

Second dose of measles, mumps, and rubella vaccine: questionnaire survey of health professionals

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BMJ 2001;322:82-5



This article is part of the BMJ's randomised controlled trial of open peer review. Documentation relating to the editorial decision making process is available on the BMJ's website

Abstract

Objective To determine the knowledge, attitudes, and practices among health professionals regarding the measles, mumps, and rubella (MMR) vaccine, particularly the second dose.

Design Self administered postal questionnaire survey.

Setting North Wales Health Authority, 1998.

Participants 148 health visitors, 239 practice nurses, and 206 general practitioners.

Main outcome measures Respondents' views on MMR vaccination, including their views on the likelihood of an association with autism and Crohn's disease and on who is the best person to give advice to parents, whether they agree with the policy of a second dose of the vaccine, and how confident they are in explaining the rationale behind the second dose.

Results Concerning the second dose of the vaccine, 48% of the professionals (220/460) had reservations and 3% (15) disagreed with the policy of giving it. Over half the professionals nominated health visitors as the best initial source of advice on the second vaccine. 61% of health visitors (86/140), compared with 46% of general practitioners (73/158), reported feeling very confident about explaining the rationale of a two dose schedule to a well informed parent, but only 20% (28/138) would unequivocally recommend the second dose to a wavering parent. 33% of the practice nurses (54/163) stated that the MMR vaccine was very likely or possibly associated with Crohn's disease and 27% (44/164) that it was associated with autism. Nearly a fifth of general practitioners (27/158) reported that they had not read the MMR section in the "green book," and 29% (44/152) reported that they had not received the Health Education Authority's factsheet on MMR immunisation.

Conclusions Knowledge and practice among health professionals regarding the second dose of the MMR vaccine vary widely. Many professionals are not aware of or do not use the good written resources that exist, though local educational initiatives could remedy this.

Introduction

On 1 October 1996 a second dose of the measles, mumps, and rubella (MMR) vaccine was added to the United Kingdom's childhood immunisation programme.¹ In doing this, the United Kingdom has

Summary of current childhood immunisation schedule in the United Kingdom

- Diphtheria, tetanus, and pertussis; poliomyelitis; *Haemophilus influenzae* type b; Meningococcal conjugate group C
2 months (first dose)
3 months (second dose)
4 months (third dose)
- Measles, mumps, and rubella (MMR)
12-15 months
- Boosters for diphtheria and tetanus and for poliomyelitis; MMR second dose
3-5 years
- BCG
10-14 years or infancy
- Boosters for tetanus and diphtheria and for poliomyelitis
13-18 years

become one of 38 countries in the World Health Organization's European region that use a two dose vaccination schedule for measles²; among these Finland is one of the countries that has eliminated indigenous measles, mumps, and rubella.³ The vaccine has been shown to be effective and to have a good safety record,^{4 5} yet recent adverse publicity in the United Kingdom has threatened to derail its vaccination programme and, with it, the target of eliminating indigenous measles in the WHO's European region by 2007.⁶

Measles cannot be eliminated with a single dose of the vaccine,^{7 8} so anecdotal reports of concern among health professionals about the second dose of the MMR vaccine are worrying.⁹ We undertook a questionnaire survey of health professionals to identify aspects of their knowledge, attitudes, and practices regarding MMR vaccination that may have an adverse effect on its coverage. This would facilitate interventions that could target these shortcomings.

Methods

We used an anonymous, self administered postal questionnaire comprising 16 questions and an opportunity to make open comments. It was sent between 8 and 11 May 1998, with a second mailing one month later, to all the health visitors and practice nurses and to a 50% random sample (selected using computer generated

Table 1 Views of health professionals on likelihood of an association between measles, mumps, and rubella (MMR) vaccine and autism or Crohn's disease. Figures are numbers (percentage of professional group)

	Association with autism			Association with Crohn's disease		
	Very likely or possible	Unlikely	Don't know	Very likely or possible	Unlikely	Don't know
General practitioners (n=158)	20 (13)	135 (85)	3 (2)	20 (13)	128 (81)	10 (6)
Health visitors (n=139)	10 (7)	120 (86)	9 (7)	15 (11)	114 (82)	10 (7)
Practice nurses (n=164)*	44 (27)	106 (65)	14 (9)	54 (33)	95 (58)	14 (9)
Total (n=461)	74 (16)	361 (78)	26 (6)	89 (19)	337 (73)	34 (7)

*One practice nurse did not answer the question on association with Crohn's disease.

random numbers) of general practitioners in the North Wales Health Authority area. We used Epi-Info 6¹⁰ and SPSS for Windows (version 8.0.1) to analyse the data.

