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# Comparison of general practitioner and practice nurse perceived barriers to immunisation uptake

Felicity Goodyear-Smith, MBChB FRNZCGP MGP, Senior Lecturer, Goodfellow Unit, and Helen Petousis-Harris, BSc, Research Fellow, Ben Soe, MBBS, BAppSci, MPH, Public Health Advisor and Nikki Turner, MBChB FRNZCGP Senior Lecturer, Immunisation Advisory Centre, Department of General Practice & Primary Health Care, School of Population Health, University of Auckland

## ABSTRACT

### Objective

To understand immunisation issues confronting New Zealand general practitioners (GPs) and practice nurses (PNs), particularly comparing their perceptions of barriers to achieving high immunisation coverage in childhood and their knowledge of immunisation contraindications.

### Methods

National computer-assisted telephone survey comparing responses of 150 randomly selected GPs and 150 randomly selected PNs. A triangulated multimethod approach was used by converging both quantitative and qualitative text data.

### Results

Both GPs and PNs identified parental fear and misinformation about vaccine safety as the major barrier to immunisation uptake, but not access to services, lack of staff time or provider knowledge. Lack of funding was identified as a greater barrier by GPs than PNs. Many practitioners had poor knowledge on contraindications to vaccination but did not perceive the need for educa-

tional update. They desired user-friendly, evidence-based resources to communicate the relative benefits and risks of the scheduled vaccines to parents.

### Conclusions

GPs and PNs identifying parental fear and misinformation as the greatest barriers to childhood vaccination is consistent with research on NZ mothers which found a pervasive underlying fear of vaccines and perceived side-effects. Difficulties in accessing services was perceived as a minor barrier to improving uptake. Practitioner misinformation on contraindications to vaccination may lead to missed vaccination opportunities.

### Implications

Strategies that focus on primary health care provider support and education are more likely to gain high coverage than those that are primarily directed at overcoming access barriers.

### Key words

Immunisation; family physician, primary health care; nurses

(NZFP 2005; 32:164–171)

## Introduction

New Zealand (NZ) has a poor record with respect to childhood immunisation coverage, ranking 102nd out of the 193 listed countries for its primary infant series immunisation rates in 1998,<sup>1</sup> with coverage rates lower than those of many other westernised countries and of our Pacific neighbours.

Effective immunisation programmes require a high coverage level. For example, if measles is to be eliminated from a population, a coverage rate of at least 95% is required.<sup>2</sup> The Ministry of Health na-

tional target is a 95% coverage of children by the age of two years.<sup>3</sup> However, a 1992 national coverage survey found that less than 60% of children were fully immunised by aged two, with only 45% of Maori and 53% of Pacific children fully immunised.<sup>4</sup> A repeat coverage survey in 1996 in the northern region found minimal improvement, with 63% of children fully immunised at aged two.<sup>5</sup> Evidence indicates that national coverage has not improved significantly since then,<sup>6</sup> although some local district integrated primary health care initiatives have been able

to obtain and maintain high immunisation coverage (>90%) for their populations, even without addressing the access issues with outreach services.<sup>7</sup>

In contrast to NZ, both Australia and the United States have substantially improved their immunisation coverage rate in recent years. This improvement has resulted from a number of concurrent approaches, in particular increased emphasis on the communication that vaccines are safe.<sup>8,9</sup>

The current NZ response to low coverage includes increasing the availability of outreach services and

development of the National Immunisation Register to track children's immunisation status, which should become available in 2004–2005.

International literature shows that poor knowledge of immunisation by health professionals, rather than attitudes, is the single biggest factor in vaccine uptake.<sup>10–13</sup> One of the reasons for this is likely to be that well-educated health professionals can effectively communicate to parents the relative benefits and the risks of vaccination.<sup>14</sup> There is an active anti-immunisation lobby in NZ,<sup>15</sup> and evidence suggests that the activities of this group contribute to the eroding of public confidence in immunisation.<sup>16</sup> Recent research has indicated that many NZ parents have concerns about vaccine safety.<sup>17</sup> The numbers of parents choosing not to vaccinate their children because of fear may in itself be sufficient to prevent the 95% target uptake rate being achieved, even if all access barriers were addressed.<sup>18</sup>

The other key aspect to the importance of an informed health professional is the reduction in missed opportunities to vaccinate. The health professional missing opportunities that present in primary health care settings is frequently cited as one of the major reasons for failing to achieve high coverage.<sup>19</sup>

The immunisation schedule for NZ children is delivered within the primary health care setting. Over the past decade practising obstetrics has become less viable for general practice obstetricians, with their role taken over by midwives and specialist obstetricians. Most antenatal care now is usually provided outside of general practice, with less opportunity for general practitioners (GPs) and practice nurses (PNs) to discuss immunisation with parents both antenatally, and shortly after the birth of a child.

