 1 July 2002 and 30 June 2012 (n=669)

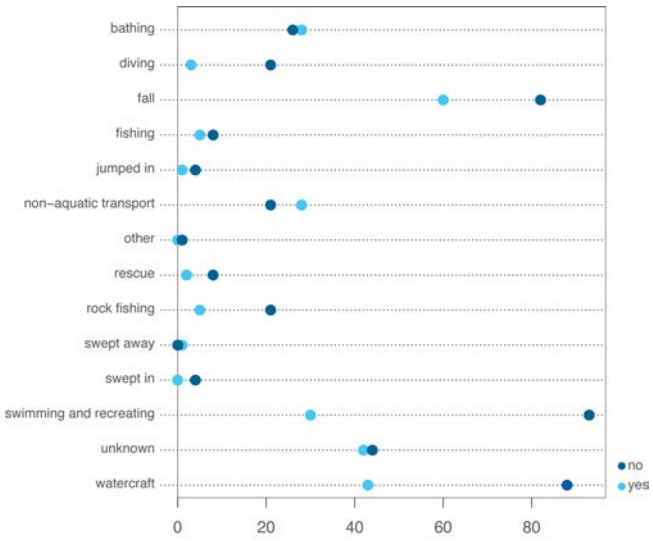
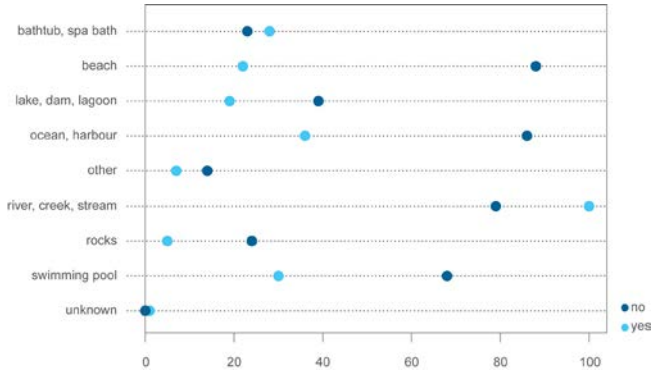


Figure 15 – Total number of drowning deaths of older Australians known to be related and not related with alcohol per location of incident, between 1 July 2002 and 30 June 2012 (n=669)



Regarding location of incident (Figure 15), rivers, creeks and streams and bathtubs and spa baths were the only two location types where drowning deaths related to alcohol consumption were higher than those not related. The age group of older Australians with higher burden of alcohol-related drowning deaths in river, creeks and streams was between 55 and 59 years old, with 30 cases. In that age group 9 people drowned after falling into the water and 14 drowned after an incident with a watercraft or a non-aquatic transport (7 in each category). The second highest age group was 50-54 with a total of 27 drowning deaths in rivers, creeks and streams, all related to alcohol. Bathtubs and spa baths and swimming pools were the locations where more females drowned compared to men, 68% and 53%, respectively. Most alcohol-related drowning deaths of older Australian females (79%) occurred before 69 years old. A similar pattern was observed for alcohol-related drowning deaths of older Australian females in swimming pools, with drowning deaths occurring in that location with females aged between 50 and 69 years old representing 88% of all female drowning deaths.

Figure 16 – Total of drowning deaths of older Australians where drugs played a significant role, by category of drug, between 1 July 2002 and 30 June 2012 (n=318)

Both medicinal and illegal drugs were known to be related with a high number of drowning deaths of older Australians – representing 30% of all cases. As with alcohol-related drowning deaths, the burden of drugs-related drowning deaths is likely to be higher as toxicology information is missing for 441 cases (41%).

Most drug-related drowning deaths occurred in males (65%). Similarly to the pattern observed for alcohol-related drowning deaths, the fraction of females drowning in comparison to males, was higher in drug-related drowning cases than those with no relation to drugs. The gap between the two genders is thus smaller when considering drug-related drowning deaths.

When examining the data of drug-related drowning deaths per state, as depicted in Figure 17, Queensland, Tasmania and Western Australia, clearly show a distinctive pattern compared to the remaining States and Territories. In all three, the numbers of drug-related drowning deaths were higher than drowning deaths not known to be drug-related.

