

The NSW Study of
**DROWNING
AND NEAR
DROWNING**
in children (0-16 years)

1 July 2015 to 31 March 2018

**kids
health**
the **childr^{en}'s** hospital at Westmead
Child Health Promotion Unit

 The Sydney
children's
Hospitals Network
care, advocacy, research, education

 John Hunter
Children's Hospital
Children, Young People & Families

“ Drowning happens so quickly
and it’s so quiet, there was
no splashing, no bubbles, no sound ”

- Parent

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THE KEY FINDINGS FROM THE NON-FATAL DROWNING INCIDENTS IN OUR STUDY



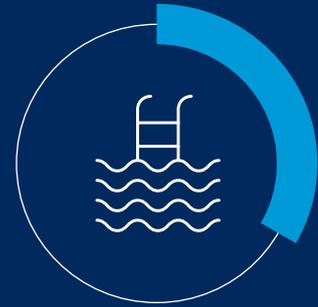
79%

of children included in the study were 0-4 years old



34%

of children 0-16 years old were from a culturally and linguistically diverse background



36%

of children 0-16 years old experienced a non-fatal drowning in swimming pools, followed by 23% in baths



Children who were unsupervised accounted for the highest number of drowning incidents, the majority of these occurring in swimming pools



68%

of children 0-4 years old were unsupervised at the time of the incident



74%

of children who needed CPR were unsupervised at the time they were in the water



33%

of incidents in private swimming pools occurred because the pool gate was propped open



85%

of children were found by a family member



49%

of children had water familiarisation or swimming lessons prior to the drowning incident

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1. EXECUTIVE SUMMARY

This report is the second from of a five year study commencing in 2013 that examined admissions and presentations for non-fatal drowning to the three paediatric tertiary hospitals in New South Wales.

The findings of this study reconfirm what is already known about drowning in children: that children under five years are at the greatest risk of drowning; that they are most likely to drown in a home swimming pool or bath and that children who are unsupervised are more likely to drown than children who are closely and actively supervised while in or near water.

The retrospective interviews conducted with parents/carers of children have added some insight into the circumstances surrounding drowning incidents in children aged 0-16 years from the perspective of the parent/carer. The qualitative data gathered as part of these interviews was examined and grouped under key themes. Under the key themes were common or frequently mentioned factors that contributed to the drowning incident.

The common/frequently mentioned factor that stood out under the theme of lapse of supervision was the adult carer being distracted by an everyday task at the time of the drowning incident. This is something that needs to be considered when discussing supervision of children in and around water.

Disappointingly, this study was unable to gather in-depth detail on the swimming pools involved from all parents/carers whose child experienced a non-fatal drowning in a swimming pool, as many could not provide the detailed information being sought.

What this study has shown is that supervision, effective pool barriers, learning swimming skills and learning resuscitation skills remain key child drowning prevention strategies, however consideration needs to be given as to how to best communicate this to parents and the wider community as the absence of these factors remain the primary causes of both fatal and non-fatal drowning in children.

2. INTRODUCTION

To address the gaps in knowledge of the circumstances surrounding drowning with or without morbidity, in 2013 the Kids Health Child Health Promotion Unit at The Children's Hospital at Westmead, and part of the Sydney Children's Hospitals Network, undertook a study of child drowning in New South Wales (NSW). The project was designed to add to the evidence base through the collection of data on unintentional drowning in all circumstances, but particularly for drowning with or without morbidity in private swimming pools.

The report on the findings of the first two years (2013-2015) of this study¹ is available online: kidshealth.schn.health.nsw.gov.au/drowning-prevention

This report presents the findings of the final three years of The NSW Study of Drowning and Near Drowning in Children (0-16 years), for the period 1 July 2015 to 31 March 2018. Data collection ceased after 31 March 2018 to allow time for recruitment of the final participants before the end of the Ethics approved period.

Drowning is defined as submersion or immersion in liquid that results in respiratory failure. This includes both fatal and non-fatal outcomes².

The current definition of drowning incorporates three possible outcomes; death, morbidity and no morbidity² acknowledging the continuum of possible consequences following a drowning event.

Throughout this report the terms drowning death and drowning with or without morbidity will be used for consistency with the 2002 World Congress definition of drowning^{3, 4} however, for consistency with the Human Research Ethics approval for our study, it will remain titled The NSW Study of Drowning and Near Drowning in Children (0-16 years): 2015-18.

More recently, the term 'non-fatal drowning' has gained acceptance over 'near drowning' when referring to drowning incidents which are not fatal. This terminology will also appear throughout this report.

While prevention efforts have contributed to a significant reduction in drowning deaths over the past decade, mortality rates in the 0-4 year age group remain high².

Drowning with or without morbidity, also called non-fatal drowning, is a significant problem in NSW affecting children under the age of sixteen. The problem is growing, with an increased number of non-fatal drowning incidents recorded over the past thirteen years. At the same time, fatal drowning has decreased, resulting in an increase in the ratio of fatal to non-fatal drowning incidents⁵.

While drowning deaths are reported frequently in documents such as Royal Life Saving Society Australia annual drowning reports and the NSW Child Death Review Team (CDRT) annual reports, there is no comparable regular reporting of drowning with or without morbidity which has, until recently, hidden the true scope of the problem⁶.

The Australian Water Safety Strategy (AWSS) 2016-2020 outlines eleven goals; key areas where progress must be made to achieve the overall aspirational goal of a 50% reduction in drowning rates by 2020. The strategy acknowledges that "the prevention of fatal drowning is only one part of the sector's role"⁷. Without a greater understanding of the contributing factors, any interventions designed to prevent drowning are only addressing part of the problem.

The first report of The NSW Study of Drowning and Near Drowning in Children (0-16 years), for the period 2013-2015 and released in late 2015, revealed that the burden of drowning was highest among children under the age of five, with drowning incidents most commonly occurring in swimming pools (including portable and inflatable pools), followed by public pools and baths. Another study, conducted in Queensland by Wallis et al (2015), examined both fatal and non-fatal drowning in children and adolescents and calculated there were ten non-fatal drowning incidents for every fatal drowning, with two out of three survivors admitted to hospital⁸.

Prior to 2017, drowning with or without morbidity was not included as part of the overall statistical reporting on drowning in Australia. As a result, policy-makers, advocacy groups and the general public were unaware of the complete burden of drowning. In 2017 Royal Life Saving Society Australia published a study of thirteen years of non-fatal drowning in Australia which detailed the collection, analysis and interpretation of non-fatal drowning data⁵. Some studies have examined the circumstances of drowning deaths and drowning with or without morbidity in greater detail by retrospectively viewing patient records^{9, 10} and clinical documents/medical charts^{11, 12, 13} however, these are reliant on clinicians obtaining and recording a detailed account of the event. This study has found that relevant information is often not recorded in the notes perhaps due to time constraints or the imperative need for treatment rather than cause. The current study is unique in that it seeks to investigate the circumstances around and reasons for the non-fatal drowning incidents through a retrospective qualitative study with the families of children who have presented to three tertiary paediatric hospitals in NSW.

It is widely acknowledged that the full impact of drowning is not limited to drowning deaths¹⁴. If a drowning incident does not result in a death, it is known as a non-fatal drowning or drowning with or without morbidity. The range of health outcomes for a person who survives a drowning incident range from no long-term effect at one end of the spectrum, through to severe brain and other organ damage at the other¹⁵. A child sustaining neurological deficits from drowning is likely to experience a lifetime of significant impairment, requiring sustained support from those who care for them.

A five year study conducted by The Children's Hospital at Westmead investigated the long-term neurocognitive outcomes in children following a non-fatal drowning incident. The children recruited to the study had no apparent neurological problems on discharge and were followed up at three to six months, one year, three years and five years. The study found that 22% of the patients showed behaviour problems, poor communication, executive function and learning difficulties at some point during their follow-up¹⁶.

Since the estimated economic costs of non-fatal drowning incidents are closely tied to a victim's age, and therefore the number of years over which they might require care or experience disability, the overall burden of non-fatal drowning in Australia is high, largely due to the proportion of very young victims⁵. The burden associated with victims who are under five years of age makes up a higher proportion (51.5%) of the total burden from non-fatal drowning, despite constituting 41.9% of victims⁵.

2.1. THE BURDEN OF DROWNING

Australia

Between 1 July 2017 and 30 June 2018, 18 children aged 0-4 years and nine children aged 5-14 years drowned in Australia. Swimming pools were the leading location for drowning deaths among the 0-4 year age group, accounting for 67% of all drowning deaths. Drowning deaths in the 5-14 year age group were distributed more evenly across a range of locations including swimming pools, bathtub/spa baths, beaches, inland waterways and open water. Falls were the leading activity prior to the drowning for the 0-4 year age group and swimming/recreating was the leading activity prior to the drowning for the 5-14 year age group, accounting for 56% of all deaths in this age group¹⁷.

While these figures are reductions in drowning deaths over time, it must be remembered that each number represents a family who has lost a child, so the need for drowning prevention strategies remains important.

Between 1 July 2002 and 30 June 2015, there were 6,158 cases of non-fatal drowning in Australia that resulted in hospitalisation. Children aged 0-4 years accounted for 42% of these and swimming pools (including backyard and public pools) were the leading location for non-fatal drowning, accounting for 36% of all incidents. Children under the age of five years accounted for 78% of non-fatal drowning incidents in home swimming pools⁵.

NSW

Between 1 July 2002 and 30 June 2017, 148 children aged 0-4 years fatally drowned in NSW across all aquatic locations, including 91 children in private swimming pools. Of these, 83 occurred in backyard pools, five in portable pools and three in outdoor spas¹⁸.

Between 1 July 2002 and 30 June 2015, there were 2021 cases of non-fatal drowning in NSW and an average of 155 non-fatal drowning incidents per year. Children under the age of five years accounted for the largest number of non-fatal drowning incidents (37.3%) followed by people aged 18-24 years (9.3%) and 25-34 years (9.2%)⁵.

