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HEPATITIS B IMMUNISATION IN CHILDREN AGED 10–13 YEARS IN NEW SOUTH WALES, 2001

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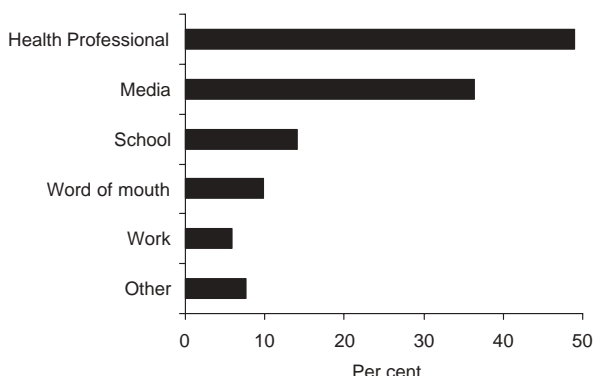
Hepatitis B is a viral infection that is an important cause of morbidity and mortality globally. The World Health Organization estimates that about two billion people have been infected and 350 million are chronic carriers.¹ Between 1991 and 2001, just over 6,000 hepatitis B notifications per year were reported to the Australian health system, including an average of 250 per year which were identified as incident cases. Approximately half of all cases notified, and a quarter of incident cases, were resident in New South Wales (NSW).²

This article describes a survey of the parents or carers of children aged 10 to 13 years in NSW to assess hepatitis B immunisation coverage rates in pre-adolescent children. In Australia, hepatitis B vaccine has been available since the early 1980s and it has been recognised by the National Health and Medical Research Council (NHMRC) as safe and effective since 1983. NSW Health introduced a policy in 1983 which recommended hepatitis B immunisation of: household contacts and sexual partners of hepatitis B carriers; prisoners; residents of some institutions and hostels; health care workers; some patients; injecting drug users and men who have sex with men.^{3,4} In 1986, the

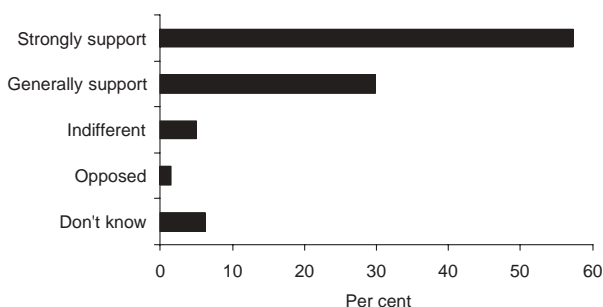
NHMRC recommended hepatitis B immunisation for children born into high-risk groups where at least 5 per cent of the population are hepatitis B surface antigen carriers. NSW Health implemented that recommendation in 1987.⁵ NSW Health also recommended that pregnant women in NSW be screened for hepatitis B and that infants born to hepatitis B surface antigen positive mothers receive hepatitis B immunoglobulin and vaccine on the first day of life. Current data indicate that this program is very effective with over 99 per cent of women screened and 94 per cent of infants born to hepatitis B positive mothers receiving hepatitis B immunoglobulin within 12 hours of birth.⁶

In 1996, the NHMRC recommended hepatitis B immunisation for all adolescents aged 10–13 years and this was introduced in NSW in 1999.⁷ This program has been mainly administered through general practitioners. From May 2000, the NHMRC recommended a birth dose of hepatitis B vaccine for all babies with a further three doses at two, four and six months of age.⁸

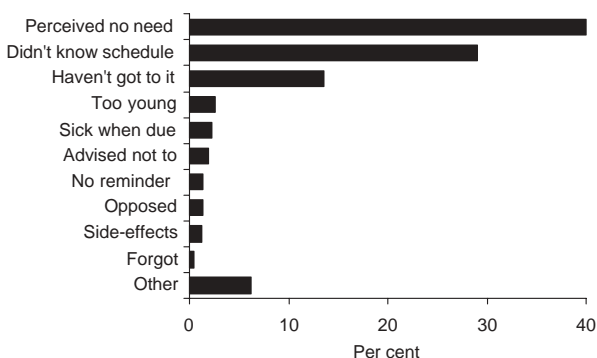
All childhood immunisations are reported to the Australian Childhood Immunisation Register for children aged less than seven years. Reliable estimates of hepatitis B immunisation in children aged 10–13 years are not available in NSW. To estimate the current uptake of hepatitis B immunisation among children aged between 10 and 13 years in NSW, NSW Health interviewed a random sample of the parents and carers of adolescent children in this age group. The survey also sought to clarify reasons why parents did not seek free hepatitis B immunisation for their children.