In Queensland, Tasmania and Western Australia, 54%, 65% and 65% were, respectively, the percentages of all drowning cases of older Australians (n=631) in the last 10 financial years that were known to be related to drugs. In New South Wales nearly half (49%) of the cases of drowning deaths in older Australians involved drugs; and in South Australia, 50% related to drugs. Northern Territory was where the smallest proportion of drug-related drowning deaths occurred. Additionally, Figure 17 shows that the overall number of drug-related drowning deaths was higher in New South Wales, with 122 cases out of 247 with available information in that State.

Bathtubs and spa baths and swimming pools were the two locations where the number of drowning deaths related to drugs exceeded the number of drowning deaths not related to drugs. Figure 18 shows this trend and also the results for other locations.

Figure 17 – Drug-related drowning deaths of older Australians by state, between 1 July 2002 and 30 June 2012 (n=631)

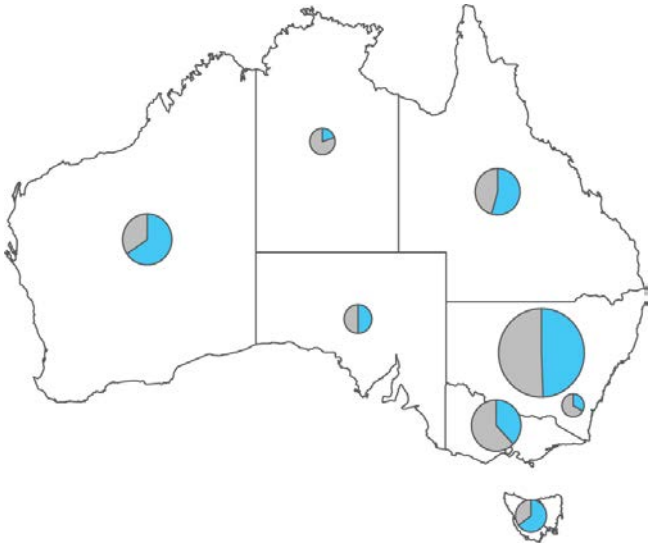
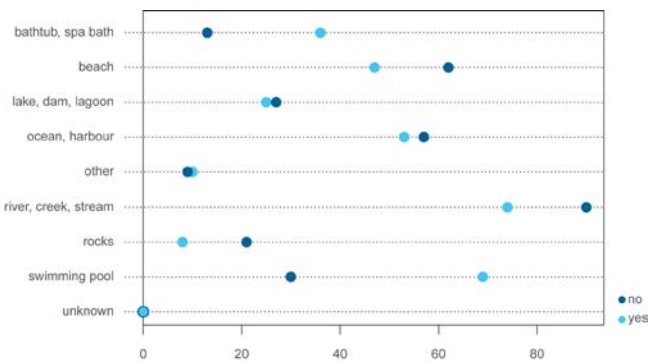


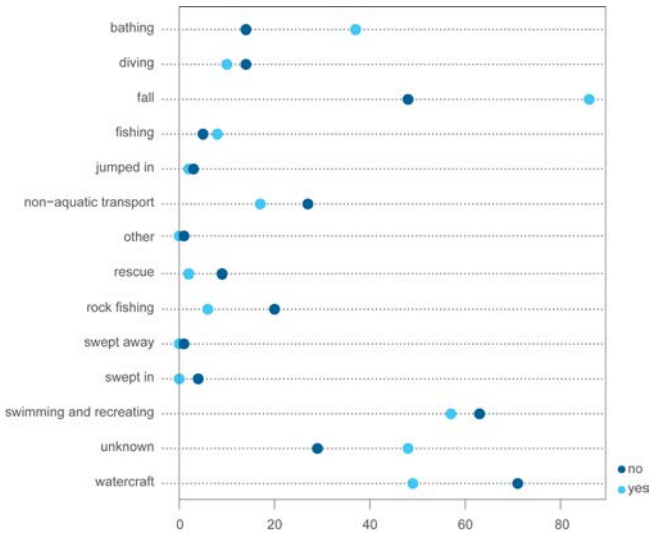
Figure 18 – Total number of drowning deaths of older Australians known to be related and not related with drugs per location of incident, between 1 July 2002 and 30 June 2012 (n=631)



A high number of drug-related drowning deaths occurred in rivers, swimming pools and ocean / harbour locations (74, 69 and 53, respectively). Most took place as a result of falling or suffering an accident with non-aquatic transport or watercraft. In the particular case of swimming pools, swimming and recreating was also an important contributor for the drug-related drowning deaths, being the second main activity prior to drowning in those locations, after falls.