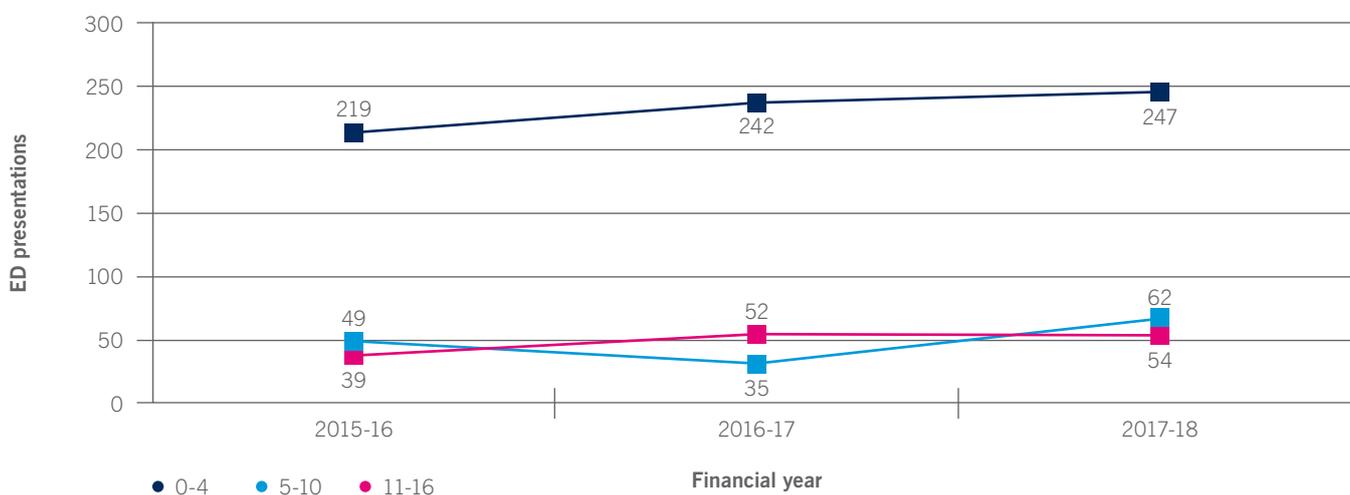
During the three financial years 2015-16 to 2017-18 (our study period), there was an increase in drowning-related presentations (fatal and non-fatal), from 5.6 to 6.5 presentations annually for every 10,000 unplanned Emergency Department (ED) presentations in NSW children aged 0-16 years¹⁹. Over these three years there were 999 ED presentations mentioning drowning (fatal and non-fatal) in children aged 0-16 years. Of these:

- 480 (48%) occurred during the three summer months (December-February)
- 562 (56%) were males and 437 (44%) females
- 360 (36%) arrived by ambulance or other type of transport
- 392 (39%) were assigned triage category 3 (potentially life-threatening) and 255 (26%) assigned triage category 4 (potentially serious)
- 213 (21%) were admitted but not to a critical care ward and 28 (3%) to a critical care ward
- 7 (1%) died in ED

Children aged 0-4 years accounted for 71% of drowning-related incidents, followed by 5-10 years (15%) and 11-16 years (15%).

Figure 1 details the drowning-related ED presentations by financial year and age from 60 NSW public hospitals.

Figure 1: Drowning-related ED presentations by financial year and age, 2015-16 to 2017-18



Across all three age groups, drowning related ED presentations increased over the three financial years.

It is important to note here that only a small proportion of drowning deaths occur in hospitals, so ED presentations data recording drowning deaths is an underrepresentation of the actual number of drowning deaths.

Diagnosis codes and external cause codes extracted from the Combined Admitted Patient Epidemiology Data (CAPED) for non-fatal drowning hospitalisations by the Ministry of Health show there were 199 hospital admissions for non-fatal drowning in children aged 0-16 in NSW during the financial years 2015-16 to 2016-17 (Table 1). Of these:

- 171 (86%) had a diagnosis of 'drowning and non-fatal submersion'
- 137 (69%) were children aged 0-4 years
- 124 (62%) were males and 75 (38%) females
- 183 (92%) were born in Australia²⁰

Table 1: Non-fatal drowning hospitalisations by financial year and age, NSW, 2015-16 to 2016-17, children 0-16 years

| Age (years) | 2015-16 | | 2016-17 | | Full period | |
|--------------|-----------|-------------|------------|-------------|-------------|-------------|
| | Count | % | Count | % | Count | % |
| 0-4 | 55 | 64% | 82 | 73% | 137 | 69% |
| 5-10 | 15 | 17% | 11 | 10% | 26 | 13% |
| 11-16 | 16 | 19% | 20 | 18% | 36 | 18% |
| Total | 86 | 100% | 113 | 100% | 199 | 100% |

* Percentages in the table above have been rounded to whole numbers and as a consequence may not total 100%.

Of the incidents involving children aged 0-4 years (n=137), 81 (60%) related to drowning in bathtubs and pools as shown in Table 2.

Table 2: Non-fatal drowning hospitalisations by diagnosis or external cause code and age, NSW, 2015-16 to 2016-17, children 0-16 years

| Code type | Code | Age (years) | | |
|--|--|-------------|------------|-----------------|
| | | 0-16 | 0-4 | |
| | | Count* | Count | % for age group |
| Diagnosis | Drowning and non-fatal submersion (T75.1) | 171 | 126 | 74% |
| External cause | In a bathtub or following fall into bathtub (W65, W66) | 26 | 24 | 92% |
| | In pool or following fall into pool (W67, W68) | 76 | 57 | 75% |
| | In natural water or following fall into natural water (W69, W70) | 18 | 6 | 33% |
| | Other/unspecified drowning and submersion (W73, W74) | 52 | 33 | 63% |
| All non-fatal drowning hospitalisations | | 199 | 137 | 69% |

* Each hospitalisation may have had one or more of these diagnoses

2.2. PREVENTION OF CHILD DROWNING

While children under the age of five remain the age group at highest risk of unintentional fatal and non-fatal drowning, there has been significant reduction (67%)²¹ over the past 25 years in the rate of fatal drowning in this age group .

These reductions have been largely possible due to four evidence based strategies for child drowning prevention: supervision, separation (pool barriers), Cardiopulmonary Resuscitation (CPR) and water survival skills (water familiarisation and swimming skills).

These strategies are supported through public policy, legislation and enforcement, public awareness and education, advocacy and research⁷.

Supervision

Active supervision of children in and around water is one of the key strategies to prevent children drowning. The definition of active supervision consists of four elements. Adult carers must:

- be prepared
- be close (within arm's reach)
- have all their attention on the child
- be consistent with the above all of the time

This strategy is supported at public pools with the 'Keep Watch at Public Pools'²² policy which requires adult carers of children aged 0-4 years old and non-swimmers stay 'within arms' reach' of the child; be close, prepared and maintain constant visual contact of 6-10 years olds and weak swimmers and to maintain visual contact of 11-14 years olds⁷.

Pool barriers

Evidence clearly supports the importance of swimming pool barriers as a means of preventing child drowning by restricting young children's access to swimming pools. However, there is also evidence that compliance with pool barrier requirements and ongoing maintenance is relatively low. Legislation, regulation, enforcement and public awareness campaigns have a role to play in ensuring ongoing compliance.

CPR

Child survival and improved long-term outcomes are enhanced by prompt resuscitation following an immersion. International resuscitation guidelines reinforce the importance of expired air resuscitation in a drowning emergency of a child⁷. The Australian Resuscitation Council (ARC) emphasises that 'any attempt is better than no attempt'¹⁷ and recommends annual CPR refresher classes.

Although Australia has relatively high levels of community skill in CPR and first aid compared with other countries in the region, it is of paramount importance to continue advocating for community-wide CPR skills, particularly for parents and carers, pool owners, child care workers, teachers, Aboriginal and Torres Strait Islander people and those from culturally and linguistically diverse backgrounds.

Water familiarisation and swimming skills

Swimming and water safety skills have been shown to reduce the risk of drowning, prompting the World Health Organisation (WHO) to recommend teaching all school-aged children basic swimming, water safety and safe rescue skills²⁴. Australia has had a long history in the delivery of such programs through school, vacation and private swimming school programs. The Australian Water Safety Council (AWSC) recommends benchmarks for primary and secondary school aged children, and encourages parents, schools and policy makers to prioritise swimming and water safety education for all children²².

3. OBJECTIVES

This study aimed to:

- Collect, analyse and interpret drowning data of children aged 0-16 years who presented to the three major paediatric hospitals in NSW, to determine patterns and trends across key variables.
- To address gaps in knowledge of the circumstances surrounding non-intentional drowning with or without morbidity, in all circumstances, but particularly in private swimming pools, through qualitative research.
- Collect, analyse and interpret fatal drowning data in children aged 0-16 years who have presented to the three major paediatric hospitals in NSW to determine patterns and trends across key variables.

4. METHOD

This study received Human Research Ethics approval for a five year period (2013-18) across the three paediatric hospitals in New South Wales; The Children's Hospital at Westmead (CHW), Sydney Children's Hospital, Randwick (SCH) and John Hunter Children's Hospital, New Lambton Heights (JHCH).

Drowning data was obtained through two methods:

- Patient records data (Appendix A) completed by an on-site research team member at each of the three paediatric hospitals. The on-site research team member was usually the trauma Clinical Nurse Consultant (CNC) or data manager. Completed questionnaires were forwarded on a monthly basis to the Research Officer based at CHW.
- Data retrieved directly from both hospital inpatient and emergency department medical record databases for patients who presented to CHW and SCH only. Details of drowning incident patients presenting at JHCH were provided by the on-site research team member.

Hospital separations where the principle diagnosis was any code in the ICD-10-AM Chapter XIX Injury, poisoning and certain other consequences of external causes (S00-T98) and where the first reported external cause of morbidity was Accidental Drowning and Submersion (W65-74) were included.

Children between the ages of 0-16 years who attended one of the three hospitals as a consequence of a drowning incident were eligible for inclusion in the study. Children with a pre-existing health condition or disability were excluded from the study. Incidents which on closer examination, were not drowning related were also excluded.

For the purposes of this study, the 'participant' is defined as the child involved in a drowning incident.

Parents/carers of the child participant were retrospectively contacted to invite participation in the study, gain consent and complete a semi-structured in-depth interview (Appendix B) over the phone. In most cases, contact and consent occurred at least three months after the child had been discharged from hospital. Each family was called three times over the span of a few weeks before a voicemail message was left and a text message sent via Message Media (if a mobile number was known) briefly explaining the purpose of the study and asking them to call back if they were interested in being involved. If the parent/carer did not respond to the voicemail and text message, they were placed on the 'could not be contacted' list.

Information obtained from the interview included the participant's demographics, circumstances surrounding the drowning, location of drowning, type of supervision, administration of CPR, swimming ability of the child, details of the swimming pool (if known), including pool barriers, council approval, known faults with the pool barrier and any recommendations or comments the interviewee would give to others to prevent a similar incident from occurring. This report summarises the findings from these interviews.

Supervision for this study was defined as:

| | |
|--------------------------|--|
| Within arm's reach | Parent/carer was in the water with the child and within arm's reach of them |
| From a distance | Parent/carer was not in the water but was within a few metres of the child |
| Unsupervised and aware | Parent/carer was not present but was aware that the child was in or near water |
| Unsupervised and unaware | Parent/carer was not present and was unaware that the child was in or near water |

If an interviewee required a language interpreter, this was organised through the NSW Health Health Care Interpreter Service.

Medical record data and clinical notes for the non-fatal drowning incidents where the families could not be contacted after three phone calls, a voicemail and text message was also examined to gather demographical information and as much information on the circumstances surrounding the drowning incident as possible. This data was retrieved from inpatient and emergency department medical records databases by the Management Support Analysis Unit (MSAU) for CHW and SCH and provided by the Trauma Service for JHCH. Similarly, the medical record data and clinical notes for the fatal drowning incidents were also examined and demographical information and circumstances surrounding the drowning incident gathered. This data is summarised in sections 5.6 and 5.7. The purpose of summarising this data was to determine if there were any major differences between these groups and those who participated in the interviews.

5. RESULTS

169 children aged 0-16 years were eligible for inclusion in the study between 1 July 2015 and 31 March 2018. Of these, 13 children were excluded as the incident was not a non-fatal drowning incident or because they had a pre-existing health condition or disability, leaving 156 potential participants for the study.

Consent for 86 (55%) of the eligible participants was obtained over the phone. Of the remaining 70 families, 53 (76%) could not be contacted after three phone calls, a voicemail and a text message, nine (13%) did not consent to the interview and eight (11%) were excluded as they resided out of the country or had disconnected phones.