FIGURE 1**WHERE PARENTS OF CHILDREN AGED 10–13 YEARS HEARD ABOUT HEPATITIS B IMMUNISATION (N=1,093)**

Source: NSW Health Survey program

FIGURE 2**SUPPORT FOR IMMUNISATION AMONG THE PARENTS OF CHILDREN AGED 10–13 YEARS IN NSW (N=1,567)**

Source: NSW Health Survey program

FIGURE 3**PARENTS' REASONS FOR NOT IMMUNISING CHILDREN AGED 10–13 YEARS IN NSW (N=1,651 UNIMMUNISED CHILDREN)**

Source: NSW Health Survey program

METHODS**Selection of participants**

This was the first time a survey investigating the uptake of hepatitis B vaccination in children aged between 10 and 13 years had been carried out in New South Wales.

During October and November 2001, the parents or carers of children aged 10–13 years were interviewed to assess the hepatitis B immunisation coverage of their children. The sample was drawn at random from the population of all residents in NSW living in households with private telephones. Telephone numbers were randomly generated using methods described elsewhere.⁹ When households were contacted, they were asked if they had any children aged 10–13 years, and the parent or carer who knew the most about the health of those children was invited to respond. Trained interviewers conducted the interviews consistent with methods that have been described elsewhere.¹⁰

Interview questionnaire

All parents were asked whether their children were immunised against hepatitis B. Children in NSW are routinely provided with a personal health record (Blue Book), which includes a record of the immunisations that they have received. Parents who reported that their children were immunised were asked to locate each child's personal health record (Blue Book) and provide the date of immunisation for confirmation. Parents who reported their children had not been immunised were asked to provide the reasons for not immunising and whether they were aware that free hepatitis B immunisation was available for this age group.

Additionally, all parents were asked questions about their knowledge and attitudes towards hepatitis B immunisation including their sources of information about hepatitis B. Parents were not prompted with options for their answers. Answers were categorised by the interviewer. Demographic information collected included: the number and gender of children in the household; parents' ethnicity, educational level; local government area; postcode; and number of residential phones.

Statistical analysis

All statistical analyses were performed using SAS version 8.02.¹¹ Parents were categorised as either having at least one immunised child or no immunised children as the main outcome variable. Associations between this outcome and prior knowledge and attitudes about immunisation, as well as demographic factors, were assessed using chi-squared tests. Significant factors from the univariate analysis were included in a multivariate logistic regression model.

RESULTS

There were 1,956 households contacted who had children in the target age group and of these, parents in 1567 households (80.1 per cent) agreed to participate. There

were 1,157 (74 per cent) households with one child, 382 (24 per cent) with two children and the remaining 28 (2 per cent) reported there were three or four children in the household in the target age group. Altogether, information was obtained for 2,010 children, 52 per cent of whom were male.

Of the 1,567 parents or carers interviewed, 676 (43 per cent) initially stated that some or all of their children aged 10–13 years were immunised against hepatitis B, 422 (27 per cent) stated they had Blue Books, 315 (20 per cent) could access these books and 301 (19.2 per cent) confirmed that one or more children in their household were immunised against hepatitis B from Blue Book records. This corresponded to 359 (17.9 per cent) children who had been immunised against hepatitis B.

Nearly 70 per cent of parents indicated that they had heard about hepatitis B immunisation in the last two years. The most common source of information was health professionals (49 per cent) and the media (36 per cent) (Figure 1). There were 32 per cent who reported they had been advised to immunise their child against hepatitis B.

Parents indicated a high level of support for hepatitis B immunisation with 58 per cent strongly supporting it and a further 30 per cent generally supporting it (Figure 2). Among parents who reported their children were not immunised, 80.6 per cent indicated they were unaware that free hepatitis B immunisation was available. These parents were asked to provide reasons for not immunising their child, with 40 per cent stating that they had not perceived the need and 29 per cent that they were not aware it was on the immunisation schedule (Figure 3).

Associations between demographic characteristics and having one or more immunised child are summarised in Table 1. Level of the parent's education was not associated with having at least one immunised child. Adjusted analyses are summarised in Table 2. Parents who had been advised to immunise their child were significantly more likely to have immunised children than parents who had not been advised. Those who indicated that they strongly supported hepatitis B immunisation were also significantly more likely to have immunised children than those who did not indicate strong support.