In most general practices, GPs and PNs work as a team. Providers of primary care have a unique opportunity to educate parents because parents see them as the most important source of information about immunisation.<sup>20</sup> The GP's primary role is to educate parents about immunisation issues, and to opportunistically encourage them to have their children vaccinated when they present for other health reasons. Doctors actively administer vaccines only in a minority of practices. A small number of sole GP practices do not employ PNs (7% of all practices)<sup>21</sup> and in these cases the doctor assumes all responsibility for im-

munisation administration. The PN's role generally involves not only parental education, but all aspects of immunisation delivery including ordering, safely storing (with documented evidence of maintenance of the cold chain) and administering vaccines to children, as well as maintaining a recall system for all children registered with the practice. In group practices with two or more doctors and nurses, at least one PN is likely to have attended one of the nationally standardised vaccinator training courses, which include two-yearly updates.

The aim of this study was to understand and compare the immunisation issues confronting NZ GPs and PNs using a national randomised computer-assisted telephone survey. The questions focused on general practice organisation issues; GP and PN perceptions of barriers to improving immunisation; their knowledge and educational needs regarding immunisation; preferred resources, and

their own practices around immunisation.

## Method

Both quantitative and qualitative text data were obtained through computer-assisted telephone surveys. These data were converged using a triangulation, multimethod approach to understand and compare immunisation issues confronting GPs and PNs.

The study was conducted between July 2002 and January 2003. The participants were GPs and PNs working in NZ general practices nationwide. Interviewers were supplied with two separate lists of randomly-selected

practices from a national general practice database and continued contacting practices in the order provided until 150 GPs and 150 PNs respectively had been recruited to the study. All practices carrying out childhood immunisations were considered eligible.

Inclusion criteria for GPs were any doctor working at the practice either part or full-time. Doctors working in locum tenure positions were excluded. In multi-practitioner settings the interviewers spoke to the first practitioner available. Similarly, for PNs the inclusion criterion was any immunising practice nurse working at the practice either part or full-time, with locum nurses excluded. In practices with more than one practice nurse, the nurse primarily responsible for administering vaccines was interviewed. Exclusion criteria were non-vaccinating practices included in the practice database (family planning clinics; some accident and medical centres; sports medicine practices) and practices without a practice nurse on the PN interviewer's randomised list.

Sample size calculation using EpiInfo 2000 indicated 150 GPs and PNs should be interviewed. This was

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based on international literature that found an expected frequency of 53% of health professionals who would know that egg allergy is not a contraindication to MMR vaccination.<sup>10</sup> Given a population of approximately 3000 GPs and 3200 NZ PNs, a sample of 142 GPs and 143 PNs is needed, using standard error and 95% confidence interval, which is acceptably small ( $\pm 8\%$  with a potential of further reduction for situations where expected frequency of incorrect responses is lower than 47%).

The design of the questionnaire was based on areas identified in the literature as barriers to immunisation. It also explored practitioners' educational needs and preferred sources for immunisation information. Interviewing was facilitated by a computer-assisted telephone survey tool that managed the sample and questions. The interview duration was approximately 20 minutes, with answers entered directly into the database for collation and analysis. Quantitative responses included yes/no answers; Likert scales, multi-choice options and demographic data including age, gender and nature, duration in, and location of, practice. Quantitative data analysis was conducted using EpiInfo 2000 where differences between GP and PN groups were sought. Cross tabulations were carried out to determine differences between age groups; years in practice; urban versus rural and responses to some of the key areas.

