



## Original Research

# Population reach and redemption of swimming lesson vouchers for pre-school-aged children in New South Wales, Australia

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## ABSTRACT

**Objectives:** Swimming and water safety skills are a key drowning prevention intervention. However, there are disparities in engagement and participation across different population groups. In New South Wales (NSW), Australia, the government created a universal AU\$100 swimming lesson voucher program for children aged 3–6 years. This study aimed to characterise the relationship between demographic factors, previous participation in swimming lessons, and voucher reach and redemption in 2022–2023.

**Study design:** Program impact evaluation.

**Methods:** Proportional Reporting Ratios (PRRs) and binary logistic models were used to examine the relationships between self-reported demographic variables and voucher creation (reach) in the NSW population, and redemption.

**Results:** In total, 136,299 vouchers were created, and 104,913 (77.7 %) were redeemed. This represented 47.2 % and 36.3 %, respectively, of the 288,860 eligible children in NSW. PRRs for creation and redemption were lower for children living with disability and speaking non-English languages at home and living in low-socioeconomic and remote areas than for other children. Modelling revealed a strong positive relationship between previous swimming lesson participation and redemption (adjusted odds ratio; aOR 10.82, 95 % confidence interval; CI 9.21–12.71), increasing area-level socioeconomic status (most advantaged compared to least advantaged quintile: aOR 7.19, 95 % CI 5.73–9.01), and in regional/remote areas (aOR 3.10, 95 % CI 2.43–3.96).

**Conclusions:** First Lap vouchers were created and redeemed by a large proportion of children in NSW, however uptake was lower amongst some priority groups. Program targeting is required to reach these groups, particularly those speaking non-English languages at home, living with a disability, and in the lowest socioeconomic areas.

## 1. Introduction

Australia, culturally known to be a “water loving” nation, sees high participation in swimming and other aquatic activities.<sup>1,2</sup> Swimming is the most popular sport-related activity for children under 15, with an estimated almost 2 million children participating in 2023.<sup>3</sup> Learning to swim provides children with foundational skills to reduce injury risk and participate safely in other aquatic activities.<sup>4</sup> Learning basic swimming and water safety skills is recognised as a key intervention for drowning prevention by the World Health Organization.<sup>5</sup> Participation may reduce drowning in children aged 2–4 years,<sup>6,7</sup> and can also increase parental awareness of the importance of supervising children around

water.<sup>8,9</sup>

However, swimming lesson participation is lower in some population groups than among other children, including living in regional and remote areas, as well as areas of low socio-economic status (SES), as well as among children living with disabilities, and children of culturally and linguistically diverse (CaLD) families.<sup>10</sup> Consequently people in these groups have been found to be at higher risk of drowning.<sup>11–14</sup> Further, prior to the COVID-19 pandemic, up to 40 % of all children did not achieve the minimum Australian National Benchmark of being able to swim 50m by 12 years of age.<sup>10</sup> This number is likely to worsen post-pandemic, with ongoing cost-of-living pressures and instructor shortages hindering re-engagement in lessons.<sup>15,16</sup>

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**Table 1**  
Population reach of NSW First Lap voucher program (2022–2023).

Variable	NSW eligible population N = 288,860		Created First Lap voucher N = 136,299 (47.2 %)		Difference Between Groups PRR	Redeemed First Lap voucher N = 104,913 (36.3 %)		Difference Between Groups PRR
	N	%	N	%		N	%	
<b>Age (years; N=136,299)</b>								
3	93,627	32.4	45,551	33.4	1.0	34,004	32.4	1.0
4	96,089	33.3	52,659	38.7	1.2	40,617	38.7	1.2
5	99,138	34.3	38,019	27.9	0.8	30,292	28.9	0.8
<b>Gender (N=135,865)</b>								
Boys	148,377	51.4	69,554	51.2	1.0	53,150	50.8	1.0
Girls	140,482	48.6	66,311	48.8	1.0	51,497	49.2	1.0
<b>Primary language spoken at home (N=136,153)</b>								
English	199,676	69.1	117,965	86.6	1.3	92,682	88.4	1.3
Arabic	8883	3.1	1350	1.0	0.3	749	0.7	0.2
Cantonese	3168	1.1	1151	0.8	0.7	858	0.8	0.7
Korean	2138	0.7	786	0.6	0.9	504	0.5	0.7
Mandarin	11,075	3.8	4501	3.3	0.9	3257	3.1	0.8
Nepali	2076	0.7	890	0.7	1.0	552	0.5	0.7
Vietnamese	3357	1.2	882	0.6	0.5	518	0.5	0.4
Other <sup>a</sup>	58,487	20.2	8628	6.3	0.3	5744	5.5	0.3
<b>Living with a disability (N=134,086)</b>								
Yes	10,753	3.7	3002	2.2	0.6	1930	1.9	0.5
No	278,107	96.3	131,084	97.8	1.0	101,504	98.1	1.0
<b>Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) quintile (N=135,961)</b>								
1 Most disadvantaged	37,087	12.8	15,611	11.5	0.9	10,359	9.9	0.8
2	53,805	18.6	25,172	18.5	1.0	18,746	17.9	1.0
3	48,394	16.8	23,620	17.5	1.0	18,468	17.6	1.0
4	50,248	17.4	22,669	16.6	1.0	17,592	16.8	1.0
5 Most advantaged	99,065	34.3	48,889	36.0	1.0	39,539	37.8	1.1
<b>Location (N=135,950)</b>								
Major City	221,662	76.7	109,095	80.2	1.0	83,881	80.1	1.0
Regional	65,638	22.7	26,641	19.6	0.9	20,725	19.8	0.9
Remote	1296	0.4	214	0.2	0.5	106	0.1	0.3
<b>Previous participation in swimming lessons, past 12 months (N=133,820)</b>								
Yes	N/A		86,068	64.3	N/A	75,776	73.5	N/A
No			47,752	35.7		27,388	26.5	

