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Changes in parent/carer water safety awareness during a swimming lesson voucher programme implementation in New South Wales, Australia

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ABSTRACT

Background Water safety awareness and swimming lesson participation can reduce drowning risk among children in Australia. Providing financial support for swimming lesson participation could additionally impact knowledge and awareness among parents/carers of the importance of learning to swim as a water safety strategy. Between 2021 and 2023, the New South Wales First Lap voucher programme provided preschool-aged children (ages 3–6 years) with two \$A100 vouchers, one per financial year, for swimming lessons. This study aimed to examine parent/carer changes in water safety knowledge and awareness during this programme implementation period.

Methods This cohort study used survey responses from parents/carers who applied for First Lap vouchers and completed the survey in two consecutive years of the programme. Parents/carers were asked about their knowledge and awareness of five evidence-based strategies to help keep children safe around water, selecting 'yes' or 'no' in response to each strategy. Multinomial regressions examined changes in knowledge and awareness of parents, adjusted for sociodemographic variables.

Results Parents/carers who spoke a non-English language at home were less likely to have or acquire knowledge on water safety strategies. Conversely, parents/carers living in regional/remote areas, having younger children or whose children had previously participated in swimming lessons were more likely to have or acquire water safety knowledge.

Conclusion The increases in knowledge of supervision as a water safety strategy in some population subgroups in this cohort of parents/carers who applied for First Lap programme vouchers suggest that the programme may have contributed to this favourable change.

BACKGROUND

Drowning ranks among the top 10 causes of mortality for children across all nations worldwide, with 0–4-year-olds facing a disproportionately higher risk.¹ According to the WHO, an estimated 66 000 children under the age of 5 drown each year.² In Australia, an average of 278 deaths resulting from unintentional drowning are reported each year, with an average of 20 incidents among children aged 0–4 years.³ Additionally, studies have reported that there are on average 10–15 non-fatal drowning incidents for each fatal incident.⁴ When

WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ Increasing parents/carers' awareness of water safety strategies can contribute to child drowning risk reduction.
- ⇒ Child participation in swimming lessons is an opportunity to provide parent/carer education on water safety strategies.

WHAT THIS STUDY ADDS

- ⇒ There was high pre-existing awareness of water safety strategies among Australian parents/carers, except for those speaking a language other than English at home.
- ⇒ A voucher providing a financial incentive for children to participate in swimming lessons was associated with only a small increase in parent/carer awareness of the importance of supervision to prevent drowning.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

- ⇒ Engaging parents with targeted water safety education alongside children's swimming lessons could be an effective way to enhance drowning prevention policy.

considering age-specific rates, both total and fatal incident rates are highest for ages 0–4 years.^{4,5}

Preventive water safety measures for this age group have often concentrated either on environmental improvements or behavioural change.⁶ Improvements to the environment include the establishment of shallow water zones designated for safe recreational activities for children and the installation of fences as a protective measure to restrict access to water.^{3,7} It is estimated that the implementation of pool fencing laws has resulted in a 30% decrease in child drowning fatalities.⁸ Behavioural modifications include the dissemination of educational materials, increasing awareness of drowning prevention strategies, as well as the introduction of first-aid techniques or resuscitation in the event of a drowning incident.^{3,7} Swimming and water safety lessons, conducted simultaneously with a parent education programme, have demonstrated enhanced awareness among parents of the importance of adult supervision in preventing toddler drowning.⁹ However, lessons cannot be considered absolute protections against drowning incidents that may occur due to barrier failure or inadequate parental supervision.¹⁰ Hence, to



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further protect against drownings, behavioural interventions are necessary, and raising parents' and caregivers' awareness helps prevent injurious incidents involving water.⁶

Swimming lessons are among the most widely used interventions aimed at reducing the risk of drowning,¹¹ particularly in high-income nations. However, several barriers exist for those accessing swimming lessons and cultural, social, environmental and economic factors affect children's ability to achieve proficiency. Children residing in urban (as compared with regional) areas and being of a higher (rather than lower) socioeconomic status (SES) are more likely to have access to swimming and water safety education outside the scope of school-based programmes.¹² Other barriers to participation relevant to 0–4-year-old children include cost, lack of available swim schools, child disability or health needs, family or personal circumstances, parent/carer availability, including to fulfil participation requirements and low parent/carer perceptions of its importance.^{4 13 14}

Encouraging participation in swimming lessons and water safety education for children may also improve parents/carers' understanding of their children's drowning risk and their commitment to supervision as an effective intervention strategy for mitigating the risk of drowning.¹⁵ The extent to which this occurs, though, is unknown.

To address barriers in accessing swimming lessons, the First Lap voucher programme was established in mid-2021 by the government of New South Wales (NSW), Australia's most populous state.¹⁶ During the financial years 2021–2022 and 2022–2023, parents/carers of children aged 3–6 years could apply for two \$100 vouchers to help reduce the cost of swimming lessons.¹⁶ The vouchers could be used for a minimum of five organised and supervised swimming lessons with a participating business that was an approved First Lap provider. This study aims to examine the influence of the First Lap voucher programme on parents/carers' water safety awareness.