Qualitative data involved free-form answers to questions including other perceived barriers to immunisation, sources of information about immunisation and about adverse reactions. Free-form data response analysis used a general inductive approach with individual text responses initially analysed to identify sub-themes. The data were then collated and analysed for emerging categories. These were combined into major themes through ongoing discussions and re-reading of the data by the first two authors until consensus about the main themes was achieved. The same

Table 1. Practitioner characteristics  
N=150 for both groups

	GP N (%)	PN N (%)
Male	111 (74%)	2 (1.3%)
Worked full-time (=8/10)	123 (82%)	75 (50%)
Aged over 39 years	119 (79%)	117 (78%)
Practising 10 or more years	122 (81%)	66 (44%)

Table 2. Perceived barriers to improving immunisation  
(GP: N = 150; PN: N = 150)

More than one barrier could be identified by respondents

Agreed barrier	GP n (%)	PN n (%)	p
Parental fear regarding immunisation	80 (53)	103 (68.7)	0.006
Lack of funding for providers	66 (44)	31 (20.6)	<0.001
Lack of time for providers to offer services	42 (28)	24 (16.0)	0.012
Poor Ministry of Health direction	41 (27)	4 (2.7)	<0.001
Patient difficulties accessing services	20 (13)	22 (14.7)	0.739
Lack of interest in the topic by providers	17 (11)	4 (2.7)	0.002
Lack of knowledge in health professionals	12 (8)	7 (4.7)	0.236

codes were used for GP and PN responses where applicable. The data were independently double-coded as a consistency check with discrepancies resolved by adjudication.

The study had University of Auckland Human Ethics Committee approval.

## Results

Details of the individual GP and the PN responses have been published elsewhere.<sup>21,22</sup> A total of 227 randomly selected eligible practices were contacted to reach a sample of 150 GPs (66% response rate). For PNs, a total of 168 randomly selected eligible practices were contacted to reach the 150 PN sample (89% response rate).

Practitioner demographics are outlined in Table 1. GP characteristics are similar to those of the Royal New Zealand College of General Practitioners' membership from 1996 and 2000 data in terms of age and years in practice.<sup>23</sup> Their average age was equal to the national GP population (44 years). The sample was matched for the main city centres; Auckland (33%), Wellington (7.3%) and

Christchurch (9.3%), although it had a greater representation of rural participants than the national GP population (23% compared to 15%).<sup>24</sup> Although there was a larger representation of male over female GPs compared to the actual population (74% male compared to 64% nationally) there were no significant inter-gender differences in responses to several key questions. All but two of the PNs were female with the majority aged over 39 years. However 56% had been in practice less than ten years, indicating a relatively late onset to this vocation, with half working part-time.

## Barriers to immunisation

Perceived barriers to improving immunisation are outlined in Table 2. Lack of access to immunisation services and of knowledge in health professionals were not identified as major barriers to immunisation coverage, and there was no significant difference between GPs and PNs in these responses. A majority of both GPs and PNs identified parental fear as a barrier, although this was significantly

more of an issue for the PNs (Pearson's chi-square ( $\chi^2$ )=7.412; df=1;  $p$ =0.006). GPs were significantly more likely than PNs to identify as barriers lack of funding for providers ( $\chi^2$ =18.66; df=1;  $p$ <0.001.); lack of time for providers to offer services ( $\chi^2$ =6.29; df=1;  $p$ =0.012); poor Ministry of Health direction (Fisher's exact 2-tailed  $p$ <0.001) and lack of interest in the topic by providers (Fisher's exact 2-tailed  $p$ =0.002).

In the qualitative analysis, the strongest theme to emerge from the GPs was concerns about 'negative parental information' they needed to overcome, especially the 'considerable amount of misinformation from midwives and anti-immunisation lobby groups'. This theme was strongly echoed by the PNs with frequent comments such as 'Midwives are not giving immunisation a fair go, giving incomplete information to parents especially first-time parents'.

A minority of GPs (13%) and PNs (15%) thought that patient difficulties accessing services was an important contributor to poor uptake. In their qualitative responses both GPs and PNs highlighted difficulties presented by transient patients (GP: 'Mobile population makes for difficulties in recall') and felt that patient apathy was a factor in some cases (PN: 'Just don't get around to it. Not important enough.').

Very few GPs (8%) or PNs (5%) perceived lack of knowledge in health professionals as a barrier to immunisation.