<sup>a</sup> there were 510 distinct languages entered (including misspellings); analyses were conducted for the 6 most common (other than English) to give sufficient sample sizes for modelling, with all other non-English responses aggregated as “other”.

In response, the government in New South Wales (NSW; Australia’s largest state) launched the First Lap program in December 2021: a universal voucher program offering parents of pre-school-aged children AU\$100 to contribute to swimming lesson costs.<sup>17</sup> The average cost of a lesson in Australia is AU\$15<sup>10</sup> with the voucher required to be used for an intensive or weekly/term-based learn to swim program.<sup>17</sup> Other universal financial incentive programs have had mixed results in increasing children’s participation. Voucher provision has been found to increase children’s and teenager’s participation in sports in Australia and the United Kingdom,<sup>18–20</sup> however a German sports club voucher program and Canadian fitness tax credit were found ineffective.<sup>21,22</sup> Universal programs had varying population reach across sociodemographic groups, generally having lower reach for targeted groups, including low-SES families, females, and CaLD groups.<sup>22–24</sup> There is need for a robust understanding of engagement with the First Lap program through comprehensive evaluation.<sup>17</sup> Qualitative examination of parent/carer’s pre-existing perceived barriers to swimming lesson participation<sup>25</sup> and voucher redemption<sup>26</sup> indicated various challenges to attending lessons and using the vouchers; similarly quantitative findings revealed differences by CaLD groups, rurality, and SES.<sup>27</sup>

This study aims to quantitatively examine the population reach and redemption of the voucher, including associations with child socio-demographic factors, previous participation in swimming lessons.

## 2. Methods

### 2.1. Participants

Participants for this program impact evaluation were children aged 3–5 years for whom a First Lap voucher was created. The NSW Office of

Sport provided anonymised voucher creation survey data and redemption status for all vouchers created in the financial year 2022–23 (July 1, 2022 to June 30, 2023) through a government platform linked to the child’s universal health care card, Medicare.

### 2.2. Measures

The survey contained questions regarding the child’s age (derived from date of birth in the child’s Medicare card) and residential postcode and additional questions on the child’s gender, disability status, primary language spoken at home, and previous participation in swimming lessons with an opt-out option (prefer not to say). Language spoken at home was coded according to the six most common languages spoken in NSW. Where more than one language was specified, the language the participant entered first was used, as it was considered their primary language. Obvious misspellings were accounted for by using carefully selected substrings to match the top languages.

Classifications for the family’s Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) quintile, and their Remoteness Area Structure in the Australian Statistical Geography Standard (ASGS), were derived from the entered postcode.<sup>28,29</sup>

### 2.3. Data analysis

The absence or presence of a voucher redemption date was used to code redemption as a binary variable. The study population of families that created vouchers was descriptively compared to the NSW eligible population of 288,860 children aged 3–5 years.<sup>30,31</sup> Proportional reporting ratios (PRR) were used to calculate the differences between all eligible children and those for whom a voucher was created. Binary

logistic models were then created using SPSS version 28 for the associations between the sociodemographic variables and redemption. Records with missing demographic variables were excluded, resulting in complete-case analysis. Univariable logistic regression models were created to assess the raw association between variables and redemption, then a fully adjusted model accounted for all covariables. The Hosmer–Lemeshow test was used to assess goodness of fit. Interaction tests were created for each combination of covariables; significant interactions were found between several variables so stratified models were subsequently created for previous participation in swimming lessons, area-level socioeconomic status, and remoteness, and significant interactions were also included in the models. The (adjusted) odds ratio (OR) with a 95 % confidence interval are presented in the results, and statistical significance was deemed at corrected  $p < 0.05$ .

