

## RESEARCH ARTICLE OPEN ACCESS

# Measuring the Swimming Skills of Adults Attending Swimming Lessons in Australia as a Drowning Prevention Measure

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## ABSTRACT

**Introduction:** Swimming and water safety skills are essential for reducing drowning. Swimming and water safety programs primarily focus on children, despite adults accounting for over 80% of fatal drowning in Australia. This study aims to identify types of adult swimming programs in Australia, who attends these programs, and measure their swimming skill achievement against national benchmarks.

**Methods:** A retrospective cross-sectional study of adults attending swimming programs between 2018 and 2021 was conducted. Participant assessment records were analysed against the [Australian] National Swimming and Water Safety Framework and national benchmarks to be achieved by 6 and 12 years old. Descriptive statistics and Chi-square analysis were undertaken.

**Results:** Of 4914 adults attending swimming lessons, 44% were female, median age was 38 years, and 40% were from high socioeconomic areas. On average, adults attended nine lessons, averaging 4.5 h in the water. At their final assessment, 69% could swim at least 5 m (6-year-old benchmark), and 8% could swim 50 m continuously (12-year-old benchmark).

**Conclusions:** Adults of all ages are learning to swim; however, only 8% are achieving the 12-year-old benchmark of swimming 50 m. An equity issue exists, with adults from lower socioeconomic areas and men less likely to be attending swimming programs. Developing and maintaining water safety skills throughout the lifespan is vital for reducing drowning risk among adults.

**So What?** Adults are spending time, money and effort learning to swim, however, more is needed to ensure that participants stay in lessons long enough to develop the necessary skills needed to be safe in the water.

## 1 | Introduction

Swimming and water safety skills are the gateway for enjoying aquatic activities safely and provide lifelong benefits, including mitigation against drowning risk, increased health and well-being, sport and employment opportunities [1–3]. In Australia, swimming is the most popular physical activity/sport for children and

adults, with approximately 30% of the population (over 3.5 million adults and 4.2 million children) participating annually [4]. Other high-income countries (HIC) report lower participation in swimming among adults. In New Zealand, 7% of adults report participating in organised and informal swimming activities annually, compared with 31% of children and young people [5]. In England, approximately 14 million adults swim annually, approximately 4%

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of the population [6] and 28 million people in the USA swim for fitness annually, around 12% of the population [7].

Participating in aquatic activities is not without risk. Globally, drowning is the leading cause of death in aquatic activities, both recreationally, and commercially in the boating, fishing and diving industries [8–10]. Over 295 000 people drown worldwide annually [11, 12], with 90% of the burden occurring in low-and-middle income countries (LMIC), and males and children aged 0–4 years over-represented [11, 12]. In HIC such as Australia, New Zealand and Canada, more than 80% of drowning deaths are among adults [13].

In Australia, on average 279 people drown annually, 80% are aged 18 and over, with males over-represented [14]. Primary school children have the lowest rates of drowning, supporting the effectiveness of long-term drowning prevention education programs [14, 15]. In contrast, males aged 15–19 years and adults over 65 years have the highest age-standardised rates and are identified as priority populations for targeted interventions in the Australian Water Safety Strategy 2030 [15].

Despite the high proportion of adults drowning, little is known about the actual swimming and water safety skills of adults, and if poor swimming and water safety skills increase their drowning risk. Reported levels of swimming and water safety competency among adults have been largely self-reported. A global survey conducted in 2019 reported that 25% of adults in HIC and 75% of adults in LMIC cannot swim, with disparities between males and females (noting that the survey respondents could only state ‘yes’ or ‘no’ in response to the question ‘Can you swim?’) [2]. In Australia, 25% of adults self-reported that they were poor or non-swimmers [16]. A New Zealand study reported that 35% of adults considered themselves as being a poor/non-swimmer and 32% did not think they had the competency to keep safe in open water [17]. Studies of university students found that young adults overestimated their actual ability in performing swimming and water safety skills in a pool environment compared with their perceived ability [18, 19]. Males consistently report higher perceived skills and lower risk perception of drowning than females [20–22].