Of the consented participants, 53 (62%) presented to CHW, 22 (26%) to SCH and 11 (12%) to JHCH.

Table 3 shows the number of incidents that occurred in each financial year of our study period.

Table 3: Number of incidents per financial year 2015-16 to 2017-18

| Financial year (1 July – 30 June) | Number | Percentage |
|-----------------------------------|--------|------------|
| 2015-16 | 30 | 35% |
| 2016-17 | 32 | 37% |
| 2017-18 to 31 March 2018 | 24 | 28% |
| | 86 | 100% |

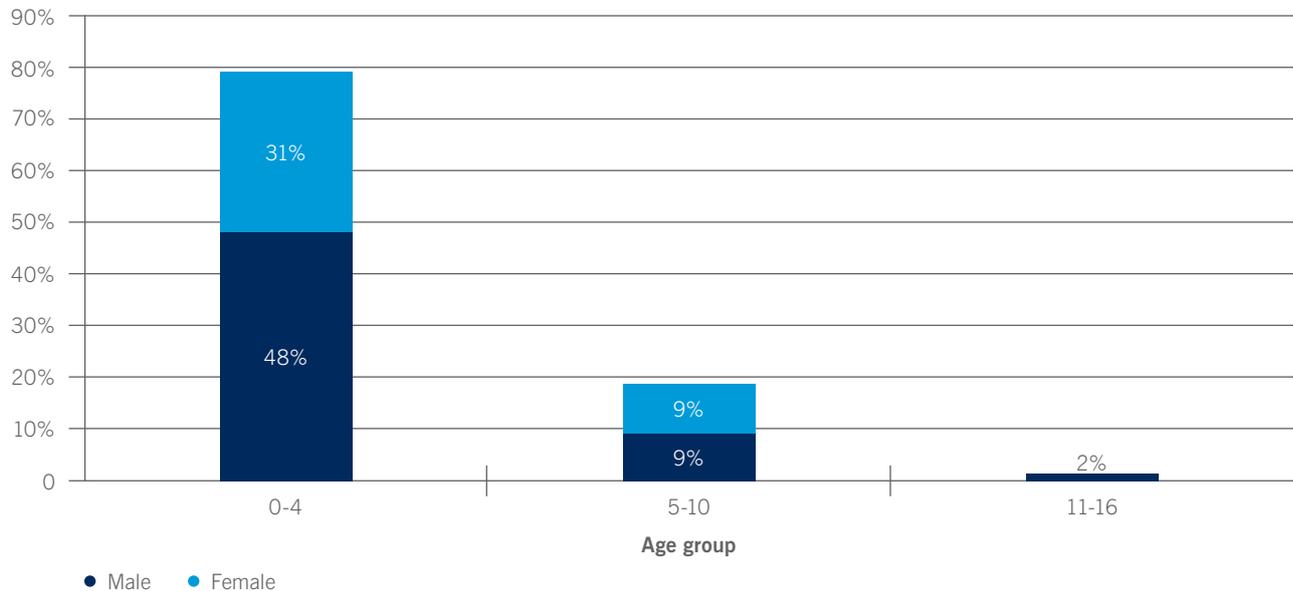
Percentages reported throughout the remainder of this report have been rounded to whole numbers and as a consequence the sum of the percentages in some instances may not total 100%.

5.1. DEMOGRAPHIC SUMMARY OF PARTICIPANTS

Age group and gender

In total, 86 children who had experienced a drowning with or without morbidity participated in our study. Children aged 0-4 years accounted for the largest number (n=68, 79%) of incidents. Males accounted for a higher proportion (59%) of participants compared to females (41%). Figure 2 shows the distribution of participants by age and gender.

Figure 2: Study participants by age group and gender, 0-16 years



Aboriginal and Torres Strait Islander and culturally and linguistically diverse (CALD) status

The 2016 Census shows that Aboriginal and Torres Strait Islander people represented 2.9% of the population in NSW, of which 35.2% were children aged 0-14 years²³.

Other studies have shown that the incidence rates for fatal and non-fatal drowning in Aboriginal and Torres Strait Islander children are significantly higher than that for non-Aboriginal and Torres Strait Islander children. Drowning episodes occurred more often in remote and regional areas and were higher in females than males²⁴.

Aboriginal and Torres Strait Islander people continue to be overrepresented in drowning statistics, accounting for 6% of all drowning deaths in the financial years between 2004-05 and 2014-15, despite making up an estimated 3% of the Australian population²⁵.

In our study, participants slightly underrepresent the proportion of Aboriginal and Torres Strait Islanders compared to the NSW population, with just 2% of participants in our study identified as Aboriginal or Torres Strait Islander.

Language spoken at home

According to the 2016 Census, 26.5% of people in NSW speak a language other than English at home²³. Of the 86 participants in this study, 26 spoke a language other than English at home, representing a slightly higher proportion (30%) than in the NSW population (26.5%).

According to the 2011 Census, 22% of the total population of children in NSW were from culturally and linguistically diverse backgrounds²⁶. The cohort in this study was more culturally and linguistically diverse than that of the general population of NSW.

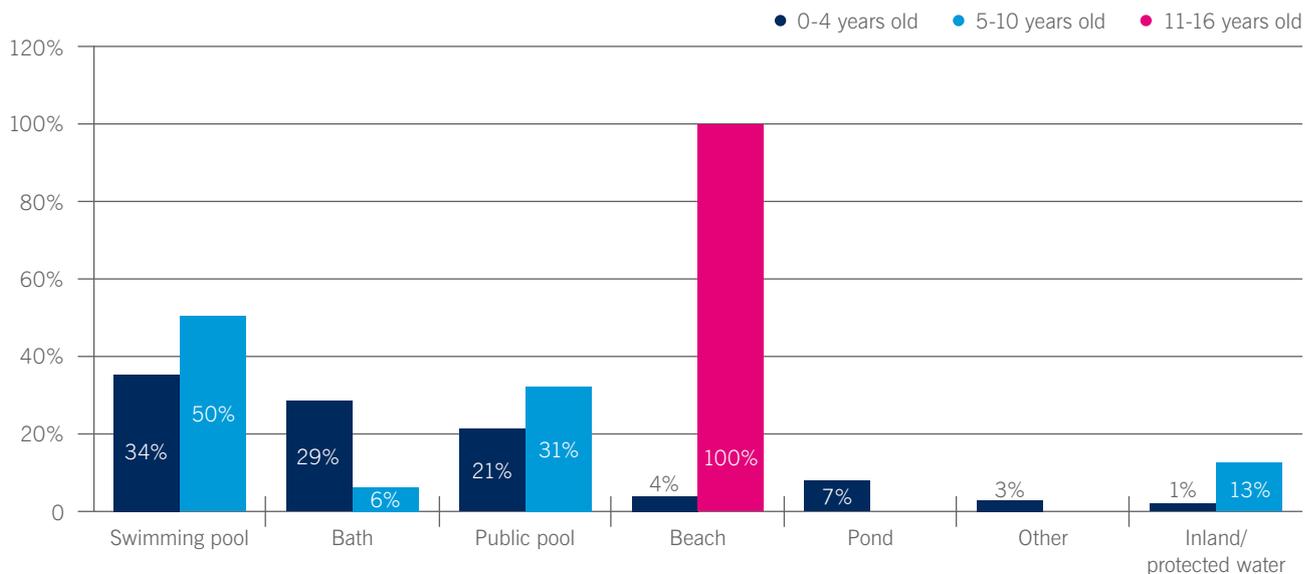
5.2. INCIDENT DETAILS

The majority of the non-fatal drowning incidents in our study occurred during the spring (35%) and summer (44%) months and most frequently during the afternoon and evening.

Incident site

Swimming pools, including permanent, inflatable and portable pools, were the leading incident site, accounting for 36% of drowning incidents. Other common incident sites were home baths (23%) and public pools (19%). Throughout this report, the term 'swimming pool' includes in-ground, above-ground, inflatable and portable pools.

Figure 3: Incident site by age group

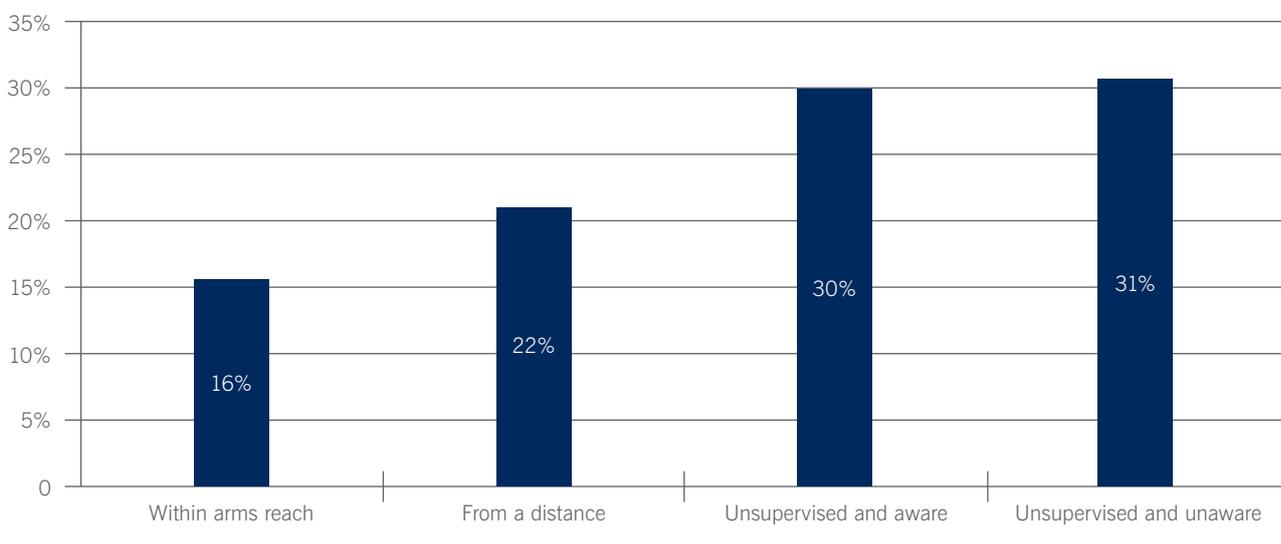


As shown in Figure 3, the most common sites of non-fatal drowning for children in the 0-4 year age were swimming pools (34%), baths (29%) and public pools (21%). For children in the 5-10 year age group, the most common incident sites were swimming pools (50%) and public pools (31%) and for children in the 11-16 years age group, beaches were the most common incident site.

