



**A 10 YEAR ANALYSIS OF
DROWNING IN TODDLERS
AGED 0-4 YEARS IN
WESTERN AUSTRALIA**

2003/04 TO 2012/13



Eliminating
Toddler
Drowning



SNAPSHOT OF FINDINGS

40 DROWNING DEATHS

326 HOSPITALISATIONS

22% DECREASE IN DROWNING DEATHS OVER 10 YEAR PERIOD AND A 40% INCREASE IN HOSPITALISATIONS

ON AVERAGE, FOR EVERY TODDLER THAT DROWNED THERE WERE EIGHT HOSPITALISED FOLLOWING A NON-FATAL DROWNING INCIDENT

85% OF DROWNING DEATHS OCCURRED IN TODDLERS AGED 0-2 YEARS

MALES WERE 1.9 TIMES MORE LIKELY TO DROWN AND 1.5 TIMES MORE LIKELY TO BE HOSPITALISED THAN FEMALES

DROWNING DEATHS WERE MOST LIKELY TO OCCUR IN SPRING (40%) AND HOSPITALISATIONS WERE MOST LIKELY TO OCCUR IN SUMMER (50%)

TOP 3 DROWNING REGIONS: GREAT SOUTHERN, NORTH METROPOLITAN, KIMBERLEY

90% OF DROWNING DEATHS OCCURRED AT LOCATIONS IN AND AROUND THE HOME

TOP 3 DROWNING LOCATIONS:
HOME SWIMMING POOL (40%)
BATHTUB (17.5%)
FISHPOND (15%)

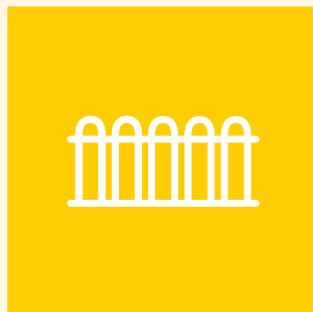
20% WERE ABORIGINAL CHILDREN

LACK OF SUPERVISION WAS A FACTOR IN ALL DROWNING DEATHS

HELP ELIMINATE TODDLER DROWNING



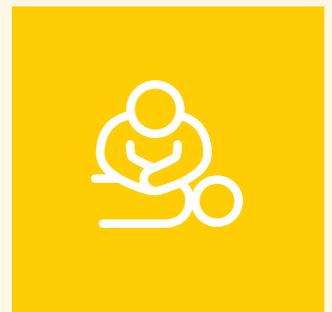
**SUPERVISE
CHILDREN**



**PREVENT
ACCESS**



**FAMILIARISE CHILD
WITH WATER**



**LEARN CPR
& FIRST AID**

INTRODUCTION

Drowning is a leading cause of preventable death in children internationally and remains a worldwide challenge, with a global rate of drowning of 18.9 deaths per 100,000 population for toddlers aged 0-4 years.^{6,9,10,12,13} Drowning is also the biggest cause of preventable death in toddlers in Australia; however preventing these tragedies is possible.

Toddlers aged 0-4 years are the most vulnerable to a drowning event and recorded the highest rate of drowning regardless of severity of any age group.¹⁰ Nationally, 317 toddlers aged 0-4 years drowned between 1 July 2003 and 30 July 2013 in Australia at a rate of 2.27 deaths per 100,000 population.⁸ Drowning is rarely the result of a single cause and circumstances surrounding drowning in toddlers can vary by age and aquatic location. A number of key risk factors have been identified including lack of close supervision, lack of barriers controlling exposure to water, increased access to water, poor swimming skills, male gender and socio-economic status.^{1,13}

Pivotal to any prevention effort is an understanding of who, where, how and why drowning occurs within that sequence of events and what factors may have contributed to these incidents. It is widely acknowledged that the full burden of drowning is not limited to drowning deaths. Therefore, this report aims to better understand the patterns and key risk factors of toddler drowning and to provide guidance for toddler drowning prevention initiatives.

METHODS

Information on fatal and non-fatal drowning cases involving toddlers aged 0-4 years from 1 July 2003 to 30 June 2013 in Western Australia have been included within this report.

Fatal drowning data was collected from the Western Australian Coroner's Office. Each individual case file with a cause of death related to drowning, immersion or missing at sea was reviewed in full including coronial findings, police reports, witness statements, toxicology reports and other relevant reports. These cases were validated against searches through the online National Coroner's Information System and media reports collected through the Media Monitors program to minimise the number of missed cases. Data was analysed by age, gender, region, location, region, ethnicity and contributing factors.

Only unintentional deaths closed by the Coroner have been included within this report and all deaths relating to suicide, homicide, natural causes, shark attacks, asylum seekers and other aquatic-related deaths (where drowning was not the primary cause of death) were excluded from the report.

