

Misperceptions about routine childhood vaccination among parents in Australia, before and after the COVID-19 pandemic: a cross-sectional survey study

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Routine vaccination services were disrupted, and misinformation and vaccine hesitancy increased during the coronavirus disease 2019 (COVID-19) pandemic.¹ The largest declines in childhood vaccination coverage were in low and middle income countries.² In Australia, the proportion of 12-month-old children who were fully vaccinated declined from 94.31% in 2019³ to 93.16% in 2023;⁴ among Indigenous children it declined from 92.61%⁵ to 90.39%.⁶ Practical barriers contributed to these changes, but reduced confidence in vaccines was also a factor; general public perceptions of the importance of childhood vaccination had declined in 52 of 55 countries examined by a 2023 UNICEF report.² In Australia, a 2022 report found that the proportion of parents of children aged 0–5 years who strongly support childhood vaccination had declined from 72% in 2017 to 50% in 2022.⁷

As information about the impact of the COVID-19 pandemic on trust and confidence in routine vaccinations is limited, we examined parents' misperceptions regarding routine childhood vaccines and their children's vaccination status before and after the pandemic in Australia. We undertook cross-sectional online surveys of a sample of Australian parents in 2017 (17 January – 6 February) and 2023 (11–21 April). We randomly selected a stratified sample of adults with children under 18 years of age from a nationally representative panel of more than 350 000 Australian adults, managed by the Online Research Unit and recruited by door knocking, phone calls, letters, and email. One person per household could participate, and each person who consented to participation was provided a unique identifier code to ensure anonymity and one-time survey access.

The survey items were developed by members of the research team, based on standardised surveys such as the New South Wales Child Population Health Survey,⁸ with changes informed by a literature search and consultations with paediatricians, social scientists, and vaccination experts. The survey items were not based on validated scales but some items had been used in previous investigations of parental views on vaccination.⁹ The survey was piloted with 100 people and was subsequently reviewed to improve its performance. Apart from requesting demographic details, we asked parents whether they agreed that childhood vaccines cause autism, that they cause eczema or asthma, that they contain harmful ingredients, and that children receive too many vaccines in their first two years of life. We also asked them about their child's vaccination status. All questions were administered by the Royal Children's Hospital (Melbourne) National Child Health Poll ([Supporting Information](#)).

We estimated differences in proportions (with 95% confidence intervals, CIs) in generalised linear models (binomial). All estimates (proportions, differences in proportions, CIs) were

weighted by age, gender, number of children, Indigenous status, and state of residence, using a customised parent population data report prepared for the authors by the Australian Bureau of Statistics from 2021 Census of Population and Housing data¹⁰ and Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) quintile.¹¹ The study was approved by the Royal Children's Hospital Human Research Ethics Committee (35254).

Of 3065 panel members invited to participate in 2017, 1992 provided complete responses (65%), and 2014 of 2616 in 2023 (77%). The characteristics of our sample matched those of all Australian parents in terms of state/territory of residence, gender, and age ([Supporting Information](#), table). The weighted proportion of parents who believed that children receive too many vaccines was larger in 2023 than 2017 (25.2% *v* 17.2%; difference, 7.9 [95% CI, 4.3–11.6] percentage points), as was that of parents who believed that vaccines cause autism (14.4% *v* 8.7%; difference, 5.7 [95% CI, 2.8–8.4] percentage points) or that vaccine ingredients cause harm (19.4% *v* 14.6%; difference, 4.9 [95% CI, 1.6–8.1] percentage points). The proportion who believed that vaccines caused allergies was smaller in 2023 than in 2017 (15.6% *v* 21.0%; difference, –4.9 [95% CI, –8.7 to –1.6] percentage points). The weighted proportions for the four misperceptions were generally larger among parents without fully vaccinated children, those aged 18–39 years (compared with older age groups), single parents, parents who spoke a language other than English at home, and parents who lived in major cities (compared with regional or remote areas) ([Box](#)).

Parents reported the vaccination status of 3571 children in 2017 and 3324 children in 2023. The weighted proportion of children reported as fully vaccinated declined from 94.8% in 2017 to 87.0% in 2023 (difference, 7.7 [95% CI, 5.1–10.2] percentage points); the weighted proportion of partially vaccinated children increased from 3.7% to 9.0% (difference, 5.0 [95% CI, 2.9–7.1] percentage points).