Results

Overall, 80% of general practitioners (165/206), 95% of health visitors (140/148), and 85% of practice nurses (204/239) responded to the survey. All the health visitors stated that they give advice on immunisation to parents, but 4% of the general practitioners (7/165) and 17% of the practice nurses (35/204) reported that they do not give advice on immunisation; they were excluded from further analysis, as were four practice nurses who did not respond to this question.

Information on immunisation and the MMR vaccine in general

Three per cent of general practitioners (5/156) reported not having easy access to a copy of the "green book,"⁵ and 17% (27/158) said that they had not read the section on measles, mumps, and rubella. Just over a quarter of general practitioners (44/152), 11% of health visitors (15/138), and 14% of practice nurses (22/161) reported that they had not received the Health Education Authority's factsheet on MMR immunisation.¹¹ Of those professionals who reported that they had received it, 91% of general practitioners (96/105), 96% of health visitors (114/119), and 98% of practice nurses (133/136) stated that they found it extremely or moderately useful. Moreover, 46% of general practitioners (72/156), 70% of health visitors (97/138), and 76% of practice nurses (122/160) reported that they would have liked more information or training on the MMR vaccine in general.

Table 1 shows that 33% of practice nurses (54/163) stated that an association between the MMR vaccine and Crohn's disease is very likely or possible, while 27% (44/164) believed there to be an association with autism. Furthermore, 12% (19/161) believed an association with asthma to be very likely or possible. Eighty per cent (364/457) of all respondents stated that they either did not know or thought it unlikely that the vaccine is associated with idiopathic thrombocytopenic purpura.

The second dose of the MMR vaccine

Health visitors were nominated as the best initial source of advice on the second vaccine by 55% of professionals (246/445) (table 2). Of the health visitors, 61% (86/140) reported feeling very confident about explaining the rationale behind the two dose schedule to a well informed parent, compared with 46% of general practitioners (73/158) (table 3), but only 20%

(28/138) would unequivocally recommend the second dose to a wavering parent. Professionals who stated that they would be very confident were significantly more likely to agree completely with the policy of giving the second dose of the vaccine (general practitioners, odds ratio 5.2 (95% confidence interval 2.6 to 10.4); health visitors, 5.3 (2.4 to 11.9); practice nurses, 2.1 (1.1 to 4.0)).

Thirty nine health professionals commented on various problems they saw with the rationale. Some had difficulty with the concept of herd immunity, while others doubted the necessity of a second dose or of using it as an opportunity for giving a first dose to non-attenders (box).

Faced with a parent who was still unsure about the second dose of the vaccine, even though they had answered all the parent's questions, 72% of general practitioners (113/156), compared with 42% of practice nurses (68/161) and 20% of health visitors (28/138), said that they would recommend the second dose. Significantly more respondents who said that they agreed completely with the policy of giving the second dose stated that they would recommend it in such a situation than did those who gave another response to the policy (general practitioners, odds ratio 5.8 (95% confidence interval 2.6 to 13.1); health visitors, 5.1 (2.1 to 12.8); practice nurses, 5.2 (2.6 to 10.2)).

Data on the responses of the health professionals when they don't have an answer to a parent's question about the second dose are presented in table 4, and table 5 shows respondents' attitudes to measurement

Table 2 Views of health professionals on who is the best person to give advice to parents at the time that the second measles, mumps, and rubella (MMR) vaccination is due. Figures are numbers (percentage of professional group)

	General practitioner	Practice nurse	Health visitor	Community paediatrician	Other
General practitioners (n=147)	30 (20)	25 (17)	85 (58)	5 (3)	2 (1)
Health visitors (n=137)	14 (10)	5 (4)	95 (70)	5 (4)	18 (13)
Practice nurses (n=161)	42 (26)	32 (20)	66 (41)	4 (3)	17 (11)
Total (n=445)	86 (19)	62 (14)	246 (55)	14 (3)	37 (8)

Table 3 Confidence of health professionals in explaining the rationale behind the second measles, mumps, and rubella vaccination. Figures are numbers (percentage of professional group)

	Very confident, no trouble explaining	Fairly confident, some points not entirely clear	Not particularly confident, some difficulty explaining	Not at all confident, policy difficult to understand
General practitioners (n=158)	73 (46)	73 (46)	12 (8)	0 (0)
Health visitors (n=140)	86 (61)	44 (31)	10 (7)	0 (0)
Practice nurses (n=164)	66 (40)	86 (52)	11 (7)	1 (1)
Total (n=462)	225 (49)	203 (44)	33 (7)	1 (<1)