Bathing, falls and fishing were the three activities where the drug-related drowning deaths exceeded those not related to drugs. Considering that drug-related drowning deaths depicted in Figure 19 includes both legal and illegal, and considering drugs are a known risk factor for falls, it is understandable that a high fraction of drug-related drowning deaths of older Australians occurred after a fall into the water.

Figure 19 – Total number of drowning deaths of older Australians known to be related and not related with drugs per activity prior to drowning, between 1 July 2002 and 30 June 2012 (n=631)



The use of both alcohol and drugs was deemed to be contributory in 26% of all cases where drugs and alcohol were both known to be present. Even though the fraction is small, when drugs were combined with alcohol, the use of illegal drugs was found to be involved in twice the number of cases.

UNDERLYING MEDICAL CONDITIONS

The high number of drugs-related drowning deaths in older people, especially regarding the use of legal/ prescribed drugs, implicates that underlying medical conditions play an important role and therefore present themselves as relevant risk factors for the sequence of events leading to drowning. Of all drowning deaths in older people aged 65 years and over, 352 cases were known to have underlying medical conditions.

The most common medical conditions were diseases of the circulatory system (such as ischemic heart disease and cardiac arrhythmias), mental and behavioural disorders (such as dementia) and diseases of the nervous system such as epilepsy.

There's an obvious interest in further investigating this issue, since underlying medical conditions can increase the risk of drowning in any aquatic environment and will certainly need tailored actions to specifically target a drowning reduction in individuals with such medical conditions.

KEY FACTS:

- 37% of all cases, with information available about the contribution of alcohol, were known to be alcohol-related
- 69% of these were males
- 56% of all drowning deaths in the Northern Territory were alcohol-related
- 61% had a Blood Alcohol Content above the legal limit (0.05g/L)
- 30% cases of drug-related drowning deaths in older people
- 65% were males
- Most common activity prior to drowning in alcohol- and drug-related drowning was falling into the water
- 26% were both alcohol- and drug-related drowning
- When drugs were combined with alcohol, the use of illegal drugs was found to be involved in twice the number of cases

Most drowning deaths are thought to be preventable and the implementation of drowning prevention strategies is preferable to relying on rescue and resuscitation methods [24].

A report into the aquatic safety of people aged over 55 years [4] identified a range of factors including alcohol, drugs, mental health and other medical events which contribute to an increased risk of drowning in this life stage. This report encompassing older Australians aged 50 years and over achieved similar results, meaning that the sample is similar to that previously studied. This evidences that not enough attention is being put into the age group of people aged 50-54 years old, consequently resulting in sustained high numbers of drowning deaths.

People aged 50 years old and over may respond to aquatic situations by reliance on skills (e.g. swimming) gained earlier in life and consequently overestimate their current abilities. Additionally, reduced fitness, greater exposure through increased aquatic activities (after retirement) with increased time spent near water (due to both increased leisure time and living near the water), are likely factors contributing to the drowning rate. Further research on older people's awareness of limitations in physical skills and knowledge would help developing and implementing prevention methods more effectively.

As data detailed in this report showed, diverse activities are being undertaken even in quite "old" age. Watercraft were responsible for a significant fraction of drowning deaths in older people over the 10 year period of this study. Recreational boating is a popular leisure time activity in many countries. It is estimated that in Australia, boating incidents cause more harm than rail and air crashes combined and, in terms of transport, are second only to motor vehicle crashes as a cause of serious injury [25]. A study published in 2003 [26] showed that the increased use of PFDs, avoidance of dangerous currents, and less alcohol use by operators and passengers of all types of watercraft would result in a reduction of watercraft-related drowning deaths. Therefore, prevention strategies such as these must all be explored and implemented.