Type of supervision

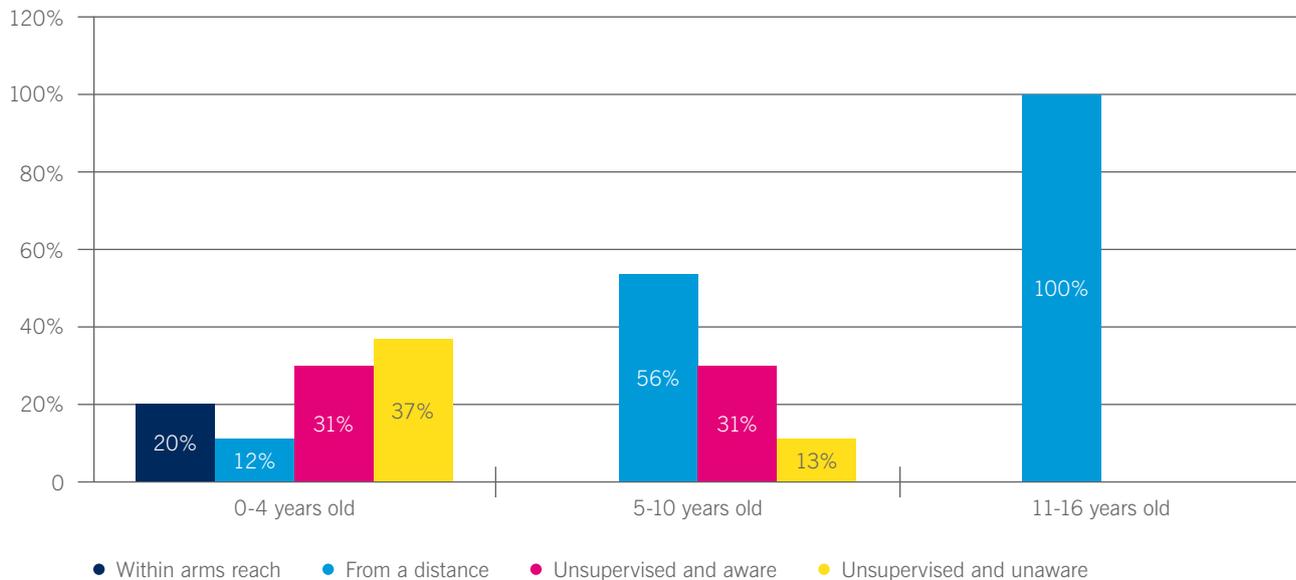
Type of supervision varies across age groups, however across all age groups, the majority of drowning incidents occurred while children were unsupervised (61%). In 31% of the incidents, the child was unsupervised and the parent/carer was unaware that the child was in or near water.

Figure 4: Type of supervision, all age groups



For the 0-4 year age group 37% of drowning incidents occurred while the child was unsupervised and the parent unaware that the child was in or near water. Alarmingly, for 31% of drowning incidents in this age group, the child was unsupervised and the parent was aware that the child was in or near water, while a further 12% were supervised from a distance. The 20% of children in the 0-4 year age group who experienced a drowning incident while being supervised within arm's reach were primarily infants under the age of one who slipped out of their parent's hold while being bathed and were briefly immersed.

Figure 5: Type of supervision by age group



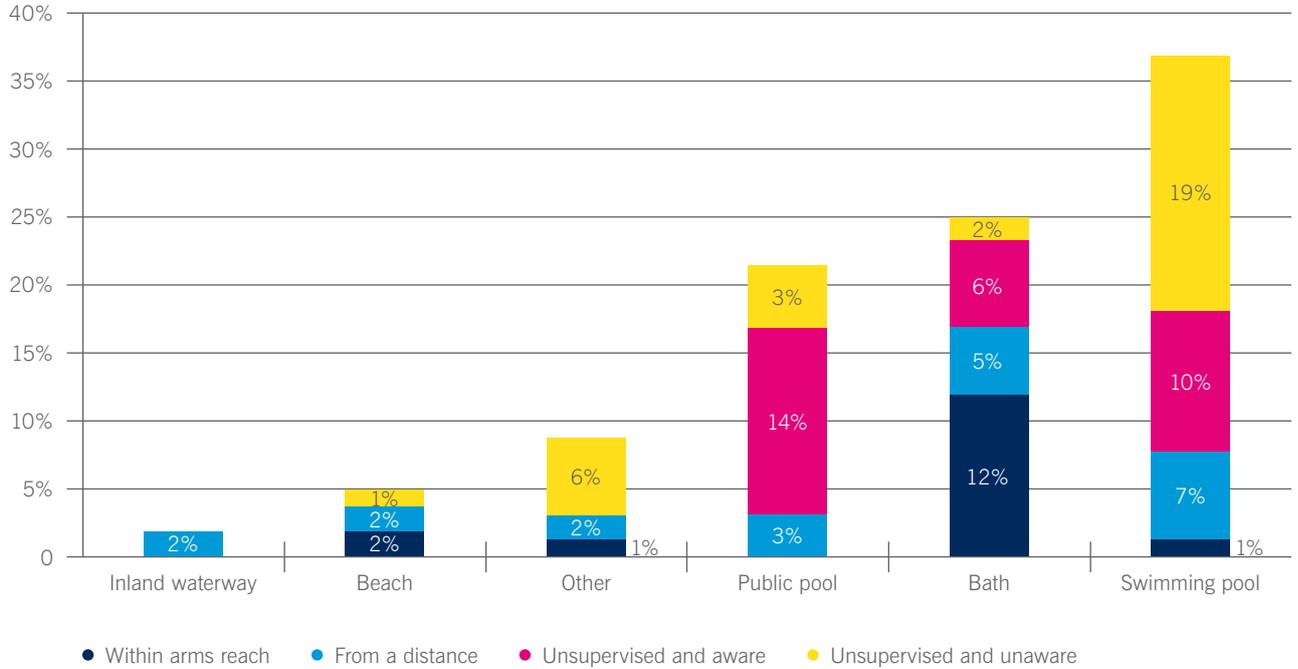
Over half (56%) of children aged 5-10 years old were supervised from a distance while they were in the water. The remaining incidents occurred while children were unsupervised, 31% where the parent was aware the child was in or near water and 13% where the parent was unaware the child was in or near water.

Type of supervision by incident site

Children who were unsupervised, regardless of whether their caregiver was aware or unaware that they were in or near water, accounted for the highest proportion (61%) of drowning incidents, with the highest percentage of these being in swimming pools (37%), followed closely by baths (24%).

Children who were supervised from a distance experienced a drowning incident in a range of locations, with swimming pools (7%) being the most likely location for this type of supervision.

Figure 6: Type of supervision by incident site



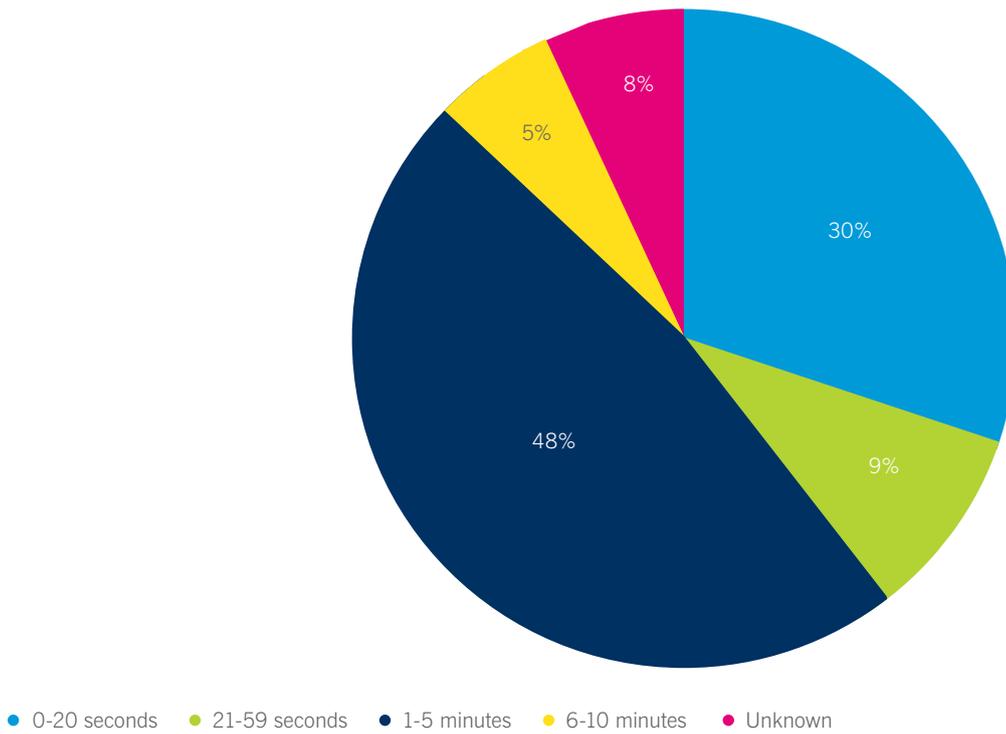
Length of time the child was immersed

Across all age groups, the majority (87%) of children were estimated by their parent/carer to be underwater for five minutes or less. Of these, 48% of children were estimated to be underwater between one to five minutes and 30% were estimated to be underwater for only 0-20 seconds.

Of the group who were estimated to be underwater for 20 seconds or less, 46% were less than 12 months of age and were being bathed by the parent/carer at the time of the incident.

It must be noted that the length of time of immersion is an estimate by the interviewee and may not reflect the true length of time the child was immersed.

Figure 7: Length of time child was immersed in water



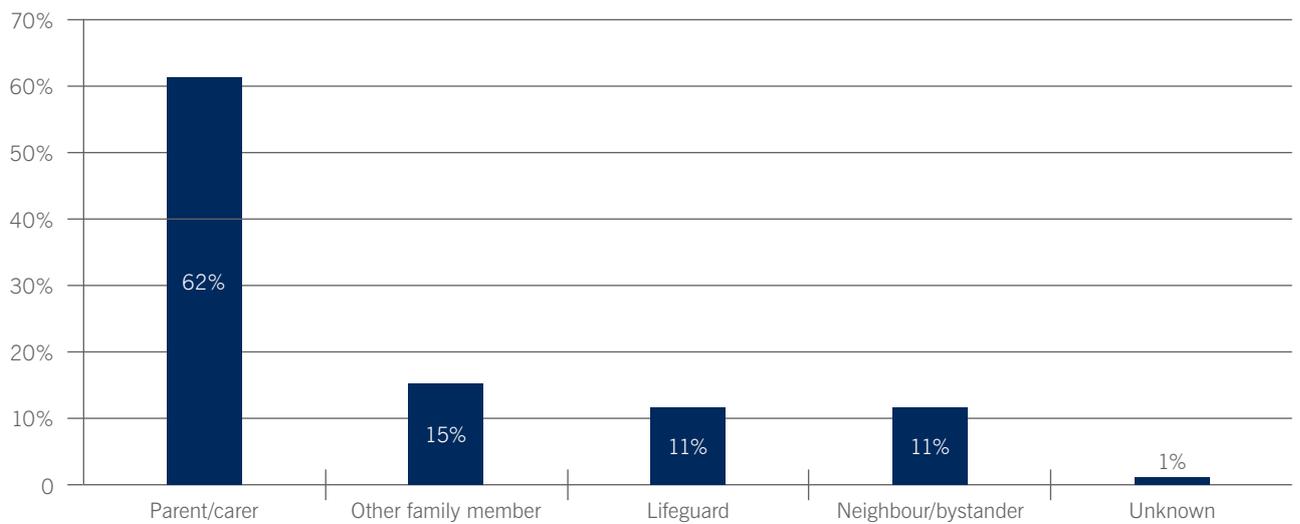
Person who found child under water

In 85% of incidents in our study, it was a family member of the child (parent, sibling, grandparent or other relative) who found the child in the water. The remainder were found by bystanders, friends and lifeguards.

Administration of CPR

Where CPR was performed, it was most commonly provided by a parent (62%) or other family member (15%).