Non-fatal drowning data for toddlers aged 0-4 years between 1 July 2003 and 30 June 2013 was collected using the statewide hospital admissions data supplied by the Department of Health Western Australia, Epidemiology Branch. This data was analysed by age, gender, location, race and ethnicity.

While all care has been taken to ensure that the information presented in this report is as accurate as possible, data may be subject to change following ongoing coronial investigations.



WHO DROWNS?

Epidemiology of drowning

Between 1 July 2003 and 30 June 2013, toddlers aged 0-4 years had the highest risk of drowning of any age group in Western Australia with the rate of hospitalisation amongst toddlers more than seven times greater than any other age group.

Overall, 40 toddlers aged 0-4 years were involved in a fatal drowning and a further 326 were hospitalised following a non-fatal drowning incident in Western Australia between 1 July 2003 and 30 June 2013. This means that on average, four toddlers will drown each year in Western Australia and almost 33 will be hospitalised following a non-fatal drowning incident. On average, for every child that drowns in Western Australia, eight will be hospitalised. The average time spent in hospital was 5.2 days and ranged from 1 day to 30 days.

During this ten-year period there was a 22% decrease in fatal drowning amongst toddlers aged 0-4 years. Yet despite this decrease in fatal drowning, there was a 40% increase in toddlers being hospitalised following a non-fatal drowning incident.

The highest rate of drowning in this age group was recorded in 2012/13 (4.8 deaths per 100,000 population) and the lowest rate was recorded in 2008/09 where only one death was recorded (0.7 deaths per 100,000 population). (Figure 1) The highest rate of hospitalisation was recorded in 2010/11 where 54 toddlers were hospitalised (34.8 hospitalisations per 100,000 population) and the lowest rate was recorded in 2004/05 (14.3 hospitalisations per 100,000 population). (Figure 2)

At a national level, Western Australia recorded the second highest rate (2.8 deaths per 100,000) of drowning of any state or territory behind Queensland (3.69 deaths per 100,000) and a slightly higher rate than the national rate of 2.27 deaths per 100,000 population. (Table 3)

Age

The average age of toddlers who died through drowning during this period was 19 months, ranging from 6 months to 3 years. Overall, the majority of deaths (85.0%; N=34) occurred in toddlers aged 6 months to 2 years with the remaining 15.0% occurring in toddlers aged 2 to 3 years.

Individual ages were unavailable for hospitalisations following a non-fatal drowning.

Figure 1: Drowning deaths in children aged 0-4 years in Western Australia, 2003/04 to 2012/13

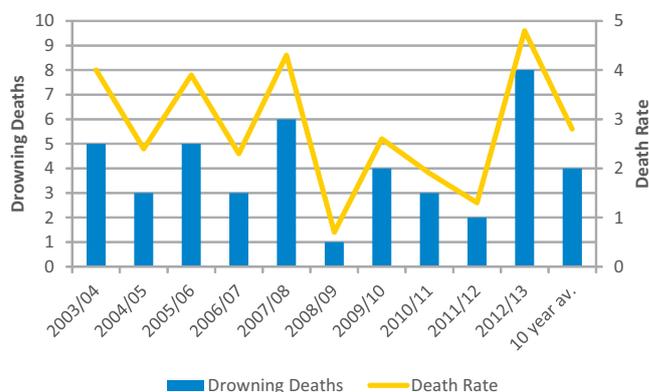


Figure 2: Hospitalisations in children aged 0-4 years in Western Australia, 2003/04 to 2012/13

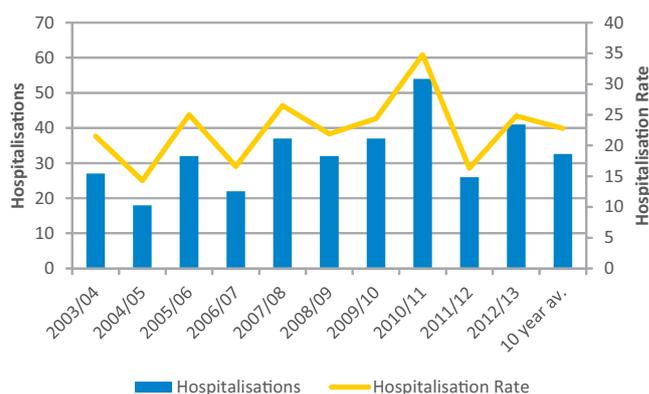
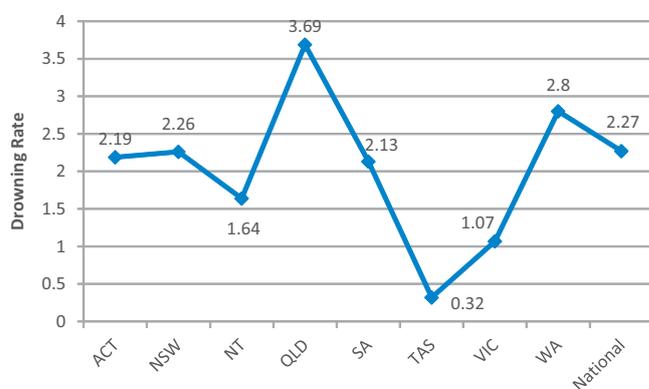