Knowing the complexity of risk factors for falls, which is a major activity contributing to drowning deaths in older Australians, is very helpful in developing single targeted interventions to reduce their frequency. Recent research [27] revealed that while multifactorial fall prevention interventions are effective at an individual level, for community programmes for populations at risk, targeted single interventions are as effective as multifactorial interventions and may be more acceptable and cost effective [27]. Encouragement of aquatic activity due to health and well-being benefits will likely impact behaviours around water and decrease the risk of falling into water.

Even though there is evidence to support the link between alcohol and drugs consumption and drowning [28-30], the role of alcohol and drugs is not routinely ascertained as an autopsy outcome and reported against, which continues to be problematic for determining the role of alcohol and drugs in drowning deaths. The high number of cases where alcohol and drug consumption is unknown, up to 41% of cases over the 10 years, supports the call for improvements in data collection to establish the true picture of alcohol related drowning deaths. Therefore, improvement in data collection will prove helpful in further understanding the contribution of alcohol and drugs to drowning deaths of older Australians.

It is well recognized that people are at greater risk of harm from drugs and alcohol at points of life transition, including retiring [31]. A public awareness campaign should not only target specifically this age group but also include information about the risk of mixing the two with other risk factors such as lack of mobility and fitness.

Alcohol consumption is known to impair balance and coordination, judgement and cognition, and can result in greater risk taking behaviour, thus placing the individual at a greater risk of drowning. The effects are magnified when the person in question is skippering a vessel, supervising a child or swimming alone [28].

The consumption of alcohol among recreational boaters is considered an important factor for fatalities and injuries among both operators and passengers. The number of drowning deaths in older Australians over the 10 years that were alcohol-related reveals that the problem is not only just an issue for young adults. As alcohol is increasingly recognised as a factor in many boating fatalities [32] the association between its consumption and mortality among boaters has not been well quantified as demonstrated by the 403 cases of older people drowning deaths with inadequate information at this level. Further work needs to be conducted at the coronial level to ensure better reporting of the involvement of alcohol, drugs and underlying medical conditions.

To decrease alcohol-influenced boating, new strategies should be developed. Strategies successfully used to decrease drinking and driving motor vehicles may prove adaptable to preventing alcohol-influenced boating [33]. All efforts to decrease watercraft-related incidents (such as through education and legislation measures) must be monitored over time to determine the effects of these strategies upon safety behaviours.

The impact of medical conditions and the use of medication have also been posited as reasons which can contribute to unintentional injury and drowning death.

Previous research [4] has identified a number of barriers that prevented Australians aged over 55 from participating in aquatic activities including accessibility (both to venue and getting in the water), cost (both to travel to the venue and entry to the venue) body image, age of instructors and temperature.

CONCLUSIONS AND FUTURE PERSPECTIVES

This report aimed to enhance understanding of drowning incidents in people aged 50 years and over in Australia. Therefore newly developed prevention measures must consider the following:

- Increasing numbers of older people living outside of residential care
- A diversity of languages, cultures, skills, and life experiences in older people in Australia
- More than a third of the population aged 50 years live outside of areas classified as Major Cities
- Changes in income and the impact of this on recreation, location and mobility
- Increased life expectancy, countered with an increased use of medication
- Older people working longer and / or contributing to community via volunteer pathways
- Changes in the role of older people, particularly grandparents as carers of children

Nevertheless, many unanswered questions remain around drowning deaths in people aged 50 years and over, and what may constitute effective strategies for prevention. Therefore further research needs to be undertaken namely aimed at:

- Broadening examination of older people to include examination of aquatic deaths i.e. deaths that took place in aquatic environments but were not ruled to be a drowning and an examination of the preventative measures that could have been undertaken to prevent them – e.g correct PDF, EPIRB etc.
- Conducting a review of the 58 cases of drowning deaths of people aged 50 years and over where coronial recommendations were known to be made and available for review
- Evaluating the real and perceived effectiveness of training programs and other prevention methods, such as Grey Medallion, through surveying the community against drowning data
- Collecting and analysing population level exposure data to assist in interpreting changes in population drowning rates. Periodic surveys of aquatic activities including boating and boat ownerships, for example, can provide information on patterns of exposure in this age group.
- Assessing the risk perception and the role of behavioural and social influences on drowning occurrence and prevention.

