

A picture speaks a thousand words: evaluation of a pictorial post-vaccination care resource in Australia

Hammad Ali^{A,C}, Holly Seale^A, Kirsten Ward^B and Nicholas Zwar^A

^ASchool of Public Health and Community Medicine, Faculty of Medicine, University of New South Wales, Sydney, NSW 2052, Australia.

^BGeneral Practice New South Wales, GPO Box 5433, Sydney, NSW 2001, Australia.

^CCorresponding author. Email: drhammadali@gmail.com

Abstract. Evaluating the ‘Common Reactions to Vaccination’ post-vaccination care resource was seen as an opportunity to contribute to the limited literature base in this important area, learn from the strengths and weaknesses of the resource and gain insight into post-vaccination care practices. Semi-structured in-depth interviews were conducted with 12 general practitioners and 29 practice nurses in New South Wales and Australian Capital Territory, Australia. Structured interview guides were used and data was analysed thematically. A self-administered survey was also distributed to parents or guardians during routine childhood vaccination visits. When compared with previous resources, participants felt the new resource was more appropriate as it had a simple layout; it was colourful, incorporated pictures and had basic and practical information. Information about post-vaccination care and common reactions to vaccination must be provided in written form accompanied by a verbal reinforcement so that patients can revisit the information at a later stage if required. The ‘Common Reactions to Vaccination’ post-vaccination care resource provides comprehensive information in an easy-to-understand pictorial way and was appreciated by both vaccination providers and patients.

Additional keywords: general practice, immunisation.

Introduction

Vaccination side effects have been reported as a major concern in several international studies of parental attitudes towards vaccination and physician risk–benefit communication (Davis *et al.* 2001; Petousis-Harris *et al.* 2002; Taylor *et al.* 2002; Hamilton *et al.* 2004; Borrás *et al.* 2009; Freed *et al.* 2010; Luthy *et al.* 2010). Unexpected serious post-vaccination reactions such as swollen limbs and prolonged bouts of crying are of major concern for parents or guardians and can result in delay or discontinuation of vaccination (Bond *et al.* 1998). Other minor and more common reactions, like local inflammation at the injection site and fever, are also a source of concern for parents or guardians and play an important role in acceptance or rejection of vaccination (Jacobson *et al.* 2001). In addition, parents are also concerned about possible links between vaccinations and diseases like autism, diabetes, Crohn’s disease, asthma and allergies and immune system overload (Hamilton *et al.* 2004; Borrás *et al.* 2009; Smith *et al.* 2009; Freed *et al.* 2010; Luthy *et al.* 2010). Thus, parents are concerned about many aspects related to vaccination, from immediate pain and multiple vaccinations given simultaneously to long-term health issues (Petousis-Harris

et al. 2002; Luthy *et al.* 2010). In spite of high vaccination coverage levels, there will always be parents or guardians with doubts about the safety of childhood vaccinations (Streefland 2001; Freed *et al.* 2010).

Relevant, reliable and timely information about childhood vaccination, including information regarding post-vaccination reactions and how to care for them, is an important decision-making factor in the acceptance of vaccination by patients and their parents or guardians.

In a recent Australian study, lack of detailed and balanced information was considered an important barrier to vaccination (Forrest *et al.* 2000). ‘Post-vaccination care’ advice should be provided as part of any vaccination consultation; however, anecdotally such information is often not given priority by either patients or providers. This may be due to distress immediately following vaccination, lack of thought or time for providers to convey this information (Davis *et al.* 2001) and patients forgetting what they have been told. This could lead to a lack of understanding by the patients or parents of what the commonly observed reactions may be following vaccination and when medical attention should be sought. Ideally post-vaccination reaction care information

should be written, valid and unbiased, and available at the time of vaccination (St-Amour *et al.* 2006; National Health and Medical Research Council 2008).

The Australian General Practice Network, State Based Organisation Immunisation Committee utilised existing pictorial health promotion resources from Australia and overseas to develop the pictorial information sheet ‘Common Reactions to Vaccination’ (Fig. 1). It describes the commonly observed reactions following vaccination (DTPa-Hib, Hep B-Polio, Pneumococcal (23Vppv & 7Vpcv), varicella-zoster, measles/mumps/rubella, meningococcal vaccine, HPV, influenza, adult DT & DTP) and aims to increase awareness and understanding among recipients or their parents or guardians about what to expect following vaccination and when to seek medical attention. Simple language along with pictures of commonly observed reactions and the care required are used in the resource, which is provided in both hardcopy and electronic format. The latter can be accessed at www.gpns.wa.gov.au/programs/immunisation/immresources (verified 10 July 2010). Three Australian states and one territory are using this or a modified version of the resource. An internet and Medline database search revealed no previous studies that specifically examine the effectiveness of any

post-vaccination care resource provided to parents or guardians in Australia. The aim of this study therefore was to contribute to the limited literature base in this important area and evaluate, using a mixed methods approach, the strengths and weaknesses of this resource.

