



# Reasons for incomplete immunisation among Australian children

## *A national survey of parents*

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### BACKGROUND

Incomplete immunisation among Australian children may be due to parents disagreeing with immunisation rather than medical contraindications or access issues.

### SETTING AND METHODS

The parents of 1338 children recorded on the ACIR as incompletely immunised were telephoned and interviewed.

### RESULTS

Of the 462 parents who confirmed their child was incompletely immunised, 270 (58%) disagreed with or were concerned about immunisation; 190 (70%) of these were concerned about vaccine side effects. The disagreeing 270 parents were significantly more likely to be highly educated and have a child with no vaccinations recorded on the ACIR. No vaccinations were recorded on the ACIR for 81% of children of both these parents, and of parents registered as conscientious objectors to immunisation. Together these two groups account for 2.5–3.0% of the annual birth cohort.

### DISCUSSION

In order to achieve the 95% immunisation rates necessary for disease control, tailored approaches to promote immunisation among parents are required.

General practitioners have a major role in immunisation. A rate of 95% immunisation coverage is necessary for the sustained control of vaccine preventable diseases. However, about 6% of Australian children are incompletely immunised at 12 months of age, and 10% at 24 months of age.<sup>1</sup> Parents' beliefs about immunisation risks and benefits may be the most common reason for incomplete immunisation. However, there are few data about this reason compared to other reasons such as medical contraindications or access issues.<sup>2-4</sup>

We used national data from the Australian Childhood Immunisation Register (ACIR)<sup>1</sup> to investigate reasons for incomplete immunisation. Over 98% of Australian children are registered with the ACIR via Medicare registration.

## Methods

### Sample selection and recruitment

We telephoned parents whose child was recorded on the ACIR as being 10 months or more overdue for immunisations and was born in either of two 3 month periods (October to December 1998 or 1999). Parents registered as conscientious objectors to immunisation were not selected (for privacy reasons). Letters to explain the study were sent to random samples of 1681 parents of the 1998 birth cohort and 1576 parents of the

1999 cohort. A total of 1338 were interviewed: 698 parents of the 1998, and 640 of the 1999 cohorts. To assess the representativeness of the interviewed sample, the characteristics of the 1338 interviewed parents and the 1908 parents selected for the study but not interviewed, were compared using information recorded on the ACIR.

### The telephone interview

Interviewed parents were asked sociodemographic questions and whether their child had received the vaccinations not recorded on the ACIR. Those who confirmed that their child was incompletely immunised were asked for the reasons using closed questions with response categories based on the results of a qualitative study of parent reported reasons for incomplete immunisation.<sup>2</sup> Parents could provide multiple reasons.

### Data analysis

We compared sociodemographic characteristics of parents whose reasons for incomplete immunisation were either disagreement with or concern about immunisation with parents who reported any other reason, and parents who had registered a conscientious objection to immunisation. For the 1999 cohort, we estimated the percentage of all children incompletely immunised due to parental

objection, disagreement or concern with immunisation.

## Results

### Representativeness of survey respondents

There were no significant differences in age, gender, state/territory of residence, or rurality recorded on the ACIR for the 1338 children whose parents were interviewed and the remaining 1908 who were not because their parents could not be contacted, was living overseas, or refused to participate. Surveyed children born in 1998 were more likely to have immunisations recorded on the ACIR than those not surveyed (79% versus 65%,  $p < 0.01$ ). There was no significant difference for the 1999 cohort.

### Reasons for incomplete immunisation

Of the 1338 interviewed parents, 462 (35%) confirmed their child was incompletely immunised, 271 out of 640 (42%) of the 1999 birth group, and 191 out of 698 (27%) of the 1998 birth group. Nearly half these 462 parents reported their child was overdue for immunisation because they disagreed with it (*Table 1*). A further 11% reported they had concerns about immunisation but did not indicate disagreement. Combining these gives a total of 58% who disagreed with or were concerned about immunisation. A quarter of the parents gave reasons that their child was unwell at the time immunisations were due, or medical recommendations against immunisation (*Table 1*). Of the 270 parents who disagreed with or were concerned about immunisation, most (70%) were concerned about vaccine side effects, while nearly one-fifth thought vaccines were not effective (*Table 2*).

The parents who disagreed with or were concerned about immunisation were significantly more likely than those who gave other reasons for their child's incomplete immunisation status to have completed postsecondary education, particularly a university degree, or to live in a rural area (*Table 3*). Their children were significantly more likely to not have any immunisations recorded on the ACIR (81% versus 36%,  $p < 0.0001$ ). They were less likely to be single or indigenous (*Table 3*).