The World Health Organization (WHO) identifies 10 actions to prevent drowning, ranging from community-based initiatives and policy development and legislation, to teaching school-age children swimming and water safety skills, as well as training bystanders in safe rescue and resuscitation techniques [3]. Some swimming and water safety programs have been found to contribute towards decreased drowning rates among children [23–25]. However, many children and families still face barriers in accessing swimming and water safety education and reach adulthood with limited swimming and water safety skills [26–28]. WHO guidelines recognise that parents/caregivers should be a target audience for learning rescue and resuscitation skills as they are usually the first responders to a drowning incident, often attempting to rescue children and sometimes becoming victims themselves [29]. Studies investigating the impact of bystander rescues recommend that bystanders avoid entering the water in an attempt to rescue someone in difficulty. Instead, recommended steps to encourage self-rescue, include reaching out using an aid, throwing a buoyant item to provide support or

using a rope to pull the person to safety. However, many people inadvertently put themselves at risk by entering the water and swimming towards the person in difficulty [30–32].

In Australia, the National Swimming and Water Safety Framework (The ‘Framework’) was developed in 1999 [33]. This Framework encompasses a holistic set of skills required for safer participation in the water, including safety and survival skills to help individuals respond in an emergency situation. The Framework sets out National Benchmarks for all children to be able to achieve before leaving primary school, or by age 12 years. These benchmarks include the ability to swim 50 m and tread water or stay afloat independently for two minutes [33]. Research identified that 40% of children in Australia were not achieving this National benchmark before leaving primary school, and that many children dropped out of swimming lessons (outside of school) before achieving these minimum skills [26]. Following this research, the Framework was revised in 2019 to include two additional benchmarks to achieve by age 6 and at 17 years (Table 1) [33].

While research on swimming and water skills for drowning prevention has largely concentrated on children and adolescence [23–28, 33–35], adult swimming lessons are available in Australia, however little is known about their use, numbers of people participating and swimming skills achieved. A recent literature review exploring drowning prevention interventions for adults found of the 22 studies reviewed, only six focused on physical swimming skills and ability [36]. To the authors’ knowledge, few studies have focused specifically on the swimming skills of adults attending swimming programs.

Therefore, this study sought to:

- Describe the types of adult swimming programs available in Australia and the skills being taught.
- Describe the participants (age, gender, socioeconomic background), how long they are attending (duration of lesson and number of lessons), and how much money they are spending on learning to swim.
- Analyse adult swimming and water safety skills against the National Swimming and Water Safety Framework Benchmarks.

## 2 | Methods

This was a retrospective cross-sectional study of adults attending swimming lessons in Australia between 2018 and 2021. Data on adult swimming skills was collected from swim schools across Australia and was analysed against the Australian National Swimming and Water Safety Framework (the ‘Framework’) and the National Benchmarks (the ‘Benchmarks’) [33]. A selective purposive sampling approach was utilised to identify and recruit swim schools across Australia that offered swimming programs for adults. For the purposes of this study, ‘adult’ is from 15 years, as a small number of swim programs combined programs for teenagers and adults, where it was inappropriate to include them in children’s programs. For the purposes of this study, the authors refer to a ‘program’ as a set of lessons (e.g. 10 lessons) that usually follows a progressive curriculum, based

**TABLE 1** | Australian National Swimming and Water Safety benchmarks to be achieved by age 6 years, 12 years and 17 years [31].

<b>Strands</b>	<b>By the age of 6 years—100% of children</b>	<b>By the age of 12 years—100% of children<sup>a</sup></b>	<b>By the age of 17 years—50% can achieve</b>
Hazards and personal safety	Identify rules for safe behaviour at aquatic environments at or near the home	Understand and respect safety rules for a range of aquatic environments	Understand behaviours that affect personal safety in aquatic environments and activities
Entry and exit	Enter and exit shallow water unassisted	Enter and exit the water for a range of environments	Assist others to exit deep water using bystanders
Flotation	Float and recover to a standing or secure position	Float, scull or tread water for 2 min and signal for help	Float, scull or tread water for 5 min and signal for help
Swimming	Move continuously for 5 m (5 m)	Swim continuously for 50 m (50 m)	Swim continuously for 400 m (400 m)
Underwater	Submerge the body and move through an obstacle	Surface dive, swim underwater and search to recover an object from deep water	Search in a deep-water environment and recover a person
Lifesaving	Identify people and actions to help in an aquatic emergency	Respond to an emergency and perform a primary assessment	Respond to an emergency and provide first aid
Rescue	NA	Rescue a person using a non-swimming rescue technique with non-rigid aids	Rescue an unconscious person in deep water
Survival sequence	Perform a survival sequence to simulate an accidental entry	Perform a survival sequence wearing light clothing	Perform a survival sequence wearing heavy clothing

<sup>a</sup>These skills have been the National Benchmark for many years, with the 6-year-old and 17-year-old benchmarks included as part of the revision of the Australian National Swimming and Water Safety Framework in 2019 [31].

on skill achievement. ‘Lessons’ are referred to as individual lessons, e.g. number of lessons attended, cost per lesson.