METHODS

This cohort study used the responses of parents/carers who completed the First Lap parent survey two times: in July 2022 and April 2023. To be invited to participate in both surveys, their children had to be eligible for a First Lap voucher in both years: preschool-aged children aged 3–5 in the first year of the programme (children aged 6 at the start of the programme were excluded as they were ineligible for the voucher in the second year), residing in NSW, and not enrolled in primary school.¹⁶

Demographic information about the child was collected from the voucher creation survey at time 1. This included age in years, gender, whether they live with a disability, the language spoken at home and the family's residential postcode. Additionally, parents/carers were asked if the child had participated in swimming lessons before. Age was verified with NSW government systems to confirm voucher eligibility; however, 'prefer not to say' was an option for all other questions. Area-level socioeconomic quartile and residential remoteness were derived from the residential postcode entered in the survey using Australian Socio-Economic Indexes for Areas¹⁷ and the Australian Statistical Geography Standard.¹⁸ Due to low numbers in more remote areas, remoteness categories were grouped into two categories: major cities and regional/remote. Similarly, language was categorised as 'English' and 'other'.

In the parent survey, participants were presented with a multiple-choice question to assess their awareness regarding five evidence-based measures to address drowning risk factors and keep children safe around water: supervision; restricting access to

water; pool fencing; learning to swim; resuscitation.^{19 20} Participants could select multiple answers from the options provided. The responses to each of these questions were considered the outcomes of the study.

Data were analysed using Python V.3.14 with the StatsModels V.0.14.1.^{21 22} To identify any differences in awareness among different population groups, frequency and percentages were calculated to describe demographic variables. McNemar's test was used to determine whether changes in awareness of each water safety strategy from surveys 1–2 were statistically significant ($p < 0.05$). Multinomial regression analyses were then carried out to determine changes in awareness of each strategy among parents/carers, adjusted for all sociodemographic variables and whether the child had previously participated in swimming lessons.

The variance inflation factor was used to exclude multicollinearity (all values < 5). Statistical significance was deemed at $p < 0.05$ after Bonferroni correction; each p value was multiplied by the number of comparisons in the model. Interaction terms were added to each model, and a likelihood ratio test was used to check for the presence of effect modification. Results were presented as (adjusted) ORs (aORs) with their 95% CI for 'existing awareness' (answering 'yes' to both surveys), 'increasing awareness' (answering 'no' in survey 1 and 'yes' in survey 2), 'decreasing awareness' (answering 'yes' in survey 1 and 'no' in survey 2); with 'no awareness' (selecting no in both surveys) as the reference category.

Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

RESULTS

A total of 2256 respondents participated in both surveys (figure 1); of these 2138 provided answers on the water safety strategies questions in both surveys and were included in the analysis (94.8%).

Figure 2 presents the parent/carer awareness of each water safety strategy and changes between surveys 1 and 2. All strategies except learning to swim showed increases between the two surveys. Learning to swim (survey 1=2067; 96.6% and survey 2=2063; 96.5%) and supervision were the most commonly

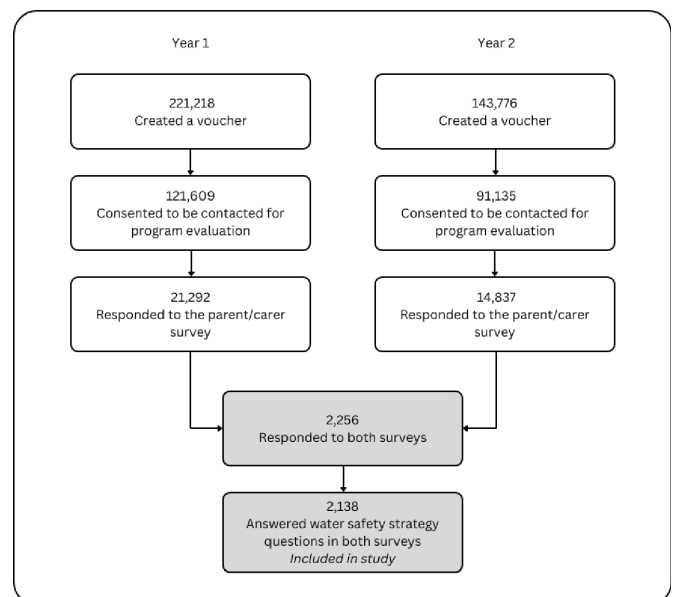


Figure 1 Participant flow chart.

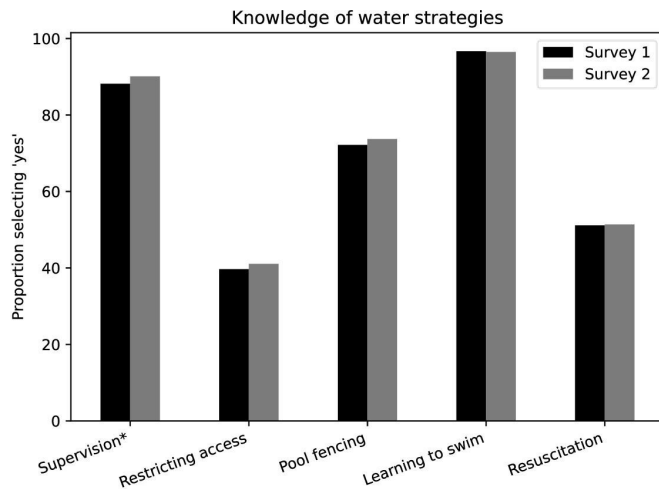


Figure 2 Awareness of water safety strategies reported by parents/carers of children participating in two First Lap programme surveys, 2022–2023. *Statistically significant change detected using McNemar's test ($p=0.01$).

known drowning prevention strategies (survey 1=1885; 87.9% and survey 2=1926; 90.0%), while resuscitation (survey 1=1093; 50.8% and survey 2=1098; 51.0%) and restricting access were the least-known (survey 1=848; 39.4% and survey 2=878; 40.7%). For pool fencing, 1543 (72.1%) of parents/carers indicated awareness of the strategy in survey 1, and 1576 (73.3%) in survey 2. McNemar's test showed that only the overall increase in awareness for supervision was statistically significant ($p=0.01$).