Figure 3: Drowning deaths of toddlers aged 0-4 years by State, 2004/04 to 2012/13



Gender

Similar to other injury and drowning data, males were at a higher risk of drowning than females in the 0-4 year age group; however this difference was not as marked as seen in other age groups in Western Australia. Amongst toddlers aged 0-4 years, 65.0% of drowning deaths and 60% of hospitalisations involved males. (Figure 4 and 5) Overall, males were 1.9 times more likely to drown and 1.5 times more likely to be hospitalised following a non-fatal drowning incident than females.

Figure 4: Drowning deaths by gender 2003/04 to 2012/13, WA



Figure 5: Hospitalisations by gender 2003/04 to 2012/13, WA



KEY FACTS

Toddlers aged 0-4 years recorded the highest drowning rate of any age group in Western Australia

Western Australia has the second highest rate of drowning in toddlers aged 0-4 years nationally

For every toddler that dies as a result of drowning in this age group, a further eight are hospitalised following a non-fatal drowning incident

The majority (85.0%) of deaths occurred amongst toddlers aged 6 months to 2 years

Males were 1.9 times more likely to drown and 1.5 times more likely to be hospitalised following a non-fatal drowning than females



WHEN DO TODDLERS DROWN?

Season

Toddler drowning occurs all year round, however the majority of deaths occurred in spring (40.0%; N=16) followed by summer (30.0%; N=12). (Figure 6) Drowning deaths were most common in November (N=7) and September (N=6) and least likely to occur in April, May, June and August (N=1).

The majority of hospitalisations occurred in summer (50.0%; N=163) followed by spring (23.0%; N=75). (Figure 7) Hospitalisations were most common in December (N=64) and January (N=60) and were least likely to occur in June (N=9) and August (N=10).

Day of the week

Drowning deaths amongst toddlers aged 0-4 years were most likely to occur on the weekend and later in the week with 40% (N=16) of deaths occurring on the weekend and a further 17.5% (N=7) occurring on a Thursday or Friday. (Figure 8) More than one quarter (27.5%) of deaths occurred during school holidays and/or on public holidays.

Time of day

Drowning deaths amongst toddlers aged 0-4 years were most likely to occur in the afternoon with two thirds (N=27) occurring between 12noon and 6pm and the majority occurring between 2.00 and 5.00pm (35.0%; N=14). A further 25.0% (N=10) occurred in the morning, with the majority of these between 8.00 to 10.00am (15%; N=6)

KEY FACTS

Drowning occurs all year round but toddlers were most likely to die from drowning in spring and were most likely to be hospitalised following a non-fatal drowning incident in summer months

40.0% of drowning deaths occurred on the weekend

27.5% of drowning deaths occurred during school holidays and/or on public holidays

