

## Peer-reviewed articles

# IMPACT OF FAXED HEALTH ALERTS ON THE PREPAREDNESS OF GENERAL PRACTITIONERS DURING COMMUNICABLE DISEASE OUTBREAKS

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## Abstract

The NSW Department of Health (NSW Health) faxed health alerts to general medical practitioners during measles outbreaks in March and May 2006. We conducted a retrospective cohort study of randomly selected general practitioners (GPs) (1 per medical practice) in New South Wales to investigate the effectiveness of faxing health alerts to GPs during a communicable disease outbreak. Fax transmission data allowed comparison of GPs sent and not sent the measles alert for self-reported awareness and practice actions aimed at the prevention and control of measles. A total of 328 GPs participated in the study. GPs who were sent the alert were more likely to be aware of the measles outbreak (RR 1.18, 95% CI 1.02, 1.38). When analysed by whether a fax had been received from either NSW Health or the Australian General Practice Network, GPs who reported receiving a faxed measles alert were more likely to be aware of the outbreak (RR 2.56, 95% CI 1.84, 3.56), to offer vaccination to susceptible staff (RR 6.46, 95% CI 2.49, 16.78), and be aware of other infection control recommendations. Respondents reported that the faxed alerts were useful with 65% reporting that the alerts had reminded them to consider measles in the differential diagnosis. This study shows that faxed health alerts were useful for preparing GPs to respond effectively to a communicable disease outbreak. The fax alert system could be improved by ensuring that all general practices in New South Wales are included in the faxstream database and that their contact details are updated regularly. *Commun Dis Intell* 2010;34(1):23–28.

Keywords: fax, health alert, measles, outbreak, communication, immunisation, public health, general practitioner, health department

## Introduction

The importance of timely identification and response to significant public health events, including communicable disease outbreaks, has been demonstrated across a variety of epidemiological

settings.<sup>1,2</sup> Rapid, mass communication between health departments and community-based clinicians is commonly regarded as a key element in an effective response to such events.<sup>3,4</sup> However, published evidence is sparse regarding the effectiveness of such communications methods in reaching the intended audience and clinicians taking the requested public health actions to identify cases and reduce disease transmission.

Traditionally, the NSW Department of Health (NSW Health) has collaborated with the local Australian General Practice Network (AGPN) to communicate rapidly with community general practitioners (GPs). However, not all GPs in New South Wales are members of the AGPN, nor are medical specialists and a range of other health professionals. The community-wide threat of pandemic influenza and a growing awareness of the need for rapid uniform communication with a range of health professionals during significant health events prompted NSW Health to seek a more comprehensive communication tool for providing up to date information to a more diverse audience.

In 2005, NSW Health investigated a range of options to address this need and procured a commercially available database (Database X). In addition to the contact information for 24,000 medical doctors in New South Wales and the Australian Capital Territory, Database X contains similar information for medical specialists, emergency departments and aged care facilities. Between late March and June 2006, there were 3 measles outbreaks (2 localised New South Wales outbreaks and 1 larger multi-state outbreak),<sup>5,6</sup> which provided the first opportunity to test the utility and effectiveness of the Database X faxstreaming system to New South Wales-based GPs, in combination with the AGPN faxstream process.

Since the 1990s, the incidence of measles in Australia has declined to a point where the disease is now uncommon.<sup>7</sup> As a result, many GPs have either never seen a person with measles or do not consider measles in their differential diagnoses.<sup>8,9</sup> During an outbreak of measles in this context, cases may

present to general practices and emergency departments several times during their infectious period before a correct diagnosis is made. This could result in a high risk of ongoing transmission in health care settings, particularly among unimmunised infants and susceptible adults.<sup>10–12</sup> Rapid, direct, mass communication with GPs and hospitals may minimise the risk of transmission in health care settings and result in better preparedness to control measles and other communicable diseases outbreaks.

Using contact details from Database X, NSW Health faxed measles health alerts to community general medical practices in March and again in May 2006. Information contained in the health alert included a brief description of the measles outbreak, the age groups most susceptible to measles infection and advice on actions required of GPs to help reduce ongoing transmission of measles in the community. These included consideration of measles in the differential diagnosis of patients with a febrile illness, a request to notify possible cases to the local public health unit, advice on collection of appropriate samples for laboratory tests, as well as information about offering measles, mumps, rubella (MMR) vaccine to all susceptible patients, their contacts and practice staff (i.e. those born after 1965 but not vaccinated with 2 doses of MMR), and appropriate infection control measures implemented when a patient with possible measles attended the practice. A record was kept of the practices sent faxes, whether fax transmission was successful, and practices not sent a fax as no fax number was recorded.

We aimed to evaluate the effectiveness of the faxed health alerts in achieving the objectives of improving measles control and prevention by comparing awareness and actions related to the recommendations contained in the health alert among general medical practices recorded as having been successfully sent one or more faxed alerts, and those not sent the alert (i.e. unsuccessful transmission or missing fax number). We also recognised that GPs may have received faxed information from other sources, including the AGPN, and therefore assessed the effectiveness of faxed health alerts by self-reported 'fax received' status as well as documented 'fax sent' status.

## Methods

We conducted an historical cohort study of a random sample of general medical practices in New South Wales recorded in Database X. The unit of selection for both the NSW Health faxstream system and our study was the general practice, not individual GPs.