### 3. Results

In 2022–2023, vouchers were created for 136,299 children aged 3–5 years, approximately 47 % of all eligible children in NSW (Table 1). A higher proportion of vouchers were created for 4-year-olds (than other ages) and those who primarily spoke English at home, relative to a different language. Correspondingly, a lower proportion of vouchers were created for 5-year-olds, those who spoke five of the six most common languages other than English at home (except Nepali speakers). A lower proportion of vouchers were also created for children living with a disability, those living in the most disadvantaged IRSAD quintile areas, and those living in regional and remote areas compared to their counterparts. Similar proportions of vouchers were created for boys and

girls, and in the upper four IRSAD quintile areas.

Vouchers were redeemed for 104,913 children, 77 % of all vouchers created and approximately 36 % of all eligible children. A higher proportion of vouchers were redeemed for 4-year-olds, those speaking English at home, and those living in the most advantaged IRSAD quintile areas compared to their counterparts. A lower proportion of vouchers were redeemed for 5-year-olds, those speaking a non-English language at home, those living with a disability, in the lowest IRSAD quintile areas, living in regional and remote areas. Similar proportions of vouchers were redeemed for boys and girls, and for those living in the middle three IRSAD quartiles.

Binary logistic regression revealed that 5-year-old children had slightly higher odds of redeeming their voucher than other ages (Table 2). Those living in regional and remote areas had 3 times the odds of redeeming a voucher compared to those living in major cities. There was a clear socioeconomic trend in increasing odds of voucher redemption for those living in more advantaged IRSAD areas, with over 7 times higher odds of redeeming a voucher than those in the least advantaged areas. Similarly, those who had previously participated in swimming lessons had over 10 times the odds of redeeming a voucher. No other associations were significant in the adjusted models.

When stratified by previous participation in lessons (Table 3, 4- and 5-year-old children without previous participation had 18–54 % higher odds of voucher redemption compared to 3-year-olds without participation. This finding was not significant for those with previous participation. Similarly, regional/remote residing children without previous participation had 79 % higher odds of voucher redemption than those residing in major cities, while no association was seen for those with

**Table 2**

Univariate and adjusted binary logistic regression model of the association between sociodemographic variables, previous swimming lesson participation and voucher redemption.

Variable	Redeemed First Lap voucher			
	OR	95 % CI	aOR	95 % CI
<b>Age (years)</b>				
3	reference	reference	reference	reference
4	1.15	1.11–1.18	0.996	0.96–1.03
5	1.33	1.29–1.38	1.04	1.00–1.08
<b>Gender</b>				
Girls	reference	reference	reference	reference
Boys	0.93	0.91–0.96	1.05	0.96–1.14
<b>Primary language spoken at home</b>				
English	reference	reference	reference	reference
Arabic	0.34	0.31–0.38	2.19	0.92–5.24
Cantonese	0.80	0.70–0.91	1.56	0.53–4.57
Korean	0.49	0.42–0.56	1.73	0.46–6.52
Mandarin	0.71	0.67–0.76	1.72	0.71–4.16
Nepali	0.45	0.39–0.51	2.26	0.83–6.13
Vietnamese	0.39	0.34–0.44	2.55	1.02–6.38
Other*	0.54	0.52–0.57	1.61	0.73–3.55
<b>Living with a disability</b>				
No	reference	reference	reference	reference
Yes	<b>0.53</b>	<b>0.49–0.57</b>	0.84	0.65–1.09
<b>Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) quintile</b>				
1 Most disadvantaged	reference	reference	reference	reference
2	1.48	1.42–1.55	1.92	1.56–2.36
3	1.82	1.74–1.90	1.95	1.58–2.42
4	1.76	1.68–1.84	4.86	3.78–6.24
5 Most advantaged	2.14	2.06–2.23	7.19	5.73–9.01
<b>Remoteness</b>				
Major City	reference	reference	reference	reference
Regional	1.05	1.02–1.08	3.10	2.43–3.96
Remote	0.30	0.23–0.39		
<b>Previous participation in swimming lessons, past 12 months</b>				
No	reference	reference	reference	reference
Yes	5.47	5.33–5.63	10.82	9.21–12.71

Location regional and remote variables were combined due to small remote numbers.

Model was additionally adjusted for significant interactions of: gender\*previousparticipation, Location\*disability, Location\*previousparticipation, IRSAD\* previousparticipation, Language\* previousparticipation, Location\*IRSAD, language\*IRSAD, Age\*language.