Two thirds of drowning deaths occurred in the afternoon between 12.00 and 6.00pm

Figure 6: Drowning deaths by season 2003/04 to 2012/13, WA

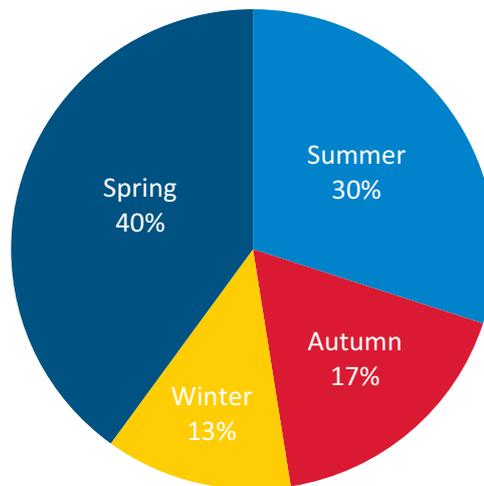


Figure 7: Hospitalisations by season 2003/04 to 2012/13, WA

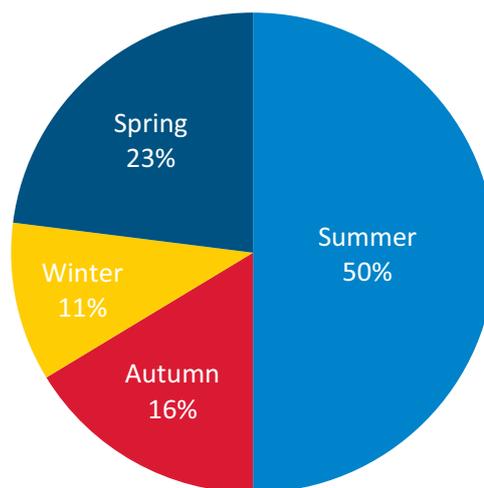
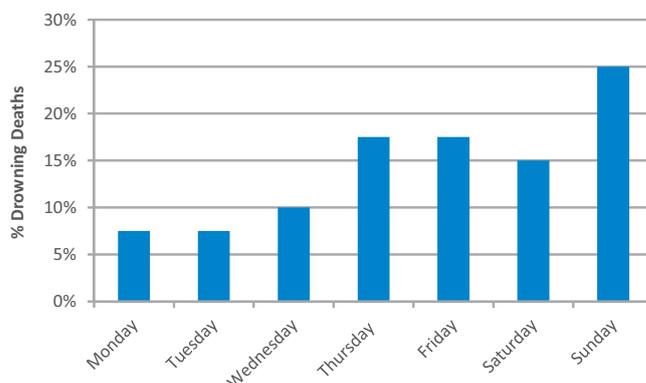


Figure 8: Drowning deaths by day of the week 2003/04 to 2012/13, WA



WHERE AND HOW DO TODDLERS DROWN?

Region in Western Australia

Drowning affects all communities and all regions in Western Australia. Drowning rates amongst toddlers aged 0-4 years were similar in the Perth metropolitan area and regional and remote areas of Western Australia. Overall, 77.5% (N=31; 2.9 deaths per 100,000 population) of deaths occurred in the Perth metropolitan area while the remaining 32.5% (N=9; 2.5 deaths per 100,000 population) occurred at regional locations.

Toddlers aged 0-4 years in regional and remote areas of Western Australia were at slightly higher risk of hospitalisation following a non-fatal drowning incident than those in the Perth metropolitan area. Overall, 27.6% (N=90) of hospitalisations occurred in regional and remote areas (25.3 hospitalisations per 100,000 population) while the remaining 72.4% (N=236) occurred in the Perth metropolitan area (22.0 hospitalisations per 100,000 population). (Figure 9)

The highest number of drowning deaths amongst toddlers aged 0-4 years occurred in the North Metropolitan region (N=18), particularly in the City Of Wanneroo, City of Joondalup and City of Swan. The South Metropolitan region (N=12), Great Southern (N=3) and the South West region (N=3) also recorded high numbers of toddler drowning deaths. However, the Great Southern region recorded the highest rate of fatal drowning (8.2 deaths per 100,000 population) followed by the North Metropolitan region (3.2 deaths per 10,000 population) and the Kimberley region (3.1 deaths per 100,00 population). The lowest rate was recorded in the Mid-West region where there were no toddler drowning deaths recorded. (Figure 10)

The highest number of hospitalisations following a non-fatal drowning incident amongst toddlers aged 0-4 years was recorded in the South Metropolitan region (N=125), followed by the North Metropolitan region (N=111) and the Pilbara region (N=21). However, the Pilbara region recorded the highest hospitalisation rate of any region (47.4 hospitalisations per 100,000 population), followed by the Mid-West region (38.1 hospitalisations per 100,000 population) and the Kimberley region (37.3 hospitalisations per 100,000 population). The lowest rate of hospitalisation was recorded in the Great Southern region (5.4 hospitalisations per 100,000 population). (Figure 10)

Figure 9: Metropolitan vs. regional drowning 2003/04 to 2012/13, WA

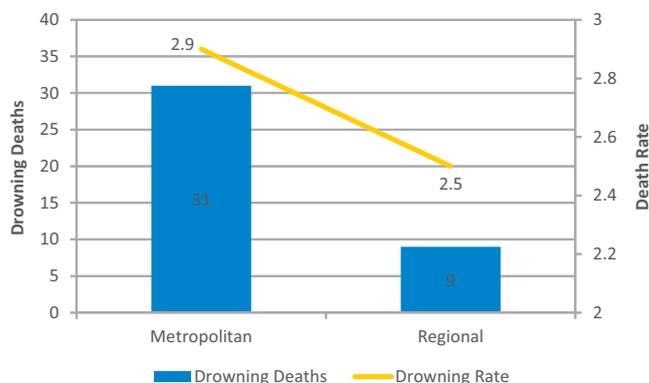
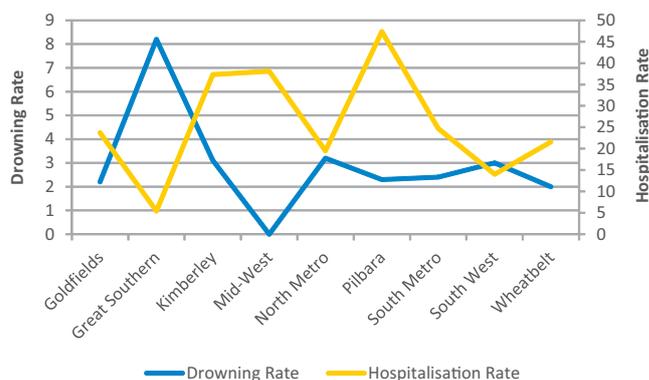


