Aquatic Injury Prevention Agenda

2026 – 27

Research and Health Promotion | Life Saving Victoria

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Acknowledgement of Country

Life Saving Victoria respectfully acknowledges the Traditional Owners of the Land and waterways in which we swim, explore, play and meet.

We wish to specifically acknowledge the Bunurong People of the South Eastern Kulin Nation as the Traditional Owners of the Lands on which this report was compiled. We also acknowledge the Traditional Owners of the various Lands on which our activities take place, and pay our respect to Elders past and present.

Acknowledgement of Data Sources

Information presented in this report is from the Life Saving Victoria Fatal Drowning Database, which relies on data collated from the National Coronial Information System (NCIS), the Coroner's Prevention Unit at the Coroner's Court of Victoria, and year-round media monitoring. Information contained within the NCIS is made available by the Victorian Department of Justice and Community Safety.

Life Saving Victoria (LSV) recognises that every life lost to drowning is a tragedy that deeply affects loved ones and communities, including first responders, volunteers and emergency personnel who attend these incidents. We extend our heartfelt condolences to those who have lost loved ones, and we honour the memory of every life lost.

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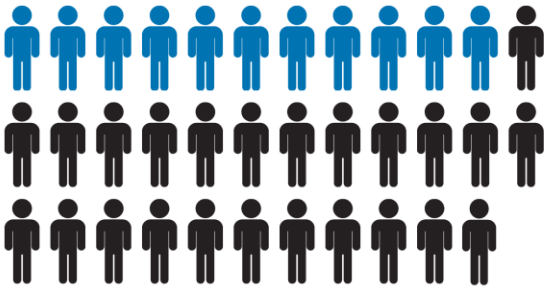
Table of Contents

Executive Summary

Year-to-date 1 July 2025 – 28 February 2026

35 people fatally drowned within Victorian waterways



↓ **14% decrease** on the 5-year average for the same period

- **11 fatal drownings** involved individuals from multicultural backgrounds
- 77% of fatal drownings were male
- 43% home/other environments
- 29% inland environments
- 29% coastal environments

Summer 1 December 2025 – 28 February 2026

18 people fatally drowned within Victorian waterways

↓ **20% decrease** on the 5-year average for the same period

- 39% coastal environments
- 33% inland environments
- 28% home/other environments

37% ↗

Increase in fatal drownings in coastal waterways (compared to baseline*)

46%

of drownings among young adults (15-24 yrs) involved individuals from multicultural backgrounds (over past 5 years)

Mornington Peninsula ⚠

LGA with the **most coastal incidents** in the year-to-date

54%

of fatal drownings involving those aged 65+ years occurred in home/other environments (over past 10 years)

67% ↘

reduction in fatal drownings involving alcohol and/or drugs (illegal or misuse of legal; compared to baseline*)

*Baseline years of the Victorian Water Safety Strategy: 2004–05 to 2006–07.

Evidence-Based Recommendations

Coastal waterways:

- Expand installation of public recue equipment, seek novel methods of water safety messaging for international visitors, and facilitate access to multilingual coastal safety education and signage.

Boating, watercraft and recreational activity related drowning:

- Provide targeted education for novice divers and advocate for stronger health screening protocols for underwater activities.

Young people aged 15 – 24:

- Promote responsible mateship, restrict alcohol availability and advertising around aquatic environments, and leverage social media to reinforce positive safety norms.

High risk populations:

- Integrate water safety information into migrant settlement processes, promote positive community role models, and emphasise swimming as a lifelong skill with pathways to other sports and employment opportunities.

Disaster and extreme weather:

- Ensure adequate flood-risk messaging and signage strategies are in place for flood-prone areas.

Ongoing Recommendations

- Advocate for consistent, validated, evidence-based frameworks for aquatic skills assessments that move beyond dichotomous competency assessments.
- Increase community programs focusing on safe participation in aquatic activities for older adults, with a link to falls prevention education.
- Improve community education on non-contact aquatic rescue techniques, particularly in rural and remote areas.
- Boost participation in swimming and water safety education among children, particularly children with disabilities, upper primary/early secondary school children and children in communities with high socioeconomic disadvantage.
- Strengthen alcohol marketing regulation in aquatic environments and increase safety messaging during summer, public holidays and heatwaves.

Background and methods

Background

The Aquatic Injury Prevention Agenda (AIPA) delivers an updated snapshot of Victorian drowning trends, bridging the gap between current insights and future action. This interim report builds on the *Victorian Drowning Report 2024–25*, highlighting emerging patterns and informing key water safety messaging and initiatives for the 2026–27 financial year.

By benchmarking against strategic goals, the AIPA tracks progress across critical areas such as demographics, locations, activities, and behaviours. It also identifies new and evolving risks which ensures that prevention strategies remain targeted and responsive.

The focus areas in this update draw on the latest drowning statistics from the current financial year-to-date (1 July 2025 to 28 February 2026), historical trends, recent research in aquatic injury prevention and related fields, and coronial findings. Together, these insights shape evidence-based priorities for reducing drowning deaths in Victoria.

Serving as a link between the Victorian Water Safety Strategy (VWSS) 2021–2025 and Play it Safe by the Water (PISBTW) communications, the AIPA informs strategic activities, program development, and campaign responses, helping to keep Victorian communities safer around water.

Drowning is defined as 'the process of experiencing respiratory impairment from submersion/immersion in liquid' (van Beeck & Branche, 2014), and outcomes can be fatal or non-fatal, with the potential for varied resulting morbidities. Drowning prevention has recently been defined as:

> *"A multidisciplinary approach that reduces drowning risk and builds resilience by implementing evidence-informed measures that address hazards, exposures and vulnerabilities to protect an individual, community or population against fatal and non-fatal drowning"*. (Scarr & Jagnoor, 2023)

A recent editorial discussing the World Health Organisation's first Global Status Report on Drowning Prevention (released in December 2024) highlights progress and gaps relevant to Australia and other high-income countries (Peden, 2026). Drowning deaths have declined worldwide by 38 per cent since 2000, yet the burden remains underestimated, particularly in high-income settings where deaths from water transport and disasters (e.g., floods) are often excluded. Globally, major policy and legislative gaps in relation to drowning prevention persist, including limited integration of drowning prevention into disaster risk management, weak alcohol regulation around water, and widespread absence of pool fencing legislation globally, despite the strong evidence of effectiveness (e.g., a 63 per cent reduction in drowning rates among children 0–4 years in Australia). The editorial calls for improved data quality, stronger legislation, multisectoral coordination, and scaling proven interventions, especially for children and young people, to accelerate drowning prevention in high-income countries.

The current Australian Water Safety Strategy 2030 (AWSS 2030) makes a commitment to reduce drowning by 50 per cent (on a population rate basis) by 2030 (Australian Water Safety

Council, 2021). Following a consultative review process, the AWSS Midpoint Review was released in 2025 and provided a critical assessment of progress to date on this overall goal compared to the AWSS baseline years (2017/18 – 2019/20) (Australian Water Safety Council, 2025). Notably, there has been an overall increase in drowning rates in Australia (Figure 1), particularly among older adults (65+ years), with beaches, rivers, lakes and aquatic facilities being key locations of concern. Subsequently, the AWSS was updated and streamlined based on where collective action is most needed, including highlighting three national imperatives – swimming and water safety skills for all, localising water safety efforts, and aligning policies and partnership for change. This updated strategy provides a shared foundation for making decisions about priorities, coordination, and funding across Australia.

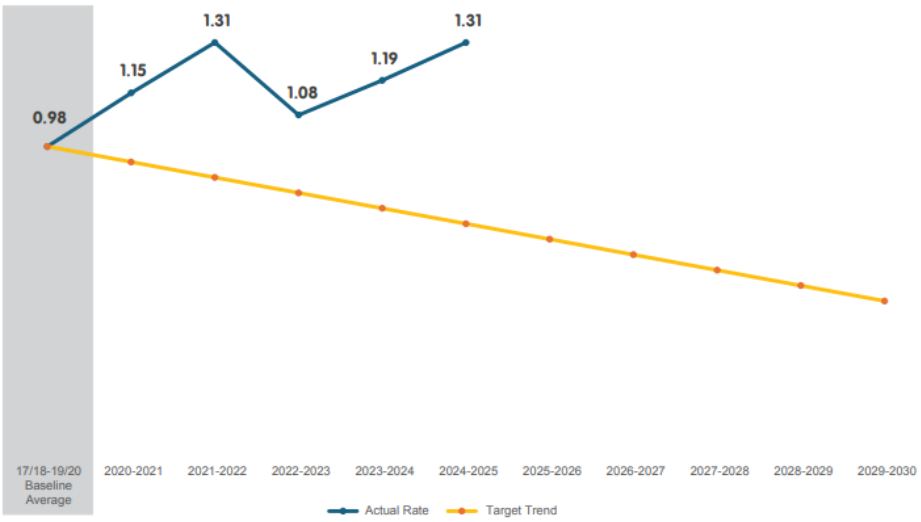


Figure 1. Comparison of national fatal drowning rates per 100,000 population from the first five years of the AWSS to the target trend for 2030.

Alongside the AWSS midpoint review, a recently published 20-year epidemiological analysis of Australia's National Fatal Drowning Database reveals both substantial progress and ongoing challenges in reducing unintentional drowning (Miller et al., 2025). Children aged 0–4 years experienced the most dramatic improvement, with drowning rates falling by 59 per cent, largely attributed to strengthened pool fencing legislation, improved supervision messaging, and early water-familiarisation initiatives. In contrast, drowning rates among adults aged 65+ showed no statistically significant decline, signalling a growing high-risk population influenced by factors such as medical conditions, falls, and increased recreational water use in older age. While males accounted for 79 per cent of all fatalities, young males in particular were overrepresented, with risk-taking behaviours, alcohol consumption, and recreational exposure continuing to drive fatalities despite modest reductions. Rivers and creeks were the leading drowning locations (26 per cent) although notable decreases earlier in the period were followed by a sharp rise during 2020 – 2022, likely linked to widespread

flooding. Beaches were the second most common drowning location and did not show any improvement over time, underscoring the enduring risks of Australia's popular coastal environments. The report highlights significant inequities, with drowning rates highest among people in very remote areas, socio-economically disadvantaged communities, multicultural populations, and Aboriginal and Torres Strait Islander peoples. Despite progress driven by the AWSS and related policies, nationally there is still the need for renewed focus on older adults, males, high-risk locations such as beaches and rock platforms, and improved exposure and vulnerability data to meet the 2030 national drowning-reduction goals.

At the time of writing, the VWSS 2026 – 2030 was under development by the Victorian Water Safety Coordination Forum. The Water Safety Coordination Forum (WSCF) is an ongoing cross-government coordination body established in response to a recommendation from the Inspector-General for Emergency Management's (IGEM) review of Victoria's water safety arrangements. The WSCF builds on the work of the Water Safety Taskforce and coordinates and progresses shared water safety initiatives across government, including governance for the implementation of VWSS 2021-25. The VWSS sets Victoria's shared direction for drowning prevention and water safety, aligning efforts across agencies and partners to reduce preventable drownings and water-related injuries to zero. The VWSS 2026–2030 will continue the vision to encourage more Victorians to safely participate and enjoy recreation in and around water, as well as drawing on the principles of the AWSS 2030.

Methods

Drowning data

Information on fatal drowning incidents was collected from the Coroners Court of Victoria, and the National Coronial Information System (NCIS). Deaths due to natural causes, suicide or homicide were excluded from this report. Coronial information relates to both open and closed cases. While all care is taken to ensure that the results are as accurate as possible, these figures are provisional only as coronial investigations and findings related to open cases may alter the reported drowning figures.

In this report, we refer to 'multicultural communities' in our data rather than 'culturally and linguistically diverse' or 'non-English speaking' because it is broadly inclusive, but we recognise this is not a perfect choice. The diversity of Victoria cannot be condensed into one 'multicultural group' and there is diversity within diversity which requires nuance and careful attention when it comes to drowning prevention efforts. When analysing data to determine representation of those from multicultural backgrounds, the following indicators, as per the Australian Bureau of Statistics, were used: country of birth, main language other than English spoken at home, and proficiency in spoken English (Australian Bureau of Statistics, 2022). Utilisation of this definition ensures all cultures are considered, whether Western and/or English speaking or not, who have not experienced the water safety and drowning prevention approaches in Australia. This enables more insight for prevention opportunities for people arriving in Australia. It is important to note that cultural background or country of birth information is not always captured or reported in drowning data. Accordingly, the drowning statistics are subject to change if further information becomes available once cases are closed before the coroner. Owing to these data gaps, the prevalence of this issue may be underestimated. Further, where published literature included in this report has identified particular population sub-groups, we have retained the terminology used by the original authors.

Due to relatively low numbers of drowning incidents in some sub-groups, there is potential for the figures to be skewed by a higher number of incidents in any given year. This was taken into consideration in developing this report. The rate of drowning per head of population was also considered when understanding the data for the different age groups in *people and populations*, because this accounts for any influence of population growth or decline (as a surrogate measure of exposure).

Each issue identified in the current report has been categorised into the relevant priority area from the VWSS 2021–2025 and AWSS 2030. It is important to note there may be some overlap between priority areas. Instances where priority areas overlap are highlighted where relevant in the report.

Coronial findings

The role of the coroner in Victoria is to investigate reportable deaths, which include drowning, to determine the identity of the person who died, the cause of the death and, in some situations, the circumstances surrounding the death. As part of this process the coroner may recommend ways to prevent similar deaths in the future. There were 7 coronial findings in 2025–2026 YTD where recommendations and/or comments were made relating to drowning deaths. Where included in this report, a summary of the incident and the recommendations and/or comments made by the coroner are provided. Full versions of the findings can be accessed from the Coroners Court of Victoria website.

Recommendations from published literature

Academic literature offers a wealth of knowledge for practitioners to harness when seeking to develop drowning prevention campaigns and other activities. Through the outcomes of their research, academics and practitioners can recommend evidence-based practice for effectively delivering drowning prevention and water safety messages, and education to people and populations most at risk. To ensure currency, academic research with a focus on drowning prevention and water safety, published in journals between 1 March 2025 and 28 February 2026 and where full texts were available in English, were reviewed. The recommendations from 43 articles have been summarised and reported alongside aligned data and coroner's reports, and are grouped by priority area. This is an 88 per cent increase on the number of articles included in last year's AIPA (24 articles), which may reflect increased interest in this field of research and emphasis on evidence-based drowning prevention efforts (Figure 2).

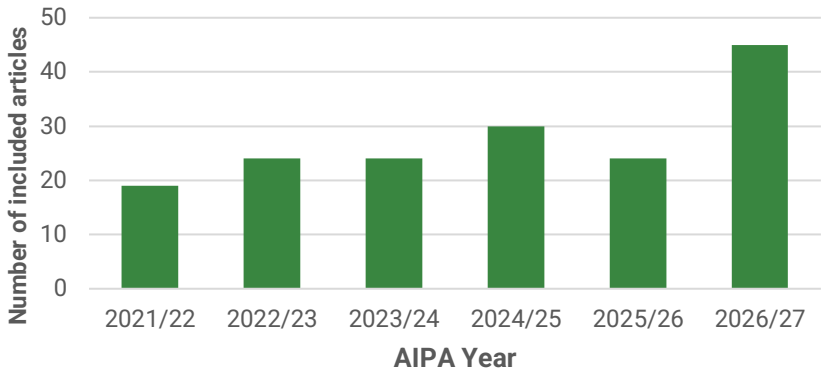


Figure 2. Year-on-year change in number of research articles included in the AIPA since 2019/20.

It is worth noting that no relevant research was found to have been published within the current YTD in relation to two priority areas, 'males aged 45-64 years' and 'males aged 25-44 years'. Accordingly, no evidence-based recommendations are offered targeting these groups, however, this should not detract from the urgency required for drowning prevention efforts.

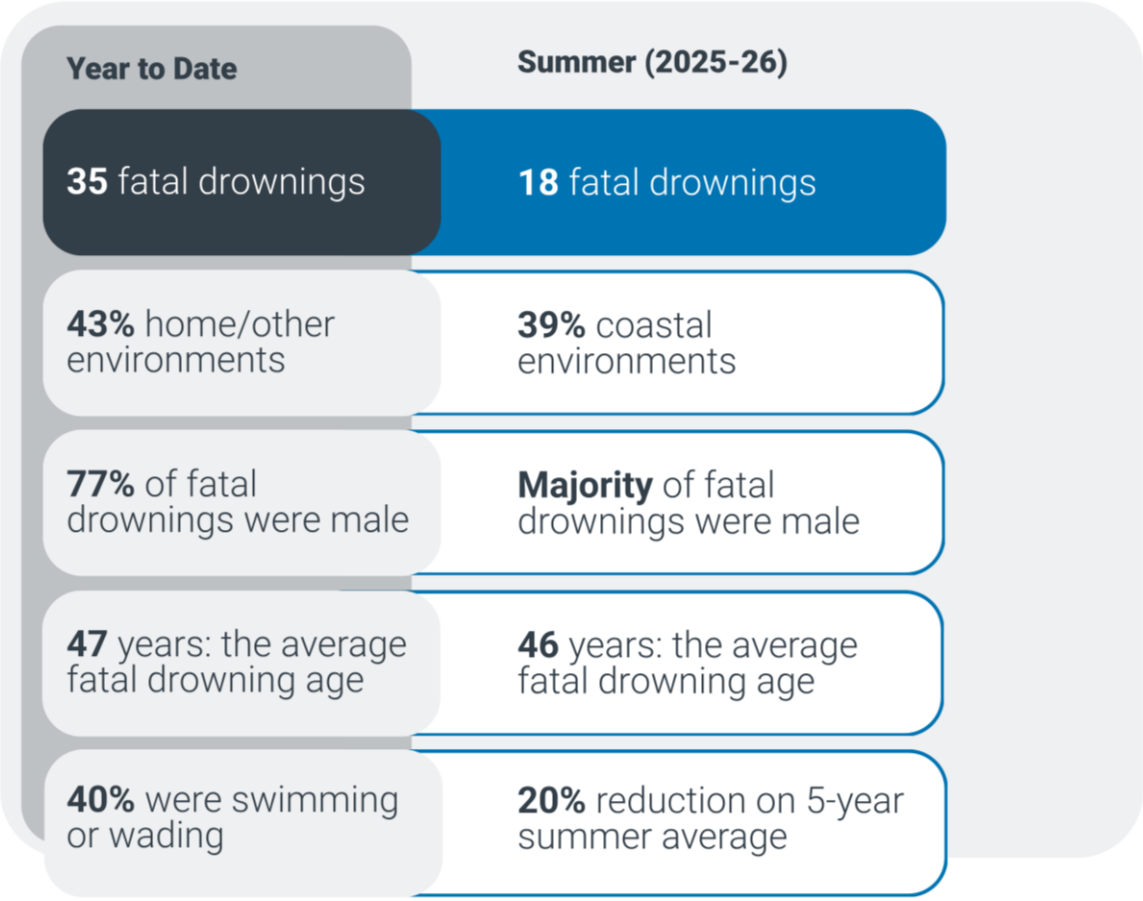
A visual summary of all research articles included in the current AIPA is presented on the following page (Figure 3).

Figure 3. Visual summary of research articles included in the AIPA.

PISBTW Agency Insights

The PISBTW Committee was founded in 1998 to address aquatic related death and injury in Victoria and brings together water safety and aquatics agencies with industry and government representatives. To gather additional insights on current water safety issues for the AIPA 2026-27, a provisional draft was disseminated to the agencies of the PISBTW Committee for their feedback. These *agency insights* have been incorporated into this report to provide additional context to the water safety issues for relevant priority areas. A list of the PISBTW Committee agencies is available here: www.vic.gov.au/water-safety.

Overview and key trends



The winter months in Victoria recorded a small number of incidents, with no fatalities during July, the first time on record. Winter drownings were predominantly in home environments resulting from bathing. With temperatures starting to warm in spring, drownings in Victoria increased with 13 recorded, the highest number in 9 years. These were primarily in home environments and inland waterways.