## 2.1 | Recruitment

Data for this research were obtained from swim schools across Australia, including government, non-profit and commercial swim schools that delivered community swimming and water safety programs for adults and teenagers aged 15 years and over. This study included funded (no cost to the participant), subsidised (some contribution but not full price, funder information was not provided) and publicly accessible (full payment) programs for adults. Swim schools were identified from a desktop review of swim schools listed on the AUSTSWIM ([www.austswim.com.au/swim-schools](http://www.austswim.com.au/swim-schools)), Swim Australia ([www.swimaustralia.org.au/find-a-swim-school](http://www.swimaustralia.org.au/find-a-swim-school)) and Royal Life Saving Australia (<https://www.royallifesaving.com.au/educate-participate/swimming/swim-survive-partners/local-swim-and-survive-providers>) websites as of 30 January 2022.

From the desktop audit, 25 swim schools were purposely selected to be included in the study, based on the rationale that not

all swim schools cater for adults. Ten swim schools agreed to be part of the study, resulting in a 40% response rate. Swim schools were recruited via an invitation email from the lead researcher (SWP) and followed up twice. An information sheet was provided to each swim school. Letters of support were provided from each swim school who agreed to be part of the study which gave consent to access and use their data for research purposes.

Swim schools provided de-identifiable data of assessment records of adults who had participated in their swimming and water safety programs between 2018 and 2021. This included demographic information, and any skill assessments collected, usually recorded at the first lesson and when they completed a swim level or completion of their program. Names of individuals and the swim schools were de-identified before being received by the researchers and reporting of the results will not identify swim schools or individual participants.

## 2.2 | Variables Analysed

Variables analysed were gender, age, residential postcode, type of program, frequency of lessons, duration of lesson, cost per lesson,

date started in swim level, name of swim level, date of last assessment, skill being assessed on and the number of lessons attended.

Socioeconomic background was calculated based on the participants home postcode, against the Australian Bureau of Statistics Socio-Economic Indexes for Area based on relative socioeconomic advantage and disadvantage, ranging from decile 1 being the lowest area of socioeconomic advantage and decile 10 being the highest [37]. For the purposes of reporting, socioeconomic background was grouped into three categories: low (decile 1–3), medium (decile 4–6) and high (decile 7–10).

Overall number of swimming lessons an individual attended was calculated based on the date recorded having started lessons and date of last assessment. For public lessons, participants attended one lesson per week. For subsidised and funded programs, these usually encompassed a set number of lessons (e.g. 10 lessons) and were calculated accordingly. Additional information on lesson duration and cost was sought from the swim school in addition to assessment records.

Participant information is routinely collected by swim schools at enrolment, a baseline skill assessment is usually conducted at the first lesson (baseline, when started) and an assessment conducted during the last lesson of the program to measure progress (for the purposes of this study, the final assessment). In Australia, currently, there is no one national database or consistent method for collecting and reporting on swimming assessment data, particularly for adults. The majority of the data collected was from mixed-gender group swimming lessons, with some data collected from single-gender programs (female-only and male-only). Due to the small number of single-gender programs data analysis was aggregated for all programs. This study excluded data from private one-on-one lessons.

### 2.3 | National Swimming and Water Safety Benchmarks

Swim levels and their associated skills were matched to the National Benchmarks (Table 1) and were analysed against gender, age, socioeconomic background, time in lessons. For the purposes of this study, the authors chose to analyse adult swimming skills against the Benchmarks for 12-year-old and 6-year-old children of being able to swim 50 m (50 m) and 5 m (5 m), to compare against previous research [26, 28]. The 17-year-old benchmarks of being able to swim 400 m (400 m) were not included due to the authors hypothesising that there would be few adults included in the dataset able to swim 400 m continuously, as many adults in lessons are just learning to swim.

For the ease of understanding, the results will be presented by swimming distance achieved.

Adult programs in this study were organised into three levels—beginner, intermediate and advanced. However, the skillsets included for each level varied between swim schools and could not be used for analysis purposes. For example, the skills included in ‘beginner’ levels ranged from moving through the water for 3 m (3 m) to swimming 25 m (25 m).

The skills in the ‘intermediate’ level ranged from swimming freestyle 15 to 50 m, backstroke from 10 to 50 m, and survival strokes for 10 m. The advanced skills ranged from swimming freestyle 50 to 100 m, swimming backstroke 25 to 100 m, and treading water for 30 to 60 s.