Table 1 presents the demographics of the children of the survey respondents alongside the proportions selecting 'yes' to each strategy in each subgroup. Notably lower proportions of parents/carers of children speaking a non-English language at home (hereafter presumed to be culturally and linguistically diverse; CALD) selected 'yes' for every strategy, and correspondingly selected fewer total strategies at both time points. Similarly, regional and remote parents/carers were more likely to select each of the strategies, and on average selected a higher number of strategies at both time points.

Multinomial modelling revealed the same trend for CALD parents/carers having lower odds of having existing awareness of each strategy at both time points (supervision (table 2) aOR 0.22, 95% CI 0.13 to 0.38; restricting access (table 3) aOR 0.28, 95% CI 0.18 to 0.45; pool fencing (table 4) aOR 0.09, 95% CI 0.06 to 0.14; learning to swim (table 5) aOR 0.13, 95% CI 0.04 to 0.48; resuscitation (table 6) aOR 0.13, 95% CI 0.08 to 0.20), after adjusting for previous participation, age, gender, remoteness and socioeconomic quartile. They also had lower odds of increasing awareness of several strategies (restricting access aOR 0.50, 95% CI 0.31 to 0.81; pool fencing aOR 0.35, 95% CI 0.21 to 0.57; resuscitation aOR 0.13, 95% CI 0.08 to 0.20). However, they also had lower odds of decreasing awareness (restricting access aOR 0.42, 95% CI 0.25 to 0.70; pool fencing aOR 0.36, 95% CI 0.22 to 0.61; resuscitation aOR 0.26, 95% CI 0.15 to 0.46).

Regional/remote parents/carers had higher odds of having existing awareness of resuscitation at both time points (resuscitation aOR 1.52, 95% CI 1.08 to 2.12). Living in a regional/remote area was not associated with increasing awareness of any strategy.

Parents/carers of younger children had higher odds of having existing awareness of supervision, pool fencing, learning to swim and resuscitation at both time points (3-year-olds: supervision aOR 2.01, 95% CI 1.07 to 3.77; pool fencing aOR 2.06, 95% CI 1.37 to 3.09; learning to swim aOR 7.52, 95% CI 1.21 to 46.80; resuscitation aOR 1.61, 95% CI 1.14 to 2.27). Age was not associated with increasing awareness of any strategy.

Having a child with previous participation in swimming lessons was associated with higher odds of parent/carer existing awareness of supervision (aOR 2.43, 95% CI 1.46 to 4.04), pool fencing (aOR 2.97, 95% CI 2.14 to 4.11) and resuscitation (aOR 1.73, 95% CI 1.28 to 2.33). It was also associated with increasing awareness of restricting access (aOR 1.52, 95% CI 1.04 to 2.23), pool fencing (aOR 2.09, 95% CI 1.33 to 3.28) and resuscitation (1.73, 95% CI 1.15 to 2.62). Conversely, it was also associated with decreasing awareness of pool fencing (aOR 2.30, 95% CI 1.42 to 3.73) and resuscitation (1.73, 95% CI 1.14 to 2.63).

The child's gender and the family's area-level SES did not have an effect on the odds of having existing or increasing awareness of water safety strategies for children. No interacting variables were found.

DISCUSSION

Combining swimming lessons and water safety education to enhance parents/carers' awareness of water safety strategies is widely acknowledged as an effective strategy to reduce the risk of drowning.¹⁵ In this study, there was some evidence of improvement in parents/carers' awareness during the programme implementation period.

Interventions for child drowning prevention comprise swimming competency, parental education and restricting access to water.²³ Most parents/carers who responded to survey 1 had high levels of awareness of learning to swim (96.7%) and supervision (88.2%) as strategies that can help keep their children safe around water. As a result, measuring their awareness change or improvement becomes challenging due to a ceiling effect,²⁴ particularly for learning to swim. In contrast, initial awareness of restricting access to water (39.7%) and resuscitation (51.1%) was much lower, with little change during the voucher programme period. This suggests that many parents/carers had partial awareness about water safety strategies; however, minimal changes occurred in a programme that focused solely on swimming lessons for children. Engaging parents with targeted water safety education alongside children's swimming lessons could be an effective way to enhance drowning prevention initiatives.²⁵

CALD parents/carers were much less likely to have existing, or increasing, awareness of water safety strategies for children, instead maintaining a low level of awareness across the study period. Alongside having lower awareness than English-speaking parents/carers at survey 1, this is concerning, particularly given this population's higher risk of drowning.^{5 10 26} This reflects existing research highlighting cultural and attitudinal differences between migrants and non-migrants regarding swimming. Migrant parents may come from places where swimming is uncommon, not considered an essential skill, or not perceived as a recreational activity.^{26–28} Further, parents may unintentionally pass on unhelpful attitudes towards swimming, including fear of water, to their children through resulting differences in practice, confidence and encouragement.²⁶ While the sample size in the present study is too small to break down language further, these findings warrant further investigation given the diversity of this group: it is likely that the reasons vary for each language group. Studies have shown that many CALD individuals want their