As Victoria entered summertime, there was a steady increase in drowning fatalities as would be expected due to increased exposure with the warmer weather; however, the summer drowning total was 14 per cent less than the decade average. This decrease was largely due to December and January recording 63 per cent and 26 per cent fewer incidents respectively than the decade average, but in February more than double the decade average numbers were recorded (9). Of note, there was also a 34 per cent reduction in rescues by Victorian lifesaving services over summer this year compared to summer 2024 – 2025 (Surf Life Saving Australia, 2026).

Drowning in inland waterways and coastal waterways from July to February declined compared to the decade average. However, incidents in home environments increased by 50 per cent, primarily occurring in private pools, spa pools and bathtubs.

Progress against water safety strategies

The following table measures Victoria's progress in reducing fatal drowning against national and state priority areas by comparing the most recent 3-year period to the baseline years of the VWSS (2004–05 to 2006–07).

Table 1. Progress against national and state drowning prevention priority areas.

Priority areas		VWSS baseline (2004 – 05 to 2006 – 07)	Follow-up (2023 – 24 to 2025 – 26 YTD)	Difference from baseline to follow-up
PEOPLE & POPULATIONS		Rate (per 100,000 population)	Rate (per 100,000 population)	(Target: -50%) %
1. Reduce drowning in children aged 0 – 14 years	0 - 4 years	1.16	0.52	▼ 55%
	5 - 14 years	0.62	0.36	▼ 41%
2. Reduce drowning in young people aged 15 – 24 years		0.71	0.76	▲ 7%
3. Reduce drowning in males aged 25 – 64 years	25 - 44 years	1.49	1.04	▼ 30%
	45 - 64 years	1.10	1.11	▲ 1%
4. Reduce drowning in people aged 65+ years		1.18	0.93	▼ 22%
5. Reduce drowning in high-risk populations[1]		0.70	0.72	▲ 3%
PLACES		Frequency	Frequency	%
6. Reduce drowning in inland waterways		16.0	13.67	▼ 15%
7. Reduce drowning in coastal waterways		13.67	18.67	▲ 37%
8. Reduce drowning by strengthening the aquatic industry[2]		0	0.67	▼ 0%
ACTIVITIES & RISK FACTORS		Frequency	Frequency	%
9. Reduce alcohol and drug-related drowning[3]		15.0	5.0	▼ 67%
10. Reduce boating, watercraft and recreational activity-related drowning[4]		8.0	9.67	▲ 21%
11. Reduce the impact of disaster and extreme weather on drowning		0.67	0.67	▲ 0%

PROGRESS RATING LEGEND: On track (ensure continued work) | Work needed | Urgent priority

1. Includes Aboriginal and Torres Strait Islander peoples, people from multicultural backgrounds, international tourists and students. Statistics are primarily determined from country of birth data. Follow-up average from most recent 3-year period where country of birth known: 2022 – 23 to 2024 – 25.
2. Figures include drowning deaths at public swimming pools.
3. Toxicology reports to confirm alcohol and/or drug involvement are available only in closed cases, therefore numbers may change once cases are closed. The number of open cases in recent years with unknown toxicology results is approximately 82%.
4. Includes boating, watercraft, fishing, rock fishing and diving/snorkelling.

Fatal drowning forecast for 2026–27

Forecasting was undertaken using a trend-based scenario approach. Current YTD drowning counts were compared with 10-year historical monthly averages for the same period to determine whether the current year is tracking above or below long-term expectations. This relative difference was then applied to historical monthly averages for the remaining months of the year to estimate likely patterns, while preserving established seasonal variation. Forecast outputs are intended to identify potential pressure points for prevention activity rather than to predict exact drowning numbers. Given the low frequency and variability of drowning events, forecasts are sensitive to short-term fluctuations and should be interpreted with caution.

Current estimations predict **approximately 46 fatal incidents** for the 2025–26 financial year. Figure 4 illustrates the monthly breakdown of fatal drowning incidents for the current financial year in green (where there have been five or more incidents that month). The forecasted number of fatal drowning incidents for March to June 2026 are shown as a dotted line. The figure also provides a comparison to the 5- and 10-year averages for each month.

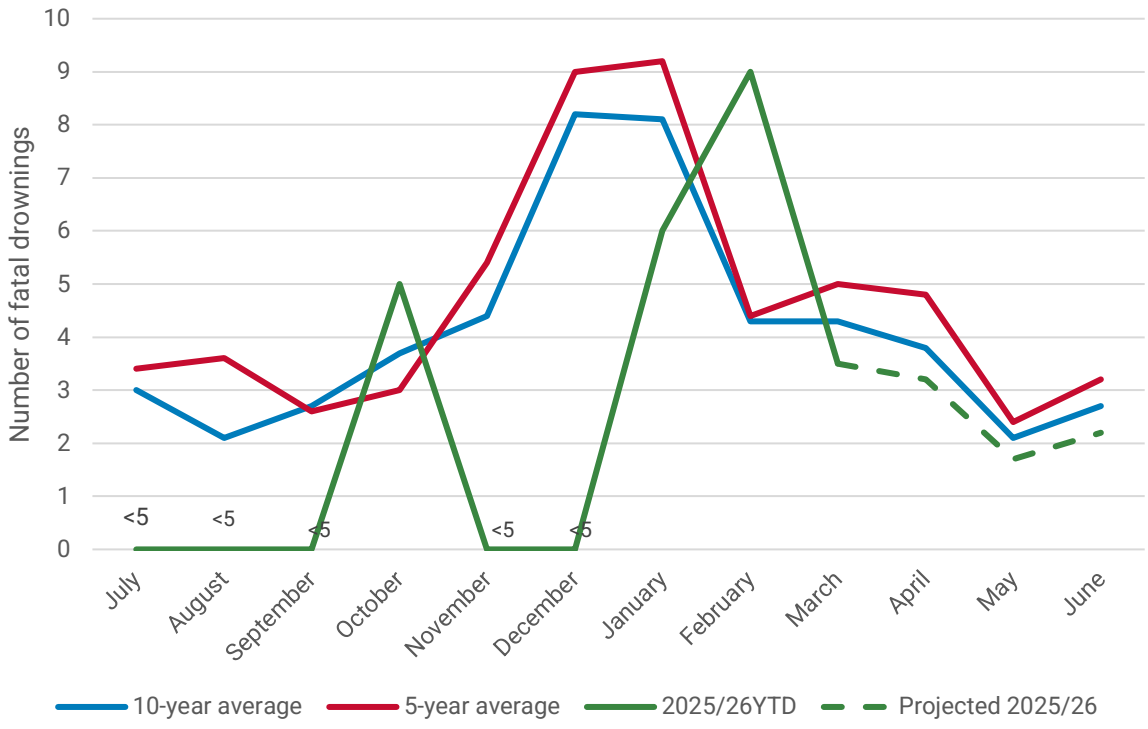
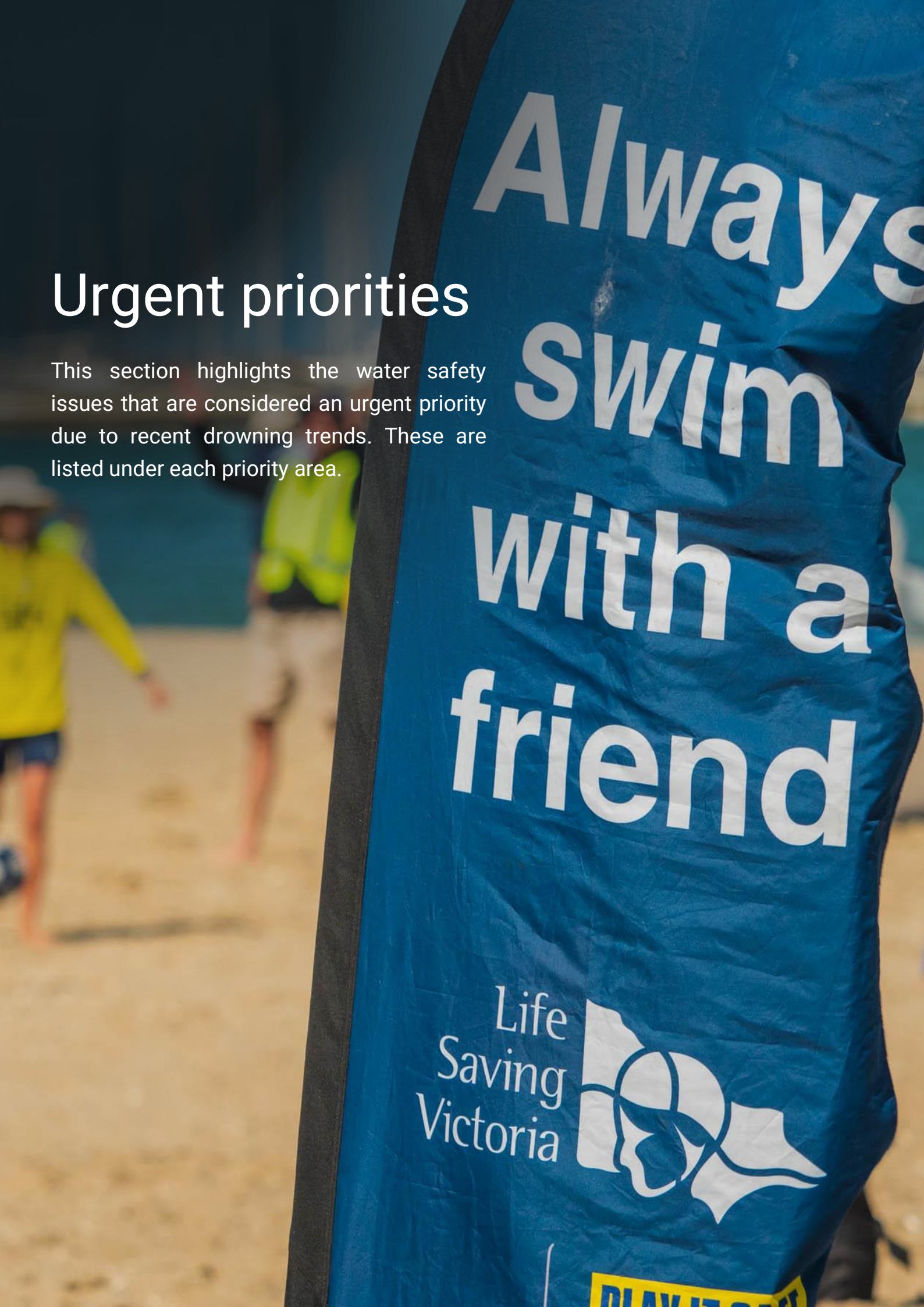


Figure 4. Fatal drowning in Victoria by month: 2025/26 year-to-date and projection compared to 5- and 10-year average.

Urgent priorities

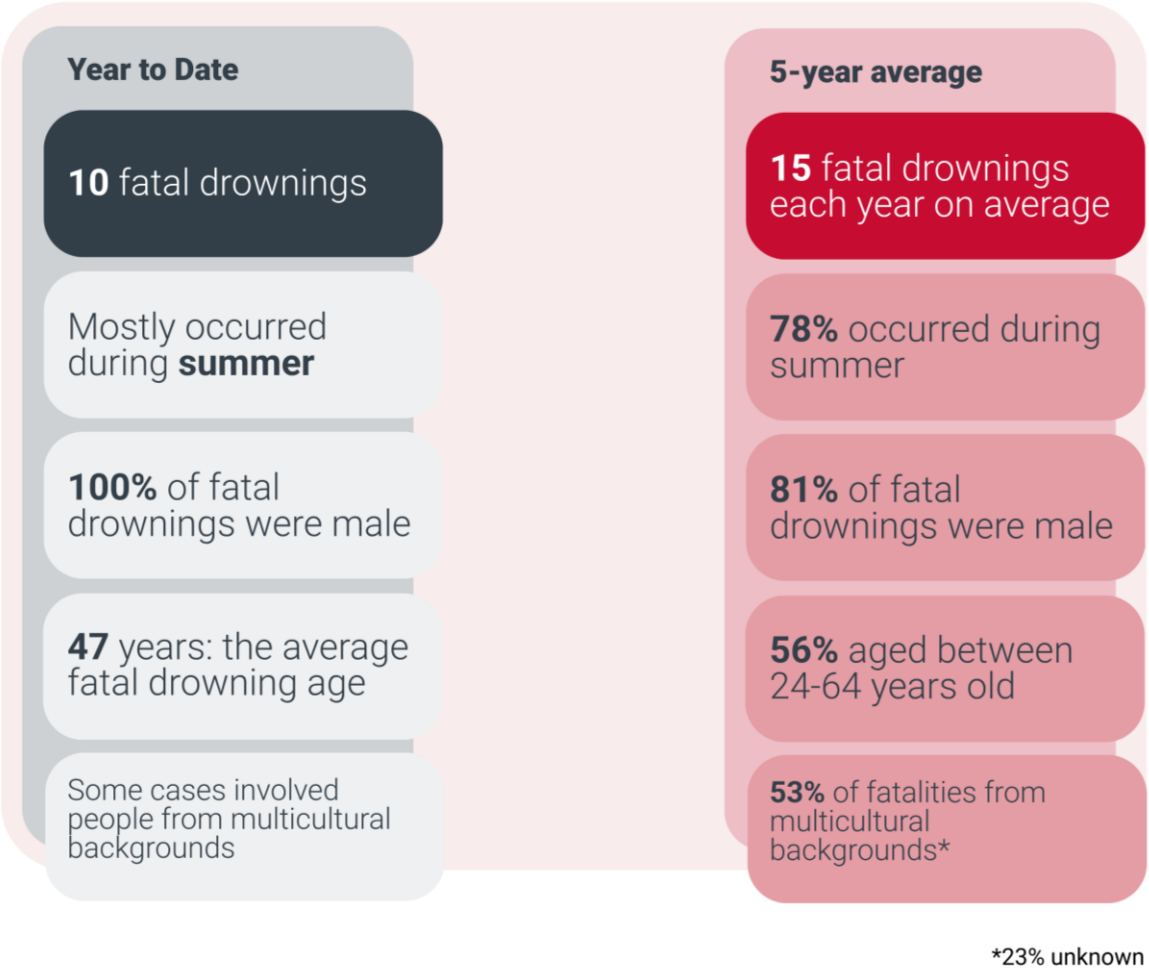
This section highlights the water safety issues that are considered an urgent priority due to recent drowning trends. These are listed under each priority area.



Coastal waterways

Urgent priority

Reduce drowning in coastal waterways



*23% unknown

Key trends

Swimming, fishing (including from a boat and snorkelling), craft riding, and attempting a rescue were common activities preceding drowning in the YTD. Similarly, on average over the past five years, 45 per cent of incidents involved swimming, paddling or wading, and 12 per cent involved fishing. Over the past five years, one quarter (25 per cent) of incidents occurred in the Latrobe-Gippsland region, and 59 per cent of incidents involved metropolitan residents.

Research

Rip current-related research

Kelly et al. (2025) undertook an epidemiological analysis of rip current-related drowning deaths in Australia using fatal coastal drowning data from 1 July 2004 – 30 June 2023 and exposure estimates from SLSA's National Coastal Safety Survey. Overall, 407 rip current drowning deaths were recorded in the study's 19-year timeframe. Incidence did not change over the study period; however, there was a statistically significant decrease in male rip current drowning deaths of two per cent every two years. Males accounted for 85 per cent of deaths and were nearly six times more likely to drown in a rip current than females when accounting for exposure. Incidents were most common among 16–34-year-olds, occurred while other people were present, and took place on weekends, commonly in the summertime. Over half of cases occurred in regional/remote areas and these residents were three times more likely to drown in rip currents than metropolitan residents. In more than half of cases, the incident occurred more than one kilometre from a surf lifesaving service. Estimates suggested that for every one fatality, 11,977 people were caught in a rip current: 2,449 were rescued by someone else (705 by surfers, 762 by lifesaver/lifeguard) and 8,171 rescued themselves (remainder rescued by other/cannot say). The authors noted the likely positive impact that education efforts have had on male rip current drowning rates. However, continued prevention and rescue efforts are needed, especially at unpatrolled sites. This could include education on rip current hazards and research on bystander rescue scenarios (including evaluating public rescue equipment and alert systems), as well as improving community swimming, rescue and cardiopulmonary resuscitation (CPR) skills, facilitating recreation in open water sites, and supporting surfer rescue training.

Acknowledging that rip currents are one of the leading causes of coastal drownings worldwide, López-García et al. (2025) examined whether a brief, 60-minute training program could improve university students' knowledge in this area. Students in Spain with no prior formal training in aquatic safety (n = 93) completed surveys before training, one week and eight weeks later. The training session was taught by lifeguard instructors and covered drowning prevention, rip current characteristics, beach hazard recognition, and appropriate emergency responses. Before the intervention, students demonstrated a limited understanding of rip currents, with only 34 per cent able to correctly identify safe swimming zones, and fewer than one third could accurately identify a rip current in images. Following the training, there were statistically significant improvements across all knowledge domains, including a 50 per cent improvement in identifying safe swimming zones. Similarly, visual identification skills, appropriate response strategies (e.g., staying calm, floating, and swimming parallel to shore) and being able to correctly define rip currents all showed improvements after training, and retention was maintained after eight weeks. These results demonstrate that even short educational interventions can meaningfully enhance water safety knowledge among students. However, as static images were used for education and

assessments rather than videos or real-life simulations, future research using dynamic visual tools and/or virtual reality could strengthen knowledge transfer and long-term safety outcomes.

International visitor safety on the coast

Using 15 years of coronial data (2005–2019), Koon et al. (2025) conducted a retrospective analysis of coastal fatalities in Australia, focussed on internation visitors, to assess changes over time. International visitors accounted for 13 per cent of all unintentional coastal fatalities over the study period, averaging 22–23 deaths annually, with drowning being the leading cause of death. However, unlike residents, visitors were far more likely to die while snorkelling, in offshore or remote locations, and during organised activities, particularly in Queensland. This reflects risk factors such as environmental unfamiliarity, variable swimming ability, and limited awareness of Australian safety norms among this cohort. Despite rising international arrivals over the study period, visitor fatality rates declined by nearly 6 per cent per year, suggesting that interventions such as multilingual safety resources, improved dive and snorkelling guidelines, in-flight and airport messaging, and lifeguard-led outreach have contributed to risk reduction. Persistent challenges for injury prevention were identified, including remote and unpatrolled beaches being promoted as pristine attractions for tourists; snorkelling deaths being disproportionately high, and inconsistent safety practices among tourism operators. This reinforces the need for coastal safety to be embedded within tourism strategy, including coordinated efforts across government, industry, and water-safety organisations, to ensure international visitors can enjoy the coast safely.

Visitor education on the beach

The 'Safe Beaches' education project, implemented along the Lazio coast in Italy during summer 2023, aimed to promote health and safety among beachgoers through an onsite, multidisciplinary health promotion program (D'Angelo et al., 2025). The project was grounded in the Health Belief Model, which emphasises perceived risk, severity, benefits, and barriers as drivers of behaviour change. Between June and September 2023, the program operated across 48 bathing facilities on the coastline, providing brief, interactive educational sessions tailored to visitors' expressed interests. Topics included sun safety, beach hazards, first aid and emergency response education, with hands-on components such as CPR training and drowning simulations to increase engagement and self-efficacy. Overall satisfaction was extremely high among participants (n = 1032), with 88 per cent indicating they learnt something useful or practical from the session. Overall, the project demonstrated the feasibility and value of delivering health education directly within recreational environments. Suggestions for improvement included broader promotion, more time for simulations, year-round initiatives, and increased cultural and linguistic accessibility.

Survival skills UK public health campaign

The 'Float to Live' public health campaign by the Royal National Lifeboat Institution (RNLI) in the UK is a widely adopted drowning-prevention strategy grounded in decades of physiological research on cold-water immersion. A special feature article by Tipton et al. (2025) detailed the development of the Float to Live campaign, which encourages people to remain still and float calmly to minimise the cold shock response and dramatically improve survival rates. The campaign targeted high-risk groups, particularly young men, and used cinema ads, social media, community outreach and collaborations with researchers to refine messaging. Public recall and adoption grew rapidly, with real-world survivor reports directly crediting the message for saving lives. The campaign expanded between 2017 and 2025, integrating new evidence, testing communication with diverse audiences, gathering survivor stories and partnering with organisations such as the Gaelic Athletic Association. It has since become a national standard incorporated into Coastguard emergency scripts and is scheduled for inclusion in the UK education curriculum from 2026. Overall, 'Float to Live' demonstrates how sustained collaboration between scientists, public health agencies, and emergency services can transform experimental research into an effective, life-saving public health intervention.