Figure 10: Drowning rates by region 2003/04 to 2012/13, WA



Aquatic environment

Aquatic locations in the home environment posed the highest drowning risk to toddlers aged 0-4 years in Western Australia, with 90.0% of drowning deaths and 73.0% of hospitalisations following a non-fatal drowning incident occurring at locations in and around the home. While the majority of drowning deaths occurred at the toddler's place of residence, 15.0% (N=6) of drowning deaths occurred at a relative or neighbour's home. (Figure 11) The most common location was the home swimming pool (40.0%; N=16) with 87.5% of these being below ground swimming pools. Bathtubs (17.5%; N=7) and fishponds (15.0%; N=6) were also common locations for toddler drowning. Other common locations included dams, soak wells, showers and inflatable swimming pools.

The remaining 10.0% (N=4) of incidents occurred at inland waterway locations where the water was reported to be fast flowing and deep with high walls making it difficult to exit the water.

The aquatic location where the incident occurred varied with age. Toddlers aged less than 1 year were most likely to drown in bathtubs (37.5% of incidents involved the child being left in a bath seat), while children aged 1 to 3 years were more likely to drown in the home swimming pool.

Aquatic activity

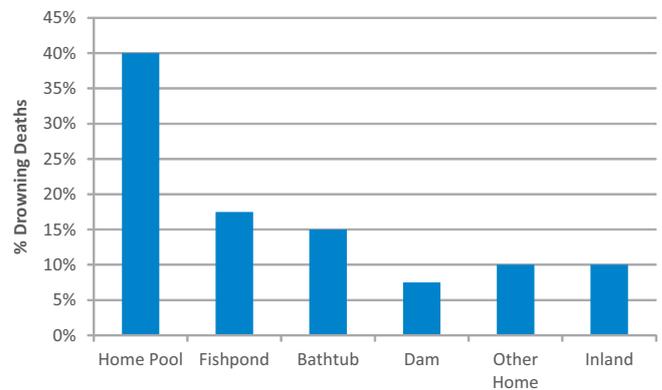
The most common activity being undertaken at the time of the incident was recreating (80.0%; N=32) where the entry into the water was unintentional and the toddler slipped or fell. This was followed by bathing (17.5%; N=7) where the entry into the water was intentional.

Rescue and CPR

A rescue was attempted in 95.0% (N=38) of drowning death incidents with CPR performed until emergency services arrived. For the remaining 5.0% of incidents the child was unable to be located and was later retrieved by police.

When a rescue was attempted, it was most likely a family member and usually the toddler's parent (92.0%) that performed the rescue. In the remaining 8.0% of rescues, a family friend or neighbor performed it.

Figure 11: Drowning deaths by aquatic location 2003/04 to 2012/13, WA



KEY FACTS

Drowning affects all communities and all regions at all locations in Western Australia

Toddler drowning rates are similar in metropolitan and regional areas of Western Australia

Kimberley, Great Southern, Pilbara and Perth Metropolitan regions are priority areas for drowning prevention efforts

90.0% of drowning deaths and 73.0% of hospitalisations following a non-fatal drowning incident occurred at locations in and around the home

15.0% of drowning deaths occurred at a relative or neighbour's home

Toddlers under 1 year of age were most likely to drown in the bathtub, while toddlers aged 1-3 years were most likely to drown in the home swimming pool

Family members, particularly the toddler's parents, were most likely to perform the rescue

CONTRIBUTING FACTORS

Lack of supervision

A lack of appropriate adult supervision was a factor in all drowning incidents recorded amongst this age group. On average, adult supervision was absent for 20 minutes and ranged from 2 minutes to 2 hours, with the supervision most likely to have been absent for 5 to 10 minutes (56.0%; N=26).

In almost all cases, adults were present at the location where the incident occurred and supervision was interrupted. The most common reason for the lapse in supervision was undertaking household chores including organising belongings for a trip, washing/folding clothes, answering phone calls, food preparation, showering, using a mobile phone, gardening and cleaning (60.0%, N=24). Other common reasons were that the adults were sleeping (12.5%; N=5), adults were attending to other children (12.5%, N=5) or there was confusion over which adult was responsible for supervising the toddler (7.5%; N=3). In 35.0% of incidents (N=14), the toddler was left in the care of an older sibling at the time of the incident.