We found concerning increases between 2017 and 2023 in the proportions of Australian parents expressing misperceptions about childhood vaccinations. The decline in parent-reported vaccination of their children was larger than recorded in the Australian Immunisation Register,^{3,4} but directly comparable vaccination coverage numbers for all children aged 0–17 years are not available. The lower coverage reported by parents could indicate recall bias or self-selection bias; that is, our respondents may have included a large number of parents with more concerns about vaccination than the general public. Although representative by age, gender and jurisdiction, the representativeness of our sample by socio-economic status and remoteness is unclear, and generalising our findings to all parents in Australia should be undertaken with caution.

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Parents' agreement with statements regarding routine childhood vaccination in Australia, 2017 and 2023*

Parent's characteristics	Number (weighted proportion*)									
	Parents		Vaccines cause autism		Vaccines cause eczema or asthma		Vaccine ingredients cause harm		Children get too many vaccines	
	2017	2023	2017	2023	2017	2023	2017	2023	2017	2023
All survey respondents	1992	2014	193 (8.7%)	272 (14.4%)	418 (21.0%)	300 (15.6%)	311 (14.6%)	362 (19.4%)	310 (17.2%)	474 (25.2%)
Age group (years)										
18–29	196	186	34 (15%)	52 (23%)	58 (28%)	56 (29%)	49 (24%)	61 (30%)	52 (26%)	67 (35%)
30–39	771	543	80 (9.7%)	107 (21%)	185 (24%)	122 (22%)	127 (15%)	129 (24%)	135 (19%)	174 (31%)
40–49	629	722	45 (6.4%)	69 (9.1%)	110 (17%)	74 (10%)	76 (12%)	100 (14%)	81 (15%)	138 (19%)
50 or older	396	563	34 (9.7%)	44 (11%)	65 (20%)	48 (10%)	59 (14%)	72 (18%)	42 (14%)	95 (23%)
Gender										
Men	935	1022	103 (10.0%)	156 (17.0%)	201 (22.3%)	168 (17.9%)	154 (15.7%)	176 (17.8%)	128 (15.4%)	248 (25.6%)
Women	1055	989	90 (7.7%)	115 (12.4%)	217 (20.1%)	131 (13.9%)	157 (13.7%)	185 (20.8%)	182 (18.8%)	225 (25.0%)
Other	2	3	0	1 (0.5%)	0	1 (0.5%)	0	1 (0.5%)	0	1 (0.5%)
Family structure										
Single parent	445	472	84 (17.2%)	126 (29.3%)	127 (25.7%)	137 (29.0%)	112 (22.2%)	152 (36.4%)	109 (24.2%)	169 (36.7%)
Couple	1547	1542	109 (6.5%)	146 (9.8%)	291 (19.8%)	163 (11.5%)	199 (12.6%)	210 (14.2%)	201 (15.4%)	305 (21.6%)
Born in Australia [†]										
Yes	1423	1434	143 (9.0%)	201 (14.5%)	280 (19.3%)	214 (15.6%)	225 (14.8%)	249 (18.7%)	199 (15.0%)	304 (21.9%)
No	569	537	50 (8.1%)	57 (13%)	138 (24%)	73 (15%)	86 (14%)	99 (20%)	111 (21%)	151 (31%)
Language spoken at home										
English	1638	1548	161 (8.7%)	187 (13.1%)	325 (19.2%)	204 (14.8%)	260 (14.8%)	248 (18.0%)	230 (15.0%)	300 (20.6%)
Other	354	466	32 (8.8%)	85 (18%)	93 (27%)	96 (18%)	51 (14%)	114 (23%)	80 (24%)	174 (37%)
Highest level of education										
Undergraduate degree or higher	953	1173	102 (9.5%)	127 (13%)	232 (24%)	166 (15%)	161 (14%)	185 (18%)	167 (19%)	269 (24%)
Certificate I–IV [‡]	612	500	51 (9.0%)	71 (18%)	118 (19%)	63 (15%)	94 (16%)	100 (22%)	87 (16%)	120 (27%)
Year 12 or less	427	341	40 (6.1%)	74 (21%)	68 (15%)	71 (18%)	56 (14%)	77 (23%)	56 (14%)	85 (26%)
Employment status										
Working full time	1038	1290	101 (8.0%)	187 (16.6%)	218 (20.0%)	205 (17.4%)	160 (13.1%)	225 (19.0%)	145 (15.3%)	304 (25.3%)
Working part time or casual	510	450	50 (9.8%)	57 (12%)	102 (20%)	65 (15%)	80 (17%)	88 (21%)	92 (21%)	117 (24%)
Unemployed, home duties, retired, unable to work	444	274	42 (9.0%)	28 (6.8%)	98 (24%)	30 (7.2%)	71 (15%)	49 (18%)	73 (18%)	53 (26%)
Socio-economic status [§]										
Quintile 1 (most disadvantaged)	283	230	25 (6.6%)	31 (14%)	64 (24%)	36 (15%)	45 (13%)	48 (19%)	52 (21%)	56 (27%)
Quintile 2	312	301	34 (12%)	43 (17%)	57 (18%)	49 (20%)	54 (17%)	61 (25%)	53 (21%)	71 (25%)
Quintile 3	443	418	48 (8.6%)	67 (14%)	100 (20%)	69 (15%)	78 (17%)	89 (21%)	77 (17%)	114 (28%)
Quintile 4	425	398	35 (8.0%)	59 (15%)	89 (24%)	66 (16%)	58 (15%)	71 (18%)	61 (16%)	102 (25%)
Quintile 5 (least disadvantaged)	529	667	51 (8.4%)	72 (12%)	108 (19%)	80 (13%)	76 (12%)	93 (15%)	67 (13%)	131 (22%)
Remoteness [¶]										
Major cities	1591	1645	164 (9.0%)	234 (14.6%)	353 (21.3%)	260 (16.2%)	267 (14.9%)	313 (19.8%)	275 (18.1%)	404 (26.0%)
Regional/remote areas	401	369	29 (6.1%)	38 (12%)	65 (18%)	40 (9.3%)	44 (12%)	49 (16%)	35 (9.1%)	70 (17%)