Methodology

Qualitative

Semi-structured in-depth interviews allow exploration of theories and models (Wengraf 2001). This method was chosen for the study as we sought to explore the views of a variety of groups who use the resource.

Participants

Divisional immunisation coordinators (DICs), general practitioners (GPs) and practice nurses (PNs) from New South Wales and the Australian Capital Territory were included in this study. Recruitment of DICs was done by an expression of interest, sent out to all 34 divisions in New South Wales and one in the Australian Capital Territory. The participation target was set at 10 divisions; however, 13 DICs showed interest in participating in the evaluation and were all included.

IMMUNISATION

COMMON OBSERVED REACTIONS TO VACCINES AND WHAT TO DO

ALL VACCINE NEEDLES (INJECTIONS) MAY CAUSE THE FOLLOWING REACTIONS:

Mild fever <math>< 38.5</math> short lasting

Where the needle was given: Sore, red, burning, itching or swelling for 1-2 days and/or small, hard lump for a few weeks

Grizzly, unsettled and unhappy

SOME VACCINE NEEDLES (INJECTIONS) MAY CAUSE ADDITIONAL REACTIONS:

DTPa-Hib-Hep B-Polio vaccine: diphtheria-tetanus-pertussis-hepatitis B-polio-haemophilus influenzae B	Not hungry	Given
Pneumococcal vaccine	Sleepy	Given
Varicella zoster vaccine: varicella/chicken pox After 5-26 days	Mild rash where needle given; may spread to other parts of the body	Given
MMR vaccine: measles-mumps-rubella After 5-12 days	Light rash (not infectious)	Given
Meningococcal C vaccine	Headache Not hungry	Given

WHAT TO DO AT HOME:

Give paracetamol, in accordance with the directions on the pack, if hot, grizzly or for sore injection site as needed

Do not put on lots of clothes or blankets if hot

Give extra fluids

Put a cold wet cloth on the injection site if it is sore

WHEN TO SEEK MEDICAL ADVICE:

Paracetamol is needed for more than 1 or 2 days

Side effects are bad and not going away. Or, if you are worried at all!

Additional copies of this resource may be obtained from your local Division of General Practice

COMMONLY OBSERVED REACTIONS TO VACCINES ON THE NATIONAL IMMUNISATION PROGRAM

<ul style="list-style-type: none"> Irritable, crying, unsettled and generally unhappy Drowsiness or tiredness Localised pain, redness and swelling at injection site Occasionally injection site nodule – may last many weeks (no treatment needed) Low grade temperature (fever) 	<ul style="list-style-type: none"> 1-3 in 100 recipients may develop vomiting and diarrhoea up to 7 days after vaccination 	<ul style="list-style-type: none"> Localised pain, redness and swelling at injection site Occasionally injection site nodule – may last many weeks (no treatment needed) Low grade temperature (fever)
MenCCV (meningococcal C) <ul style="list-style-type: none"> Irritable, crying, unsettled and generally unhappy Loss of appetite Headache (usually observed in adolescent/adults) Localised pain, redness and swelling at injection site Occasionally injection site nodule – may last many weeks (no treatment needed) Low grade temperature (fever) 	MMR (measles/mumps/rubella) <ul style="list-style-type: none"> Occasionally injection site nodule – may last many weeks (no treatment needed) <p>Seen 7 to 10 days after vaccination:</p> <ul style="list-style-type: none"> Low grade temperature (fever) lasting 2-3 days Faint red rash (not infectious) Head cold and/or runny nose, cough and/or puffy eyes 	Hib (haemophilus influenzae) <ul style="list-style-type: none"> Localised pain, redness and swelling at injection site Occasionally injection site nodule – may last many weeks (no treatment needed) Low grade temperature (fever)
VZV (varicella/chicken pox) <ul style="list-style-type: none"> Localised pain, redness and swelling at injection site Occasionally injection site nodule – may last many weeks (no treatment needed) Low grade temperature (fever) <p>Seen 5-26 days after vaccination:</p> <ul style="list-style-type: none"> Few small red lumps or blisters (2-5 lesions) usually at injection site which occasionally covers other parts of the body 	Hep B (hepatitis B) <ul style="list-style-type: none"> Localised pain, redness and swelling at injection site Occasionally injection site nodule – may last many weeks (no treatment needed) Low grade temperature (fever) Mild nausea Mild headache 	Human papillomavirus (HPV) <ul style="list-style-type: none"> Localised pain, redness and swelling at injection site Low grade temperature (fever) Mild nausea Mild headache
Adult DTP (diphtheria/tetanus/pertussis) <ul style="list-style-type: none"> Drowsiness or tiredness Localised pain, redness and swelling at injection site Occasionally injection site nodule – may last many weeks (no treatment needed) Low grade temperature (fever) 	Influenza <ul style="list-style-type: none"> Drowsiness or tiredness Muscle aches Localised pain, redness and swelling at injection site Occasionally injection site nodule – may last many weeks (no treatment needed) Low grade temperature (fever) 	Adult dT (diphtheria/tetanus) <ul style="list-style-type: none"> Localised pain, redness and swelling at injection site Occasionally injection site nodule – may last many weeks (no treatment needed) Low grade temperature (fever)