Barriers to water

Lack of appropriate barriers to water locations was also a contributing factor to drowning deaths amongst toddlers aged 0-4 years. Overall, 83.3% (N=5) of fishponds where toddlers died from drowning had no barrier/cover and the remaining 16.7% had a faulty barrier/cover, which allowed the toddler to access the water.

Overall, 62.5% (N=10) of home swimming pools had a barrier installed at the time of the incident, however the toddler managed to gain access to the pool through the gate being propped open (30.0%, N=3), the gate not being self-closing/self-latching (30.0%, N=3) or through a gap underneath the fence or gate (30.0%, N=3).

Information regarding previous home pool barrier inspections was provided for 37.5% (N=6) of swimming pool drowning death cases. Inspections occurred from 3 years to 3 days prior to the incident. Of these, three were deemed non-compliant at the time of inspection and the remaining three barriers while deemed to be compliant at the time of inspection but had become non-compliant by the time of the incident

The remaining 37.5% (N=6) of swimming pools had no barrier. Of these, two pools did not require a barrier as they were constructed prior to 2001 and three pools were new and waiting for the barrier to be installed.

Swimming ability

Swimming ability was able to be determined in 95.0% of cases and the majority of toddlers were non-swimmers. While some had completed formal lessons they were unable to swim without the use of floatation aids.

Ethnicity

Aboriginal toddlers were over-represented in drowning deaths with 20.0% (N=8) of drowning deaths recorded in the 0-4 years age group involving Aboriginal toddlers. Half of these deaths occurred in regional and remote areas of Western Australia with the remaining 50.0% taking place in the Perth metropolitan area. Furthermore, almost all (75%; N=3) of the deaths occurring at inland waterway locations involved Aboriginal toddlers. In addition, 8.0% of hospitalisations following a non-fatal drowning incident involved Aboriginal toddlers.

Overall, only 5.0% of drowning deaths involved children from culturally and linguistically diverse backgrounds.

Socio-economic status

Toddlers living in higher socio-economic areas were at greater risk of fatal drowning than those living in lower socio-economic areas. Socio-economic status was determined using the Social Indexes for Areas (SEIFA) which using a ranking from 0 to 10 with 0 being the least disadvantaged to 10 being the most advantaged for the child's usual place of residence. For drowning deaths involving toddlers aged 0-4 years the average SEIFA ranking was 7 with 52.5% (N=21) placed in the highest three rankings and only 15.0% in the lowest three rankings.

KEY FACTS

Lack of appropriate adult supervision was a contributing factor in all toddler drowning deaths with supervision absent for 5 to 10 minutes in the majority of incidents

Common reasons for lack of supervision included undertaking household chores, adults sleeping or attending to other children and confusion over who was responsible for supervision

Common home pool barrier faults included leaving the gate propped open, gate not self-closing/self-latching and large gaps underneath the fence

Aboriginal toddlers were over-represented in drowning statistics with 20.0% of drowning deaths and 8.0% of hospitalisations following a non-fatal drowning incident involving Aboriginal toddlers

Children living in higher socio-economic areas were at higher risk of fatal drowning



DISCUSSION

Drowning in toddlers remains a significant injury prevention issue in Western Australia. During the study period, toddlers aged 0-4 years were the most vulnerable of any age group to drowning. The risk of a non-fatal drowning event in this group was higher than a fatal event with the hospitalisation rate amongst toddlers more than seven times greater than any other age group in Western Australia.

The rate of toddler drowning in Western Australia decreased by 22% over the study period; however over the same period the rate of hospitalisations following a non-fatal drowning incident increased by 40%. It is possible that existing education and awareness initiatives that promote the importance of adult supervision of young children and the strict enforcement of pool barrier legislation in Western Australia have resulted in increased vigilance amongst parents with young children. While this could explain the decrease in fatal drowning incidents as parents are providing greater levels of supervision and barriers to water locations in and around the home are becoming more effective, it could also explain the increase in non-fatal drowning incidents. With greater levels of supervision, parents are able to recognise an incident earlier, initiate a rescue and commence CPR in a more timely manner therefore increasing the likelihood of survival.

Despite these decreases in drowning deaths, nationally Western Australia has the second highest rate of toddler drowning of any other State or Territory behind Queensland. It is important to note that Queensland and Western Australia have the highest rate of home pool ownership, and given that home pools are the most common location for drowning amongst this age group, this could explain the high toddler drowning rates in these states.