Comments of survey respondents

- On problems with the rationale behind a two dose MMR vaccination schedule:
 “I find it difficult advising a parent that their child required a second dose in order to ensure ‘herd’ immunity when they may themselves already be immune.”
 “The second dose is only really benefiting a few.”
 “Those parents who don’t give the first dose are the ones who tend not to give the second dose.”
- The timing of the second dose was commented on by 29 respondents. A typical comment was:
 “As a practice nurse, I find giving two injections to pre-school children very distressing to child, parent, and myself.”
- Reservations were expressed by 10 health professionals on giving MMR vaccine to their own children, including:
 “I personally will not [let] my children have their second MMR but I don’t influence parents in any way. I first let them read your factsheet and let them decide. I would be frightened to urge parents to have the second MMR in case there were problems afterwards. I would not want anybody to blame me for persuading them.”

of antibody levels in a child whose parents still have doubts about the vaccine.

Overall, 58% of general practitioners (91/156), 68% of health visitors (93/137), and 83% of practice nurses (132/160) stated that they would have liked more information or training on the rationale behind the introduction of the second dose of the vaccine. Furthermore, 40% of general practitioners (63/157), 49% of health visitors (68/139), and 54% of practice nurses (89/164) stated that they had reservations

Table 4 What health professionals would do when they don’t have an answer to a parent’s questions about the second measles, mumps, and rubella vaccination. Figures are numbers (percentage of professional group)

	Nothing further	Refer to a colleague	Refer to a community paediatrician	Other
General practitioners (n=154)	27 (18)	30 (20)	75 (49)	22 (14)
Health visitors (n=136)	1 (1)	30 (22)	54 (40)	51 (38)
Practice nurses (n=161)	1 (1)	86 (53)	41 (26)	33 (21)
Total (n=451)	29 (6)	146 (32)	170 (38)	106 (24)

Table 5 Do health professionals agree with measuring antibody levels in a child requiring the second measles, mumps, and rubella vaccination but whose parents still have doubts? Figures are numbers (percentage of professional group)

	Yes, entirely appropriate	Yes, reluctantly	No	Don’t know
General practitioners (n=158)	24 (15)	56 (35)	58 (37)	20 (13)
Health visitors (n=135)	40 (30)	35 (26)	37 (27)	23 (17)
Practice nurses (n=164)	15 (10)	59 (36)	60 (37)	30 (18)
Total (n=457)	79 (17)	150 (33)	155 (34)	73 (16)

Table 6 Agreement among health professionals with the policy of giving the second dose of the measles, mumps, and rubella vaccine. Figures are numbers (percentage of professional group)

	Agree completely	Agree, but with some reservations	Disagree	Don’t know
General practitioners (n=157)	84 (54)	63 (40)	3 (2)	7 (5)
Health visitors (n=139)	57 (41)	68 (49)	10 (7)	4 (3)
Practice nurses (n=164)	67 (41)	89 (54)	2 (1)	6 (4)
Total (n=460)	208 (45)	220 (48)	15 (3)	17 (4)

about the policy of giving the second dose (table 6). General practitioners were more likely than health visitors (odds ratio 1.7 (95% confidence interval 1.1 to 2.8)) or practice nurses (1.7 (1.1 to 2.7)) to agree completely with the policy.

Discussion

This is the first published survey in the United Kingdom of the knowledge, attitudes, and practices of health professionals regarding the second dose of the MMR vaccine. It has highlighted several ways in which local knowledge or practice varies from national policy and scientific evidence. Because of the good response rate it is likely that these results accurately reflect the views of health professionals in north Wales. The findings are also likely to be generalisable to other areas of the United Kingdom. The coverage of MMR vaccination in the North Wales Health Authority area was similar to that in the United Kingdom as a whole at the time of the survey (D Rh Thomas, Communicable Disease Surveillance Centre, Wales, personal communication),¹² and most childhood vaccinations in the area are given in general practice.

Immunisation Against Infectious Disease (the “green book”)⁵ provides authoritative advice on immunisation. Despite this, some general practitioners who gave immunisation advice to parents said that they had not read the section on MMR. Similarly, more than a quarter of general practitioners and more than 10% of the other two groups reported that they had not received a copy of the Health Education Authority’s MMR factsheet,¹¹ despite its having been circulated to all general practices.