**Table 1. Reasons reported by 462 parents for their child being 10 months or more overdue for immunisations**

Reason	Number	%*
Disagreed with immunisation	219	47
Concerned about immunisation	51	11
Illness of child/medical recommendation**	116	25
Logistical, eg. holidays, family break up	48	10
Forgot when immunisation was due	29	6
Other reasons	26	6
Don't know/refused	6	1

\* Some categories are not mutually exclusive as some parents gave more than one reason. Therefore the columns total more than 100%

\*\* Medical reasons included prolonged illness and medical recommendation against immunisation

**Table 2. Reasons given by 270 parents of incompletely immunised children who disagreed with or were concerned about immunisation**

Reason	Number	%*
Vaccine side effects	190	70
Immunisation is not effective against disease	51	19
Prefer 'natural' approaches	28	10
Vaccines harmful/contain toxic substances	25	9
The risk of disease is low	22	8
Prefer to delay immunisation until child older	18	7
Dispute the quality/sources of information	17	6
Other reasons	16	6
Undecided about immunisation	14	5
Personal belief or choice (not further defined)	11	4

\* The categories are not mutually exclusive as some parents gave more than one reason. Therefore, the columns total more than 100%

### Comparisons with registered conscientious objectors

The ACIR recorded immunisation and residential characteristics available for comparison did not differ significantly between the 462 children whose parents disagreed with or were concerned about immunisation, and the 672 children born in the same 3 month cohorts whose parents were registered with the ACIR as conscientious objectors to immunisation. The same proportion (81%) of children in both groups had no immunisations recorded on the ACIR.

We estimated that 2.5–3.0% of all parents of the approximately 62 000 children born

1 October to 31 December 1999 objected, disagreed or were concerned about immunisation. The proportion of children aged 0–7 years whose parents were registered as conscientious objectors was 0.4%.

## Discussion

This study showed that parental beliefs about immunisation in general – and vaccine side effects in particular – are the major reasons for incomplete immunisations among Australian children. These reasons are linked to perceptions about vaccine safety.

This study had strengths and limitations. The major strength was that it involved a

**Table 3. Parent characteristics of children 10 months or more overdue for immunisations, by parent reported reason for incomplete immunisation**

Characteristic	Disagreed or concerned about immunisation (n=270)		Other reasons (n=192)		p value
	N	%	N	%	
No immunisations recorded on ACIR	218	81	70	36	<0.0001
Live in a rural area	112	41	56	29	0.007
Indigenous Australian	3	1	12	6	0.002
Speak another language at home*	34	13	25	14	NS**
Single parent household*	36	13	40	21	0.03
Three or more children in household	116	43	83	43	NS
Have a health care card*	118	44	89	47	NS
Annual household income <\$50 000*	154	57	115	60	NS
Educational background					
Year 10 or less	50	19	65	34	0.002
Any postsecondary education	148	55	74	39	0.0005
Completed a university degree	98	37	41	21	0.0005

\* Some data were missing for these questions: language spoken at home: n=1 from each group, single parent household: n=1 from each group, health care card: n=4 from 'disagree' group, n=3 from 'other' group, education: n=2 from 'disagree' group, n=1 from 'other' group, household income: n=32 (12%) from 'disagree' group, n=11 (6%) from 'other' group.

\*\* NS = not statistically significant ( $p>0.05$ )

national population based sample of parents who confirmed their children were significantly overdue for immunisation. The major limitations were the lower than optimal contact rates among those selected from the ACIR (mainly due to out of date contact details), and under representation of children without any immunisations recorded on the ACIR among the surveyed 1998 group. These limitations were balanced by the high participation rate (93%) among parents where telephone contact was established, and the comparability of surveyed and unsurveyed children (particularly those born in 1999) and of registered conscientious objectors and the interviewed 'disagree/concerned' parents. The under representation of incompletely immunised children in the 1998 study group is unlikely to impact on the overall picture of the relative contributions of reasons for incomplete immunisation. Only the 1999 data were used to estimate the percentage of parents who objected, disagreed or were concerned about immunisation.