This report found that age was a significant risk factor with younger toddlers at the highest risk. All drowning deaths in this group involved toddlers under the age of 3 years and the majority occurred in children aged 0-2 years. Children aged less than 1 year are relatively immobile and are entirely dependent on parents and caregivers for supervision likely explaining the increased number of bathtub drownings in this very young group. As children became older and more mobile they were more likely to drown in home pools and other locations in and around the home. Drowning prevention initiatives need to target parents and caregivers with children aged 0-2 years and messages must evolve as the child's mobility and independence increases with age.

General state and national trends show that males are over-represented in drowning statistics and are at a greater risk of drowning than females.^{1,7,8,10} However, this is less marked in toddlers with males 1.9 times more likely to die from drowning and 1.5 times more likely to be hospitalised following a non-fatal drowning incident than females in Western Australia during the study period. This may be due to the similar levels of exposure to water environments for both males and females relative to older age groups and the reliance on adult supervision amongst this young group.

Aboriginal toddlers were found to be at a greater risk of drowning than non-Aboriginal toddlers in Western Australia with 20% of fatal drowning and 8% of non-fatal incidents involving Aboriginal toddlers. Given that only 3.1% of the Western Australia population is of Aboriginal origin, this group is over-represented in toddler drowning statistics. Furthermore, these figures are likely to be vastly under-estimated due to under reporting of Aboriginality in drowning data with some research stating that statistics can be 11-13% lower than actual numbers.¹⁰ It is therefore important to ensure that toddler drowning prevention programs are accessible in Aboriginal communities and that the information provided is culturally appropriate to local Aboriginal cultural beliefs and ways of life.

When a child drowning occurs, a lapse in supervision is often found to be a contributing factor. This report revealed that a lack of appropriate adult supervision was a contributing factor in all toddler drowning incidents during the study period. Supervision was reportedly absent for on average 20 minutes with the majority reported to have been absent for 5-10 minutes. Drowning incidents typically occurred in the short time that supervision was absent while parents were undertaking household chores and at times when they were caring for other children. It was also common for parents to rely on older siblings to provide supervision for younger children and reliance on safety devices such as bath seats was also common. Children are easily distracted, often are unable to discern danger and lack the skills to perform a rescue in an emergency situation.

Research shows that parents often under-estimate the risk of drowning and over-estimate their child's ability to protect themselves from this risk.^{4,5} Continued education on the risk of toddler drowning, what constitutes adequate supervision when around the water, high-risk times and activities that may compromise supervision and the dangers of relying on older siblings and safety devices such as bath seats as a substitute for supervision is required. Parents also need to be made aware of how quickly a toddler drowning incident can occur and be provided with practical tips on how to reduce the risk.

Exposure to water locations has also been identified as a key risk factor to drowning. This report found that the majority of toddler drowning incidents occurred at locations in and around the home where toddlers spend most of their time and where they have exposure to a variety of water locations. Home swimming pools and bathtubs were the most common locations for toddler drowning. Each year, it is estimated that around 6,000 new home swimming pools will be installed in Western Australia. Exposure to home swimming pools is much greater in the Perth metropolitan regions with higher home pool ownership compared with regional areas of Western Australia. Hence it is not surprising that the majority of drowning incidents occurring in home pools were recorded in the Perth metropolitan area.

The protective effects of home pool fencing have been shown to protect children under 3 years from gaining unintended access when adult supervision may lapse.¹² Given that all toddler drowning deaths recorded in this study period involved children under 3 years, the importance of home pool barriers in preventing drowning is paramount. Where a pool barrier was in place, toddlers commonly gained access to the water through a propped open gate, a gate that didn't properly self-close or self-latch or through gaps underneath the barrier. In addition, many of the home pool barriers that had been assessed prior to the incident had become non-compliant at the time of the incident. Efforts to better engage with home pool owners through local government authority programs and pool barrier assessment programs is essential to provide them with information on current legislative requirements and practical tips for pool barrier maintenance between inspections and should be considered.

This report also found that the majority of fatal drowning incidents occurred in spring months and non-fatal incidents were most likely to occur in summer. Exposure to water is higher in spring and summer due to warm weather and school holidays. Evidently it is not surprising that drowning is higher at these times of the year. Many toddler drowning prevention education and awareness programs target messages during these peak times, potentially leading to increased awareness of the risks and parents taking more precautions when around water and may explain the higher rate of non-fatal incidents during summer.