Progress in levels was calculated by comparing the assessment level at the start of their lessons to the final assessment (either at the end of the program or last assessment on record conducted by the swim instructors). Due to the differences outlined earlier, the authors have chosen to analyse swimming distance achieved, not progress against program levels.

### 2.4 | Data Analysis

Data were cleaned and coded in Microsoft Excel, and IBM SPSS Statistics V27 [38] was used for data analysis. Descriptive statistics and chi-square analysis were undertaken. Achievement of swimming skills for each individual was taken from assessment records provided in the dataset (baseline and final assessment), focusing on swim distance achieved (ranging between 3 and 200 m). Where assessment data was missing for either the baseline or final assessment, this was excluded in the swim skills data analysis, however, demographic data of the individuals were included in the overall analysis.

### 2.5 | Ethics Approval

Ethics approval was given from the James Cook University Human Ethics Research Committee (H8274).

## 3 | Results

A total of 4914 adults attending swimming programs were included in the study, aged between 15 and 84 years (mean 38 years, SD 10.90), 44.2% were female (where gender was known). Where residential postcode was known, 51.4% resided in metropolitan locations and 40.2% resided in high socioeconomic areas (decile rank 7–10) (Table 2).

### 3.1 | Duration of Lessons

In this study, adults generally attended one lesson weekly. The median number of weeks adults attended lessons was 10 weeks (42.8% attended lessons for between 5 and 8 weeks or the equivalent between 1 and 2 months). The median number of lesson adults attended was nine lessons. Lesson time ranged from 30 to 60 min depending on program type (median 30 min). The overall average lesson time was 4.5 h.

### 3.2 | Differences Between the Types of Programs Adults are Attending

In this study, 82.7% attended public swimming programs, 12.9% attended subsidised programs and 4.4% attended fully funded swimming programs (Table 2).

**TABLE 2** | Demographic factors for adults attending swimming lessons ( $N=4914$ ).

	<i>N</i>	%
Gender		
Female	2170	44.2
Male	1373	27.9
Unknown	1371	27.9
Total	4914	100.0
Age group (years)		
15–24	370	7.5
25–34	1333	27.1
35–44	1736	35.3
45–55	548	11.2
55–64	217	4.4
65+	139	2.8
Unknown	571	11.6
Total	4914	100.0
Socioeconomic area of participants		
High (7–10)	1977	40.2
Mid (4–6)	527	10.7
Low (1–3)	97	2.0
Unknown	2313	47.1
Total	4914	100.0
Metropolitan/regional		
Metro	2525	51.4
Regional	84	1.7
Unknown	2305	46.9
Total	4914	100.0
Time in lessons		
1–4 weeks	1056	21.5
1–2 months	2101	42.8
2–4 months	806	16.4
4–7 months	348	7.1
7–12 months	316	6.4
12 months + (1 year or more)	287	5.8
Total	4914	100.0
Cost of lesson (charged to participants)		
\$8.13 <sup>a</sup>	634	12.9
\$16.80	1043	21.2
\$17.00	243	4.9

(Continues)

**TABLE 2** | (Continued)

	<i>N</i>	%
\$17.50	259	5.3
\$19.50	48	1.0
\$21.00	2421	49.3
Unknown	266	5.4
Total	4914	100.0
Program type		
Public lessons	4062	82.7
Partially funded (subsidised)	634	12.9
Fully funded (no cost to participant)	218	4.4
Total	4914	100.0

<sup>a</sup>Subsidised lessons in this study were charged at \$65.00 for 8 1-h lessons over an 8-week period (\$8.13 per lesson).

When analysed by type of program, adults enrolled in public swimming programs attended an average of 10 lessons, based on one, 30-min lesson per week, a median time of 5 h in the water; 39.9% were in lessons for between 1 and 2 months, and 21.0% were in lessons for two months or more. In comparison, adults in subsidised lessons attended eight, one-hour lessons, equating to eight hours in the water, and 65.0% were in lessons for between 1 and 2 months, 19.0% continued in lessons for 2 or more months. Adults attending fully funded (free) attended an average of seven lessons, lesson time varied in funded programs between 30 and 60 min; 51.4% attended 30-min lessons and 48.6% attended 60 min lessons (Supplementary Table S1).

Individual lesson cost varied depending on program type. The cost of public lessons ranged from \$16.80 to \$21.00 per lesson (median \$21.00, 75.0% paid \$21.00). Subsidised programs were charged at \$65.00 for eight, 1-h lessons over an 8-week period (\$8.13 per lesson).