**Table 3**  
Voucher redemption stratified by previous participation in swimming lessons.

Variable	Participation in swimming lessons, previous 12 months				No participation in swimming lessons, previous 12 months			
	Redeemed First Lap voucher							
	OR	95 % CI	aOR	95 % CI	OR	95 %CI	aOR	95 % CI
<b>Age (years)</b>								
3 (reference)								
4	0.98	0.93–1.03	1.00	0.85–1.17	1.03	0.99–1.07	<b>1.18</b>	<b>1.03–1.35</b>
5	<b>1.06</b>	<b>1.00–1.12</b>	1.03	0.88–1.23	<b>1.05</b>	<b>1.00–1.11</b>	<b>1.54</b>	<b>1.32–1.80</b>
<b>Gender</b>								
Girls (reference)								
Boys	<b>0.93</b>	<b>0.89–0.97</b>	0.89	0.78–1.01	0.98	0.94–1.01	1.06	0.97–1.17
<b>Primary language spoken at home</b>								
English (reference)								
Arabic	<b>0.45</b>	<b>0.36–0.55</b>	0.28	0.06–1.33	<b>0.54</b>	<b>0.47–0.62</b>	1.02	0.65–1.61
Cantonese	0.99	0.75–1.31	0.70	0.15–4.25	<b>1.23</b>	<b>1.04–1.45</b>	1.14	0.67–1.94
Korean	0.81	0.58–1.13	0.84	0.14–5.12	<b>0.75</b>	<b>0.63–0.90</b>	<b>0.52</b>	<b>0.29–0.92</b>
Mandarin	1.06	0.91–1.22	0.85	0.19–3.78	1.08	0.99–1.17	<b>0.67</b>	<b>0.51–0.88</b>
Nepali	<b>0.61</b>	<b>0.46–0.80</b>	0.59	0.11–3.17	<b>0.66</b>	<b>0.55–0.79</b>	0.81	0.46–1.44
Vietnamese	<b>0.62</b>	<b>0.46–0.85</b>	1.01	0.17–6.07	<b>0.64</b>	<b>0.55–0.76</b>	0.91	0.54–1.55
Other*	<b>0.75</b>	<b>0.68–0.82</b>	0.74	0.55–0.98	<b>0.73</b>	<b>0.68–0.77</b>	0.87	0.71–1.07
<b>Living with a disability</b>								
No (reference)								
Yes	<b>0.60</b>	<b>0.52–0.68</b>	<b>0.60</b>	<b>0.53–0.68</b>	<b>0.58</b>	<b>0.52–0.64</b>	<b>0.58</b>	<b>0.52–0.65</b>
<b>Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) quintile</b>								
1 Most Disadvantaged (reference)								
2	<b>1.19</b>	<b>1.10–1.29</b>	<b>1.59</b>	<b>1.12–2.24</b>	<b>1.36</b>	<b>1.28–1.45</b>	<b>1.77</b>	<b>1.36–2.31</b>
3	<b>1.44</b>	<b>1.33–1.56</b>	1.40	0.98–1.98	1.54	1.45–1.64	<b>2.25</b>	<b>1.71–2.98</b>
4	<b>1.41</b>	<b>1.30–1.53</b>	<b>3.78</b>	<b>2.57–5.55</b>	<b>1.57</b>	<b>1.48–1.68</b>	<b>4.10</b>	<b>2.88–5.83</b>
5 Most advantaged	<b>1.33</b>	<b>1.24–1.43</b>	<b>2.30</b>	<b>1.63–3.24</b>	<b>1.95</b>	<b>1.85–2.07</b>	<b>5.49</b>	<b>3.97–7.58</b>
<b>Remoteness</b>								
Major City (reference)								
Regional	<b>0.91</b>	<b>0.86–0.96</b>	1.13	0.98–1.32	<b>1.161</b>	<b>1.11–1.22</b>	<b>1.79</b>	<b>1.59–2.01</b>
Remote	<b>0.20</b>	<b>0.13–0.29</b>			<b>0.51</b>	<b>0.34–0.75</b>		

Location regional and remote variables were combined due to small remote numbers.

Model was additionally adjusted for significant interactions of: Age\*location, gender\*IRSAD, gender\*language, location\*IRSAD.