Exposure to swimming and water safety programs has also been identified as a key protective factor for toddler drowning. The evidence shows that prevention skills can be learnt from a young age and that participation in formal swimming lessons was a significant predictor of drowning risk.^{2,3,12} Swimming lessons have been shown to be effective in improving swimming ability in children aged 2-4 years and reducing the risk of drowning in children aged 1 to 4 years by up to 40% and 88%.² Most importantly, this research showed that participation in swimming lessons didn't place the child at greater risk of drowning through increased exposure to water or decreased parental vigilance as parents become more confident in their child's swimming ability.¹²

However, the evidence also shows that this is not a viable option for children less than 2 years of age as the effectiveness of swimming lessons in this age group is yet to be proven. Given that children aged less than 2 years were at the highest-risk of drowning in Western Australia it is important to encourage parents to introduce children to water from an early age to build confidence, since acquisition of swimming and survival skills is not likely to be possible.

This research study aimed to provide a better understanding of the patterns and key risk factors of toddler drowning in Western Australia. The use of multiple data sources to compile data minimised the risk of missing cases and the ability to access full coronial records provided more detailed information regarding the circumstances surrounding the incident and the factors which contributed to it. The inclusion of non-fatal drowning data through hospitalisation records allowed better understanding of the full extent of the burden of drowning. However, there were a few limitations associated with this. There was limited information available regarding the location and activity associated with incidents that led to hospitalisations and emergency presentations were not included within this study. Absence of emergency presentation data means that the burden of drowning and in particular non-fatal drowning is likely to be much higher than included in this report. Future research should look at the inclusion of multiple sources of non-fatal drowning data including all hospital presentations and admissions as well as ambulance data in order to get a full picture of the burden of drowning in Western Australia.

RECOMMENDATIONS

This report recommends the following to reduce the toll of toddler drowning in the Western Australian community:

1. **Promote importance of adult supervision** – close adult supervision is the most effective way to prevent toddler drowning. More work is needed to educate the community on the importance of supervision within arm's reach of toddlers when around water environments. Supervision messages should focus on providing parents with information on when drowning risk is highest and should highlight the dangers of having older siblings supervise younger children and relying on safety devices such as bath seats as a substitute for supervision.
2. **Encourage early introduction to water familiarisation** – research shows that the early introduction to water safety programs can improve swimming ability and reduce the risk of drowning. Therefore, it is important to encourage parents to build a child's water confidence and introduce them to basic water safety and survival skills from a young age.
3. **Promote home pool safety** – the home swimming pool is the most common location for toddler drowning in Western Australia. Current barrier assessment programs should continue and programs targeting home pool owners should be developed with a focus on providing information on current barrier requirements and practical tips on pool barrier maintenance.
4. **Targeted education strategies for at-risk groups and communities** – toddler drowning prevention programs and strategies need to target those who are most at-risk including home pool owners, parents with toddlers aged 0-2 years, Aboriginal families and those living in the Perth metropolitan area, the North West and Great Southern regions. Education programs need to be adapted to ensure they are specific to the local context and needs of these groups in order to be effective.
5. **Engage with local government authorities** – strategies to better engage and develop partnerships with local government authorities who are responsible for the implementation of home swimming pool barrier inspection programs to promote toddler drowning prevention programs and messages within their communities need to be developed. These programs should focus on home pool safety and the provision of training to those responsible for undertaking home pool barrier assessments.
6. **Promote community wide CPR and first aid skills** – in the majority of drowning incidents, a parent was the first person to respond to the drowning incident and was required to provide lifesaving assistance until emergency services arrived. Early CPR has been shown to contribute to an increased chance of survival in child drowning, therefore it is essential that all parents and caregivers of young children have up-to-date CPR and first aid skills to ensure that they know what to do in the event of an emergency.
7. **Improved reporting**
– better access to non-fatal drowning data is required to determine the full extent of drowning in Western Australia. Strategies to improve the quality of data collected, the use of additional data sources including ambulance data and further collection of data relating to the outcomes of non-fatal drowning should be investigated.

CONCLUSION

This report shows that despite the reduction in the rate of toddler drowning during the study period in Western Australia, it remains a significant issue in the community. Trends show that the decreases in fatal drowning, while pleasing, are not at the same magnitude of the increase in non-fatal drowning. Drowning is rarely the result of a single cause and can vary by age, gender, exposure to water, culture and location.

Therefore, any response to preventing toddler drowning needs to take into account these risk factors and take a multi-faceted approach. Education programs will only be effective if they are run alongside legislation and programs that improve the skills of children to participate safely and parents to respond effectively.

They need to target those at the highest risk – parents with children aged 0 to 2 years, home pool owners and Aboriginal communities and messages need to focus on the importance of supervision, water safety in and around the home and provide parents with practical solutions to reduce the risk.

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FOR MORE INFORMATION

The Royal Life Saving Society WA Inc.

McGillivray Road, Mt Claremont WA 6010
PO Box 28, Floreat Forum WA 6014

T: (08) 9383 8200

F: (08) 9383 9922

E: info@rlsswa.com.au

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