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Continued

Parent's characteristics	Number (weighted proportion*)									
	Parents		Vaccines cause autism		Vaccines cause eczema or asthma		Vaccine ingredients cause harm		Children get too many vaccines	
	2017	2023	2017	2023	2017	2023	2017	2023	2017	2023
State of residence										
New South Wales	657	583	83 (11%)	97 (16%)	148 (22%)	95 (14%)	116 (16%)	123 (20%)	116 (19%)	153 (26%)
Victoria	489	558	39 (6.8%)	74 (13%)	100 (19%)	95 (18%)	61 (11%)	99 (20%)	81 (18%)	141 (26%)
Queensland	397	369	34 (8.2%)	51 (14%)	86 (20%)	53 (15%)	63 (14%)	66 (20%)	53 (15%)	75 (24%)
Other	449	504	37 (7.7%)	50 (13%)	84 (22%)	57 (14%)	71 (18%)	74 (18%)	60 (13%)	105 (22%)
At least one fully vaccinated child										
No	74	188	30 (44%)	68 (38%)	36 (49%)	82 (44%)	32 (49%)	87 (46%)	34 (53%)	98 (49%)
Yes	1918	1826	163 (7.6%)	204 (11.9%)	382 (20.1%)	218 (12.7%)	279 (13.5%)	275 (16.6%)	276 (16.1%)	376 (22.7%)

* Proportions are weighted by age, gender, number of children, Indigenous status, and state of residence, using a customised data report prepared for the authors by the Australian Bureau of Statistics from 2021 Census of Population and Housing and Australian Bureau of Statistics data¹⁰ and Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) quintile.¹¹ † Responses for 43 people who selected "Prefer not to say" in 2023 were excluded because their responses could not be weighted. ‡ Vocational training after completing school year 12. § Australian Bureau of Statistics IRSAD quintile.¹¹ ¶ Australian Bureau of Statistics, Australian Statistical Geography Standard, Accessibility and Remoteness Index of Australia.¹² ◆

Vaccination coverage reflects changes in vaccine uptake without indicating the reasons for these changes. Alongside combating misinformation, regular monitoring of both vaccine sentiment and perceived access barriers could identify and respond to worrying trends in attitudes before they lead to reduced vaccination rates.

Acknowledgements: This study was funded by the Royal Children's Hospital Foundation. The funder had no further role in the study.

Open access: Open access publishing facilitated by the University of Melbourne, as part of the Wiley – the University of Melbourne agreement via the Council of Australian University Librarians.

Competing interests: No relevant disclosures.

Data sharing: Royal Children's Hospital Child Health Poll data are available for sharing upon request to child.healthpoll@rch.org.au. ■

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Supporting Information

Additional [Supporting Information](#) is included with the online version of this article.