Table 1 Awareness of water safety strategies reported by parents/carers in two First Lap parent surveys (n1, n2), 2022–2023, by sociodemographic groups

Sociodemographic variable (survey 1)	Total respondents n (%)	Number of strategies known mean1, mean2 (SD1, SD2)	Water safety strategies n1, n2 (% , %)									
			Supervision	Restricting access	Pool fencing	Learning to swim	Resus					
Child previously participated in swimming lessons (missing: 19; 0.9%)												
Yes	1658 (77.5%)	3.60, 3.67 (1.33, 1.29)	1496, 1530 (90.2%, 92.3%)	683, 719 (41.2%, 43.4%)	1280, 1300 (77.2%, 78.4%)	1614, 1619 (97.3%, 97.6%)	904, 910 (54.5%, 54.9%)					
No	461 (21.6)	3.05, 3.06 (1.47, 1.48)	377, 382 (81.8%, 82.9%)	159, 151 (34.5%, 32.8%)	254, 265 (55.1%, 57.5%)	435, 428 (94.4%, 92.8%)	182, 183 (39.5%, 39.7%)					
Age*												
3	831 (38.9%)	3.55, 3.62 (1.36, 1.33)	741, 760 (89.2%, 91.5%)	334, 361 (40.2%, 43.4%)	625, 633 (75.2%, 76.2%)	811, 810 (97.6%, 97.5%)	442, 441 (53.2%, 53.1%)					
4	911 (42.6%)	3.50, 3.52 (1.36, 1.34)	815, 823 (89.5%, 90.3%)	360, 357 (39.5%, 39.2%)	655, 679 (71.9%, 74.5%)	880, 880 (96.6%, 96.6%)	478, 469 (52.5%, 51.5%)					
5	396 (18.5%)	3.27, 3.35 (1.47, 1.47)	329, 343 (83.1%, 86.6%)	154, 160 (38.9%, 40.4%)	263, 264 (66.4%, 66.7%)	376, 373 (94.9%, 94.2%)	173, 188 (43.7%, 47.5%)					
Gender												
Girls	1034 (48.4%)	3.43, 3.53 (1.40, 1.36)	899, 934 (86.9%, 90.3%)	399, 435 (38.6%, 42.1%)	731, 761 (70.7%, 73.6%)	995, 997 (96.2%, 96.4%)	524, 522 (50.7%, 50.5%)					
Boys	1103 (51.6%)	3.52, 3.53 (1.37, 1.36)	985, 991 (89.3%, 89.8%)	449, 443 (40.7%, 40.2%)	811, 815 (73.5%, 73.9%)	1071, 1065 (97.1%, 96.6%)	568, 576 (51.5%, 52.2%)					
Disability												
No	2077 (97.1%)	3.47, 3.53 (1.38, 1.36)	1830, 1876 (88.1%, 90.3%)	814, 849 (39.2%, 40.9%)	1494, 1531 (71.9%, 73.7%)	2008, 2005 (96.7%, 96.5%)	1060, 1062 (51.0%, 51.1%)					
Yes	35 (1.6%)	4.06, 3.94 (1.11, 1.37)	35, 31 (100.0%, 88.6%)	22, 21 (62.9%, 60.0%)	30, 29 (85.7%, 82.9%)	34, 34 (97.1%, 97.1%)	21, 23 (60.0%, 65.7%)					
Language spoken at home												
English	1854 (86.7%)	3.65, 3.70 (1.31, 1.28)	1680, 1715 (90.6%, 92.5%)	792, 814 (42.7%, 43.9%)	1449, 1478 (78.2%, 79.7%)	1808, 1811 (97.5%, 97.7%)	1041, 1044 (56.1%, 56.3%)					
Other (CALD) (missing: 0)	284 (13.3%)	2.35, 2.39 (1.34, 1.30)	205, 211 (72.2%, 74.3%)	56, 64 (19.7%, 22.5%)	94, 98 (33.1%, 34.5%)	259, 252 (91.2%, 88.7%)	52, 54 (18.3%, 19.0%)					
Area level socioeconomic quartile												
1 (lowest)	325 (15.2%)	3.38, 3.43 (1.45, 1.50)	280, 276 (86.2%, 84.9%)	121, 135 (37.2%, 41.5%)	220, 231 (67.7%, 71.1%)	307, 304 (94.5%, 93.5%)	172, 170 (52.9%, 52.3%)					
2	593 (27.7%)	3.58, 3.65 (1.39, 1.32)	524, 545 (88.4%, 91.9%)	259, 258 (43.7%, 43.5%)	441, 451 (74.4%, 76.1%)	575, 572 (97.0%, 96.5%)	321, 336 (54.1%, 56.7%)					
3	482 (22.5%)	3.54, 3.62 (1.38, 1.31)	434, 447 (90.0%, 92.7%)	208, 201 (43.2%, 41.7%)	353, 371 (73.2%, 77.0%)	463, 464 (96.1%, 96.3%)	249, 263 (51.7%, 54.6%)					
4 (highest)	738 (34.5%)	3.40, 3.41 (1.35, 1.35)	647, 658 (87.7%, 89.2%)	260, 284 (35.2%, 38.5%)	529, 523 (71.7%, 70.9%)	722, 723 (97.8%, 98.0%)	351, 329 (47.6%, 44.6%)					
Remoteness												
Major cities	1686 (78.9%)	3.40, 3.45 (1.40, 1.38)	1469, 1499 (87.1%, 88.9%)	636, 674 (37.7%, 40.0%)	1183, 1207 (70.2%, 71.6%)	1624, 1624 (96.3%, 96.3%)	822, 812 (48.8%, 48.2%)					
Regional/remote	452 (21.1%)	3.77, 3.82 (1.28, 1.24)	416, 427 (92.0%, 94.5%)	212, 204 (46.9%, 45.1%)	360, 369 (79.6%, 81.6%)	443, 439 (98.0%, 97.1%)	271, 286 (60.0%, 63.3%)					