### Practitioner knowledge and educational needs

The practitioners were asked what they considered to be contraindications to giving the MMR and pertussis vaccines (see Table 3). Most striking about these results is the relatively high percentages of GPs and PNs who wrongly considered specific conditions were contraindications. About 20% of both GPs and PNs incorrectly believed that MMR should not be given if a child has a snuffly nose, and the majority would withhold this vaccine if a child has evidence of egg allergy. Seven GPs

Table 3. Results for perceived contraindications to MMR and Pertussis vaccinations (GP: N=150; PN: N=150)

Correct answer rate	GP n (%)	PN n (%)	p
<b>Perceived contraindication to MMR vaccination</b>			
*Baby being treated for leukaemia	84 (56)	50 (33)	<0.001
History of parental febrile fits	145 (97)	129 (86)	0.002
Baby has eczema	143 (95)	142 (94)	0.980
Baby reported to have had measles	137 (91)	123 (82)	0.017
Mother breastfeeding	133 (89)	140 (93)	0.158
Sibling has ADHD, autism or Aspergers	122 (81)	128 (85)	0.353
Baby with snuffly cold	119 (79)	122 (81)	0.663
Baby had a febrile convulsion at 11 months	110 (73)	119 (79)	0.222
Mother pregnant	99 (66)	114 (76)	0.056
Baby has spina bifida and hydrocephalus	72 (48)	84 (56)	0.166
Baby gets a rash eating eggs	54 (36)	65 (43)	0.194
<b>Perceived contraindication to Pertussis vaccination</b>			
*Baby has motor delay	97 (65)	109 (73)	0.135
Sibling has eczema or asthma	150 (100)	148 (98)	0.498
Baby has eczema	146 (97)	141 (94)	0.256
History of parental febrile fits	145 (97)	141 (94)	0.256
Other sibling had fever following DTaP	141 (94)	146 (97)	0.256
Baby has snuffly nose / nasal discharge	127 (85)	116 (77)	0.105
Baby has spina bifida, no leg weakness	97 (65)	103 (69)	0.462
Baby had apnoea in first three weeks	75 (50)	92 (61)	0.048
Screaming for more than three hours after the previous immunisation	58 (39)	39 (26)	0.019
Baby had an HHE following previous immunisation	9 (6)	25 (16)	<0.001

#### \* Actual contraindications to immunisation

ADHD: Attention deficit hyperactivity disorder

HHE: Hypotonic hypo-responsive episode

DTaP: Diphtheria, tetanus and acellular pertussis vaccine

(4.7%) and 12 PNs (8%) thought that six weeks was too young to start immunisation, and a further nine GPs (6%) and 20 PNs (13%) thought that was sometimes the case.

Significantly more PNs than GPs knew that apnoea in the first three weeks of life, screaming for more than three hours after the previous immunisation or a hypotonic hypo-responsive episode following a previous immunisation were not vaccine contraindications.

However, when asked about areas where they perceived a need for more education (see Table 4) only about a

third of GPs felt that their knowledge on vaccines, their side-effects and information about the NZ schedule needed updating, and PNs were even more confident that they did not need education in these areas. Significantly fewer PNs (27% and 21% respectively) than GPs (38% and 33%) thought they needed more knowledge on vaccine side-effects or details around the immunisation schedule.

Both GPs and PNs were keen to get more information on current immunisation issues reported in the media (66% of both groups). They also wanted support with methods for ob-

taining informed consent, and answering parental concerns. This was significantly more important to GPs than PNs (56% compared with 39%,  $\chi^2 = 8.35$ , df1,  $p=0.004$ ). GPs were also more interested in information on new vaccines than PNs.

In their qualitative responses, GPs were very vocal in their requests for resources to dispel parental fears ('*Would like leaflet for parents noting benefits of immunisation to counteract the misinformation*'; '*There should be active counteracting on anti-immunisation issues by the Ministry or other organisation*') and PNs expressed similar opinions ('*anti immunisation in the media gets more coverage than the other side of the argument*'; '*Want accurate information to hand to parents disproving the myths*').

Another area of need identified was international information (GP: '*Up-to-date opinions from the world regarding safety and risk disease prevalence patterns*') including easy access to immunisation schedules from other countries, to facilitate immunisation updates for immigrant families (PN: '*Would like comparative schedule of immunisation for parents from abroad*').

## Discussion and implications

There was considerable concordance between GPs and PNs regarding the key barriers to immunisation uptake. Both GPs and PNs indicate that the largest barrier to administering childhood vaccination is parental fear and that parental information is a problem, both in terms of misinformation and lack of information. This finding supports our recent research with NZ mothers which found a pervasive underlying fear of vaccines and perceived side effects.<sup>17</sup> Both parents who chose to vaccinate their children and those who actively object have concerns about immunisation safety.<sup>25</sup>

GPs were far more likely than PNs to identify lack of funding to health providers as a barrier. This is not surprising, given that GPs have to meet the costs of service delivery, including cold chain requirements and main-

Table 4. Identified educational needs (GP: N = 150; PN: N = 150)