Our estimate that 2.5–3.0% of parents object, disagree, or are concerned about immunisation is similar to a previous telephone survey conducted in New South Wales in 2001.<sup>5</sup> This extrapolates to approximately 40 000 Australian children under the age of 5 years. This could be particularly important in terms of infectious disease outbreaks if concentrated in one geographic area; remembering that 95% immunisation coverage rates must be achieved and maintained to prevent outbreaks.<sup>6</sup>

Different strategies are needed to address

the varying reasons for incomplete immunisation and will be particularly centred on general practitioners. Although addressing parents' concerns (guided by currently available resources<sup>7,8</sup>) will help parents make informed decisions, some parents view this type of education negatively.<sup>9,10</sup> Some parents – especially the tertiary educated – may be influenced by alternative methods of presenting information about immunisation risks and benefits such as decision aids<sup>11</sup> and internet based resources. General practitioners

#### Implications of this study for general practice

- Disagreement or concern, particularly about vaccine side effects, is the major parent reported reason for incomplete immunisation. Postponement due to illness is also common.
- Parents who disagree or are concerned about immunisation are significantly more likely to be tertiary educated and to have children who are completely unimmunised. Children not fully immunised due to illness or access reasons are likely to have started the immunisation schedule.
- Up to 3% of Australian parents do not immunise their children because they object, disagree or are concerned about immunisation. General practitioners have an important role in identifying such parents and discussing their concerns with them.

should address parents' concerns regarding the few appropriate medical contraindications to immunisation to help reduce unnecessary and often lengthy postponement due to mild illnesses.<sup>12,13</sup> The concerns and experiences of previously compliant parents concerned after a child experiences minor anticipated vaccine side effects, or a more serious adverse event, should be addressed and managed appropriately,<sup>9</sup> including referral to a specialist immunisation adverse events clinic if necessary.<sup>14,15</sup>

Conflict of interest: none declared.

### Acknowledgment

This study was funded by the Australian Department of Health and Ageing. NCIRS is supported by the Commonwealth Department of Health and Ageing, the New South Wales Department of Health and The Children's Hospital at Westmead.

### References

- Hull BP, Lawrence GL, MacIntyre CR, McIntyre PB. Immunisation coverage in Australia corrected for under reporting to the Australian Childhood Immunisation Register. *Aust N Z J Public Health* 2003;27:533-538.
- Bond L, Nolan T, Pattison P, Carlin J. Vaccine preventable diseases and immunisations: a qualitative study of mother's perceptions of severity, susceptibility, benefits and barriers. *Aust N Z J Public Health* 1998;22:441-446.
- Hull BP, McIntyre PB, Sayer GP. Factors associated with low uptake of measles and pertussis vaccines: an ecologic study based on the Australian Childhood Immunisation Register. *Aust N Z J Public Health* 2001;25:405-410.
- Yawn BP, Xia Z, Edmonson L, Jacobson RM, Jacobsen SJ. Barriers to immunisation in a relatively affluent community. *J Am Board Fam Pract* 2000;13:325-332.
- Anonymous. New South Wales Child Health Survey 2001. *New South Wales Public Health Bulletin* 2002;13:1-84.
- Hull BP, McIntyre PB. Mapping immunisation coverage and conscientious objectors to immunisation in NSW. *New South Wales Public Health Bulletin* 2003;14:8-12.
- National Health and Medical Research Council. *The Australian Immunisation Handbook*. 8th edn. Canberra: AGPS, 2003; 303-316. Available at: <http://immunise.health.gov.au/handbook.htm>.
- Hall R, O'Brien E, MacIntyre CR, Gidding H. *Immunisation myths and realities: responding to arguments against immunisation. A guide for providers*. 3rd edn. Commonwealth Department of Health and Aged Care: Canberra: 2001. Available at: [http://immunise.health.gov.au/myths\\_2.pdf](http://immunise.health.gov.au/myths_2.pdf).
- Sporton RK, Francis SA. Choosing not to immunise: are parents making informed decisions? *Fam Pract* 2001;18:181-188.
- Leask JA, Chapman S, Hawe P. Concerns about immunisation: facts are not enough [letter]. *BMJ* 2000;321:109.
- O'Connor AM, Legare F, Stacey D. Risk communication in practice: the contribution of decision aids. *BMJ* 2003;327:726-740.
- Burgess MA, McIntyre PB, Heath TC. Rethinking contraindications to vaccination. *Med J Aust* 1998;168:476-477.
- Prislin R, Sawyer MH, Nader PR, Goerlitz M, De Guire M, Ho S. Provider-staff discrepancies in reported immunisation knowledge and practices. *Prev Med* 2002;34:554-561.
- Wood N. Immunisation adverse events clinics. *New South Wales Public Health Bulletin* 2003;14:25-27.
- Gold MS, Noonan S, Osbourn M, Precepa S, Kempe AE. Local reactions after the fourth dose of acellular pertussis vaccine in South Australia. *Med J Aust* 2003;179:191-194.

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