### 3.3 | Swimming and Water Safety Skills Being Achieved by Adults

**Baseline assessment** information was available for 75.0% of participants, of which 49.0% were assessed as being at the beginner level and 48.0% at intermediate level. Data were matched for 86.0% of adult swimmers at their **final assessment**, of which 94.0% of adults did not progress from the level they started lessons compared to their final assessment.

At the completion of their program, overall, 69.1% could swim at least 5 m continuously without assistance, and 7.9% could swim at least 50 m continuously without assistance (Table 3). Over a third (45.1%) of adults could swim 25 m or more, and 3.4% could swim 100 m or more, below the 17-year-old benchmark of swimming 400 m. Almost one-third (30.8%) were unable to swim unassisted and meet any of the Benchmarks (Figure 1) at their final assessment.



**TABLE 3** | Achievement of National Benchmarks<sup>a</sup> (BM) by age, gender, socioeconomic background, time in lessons, program type.

Variable	Total could swim 5 m (6-yo BM)	Total could swim 50 m (12-yo BM) (%)
Total	59.9	7.9
Gender		
Female	57.6%	7.9
Male	52.8%	9.5
Age groups (years)		
15–24	57.8%*	6.6
25–34	63.0%*	5.9
35–44	75.1%*	8.5
45–55	76.3%*	9.4
55–64	71.0%	13.7
65	66.0%	4.1
Socioeconomic background		
High (7–10)	76.7%	13.5
Mid (4–6)	98.2%	5.1
Low (1–3)	98.5%	7.7
Time in lessons		
> 4 weeks	43.5%	4.3
1–2 months	86.8%	8.2
2–4 months	52.0%	7.2
4–7 months	58.3%	9.9
7–12 months	70.8%	7.4
1 year+	72.6%	18.0
Program type		
Public lessons	63.2%	7.6
Partially funded	100.0%	9.6
Fully funded	92.9%	8.3

<sup>a</sup>Based on the Australian National Swimming and Water Safety Framework, benchmarks set out for 6-year-old children of moving 5 m continuously in the water, and for 12-year-old children to swim continuously for 50 m of any stroke.

\*Statistically significant  $p < 0.001$ .

### 3.4 | Analysis by Age, Gender, Socioeconomic Status and Time in Lessons

#### 3.4.1 | Age Groups

At the final assessment, when analysed by age groups, adults aged 45–55 years were more likely to be able to swim a distance of 5 m (6-year-old benchmark distance) compared to other age groups ( $p < 0.001$ ) (Table 3).

The overall proportion of adults being able to swim 50 m (12-year-old benchmark distance) was much smaller, the highest

proportion was being achieved by those aged 55–64 years (13.7%) and the lowest proportion was reported among the 65+ years age group (4.1%) ( $p = 0.024$ ). No differences were found when analysed by gender (Supplementary Table S2).

#### 3.4.2 | Socioeconomic Background

When analysed by socioeconomic background, 90.0% of adults from low- and mid-decile areas were able to swim 5 m ( $p < 0.001$ ) (Table 3). The highest proportion of adults able to swim 50 m were from high decile areas (13.5% compared with 5.1% and 7.7%, respectively) ( $p < 0.001$ ) (Table 3).

#### 3.4.3 | Time in Lessons

Overall, 86.8% of people were able to swim 5 m within two months of attending lessons. The highest proportion of people who could swim 50 m had been in lessons continuously for 12 months or more (18.0%) (Table 3).