Perspectives of surf lifesavers on emerging risks and issues

Surf lifesavers are uniquely placed to understand coastal safety risks and opportunities for education and risk mitigation among beachgoers. An anonymous online survey of 898 SLSA members (77 per cent male, 23 per cent female; NSW members: 44 per cent, QLD: 22 per cent, Victoria: 13 per cent) by Lawes et al. (2025) sought to understand the perceptions of members on current and emerging coastal issues in their area, with 'swimming outside the patrol flags' found to be the highest ranked issue for most states. Lack of swimming ability, rip currents, increased coastal visitation and extreme weather were other issues rated highly by respondents, and 61 per cent reported that the coastal issues in their area were changing. Some of the emerging issues reported by respondents included increased coastal visitation, particularly by multicultural communities; low/poor understanding of beach conditions and lack of flag awareness, as well as coastal erosion. In response to how often they receive coastal safety questions from the public, 36 per cent of lifesaving members reported at least daily, while 56 per cent reported at least weekly. Accordingly, members overwhelmingly felt that public education was the most important area to address future coastal safety concerns (84 per cent of respondents), alongside changes to signage (59 per cent), safety campaigns (53 per cent), and training (53 per cent). These results highlight key emerging issues for paid and volunteer lifesavers/lifeguards across Australia, emphasising the need for ongoing member training, alongside concerted public education efforts to encourage behaviour change and improve coastal safety.

Lifeguard surveillance and performance

The speed and perceptual skill of lifeguards are critical components of drowning prevention; however, the visual behaviour and surveillance skills of lifeguards are not well understood. An

experimental study in Belgium recruited certified beach lifeguards (n = 24) to watch short video clips of calm and busy days at the beach and compared their visual behaviour to that of non-lifeguards through eye-tracking technology (Vansteenkiste et al., 2025). It was found that lifeguards and non-lifeguards did not differ in their average number of reactions or average fixation duration. However, lifeguards on average directed their gaze deeper into the sea and appeared to react more often to the beachgoers depicted in the videos who were swimming further away from the shore. This may reflect a level of experiential knowledge, as lifeguards appeared to be less distracted by stimuli on the beach and focused on scanning the whole swimming zone compared to non-lifeguards. However, the study did not assess ability to detect potential environmental hazards, e.g., rip currents, and the video did not include any depictions of actual drowning events which would have required lifeguards to intervene. As this was a lab-based study, it is also possible that both groups of participants adopted a more vigilant approach than they otherwise would have in a real-life situation. This study adopted a novel method to assess lifeguard visual surveillance behaviour and has potential as a training method for novice lifeguards to improve their surveillance under simulated conditions.

A similar study examined six years of unannounced in-situ simulations (ISS) conducted across Denmark's nationwide surf lifeguard service to evaluate real-time performance in recognising and responding to aquatic emergencies (Rasmussen et al., 2025). ISS involves lifeguard instructors covertly simulating drowning scenarios in the lifeguards' actual work environment, enabling highly realistic assessment of surveillance, rescue skills, teamwork and overall operational readiness. Across 768 simulations conducted between 2018 and 2023 (most commonly involving a simulated unconscious patient) one in five assessments were rated non-satisfactory, revealing significant variability in lifeguard performance. Several factors were strongly associated with poor performance, including slow response time and being distracted by beach setup activities, breaks or administrative tasks. Deficiencies in rescue execution, including board and boat rescues, delayed alarm calls, and errors in defibrillation, were also significant contributors. Non-technical skills such as teamwork, situational awareness, communication and decision making were frequently flagged, underscoring their central role in lifeguard readiness. The study highlights the unique value and feasibility of unannounced real environment simulations, which provide insights beyond those gained in classroom or off-site training and allow lifeguard services to detect gaps in vigilance, fatigue management and rescue techniques. The authors conclude that strengthening surveillance practices, refining rescue skills and prioritising development of non-technical skills should be core components of future lifeguard training.

Meanwhile, CPR is a critical determinant of survival in cases of cardiorespiratory arrest; however, the quality of CPR can be compromised by rescuer fatigue. In an experimental study by Ruibal-Lista et al. (2025), trained lifeguards (n = 20) completed a baseline CPR test, followed on the next day by two simulated beach rescues of 100- and 200 metres. Each rescue involved entering the surf, swimming to a mannequin victim, performing a tow back to shore, and immediately initiating CPR for two minutes. The results showed that both rescue distances caused a substantial decline in CPR quality compared with CPR performed at rest,

including significant decreases in the proportion of correct chest compressions, compression rate accuracy, and ventilation quality after both rescue trials. Physiological measures reflected high rescuer exertion, with heart rates exceeding 95 per cent of predicted maximum and elevated ratings of perceived effort. Despite the longer duration and greater physical demand of the 200-metre rescue, CPR performance after the 100- and 200- metre rescues did not differ significantly. This suggests that the intense exertion required for any real-world rescue, regardless of distance, has the potential to impact subsequent CPR quality; though, the sample size was small and similar research in this field has been limited. The authors encourage training programs for lifesavers that incorporate endurance conditioning, technique work under fatigue, and realistic rescue simulations to help lifeguards maintain high-quality resuscitation even under high physical stress.

Coronial Findings

Ying Sun (53 years old)

Ying Sun and her spouse visited their son, who was studying in Australia, in September 2024 from Taiwan. On a trip to Rosebud, the family visited Cape Schanck and decided to walk along the rocks near Black Rock Beach. When they turned to return to the carpark, a large wave hit the family from behind and all three individuals were knocked off their feet. A second wave subsequently caused Ying to be dragged into the water off the rocks, while her spouse and son were able to get to their feet. Sadly, Ying quickly drifted out to sea and her body was recovered a short time later by police helicopter. The coroner acknowledged the existence of safety signage at Cape Schank, though noted that despite the unstable cliff edges and variable water conditions, it remains a popular location for beachgoers, walkers and climbers. The coroner made the following recommendations:

(i) That Parks Victoria consider the installation of additional signage at the end of the boardwalk towards Black Rock Beach. This additional signage should remind visitors and warn them of the hazards present in the area and the need for caution around the water and rocks.
(ii) That Parks Victoria consider updating all hazard warning signage in the area with QR codes to link to information on the Parks Victoria website that is available in multiple languages to ensure international visitors have access to relevant information in their own languages.

Cienna Jervies (12 years old)

Cienna and her family lived at Clifton Springs and enjoyed spending time at the beach and their backyard pool. On 19 September 2023, Cienna visited Ocean Grove Beach with her mother, grandmother, younger brother and a friend. The area of Ocean Grove Beach which they visited was signposted as having strong currents, submerged objects and slippery rocks, and was not patrolled at the time of the family's visit. Cienna and her friend were swimming

by the water's edge at approximately 6pm when they got into trouble and could no longer be seen by the supervising adults from the shore. Two bystanders attempted to rescue the girls, however, due to the challenging conditions only Cienna's friend was able to be rescued. Approximately 40 minutes later, Cienna's body was located by police helicopter, and she was sadly unable to be revived. The coroner remarked that inadequate safety signage was not a contributing factor to Cienna's death, as the family were local residents and were likely aware of the risks of swimming at that beach. However, an assessment of the existing signage by LSV undertaken as part of the coroner's investigation found that the signage was in poor condition, inconsistent in the provision of emergency markers and council by-law elements and was sparsely located near the entry paths to the beach. The coroner sought to understand the feasibility of the Victorian Government providing land managers with water safety guidance in the form of a practice note, similar to that currently in operation in New South Wales, as this would provide clarity on risk mitigation and promote coordinated and collaborative drowning prevention efforts. The coroner made the following recommendation:

(i) That Emergency Management Victoria consider developing a resource similar to NSW's *Practice Note 15: Water Safety* under the Victorian Statement Emergency Plan with a view to clarifying, coordinating and strengthening the water safety functions and responsibilities of Victorian water safety duty holders.

Remy Da Silva (20 years old)

Remy was fit and healthy and was known to be a strong and experienced swimmer. Remy's family had a beach house in Rye and spent every summer and many long weekends there during the year, with Gunnamatta Beach being their usual beach of choice. On 6 January, 2023, Remy and his family visited Gunnamatta Beach in the late afternoon, at a time when the lifesavers were packing up for the day and the wind was extremely strong. Remy and his younger brother entered the water, with their father noting that the surf was rough and a current was slowly pulling them towards the east. About half an hour later, Remy and his brother were caught in a rip and both began to struggle and wave for help. Remy was about 20 metres further out than his brother and was unable to consistently hold his head above water. Their father was able to reach Remy's brother and, together with a passerby, assisted him safely to shore. Another passerby was able to reach Remy, who was by this stage unresponsive, and they struggled to maintain a hold on Remy in the rough conditions. The passerby assisted Remy's father to keep his head above water until Gunnamatta lifesavers reached them with a rescue board. A rescue operation was commenced to locate Remy, however, due to the poor conditions, lifesavers were unable to recover his body. Despite further searches in the following days, Remy's body was unfortunately unable to be recovered.

Based on expert evidence, the coroner's investigation found that Remy and his brother were likely swimming in a trough between breaking zones, which would appear to be a calm, 'lagoon-like' area, ideal for swimming, but which, at the time of the family's visit, would have been rapidly filling with water as the tide came in. This likely pushed the brothers along the

beach towards a rip current, dragging them both out to sea. The coroner noted that Gunnamatta Beach is one of the most dangerous beaches in Victoria, characterised by violent rip currents, particularly at low tide, and that such hazards could be more clearly communicated to beachgoers through methods like interactive signage or the Beachsafe app/website. As such, the coroner made the following recommendations:

1. Life Saving Victoria conduct a site-specific risk assessment at Gunnamatta Beach to explore the most effective drowning mitigation strategies for that particular location.
2. Life Saving Victoria, Parks Victoria, and Surf Living Australia continue to promote the Beachsafe app and website, including by installing infrastructure to support QR code access to information on site at Victorian beaches.
3. Parks Victoria explore the feasibility of interactive signage with up-to-date safety information at Gunnamatta and other high risk Victorian beaches.

Water safety issues: drowning in coastal waterways

Lack of awareness of open water hazards (e.g. strong and unpredictable currents).
Lack of understanding or preparedness for open waterway conditions and dangers, particularly rip currents or strong currents.
Lack of preparedness/experience before participating in aquatic activities.
Supervising others while not having adequate water safety skills or knowledge themselves.
Alcohol and/or drug use prior to recreating in, on and around water.
Not reading or heeding aquatic safety signs and advice.
Resources for understanding hazards at beaches not well known (e.g. Beachsafe app) or are predominantly in English, resulting in water safety messaging which has limited reach to key high-risk groups and communities.
Lack of opportunities to learn swimming and water safety (in particular, high-risk populations).
Peer pressure and risk-taking behaviours.
Lack of lifejacket wear or incorrect lifejacket use for the conditions/activity.

PISBTW agency insights on key issues for drowning in coastal waterways:

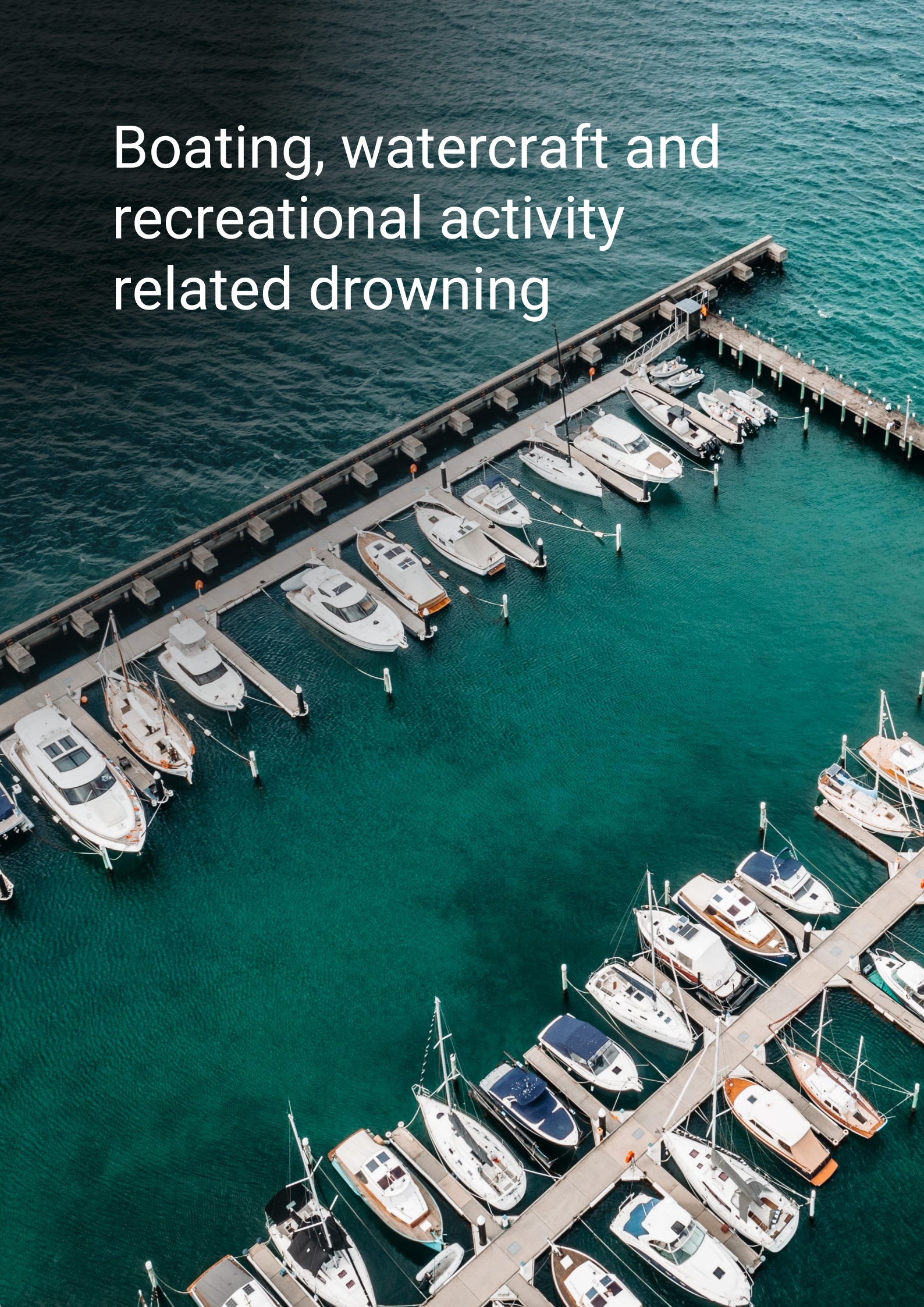
- Lack of understanding of ocean conditions, in particular offshore winds, swell directions and size.
- Overconfidence in coastal waterway experience.
- Lack of clear and concise point-of-entry safety messaging at waterways.
- Gaps in community-level education and training on safe bystander rescue techniques.

Recommendations: Reduce drowning in coastal waterways

Action	Recommendations
Advocacy	• Promote alternative patrol models to account for the high rate of fatal drownings occurring at unpatrolled beaches or outside patrol times, and warmer weather extending beyond summer months. • Advocate for recognition of surfers and bystanders as essential first responders, supporting funding for community rescue training programs. • Strengthen screening processes for snorkelling and diving participants, including medical fitness assessments. • Ensure tourism operators comply with existing snorkelling and diving codes of practice and provide appropriate on-site, activity-specific briefings on environmental risks, equipment use and emergency procedures. • Strengthen partnerships between health authorities, local government, lifeguard services and community organisations to sustain long-term beach safety initiatives. • Implement operational policies to reduce on-shift distractions (e.g., administrative tasks, setup/pack-down) and ensure consistent, correct supervision configurations for coastal swimming locations.
Campaigns and programs	• Use novel communication channels (e.g., smart devices, geo-targeting) to deliver rip-hazard warnings, especially at unpatrolled beaches. • Expand installation and evaluation of public rescue equipment, such as rescue tubes and angel rings, especially in remote and high-risk locations. • Continue leadership, diversity and capability-building programs for volunteer lifesavers to improve capacity, cohesion and confidence when interacting with diverse beachgoers. • Continue novel methods of disseminating proactive water safety messaging to international visitors, e.g., accommodation providers and tourism media. • Promote real-world accounts of survival where floating and other survival skills saved lives, to strengthen public engagement and message retention.
Education and training	• Promote public training and education in non-contact rescue techniques, CPR and safe rescue decision-making to promote bystander rescue safety. • Expand training in teamwork, communication, situational awareness and decision making for lifesavers, lifeguards and other aquatic supervisors. • Integrate opportunities for CPR training immediately after high-intensity exertion to build endurance in rescue personnel and improve CPR quality under fatigue. • Improve public understanding of major risks identified by lifesavers (e.g., rip currents, low surf knowledge, swimming outside the flags) using

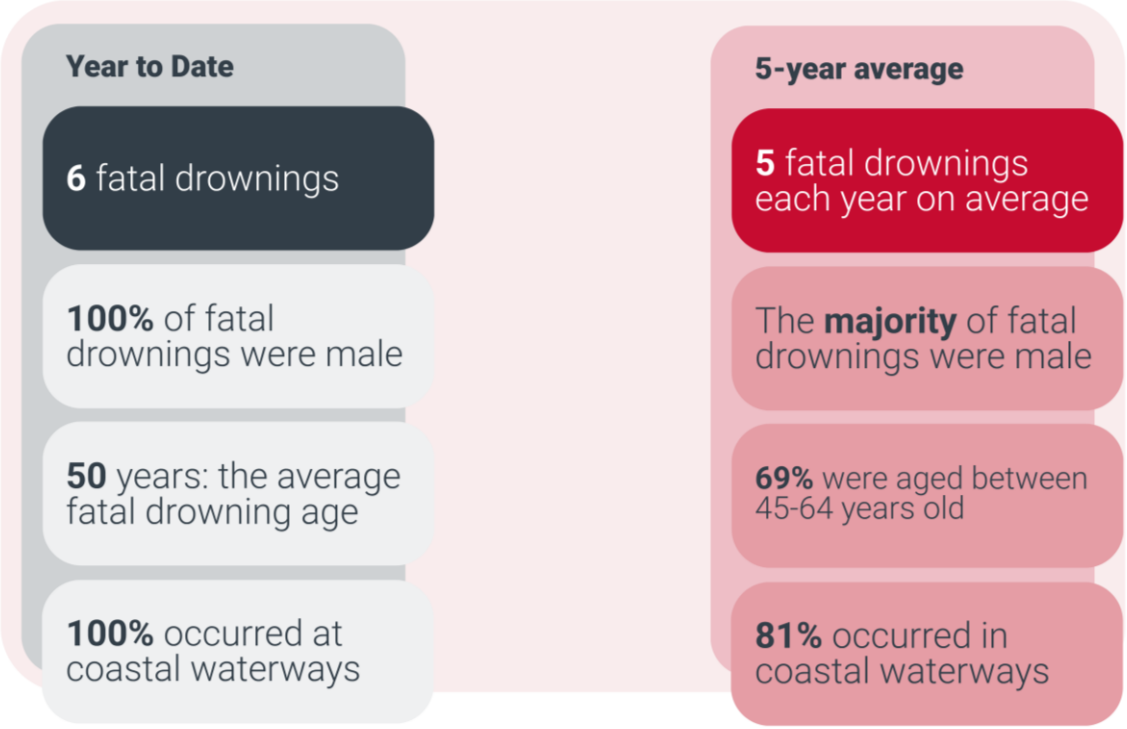
Action	Recommendations
	behaviour-change–focused approaches that align with 'normative learning' recommendations. • Utilise immersive or realistic media for rip current and coastal hazard recognition in public education. • Include practical, cognitive, and emotional skills as part of rip current education, such as staying calm and making safe decisions.
Research	• Apply geospatial modelling to identify high-risk, high-visitation locations where expanded lifesaving services or public rescue equipment would have the greatest impact. • Evaluate the feasibility of additional lifesaver/lifeguard coastal supervision strategies, including roving patrols, community water safety ambassadors, and temporary patrol posts in hotspots. • Investigate methods to address confusion or misinterpretation of safety signage and/or the red and yellow flags, especially for inexperienced or multilingual beachgoers.