NOTE TO IMMUNISATION PROVIDERS: PLEASE INDICATE THE VACCINE ADMINISTERED BY TICKING THE BOX

Fig. 1. The ‘Common Reactions to Vaccination’ resource (reproduced with permission from GPNSW).

Recruitment of GPs and PNs was the responsibility of the DICs. A purposive sampling technique was used by the DICs, which involves personal judgement to select a sample that should be representative (Fraenkel and Wallen 1993). This method was used as the desired sample needed to provide adequate representation of both urban and rural populations, thus practices from both of these settings were included. Through their regular communication channels (newsletters and faxes), the DICs recruited 12 GPs and 29 PNs who used the 'Common Reactions to Vaccination' post-vaccination reaction care resource in their general practice. The purpose of the evaluation was explained to all participants verbally and through the information sheet. Written consent was obtained from all participants.

Data collection and analysis

A structured interview guide was used to ensure that all interviews covered the main areas of interest (see Box 1 for sample interview questions). Separate guides for interviews with DICs and GPs or PNs were prepared and pilot tested with one DIC, one GP and one PN, who were similar in their characteristics to the members of the study population, and modified accordingly. All interviews were conducted over the telephone and were audio recorded. For consistency and quality purposes the interviews were professionally transcribed and de-identified. The interview recordings and the transcriptions were stored at one site and only the authors had access to these. To analyse the data, the transcripts of all interviews were studied by three of the authors and major themes were individually identified. These major themes have been used as subheadings in the results section. Each statement was coded into a category from a list of themes iteratively developed from the data by three authors.

Quantitative

A self-administered survey of parents or guardians constituted the quantitative component of this evaluation. An anonymous two-page survey was developed that assessed the following: (1) demographic characteristics of the respondent and the age of the child being vaccinated; (2) previous exposure to and type of post-vaccination care resource; and (3) attitudes towards the 'Common Reaction to Vaccination' post-

vaccination reaction care resource. All the questions were closed, except for one that asked participants whether they wanted the information sheets to contain any other information. Surveys were distributed to practices that had staff participating in the evaluation. Equal numbers of surveys were sent out to each participating practice, in order to capture as diverse a sample as possible.

The vaccination provider (GP or PN) provided the survey to parents or guardians who had brought their child in for routine vaccination. Along with the survey, the parent was provided a copy of the common reactions to vaccination resource or was asked if they already had a version. Along with the survey, an information sheet was distributed that described the purpose of the study, contained instructions on how to complete it, and had the contact information of the researchers. Parents or guardians were requested to fill out the survey within 7 days of vaccination. A total of 400 surveys were distributed to parents or guardians along with a prepaid postage envelope and 120 completed surveys were received in response. The surveys are stored at the University of New South Wales and only the authors have access to the surveys. Survey responses were collated in Microsoft Excel, summary statistics prepared and analysis on the summary statistics was conducted.

Ethics approval for the evaluation was obtained from the Human Research Ethics Committee at the University of New South Wales. The project was supported by the General Practice NSW Immunisation Program, which receives funding from the Commonwealth Government, Department of Health and Ageing.

Results

Interviews

Forty-one participants were interviewed (12 GPs, 29 PNs).

Previous sources of post-vaccination reaction care advice

Participants were asked how they provided post-vaccination care advice to patients before the availability of this resource. Both written and verbal advice to patients was the most commonly stated answer, followed by written information only and then verbal advice only.