**Table 4**  
Voucher redemption stratified by area-level socioeconomic status.

Variable	Quintile 1 (most disadvantaged)				Quintile 2				Quintile 3				Quintile 4				Quintile 5 (most advantaged)			
	Redeemed First Lap voucher																			
	OR	95 % CI	aOR	95 % CI	OR	95 % CI	aOR	95 % CI	OR	95 % CI	aOR	95 % CI	OR	95 % CI	aOR	95 % CI	OR	95 % CI	aOR	95 % CI
<b>Age (years)</b>																				
<b>3 (reference)</b>																				
<b>4</b>	<b>1.12</b>	<b>1.03-1.21</b>	1.16	0.87–1.54	<b>1.13</b>	<b>1.05-1.20</b>	0.96	0.76–1.22	<b>1.12</b>	<b>1.05-1.21</b>	1.14	0.88–1.46	<b>1.26</b>	<b>1.17-1.36</b>	1.07	0.83–1.38	<b>1.15</b>	<b>1.09-1.21</b>	0.90	0.75–1.08
<b>5</b>	<b>1.29</b>	<b>1.19-1.41</b>	1.18	0.87–1.62	<b>1.28</b>	<b>1.19-1.37</b>	0.99	0.77–1.29	<b>1.35</b>	<b>1.25-1.46</b>	1.29	0.96–1.71	<b>1.44</b>	<b>1.33-1.56</b>	1.07	0.80–1.44	<b>1.39</b>	<b>1.31-1.47</b>	0.83	0.68–1.03
<b>Gender</b>																				
<b>Girls (reference)</b>																				
<b>Boys</b>	0.95	0.89–1.01	<b>1.36</b>	<b>1.06-1.74</b>	<b>0.89</b>	<b>0.84-0.95</b>	1.14	0.92–1.40	<b>0.92</b>	<b>0.87-0.98</b>	0.99	0.79–1.23	<b>0.91</b>	<b>0.85-0.97</b>	1.00	0.79–1.26	0.96	0.92–1.01	1.00	0.85–1.19
<b>Primary language spoken at home</b>																				
<b>English (reference)</b>																				
<b>Arabic</b>	<b>0.37</b>	<b>0.30-0.44</b>	2.12	0.85–5.32	<b>0.35</b>	<b>0.29-0.43</b>	1.99	0.85–4.65	<b>0.42</b>	<b>0.29-0.61</b>	0.13	0.02–1.12	<b>0.51</b>	<b>0.38-0.69</b>	0.88	0.21–3.70	<b>0.61</b>	<b>0.42-0.87</b>	0.69	0.13–3.80
<b>Cantonese</b>	<b>0.55</b>	<b>0.33-0.91</b>	1.52	0.14–16.28	0.69	0.37–1.27	0.706	0.03–14.70	<b>0.59</b>	<b>0.36-0.96</b>	2.59	0.24–27.49	0.86	0.64–1.15	1.26	0.26–5.99	<b>0.71</b>	<b>0.59-0.83</b>	1.08	0.50–2.33
<b>Korean</b>	0.78	0.33–1.87	0.98	0.02–50.68	<b>0.53</b>	<b>0.29-0.98</b>	1.08	0.04–27.75	<b>0.36</b>	<b>0.24-0.52</b>	0.32	0.05–2.25	<b>0.45</b>	<b>0.30-0.65</b>	1.20	0.13–10.89	<b>0.43</b>	<b>0.35-0.51</b>	<b>0.30</b>	<b>0.12-0.75</b>
<b>Mandarin</b>	<b>0.69</b>	<b>0.49-0.97</b>	0.58	0.10–3.20	<b>0.63</b>	<b>0.47-0.84</b>	2.11	0.48–9.23	<b>0.68</b>	<b>0.52-0.89</b>	0.88	0.23–3.29	<b>0.60</b>	<b>0.52-0.70</b>	0.82	0.39–1.70	<b>0.62</b>	<b>0.57-0.67</b>	<b>0.45</b>	<b>0.30-0.68</b>
<b>Nepali</b>	<b>0.55</b>	<b>0.35-0.85</b>	2.76	0.35–21.89	<b>0.46</b>	<b>0.33-0.64</b>	3.12	0.60–16.33	<b>0.42</b>	<b>0.32-0.55</b>	1.53	0.42–5.56	<b>0.44</b>	<b>0.34-0.58</b>	0.46	0.11–1.76	<b>0.42</b>	<b>0.31-0.55</b>	0.33	0.09–1.25
<b>Vietnamese</b>	<b>0.57</b>	<b>0.47-0.70</b>	1.63	0.64–4.17	<b>0.39</b>	<b>0.29-0.52</b>	0.95	0.22–4.03	<b>0.43</b>	<b>0.24-0.78</b>	1.15	0.05–25.96	<b>0.52</b>	<b>0.36-0.75</b>	1.81	0.33–9.85	<b>0.39</b>	<b>0.25-0.60</b>	0.36	0.06–2.37
<b>Other*</b>	<b>0.40</b>	<b>0.35-0.46</b>	1.59	0.86–2.94	<b>0.40</b>	<b>0.36-0.46</b>	0.87	0.49–1.56	<b>0.54</b>	<b>0.48-0.61</b>	1.34	0.75–2.38	<b>0.57</b>	<b>0.52-0.63</b>	0.85	0.52–1.36	<b>0.65</b>	<b>0.60-0.71</b>	<b>0.60</b>	<b>0.40-0.90</b>
<b>Living with a disability</b>																				
<b>No (reference)</b>																				
<b>Yes</b>	0.55	0.46–0.66	0.90	0.49–1.67	<b>0.54</b>	<b>0.46-0.64</b>	0.80	0.47–1.36	<b>0.51</b>	<b>0.43-0.60</b>	1.30	0.74–2.28	<b>0.56</b>	<b>0.46-0.68</b>	0.71	0.28–1.77	<b>0.58</b>	<b>0.50-0.68</b>	0.79	0.34–1.82
<b>Previous participation in swimming lessons, past 12 months</b>																				
<b>No (reference)</b>																				
<b>Yes</b>	6.37	5.90–6.88	13.82	9.71–19.66	5.57	5.24–5.93	11.85	8.95–15.70	5.94	5.55–6.36	8.18	6.07–11.01	5.71	5.33–6.11	12.09	8.06–18.15	4.34	4.14–4.55	5.29	3.80–7.36
<b>Location</b>																				
<b>Major City (reference)</b>																				
<b>Regional/remote</b>	1.74	1.62–1.87	3.44	2.11–5.61	1.33	1.26–1.41	2.49	1.62–3.83	1.30	1.21–1.39	3.66	2.29–5.85	<b>0.78</b>	<b>0.67-0.90</b>	2.06	0.73–5.83	<b>0.76</b>	<b>0.67-0.86</b>	1.17	0.47–2.92