*Children aged 6 in survey 1 were ineligible for the voucher at the time point of survey 2, thus could not participate in survey 2. CALD, culturally and linguistically diverse.

Table 2 Univariable and multivariable multinomial models for selection of supervision in two First Lap parent surveys, 2022–2023 (adjusted OR and 95% CI)

Sociodemographic variable/strategy		Selection in survey 1–selection in survey 2					
		Yes-No (decreasing awareness)		No-Yes (increasing awareness)		Yes-Yes (existing awareness)	
		OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)
Supervision							
Previously participated in swimming lessons	Yes	1.76 (0.92 to 3.36)	1.55 (0.78 to 3.06)	2.24 (1.21 to 4.15)	1.86 (0.97 to 3.55)	3.39 (2.12 to 5.43)	2.43 (1.46 to 4.04)
	No	Reference	Reference	Reference	Reference	Reference	Reference
Age	3	1.15 (0.51 to 2.60)	1.23 (0.53 to 2.84)	1.13 (0.54 to 2.36)	1.19 (0.56 to 2.56)	1.86 (1.03 to 3.34)	2.01 (1.07 to 3.77)
	4	1.28 (0.59 to 2.80)	1.32 (0.59 to 2.94)	0.96 (0.47 to 1.98)	0.97 (0.46 to 2.05)	1.73 (0.98 to 3.05)	1.82 (0.99 to 3.33)
	5	Reference	Reference	Reference	Reference	Reference	Reference
Gender	Female	0.50 (0.27 to 0.94)	0.54 (0.29 to 1.02)	0.85 (0.48 to 1.51)	0.90 (0.50 to 1.62)	0.74 (0.47 to 1.17)	0.76 (0.47 to 1.23)
	Male	Reference	Reference	Reference	Reference	Reference	Reference
Language spoken at home	Non-English (CALD)	0.50 (0.26 to 0.97)	0.59 (0.29 to 1.20)	0.42 (0.23 to 0.78)	0.53 (0.27 to 1.05)	0.15 (0.09 to 0.24)	0.22 (0.13 to 0.38)
	English	Reference	Reference	Reference	Reference	Reference	Reference
Remoteness	Regional/remote	1.84 (0.68 to 4.94)	1.37 (0.47 to 4.01)	2.34 (0.94 to 5.84)	1.70 (0.62 to 4.61)	3.07 (1.39 to 6.77)	2.17 (0.92 to 5.15)
	Major cities	Reference	Reference	Reference	Reference	Reference	Reference
Area-level socioeconomic quartile	1 (lowest)	1.33 (0.59 to 3.02)	1.33 (0.56 to 3.17)	0.90 (0.39 to 2.04)	0.92 (0.39 to 2.20)	0.79 (0.42 to 1.48)	0.73 (0.37 to 1.46)
	2	1.00 (0.44 to 2.27)	0.90 (0.37 to 2.18)	1.47 (0.70 to 3.08)	1.23 (0.55 to 2.76)	1.37 (0.76 to 2.49)	0.97 (0.50 to 1.87)
	3	0.84 (0.34 to 2.09)	0.77 (0.30 to 1.93)	1.2 (0.53 to 2.7)	1.08 (0.47 to 2.48)	1.45 (0.76 to 2.75)	1.18 (0.61 to 2.28)
	4 (highest)	Reference	Reference	Reference	Reference	Reference	Reference

aOR, adjusted OR; CALD, culturally and linguistically diverse.

children to participate in swimming;²⁸ however, face barriers such as Eurocentric pool and swim school environments.^{26–28} Swim schools in NSW have expressed difficulty creating and running CALD-specific programmes, such as the need to shorten swim lesson programmes while retaining essential content, translating materials and finding suitable instructors to teach in the required language.^{26 28} Partnership with communities to develop appropriate water safety education content has been shown to increase skills and knowledge in CALD children and youths,^{29 30} which suggests that the water safety needs of the CALD population could be more adequately addressed by the aquatic industry.

A positive finding was that regional and remote parents/carers had higher odds of having an existing awareness of water safety strategies. This is promising as swimming lessons can be more difficult to access in rural towns,³¹ and regional and remote areas have higher drowning fatality rates than major cities.^{10 32} Similarly, it is promising that parents/carers of younger children had higher odds of having awareness of water safety strategies, as the risk of drowning decreases as children get older.³ However, there were too few responses among remote living parents/carers to examine regional and remote groups separately.