Of those participants who provided written information, the most commonly reported resource was printouts from general practice software programs such as Medical Director (Health Communications Network 2010) and Best Practice (Best Practice 2010). Others photocopied the information from the *Australian Immunisation Handbook* 9th edn. (National Health and Medical Research Council 2008) or developed a resource themselves. Most participants who used other forms of written information reported that they were not satisfied with them. They considered that the information was too complicated for patients to understand, poorly laid out and not suitable for people from a non-English speaking background or with low literacy levels.

Box 1. Sample interview questions

- Guide for general practitioners and practice nurses
- Before the availability of this information sheet, how did you provide post-vaccination care information to parents?
 - What was your initial response to the information sheet?
 - How often do you make use of this resource?
 - What is your personal opinion about the clinical information given in the information sheet?
 - In your opinion, what was the initial response of your patients to the information sheet?
 - Do patients ask you any questions about the information sheet?
 - Do you have any suggestions for improving this resource?

We had a vaccination booklet that was quite complicated to read and quite scary for the . . . parents. (PN)

There was a lot of writing and it wasn't very good and I didn't use them very much. (PN)

It was a horrible copied sheet. (PN)

Initial reaction towards the resource

Participating GPs and PNs started using the resource immediately after receiving it and when asked about their initial reaction to it, the majority said they were 'impressed'. In regards to the layout, many respondents reported that they loved the colours of the resource as it made it attractive and drew the patient's attention. Additionally, the participants thought it was 'great' compared with any written or printed material they had been previously provided.

It's very colourful which makes it even better or attractive to have a little go through. (PN)

The participants were also asked what they thought of the clinical information presented in the resource. The majority said that the clinical information was 'clear and easy to understand', 'accurate' and 'sufficient'; and they were happy with it as it was appropriate for the patients. Only one participant said that the information was a bit repetitive.

I thought it was very clear and set out really well and in terminology that I think the patients or the parents could understand. (PN)

It's in layperson's terms, so it's good for . . . a person who is . . . not in the health profession to understand, but it's also easy for us to understand too. (PN)

The participants mentioned that it is important for the parents or guardians to be given some written information following vaccination as many are unable to absorb or recall verbal information provided at the time of vaccination as their child is often distressed.

. . . the parents are often quite traumatised when you vaccinate their babies, particularly initially, they're quite upset, and I don't think they really take it all in. But if you've got it all written down, over time they can refer to it as well. (GP)

To assess the use and benefit of the resource when post-vaccination reactions occur, participants were asked if they thought that there had been any change in the number of patients who contacted them after vaccination with complications or concerns. Many participants felt that there had been a decrease in the number of patients contacting them concerned about post-vaccination reactions since they started providing the resource. The remaining were either not sure if there was any change or not, or thought there had been no change at all as they had hardly received any calls about post-vaccination reactions from patients before they started giving out the resource.

Along with their own response to the resource, the GPs and PNs were asked if they had received any feedback from their patients. Most said that the parents or guardians 'loved it' or the response was 'quite positive' and that they thought the resource was 'simple', 'clear' and 'easy to follow'. They also mentioned that the parents or guardians thought that the colours made all the difference.

They (parents) loved the fact that it was colour-coded. A few of them said to me that they actually put it on the fridge magnet so that it was there for them to look at any time. (PN)

Suggestions to improve the resource

Participants were also asked if they had any suggestions for improving the resource. Some mentioned that vaccinations should be added by brand name (e.g. *Infanrix*®[®], *Gardasil*®, and *Boostrix*®). Another suggestion to improve the resource was to have a place on the resource to add the contact details of the practice so parents or guardians could contact the practice if they had any questions or concerns. One participant also mentioned that a specific temperature, constituting a fever, should be mentioned at the top of the page.

Target audience survey

A total of 400 self-administered surveys were distributed to parents or guardians and 120 were collected (30%). Of these, 92% (110/120) of survey participants were classified as the child's mother and the majority were aged between 25 and 44 years (99/120, 82.5%).

Prior to the availability of the resource, parents or guardians indicated that the usual source of post-vaccination information used to be verbal information given by the doctor (62/120, 51.6%). This was followed by participants indicating that they had received another pamphlet earlier (44/120, 36.6%).

Following the vaccination, 53 (44.2%) participants indicated that their child had a reaction. Of these participants, 90.6% (48/53) indicated that they used the information sheet. Participants were asked to rate its usefulness following the reaction, of which 20 (41.7%) said 'very useful' and the remainder (28, 58.3%) said 'useful'. Attitudes towards the information sheet are further detailed in Table 1.