Model was additionally adjusted for significant interactions of: gender\*language, Location\*disability, gender\*previousparticipation, Language\*previousparticipation, Location\*previousparticipation, Age\*language, Age\*gender.

**Table 5**  
Voucher redemption stratified by remoteness.

Variable	Remoteness: Major city				Location: Regional/remote			
	Redeemed First Lap voucher							
	OR	95 %CI	aOR	95 %CI	OR	95 %CI	aOR	95 %CI
<b>Age (years)</b>								
<b>3 (reference)</b>								
<b>4</b>	1.16	1.13-1.20	1.00	0.86-1.16	1.07	1.00-1.14	1.07	0.83-1.37
<b>5</b>	1.37	1.32-1.42	1.13	0.95-1.34	<b>1.19</b>	<b>1.10-1.28</b>	<b>0.67</b>	<b>0.50-0.88</b>
<b>Gender</b>								
<b>Girls (reference)</b>								
<b>Boys</b>	0.94	0.91-0.96	0.98	0.95-1.01	<b>0.91</b>	<b>0.86-0.96</b>	0.94	0.89-1.01
<b>Primary language spoken at home</b>								
<b>English (reference)</b>								
<b>Arabic</b>	0.33	0.30-0.37	1.23	0.71-2.15	0.64	0.29-1.40	0.43	0.00-493.72
<b>Cantonese</b>	0.79	0.69-0.90	0.81	0.33-1.97	0.79	0.25-2.48	a	a
<b>Korean</b>	0.48	0.41-0.55	0.51	0.15-1.76	1.87	0.42-8.27	a	a
<b>Mandarin</b>	0.71	0.66-0.76	0.60	0.36-1.00	0.65	0.36-1.16	6.65	0.19-234.70
<b>Nepali</b>	0.43	0.37-0.50	1.12	0.49-2.57	0.63	0.37-1.07	8.00	0.49-131.67
<b>Vietnamese</b>	0.39	0.34-0.44	1.25	0.64-2.43	0.19	0.01-0.54	a	a
<b>Other</b>	0.53	0.51-0.56	0.76	0.58-0.99	<b>0.68</b>	<b>0.56-0.82</b>	1.22	0.43-3.43
<b>English (reference)</b>								
<b>(all) other</b>	0.54	0.52-0.56	0.48	0.40-0.57	0.65	0.56-0.77	0.46	0.21-1.02
<b>Living with a disability</b>								
<b>No (reference)</b>								
<b>Yes</b>	0.56	0.51-0.61	0.63	0.57-0.70	0.43	0.36-0.50	0.48	0.41-0.57
<b>Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) quintile</b>								
<b>1 Most Disadvantaged (reference)</b>								
<b>2</b>	1.63	1.54-1.72	1.53	1.25-1.88	1.24	1.16-1.34	1.55	1.20-2.01
<b>3</b>	2.06	1.95-2.18	1.70	1.41-2.15	1.53	1.41-1.66	1.46	1.10-1.94
<b>4</b>	2.19	2.08-2.31	2.04	1.68-2.49	0.97	0.84-1.13	1.83	1.02-3.29
<b>5 Most advantaged</b>	2.66	2.54-2.79	3.66	3.05-4.39	1.16	1.01-1.33	1.51	0.89-2.56
<b>Previous participation in swimming lessons, past 12 months</b>								
<b>No (reference)</b>								
<b>Yes</b>	5.76	5.58-5.94	7.00	6.24-7.85	4.48	4.21-4.76	4.60	3.93-5.37

<sup>a</sup>indicates insufficient sample size for modelling.