Boating, watercraft and recreational activity related drowning



Urgent priority

Reduce boating, watercraft and recreational activity related drowning



Research

Analysis of 50 years of Australian scuba diving fatalities

Lippmann (2025) analysed 430 Australian scuba diving fatalities from 1972–1999 and 2000–2021 to understand long-term trends in diver characteristics, incident factors and causes of death. While total annual fatalities remained relatively stable across the two periods (8.4 vs. 8.8 deaths per year), major demographic shifts were observed. Decedents became substantially older, with the median age increasing from 33 to 47 years, while the proportion aged 45+ years old more than doubled. The proportion of female divers who died also increased, which may reflect broader participation in diving over this time. The most notable shift was in contributing health factors, as cardiac-related predisposing conditions more than doubled (from 12 per cent to 26 per cent of cases). This may reflect an older and more obese diver cohort, as 43 per cent of decedents were classified as obese (of those where Body Mass Index was reported). In contrast, inexperience and equipment-related issues were less common than in earlier decades, and there was a decline in uncertified divers and out-of-gas incidents. Buddy practices also improved, with more divers remaining with a buddy at the time of the incident. These findings highlight the influence of ageing divers and changing health

profiles on diving mortality, reinforcing the need for improved health screening, diver fitness education, careful dive planning, and reminders of emergency buoyancy and buddy procedures as crucial strategies to reduce future fatalities.

Analysis of drowning deaths related to hot spring bathing

Hot spring bathing is a popular practice in Japan for its purported wellness benefits; however, it can also pose unique risks. A retrospective cohort study of 125 patients over 12 years who experienced bathing-related adverse events and were transported to hospital was conducted by Yokoyama et al. (2025) to understand factors associated with these events. These patients were mostly male, with an average age of 76 years, and the majority of adverse events occurred during bathing (74 per cent) or after bathing (24 per cent). Hot spring bathing was significantly associated with drowning events (fatal or non-fatal) compared to other types of bathing and was commonly related to adverse respiratory events and impaired consciousness. The latter may be related to heat stroke or heat shock associated with increased body temperature from extended periods in hot baths. The authors also noted that respiratory impairment may occur from aspiration of hot spring water, which can be acidic and may have contributed to drowning. Other adverse events (e.g., cardiovascular, burns, heat-related, and central nervous system disturbances) were not significantly related to hot spring bathing. While this was a small study of patients at one emergency medical centre in Japan, it demonstrates the need for caution and risk mitigation, particularly among older males and those with pre-existing health conditions.

Coronial findings

Andrew Mallett (41 years old)

A resident of Queensland, Andrew Mallett was visiting Lorne in Victoria on a solo driving holiday in November 2024 when he decided to visit Artillery Rock. While popular for rock fishing and spearfishing, Artillery Rock is also hazardous due to unexpected large waves, submerged and slippery rocks and the lack of lifesaving services. Other fishers in the area recalled Andrew saying he might go spearfishing off the rocks, but a short time later saw him struggling in the water and calling for help. A passerby threw a nearby buoy, which had an attached rope, to Andrew which fell short and Andrew was not seen above the water again. Despite extensive searches by rescue divers, airwing and the SES, Andrew was sadly not located and is presumed deceased having likely drowned. The coroner did not make any recommendations in this case, noting that ‘the death was the result of misadventure being that Andrew misjudged the area and [entered] the water to spearfish when the conditions were not safe to do so’.

Chieu Kheang Chua (40 years old)

Born in Cambodia, Cheiu had lived in Australia for 12 years at the time of his passing, and lived with his wife and two children. Cheiu enjoyed crab fishing with his friends on the weekends, and on Saturday 13 April, 2024, he organised to go to Point Roadknight with three friends. The group arrived sometime after 8pm and put on head torches before making their way from the carpark to the rock shelf on the point, which can be fully exposed at low tide but fully covered at high tide. At the time of the Cheiu's arrival to Point Roadknight, there was an incoming tide with large swell. The men separated into pairs to look for crabs and were not wearing or carrying any personal floatation devices (PFDs). A short time later, Chieu's friend was knocked over by a large wave and, when he regained his footing, was unable to locate Chieu. The group then located Chieu face down in the water approximately three metres from the rock edge and one member of the group jumped into the water to retrieve him. Cheiu was unconscious and not breathing when his friend called Triple Zero and started CPR as instructed by the operator. Paramedics soon arrived to take over CPR but sadly, Cheiu was unable to be revived. In their findings, the coroner referred to the Victorian Fisheries Authority PFD mandate for rock fishing at ten designated high-risk locations in Victoria, and also emphasised the importance of checking the weather, tides, swell, marine and wind warnings prior to visiting rock platforms. The coroner made the following recommendations:

1. I recommend that the Victorian Fisheries Authority publicly release the evaluation of the trial of mandatory lifejacket use at the 10 high-risk zones identified along the Victorian coastline to complement the drowning data available.
2. I recommend that the Victorian Fisheries Authority and Minister for Outdoor Recreation update the legislative requirement to wear lifejackets to extend to all coastal rock platforms across the state of Victoria.
3. I recommend that the Minister for Outdoor Recreation consider the mandatory wearing of lifejackets or use of other safety equipment for all users of rocky platforms along Victoria's coastline, including for those walking on rocks.
4. I recommend that the Victorian Fisheries Authority consult with Life Saving Victoria regarding incorporating the legislative requirement to wear lifejackets into current compliant static water safety signage at these zones, to avoid the over-saturation of signage and to avoid the risk of temporary signage being damaged or removed.
5. I recommend that the Minister for Outdoor Education or other appropriate entity explore how real-time hazardous surf and weather conditions could be communicated to those attending high-risk locations, for example through push notification via the VicEmergency App, BeachSafe App or Bureau of Meteorology website.

Shuyang Wang (24 years old)

Shuyang Wang grew up in China and moved to Australia on a student visa in 2018. He was not a competent swimmer and did not have any experience with water sports or activities. In late December 2023, Shuyang and his friends visited Rosebud Beach and had a BBQ. Shuyang and his friend played in calm, knee-deep water before deciding to venture out to sea on an inflatable two-person kayak. Witnesses reported that the kayak did not appear to be fully

inflated, and Shuyang was not wearing a PFD. Shuyang and his friend reached the end of Rosebud pier where the friend alighted from the kayak and climbed a ladder to the pier. Subsequently, the kayak began to drift away due to the wind. Shuyang's friend returned to the water to try and reach the kayak but it was pushed further out to sea by intensifying wind. Unable to reach the kayak, Shuyang's friend returned to the beach and witnesses contacted emergency services as Shuyang continued to drift out to sea on the kayak. A short time later, a police helicopter identified Shuyang in the kayak approximately 400 metres from the shore, where Shuyang was ineffectively attempting to paddle. As the police were determining the most appropriate rescue method, Shuyang entered the water and began to struggle. The helicopter pilot lost sight of Shuyang and a search operation was commenced. Sadly, Shuyang's body was located approximately two hours later by the search and rescue squad. The coroner found that the predominant factors contributing to Shuyang's death were his decision to use the kayak without an approved PFD, indicating a lack of understanding of appropriate safety measures while using watercraft; and that the kayak was improperly inflated and therefore unstable. The coroner made the following recommendations:

1. I recommend that the Victorian Water Safety Coordination Forum with the support of Emergency Management Victoria and Life Saving Victoria, develop a suitable instrument, subplan or equivalent framework that clearly articulates roles, responsibilities, arrangements and accountability for risk assessment, prevention, operational preparedness and incident control in relation to drowning prevention.
2. I recommend that the Victorian Water Safety Coordination Forum prioritise data-sharing to fully understand the burden of non-fatal drowning among culturally and linguistically diverse (CALD) communities.
3. I recommend that the Department of Justice and Community Safety and the Department of Treasury and Finance review current campaign spending to enable increased reach of water safety messaging in line with current (at-risk) priority target audiences.
4. I recommend that the Department of Jobs, Skills, Industry and Regions works together with Life Saving Victoria and other relevant agencies to include safety warnings and messages in its promotion of aquatic locations.

Water safety issues: boating, watercraft and recreational activity related drowning

Lack of understanding or preparedness for open waterway conditions and dangers, particularly rip currents or strong currents in coastal settings and steeper riverbanks and muddier waters after drought in inland waterways.
Not telling someone where they are going, the departure point and return time.
Not checking the forecast weather conditions (including wind and water conditions), nor understanding the suitability of the vessel or craft for the conditions.
Making modifications to the vessel that impact seaworthiness.
Lack of preparedness/experience before participating in aquatic activities, e.g., jet skiing.
Not carrying or using the necessary safety equipment.
Not staying in contact with craft/vessel.
Alcohol and/or drug consumption in, on and around water.
Peer pressure and risk-taking behaviours.
No or incorrect lifejacket use for the activity.

PISBTW agency insights on key issues for boating, watercraft and recreational activity related drowning:

- Lack of understanding or planning for how to get back in or on watercraft in emergency scenarios, particularly among older adults.
- Unclear lifejacket regulations for different types of watercraft activities.
- Limited awareness and/or inconsistent availability of standard emergency markers, particular at inland waterways.
- Limited availability of up-to-date mapping and boating apps for inland waterways.
- Poor maintenance of boating ramps, or changing waterway access due to flooding and/or drought conditions contributing to unstable surfaces.
- Lack of visible and consistent water safety messaging at point-of-sale/partner touchpoints (e.g., boat sales, servicing, tackle shops, etc).

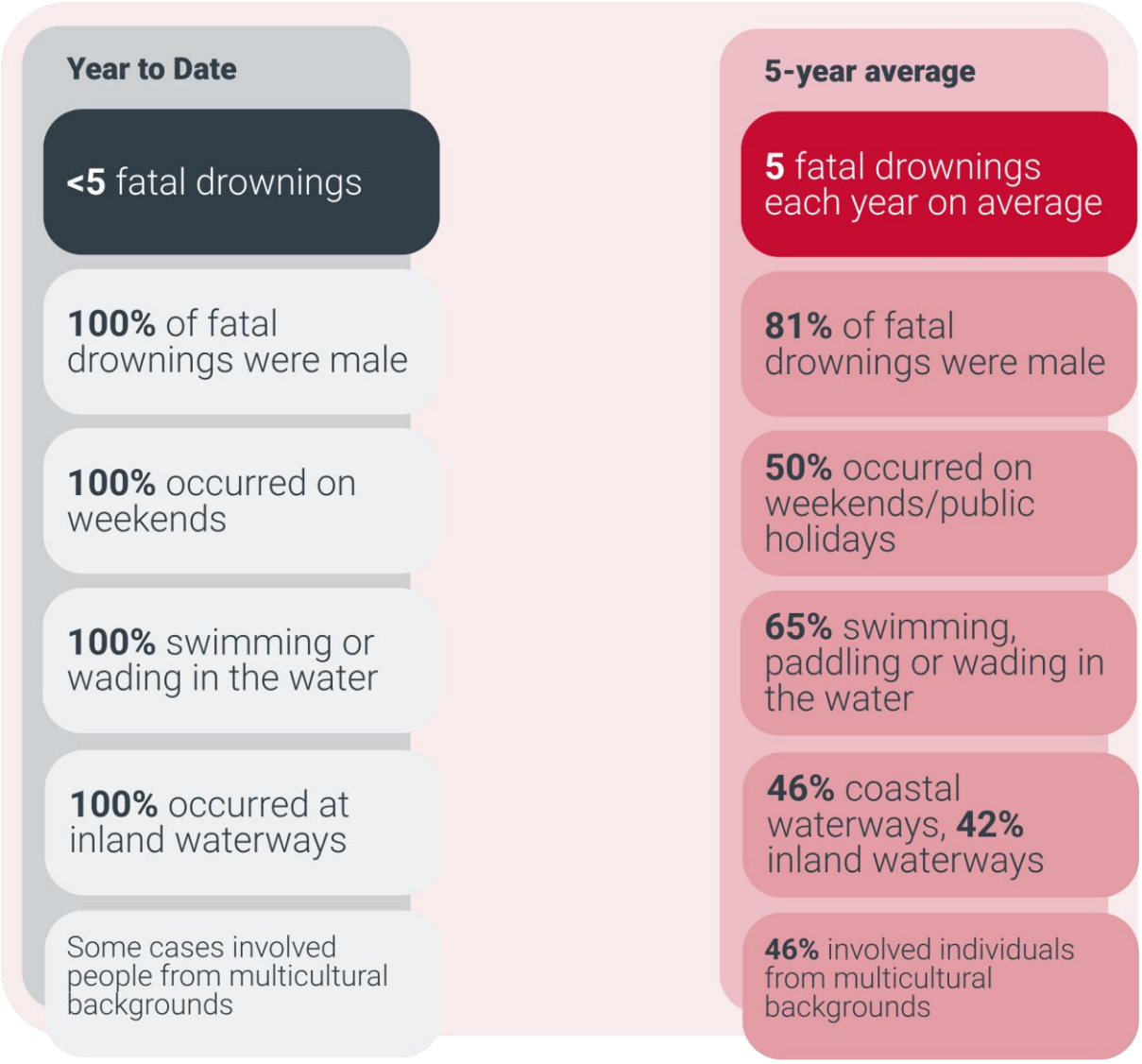
Recommendations: Reduce boating, watercraft and recreational activity related drowning

Action	Recommendations
Advocacy	• Support broader public health messaging emphasising fitness, weight management and cardiac risk awareness in recreational diving communities, and advocate for stronger health screening protocols to participate in these activities. • Ensure appropriate risk mitigation and health screening measures are in place for hot spring or similar public bathing facilities to avoid bathing-related adverse events.
Education	• Increase education on cardiac risk, obesity and chronic disease as major contributors to diving fatalities, especially for divers over 45 years. • Provide targeted education for novice divers on incremental experience-building, safe conditions for diving, buddy protocols and awareness of equipment limitations.

Young people aged 15 – 24 years

Urgent priority

Reduce drowning among young people aged 15 – 24 years



Research

Young males' perceptions of risk around alcohol and aquatic activities

Smith et al. (2025) explored the lived experiences, risk perceptions and social identity influences shaping the decisions of young Australian males to consume alcohol around water, a behaviour strongly associated with drowning risk. Through qualitative interviews with males aged 18–30 years who had previously drunk alcohol around water (n = 23), the study found that drinking in aquatic settings was typically social, spontaneous and unplanned, often

occurring at beaches, pools, rivers or on boats, and frequently in environments lacking safety measures such as lifeguards. Participants acknowledged that drinking increased drowning risk, yet many believed they could accurately assess their level of intoxication, water conditions and their own swimming ability. Risk was often considered only after the event, and for some participants, not considered at all. Social identity strongly shaped behaviour: participants described the 'typical' person who drinks and swims as young, male, adventurous, sensation-seeking and reckless. Most viewed such behaviour as socially undesirable and irresponsible and portrayed their own behaviour as more controlled or sensible, despite it being similarly risky behaviour. Peer groups played a significant role, with encouragement from friends normalising risky behaviour and reinforcing group conformity, even when participants recognised broader social disapproval. These findings highlight the disconnect between risk awareness and action, which can be fuelled by optimism bias, masculine norms, overconfidence in swimming ability and peer dynamics. The authors highlight opportunities for targeted interventions, including campaigns that leverage social identity, challenge overconfident behaviours, promote peer responsibility, and communicate how alcohol impairs both judgement and physical ability in water.

Social media-driven visitation and aquatic safety in national parks

As social media increasingly shapes visitation patterns and behaviour in natural environments, there have been growing concerns about visitors engaging in risky behaviours. Through a partnership with Queensland Parks and Wildlife Service, Cornell et al. (2025) investigated whether a co-produced, targeted Instagram campaign could effectively communicate aquatic safety risks at a popular Queensland national park site. Interviews with travel influencers, surveys with social media users (n = 509) and insights from rangers were used to inform message tone, content preferences and platform selection, with Instagram identified as the most influential channel for trip planning among younger adults (18 – 35 years old). The resulting campaign deployed statewide and site-specific ads alongside tailored landing pages which emphasised hazard awareness at aquatic locations. Across January to February 2024, the campaign reached more than 960,000 users and generated 4,000 link clicks, 254 post saves and over 100 shares, demonstrating strong engagement with safety messaging. On-site surveys (n = 50) found that a third of visitors reported social media influenced their decision to visit, with those visiting specifically for photography significantly more likely to be influenced by online content. Meanwhile, 32 per cent of surveyed visitors recognised at least one campaign post, with 20 per cent finding the messages to be useful; however, 20 per cent viewed the tone as condescending or passive-aggressive. Overall, the study highlights the potential benefits of social media as a low-cost, high-reach avenue for promoting aquatic safety, however, effectiveness can depend on message tone, authenticity, and alignment with user expectations. The authors suggest that future work should prioritise audience co-design, refine messaging style and explore social media influencer partnerships to strengthen resonance and behavioural impact.

Swimming and lifesaving skills for holistic education in secondary schools

A qualitative study from Norway explored the experiences of physical education (PE) teachers in teaching outdoor swimming, self-rescue and lifesaving in lower secondary schools (Esser-Noethlichs & Hegland, 2025). While these skills are often framed primarily as drowning prevention activities, the authors interpreted the teachers' reflections through the Norweigan concept of 'Bildung', which emphasises holistic, lifelong development towards active and responsible citizenship. Semi-structured interviews with PE teachers (n = 6) were thematically analysed to understand the potential for these swimming and lifesaving skills to be potential facilitators of *Bildung*. Teachers described the program as emotionally demanding but highly engaging for both students and teachers, with outdoor environments creating powerful learning situations through cold water, unpredictability and exposure. These conditions often prompted fear, uncertainty and discomfort, but also fostered confidence, bodily awareness, trust and cooperation. However, significant barriers were noted, including safety concerns, limited time, insufficient training and resource constraints. Lifesaving activities were seen to promote solidarity, as students relied on and supported one another in challenging situations. The findings suggest the program can support skill learning and holistic development. However, stronger teacher preparation, professional development and school level support are needed to meet broader educational goals.

Water safety issues: drowning among young people aged 15 – 24 years

Alcohol and/or drug consumption in, on and around water.
Lack of awareness of open water hazards such as rip currents.
Risk-taking behaviours, including selfie-related behaviours in high-risk locations.
Lack of preparedness/experience before participating in higher risk aquatic activities.
Peer pressure.
Not reading or adhering to aquatic safety signs.
Lack of lifejacket wear or incorrect lifejacket use for the conditions/activity.

PISBTW agency insights on key issues for drowning among young people aged 15 – 24 years:

- Deterioration in swimming and water safety skills due to drop-off in formal lessons before adolescence.
- Lack of appealing and engaging water safety programs for tweens and young adolescents compared with other sports and recreational activities.
- Insufficient engagement with adolescents through age-appropriate water safety communication channels.
- Inadequate water safety messaging or reliance on static messaging only at waterway point-of-entries.