Figure 8: Person who resuscitated the child



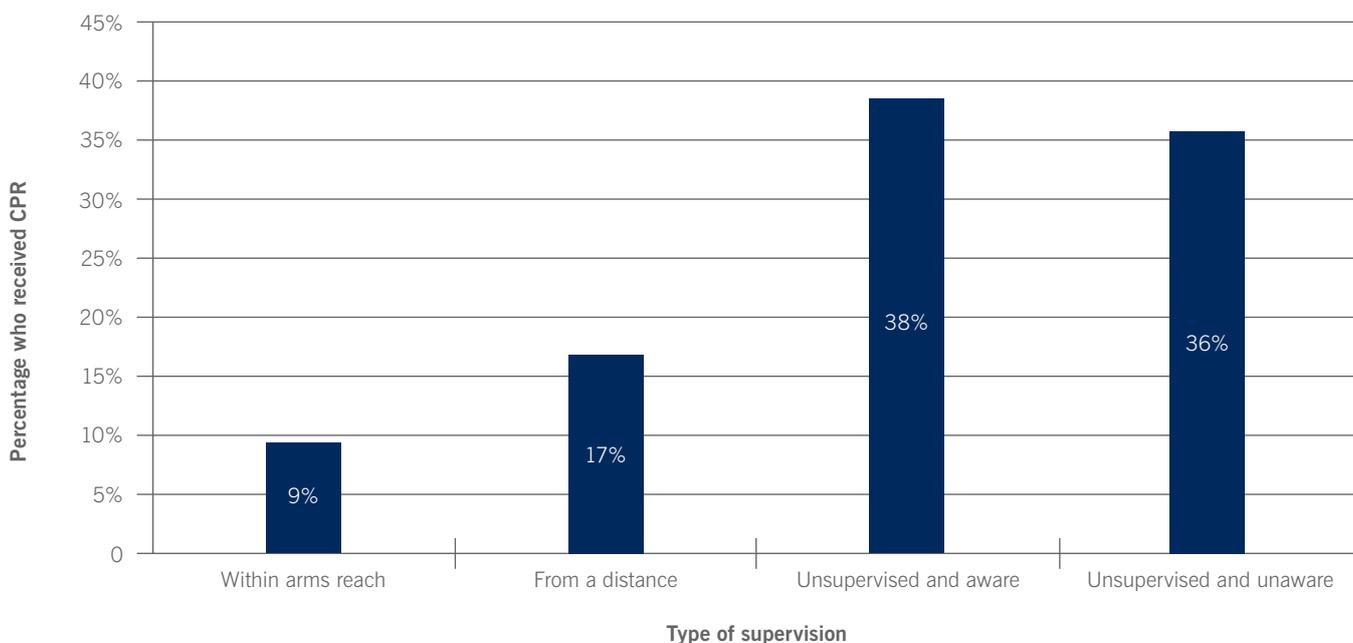
CPR Training

A high proportion (65%) of the interviewees reported having had training in CPR but only a third (30%) of these reported having had CPR training during the study period.

Type of supervision and the need for Cardiopulmonary Resuscitation (CPR)

There is a clear relationship between type of supervision and the need for CPR in the non-fatal drowning incidents in our study. The lower the level of supervision, the more likely the child was to require CPR. Of the children who received CPR, 74% were unsupervised while 26% were supervised from a distance or within arm's reach.

Figure 8: Type of supervision and receiving CPR



Child participation in water familiarisation/swimming lessons before the incident

Approximately half (49%) of our study participants had participated in water familiarisation or swimming lessons before the drowning incident occurred.

Table 4: Child participation in water familiarisation/swimming lessons before incident by age group

| | 0-4 years | % of age group | 5-10 years | % of age group | 11-16 years | % of age group | TOTAL | % of TOTAL |
|---------------------|-----------|----------------|------------|----------------|-------------|----------------|-----------|------------|
| Yes | 30 | 44% | 10 | 63% | 2 | 100% | 42 | 49% |
| No | 33 | 49% | 4 | 25% | | | 37 | 43% |
| Not answered | 5 | 7% | 2 | 12% | | | 7 | 8% |
| TOTAL | 68 | | 16 | | 2 | | 86 | |

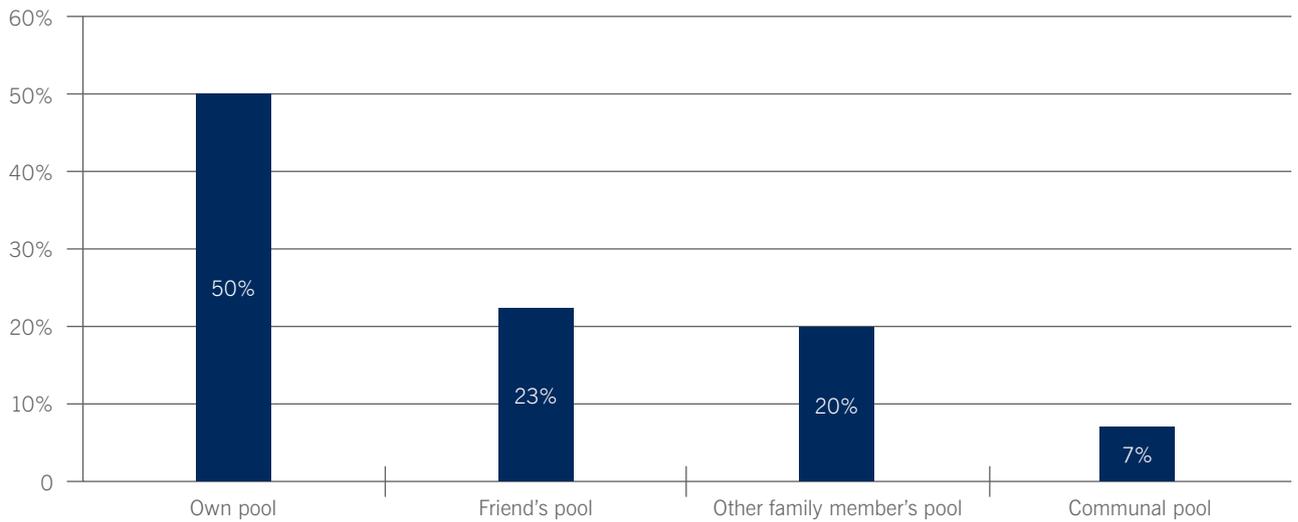
5.3. PRIVATE SWIMMING POOL INCIDENTS

Across all ages, 35% (n=30) of incidents occurred in private swimming pools.

Pool ownership

The incidents in private swimming pools in this study mostly occurred in the family's own pool (50%), followed by a friend's pool (23%) and other family member's pool (20%).

Figure 9: Pool ownership

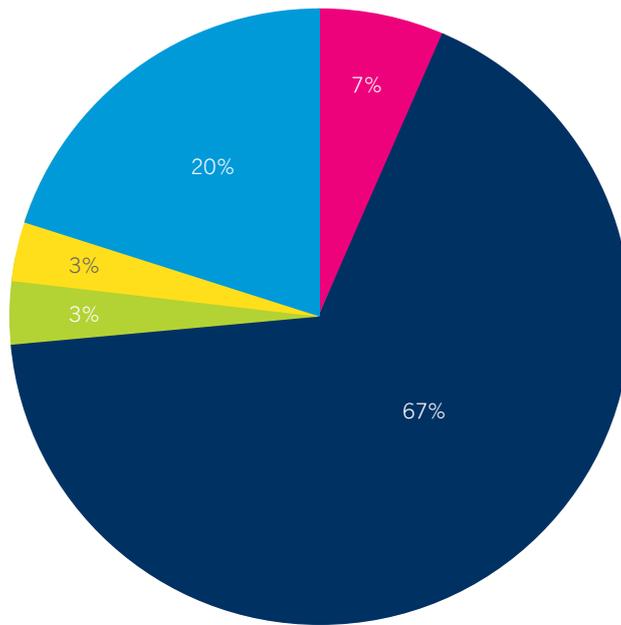


Details of the pool and property

A large proportion (20%) of interviewees did not or could not provide responses to questions seeking detailed information about the pool and the property. The figures in this section are therefore based on a smaller number of responses.

Permanent in-ground pools accounted for 67% of drowning incidents, followed by permanent above-ground (7%), permanent semi in-ground (3%) and inflatable or portable pools (3%).

Figure 10: Type of swimming pool



● Permanent above-ground ● Permanent in-ground ● Permanent semi in-ground ● Inflatable or portable pool ● No response

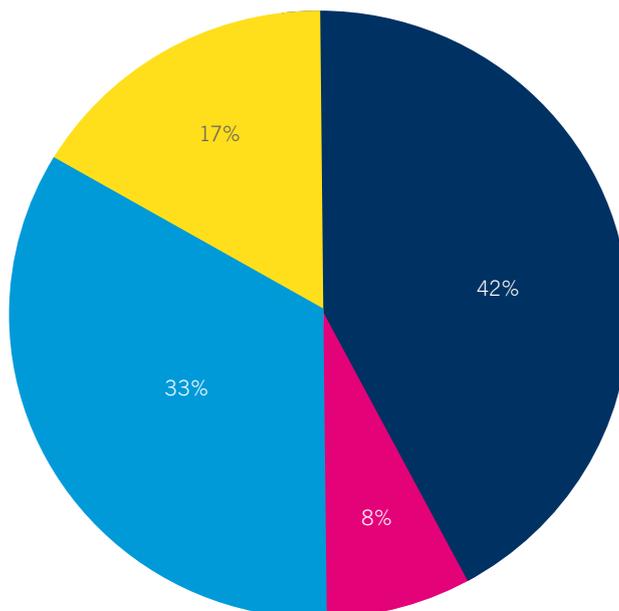
Presence of swimming pool barrier

In the incidents which involved a swimming pool, 50% had a barrier, 10% did not have a barrier and 40% of respondents did not or could not provide a response.

Type of barrier

Of the interviewees who were able to provide a response about the type of barrier, the most common type of barrier was a four sided isolation fence (42%), followed by a barrier which included the wall(s) of the house as a side (33%) and barriers that included a boundary fence(s) as a side (8%).

Figure 11: Type of pool barrier



● 4-sided barrier ● Boundary fence part of barrier ● Wall(s) of house of barrier ● Other

For incidents that occurred in a private swimming pool and where there was no barrier, the majority of interviewees (87%) were unable to say if the pool had any exemptions for fencing.

In relation to incidents that occurred in private swimming pools, 87% of respondents were unable to say if development approval had been obtained for the pool.

Just 11% of respondents reported that the pool had been inspected and only one of those identified that it had been inspected in the past six months.

Means of access to the pool

Of the pools that were privately owned, 29% of respondents reported that the pool barrier had a known fault at the time of the incident and 7% had no barrier.

For 33% of incidents in private swimming pools with a barrier, means of access was due to the pool gate being propped open. Objects within the non-climbable zone (90cm arc from the top of the fence to the ground), vertical gaps in the pool barrier too large (>10 cm gap between bars), gates that didn't self-close or self-latch, gaps between the boundary fence and pool barrier and non-compliant barriers were the other means of access reported by respondents.