Model was additionally adjusted for significant interactions of: Age\*previousparticipation, previousparticipation\*IRSAD, gender\*language, language\*IRSAD, previousparticipation\*language, age\*language, age\* IRSAD.

previous participation. The trend of increasing odds of voucher redemption by IRSAD quintile was present for both those with and without previous participation, however the association was stronger for those without previous participation (see Table 4).

Korean and Mandarin speakers who had previous participated had 33–48 % lower odds of voucher redemption than English, however there were no significant results for any language in those who had previously participated. Those living with a disability had similar, lower odds of voucher redemption for both groups.

When stratified by area-based socioeconomic status, age, gender, and presence of a disability was not associated with redemption rates for any IRSAD quintile. In the most advantaged quintile only, Korean, Mandarin, and other non-English language speakers had lower odds of redemption (although numbers were small so this result should be interpreted with caution). The association of previous participation with redemption was strongest in quintiles 1 and quintile 4 (aOR 12.09, 95 % CI 8.06–18.15), and less strong, but still significant, in the most advantaged group, quintile 5. Similarly, less advantaged regional/remote families in quintiles 2 and 3 had significantly higher odds of redemption, with no association seen in the most advantaged quintiles 4 and 5.

When data were stratified by remoteness, the trend of increasing odds of voucher redemption by IRSAD quintile was again evident in major cities, however in regional/remote areas quintile 4 had the highest odds of redemption (Table 5). While the association of previous participation with voucher redemption was strong in both remoteness categories, it was larger in major cities than in regional/remote areas. Conversely, regional/remote 5-year-olds had 33 % lower odds of voucher redemption than 3-year-olds, and there was no effect by age for children living in major cities. Children who spoke a language other than the six most common languages, and lived in a major city, had 24 %

lower odds of voucher redemption than similar English-speaking children. No association was seen between any language group and redemption in regional/remote areas; however, analysis of individual languages was not possible due to low numbers. Similar to other findings, children living with a disability in both remoteness categories had lower odds of voucher redemption, however the odds were lower in regional/remote areas than in major cities.

#### 4. Discussion

Voucher redemption is a key outcome of interest in evaluating large scale programs such as First Lap, and the large sample size and data collected in this study allowed for examination of redemption among a diverse range of demographic groups. This identified differences among priority population groups that are not often reflected in program evaluation, including disaggregation of language groups and children living with a disability. This study contributes to the literature examining the effect of financial incentives to encourage swimming lesson and physical activity participation. The program had wide reach, with a voucher being redeemed for over 35 % of eligible children in the NSW population. However, voucher creation and redemption rates varied by sociodemographic groups, other than gender.

##### 4.1. Previous participation

There was very high odds of voucher redemption for children who had previously participated in swimming lessons. This suggests that awareness of First Lap was greater for those currently participating, and/or that the program prompted some parent/carers to re-engage with lessons after COVID-19 restrictions had ended. This result is expected given that these parent/carers were found to have much lower

odds of indicating there were barriers to participation,<sup>27</sup> as presumably any barriers had already been overcome without the voucher. Additionally, these families may have been continually enrolled in swimming lessons, familiar with pool policies and/or not have needed to join a waiting list before being able to enrol (and thus redeem a voucher). This result is emphasised by the result that the otherwise strong association between socioeconomic status and voucher redemption was lower in those who had previously participated.

#### 4.2. Socio-economic status

The gradient of increasing odds of redemption with increasing area-level socioeconomic status is consistent with previous research into financial incentives for physical activity in children.<sup>21,23</sup> It is also consistent with other research into the First Lap program, where parent/carers who lived in lower socio-economic status areas had higher odds of reporting that cost and prioritising swimming lessons were barriers to participation.<sup>27</sup> This suggests that the voucher program may have paradoxically widened the gap in participation between the least and most advantaged socioeconomic status groups, as demand increased most from those who may already have been able to afford it (and already had higher participation rates<sup>32</sup>).

Conversely, the finding that the odds of redemption were higher amongst disadvantaged families whose children had previously participated in swimming lessons, and in disadvantaged rural/remote families is promising. This suggests that at least for the subgroup of disadvantaged families who had managed to overcome barriers to lessons previously, the voucher provided an incentive to continue participation in swimming lessons.