The paradoxical finding that previous participation in swimming lessons was associated with both an increase and a decrease in awareness of water safety strategies can be explained by two competing reasons. Awareness gain may occur due to exposure to child drowning prevention programmes run in public pools where swimming lessons occur, such as the Keep Watch at Public Pools programme.^{19 25} However, parents/carers who have young children enrolled in swimming lessons may be susceptible to

developing optimistic biases regarding the protective effects of these lessons against drowning.^{33 34} As children advance in their swimming lessons, research indicates parents/carers observe that their children are becoming more competent in ensuring their own safety, therefore requiring less attentive supervision.¹⁵ The finding of decreasing awareness is concerning because most children under 5 still lack the developmental skills necessary to keep themselves safe on their own and need active supervision.^{3 15}

This study's findings suggest that the First Lap voucher programme may be effective in improving parents/carers' awareness of water safety strategies, particularly supervision through child participation in swimming lessons. By enrolling children into swimming lessons, parents/carers may be exposed to information about the importance of water safety strategies such as the Keep Watch at Public Pools programme,^{19 35} and become more aware of watching their children around water. However, it may not be expected for a learn-to-swim voucher programme to necessarily improve the awareness of parents/carers since it was not designed particularly for that purpose. Therefore, further research is required to discover strategies that can support policymakers in tailoring a programme to reach and engage more CALD parents/carers and those who live in the lowest socioeconomic, regional and remote areas.

Strengths and limitations

The findings of this study add to the limited research on parents/carers' awareness of water safety strategies as well as

Table 3 Univariable and multivariable multinomial models for selection of restricting access in two First Lap parent surveys, 2022–2023 (adjusted OR and 95% CI)

Sociodemographic variable/strategy		Selection in survey 1–selection in survey 2					
		Yes-No (decreasing awareness)		No-Yes (increasing awareness)		Yes-Yes (existing awareness)	
		OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)
Restricting access							
Previously participated in swimming lessons	Yes	1.27 (0.89 to 1.81)	1.08 (0.74 to 1.56)	1.67 (1.16 to 2.42)	1.52 (1.04 to 2.23)	1.65 (1.22 to 2.23)	1.34 (0.98 to 1.84)
	No	Reference	Reference	Reference	Reference	Reference	Reference
Age	3	1.18 (0.76 to 1.81)	1.19 (0.77 to 1.85)	1.30 (0.87 to 1.96)	1.37 (0.9 to 2.09)	1.11 (0.79 to 1.55)	1.13 (0.80 to 1.59)
	4	1.21 (0.80 to 1.84)	1.20 (0.78 to 1.84)	1.06 (0.70 to 1.59)	1.10 (0.72 to 1.67)	0.96 (0.69 to 1.33)	0.96 (0.68 to 1.35)
	5	Reference	Reference	Reference	Reference	Reference	Reference
Gender	Female	0.86 (0.64 to 1.16)	0.88 (0.65 to 1.19)	1.14 (0.85 to 1.52)	1.13 (0.85 to 1.51)	0.99 (0.78 to 1.26)	0.99 (0.77 to 1.26)
	Male	Reference	Reference	Reference	Reference	Reference	Reference
Language spoken at home	Non-English (CALD)	0.36 (0.22 to 0.59)	0.42 (0.25 to 0.70)	0.44 (0.28 to 0.69)	0.50 (0.31 to 0.81)	0.24 (0.15 to 0.37)	0.28 (0.18 to 0.45)
	English	Reference	Reference	Reference	Reference	Reference	Reference
Remoteness	Regional/remote	1.64 (1.16 to 2.33)	1.40 (0.94 to 2.08)	1.26 (0.88 to 1.80)	1.07 (0.71 to 1.60)	1.50 (1.12 to 2.01)	1.20 (0.86 to 1.67)
	Major cities	Reference	Reference	Reference	Reference	Reference	Reference
Area-level socioeconomic quartile	1 (lowest)	1.35 (0.85 to 2.14)	1.20 (0.73 to 1.96)	1.38 (0.90 to 2.10)	1.43 (0.91 to 2.23)	1.10 (0.76 to 1.62)	1.05 (0.70 to 1.58)
	2	1.48 (1.01 to 2.18)	1.21 (0.79 to 1.87)	1.15 (0.79 to 1.66)	1.07 (0.71 to 1.61)	1.47 (1.09 to 1.99)	1.26 (0.90 to 1.78)
	3	1.65 (1.11 to 2.46)	1.51 (1.01 to 2.28)	1.18 (0.80 to 1.74)	1.13 (0.76 to 1.68)	1.35 (0.98 to 1.88)	1.24 (0.89 to 1.73)
	4 (highest)	Reference	Reference	Reference	Reference	Reference	Reference

aOR, adjusted OR; CALD, culturally and linguistically diverse.

Table 4 Univariable and multivariable multinomial models for selection of pool fencing in two First Lap parent surveys, 2022–2023 (adjusted OR and 95% CI)