DISCUSSION

This study found 19.2 per cent of parents reported having had one or more of their children aged 10 to 13 years immunised against hepatitis B corresponding to an immunisation rate of 17.9 per cent. Most parents (70 per cent) had heard about hepatitis B immunisation in the last two years, and most (88 per cent) were supportive of immunisation against hepatitis B. A lesser proportion (32 per cent) reported being advised to immunise their child. Support for hepatitis B immunisation and being advised to immunise by a health professional were significant predictors of having an immunised child, highlighting the importance of parental knowledge in determining whether children were immunised. Among those who reported not having immunised their children, deficits in knowledge were identified. Over 80 per cent stated they were unaware that free hepatitis B immunisation was available for their pre-adolescent children, 40 per cent that they did not see the need for hepatitis B immunisation and nearly one third were not aware it was included on the immunisation schedule.

TABLE 1

UNIVARIATE* ANALYSIS OF PREDICTORS FOR PARENTS HAVING CHILDREN AGED 10–13 YEARS IMMUNISED AGAINST HEPATITIS B IN NSW (N=1,567 PARENTS)

Parent characteristic	Child immunised N (%)	Child not immunised N (%)	Odds Ratio	95% Confidence Interval	P
Had heard about immunisation in the last two years					
No	68 (23)	406 (32)	1.00		
Yes	233 (77)	860 (68)	1.66	1.23–2.23	0.001
Advised to immunise					
No	135 (45)	927 (73)	1.00		
Yes	166 (55)	339 (27)	3.51	2.70–4.56	<0.001
Strongly support HBV immunisation					
No	73 (24)	595 (47)	1.00		
Yes	228 (76)	671 (53)	2.50	1.86–3.35	<0.001
Non-English speaking background					
No	245 (81)	1097 (87)	1.00		
Yes	56 (19)	169 (13)	1.46	1.05–2.04	0.025
Tertiary education					
No	212 (70)	936 (73)	1.00		
Yes	89 (30)	330 (26)	1.94	0.91–1.58	0.199

* Univariate analysis presents results for each variable without adjusting for the effects of other variables.

TABLE 2

**MULTIVARIATE* LOGISTIC REGRESSION ANALYSIS
OF PARENTS HAVING CHILDREN AGED 10–13
IMMUNISED AGAINST HEPATITIS B IN NSW**

Characteristic	Odds Ratio	95% Confidence Interval	P
Had heard about immunisation			
No	1.00		
Yes	1.21	0.89–1.68	0.242
Advised to immunise			
No	1.00		
Yes	2.73	2.07–3.61	<0.001
Strongly support HBV immunisation			
No	1.00		
Yes	2.17	1.58–2.96	<0.001
Non-English speaking background			
No	1.00		
Yes	1.03	0.72–1.48	0.855

* Multivariate analysis presents results for each variable after adjusting for the effects of other variables.

A methodological limitation of telephone surveys is the dependence on self-report which is subject to the accuracy of the parent's recollection. To offset this, we chose hepatitis B immunisations that were confirmed in the child's Blue Book as the main outcome in our analyses. It is likely that this criterion resulted in some children who had been immunised being misclassified, as considerably more parents initially stated their children were immunised than those who were able to confirm it from Blue Book records. In most cases, parents either did not have, or could not find, their child's Blue Book. In some cases, parents had mistaken hepatitis B for another vaccine such as Hib (*Haemophilus influenzae* type b). We acknowledge the estimates we have presented may be conservative, but we consider this preferable to presenting overestimates.

In some other states in Australia, hepatitis B immunisation for pre-adolescents is administered in school-based programs while in NSW, general practitioner services are mainly used. Recent reports have identified a decline in bulk billing by Australian general practitioners,¹² increasing the expense of a visit to the GP for patients. It is possible that the cost of three visits to the GP required to complete the immunisation may have been a barrier to some parents having their children immunised against hepatitis B. In South Australia, hepatitis B coverage through school-based programs was 81 per cent in 2001¹³ and in Victoria, 88 per cent,¹⁴ far higher than the rates observed here.

Hepatitis B infection is a serious illness that affects large numbers of individuals in NSW each year. The long-term

outcomes of chronic infection which include cirrhosis and primary liver cancer are significant both for individuals and the health system. The availability of a safe, inexpensive and effective vaccine, as well as the high level of community acceptance of hepatitis B immunisation, make achieving a high level of immunity in the population feasible.

The findings of this survey suggest that it is timely to consider other strategies for the delivery of hepatitis B immunisation programs in NSW, including school-based service provision.

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