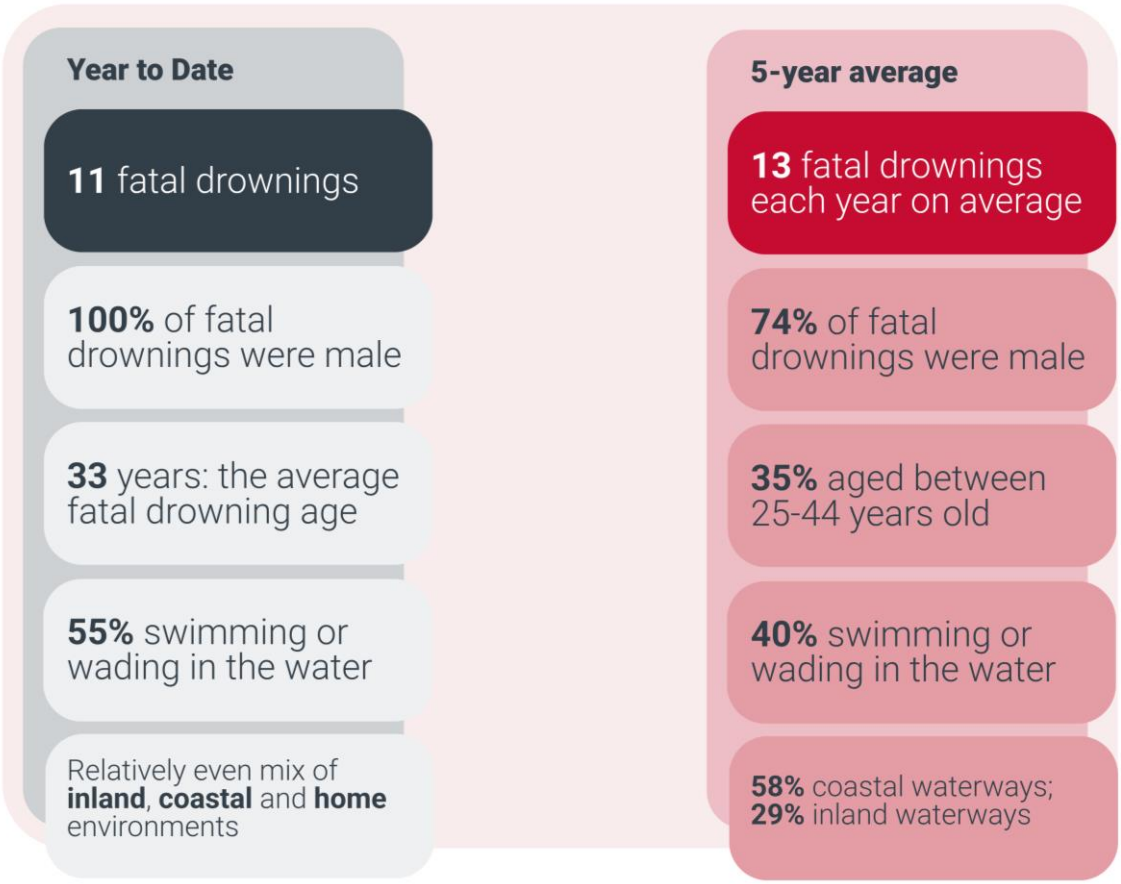
Recommendations: Reduce drowning among young people aged 15 – 24 years

Action	Recommendations
Advocacy	• Promote policy measures restricting alcohol availability near high-risk aquatic environments, including alcohol-free zones, stricter enforcement and improved signage. • Advocate for cross-agency collaboration (e.g., land managers and health promotion agencies) in digital risk communication to address social-media driven risks at popular waterways. • Encourage schools and families to recognise outdoor swimming and/or lifesaving skills as a meaningful educational experience for developing lifelong skills.
Campaigns and programs	• Promote responsible mateship and encourage pre-planning strategies (e.g., choosing non-aquatic activities after drinking starts, organising safe transport home) to counteract spontaneous decisions to drink and swim. • Explore the use of partnerships with social media influencers, leveraging their reach and relatability to reinforce positive safety norms around waterways. • Consider communication targeted at waterway visitors motivated by visual content creation, given their stronger social-media-driven visitation patterns. • Where feasible, involve the targeted demographic in the production and/or testing of water safety communication campaigns.
Education, training and policy	• Develop education programs that leverage real lived experiences, using case studies and testimonials to challenge the belief that 'responsible' drinkers are exempt from risk around water. • Incorporate content that clearly explains how alcohol impairs physical swimming ability, not just judgement, countering overconfidence in aquatic competence. • Ensure consistent cross-platform information by land managers which links social media messaging with on-site signage and official website content. • Provide clear, practical hazard recognition guidance (e.g., slippery surfaces, unstable terrain) to improve perceived behavioural control, and avoid language which could be perceived as condescending or sarcastic.
Research	• Expand demographic research on social-media-driven visitation patterns to waterways, including subgroup analysis (e.g., everyday visitors, tourists). • Explore the role of co-design with young males, testing how drowning prevention interventions grounded in lived experience can improve long-term effectiveness, particularly related to alcohol use around water. • Examine the emotional, social and ethical learning outcomes of swimming and lifesaving skills programs, not only swimming competence or risk reduction aspects.

High-risk populations

Urgent priority

Reduce drowning in high-risk populations



Research

Improving the water safety knowledge of international students

An innovative approach to improving beach safety knowledge among English language learners was adopted by Shibata et al. (2026a), who embedded coastal safety content into reading materials designed for an internationally recognised English language test. Recognising that migrants and international students face heightened coastal drowning risk due to language barriers, misinterpretation of signage, and limited rip-current knowledge, the authors developed three reading passages covering rip currents, beach safety signage and risky beach behaviours, accompanied by 40 exam-style questions. The study used a quasi-experimental design involving international students across five English-language institutions (n = 101), with pre-, post- and 4-week follow-up surveys used to assess students' water safety knowledge and understanding. The results showed significant improvements in

participants' understanding of rip currents, red-and-yellow flags and hazard terms such as 'bluebottle' and 'shore dump'. Apart from knowledge about the red-and-yellow flags, which was maintained, knowledge retention weakened slightly at the 4-week follow-up, though remained significantly higher than baseline. Participants reported finding the material useful and indicated they would share it with others. Integrating beach safety content into language-learning tasks offers a scalable, low-cost way to reach migrants who may not seek water safety education, including those unaware of their drowning risk. This approach can be incorporated into English-language programs, pre-arrival resources or used as preparatory material for in-person workshops.

Building on previous research with Japanese students which found widespread misinterpretation of common Australian beach safety symbols and phrases, Shibata et al. (2026b) sought to understand perceptions of beach safety signage among South Korean students. University students with mixed English proficiency (n = 163) completed an online survey regarding their intended behaviours on Australian beaches and signage interpretation, with the majority having never visited Australia (93 per cent). Leisure swimming was the most popular intended activity among respondents (45 per cent), followed by snorkelling, scuba diving and surfing, reinforcing Australia as a coastal destination for aquatic activities. When considering interpretation of key signage terms, the majority of students did not understand terms like 'high surf', 'submerged objects', 'shore dump' or 'rip currents'. Concerningly, the 'swim between the flags' symbol was inaccurately interpreted by 86 per cent of students, and was thought to be a danger zone, an area for a sports event or a private zone, rather than the safest area at the beach for swimming and playing in the water. While most students (91 per cent) reported that they would not go into the water if a 'dangerous currents' sign was displayed, when presented with the scenario of other people being in the water, students were more likely to enter the water regardless of the sign. Given the high risk of drowning among South Koreans (Willcox-Pidgeon et al., 2021), this study highlights the need for culturally appropriate, targeted water safety education for potential or actual visitors to Australia. However, signage terms in English could be reviewed to reduce the possibility of misinterpretation, for example by assessing the translatability of key terms in common visitor languages.

Swimming and water safety programs for migrant adults in Australia

Given the high rate of fatal drownings among overseas-born individuals in Australia, Willcox-Pidgeon et al. (2025) sought to understand how existing swimming and water safety programs are meeting the needs of adult migrants. Using a qualitative multiple case study approach, the authors reviewed 30 publicly available programs nationwide, with six of these selected for in-depth analysis using data obtained from interviews or focus groups. Participants in the programs reported strong motivation to learn due to perceived drowning risk, limited prior exposure to swimming instruction, desire for social inclusion, and the desire to protect their families around water. Fear of water, cost, transport challenges, cultural norms discouraging swimming, and discomfort in mainstream aquatic centres were frequently cited

barriers. Programs were tailored to include aspects such as subsidised lessons, childcare availability, single-gender classes, bilingual instructors, and safe, supportive learning environments. These culturally tailored approaches enabled benefits for participants which extended beyond water competence, including improved mental health, increased confidence, reduced social isolation, and stronger community connections. Several programs offered employment pathways such as swim teacher or lifeguard training, contributing to a more culturally diverse aquatic workforce and creating visible role models within migrant communities. However, long-term sustainability for programs remains a challenge, due to funding uncertainty, staffing constraints and the need for stronger partnerships. The study highlights the importance of culturally responsive, co-designed adult swim programs that address broader social determinants of health while building water safety skills.

An alternative approach was taken by Jagnoor et al. (2025), whereby recent migrants to Australia were purposefully recruited at hairdressing salons to capture their perspectives on swimming and water safety. In comparison to interviewing migrants who are already engaged in water safety programs, this approach allowed for a broader perspective and understanding of barriers and enablers for different migrant populations. Thirty individuals were interviewed, including Indian, Korean and Arab migrants, who were predominantly aged 18-39 years. Most participants were unaware of existing water safety programmes, despite acknowledging the importance of swimming skills for safety, recreation and cultural participation in Australia. A central finding was that competing settlement priorities, such as securing employment, income and housing, meant that water safety was often not a priority, particularly among newer migrants, older adults and lower-income migrants. Additional barriers included programme costs, inconvenient scheduling (especially for working adults), limited transport options, fear of aquatic environments (including sharks and jellyfish), limited swimming confidence and perceptions that learning to swim as an adult is difficult. Enablers included social connections, with friends and community networks playing a key role in introducing migrants to aquatic activities; the presence of lifeguards; the perceived safety of pools over beaches; interest among parents in enrolling children; and the desire for culturally safe, affordable and adult-focused programs. Participants emphasised the need for women-only classes in some communities, native-language instruction, and culturally tailored content, such as cliff-fishing safety information for Korean and Chinese migrants. Multiple communication strategies were suggested by participants, including pre-arrival information via immigration processes and messaging through university channels, sports clubs and community magazines. Signage was also discussed as a medium for communicating key information, though it was acknowledged that levels of attention to signage can vary. Overall, the study highlights the need for intersectional, co-designed initiatives and targeted communication strategies to improve access, relevance and uptake.

Opportunities and challenges for drowning prevention interventions

A qualitative study by Della Bona et al. (2025) explored how drowning prevention and water safety interventions are implemented in high-income countries, drawing on the perspectives

of practitioners and researchers working in the field. Using semi-structured interviews with participants across five high-income countries (n = 12), the study applied reflexive thematic analysis to examine the factors shaping implementation, including barriers, enablers, and definitions of success. Three interrelated themes were identified: *getting the issue in focus*; *meeting people where they are*; and *thinking about success*. These capture how intervention priorities are shaped by local drowning risk, organisational missions, funding requirements, expertise, equity considerations, and community concerns. Furthermore, decisions about target populations and intervention focus often involve trade-offs between reach, feasibility, and addressing populations at greatest risk. *Meeting people where they are* highlights the relational nature of implementation, emphasising trust, stakeholder engagement, culturally appropriate communication, and adaptation to local contexts. Participants described tailoring language and delivery to resonate with communities and navigating tensions between academic frameworks and practical realities. *Thinking about success* reflects the varied ways success is defined and measured, ranging from behaviour change and stakeholder engagement to informal feedback and observable practices, with evaluation approaches constrained by time, resources, and evaluation capacity. Across themes, strong practitioner-researcher partnerships and a culture of learning were identified as key enablers of effective implementation. The authors conclude that drowning prevention implementation in high-income countries is a complex, context-dependent and relational process. System-level support, capacity building in evaluation and stakeholder engagement, flexible funding models, and sustained collaboration between practitioners and researchers are needed to strengthen implementation and close the research-to-practice gap.

Water safety issues: drowning among high-risk populations

Resources for understanding hazards at beaches (such as signage and information apps) are often designed from a Western perspective, making them less accessible for diverse populations.
Lack of water safety messaging and programs which are accessible and appropriately tailored for those from CALD backgrounds.
Lack of understanding or preparedness for open waterway conditions and dangers, particularly rip currents or strong currents.
Lack of swimming ability (adults; parents/caregivers).
Swimming outside the red and yellow flags at patrolled beaches, or swimming at unpatrolled beaches.
Lack of lifejacket wear or incorrect lifejacket use for the conditions/activity.
Alcohol and/or drug consumption in, on and around water.
Not reading aquatic safety signs and supervising others while not having adequate water safety skills or knowledge themselves.

PISBTW agency insights on key issues for drowning among high-risk populations:

- Lack of cultural understanding among swimming and water safety program providers.
- Oversaturation of generalised swimming and water safety programs and a lack of, or difficulty accessing, speciality programs.
- Lack of promotion of the benefits of swimming and water safety beyond drowning prevention, e.g., health and wellbeing, involvement with aquatic recreational activities, employment and volunteering pathways.
- Inequitable access to swimming and water safety programs for individuals in rural/remote areas, with consideration to socioeconomic status as a barrier to entry.

Recommendations: Reduce drowning in high-risk populations

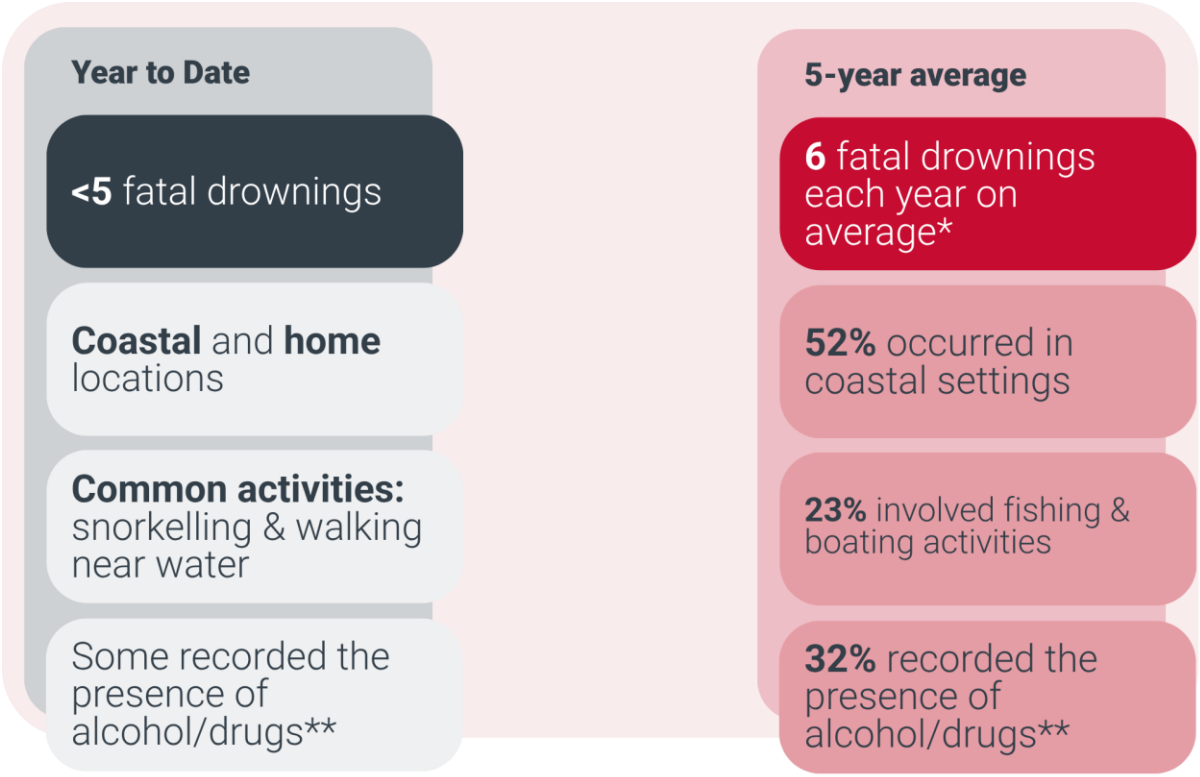
Action	Recommendations
Advocacy	• Advocate for policies that improve equity of access, including reduced pool entry fees, concessions, and culturally safe environments in aquatic centres. • Promote multi-sector partnerships (e.g., aquatic organisations, migrant settlement services, universities, sports clubs, cultural groups) to raise awareness of drowning risks among migrant communities. • Support policies that integrate water safety information early in the migrant settlement process, including pre-arrival materials and coordinated post-arrival communication. • Advocate for embedding beach safety education within English-language learning systems to reach multicultural communities.
Campaigns and programs	• Promote positive community role models (e.g., migrant swim teachers or lifeguards) to shift cultural norms and reduce stigma or fear around swimming and water safety. • Use culturally tailored messaging to emphasise swimming as a life skill and which can lead to participation in other aquatic activities, acknowledging barriers related to cost and cultural norms. • Deliver flexible, adult-friendly scheduling (evenings/weekends) to accommodate working migrants and parents who struggle with time constraints. • Build programs for migrants that leverage social networks and peer participation, enabling them to attend with family, community groups or friends to increase comfort and motivation. • Use campaigns to counter beach behaviours driven by social proof, emphasising that 'others in the water' does not equal safety.

Education	• Include cultural awareness, empathy and communication skills in swim teacher training to better support adult migrant learners. • Ensure programs address cultural, religious and gender-related needs, such as single-gender classes, inclusive swimwear, bilingual instruction, and private spaces. • Provide accessible educational materials in multiple languages and through migrant-relevant channels (community magazines, faith-based groups, WhatsApp/WeChat networks, consulates, universities). • Clarify and culturally adapt key messaging, such as replacing 'swim between the flags' with 'stay between the flags' to avoid literal misinterpretation of the term 'swim'.
Research	• Investigate long-term behavioural outcomes for migrant adults who learn to swim, including intergenerational effects on water safety attitudes. • Explore program effectiveness across diverse migrant sub-groups, including differences by residency duration, income, cultural background, and gender. • Examine the feasibility and community impact of water safety employment pathways (e.g., training migrant swim instructors and lifeguards). • Investigate how signage terms can be revised in English to improve translatability (e.g., replacing 'shore dump' with clearer terms such as 'crashing waves'). • Build practitioner capability in implementation science for drowning prevention, using practical, non-jargon training aligned to real-world constraints. • Provide tiered education for agencies/practitioners in monitoring and evaluation of programs/campaigns, starting with simple approaches (e.g. observation, reflective practice, basic process measures).

Males aged 45 – 64 years

Urgent priority

Reduce drowning among males aged 45 – 64 years



*For males in this age group. Average of 2 fatalities per year for females aged 45-64 years old.

**Refers to illegal or misuse of legal drugs.

Water safety issues: drowning among males aged 45 – 64 years

Lack of awareness of open water hazards such as rip currents in coastal settings, and changing conditions with drought such as steeper riverbanks and muddier waters within inland waterways.
Lack of preparedness/experience before participating in higher risk aquatic activities.
Risk taking behaviours.
Supervising others while not having adequate water safety skills or knowledge themselves.
Not reading aquatic safety signs.
Alcohol and/or drug consumption in, on and around water.
Lack of awareness of changing physical abilities with age or from health conditions and/or medication use.

PISBTW agency insights on key issues for drowning among males aged 45 – 64 years:

- Lack of engagement with established social and recreational settings for this cohort (e.g., Men's Sheds, sports clubs) to improve communication reach and awareness.

Impact of disaster and extreme weather

Urgent priority

Reduce the impact of disaster and extreme weather on drowning

Overview

Over the past 5 years, on average two fatal drownings each year resulted from extreme weather (including heatwaves and flooding events), though the available data on this risk factor for drowning is limited. The anticipated weather pattern changes expected from climate change make this risk factor an emerging and prominent concern given the increasing frequency and widespread impact of flooding and heatwaves in Victoria.