#### 4.3. Age

Parent/carers of children aged 4–5 years were more likely to redeem a voucher, despite fewer vouchers being created for 5-year-olds. It is likely that the lower voucher creation rate for 5-year-olds is due to some being already enrolled in primary school and thus ineligible for a voucher. The higher redemption rate for 4–5-year-olds is expected given that similar parent/carers were half as likely to indicate that they thought their child was too young for swimming lessons.<sup>27</sup> Similarly, national survey data suggests that most children begin participating in learn-to-swim programs between the ages of 4–14 years.<sup>33</sup> It is also notable that other research has found an 83 % increase in 0–3-year-olds participating in swimming lessons in NSW between 2019 and 2022; and it was 49 % for ages 4–6 over the same period.<sup>34</sup> This suggests that despite lower redemption rates in the youngest age group, the program may have contributed to increased overall engagement with swimming lessons across the target group.

#### 4.4. Location

The finding that regional/remote parent/carers had much higher odds of redeeming a voucher were promising given this group are identified as priority given higher rates of drowning.<sup>11,12</sup> The finding is also consistent with other research findings that a larger increase in regional swim school enrolments occurred between 2019 and 2022 compared to metropolitan areas (61 % vs 29 %).<sup>34</sup> This was unexpected due to previous findings that these families were more likely to indicate difficulty finding a swim school,<sup>27</sup> and that swim schools are more concentrated in metropolitan areas.<sup>1,35,36</sup> Together this suggests that there may have been an increase in capacity in regional areas, or that First Lap increased demand to closer match supply, but no known data exists on these factors.

On the other hand, univariate analyses suggest that the redemption rate might have been lower for remote areas, but the numbers were too small precluding a detailed analysis of this group. However, it is plausible that remote families may have more difficulty participating in

swimming lessons due to the distances involved, seasonal facilities which are only open for part of the year, and fewer swim schools.<sup>25</sup>

#### 4.5. Living with a disability

While there was no overall significant association between voucher redemption rate among families of children living with a disability, lower redemption rates were found in many of the stratified analyses. In particular, the odds of voucher redemption were significantly lower for children living with a disability in metropolitan, regional and remote areas, regardless of previous participation in swimming lessons. This finding is compounded by the lower voucher creation rate for these children. This may reflect that the voucher was unable to overcome barriers for swimming lessons that cater for disabilities, which may include additional cost, specialised teacher training, and/or logistical hurdles. Indeed, families of children living with a disability were more likely to describe such barriers to swimming lesson participation.<sup>25–27</sup>

#### 4.6. Cultural and linguistic diversity

Findings that language spoken at home had little association with voucher redemption were unexpected, given that this population has previously indicated various barriers to swimming lesson participation, including fears, cultural beliefs and lack of prioritisation.<sup>37</sup> However, the context of a lower proportion of the eligible CaLD population having created a voucher suggests that there may have been lower awareness or appeal in the program. Similarly, the findings that Korean and Mandarin speaking families whose child had not previously participated in swimming lessons had 48 % and 33 % lower odds of voucher redemption, especially in the highest SES quartile, suggests that targeted, community led approaches may be required to engage CaLD families with learn-to-swim programs.

Previous research on barriers to swimming lesson participation found that non-English-speaking families had more difficulty finding swim schools,<sup>27</sup> possibly reflecting the paucity of CaLD-specific programs available.<sup>38</sup> Lower interest in the program could also be affected by differing perceptions about the importance of swimming lessons, where some parent/carers consider them just another extracurricular activity rather than an injury prevention measure.<sup>25</sup>

#### 4.7. Strengths and limitations

The major strength of this study is its large sample size, reaching almost half of the eligible population in NSW. Being the first full year of the program, following a half-year lead-in, may have resulted in higher population awareness of the program and more processes in place to support it. However, this study does not provide information on why people did not redeem vouchers: reasons may be complex although some indications can be found in other studies about First Lap.<sup>25–27</sup> Low numbers of participants in remote areas, and for each language in regional/remote areas, precluded a more specific analysis of redemption for these groups; however unique insights were gained in the unadjusted analyses. Similarly, the relatively higher rate of missing data for disability, particularly among some subgroups, suggests that some participants may have been wary of disclosing that information to a government service. However, the results suggest several avenues for improvement of future programs, including means testing eligibility, and/or other efforts to prioritise benefits towards priority groups, including more targeted communication to raise awareness among groups with low voucher creation and redemption.

#### 4.8. Conclusion

The First Lap program had wide population reach, with a voucher being redeemed for 36 % of eligible pre-school children. Children who

had previously participated in swimming lessons, lived in regional and more advantaged socioeconomic areas, and who were aged 4 or 5 years had higher redemption rates than their counterparts, whereas redemption was lower for children living with a disability, and for some language groups in the highest socioeconomic quartile. This suggests that the program could be improved through targeted eligibility and greater engagement with priority groups.

### Author statements

#### Ethical approval

Ethics approval was obtained from the UNSW Human Research Ethics Committee (HC220282).

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#### Competing interests

None to declare.

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