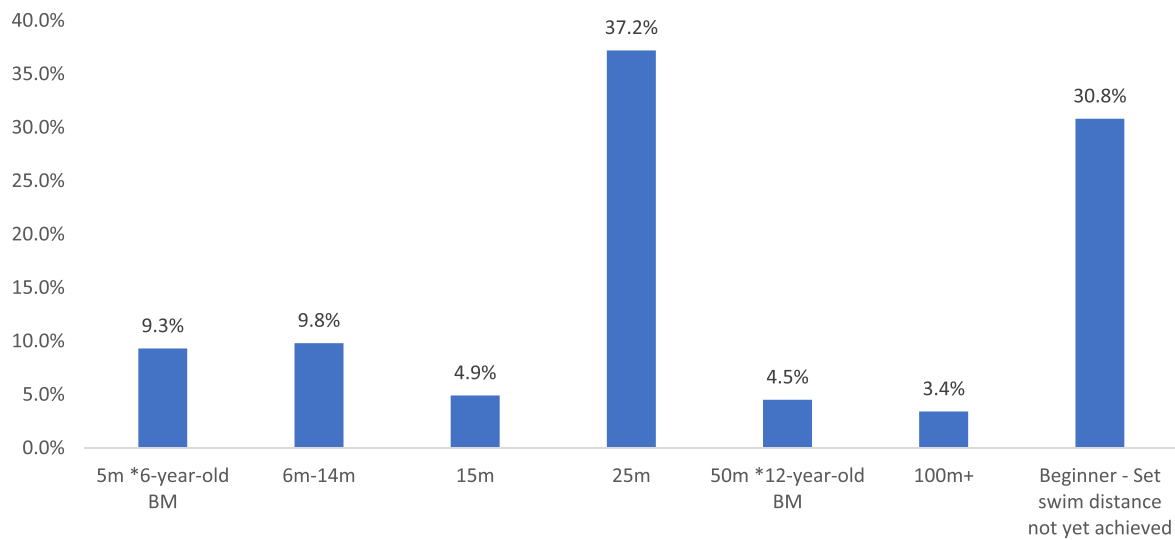
## 4 | Discussion

Drowning is a public health issue that claims over 295 000 lives every year. Swimming and water safety skills are recognised as a community-level strategy for drowning prevention [3], which enables people to enjoy aquatic activities safely. This study sought to explore swimming and water safety programs in Australia catering to adults, focusing on participants and what skills they are achieving. This study highlighted that adults are willingly spending time and money learning to swim, however, the average time spent in lessons for this group was inadequate to achieve the National Benchmarks prescribed in the National Swimming and Water Safety Framework.

### 4.1 | Who are Attending Adult Swimming Lessons?

The majority of adults attending swimming programs in Australia were female, aged between 25 and 44 years, residing in high socioeconomic areas. This is significant as males are over-represented in drowning statistics in Australia and globally [3, 11, 15]; however, they appear to be less likely to be attending swimming programs. While males are over-represented in drowning statistics, studies show that females are also at risk of drowning, with fatal and non-fatal rates among females increasing, in HIC [39, 40]. In addition, females are more likely to be the primary carers of children and conduits for passing on knowledge to their families and communities [41]. Therefore, it is important for both males and females to have the opportunity to learn vital swimming and water safety skills and knowledge.

Where socioeconomic background was known, the majority of adults in this study were from high socioeconomic backgrounds, indicating an equity issue for some communities in accessing swimming lessons, consistent with previous research [26, 27, 42]. Adults in this study were predominantly attending public swimming lessons, an average of nine swimming lessons, at the cost



**FIGURE 1** | Swimming distance being achieved by adults in swimming lessons at their final assessment.

of \$21.00 per lesson: equating to approximately \$200.00 (AUD). This may be beyond the reach for some families, especially if they are prioritising their children to attend lessons. Subsidised programs may be one solution; adults attending subsidised programs in this study had longer time in the water, with a higher proportion able to meet both the 6 and 12 years Benchmarks compared with other program participants.

Seven percent of adults were aged 55 years and over. This cohort reported the highest proportion achieving the 50m benchmark, showing that even later in life you can learn to swim (acknowledging that prior experience in the water was unknown). Increased rates of drowning among older adults have been reported in HIC [43]; perhaps not a surprise when adults are living longer, more active lives. In addition, more grandparents and older relatives are caring for young children, including around water and aquatic environments, reinforcing the importance for older people, especially those in caregiver roles, to keep their swimming, water safety and rescue skills up to date [44, 45]. Health promotion programs with a swimming and water safety focus may provide multiple benefits for older adults, including drowning prevention, improved physical fitness, increased mental health and socialisation [1, 2].

More study is required across the spectrum of adult populations, for example, people from migrant communities, and those with disabilities, to improve their swimming and water safety skills, noting there can be multiple barriers to undertaking physical activity and exercise for some adults [46, 47].

## 4.2 | What are Adults Learning and Achieving in Swimming Lessons?

Most adults were assessed at the beginner level when they started; the authors postulate that many adults sign up to swimming lessons with little prior experience in the water.

Overall, only 8% of participants were able to swim 50m at the completion of their program, with adults who had been in lessons for 12 months or longer most likely able to achieve this distance. In contrast, 37% of total participants were able to swim

25m after an average of nine lessons. These findings show that progress is being made in the right direction within a limited time period, and that additional lessons could help adults achieve the 50m distance as well as other key water safety skills.

In the absence of research exploring adult swim competency, these results are similar to several studies of children's swimming ability. A study of children aged primary school-aged children (6–12 years) attending public swimming lessons in Australia reported that an average of 16 lessons were needed to achieve the Benchmarks of swimming 50m and floating for 2 min [26]. Similarly, a study of 10-year-old non-swimmers in Poland reported steady progress over 25 lessons; however, they were still unable to achieve the expected competencies during the lesson time period, in part due to an initial fear of water [48]. There is a need for better advice around what specific needs adults have in learning to swim and what their progression might look like.