Sociodemographic variable/strategy		Selection in survey 1–selection in survey 2					
		Yes-No (decreasing awareness)		No-Yes (increasing awareness)		Yes-Yes (existing awareness)	
		OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)
Pool fencing							
Previously participated in swimming lessons	Yes	2.81 (1.77 to 4.47)	2.30 (1.42 to 3.73)	2.50 (1.63 to 3.84)	2.09 (1.33 to 3.28)	3.96 (2.96 to 5.29)	2.97 (2.14 to 4.11)
	No	Reference	Reference	Reference	Reference	Reference	Reference
Age	3	1.22 (0.72 to 2.09)	1.37 (0.78 to 2.39)	1.33 (0.79 to 2.25)	1.52 (0.88 to 2.64)	1.79 (1.25 to 2.55)	2.06 (1.37 to 3.09)
	4	1.06 (0.63 to 1.80)	1.14 (0.66 to 1.97)	1.36 (0.82 to 2.26)	1.51 (0.89 to 2.57)	1.52 (1.07 to 2.15)	1.68 (1.14 to 2.49)
	5	Reference	Reference	Reference	Reference	Reference	Reference
Gender	Female	0.67 (0.45 to 1.0)	0.68 (0.45 to 1.02)	0.89 (0.61 to 1.30)	0.89 (0.60 to 1.32)	0.86 (0.66 to 1.11)	0.83 (0.61 to 1.11)
	Male	Reference	Reference	Reference	Reference	Reference	Reference
Language spoken at home	Non-English (CALD)	0.30 (0.18 to 0.49)	0.36 (0.22 to 0.61)	0.28 (0.18 to 0.45)	0.35 (0.21 to 0.57)	0.07 (0.05 to 0.10)	0.09 (0.06 to 0.14)
	English	Reference	Reference	Reference	Reference	Reference	Reference
Remoteness	Regional/remote	2.14 (1.25 to 3.67)	1.81 (0.98 to 3.34)	2.25 (1.35 to 3.76)	1.72 (0.96 to 3.08)	2.42 (1.63 to 3.59)	1.71 (1.08 to 2.69)
	Major cities	Reference	Reference	Reference	Reference	Reference	Reference
Area-level socioeconomic quartile	1 (lowest)	0.98 (0.54 to 1.76)	0.87 (0.46 to 1.65)	1.44 (0.83 to 2.52)	1.38 (0.76 to 2.52)	0.94 (0.64 to 1.39)	0.87 (0.55 to 1.37)
	2	1.01 (0.61 to 1.69)	0.73 (0.41 to 1.31)	1.34 (0.81 to 2.21)	0.98 (0.56 to 1.73)	1.31 (0.94 to 1.83)	0.88 (0.59 to 1.33)
	3	1.12 (0.65 to 1.94)	0.97 (0.55 to 1.71)	1.77 (1.05 to 2.97)	1.56 (0.91 to 2.67)	1.38 (0.96 to 1.99)	1.11 (0.74 to 1.67)
	4 (highest)	Reference	Reference	Reference	Reference	Reference	Reference

aOR, adjusted OR; CALD, culturally and linguistically diverse.

Table 5 Univariable and multivariable multinomial models for selection of learning to swim in two First Lap parent surveys, 2022–2023 (adjusted OR and 95% CI)

Sociodemographic variable/ strategy		Selection in survey 1–selection in survey 2					
		Yes-No (decreasing awareness)		No-Yes (increasing awareness)		Yes-Yes (existing awareness)	
		OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)
Learning to swim							
Previously participated in swimming lessons	Yes	0.74 (0.20 to 2.78)	0.70 (0.17 to 2.84)	1.17 (0.31 to 4.45)	1.05 (0.25 to 4.35)	2.59 (0.79 to 8.49)	1.89 (0.53 to 6.76)
	No	Reference	Reference	Reference	Reference	Reference	Reference
Age	3	4.16 (0.59 to 29.25)	3.77 (0.53 to 27.02)	4.85 (0.67 to 34.88)	4.42 (0.6 to 32.43)	7.7 (1.27 to 46.71)	7.52 (1.21 to 46.8)
	4	1.5 (0.37 to 6.08)	1.51 (0.35 to 6.48)	1.85 (0.44 to 7.68)	2.03 (0.46 to 8.90)	2.38 (0.71 to 7.94)	2.68 (0.75 to 9.60)
	5	Reference	Reference	Reference	Reference	Reference	Reference
Gender	Female	0.70 (0.20 to 2.51)	0.81 (0.22 to 2.99)	0.93 (0.26 to 3.36)	0.98 (0.26 to 3.68)	0.72 (0.23 to 2.25)	0.77 (0.23 to 2.50)
	Male	Reference	Reference	Reference	Reference	Reference	Reference
Language spoken at home	Non-English (CALD)	0.69 (0.19 to 2.44)	0.51 (0.12 to 2.15)	0.45 (0.12 to 1.64)	0.34 (0.08 to 1.47)	0.13 (0.04 to 0.41)	0.13 (0.04 to 0.48)
	English	Reference	Reference	Reference	Reference	Reference	Reference
Remoteness	Regional/remote	0.88 (0.17 to 4.53)	0.73 (0.13 to 4.19)	0.53 (0.09 to 3.00)	0.35 (0.06 to 2.23)	1.19 (0.28 to 5.03)	0.64 (0.13 to 3.06)
	Major cities	Reference	Reference	Reference	Reference	Reference	Reference

aOR, adjusted OR; CALD, culturally and linguistically diverse.

voucher schemes, which represent a significant government policy in several Australian states and territories.¹³ While the First Lap programme is not currently operational, findings can inform the direction of future programmes, including improvements to engage parents/carers as well as children.