Additionally, future work needs to be conducted at the coronial level to ensure better reporting of victim's personal risk factors (such as swimming skills, personal floatation device use, underlying medical conditions and the involvement of drugs and alcohol).

REFERENCES

1. Australian Water Safety Council. Australian Water Safety Strategy 2012-15. Sydney: Australian Water Safety Council; 2012 pp. 1–44.

2. Australian Water Safety Council. Australian Water Safety Strategy 2008-2011. Sydney: Australian Water Safety Council; 2008 pp. 1–56.

3. McLennan W. Population projections: 1997 to 2051. Canberra: Australian Bureau of Statistics; 1998. Report No.: 3222.0.

4. Franklin RC, Mathieu E. Older Australians Aquatic Safety. Sydney: Royal Life Saving Society ; 2006.

5. van Beeck EF, Branche CM, Szpilman D, Modell JH, Bierens JJLM. A new definition of drowning: towards documentation and prevention of a global public health problem. Bull. World Health Organ. 2005 Nov;83(11):853–6.

6. Royal Life Saving - Australia National Drowning Report 2012 [Internet]. 1st ed. Royal Life Saving Society ; 2012. Available from: http://2012-Drowning-Report-1.pdf

7. Hu G, Baker SP. Recent increases in fatal and non-fatal injury among people aged 65 years and over in the USA. Inj. Prev. 2010;16(1):26–30.

8. Schyllander J, Janson S, Nyberg C, Eriksson U-B, Ekman SD. Case analyses of all children's drowning deaths occurring in Sweden 1998-2007. Scand J Public Health. 2013 Jan 2.

9. Centers for Disease Control and Prevention (CDC). Drowning-United States, 2005-2009. MMWR Morb. Mortal. Wkly. Rep. 2012 May 18;61(19):344–7.

10. Bowman SM, Aitken ME, Robbins JM, Baker SP. Trends in US Pediatric Drowning Hospitalizations, 1993-2008. PEDIATRICS. 2012;129(2):275–81.

11. Quan L, Cummings P. Characteristics of drowning by different age groups. Inj. Prev. 2003 Jun;9(2):163–8.

12. World Health Organization. WHO Global Report on Falls Prevention in Older Age. France: World Health Organization; 2007.

13. Cameron ID, Gillespie LD, Robertson MC, Murray GR, Hill KD, Cumming RG, et al. Interventions for preventing falls in older people in care facilities and hospitals. Cochrane Database Syst Rev. 2012;12:CD005465.

14. Gillespie LD, Gillespie WJ, Robertson MC, Lamb SE. Interventions for preventing falls in elderly people. Cochrane Database of Systematic Reviews. 2009;(1).

15. Australian Bureau of Statistics. Australian Social Trends 2004. Australian Bureau of Statistics. Canberra: Australian Bureau of Statistics; 2004.

16. Nelson ME, Rejeski WJ, Blair SN, Duncan PW, Judge JO, King AC, et al. Physical activity and public health in older adults: recommendation from the American College of Sports Medicine and the American Heart Association. Circulation. 2007. pp. 1094–105.

17. Hill RL, Brown WJ. Older Australians and physical activity levels: do we know how many are meeting guidelines? Australas J Ageing. 2012;31(4):208–17.

18. Kamioka H, Tsutani K, Okuizumi H, Mutoh Y, Ohta M, Handa S, et al. Effectiveness of aquatic exercise and balneotherapy: a summary of systematic reviews based on randomized controlled trials of water immersion therapies. J Epidemiol. 2010;20(1):2–12.

19. Honda T, Kamioka H. Curative and health enhancement effects of aquatic exercise: evidence based on interventional studies. Open Access Journal of Sports Medicine. 2012.