5.4. KEY THEMES FROM INCIDENT DESCRIPTION

The responses to Question 15 “Are you able to tell me what happened to (child’s name)?” were reviewed and assigned to a key theme by the Research Officer. These themes were then reviewed again for common factors. The section below summarises the key themes and common factors. A theme represents a level of commonality in the response or meaning from the data²⁷.

| Key themes | Count |
|----------------------|-----------|
| Lapse of supervision | 43 |
| Unintended access | 16 |
| Brief immersion | 12 |
| Fall into water | 11 |
| Other | 4 |
| Total | 86 |

The most frequently mentioned common factors or features for each of the key themes identified from the narratives of the drowning incidents are shown below.

| Theme: | Lapse of supervision |
|--------|--|
| | Adult carer(s) distracted |
| | Child left unattended |
| | Lost sight of child |
| | Supervised or held by other child/teenager |

| Theme: | Unintended access to water |
|--------|----------------------------|
| | Lapse of supervision |
| | Breached pool barrier |

| Theme: | Fall into water |
|--------|----------------------|
| | Slips and trips |
| | Lapse of supervision |

| Theme: | Brief immersion |
|--------|---|
| | Child slipped out of carers hold while being bathed |

5.5. KEY THEMES IN PARENT/CARER 'ADVICE' TO OTHERS

Responses to question 45, "Do you have any advice or recommendations you would give to another parent to prevent a similar incident from occurring?" were categorised into key themes. Themes represent a commonality in response or meaning from the data and are detailed in the table below. Some comments from respondents contained elements from a number of themes²⁹.

| Themes |
|---|
| Importance of supervision |
| Importance of pool barriers and maintenance |
| Importance of CPR training and emergency response |
| Drowning is quick and silent |
| Importance of learning swimming and water survival skills |

Selected quotes from parents/carers under each theme are included in Appendix C.

5.6. SUMMARY OF OTHER NON-FATAL DROWNING INCIDENTS

The following is a brief summary from medical record data and clinical notes of the non-fatal drowning incidents where families could not be contacted for interview.

- 77% were children aged 0-4 years, 11% were aged 5-10 years and 11% were aged 11-16 years
- 57% were male and 43% were female
- 28% of drowning incidents occurred in swimming pools, another 28% occurred in baths and 23% occurred at public pools
- 68% occurred in spring and summer

As far as can be determined from medical records and clinical notes, 53% of children in this group were unsupervised at the time of the drowning incident.

5.7. SUMMARY OF FATAL DROWNING INCIDENTS

Similarly, medical records and clinical notes data for the fatal drowning incidents that occurred at the paediatric hospitals during the study period were examined and the information summarised. These families were not interviewed and the summary is from medical record information only.

Between 1 July 2015 to 31 March 2018, there were 14 fatal drowning incidents across the three paediatric hospitals.

- 57% were aged 0-4 years old
- 71% were male and 29% were female
- 57% of fatal drowning incidents occurred in swimming pools. Other common incident sites included baths, ponds and public pools
- 86% occurred in spring and summer
- In 57% of cases, the child was found by a family member
- Where there was information about resuscitation attempts, emergency services and parents most frequently attempted CPR

As far as can be determined from the medical records and notes, 71% of this group were unsupervised at the time of the incident and for 50% the parent/carer was unaware that the child was in or near water.

5.8. LIMITATIONS

One of the primary limitations of our study was that many interviewees were unable to provide a response to some of the more detailed questions about the incident, particularly those that related to private swimming pools. Much of the detail about the pool, its barrier and overall compliance that we were hoping to gather was either not known by the respondent or they chose not to provide a response.

A possible effect of this lack of detail about private swimming pools is that this study identified just two drowning incidents in a portable pool, which is believed to be an underrepresentation of the proportion of portable swimming pools in use in the community.

Another limitation of this study is that an Injury Severity Score (ISS) was not used in the analysis. ISS was not always provided in the records available for the study and the decision was made to not include ISS in the analysis. Had it been used, ISS would have provided a measure of the severity of the incident. In the results there were a number of cases which are best described as brief immersions, where the child slipped from a parent's grip and was momentarily underwater. Many of the hospital attendances for these incidents appear to have been precautionary.

Our questionnaire was not detailed enough to give good insight into the factors associated with drowning incidents for CALD families included in the study. While we gathered information about language spoken at home, it remains unclear if that was a factor in the drowning incident.

Children with a pre-existing health condition or disability were excluded from our study however, there is some research^{28, 29} that shows this population might have a greater risk of drowning. A separate analysis of these incidents may be warranted to expand the knowledge of how pre-existing health conditions or disabilities might be related to non-fatal and fatal drowning incidents.

6. DISCUSSION

6.1 OVERALL

This study was unique in its methodology of collecting data on the circumstances surrounding the non-fatal drowning incident via semi-structured in-depth interviews with parents and carers of children who experienced a drowning incident with or without morbidity. Retrospectively interviewing the families of the participants to gather more comprehensive qualitative data than that which is available in the medical database and clinical notes adds depth to the understanding of the circumstances surrounding the drowning incident. Contacting the families three months after the drowning incident allowed the parent/carer to have some time to process the incident and provided enough time for them to be emotionally ready for the interview.

Our study found that the 0-4 year old age group accounts for the highest proportion of fatal and non-fatal drowning incidents in children up to 16 years of age, which is consistent with national and international data^{17, 30}. Children aged 0-4 years made up 57% of fatal drowning incidents and 78% of non-fatal drowning incidents presenting to the three paediatric hospitals included in our study during the study period.

This study had a higher proportion of males (60%) than females (40%) aged 0-16 years. This is consistent with overall NSW data of non-fatal drowning between 2015-16 and 2017-18 for the same age group (56% male and 45% female)²⁰. Males also accounted for a considerably higher proportion of fatal drowning incidents (71%) at the three hospitals compared to females (29%) during the study period.

Children born to CALD families and those on holiday from overseas are overrepresented in national drowning data, with one quarter of child drowning incidents occurring in families with parents born outside Australia². This study included a slightly higher proportion of children from CALD backgrounds compared to the NSW population and would indicate that there is a link between CALD background and increased risk of drowning. Accessing quality data on CALD people within national drowning statistics continues to be a challenge⁷.

6.2 INCIDENT DETAILS

This study found that although swimming pools were the leading incident site (36%), home baths (23%) and public pools (19%) followed closely as common incident sites for children aged 0-16 years. In the 0-4 year age group, the most common incident sites were swimming pools (34%), baths (29%) and public pools (21%). This pattern was also found when we examined the records of the non-fatal drowning incident group who were not interviewed and the fatal drowning incidents in this study. Our findings are consistent with national fatal drowning data over 25 years which shows that swimming pools accounted for 53% of all drowning deaths for children aged 0-4 years²¹.

The findings of this study confirm that all water-based locations are a potential child drowning hazard. Baths, public pools, ponds and buckets were found to be common drowning sites and should continue to be included in prevention programs and campaigns. Examination of the narratives surrounding the circumstances of the non-fatal drowning incidents in this study suggests that sources of water in and around home environments such as fish ponds and buckets filled with water are often unrecognised as potential drowning hazards. It is important that education programs and campaigns reinforce that any contained water is a hazard and that most children are attracted to water.

6.3. SUPERVISION

Children drown quickly and silently. It is essential that parents and carers remain vigilant in supervising children in and around water, noting that it requires the constant and full attention of the supervisor, rather than attempting to split attention between multiple tasks¹⁸, regardless of how simple these tasks may be.

Across all age groups, the majority of non-fatal drowning (61%) and fatal drowning (71%) incidents in this study occurred while children were unsupervised. The incident sites where children were least likely to be supervised were private and public swimming pools.

Despite many years of public education and awareness campaigns that consistently stress the importance of close supervision of young children in and around water, only 20% of children aged 0-4 years in our study were supervised from 'within arms' reach'.

It is concerning to see that 12% of the 0-4 year olds in our study were supervised from a distance and 31% were unsupervised even though the parent/carer was aware the child was in or near water. No children aged 5-16 years were supervised 'within arm's reach'. Children aged 5-10 years were more likely to be supervised from a distance (56%) or unsupervised and the parent/carer was aware that the child was in or around water (31%), while 100% of children in the 11-16 year age group were supervised from a distance.

In a number of incidents young children were left in the care of older children or adolescents. While not noted in the summary of fatal drowning incidents, this was also found in to be the case in a number of the fatal drowning incidents at the three paediatric hospitals during the study period. Children and adolescents are not developmentally ready to take on this responsibility, can be easily distracted and are not as aware of the risks and so should not be given the responsibility of supervising other children, regardless of how mature they may seem.

The thematic analysis undertaken of the incident description showed some recurring themes associated with non-fatal drowning incidents and a lapse of supervision. Firstly, adult carers often spoke about being distracted, usually by an everyday task such as getting something out of a bag, preparing food, attending to another child (in or out of the water), speaking to other adults/guests, other household tasks and checking mobile phones. Closer examination of the description of the drowning incident reveals that 'being distracted' is a softer admission that that adult wasn't watching their child at that particular moment.

In some instances, children were simply left unattended while in or near the water. Looking more closely at the circumstances as they were described, the adult carer's perception was that they had only left for a short period of time and again often for a minor task that needed doing. It is acknowledged that adults often underestimate the length of their absence and some of the parent 'advice' to other parents shows there is a serious underestimation of how quickly and silently drowning happens.

In other incidents, the parent/carer lost sight of their child in a busy or crowded environment, sometimes assuming that someone else was watching the child or that there was some other factor that would help to protect them, such as a lifeguard or floatation aid. It is evident from some of the described circumstances that the messaging regarding whose responsibility it is to supervise children in busy or crowded water based locations needs to be strengthened and that floatation aids are not lifesaving devices.

There are currently community programs running throughout NSW and nationally such as the 'Keep Watch at Public Pools' program which aims to help parents and carers understand their responsibilities and the dangers of leaving their children unattended at public pools²². Signs and flyers are present at public pool facilities reminding adult carers to supervise children in their care at all times in and around the water and that lifeguards are not solely responsible for each and every child at the venue.

The use of bath aids featured in a number of the narratives related to non-fatal drowning in baths, where the drowning incident occurred when the child slipped out of the bath aid. Comment from respondents acknowledged that the bath aid meant they did not have their hands on the child at the time and that they believed that the bath aid would keep their child safe while they 'quickly' left the bathroom to get something. This is similar to a study conducted by Peden et al. (2018) that found that risks to infants and toddlers in the bath include being left unsupervised, false confidence in the preventative role of bath aids and the unrealistic expectations in the supervisory capabilities of co-bathing children²⁸.

6.4. SWIMMING POOLS AND UNINTENDED ACCESS

Our study found that across all age groups, swimming pools were the leading location of both non-fatal and fatal drowning incidents. The majority of these incidents occurred in the family pool. This is consistent with the findings of Mahoney and Peden¹⁸ which found that 71% of children drowned in the family pool¹⁸. We also found that swimming pools belonging to friends and other family members were common locations for drowning incidents.

In our study, where children gained unintended access to the pool, the highest proportion (33%) of these were as a result of the pool gate being propped open. Children also gained unintended access to the pool:

- by utilising objects left in the non-climbable zone (90cm arc from the top of the fence to the ground) to breach the barrier
- through a gate that was not self-closing and self-locking
- through gaps in the pool barrier
- by no barrier being in place

One of the key themes in the parent recommendations to other parents was the importance of pool barriers and maintenance. In hindsight, parents/carers acknowledge the importance of an effective pool barrier even though some were aware of faults or misuse of a barrier before a drowning incident.