Research

Impact of warning signs on risky driving in flood conditions

Vehicle-related fatalities in flood conditions contribute to the high risk associated with floods, however, previous studies have identified a tendency for drivers to ignore flood warning messages and signs. A survey of residents in Texas, USA (n = 1027) examined drivers' decision-making after encountering flood warning signs through the lens of six predictors: past exposure to warning signs, warning sign comprehension, exposure to flood-related messages, experiential factors related to driving, risk perception and sociodemographic variables (Stephens et al., 2025). The results showed that prior experience of a flood was a strong predictor of driver behaviour, with those who had experienced a flood being five times more likely to turn around. In comparison, Australian research on flood-related fatalities (2001 – 2017) identified that a driver's prior experience of successful floodwater crossings contributed to vehicle-related fatalities (Ahmed et al., 2020), suggesting there is a complex relationship between driver experience and behaviour in flood scenarios. Meanwhile, those aged 55 years and above, and females were also more likely to turn around compared to younger age groups (18-35 years old) and males. Those who had previously seen a specific flood-related warning sign ('Turn around don't drown') were twice as likely to turn around, with more frequent exposure to this signage helping to reinforce safer decision-making. However, those who lived outside flood-prone areas or drove less frequently were more likely to report never receiving any flood-related safety messages, which highlights the need for broad dissemination of messages to drivers beyond flood-prone areas. Correct comprehension of the signs was also a factor related to driver behaviour, demonstrating that education around flood awareness messages is needed to ensure they are being interpreted correctly.

Effect of shore protection structures on drowning risk

Hard coastal defences such as groins and detached breakwaters in Italy are built to counter erosion and protect the beach-based tourism economy, however, they can significantly increase bathing hazards by generating artificial rip currents and dangerous changes to the seabed. Pezzini and Pranzini (2025) investigated how these shore protection structures contributed to drowning risk by analysing coastal drowning incidents recorded during the bathing seasons from 2016 to 2021 (n = 858, average ~145 fatalities per year). While medical emergencies and non-swimmers accounted for a substantial proportion of deaths, rip currents were implicated in roughly one-third of all drownings. Notably, 12 per cent of all cases were linked to rip currents generated by coastal defence structures, with an additional 12 per cent of non-swimmer deaths likely caused by sudden depth changes and erosional channels near these installations. In contrast to natural rip currents, artificial rip currents associated with breakwaters often prevent swimmers from returning to shore and delay rescue, increasing mortality risk. Additionally, regions with densely engineered coastlines, particularly along the northern Adriatic, showed disproportionately high drowning rates even under moderate wave conditions. The authors concluded that many coastal defence systems create an 'illusion of safety' in seemingly sheltered waters. They argue that drowning risk must be explicitly considered in coastal engineering and management, calling for updated regulations, improved hazard assessment during design, targeted lifeguard training, and clearer communication of risks to beach users.

Water safety issues: the impact of disaster and extreme weather on drowning

Failing to evacuate or heed other warnings during flood events.

Driving through floodwaters.

Swimming or recreating in flooded waterways.

Extreme heat or heatwaves leading to increased waterway use.

PISBTW agency insights on key issues for the impact of disaster and extreme weather on drowning:

- Limited awareness of gale-force/strong wind warnings as conditions in which aquatic activities should be avoided.
- Lack of coordinated water safety messaging aligned with extreme weather alerts.

Recommendations: Reduce the impact of disaster and extreme weather on drowning

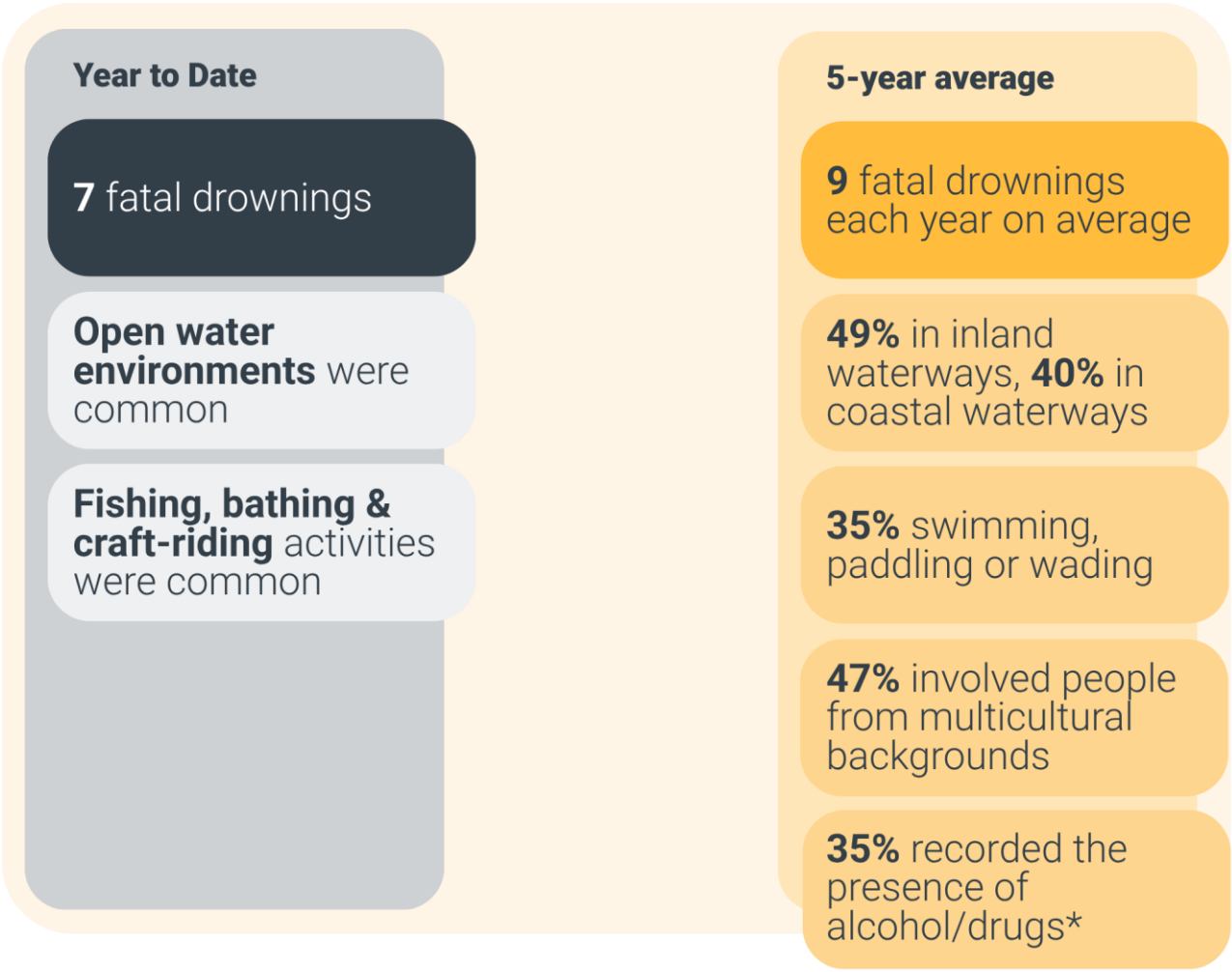
Action	Recommendations
Advocacy	• Advocate for placement of static roadside warning signs in flood-prone areas, as prior exposure to these signs can increase the likelihood of not driving through floodwaters. • Ensure flood-risk messaging and signage strategies are explicitly included in national and state disaster risk management policies. • Explicitly address drowning risk in coastal engineering and planning and consider alternative structures or layouts for shore protection structures to mitigate this risk. • Ensure the placement of site-specific hazard signage near shore protection structures that have been shown to increase rip current and/or drowning risk.
Campaigns and programs	• Increase frequency of flood-risk messaging across multiple channels (roadside, mobile alerts, social media and local media) to improve exposure, particularly for drivers who may not be local to the area.
Education, training and policy	• Embed explicit modules on flood risk and not driving through floodwaters in learner and provisional driver programs, with particular focus on young adults (18–35 years).

Ongoing issues

This section highlights the water safety issues that still warrant attention; however, are not considered an urgent priority due to recent decreases in associated drowning incidents. These are listed under each priority area.

Work needed

Reduce drowning among males aged 25 – 44 years



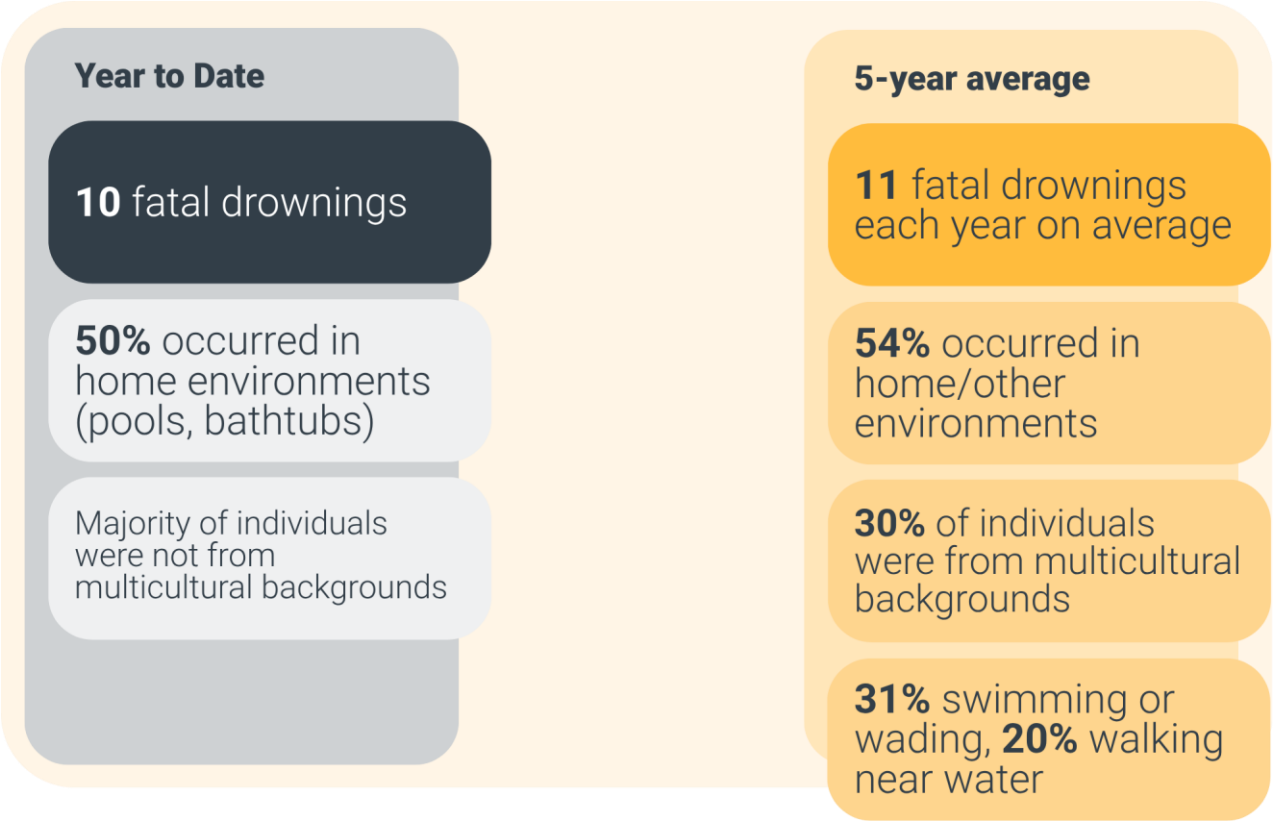
*Refers to illegal or misuse of legal drugs.

Water safety issues: drowning among males aged 25 – 44 years

Lack of awareness of open water hazards such as rip currents.
Lack of preparedness/experience before participating in higher risk aquatic activities.
Risk taking behaviours.
Supervising others while not having adequate water safety skills or knowledge themselves.
Not reading or adhering to aquatic safety signs.
Alcohol and/or drug consumption in, on and around water.

Work needed

Reduce drowning in people aged 65+ years



Research

Older adults drowning deaths in the USA

As rising life expectancy leads to a growing adult population worldwide, drowning among older adults is becoming an increasing concern. A retrospective analysis of drowning deaths for individuals aged 55 years and older between 1999 and 2020 in the USA was conducted, documenting an average 975 fatalities a year with 20,466 in total (Rath et al., 2025). The age-adjusted mortality rate increased from 10.75 in 1999 to 14.49 in 2020, mirroring trends in other countries including Australia and Canada where older adult drowning deaths have steadily increased year-on-year. Older males were found to have a drowning mortality rate that was three times that of females, which could be related to greater involvement in water-related activities such as fishing and boating, often combined with alcohol consumption. The 55–64-year-old age group represented the highest number of drownings during the period analysed compared to other age groups, which may reflect higher participation in recreational water-based activities as well as more risk-taking behaviours. The study also highlighted key demographic disparities in drowning data, including a higher risk of drowning among Non-Hispanic Alaskan Natives, American Indians and Blacks, as well as higher age-adjusted mortality rates in rural areas compared to urban areas. The authors discussed the unique challenges

for drowning prevention among older adults such as chronic health conditions, reduced mobility, and social isolation, and encouraged the development of age-appropriate interventions that consider geography, race/ethnicity and gender.

Water safety issues: drowning among people aged 65+ years

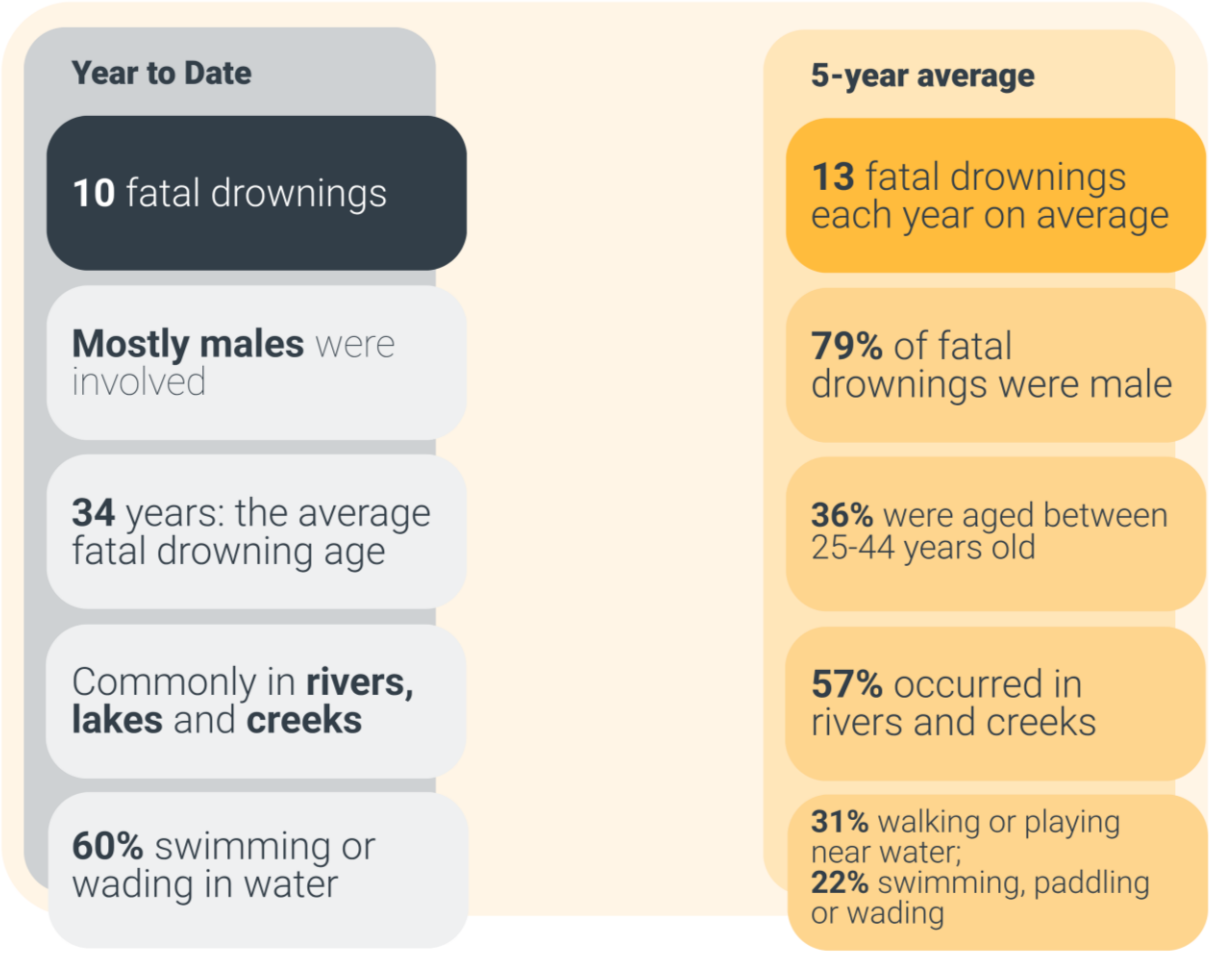
Lack of understanding of personal physical changes (including loss of fitness), medical conditions and associated medication and the impact on aquatic risk.
Overestimation of skills and underestimation of the conditions.
Lack of understanding or preparedness for open waterway conditions and dangers, particularly rip currents or strong currents.
Lack of preparedness for conditions (e.g. swimming at highly hazardous beaches, not taking/wearing appropriate safety equipment) or unprepared for changing conditions (e.g. wind, swell, tide).
Lack of lifejacket wear or incorrect lifejacket use for the conditions/activity.
Not reading or adhering to aquatic safety signs and supervising others while not having adequate water safety skills or knowledge themselves.

Recommendations: Reduce drowning in people aged 65+ years

Action	Recommendations
Campaigns and program	• Expand swim lessons and water-competency training for older adults, with adaptations for mobility limitations and chronic health issues. • Increase community programs teaching safe participation in aquatic activities, including boating, fishing and recreational swimming for older adults.
Education, training and policy	• Promote falls-prevention education alongside water safety, given the strong link between falls and drowning in older adults.
Research	• Examine interactions between race/ethnicity, rurality, socioeconomic status and health status to identify compounding vulnerabilities for drowning in older adults.

Work needed

Reduce drowning in inland waterways



Research

Bystander drowning interventions and risk stratification in Canada

Lay, or bystander, rescuer intervention is common in fatal drowning incidents. Dunne et al. (2025) examined unintentional drowning deaths in Canada from 2010 – 2019 (n = 4,535) to understand when and how bystanders responded, as well as the circumstances in which rescuers themselves died. In approximately half of these drowning fatalities, there was an attempted rescue (55 per cent), which were mostly conducted by lay rescuers rather than professionals (74 per cent). Of these, almost half involved high risk contact rescues, such as carrying or physically towing the victim, and lay rescuer fatalities occurred in four per cent of cases. Lay rescuers were significantly more likely to intervene when the drowning person was related to or known by the victim, a child, a female, in a swimming pool, alone, and when no ice was present. These findings underscore the need to expand drowning prevention strategies beyond primary prevention and include public education on safe, non-contact rescue techniques; increase the availability of rescue aids at public waterfronts and

increase targeted messaging for situations where bystander intervention is most likely, to protect both victims and rescuers.

Another study analysed unintentional water-related fatalities in Canada, stratifying risk by geographic location, moving beyond traditional hotspot mapping (Lam et al., 2025). Using coronial records from 2006–2016 (n = 5105), the authors integrated demographic, situational and environmental data with emergency medical services (EMS) accessibility and cellular network coverage to understand drowning risk factors. To address the lack of precise GPS data, incident locations were approximated by using waterbody names, civic addresses and census boundaries alongside publicly available cell tower data. Risk stratification was determined by analysing the distance from each waterbody to nearby cellular towers, the type of cellular technology available and inferred network coverage. Further, locations were categorised by their likelihood of enabling an emergency call to EMS. This approach demonstrated that sites with similar fatality counts can have distinctly different risk profiles once communication infrastructure is considered; for example, two rural lakes with identical fatality counts were shown to differ substantially in risk due to the presence or absence of cellular reception. Additionally, through incorporating EMS access as a determinant of incident survival, the model revealed the hidden risks of rural and remote settings that would be underestimated by incident counts alone. The authors emphasised that environmental risk is shaped not only by water exposure, but also the capacity for timely response. The model provides a more equitable and actionable framework for drowning prevention planning, infrastructure investment and emergency response prioritisation, particularly in Indigenous, rural and remote communities where cellular coverage is limited or absent.