Topics on which practitioner wanted more information	GP n (%)	PN n (%)	p
Current issues reported in the media	99 (66)	99 (66)	1.0
New vaccines	102 (68)	73 (49)	<0.001
Support with methods for obtaining informed consent, and answering parental concerns	84 (56)	59 (39)	0.004
Knowledge of the vaccines	49 (33)	44 (29)	0.533
Knowledge around vaccine side-effects	57 (38)	41 (27)	0.049
Knowledge around NZ immunisation schedule, and rationale behind it	50 (33)	32 (21)	0.020
Knowledge of vaccine-preventable diseases	41 (27)	27 (18)	0.054
Knowledge around delivery techniques	28 (19)	24 (16)	0.542

taining a recall system themselves. The latter includes software costs, staff time, mailing and telephone costs if the recall is posted. While scheduled immunisation for Tetanus, Diphtheria, Pertussis, Polio, Hib, Hepatitis B, Measles, Mumps and Rubella is free to NZ children, with the government paying for the vaccines and a small fee for each vaccine event, compliance costs may not be covered by the funding provided. A 1998 study found that given the frequency of recall reminders, there was a net cost to practices for childhood immunisation, after deducting the benefit rate.<sup>29</sup> A strong argument can be made for better funding the informed consent process, regardless of whether the ultimate outcome is parents agreeing to or declining the vaccination of their children.

Both GPs and PNs considered patient difficulties in accessing services as an unlikely or a minor barrier to improving immunisation. These findings are counter to the current NZ strategies which focus predominantly on structural barriers to accessing services,<sup>30</sup> rather than addressing misinformation and increasing public and professional confidence in the safety and necessity of the vaccination schedule.

Both GPs and PNs had a poor knowledge of contraindications to two primary vaccines – MMR and Pertussis (Table 3). However they did not rate their own lack of knowledge as an important factor in low immunisa-

tion coverage, and only a minority expressed a desire for further knowledge about the vaccines, their side-effects or delivery techniques. This is of considerable concern as overestimation of vaccine contraindications is very likely to lead to missing opportunities to vaccinate. With a fifth of GPs and PNs reporting that 'snuffly nose' is a contraindication to MMR vaccination, in this age group with a high incidence of this condition there is considerable scope for frequently missing opportunities to vaccinate. If GPs and PNs wrongly consider that children should not be immunised when in fact there are no contraindications, then they have an overly cautious approach in which opportunities to vaccinate are missed.

Even in the Rotorua district, where there is a relatively strong support of vaccinations, as demonstrated by their high coverage rate of 92% at two years of age,<sup>7</sup> research has shown that only 80% of GPs and PNs, and even fewer midwives, were confident that immunisations did not have unacceptable dangers.<sup>26</sup> For example, 21% of GPs, 41% of PNs and 45% of midwives were not sure whether MMR is implicated as a cause for autism or Crohn's disease, despite medical research reassuring health workers about the safety of this vaccine.<sup>26-28</sup> Our study also indicates that some GPs and PNs lack confidence in vaccine safety.

PNs being more knowledgeable about apnoea in infancy and hypotonic hypo-responsive episodes not being immunisation contraindications may reflect the vaccinator training undertaken by the PNs but not the GPs, but clearly further education for all practitioners is needed about conditions where it is safe to vaccinate.

Reluctance to start vaccinating infants at age six weeks is of concern, because small babies are most vulnerable to the serious sequelae of diseases, especially pertussis. If the primary health care team have a sound understanding of the safety issues around the vaccination schedule and basic immunology principles, they will be able to confidently encourage parents to vaccinate their children, and help address some of the anxieties and

misinformation contributing to poor immunisation uptake.

A strength of this study is that it surveyed a randomly-selected representative sample of both NZ GPs and PNs and compared their attitudes towards immunisation and their knowledge regarding its safety. A limitation is that these are self-reported measures, which may not always reflect actual clinical practice.

Primary health care provider commitment to immunisation is a key aspect to improving coverage. PNs are the primary vaccinators of NZ children. The GPs and PNs surveyed indicated a strong desire for user-friendly, evidence-based resources to communicate to parents of young children the relative benefits and risks of the vaccines against preventable diseases provided in the sched-

ule. Furthermore they are in need of further education strategies particularly around contraindications, to reduce the likelihood of missing opportunities within their practices to vaccinate. Strategies that focus on primary health care provider support and education are more likely to gain high coverage than those that are primarily directed at overcoming access barriers.

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