These findings reinforce the need to ensure that pool owners, landlords and tenants regularly inspect pool barriers for faults and fix identified faults immediately. Education and awareness campaigns must continue to emphasise that misuse of pool gates by propping them open and leaving objects in the non-climbable zone can have deadly consequences.

The findings of our study in relation to unintended access to swimming pools are reflective of the Child Death Review Report (2017) which noted that:

- children under five are most at risk of drowning in backyard swimming pools;
- all children under five years who drowned did so in the absence of adult supervision;
- almost all of the swimming pools eligible for exemption from pool barrier requirements were fenced however the barriers were mostly non-compliant with the Swimming Pools Act 1992;
- faulty gate mechanisms were the most common barrier defect through which young children accessed the pool⁶

While there are checklists available to assist pool owners and landlords to identify potential faults in swimming pool barriers and surrounding areas, it's not known how many utilise these resources.

Other jurisdictions where a mandatory program of regular swimming pool inspection is in place have demonstrated much higher compliance with swimming pool barrier regulations²¹. Very few of the interviewees in our study were able to respond to questions about compliance and inspection of the pool barrier involved in drowning incidents, however of those that could, only 11% could recall the pool being inspected. Our findings suggest that a regular mandatory pool inspection program in NSW would help to improve the compliance of private swimming pool barriers.

6.5. CARDIOPULMONARY RESUSCITATION (CPR) AND EMERGENCY RESPONSE

Across all age groups, an overwhelming proportion of children (87%) were estimated to be underwater for five minutes or less. The most common duration of time the child was estimated to be underwater was between one to five minutes (48%), followed by under one minute (39%). It is important to note that in 30% of incidents, the child was estimated to be underwater for less than 20 seconds. Given that a small proportion of children who were estimated to have had a brief immersion (less than 20 seconds) still required CPR, it needs to be conceded that the duration of immersion may have been underestimated and reinforces the need for parents/carers to have CPR skills.

Our study observed a correlation between the type of supervision and administration of CPR. Children who received CPR were more likely to have been unsupervised at the time of the drowning incident.

For both non-fatal and fatal drowning incidents in our study, the child was predominantly found by a family member (85% and 57% respectively). Where CPR was administered, in 62% of non-fatal drowning and 21% of fatal drowning incidents, it was administered by a parent. For fatal drowning incidents where CPR was administered, it was more likely (29%) to be administered by Emergency Services personnel.

Early CPR has been shown to contribute to increased survival in child drowning incidents^{11, 31}. One of the key themes in parent recommendations to other parents was how important it was to know how to perform CPR and that all parents and carers should learn CPR. While 65% of interviewees reported having had training in CPR, only a third (30%) reported having this training in the previous three years. This indicates that there is a need to continue to encourage participation in CPR training and regular updates.

A number of the narratives describing a drowning incident noted that although they had learnt CPR skills, they were unable to perform those skills when faced with the situation of their own child needing resuscitation. This also supports the need for parents/carers to learn CPR and to keep skills up-to-date so they are prepared in the event of an emergency.

While not quantified in our study, it is worth noting that a number of the narratives describing the circumstances of the non-fatal drowning incident mentioned administering blows to the child's back after they had been retrieved from the water. This is of concern and should be taken into account when promoting the importance of CPR training.

A few interviewees noted that CPR training should be compulsory, free of charge and more easily available. A free online CPR training program for parents is available on the Kids Health website that teaches the steps to perform CPR on an infant and child³². This training is freely available to address some of the barriers to participation in formal or accredited CPR courses.

6.6. WATER FAMILIARISATION AND SWIMMING LESSONS

While almost half (49%) of our study participants were reported to have had swimming or water familiarisation lessons before the incident, they were still involved in a non-fatal drowning incident. Of these children, 43% were reported to have attended for over 12 months and 24% between 6-12 months. The majority of children attended formal swimming lessons (89%) over family instruction (11%). While participation in water familiarisation and swimming lessons is one of the pillars of drowning prevention, our study would suggest that it does not 'bulletproof' children from drowning and that other factors are still in play.

Of all the children more than five years old who were reported to have had swimming lessons, parent assessment of their swimming skills was poor for more than half and average for just 19%. The importance of learning swimming and water survival skills was one of the key themes in parent recommendations to other parents.

Another theme that emerged was the lack of swimming ability for some parents/carers. Royal Life Saving Society Australia research has identified that community groups who are most likely to miss out on formal swimming and water safety include children who are Indigenous, are from a CALD background, are from a low-socioeconomic community, live in a regional or remote area, have newly arrived in Australia or are living with a disability²⁵.

Parents and carers, especially those from CALD backgrounds should be encouraged to learn to swim so they are able to supervise their child at arms' distance in the water and also respond in the event of an emergency. More work needs to be done to make CPR training more accessible and affordable for all.

6.7. FALLS INTO WATER

A number of interviewees commented that they were surprised at how quickly and silently their child disappeared in the water. Slipping or falling into water was a common theme in the narratives of drowning incidents in this study and included slipping from a parent/carer grip in the bath as well as slipping or falling into a pool or other body of water. Closer examination of the description of these incidents reveals that there is an underlying element of lapse of supervision, where the adult carer has taken their attention away from the child, sometimes only momentarily, and the child has quickly and silently slipped into the water.

7. CONCLUSION

Drowning deaths and drowning with or without morbidity are an important public health issue where further education, policies for prevention and research are required. This study aimed to add to the knowledge base on non-fatal drowning of children, and to a lesser extent, fatal drowning incidents. The method of semi-structured in-depth interviews with parents and carers of children who had been involved in a non-fatal drowning incident allowed for additional details to be gathered on the drowning incident which are not otherwise captured in the medical record.

While our study has not added new information to the body of knowledge on non-fatal drowning of children, it has reconfirmed what is already known:

- that children under five years of age are at the most risk of drowning
- that they are most likely to drown in a swimming pool at home
- that unsupervised children are at greater risk of drowning
- pools with no barrier or faulty barriers or gates propped open are a risk for young children

Although improvements have been made in the prevention of child drowning in NSW, an unacceptably high number of deaths and non-fatal incidents continue to occur, particularly in private pools. Adults can become complacent in a familiar home environment or when they believe someone else is supervising their child. This study has shown that ongoing education is needed to ensure parents and carers understand the importance of constant and active adult supervision, the dangers of everyday distractions and complacency. Effective swimming pool barriers are essential to prevent unintended access when supervision has lapsed.²¹

Although active adult supervision when children are in and around water is consistently promoted in awareness campaigns and programs nationally, further attention needs to be given to this issue to help parents and carers understand what appropriate supervision is and how quickly and silently a child can drown after a simple everyday distraction. These distractions include attending to other children, getting something out of a bag, leaving the child/ren to get a towel, speaking with other adults/entertaining or checking a mobile phone. Drowning prevention campaigns and programs should also address the common myths about drowning in children.

The results of this study highlight the importance of continued education of adult carers on the following key messages:

- What does constant active adult supervision mean when children are in and around water
- Everyday tasks can distract adults from active supervision
- Older children and adolescents are not capable substitutes for adult supervision
- Ensure that all swimming pools have compliant pool barriers that are maintained and that gates are not propped open
- Water familiarisation and swimming lessons are important, but children can still drown
- Learn CPR and how to swim so you have the skills in case of an emergency. Remember that any attempt is better than no attempt.

8. RECOMMENDATIONS FOR POLICY AND PRACTICE

- Ongoing education of parents, carers and the community broadly on the risk of drowning and non-fatal drowning, the common contributing factors and the key prevention strategies. Supervision should be highlighted.
- Consideration needs to be given as to how to best communicate the risk of drowning, consequences of non-fatal drowning, contributing factors and key drowning prevention strategies, particularly for people from CALD backgrounds. For 20 years or more the prevention strategies have been supervise, separate, learn to swim and learn CPR, yet the absence of these remains the primary contributing factors in child drowning.
- Advocacy for regular mandatory pool barrier inspections by local councils in NSW to improve compliance of swimming pool barriers.
- Free or low cost courses in CPR for parents and carers of young children, run in different languages.
- Continued research into the long-term health and social impacts of non-fatal child drowning.

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APPENDIX A

Questionnaire to be completed by staff member/research officer at hospital (based on patient records)

Title of study: NSW Study of drowning and near drowning in children (0-16 years)

Demographic information

1. Full name of child: _____
2. Date of birth: _____
3. MRN: _____
4. Country of birth: _____
5. Language spoken at home: _____
6. Aboriginal or Torres Strait Islander:
 No Yes, Aboriginal
 Yes, Torres Strait Islander Yes, both Aboriginal and Torres Strait Islander

Incident details

7. Please give a brief description of what happened

8. Injury type:
 Immersion Submersion
9. Mechanism of injury:
 T68: Hypothermia X31 Exposure to excessive natural cold
 T75.1 - Drowning and nonfatal submersion X34-X39 Drowning and submersion due to cataclysm
 W65-W74 Accidental drowning and submersion (please tick below) X71 Intentional self-harm by drowning and submersion
 W65 Drowning and submersion while in bathtub X92 Assault by drowning and submersion
 W66 Drowning and submersion following fall into bathtub V01-V99 Drowning and submersion due to transport accidents
 W67 Drowning and submersion while in swimming pool Y21 Drowning and submersion, undetermined intent
 W68 Drowning and submersion following fall into swimming pool Other _____
 W69 Drowning and submersion while in natural water, including: lake / open sea / river / stream Unknown
 W70 Drowning and submersion following fall into natural water
 W73 Other specified drowning and submersion
 W74 Unspecified drowning and submersion

10. How was the patient transported to the hospital?

By ambulance from another hospital

By ambulance from where the incident occurred

Careflight

By the family from where the incident occurred

Other

11. Was Trauma call put out by ED?

Yes No

12. State of child on arrival:

13. Was the child intubated?

Yes No

14. By whom?

Ambulance Officer At hospital

15. Was the child admitted to ICU?

Yes No

16. Date of discharge:

Length of stay:

17. ISS Score:

Chest X-ray?

18. Evidence of water in the lungs?

19. Outcome:

Immersion Submersion

20. Neurological deficits?

Yes No Unknown

21. Any other comments?

APPENDIX B

Interview Schedule with parent/carer (retrospective)

Title of study: NSW Study of Drowning and Near Drowning in Children (0-16 years)

Section 1

Demographic information

Pre-fill prior to commencing interview using patient records questionnaire

1. Name of parent/carer being interviewed: _____
2. Full name of child: _____
3. Gender:
 Male Female
4. Date of birth: _____
5. Age at incident: _____
6. Address: _____
7. Suburb: _____
8. Phone number: _____
9. Country of birth: _____
10. Languages spoken at home: _____
11. Aboriginal or Torres Strait Islander:
 No Yes, Aboriginal
 Yes, Torres Strait Islander Yes, both Aboriginal and Torres Strait Islander

Section 2

Incident details

12. Date of incident: _____
13. Time of incident: _____
14. Season:
 Summer Autumn Winter Spring
15. Are you able to tell me about what happened to (child's name)?