Water safety issues: drowning in inland waterways

Lack of awareness of open water hazards (e.g. strong and unpredictable currents).
Lack of understanding or preparedness for open waterway conditions and dangers, particularly rip currents or strong currents.
Lack of preparedness/experience before participating in aquatic activities.
Supervising others while not having adequate water safety skills or knowledge themselves.
Alcohol and/or drug use prior to recreating in, on and around water.
Not reading or heeding aquatic safety signs and advice.
Resources for understanding hazards at beaches not well known (e.g. Beachsafe app) meaning water safety messaging has limited reach to key high-risk groups and communities.
Lack of opportunities to learn swimming and water safety (in particular, high-risk populations).
Peer pressure and risk-taking behaviours.
Lack of lifejacket wear or incorrect lifejacket use for the conditions/activity.

PISBTW agency insights on key issues for drowning in inland waterways:

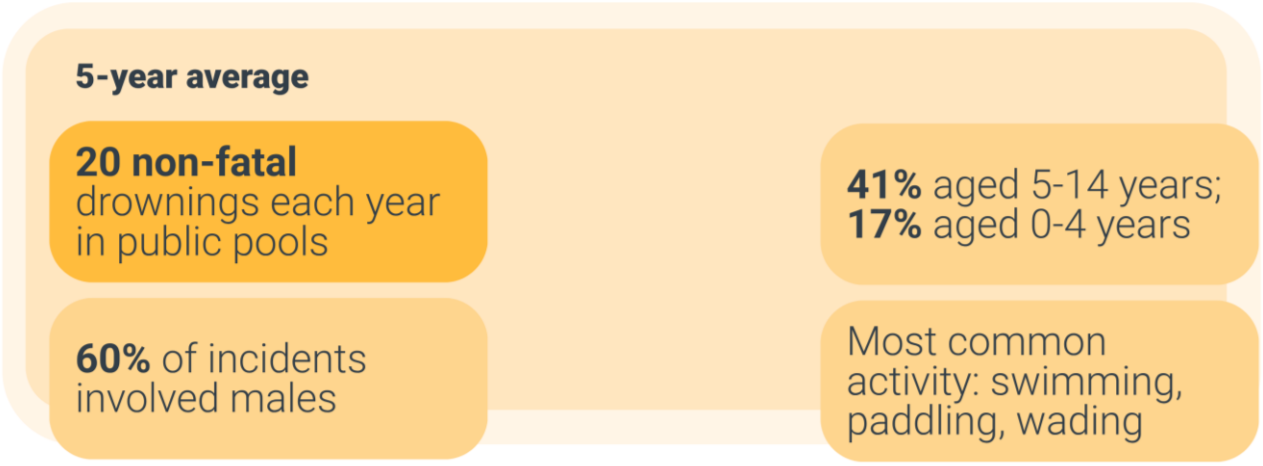
- Lack of exposure to or education on inland waterways and their specific hazards, e.g., changing water temperature, undercurrents and debris.

Recommendations: Reduce drowning in inland waterways

Action	Recommendations
Advocacy	• Advocate for readily accessible public rescue equipment at public waterfronts and known inland swimming locations to encourage non-contact rescues if required. • Advocate for improved mobile phone coverage near high-use waterways if coverage is poor or absent.
Education, training and policy	• Embed short, skills-based micro-learning in community settings (schools, workplaces, recreation centres) that educate participants on non-contact rescues. • Contextualise place-based risk for waterway users and visitors, including education on checking for reception "dead zones," offline navigation, and emergency signalling if needed.
Research	• Conduct surveillance of near-misses and non-fatal rescues at inland locations to understand the volume and type of bystander rescues undertaken. • Combine incident counts with exposure metrics (e.g., visitor counts, commuter/boating traffic, seasonal use) where available to refine location-based risk beyond 'hotspots'.

Work needed

Reduce drowning by strengthening the aquatic industry



Research

Validity of a new learn-to-swim assessment tool

The variety of assessment tools in learn-to-swim programs gives rise to inconsistencies and limitations in how learn-to-swim programs assess children's aquatic skills, as they may not capture learner capability or progression. Through a descriptive qualitative study, Nyitrai et al. (2025) examined the validity of a new aquatic skill assessment tool: RAEE (Refuse, Assisted, Effective, Efficient). This tool captures a student's skill on a continuum of outcomes according to their ability and confidence, providing greater feedback opportunities than a dichotomous 'competent'/'not yet competent' (C/NYC) assessment tool. Through focus groups with highly experienced Australian Council for the Teaching of Swimming and Water Safety (AUSTSWIM) trainers (n = 23), the study identified three major themes: the inadequacy and subjectivity of C/NYC assessments; systemic challenges within the aquatic industry, including inconsistent teaching practices, limited assessment training, and parental pressures; and the perceived usefulness of the RAEE tool as a more nuanced, reliable, and communicative tool. The RAEE tool's seven-point Likert scale, spanning refusal through varying degrees of assistance and skill efficiency, was valued for its ability to reflect environmental influences, developmental differences, and skill progression, elements critical for understanding true aquatic competency. Trainers noted that the RAEE has the potential to standardise assessment across settings, improve feedback to learners and parents, and better align instructional practices with modern concepts of water competence, which encompass motor, cognitive and affective domains. Some participants suggested simplifying the tool for practical use,

but overall consensus supported its face validity and applicability across swimming, water safety, and self-rescue contexts. The authors concluded that the RAEE tool addresses key gaps in current assessment practices, warranting further refinement and broader validation within the learn-to-swim industry.

Water safety issues: strengthening the aquatic industry

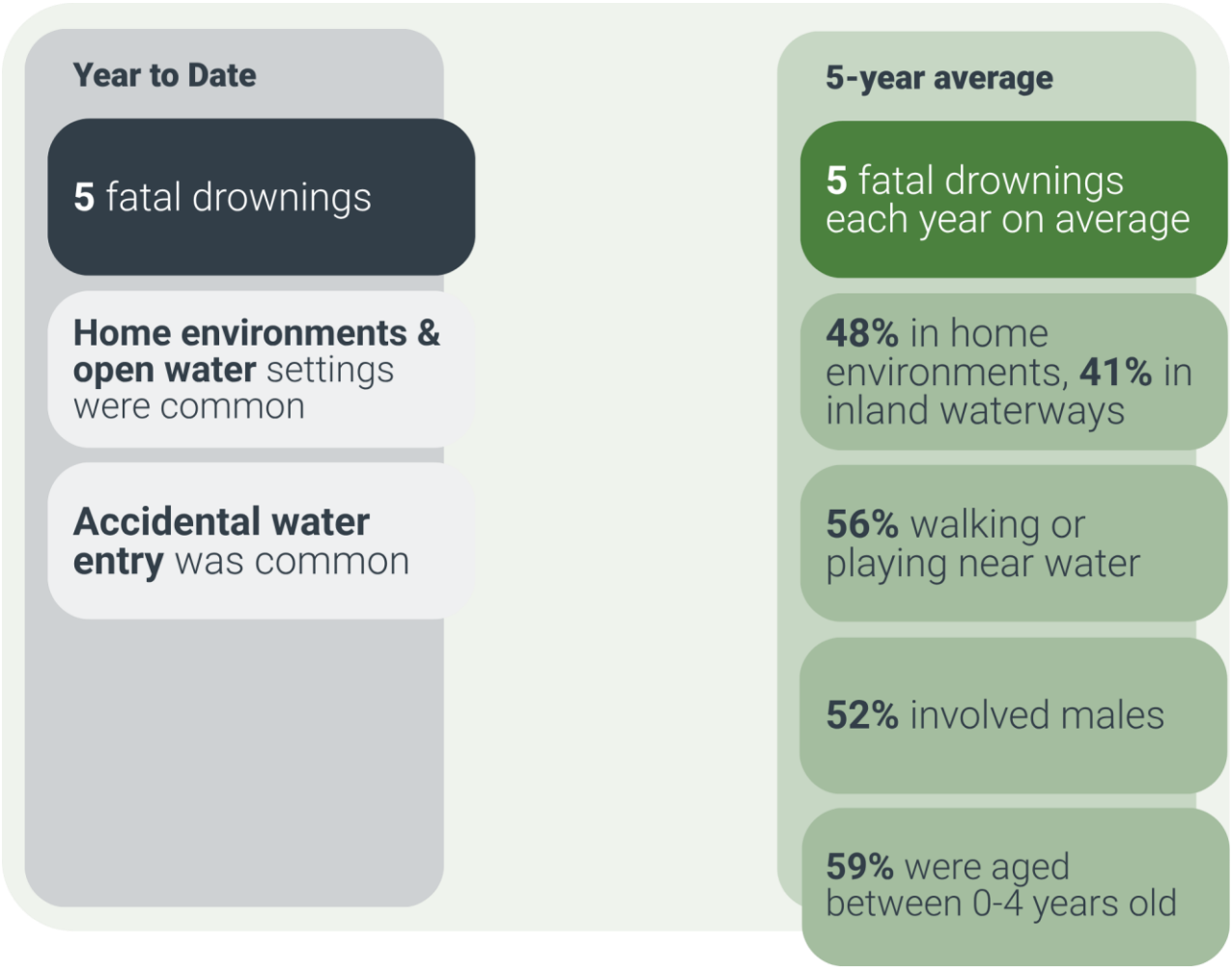
Lack of, or lapse in, child supervision by parents/caregivers.
Overreliance of parents/caregivers on lifeguards to supervise their child.
Overestimation of child's ability and underestimating risks.
Not reading and adhering to aquatic facility safety signage.
Lack of preparedness/experience before participating in higher-risk aquatic activities.
Lack of swimming competency.
Supervising others while not having adequate water safety skills or knowledge themselves.
Alcohol and/or drug consumption around water.

Recommendations: Reduce drowning by strengthening the aquatic industry

Action	Recommendations
Advocacy	• Advocate for a standardised approach to aquatic skill assessment, with a focus on evidence-based frameworks that reduce subjective judgements of learning ability.
Education, training and policy	• Integrate structured assessment training into swim teacher education and educate teachers on recognising contextual factors (e.g., environment, learner confidence, developmental stage) that influence skill demonstration.

On track (ensure continued work)

Reduce drowning among children aged 0 – 14 years



Research

Children's water competency attainment

Water competency refers to psychomotor tasks such as breath control, underwater swimming, effective water entry and exit and propulsion which contribute to a person's capability to swim unsupported. An observational study investigated the attainment of water competency among children aged 1-5 years (n = 63) enrolled in two different aquatic programs – either 4-8 lessons (30 minutes each), or 12-18 lessons (Langendorfer et al. (2025). The study found that while no children were able to demonstrate all five water competency components after their program, most children significantly improved from baseline, emphasising the benefits of both short and medium-term swimming programs. While some very young children (<3 years old) could demonstrate unsupported water competency skills, older children were more likely to achieve these skills, as were children who participated in more lessons. Additional experience and practice among children who did more

lessons also resulted in fewer regressions. Skills such as water entry and exit were acquired more easily by children compared to breath control, floating and propulsion, while front floating and swimming was more easily learnt compared to back floating and swimming. This research reiterates the importance of regular and ongoing swimming and water safety lessons among young children, and the need for close adult supervision even after children have participated in lessons.

Schwebel and Johnston (2025) explored whether 1-year-old children can learn water self-rescue skills. Toddlers aged 12–23 months (n = 50) were enrolled in a month-long program comprising 20 lessons of 10 minutes each designed to teach them to flip onto their backs, float, breathe, and remain safely buoyant. At baseline, none of the toddlers could independently maintain safe engagement in the water for five seconds. After training, however, 83 per cent successfully completed all assessment phases on their first attempt and 98 per cent succeeded on a second attempt. Parents generally expressed positive perceptions of the training, though some reported minor distress, crying, or hesitation among toddlers during early lessons. Importantly, toddlers did not learn to swim or move meaningfully through water; rather, they learned to float calmly and sustain breathing, potentially buying critical time should they fall into a pool unsupervised. The authors emphasised the training was delivered by highly trained instructors using structured behavioural methods, cautioning that not all commercial programs promote the same safety or ethical standards. They also highlighted gaps in evidence around long-term retention, skill transfer to real-world environments, and optimal lesson frequency. Despite limitations, including the lack of a control group and a relatively homogenous sample, the findings suggest that self-rescue training may offer an additional, targeted layer of toddler drowning prevention, particularly for children living near water, when used alongside established strategies such as barriers, supervision, and broader water safety education.

A multi-stage validation and feasibility study from Spain described the development of a novel aquatic competency assessment tool for children (Fonseca-Pinto & Moreno Murcia, 2025). The Aquatic Competence Assessment for Children (ACA-C) tool is a comprehensive instrument for children aged 6–12 years with a focus on emotional and cognitive responses to aquatic scenarios. The ACA-C conceptualises aquatic competence as a multidimensional construct encompassing three domains: aquatic literacy, drowning prevention, and environmental education, and is applicable across both artificial (swimming pools) and natural aquatic environments. The authors emphasised the importance of aligning children's perceived competence with their actual abilities to support safer decision making in diverse and potentially risky water contexts. The ACA-C was validated through a Delphi study with international experts in aquatic education, safety, and drowning prevention to refine item clarity, relevance, and ecological validity. Two pilot studies with children further informed revisions. The final ACA-C protocol comprised seven practical and questionnaire-based tasks across three dimensions with accompanying illustrations to aid children's understanding (example provided in Figure 5). The results indicated strong reliability and validity. Further validation of the tool is required in natural (open water) settings and with children with disabilities.

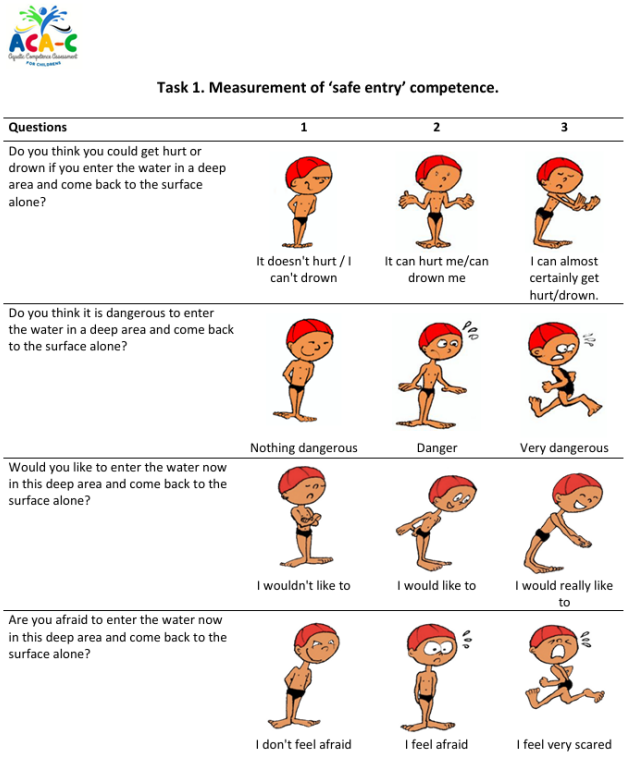


Figure 5. Example of ACA-C questionnaire-based task from Fonseca-Pinto and Moreno Murcia (2025).

In Aotearoa, New Zealand, the Water Skills for Life (WSFL) program is a national aquatic survival program designed to deliver foundational competencies in water safety through a structured school-based curriculum, with a focus on natural water settings. Peden et al. (2025) analysed participation data from 256,511 children and more than 4,000 schools from 2018 to 2023. Participation peaked in 2019 when 30 per cent of public schools were involved, before declining to 22 per cent by 2022, likely due to disruptions associated with the COVID-19 pandemic. Participation varied widely by region, ranging from 2 – 25 per cent of children on the school roll. Exploring socioeconomic differences, children attending schools in the lowest decile (indicating highest socioeconomic disadvantage) had the greatest exposure to the program, reflecting WSFL's funding model that prioritises low-SES communities. Despite reach in disadvantaged communities, overall participation rates indicate substantial room for expansion, as only 10 per cent of eligible students participated in the program nationally. The authors argued that increasing investment, strengthening school uptake, and tailoring delivery to regional needs were vital to reversing recent declines and ensuring equitable access. The findings highlight both the potential and the current limitations of school-based aquatic programs in achieving wide-scale, equitable drowning prevention.

Digital tools for children's beach safety education

Santiago et al. (2026) evaluated and compared the effectiveness of using a one-off virtual reality (VR) video and a non-immersive online water safety game (LSV's 'Swim City') to provide water safety education to primary school children in Victoria, Australia. The study used a cluster-randomised design, whereby classes of children were randomly assigned to either a 45-minute VR video (*n* = 52) or online game condition (n = 49), and completed pre-intervention and one-week post-intervention

knowledge assessments to determine effectiveness. Overall, the VR group recorded significantly greater increases in knowledge than the online game group for safe beach practices, recognition of beach safety signs and flags and rip currents. However, in the VR group, there was a significant decrease from pre-to post-test in knowledge of safety preparations before visiting the beach, contrasting to the online game group who recorded no change from pre- to post-test. Teachers recognised the educational benefits of both platforms: they felt the VR helped introduce students to new environments and experiences and the novelty of the technology was engaging, while the gamification and reward-based tasks in the online game were beneficial. However, as the online game had fewer requirements surrounding technical knowledge and equipment than the VR, it was therefore more practical and easier to implement in practice. Such factors could be considered in future exploration of VR or online games for beach safety education.

Water safety knowledge of Victorian students

Petrass et al. (2026) explored alignment beween Victorian primary school students' water safety knowledge and the Victorian Water Safety Certificate (VWSC), a benchmark for national swimming and water safety competencies. Surveys from Grade 5 and 6 students (n = 99) and their parents were combined with VWSC-aligned assessments conducted by trained swim teachers, revealing substantial gaps in children's theoretical water safety knowledge. Students scored an average of 8.7 out of 15 on a validated knowledge measure, with only 56 per cent of students meeting VWSC knowledge standards. Children performed better on general water safety items than on rescue and lifesaving concepts. For example, only 10 per cent knew what to do if someone collapsed unconscious, and only 15 per cent recognised that distressed swimmers may not wave or call for help. Children who had participated in private swimming lessons and those who spoke English at home demonstrated significantly stronger knowledge than their peers, highlighting cultural and socioeconomic disparities that may affect drowning risk. The study also found a marked disconnect between parental perceptions and actual knowledge: only 26 per cent of parents accurately estimated their child's understanding, while 42 per cent overestimated it. The authors discussed that theoretical water safety knowledge receives inconsistent attention and could be better integrated into classroom learning, teacher training and resources, including culturally appropriate aspects that support multicultural communities.

Systematic review - basic swimming and water safety skills for children

A systematic review was conducted to update the evidence on the effectiveness of basic swimming skills and water safety education on behaviours, skill and knowledge development among children (Criel et al., 2025). The original review underpinned the 2021 World Health Organization recommendation for swimming skills and water safety training for child drowning prevention. Literature searches captured 33 relevant studies, of which 12 were new additions from the previous review, mainly from high-income countries, targeting children aged up to 12 years and involved delivering a swimming skill program. Risk of bias was high across the articles, primarily due to lack of methodological detail and insufficient control for confounding factors. Results suggested utilising more non-traditional methods for swimming education to focus on basic skills,

familiarisation and motor competence over formal skill/stroke development to enhance aquatic competence. There was insufficient evidence to support the use of didactic materials (e.g., floats) to improve skills among children. The review also noted consistent observations of the benefits of educating children in water safety across all interventions observed, regardless of the time commitment.

Parent/carer water safety awareness after children's subsidised swimming lessons

Hanum et al. (2025) explored whether the New South Wales (NSW) First Lap voucher program, which subsidised swimming lessons for preschool-aged children, was associated with changes in parents' and carers' water safety awareness. The programme aimed to reduce financial barriers to early swimming participation, offering two $100 vouchers per child between 2021 and 2023. Using a cohort design, the study analysed responses from parents/carers who completed surveys in both 2022 and 2023 (n = 2,138), measuring awareness of five evidence-based strategies: supervision, restricting access to water, pool fencing, learning to swim and resuscitation. Overall, parents/carers demonstrated high baseline awareness, particularly regarding learning to swim and the importance of supervision. Accordingly, there was a ceiling effect for potential improvements in awareness, however, there was a significant increase in awareness of supervision as a strategy across surveys. Awareness of restricting access to water and resuscitation remained comparatively low. Parents/carers who spoke a non-English language at home had lower awareness across all strategies, reflecting broader inequities in drowning risk and access to water safety resources. In contrast, those living in regional or remote areas showed higher awareness, despite known barriers to swimming lesson access in these communities. The authors concluded that while the program may have contributed to improved awareness of supervision, more targeted parent/carer education is required, particularly for multicultural communities.