Findings may need to be considered in a broader context, not only for general parent/carer information on water safety strategies but also for other programmes provided in public pools. This could include mandatory informational sessions on water familiarisation programme, distribution

Table 6 Univariable and multivariable multinomial models for selection of resuscitation in two First Lap parent surveys, 2022–2023 (adjusted OR and 95% CI)

Sociodemographic variable/ strategy		Selection in survey 1–selection in survey 2					
		Yes-No (decreasing awareness)		No-Yes (increasing awareness)		Yes-Yes (existing awareness)	
		OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)	OR (95% CI)	aOR (95% CI)
Resuscitation							
Previously participated in swimming lessons	Yes	2.15 (1.44 to 3.22)	1.73 (1.14 to 2.63)	2.17 (1.46 to 3.22)	1.73 (1.15 to 2.62)	2.22 (1.69 to 2.93)	1.73 (1.28 to 2.33)
	No	Reference	Reference	Reference	Reference	Reference	Reference
Age	3	1.30 (0.82 to 2.04)	1.29 (0.81 to 2.06)	0.97 (0.63 to 1.48)	1.04 (0.67 to 1.61)	1.51 (1.09 to 2.08)	1.61 (1.14 to 2.27)
	4	1.40 (0.90 to 2.19)	1.43 (0.91 to 2.26)	0.98 (0.65 to 1.49)	1.03 (0.67 to 1.57)	1.42 (1.03 to 1.95)	1.49 (1.06 to 2.09)
	5	Reference	Reference	Reference	Reference	Reference	Reference
Gender	Female	1.08 (0.79 to 1.48)	1.08 (0.78 to 1.49)	1.01 (0.74 to 1.38)	1.01 (0.74 to 1.4)	0.93 (0.75 to 1.17)	0.93 (0.73 to 1.19)
	Male	Reference	Reference	Reference	Reference	Reference	Reference
Language spoken at home	Non-English (CALD)	0.23 (0.14 to 0.39)	0.26 (0.15 to 0.46)	0.25 (0.15 to 0.41)	0.32 (0.19 to 0.54)	0.10 (0.06 to 0.16)	0.13 (0.08 to 0.20)
	English	Reference	Reference	Reference	Reference	Reference	Reference
Remoteness	Regional/remote	1.50 (1.00 to 2.26)	1.24 (0.78 to 1.97)	2.00 (1.36 to 2.93)	1.51 (0.98 to 2.35)	2.12 (1.59 to 2.84)	1.52 (1.08 to 2.12)
	Major cities	Reference	Reference	Reference	Reference	Reference	Reference
Area-level socioeconomic quartile	1 (lowest)	1.05 (0.65 to 1.71)	1.10 (0.66 to 1.85)	1.27 (0.77 to 2.10)	1.19 (0.7 to 2.04)	1.42 (1.00 to 2.00)	1.35 (0.91 to 1.98)
	2	1.12 (0.75 to 1.68)	0.98 (0.62 to 1.54)	1.72 (1.15 to 2.58)	1.34 (0.85 to 2.11)	1.66 (1.24 to 2.22)	1.29 (0.92 to 1.80)
	3	1.13 (0.74 to 1.73)	1.04 (0.67 to 1.61)	1.77 (1.16 to 2.69)	1.55 (1.01 to 2.39)	1.47 (1.08 to 2.00)	1.29 (0.93 to 1.79)
	4 (highest)	Reference	Reference	Reference	Reference	Reference	Reference

aOR, adjusted OR; CALD, culturally and linguistically diverse.

of multilingual educational materials during cardiopulmonary resuscitation training, or digital campaigns emphasising water safety strategies.^{20 36}

Limitations include the inability to account for influences outside of the First Lap programme or capture attitudes of parents/carers not engaged with the programme or whose children were entering or leaving the programme, and under-representation of some population groups. Similarly, only parents/carers of participating children were available to be surveyed, potentially introducing an upwards bias towards water safety awareness findings. It is also likely that participants filling out both surveys were more engaged with First Lap and water safety in general: they had higher awareness of all strategies than the overall population of survey responders.³⁷ As well, actual parent/carer behaviours were not measured. In particular, respondents to the parent/carer surveys had much higher voucher redemption rates than the overall population (92% vs 69%) and therefore results reflect the attitudes of those who were more likely to redeem vouchers.³⁷ Despite this, the sample size remained large and included population diversity.

CALD parents/carers were significantly under-represented in participants compared with the NSW population in the 2021 census (13.3% vs 30%), potentially due to the survey being conducted in English.³⁸ Similarly, those residing in areas with the lowest socioeconomic quartile were also under-represented, while those in the highest quartile were over-represented (15.2% vs 34.5%). This may reflect that the programme and surveys, as well as the available learn-to-swim facility lessons, were more or less accessible to parents/carers of children from these groups. The latter reflects known challenges in accessing swimming and water safety education among these priority populations.^{26 39} Finally, the number of parents/carers of children living with disability who responded to the survey was smaller than the overall population of First Lap participants⁴ and was too small to include in the analysis. Further investigation is required to understand the needs of this population.

CONCLUSION

These findings are among the first to evaluate the effect of the First Lap voucher programme on parents/carers' awareness regarding water safety strategies that help keep children safe around water. It found high awareness among parents for most water safety strategies, though there were notable exceptions for people in priority populations, particularly CALD parents/carers, who needed more engagement to increase their awareness of water safety strategies. There was an improvement in awareness of supervision as a water safety strategy among the entire participant population but limited improvement for other strategies. The findings of this study may need to be considered not only for general parent/carer information on water safety strategies but also for other programmes provided in water settings.

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Data availability statement Data may be obtained from a third party and are not publicly available. The data that support the findings of this study are available from the corresponding author on reasonable request.

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