## 4.3 | Importance of Swimming and Water Safety Skills for Adults

The importance of developing water safety and survival skills for drowning prevention cannot be overstated. Studies report that adults are likely to perceive themselves to be 'good swimmers', with males more likely to overestimate their swimming ability compared with females [20–22]. A New Zealand study surveying adults reported that 91% believed they could swim, 70% considered their competence to be *good/very good*, despite 72% estimating they could swim 25m or less [17]. Sadly, approximately five adults drown in Australia every year attempting a rescue, when they may not have the adequate skills or knowledge [30–32, 49, 50]. Learning specific water safety and rescue skills, such as throwing a rope or flotation device instead of jumping in, may reduce these deaths [49]. A stronger focus on water safety and survival skills alongside swimming skills should be considered for adults.

While the overall focus of swimming and water safety programs is to prevent drowning, swimming offers multiple physical and mental health benefits for all ages, including increased fitness

**TABLE 4** | Study recommendations and rationale.

Domain	Recommendation	Rationale
Policy	1. A national curriculum specifically for adults aligned to the National Swimming and Water Safety Framework	To help ensure that adults are consistency working towards appropriate benchmarks
	2. Consistent nationwide policies that support subsidised cost of beginner adult lessons	To remove the financial barrier to adults enrolling in beginner swimming lessons
	3. Greater awareness and implementation of lifejacket retail programs (including discounted lifejackets) when purchasing a boat, paddle craft or fishing equipment	To acknowledge that not all adults who participate in water activities such as boating, or fishing, will enrol/attend swimming lessons, and additional strategies are needed to ensure adults are safe around the water and that prevent drowning
Practice (programs)	<i>Program design</i>	
	4. A greater focus on water safety and survival skills, including resuscitation should be included in adult programs	The WHO suggests that rescue and resuscitation skills are 'lifelong' skills that should be refreshed regularly, starting from childhood and throughout the lifespan [29]
	5. Tailored programs are needed that meet the needs of adult swimmers to ensure that they gain the necessary skills to enjoy the water safely	To ensure that adults gain a comprehensive set of skills and knowledge that can be transferred across locations and when undertaking a range of aquatic activities that are relevant to them. e.g. swimming in clothes, putting a lifejacket on in the water, and how to help someone without putting themselves at risk
Promotion and awareness	6. Programs should be made available to adults of all ages and backgrounds as either introduction or refresher courses	To encourage adults who may have missed out on swimming education as children, as well as maintenance of skills later in life or when supervising young children (e.g. grandparents)
	7. Promote other opportunities that swimming and water safety skills can lead to, such as triathlons, ocean swimming or aqua fitness, as well as employment pathways	To provide motivation for some adults to start and/or continue lessons
Research	8. A national defined minimum dataset should be developed (for adults and children) that record core variables (age, gender, prior experience)	For consistent analysis and comparison against the Framework and National Benchmarks across all ages
	9. Research exploring the true measure of swimming and water safety competencies among adults	To gain an understanding the how swimming competency contributes to drowning risk among adults in a range of situations and environments
	10. Research to understand the barriers men have in learning to swim to aid in their potential attendance of such programs	To provide evidence and inform how current program design and promotion can be modified to encourage more males to attend

levels, relaxation and social cohesion [2, 41]. An Australian study reported that people gain \$26.00 (AUD) of health benefits from visiting their local aquatic centre [51]. Furthermore, development of swimming and water safety skills can lead to community benefits, employment and career pathways, such as pool and beach lifeguards, swim teachers or aquatic activity instructors (diving, sailing, etc.).

#### 4.4 | Teaching Adults vs. Children

Swimming and water safety skills are usually taught in childhood. It is unknown how long people retain these skills as a

protective factor towards drowning into adulthood. This study found that the swim levels and skills being taught to adults are the same as is expected of children; however, adults may take longer to progress and are only achieving basic skills at the completion of their programs. A variety of factors may influence the mastering of new skills and how quickly someone progresses in the water, such as having a fear or little previous experience [41, 52]. The Framework includes a comprehensive list of essential swimming and water safety skills that are relevant for all ages; however, it may be that the teaching technique using adult learning principles and behavioural techniques is what is needed to help adults overcome these barriers to progress [36, 53].