Discussion

Availability of reliable information is one of the greatest needs and lack of suitably detailed information is a barrier to informed decision-making about vaccination (Forrest *et al.* 2000). The study highlighted that vaccine providers thought that information about post-vaccination care and common reactions to vaccination must be provided in written form along with verbal information, so patients can revisit the information at a later stage if required. If information is provided only verbally, the parents or guardians and patients may be unable to retain most of it for several reasons including their general anxiety around the time of vaccination. The effectiveness of health communications can be significantly

Table 1. Target audience attitudes towards the post-vaccination care information sheet (n = 107)

	Agree n (%)	Neither n (%)	Disagree n (%)	Unsure n (%)
The written information is easy to understand	106 (99)	1 (1)	0 (0)	0 (0)
The pictures are relevant and easy to understand	92 (86)	13 (12)	2 (2)	0 (0)
It provides enough information about when to seek medical attention	96 (90)	9 (8)	2 (2)	0 (0)
It reassures me about what to expect after the immunisation	99 (93)	5 (5)	3 (3)	0 (0)
It reassures me that immunisation is safe	68 (64)	32 (30)	7 (7)	0 (0)
The information was not detailed enough	9 (8)	14 (13)	82 (77)	2 (2)
The colours are too bright	4 (4)	18 (17)	84 (79)	1 (1)
Without this information sheet, I already know what to expect following immunisation	31 (29)	22 (32)	54 (50)	0 (0)

increased by including pictures in the design of new health education materials (Houts *et al.* 2006). Research has shown that adding pictures to written language can increase patient attention, comprehension, recall and adherence; additionally, pictures can be especially helpful to patients with low literacy skills (Houts *et al.* 2006).

The 'Common Reactions to Vaccination' post-vaccination care resource provides comprehensive information in an easy-to-understand pictorial way that is appreciated by both vaccination providers and patients as it is a great recall tool. Numerous sources of post-vaccination care advice are currently available and are being used by vaccination providers. In an Australian context, anecdotally, these include resources and printouts from various medical software programs like Medical Director and Best Practice (Best Practice 2010; Health Communications Network 2010), state and national health departments including the *Australian Immunisation Handbook* 9th edn. (National Health and Medical Research Council 2008), copies of post-vaccination resources from other countries or jurisdictions, and 'self made' compilations of information compiled by vaccination providers or divisions of general practice. However, our evaluation shows that these resources are not user friendly. They are either photocopies or printouts of technical resources and most of them are more than one page long, do not contain any pictures, use technical medical terms and are thus not targeted at the parents or guardians. It is apparent from the findings of this evaluation that the information provided in any such resource should be simple and target low literacy so that people from all backgrounds can understand the information. It is also evident that the resource should be attractive so it draws the attention of patients without providing an overwhelming amount of information.

Although this evaluation provides great insight into the strengths and weaknesses of a patient information resource, the results could be biased towards this resource for several reasons. First, participation of DICs was on a voluntary basis and although 13 out of 34 DICs in NSW and one in the ACT participated in the evaluation, they could have been more receptive to the resource than the remaining DICs. Second, the original intention was to include GPs and PNs who do not use the 'Common Reactions to Vaccination' post-vaccination reaction care resource along with ones who do. However, only those GPs and PNs who used the resource agreed to participate

in the evaluation, and thus provided the survey to the parents or guardians. This is a major limitation of the evaluation as we have no understanding of why some GPs and PNs are not using the resource, and their views on the value of the resource and those of the parents or guardians attending these practices may be quite different. Further research targeted at these GPs and PNs needs to be conducted to assess the underlying reasons behind this. Lastly, it is difficult to say that the resource made any objective difference as there is no objective comparison in terms of time or group. However, the qualitative component clearly shows that the vaccination providers think that it is a much better resource than the ones available previously.

Overall, the evaluation shows that the resource was welcomed by immunisation providers and parents or guardians as it provides the essential information in an easy to understand and visually attractive manner. Thus, such a resource, which provides information about post-vaccination reactions and their care, should be available to all immunisation providers as similar resources are available in other Australian jurisdictions. Furthermore, this resource would be a useful addition to the Child Personal Health Record book (New South Wales Health 2007) that is provided to parents in NSW hospitals following the birth of a baby and used by health professionals to document the child's health and progress.

In order to encourage vaccination providers to keep using such a resource, its continued availability needs to be ensured. One of the ways this can be made certain is by making it available online or through general practice software, although this will lose the colours of the resource as many practices may not have colour printers. The positive attributes of this resource, including simplicity in content and use of pictorial design, can be used to inform the design of other patient information resources. As our results illustrate, the visual appearance, including colour and pictures, is very important in the acceptability of such a resource.

Conflicts of interest

Kirsten Ward received funding from vaccine manufacturer Wyeth to attend a conference to present this research.

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