16. Where did the incident occur? (Name of suburb and aquatic location e.g. name of beach, river or public pool):

Incident site (tick)
 Swimming pool, including inflatable or portable pool (section 3 also needs to be completed)
 Public pool Beach River/lake/creek Bath Dam Pond
 Other

17. Do you remember where the adult carers were at the time of the incident? _____

18. How was the child being supervised?

- Within arm's reach in the water
- From a distance while the child was in the water
- Unsupervised, but aware child is in aquatic location
- Unsupervised and unaware the child is in or near water and is unsupervised

19. Child found by: _____

20. Child resuscitated by: _____

21. Was an ambulance called:

- Yes No

22. Have you had any training in CPR?:

- Yes No

If yes, please name most recent year/s: _____

If yes, please name organisations or service of training: _____

Section 3

Swimming lessons

23. Had (child's name) participated in swimming/water familiarisation lessons prior to the incident:

- Yes No

If yes, how long had (child's name) been taking swimming or water familiarisation lessons: _____

Were the swimming lessons formal or family instruction: _____

Children above 5 years of age:

24. Parent's report of child's proficiency in swimming:

- Good Average Poor

Note: If incident occurred in a pool (including inflatable and portable pools), complete SECTION 4

Section 4

Private swimming pool incidents, including inflatable/portable pools

25. Who did the swimming pool belong to?

- Our family pool Friend's pool
 Grandparent's pool Neighbour's pool
 Other

26. Do you remember what type of swimming pool it was?

- Permanent above-ground
- Permanent in-ground
- Permanent semi in-ground
- Large inflatable or portable pool (capable of being filled with more than 300mm of water)
- Small inflatable or portable pool (capable of being filled with less than 300mm of water)

27. Do you know the approximate height/depth of the pool (cm/m)? _____

28. Was the pool full at the time of the incident?

Yes No

If no, how much water would you say was in the pool? _____

29. In what type of property was the swimming pool located?

Department of Housing Rental property Owned

30. How long were you or the occupants living in the house prior to the drowning event? _____

31. Evidence of water in the lungs? _____

32. Do you recall when the swimming pool was installed?

Month and year: _____

Currently approved or being built

Unknown (go to question 33)

33. If year is unknown, can an estimate be made as per the categories below?

Before August 1990

(exemptions exist on older pools installed <August 1990)

After June 2010

(exemptions removed for waterfront, small and large properties)

August 1990-2000

Installed or set up within the past six months

2001-June 2010

I don't know

34. Was the swimming pool already installed/set up prior to moving into the property?

Yes (when did the family move in): _____

No

Unknown

Section 5

Inflatable or Portable Pools Only

35. How was the inflatable or portable pool purchased?

Online In person from a store Received as a gift Unsure

Other _____

36. Where was it purchased from?

Major department store, e.g. Kmart/ Target/ Big W/ Bunning's etc. (please name): _____

Other store e.g. one dollar shop (please name): _____

eBay

Other online store (please name): _____

Unsure

Other: _____

Section 6

Pool Fencing and Council Approval (swimming pools, including inflatable/portable)

37. Did the swimming pool have a fence around it?

Yes (Go to question 38) No (Go to question 39) I don't know

38. If yes, what type of fence was it?

4-sided isolation fencing Fencing including a boundary fence/s as a side Fencing including the wall/s of the house as a side

Other _____

39. If no, did the pool have any exemptions for fencing?

- Yes – Built prior to August 1990
- Yes – Waterfront property (built prior to 1 July 2010)
- Yes – Small property, less than 230 square metres, (built prior to 1 July 2010)
- Yes – Large property, 2 hectares or over (built prior to 1 July 2010)
- Yes – Other: _____
- No exemptions

40. Do you know if development approval had been obtained from the local council for the pool?

- Yes No

41. Do you know if the pool has ever been inspected by the local council or a private certifying authority?

- Yes (Go to question 42) No (Go to question 43) I don't know (Go to question 43)

42. If yes, when was it inspected?

- | | | |
|--|---|---|
| <input type="checkbox"/> When the pool fence was installed | <input type="checkbox"/> Never had the pool fence inspected | <input type="checkbox"/> When the house was sold / leased |
| <input type="checkbox"/> Within the past year | <input type="checkbox"/> Within the past six months | <input type="checkbox"/> Pool gate propped open |
| <input type="checkbox"/> Within the past three years | <input type="checkbox"/> Within the past two years | <input type="checkbox"/> Unsure |
| <input type="checkbox"/> Five or more years ago | <input type="checkbox"/> Within the past four years | |

43. Can you recall if there were any faults with the pool fence at the time of the incident?

- Yes (Go to question 44) No No fencing I don't know (Go to question 45)

44. If yes, please identify below:

- | | |
|--|--|
| <input type="checkbox"/> No temporary fencing around new swimming pool as it's being built | <input type="checkbox"/> CPR sign not present, ripped or broken |
| <input type="checkbox"/> Pool fence height less than 1.2m high | <input type="checkbox"/> No lockable lid or fence around the spa pool |
| <input type="checkbox"/> Objects within the Non Climbable Zone (90cm arc from the top of the fence to the ground) | <input type="checkbox"/> Windows as part of the barrier not compliant (locking device or a security screen has to be present that prevents them from opening more than 10cm) |
| <input type="checkbox"/> Vertical gaps in the pool fence too big (>10cm gap between bars) | <input type="checkbox"/> Doors as part of the barrier not compliant. Please specify below: <input type="radio"/> Doesn't self-close <input type="radio"/> Doesn't self-latch <input type="radio"/> Latching device isn't located at least 150cm off the ground <input type="radio"/> Footholds are present wider than 1cm on the door or its frame between the floor and 100cm above the floor <input type="radio"/> Pet door present |
| <input type="checkbox"/> Horizontal gaps in the pool fence too small (Bars <90cm apart from each other) | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Gap at the bottom of the fence too big (>10cm from finished ground level) | |
| <input type="checkbox"/> Gate not self-closing (without force, from any open position on the gate) | |
| <input type="checkbox"/> Gate not self-latching (without force, from any open position on the gate) | |
| <input type="checkbox"/> Pool gate swings inwards, towards the pool area | |
| <input type="checkbox"/> Pool gate propped open | |
| <input type="checkbox"/> Gate latching device location (if not located at least 150cm above ground level, must be located on the inside of the pool fence, at least 15cm below the top of the gate, with a shield fitted around the latch of at least 45cm radius) | |

45. Do you have any advice or recommendations you would give to another parent to prevent a similar incident from occurring?

APPENDIX C

Parent advice or recommendation for other parents

Theme: Importance of supervision

- Always keep your eyes on your children when they are in or around water. It only takes one minute for them to drown
- Children should always be near you and supervised, even inside the house and if you have work to do
- My advice is for parents to always supervise and watch their kids when they are in water, even if they are confident in water
- Parents or carers need to be extra vigilant when in and around public pools or hotel pools because you can lose sight of your child. Don't assume that someone is looking after your child when you are in a big group at the pool. Make sure you know who is watching your child
- If a parent needs to get a drink or go to their bag while their child is in or around water, they should take the child with them because they could drown in a few seconds, even if you put floaties on them
- Carers must be vigilant! Don't get chatting with people or distracted when a child is in water. You have to watch them all the time and be within arm's reach of them
- When you are supervising children, don't get distracted
- Get in the water with your child/ren! Unless there is an adult there supervising, they are not safe! You can't take your eyes off children when they are in water because drowning happens so quick. I thought that the other children in the pool would look out for him, but they didn't
- Parents should be organised before they bathe their kids, so you don't have to leave the room when they are in water. Have towels ready
- I was a bit tired and distracted so I want to advise parents to always have 100% concentration on your kids when they are around water. We were lucky, but we could have both drowned if no one helped us get out
- Your child can drown with no sound even when you are standing next to them in the water, so you need to always be facing them and have your eyes on them. We were three adults in the pool and no one noticed that my (child) had fallen into the water from the step into the pool
- When you are bathing your young child, don't take your hands off them because they can easily slip face forward or back into the water
- Adult supervision is key. You can't rely on other children or older cousins to keep your child safe
- Don't get distracted or lazy, be alert at all times
- I thought that my youngest child is independent and knows what to do and what not to do/how to be safe, but I shouldn't have assumed that. He was still a baby and isn't independent or old enough to be unsupervised. So always keep watch
- Always expect that drowning can happen, even if you think your child is mature enough not to fall in the water or to do something silly. Be prepared by watching them all the time and act fast

Theme: Importance of pool barriers and maintenance

- Always check that the pool gate is firmly closed before you leave the pool area, even if it is for a few seconds
- Don't hang clothes on the pool fence as it means you will be in and out of pool area constantly
- Make sure your pool is 'bulletproof'
- If someone has a pool, they need to make sure the gate has a working lock and to ask the owners of the rental property to fix it if it has a problem. Also to make sure there is nothing around the fence that a child can climb over and get to the pool themselves. I urge all landlords take responsibility to make sure the lock of their pool gates are working before they give it for lease
- Sliding doors should always be kept closed and locked. Don't use a hook to keep the pool gate open
- Adults should never open the gate for a child
- If your gate is faulty or broken, fix it as soon as possible. And if it's a rental property, notify your real estate or landlord straight away
- Don't underestimate a toddler, they are very quick and can get anywhere
- If your child is a climber, move away any chairs, bikes, toys and anything that the child can climb up on and climb over the pool fence or to the source of water
- If you have children in your house or visiting your house you should get rid of or empty all forms of water around and in the house e.g. pond, bucket, inflatable pool, anything at all - because it's a hazard

Theme: Importance of CPR training and emergency response

- All parents and carers should do CPR training
- It should be compulsory for parents to do a free CPR training when they have their first child
- CPR training should be compulsory and free
- Knowing CPR is very important. All parents should do the training; it saved my child's life!
- CPR training should be more available, approachable and affordable for parents to do

Theme: Drowning is quick and silent

- Drowning happens so quickly and it's so quiet. There was no splashing, no bubbles, no sound
- I didn't know drowning can happen so quick! Never leave a child near water on their own, even for a minute! My son is very familiar with water and is a good swimmer, yet he still almost drowned!
- Everyone should learn and understand the signs of drowning. I always thought that drowning would be frantic and that the child would scream and shout, but it was in fact very quiet and quick. There were adults in the water but they didn't help my child – maybe because they didn't know the signs of drowning
- People think that when a child is drowning they would scream out, but it's not like that. They often make the action of climbing a ladder, and their head bops up and down. Adults and children should be educated on the signs to look out for when a child is drowning
- Drowning can happen to anyone! And it only takes seconds
- Especially when your child is sick, don't leave them in the bath or in water alone, you have to keep your eyes on them at all times because they are drowsy
- You never think this is going to happen to your child, but it can
- As a parent you believe you know your child best and their abilities. In this case I thought I knew her ability to swim and I thought she could get out the water or call out if she is drowning or in trouble. But she didn't do this

Theme: Swimming ability

- It's important for migrants like myself who moved here after high school years and who have not have swimming lessons to learn water safety, to learn to swim and to know the dangers of water – not to take it lightly
- Swimming classes which infants and children attend should teach water survival skills so they know what to do if they accidentally fall into water or are in an emergency
- Children should learn how to confidently swim and not panic if they fall in water – private lessons would be better than school lessons
- I encourage all parents to take your children to swimming lessons. This is very important in Australia. I have been trying to encourage my son to do lessons after the incident, but he is now scared
- My child did a six week infant intensive survival course and I think this really helped him to float on his back during this incident. I recommend it to all parents. Cost can be a barrier however