This study identified that adults are spending their time, money and energy learning to swim; naturally, they want to feel like they are getting value for money, which may explain why some adults cease lessons if they are not seeing any progress. While the importance of mastering fundamental skills cannot be underestimated, working towards the transfer of water safety and survival skills from the pool environment to an open water experience may be more appealing and relevant to adults, such as boating, fishing, snorkelling and diving. Studies suggest that swimming and water safety assessments (for all ages) should include an open water component in readiness for participating in various aquatic activities in natural water environments [53, 54].

## 4.5 | Implications

It is encouraging to see adults of all ages and background actively choosing to learn a new skill; however, this study postulates that there may be risks in introducing people to the water, without acquiring the necessary skills needed to be safe. Adults who have participated in such programs have previously reported increased confidence and likelihood of increased participation in the water upon completing their lessons (usually only 10 lessons), despite only acquiring basic skills [41]. This may provide a false sense of security and lead to an overestimation of skills and ability in aquatic environments, actually putting them at increased risk of drowning. As discussed, males are more likely than females to overestimate their skills and lower risk perception of drowning and water safety. A balance is needed to ensure that adults can engage in the water safely while being aware of their limitations, especially when moving from the pool to an open water environment.

## 4.6 | Recommendations

Ten recommendations from this study have been collated into the following domains: policy, practice, promotion (and awareness), research. These recommendations and rationale are presented in Table 4.

## 4.7 | Strengths and Limitations

This was a cross-sectional study of over 4000 adults attending swimming and water safety programs in Australia, how long they are attending for, and the skills they are learning and achieving. This study attempts to address a gap in the literature on the actual skills of adults attending swimming programs; previous literature has generally focused on self-reported data or one-off program evaluations. It does not reflect the wider population as these are people who have chosen to attend adult swim lessons and there are likely to be many who have better swimming skills, as well as those who may have similar or worse swimming skills, including those who have a fear of water, preventing participation.

This analysis on adult swimming skills only focused on the Benchmark swimming skills in the Australian National Swimming and Water Safety Framework, as assessment data provided limited information of other skills. De-identified data

were obtained from selected swim schools and information was restricted to several variables collected by the swim school, which limited the ability to make further assumptions and comparisons against previous research that has been collected, and potentially could have double-counted people. Information was limited to what was routinely collected by swim schools, with missing data common, including gender, age, cultural background, language and residential postcode that would usually be collected as part of the enrolment process. Therefore, this may not be a true representation of all adults attending swimming lessons.

The majority of data in this study were from swim schools in metropolitan locations. More research is needed to address swimming and water safety program availability for adults in regional areas. In 2020 and 2021, the impact of COVID-19 resulted in widespread closures of aquatic facilities and swim schools in Australia, which impacted data collection and the final sample analysed for this study. As the swim schools involved in this study were purposefully selected, there may be a selection bias; study findings should be treated with caution as this study may not be representative of all adults participating in programs across Australia.

Despite these limitations, this study provides new insights on the swim skills of adults and supports the need for regular studies into the real swimming and water safety competencies of adults in addition to self-reported data or one-off program evaluations. It is hoped this study will help to inform future program design to help adults achieve minimum skills to be safer around the water and ultimately reduce their drowning risk.

## 5 | Conclusion

Drowning prevention strategies for adults are complex and require a multi-faceted approach that includes effective policy, legislation and education. Swimming and water safety skills are a recommended drowning prevention strategy that can be implemented at the community level, which provides multiple health, social and economic benefits throughout the lifespan. Encouragingly, this study showed that adults of all ages are learning to swim; however, some are not staying in lessons long enough to achieve the National Benchmarks set out for children. This study highlighted that there may be an equity issue for some adults in accessing swimming and water safety programs, with men and those from low socioeconomic backgrounds less likely to be attending such programs. This study identifies opportunities to develop holistic swimming and water safety programs specifically designed for adults to learn or refresh their skills to reduce the burden of drowning.

## Author Contributions

S.W.P. and R.C.F. developed the research study. S.W.P. and R.C.F. accessed and verified the data. S.W.P. cleaned, coded and analysed the data. S.W.P. and R.C.F. drafted the manuscript. P.A.L. and S.D. provided input into manuscript drafts. All authors reviewed and approved the final manuscript for submission and accept full responsibility for the content.

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## Conflicts of Interest

First author S.W.P. is an employee of Royal Life Saving Society—Australia. R.C.F. is a board member of Royal Life Saving Society—Australia and President of Kidsafe Australia.

## Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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## Supporting Information

Additional supporting information can be found online in the Supporting Information section.