20. Elbar O, Tzedek I, Vered E, Shvarth G, Friger M, Melzer I. A water-based training program that includes perturbation exercises improves speed of voluntary stepping in older adults: a randomized controlled cross-over trial. Arch Gerontol Geriatr. 2013;56(1):134–40.

21. Bergamin M, Zanuso S, Alvar BA, Ermolao A, Zaccaria M. Is water-based exercise training sufficient to improve physical fitness in the elderly? Eur Rev Aging Phys Act. Springer-Verlag; 2012;9(2):129–41.

22. Verhagen AP, Cardoso JR, Bierma-Zeinstra SMA. Aquatic exercise & balneotherapy in musculoskeletal conditions. Best Pract Res Clin Rheumatol. 2012;26(3):335–43.

23. Takeshima N, Rogers ME, Watanabe E, Brechue WF, Okada A, Yamada T, et al. Water-based exercise improves health-related aspects of fitness in older women. Med Sci Sports Exerc. 2002;34(3):544–51.

24. Rogmans W, Wilson J. Editorial to the special issue on drowning prevention. Injury Control and Safety Promotion. 2003 Dec;10(4):193–4.

25. Miller JR, Pikora TJ. Alcohol consumption among recreational boaters: Factors for intervention. Accid Anal Prev. 2008 Mar;40(2):496–501.

26. Browne ML, Lewis-Michl EL, Stark AD. Watercraft-related drownings among New York State residents, 1988-1994. Public Health Rep. 2003 Sep;118(5):459–63.

27. Campbell AJ, Robertson MC. Rethinking individual and community fall prevention strategies: a meta-regression comparing single and multifactorial interventions. Age and Ageing. 2007 Nov;36(6):656–62.

28. Driscoll TR, Harrison JE, Steenkamp M. Alcohol and drowning in Australia. Injury Control and Safety Promotion. Taylor & Francis Group; 2004 Sep;11(3):175–81.

29. Driscoll TR, Harrison JA, Steenkamp M. Review of the role of alcohol in drowning associated with recreational aquatic activity. Inj. Prev. 2004 Apr 1;10(2):107–13.

30. Diplock S, Jamrozik K. Legislative and regulatory measures for preventing alcohol-related drownings and near-drownings. Australian and New Zealand Journal of Public Health. 2006;30(4):314–7.

31. Strategy MCOD. National Drug Strategy 2010-2015: a framework for action on alcohol, tobacco and other drugs. Canberra: Ministerial Council on Drug Strategy; 2011.

32. Smith GS, Keyl PM, Hadley JA, Bartley CL, Foss RD, Tolbert WG, et al. Drinking and Recreational Boating FatalitiesA Population-Based Case-Control Study. JAMA. American Medical Association; 2001 Dec 19;286(23):2974–80.

33. Logan P. Alcohol-influenced recreational boat operation in the United States, 1994. American Journal of Preventive Medicine. 1999 May;16(4):278–82.

FOR MORE INFORMATION ABOUT THIS REPORT CONTACT:

Royal Life Saving Society - Australia

Phone 02 8217 3111
E-mail info@rlssa.org.au
Visit www.royallifesaving.com.au

CONTACT ROYAL LIFE SAVING IN YOUR STATE OR TERRITORY:

ACT	Phone	02 6260 5800
	E-mail	act@rlssa.org.au
NSW	Phone	02 9634 3700
	E-mail	nsw@royalnsw.com.au
NT	Phone	08 8927 0400
	E-mail	nt@rlssa.org.au
QLD	Phone	07 3823 2823
	E-mail	admin@rlssq.com.au
SA	Phone	08 8210 4500
	E-mail	training@royallifesavingsa.com.au
TAS	Phone	03 6243 7558
	E-mail	tas@rlssa.org.au
VIC	Phone	03 9676 6900
	E-mail	mail@lifesavingvictoria.com.au
WA	Phone	08 9383 8200
	E-mail	info@rlsswa.com.au

facebook.com/RoyalLifeSaving

twitter.com/royallifesaving

youtube.com/RoyalLifeSavingAust

www.royallifesaving.com.au

EVERYONE CAN BE A LIFESAVER

Royal Life Saving

ROYAL LIFE SAVING SOCIETY - AUSTRALIA

Supported by

Australian Government