Water safety for children with autism

Drowning is the leading cause of death for individuals with Autism Spectrum Disorder (ASD) in the US, related to high rates of elopement, sensory-seeking behaviours, and difficulties recognising danger. Several studies from the US explored ASD-specific drowning risks in children and programs to address these. Firstly, an epidemiological study of unintentional drowning incidents involving children with ASD treated in emergency departments (EDs) compared drowning-related ED visits (2016 – 2020) among children aged 1–19 years with and without ASD (Xie et al., 2025). After adjusting for demographic factors, children with ASD had more than twice the odds of an ED-treated unintentional drowning compared with children without ASD. Additionally, the combined presence of ASD and epilepsy was associated with a markedly elevated risk. Compared with children without ASD, drowning incidents among children with ASD were more likely to occur in swimming pools, natural water bodies, and bathtubs, and were more likely to result in hospital admission or death. Notably, a substantial proportion of drowning-related ED visits among children with ASD occurred in older children and adolescents, contrasting with the predominantly younger age profile seen in children without ASD. Several contributing factors were discussed, including wandering/elopement, co-occurring medical conditions such as epilepsy, sensory and communication challenges, and

potential gaps in supervision and environmental safety. The authors called for targeted, tailored drowning-prevention strategies among this cohort, including enhanced supervision, adaptive swimming and water-safety education, environmental modifications (such as pool fencing and alarms), and anticipatory guidance for families and caregivers.

A qualitative study aimed to understand the perspectives of parents of children (aged 0-17 years) with ASD surrounding their water safety experiences (Cosart et al., 2025). Six focus groups and one interview with 21 participants explored the experiences of 25 autistic children. Themes emerged from the discussions relating to the characteristics of ASD and how this influenced drowning risk and engagement in swimming, e.g., fascination with water, difficulty with communication, wandering, susceptibility to sensory overwhelm. These factors limited family's engagement with and visits to waterways, for safety precautions. Other themes identified a lack of support and education about swimming for children with ASD, costs, limited specialist availability, competing priorities, and the cultural and racial disparities in accessing swimming limiting engagement. Programs and experiences were more positive and effective when there were dedicated environments for the child, when parents were involved, and when teachers were appropriately trained and adapted programs appropriately for the child's needs and learning and communication styles. The authors recommended education about drowning risk and prevention be provided in settings frequented by families of children with ASD, including details of specialised swimming lesson providers, additional training for swim teachers and offering lessons for the whole family.

Another US-based study explored whether community-based swim instructors could be trained using behavioural skills training to teach essential water safety skills to children with ASD (Byun et al., 2025). The program focused on three survival behaviours: finding safety after entering the water, rolling from front to back, and floating on the back while calling for help. Three boys with autism participated. Four swim instructors were trained through a structured 'train-the-trainer' model involving instruction, modelling, role-play and supervised practice. Over three to 24 sessions, all children successfully learned the targeted safety skills and maintained these skills for up to two months afterwards. The students were also able to use these skills at new pools, with different instructors, and under real-world conditions, including performing the skills while wearing everyday clothing. Parents reported very high satisfaction, noting that the program increased their children's confidence and safety around water. The findings demonstrated that community swim instructors can effectively teach water safety skills to children with ASD when supported by evidence-based training and supervision.

Finally, Murphy and Liu (2025) examined how a structured aquatic program, 'Swim Safe: Aquatic Skills Development', improved water orientation, basic water safety, and early swimming skills among children aged 3–13 years old with ASD (n = 23). Using an aquatic orientation checklist, researchers assessed comfort level, safety behaviours, and beginning swimming skills through videotaped pre- and post-program tests. The program was delivered as twice weekly sessions of 45 minutes each for 10 weeks and employed a one-to-one instructor-to-child ratio, with an emphasis on structured entry and exit procedures designed specifically to improve safety for children prone to wandering. The results demonstrated significant improvements in several key areas of water readiness, including that children demonstrated greater willingness to approach the pool, enter and exit using the ladder, and perform foundational aquatic skills such as submerging the face. While

not all improvements reached statistical significance due to small sample size, most skills showed positive trends and meaningful gains in comfort and safety behaviours. The findings highlighted that structured, developmentally appropriate aquatic instruction can reduce resistance, increase comfort, and support acquisition of essential swimming skills. The authors recommended that instructors and programs should take care to reduce sensory overload (e.g., noise from other pool activities) where possible and allow time for substantial repetition of skills for reinforcement.

School programs, socioeconomic conditions and child drowning in the US

A survey of administrators from 90 public school districts (31 per cent of the state's school districts) in Washington State in the United States (US) was conducted to identify barriers and facilitators to implementing school-based water safety programs (Clark & Pears, 2025). Most districts reported not offering water safety lessons and had no plans to do so. Key barriers included time and funding constraints, difficulty accessing pools, and limited stakeholder buy-in. Some administrators noted schools are already overburdened by curriculum and standards mandates, arguing that water safety should be taught by parents. In the few districts with water safety education, supportive leadership, funding support, and community partnerships with recreational pools helped overcome obstacles. The authors recommended that any potential policy mandating water safety education must be coupled with sufficient funding, time, staff, and community partnerships, including outside-school initiatives such as public awareness campaigns, to reduce childhood drowning.

Using the Child Opportunity Index (COI) as a measure of community-level socioeconomic conditions for child outcomes, Mottla et al. (2025) assessed whether children from lower-opportunity communities in the US experience worse outcomes after unintentional drowning. A retrospective, cross-sectional analysis of children aged 0–18 years who presented with unintentional drowning to tertiary paediatric hospitals 2016 and 2021 was conducted (n = 4,247). COI was mapped to each child's residential area, categorising communities from 'very low' to 'very high' opportunity based on education, economic, health, social, and environmental factors. The primary outcome was severe drowning, defined as requiring invasive or non-invasive respiratory support, intensive care unit admission, cardiac arrest, poor neurologic outcome, and/or death. It was found that children from 'very low', 'low', and 'moderate' COI communities had significantly higher odds of severe drowning compared with children from 'very high' COI communities. Worsening COI was associated with increased odds of ICU admission, invasive ventilation, cardiac arrest, poor neurologic outcome, and death. Notably, children from 'very low' and 'low COI' areas had more than double the odds of poor neurologic outcomes compared with those from 'very high' COI areas. The findings demonstrated that community-level opportunity is a strong predictor of drowning severity, independent of individual demographic factors. The authors concluded that targeted, equity-focused drowning prevention and emergency response interventions in lower-opportunity communities are essential to reducing severe morbidity and mortality among children in the US.

Water safety issues: drowning among children aged 0 – 14 years

Lack of, or lapse in, supervision by parents/caregivers.
Lack of barriers to waterways in home environments, or outdoor public recreation areas.
Lack of water familiarisation and/or swimming competency of the child.
Lack of parent/caregiver training in CPR and first aid.
Lack of opportunities for children to learn swimming and water safety.
Parent/caregiver lack of awareness of aquatic hazards in the home environment (e.g. bathtubs, pet water bowls and buckets).

PISBTW agency insights on key issues for drowning among children aged 0 – 14 years:

- Lack of opportunities for education in swimming and water safety in early childhood settings (e.g., dryland education).
- There is a need for culturally appropriate education around family caregiving responsibilities, i.e., ensuring that only adults are responsible for supervising younger children around water environments, as reliance on older children can result in inadequate supervision and increased safety risks.
- Lack of awareness of water hazards in unfamiliar environments (e.g., at vacation properties, visiting the homes of relatives/friends), where children may be exposed to new or unrecognised water risks.
- Misinterpretation of water safety messaging due to unfamiliarity with key terms (e.g., "garden ponds", “channels”, “bird baths”), where concepts may not be directly translatable or may be culturally unfamiliar to some communities.
- Gap between supervision expectations (e.g., arm's reach supervision) and caregiver capacity to respond in an aquatic emergency, where caregivers may feel unequipped to safely rescue a child due to limited swimming ability themselves.
- Lack of understanding of the need for ongoing or ‘refresher’ swimming and water safety education across childhood, including for parents/guardians, grandparents and other carers.
- Parent/carer overconfidence in the swimming and water safety skills of their child/ren after insufficient formal lessons.

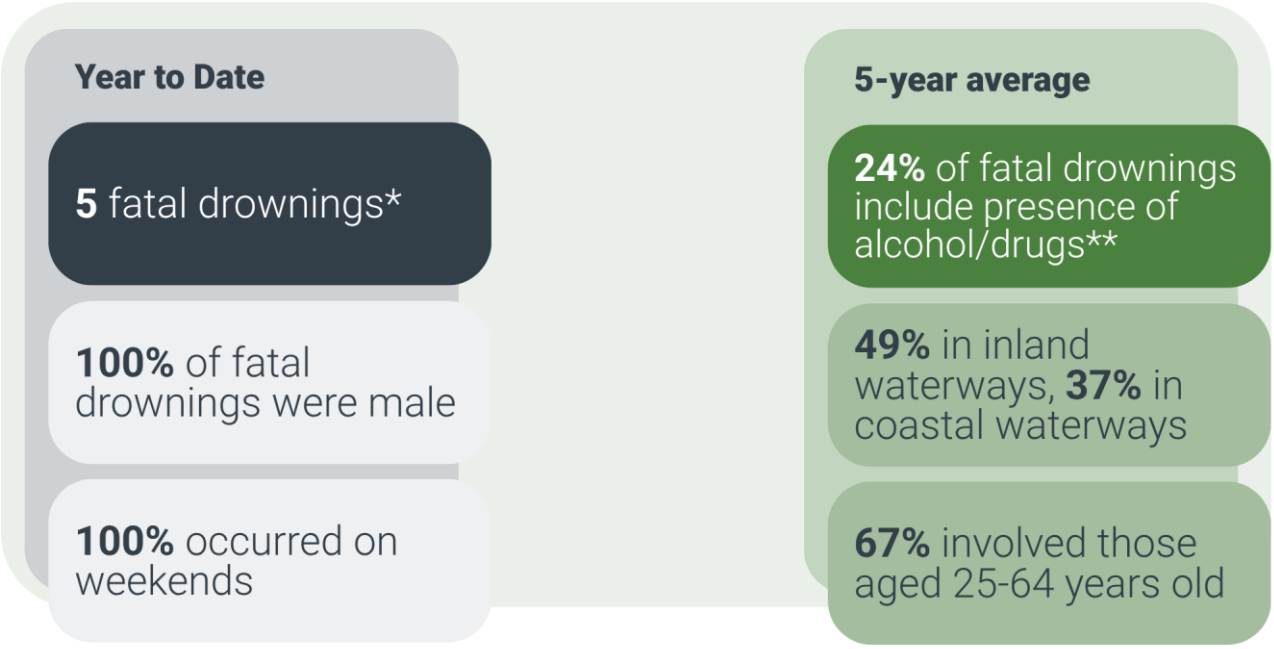
Recommendations: Reduce drowning among children aged 0 – 14 years

Action	Recommendations
Advocacy	• Prioritise drowning prevention education in communities with high socioeconomic disadvantage, e.g., through expanding subsidy or voucher-based programs for families to reduce financial barriers to lessons. • Advocate for improved teacher training and resources on water safety knowledge to improve confidence and preparation to deliver aquatic education in the classroom. • Promote policy support for community-based delivery models, where mainstream swim instructors are trained and supervised in behavioural skills training for children with autism, ensuring scalable access to evidence-based safety instruction. • Emphasise behavioural outcomes beyond 'competent/not competent' in swimming and water safety assessment frameworks.
Education	• Embed evidence-based water safety education in early childhood, healthcare and school programs. • Combine in-water swimming skills with land-based water safety education for maximum impact. • Boost participation in swimming and water safety education in upper primary and early secondary school years, where involvement drops off but risk exposure increases. • Incorporate digital platforms such as VR, interactive games and online modules to complement traditional teaching and address barriers to water safety education. • Develop tailored, multilingual water safety education for parents/carers of children, in particular children with autism (addressing specific risks such as wandering, sensory overload, poor danger awareness and impulsivity). • Train swimming and water safety instructors to meet autistic learners' needs, including communication adaptations and behavioural-support strategies. • Educate parents about the difference between swimming proficiency and water safety knowledge to ensure children receive adequate, regular practical and theoretical water safety education. • Provide targeted education for parents, caregivers, and community members on child supervision, rapid recognition of drowning, and early resuscitation skills including CPR training, especially in areas with high socioeconomic disadvantage. • Integrate environmental education with swimming and water safety education, e.g., including short activities that build connection to local waterways and stewardship behaviours as part of aquatic literacy.
Campaigns and programs	• Expand availability of adaptive or autism-friendly swimming lessons, including offering sensory-friendly pool environments such as quieter sessions, reduced lighting and whole-family participation opportunities.

Action	Recommendations
	• Consider self-rescue training as an additional layer of toddler drowning prevention, particularly for children living near waterbodies, if it is well-tolerated and does not cause undue distress to children. • Develop programs that extend beyond skill practice to generalisation, ensuring children can perform safety skills in real-world scenarios, including other pools and with varied instructors.
Research	• Evaluate transfer of water safety knowledge from digital learning to real-world environments. • Develop and validate more standardised assessment tools for water safety knowledge to reduce variability between swim teacher assessments and ensure reliable measurement across settings. • Investigate the role of parental stress, vigilance and children's avoidance behaviours to better support families of children with autism and reduce unintentional barriers to water exposure and learning.

On track (ensure continued work)

Reduce alcohol and drug related drowning



*Refers to fatal drownings that are suspected to involve alcohol and/or drugs.

**Refers to illegal or misuse of legal drugs.

Research

Outdoor alcohol advertising around waterways

Alcohol promotion in and around waterways is commonplace, often targeting young people and including depictions of mixing alcohol with aquatic activities. A cross-sectional observational study of five Western Australian coastal precincts aimed to identify the presence and content of alcohol advertising, as well as map liquor outlet density and licensed venue proximity (Leavy et al., 2025). Across these districts, 520 advertisements were identified, of which 66 per cent referenced alcohol and, of those, 13 per cent featured an aquatic location such as a beach. These advertisements were more likely to be 'medium-sized' compared to non-alcohol advertisements in the districts and were commonly posters/banners and free-standing signs near establishments serving alcohol (e.g., restaurants) and along the roadside. The authors highlight that this contributes to an *aquatic alcogenic environment* which normalises the consumption of alcohol in combination with aquatic activities, and is of particular concern for young people and tourists who frequent these areas. Further, the high prevalence of alcohol advertising in coastal precincts conflicts with consistent government and agency messaging to avoid alcohol around water, indicating a need for strengthened regulation around alcohol marketing in aquatic environments.

Understanding male alcohol use around water

Males, particularly young males, continue to be overrepresented in fatal drowning statistics in Australia, with alcohol and drug use key risk factors. The beliefs and perspectives of young males on alcohol use were explored by Sas et al. (2025) using the Theory of Planned Behaviour to understand the relationship between attitude, subjective norms and behavioural control. Interviews with males aged 18-30 years (n = 23) were conducted, more than half (56 per cent) of whom believed they could swim more than 200 metres without stopping. Participants identified several perceived advantages of drinking around water, including fun, relaxation and enjoyment (73 per cent), social connection with friends (34 per cent) and cooling off in hot weather (26 per cent). However, they also recognised disadvantages, most notably increased risk of drowning and injury (100 per cent), impaired judgement and overestimation of swimming ability (73 per cent). Normative beliefs were influential: friends commonly approved of individual behaviours, while family approval was mixed. Meanwhile, social disapproval was associated with lifeguards, police and emergency service professionals. Several control beliefs shaped behaviour: for example, drinking around water was more likely when alcohol was accessible, when others were drinking, in warm weather, and when participants felt confident about water conditions. Conversely, behaviour was less likely when alcohol was harder to access, in unsafe water conditions, when children or families were present, or when authorities or clear signage were visible. The authors concluded that despite understanding the risks, young men frequently choose to drink and swim due to social, situational and perceived capability factors. Interventions targeting specific beliefs, particularly social norms, risk misperceptions and contextual cues, are recommended to more effectively reduce alcohol-related drowning among young males.

Bath and hot tub-related drowning deaths in Australia

Darke et al. (2025) investigated the toxicology and circumstances surrounding all adult drowning deaths in baths and hot tubs in Australia between 2015 and 2024. Reviewing 195 coronial cases, the researchers found that most drownings occurred in domestic baths (88 per cent), victims had a mean age of 55 years and were predominantly female (65 per cent). In more than half of these cases, recent alcohol or drug use was found to be contributory, predominantly psychotropic substances and depressants (including hypnosedatives, alcohol, and opioids). Mental health problems were noted in more than half of all cases, particularly affective disorders. Additionally, medical events such as seizures or cardiovascular episodes preceded 17 per cent of drownings, and slips/falls were documented in 9 per cent of cases. The study highlights that intoxication poses a substantial risk in bathing environments, reducing consciousness and increasing vulnerability to accidental submersion, injury, or fatal medical events. The authors argued that public awareness of these risks remains limited, as people generally associate drowning dangers with natural waterways rather than domestic settings. They highlighted the need for targeted public health campaigns warning against bathing while intoxicated and emphasising the need for supervision or regular checks when vulnerable individuals bathe.

Coronial findings

B (23 years old)

B and his girlfriend, G, returned from birthday celebrations in inner Melbourne to G's house in North Warrandyte late on the evening of January 27, 2024 with a number of their friends. B had consumed alcohol and other drugs over the course of the evening. Between 6.30am and 7am the next morning, some of the group went down to the Yarra River, which backed onto G's house, for a swim. B suddenly disappeared while swimming and his friends called Triple Zero. Following an extensive search operation, B's body was located about 14 metres from the bank and 3.5 metres underwater. Toxicology reports indicated mixed drug consumption including ethanol, MDMA, cocaine, ketamine and benzodiazepines. The coroner did not make any recommendations in this case, though provided commentary on the importance of avoiding alcohol and drugs around water, and included a quote from B's mother: *"I just hope this doesn't happen to anybody else's baby. It was such an innocent thing. I do think that the river needs more awareness. It's a wild river and people need to know how dangerous it is to swim there. Unfortunately, they don't."*

Water safety issues: alcohol and drug related drowning

Alcohol and/or drug consumption in, on and around water.
Lack of preparedness and lack of awareness of open water hazards.
Peer pressure and risk-taking behaviours.

Recommendations: Reduce alcohol and drug-related drowning

Action	Recommendations
Advocacy	• Strengthen alcohol marketing regulation in aquatic environments, including restricting placement of alcohol advertising near beaches, rivers and other bodies, and ban or limit advertisements that depict alcohol alongside aquatic activities (e.g., surfing, swimming). • Encourage the restriction of new alcohol outlets near beaches, rivers and pools to reduce ease of access. • Support health professionals to explicitly discuss the dangers of bathing after consuming alcohol or depressant medications with clients who have substance use disorders or affective disorders.
Campaigns & programs	• Develop messaging that addresses misjudgement of personal swimming ability when drinking, highlighting how alcohol impairs coordination, risk appraisal and stamina. • Increase messaging during high-exposure seasons (summer, public holidays) and heatwaves, reflecting peak motivation to drink around water.

Action	Recommendations
	• Develop campaigns that target behavioural beliefs common to young males by reframing disadvantages, such as embarrassment or reputational damage, as powerful deterrents. • Increase awareness that baths and hot tubs are common locations for drownings (intentional and accidental), and that families and carers should remain vigilant.
Research	• Assess behavioural and safety outcomes associated with restrictions on alcohol advertising and outlet density near aquatic environments. • Develop and evaluate public awareness campaigns specifically addressing the risks of bathing while intoxicated. • Investigate intervention strategies that target social and normative influences, including peer-based, family-based, and co-designed approaches, that enable friends and families to discourage risky alcohol-related aquatic behaviours.

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