Knowledge about the adverse effects of the vaccine was variable. More than three quarters of the respondents were not aware of the documented association between the MMR vaccine and idiopathic thrombocytopenic purpura.¹³ Despite expert advice to the contrary,¹⁴ a substantial proportion of practice nurses believed that autism and Crohn’s disease may be linked to the vaccine. Our survey took place soon after the publication of a much criticised paper that reported that a small series of children who had ileal-lymphoid nodular hyperplasia developed autistic symptoms after MMR vaccination^{15 16}; this influence may have been reduced by subsequent findings.¹⁷

Health visitors were seen as the best initial source of advice about the second dose of the vaccine and were more confident than the other groups in explaining its rationale. Even so, when faced with a wavering parent only a fifth of health visitors would advise the second dose without referral to a colleague or a community paediatrician.

Just over half of the respondents said that they would agree, either entirely or reluctantly, to antibody testing. This is of concern because vaccines containing live, attenuated measles virus are safe in immune children and therefore antibody testing in children is unnecessary as well as impractical.

Few respondents disagreed completely with giving a second dose of the vaccine, although around a half had reservations. We found that respondents’ confidence in explaining the rationale of the second dose to a well informed parent was strongly associated with their agreeing with the policy, and that agreement was

What is already known on this topic

No formal study has looked at the attitudes and practices of health professionals regarding the second dose of the measles, mumps, and rubella vaccine

Anecdotal reports have suggested professional concerns about the second vaccination

What this study adds

Many health professionals have reservations about the second dose of the measles, mumps, and rubella vaccine

Wide variation in knowledge and practice regarding the vaccine may be influencing the advice that is given to parents

Many health professionals do not know about or use nationally available resources on immunisation

strongly associated with recommending the second dose to a wavering parent. It is plausible, therefore, that meeting the demand for education and information and improving understanding among health professionals of the rationale of the second dose will increase the number of positive recommendations.

In response to the findings of this survey the North Wales Health Authority's department of public health is constructing a measles, mumps, and rubella vaccination resource pack that contains evidence based information and is designed for use by health professionals during consultation with parents. Future work could include national monitoring of knowledge and practice of healthcare professionals to evaluate and inform the effectiveness of professional communication in the childhood immunisation programme.

Di Barnes and Glenys Proffitt provided initial ideas about the factors that may affect uptake of childhood immunisations and facilitated the survey among practice nurses. Zoltan Bozoky provided information on the Health Education Authority's work in the area of immunisation. Contractor services staff at North Wales Health Authority provided data on local general practitioners and practice nurses. Sue Davies, Hannah Potter, Gill Shawcross, and Sue Williams provided logistical and secretarial support. John King and staff from Health Solutions Wales provided data from the Welsh child health computer system.

William Poley facilitated the study in Clwydian Community Health Trust. Graham Wharton facilitated the study in Gwynedd Community Health Trust. We thank the health professionals of north Wales who helped in piloting the questionnaire and who took part in the survey.

Contributors: Norman Begg and RR had the initial ideas for the research. Anthony Swan provided statistical advice on the study design. MP, RR, and MR designed the study, interpreted the data, participated in writing the paper, and approved the final draft. MP and André Charlett analysed the data. MP will act as guarantor for the study.

Funding: This study was performed as part of the routine service work of the North Wales Health Authority's department of public health. There was no external funding.

Competing interests: MR has received reimbursement from the manufacturers of the measles, mumps, and rubella vaccine for attending symposiums.

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(Accepted 3 October 2000)

On breakfast and randomised trials

The box says that my son's breakfast cereal "may help lower cholesterol." I reflected, as I watched him eat, that this would be false only if a randomised trial had been conducted and the confidence intervals for cholesterol reduction had excluded a clinically relevant effect. Even then you might imagine the manufacturers writing a letter to the editor pointing out methodological flaws in the trial and concluding that, despite the apparently negative result, their product "may" still be of benefit.

It is disheartening to see similar claims in medical journals. For example, a recent randomised trial concluded that "hyperfractionation may result in better tumour control." Of course hyperfractionation "may" help. We already knew that. What was the point of the trial then?

I examined the abstracts of several hundred of the most recent randomised trials in the Cochrane library. Approximately one in

10 used the word "may" when drawing a conclusion about the principal hypothesis under test. So, after all the effort of getting a trial set up, treating patients, taking data and analysing results, the conclusion of 10% of trials is something that we knew before we started.

My guess is that the authors of these trials are depending on an implicit probabilistic hierarchy of "might," "could," "may," and "possibly." This seems imprecise and misleading. In the case of randomised trials it "may" be time to abandon vague probability words and stick to numbers.

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