In sample size calculations, we estimated that 363 practices recorded as sent the faxed alert and 116 practices not sent the fax (i.e. a ratio of approximately 3:1) were required to detect differences

with 80% power at a significance level of 0.05 in (i) awareness of the measles outbreak (assuming that 80% of practices sent the fax and 65% of those not sent the fax were aware of the outbreak), and (ii) offering MMR vaccine to susceptible practice staff (assuming that 15% of those sent and 5% of those not sent the fax would have done this). We over-sampled the 2 groups of practices assuming that up to 50% of the GPs selected for the study may not participate, based on previous studies of GPs in New South Wales. Random samples were selected from Database X of 725 practices sent the fax and 231 practices not sent the fax (Figure).

In August 2006, a self-administered questionnaire was mailed to 1 GP in each of the 956 randomly selected practices with a letter of invitation to participate in the study from the Chief Health Officer of New South Wales. A reminder letter and the questionnaire were mailed to all non-respondents after a period of 4 weeks. The group (i.e. fax sent and not sent) of each selected GP was identified from a coded sticker applied by research staff to the return-paid envelope. Data were collected under New South Wales public health legislation.

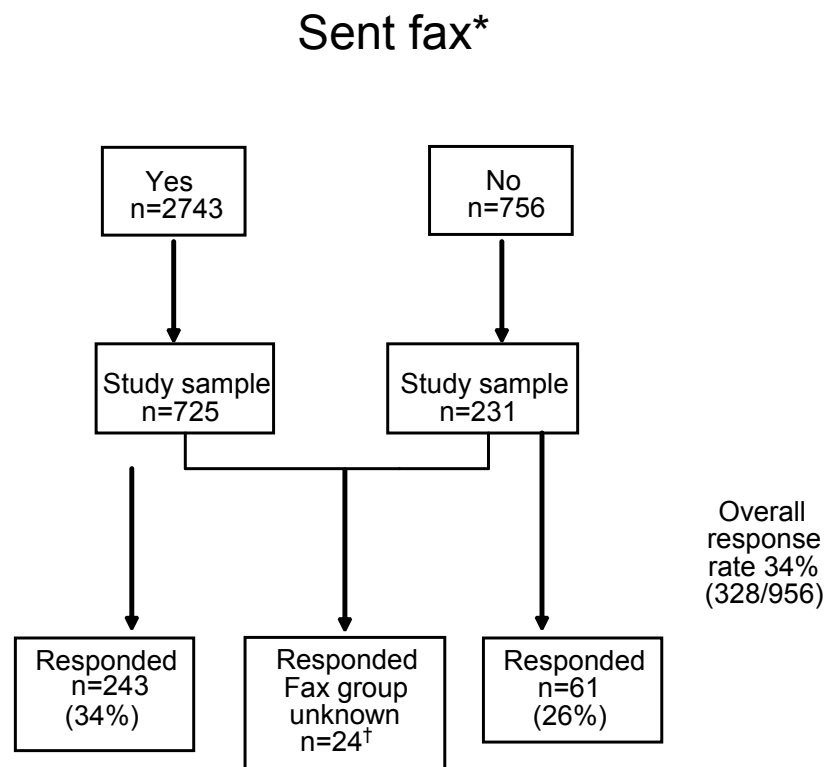
Information collected in the questionnaire included GP and practice demographics, information sources used during the measles outbreak including receipt of faxed measles health alerts from the AGPN, the usefulness of health alerts as well as awareness and implementation of NSW Health recommendations related to measles control.

All data cleaning, recoding and statistical analyses were performed using STATA Version 9 software (Stata Corp, College Station, TX, USA). The representativeness of survey respondents was assessed by comparing practice characteristics recorded in Database X for practices in the 'sent' and 'not sent' groups, from which the samples had been drawn. We calculated relative risks and 95% confidence intervals to compare proportions between groups. Chi-square tests were used to assess statistical significance. Two types of comparisons were conducted: (1) by 'fax sent' status, based on whether the practice was recorded as having been sent at least 1 alert by NSW Health, and (2) by 'fax received' status, based on whether the respondent reported receiving a faxed alert from NSW Health and/or the AGPN.

## Results

The overall response rate was 34% after the second mail-out, with 33.5% (243/725) for the 'sent' group and 26.4% (61/231) for the 'not sent' group. Twenty-four surveys were excluded from 1 part of the analysis following loss of identifying stickers from envelopes during postage.

Figure: Recruitment of the study sample



\* Based on records of NSW Department of Health.

† General practitioner identifying information was removed during postage.

Practice characteristics for survey respondents were found to be representative of all those sampled and the frames from which they were selected in terms of information contained in Database X (Table 1). Self-reported information from survey respondents in the 'sent' and 'not sent' fax groups showed that the two groups were similar in terms of urban/rural location, and self-reported characteristics including access to a fax machine, the proportion of GPs under 50 years of age, the proportion of female GPs and membership of the AGPN (Table 2). However, solo practitioners were less likely to have been sent a fax (Tables 1 and 2; RR 0.71, 95% CI 0.61, 0.82).

### General practitioner knowledge and implementation of measles health alert information

GPs in practices faxed a health alert by NSW Health were more likely to report that they were aware of the measles outbreaks compared with GPs in practices not sent faxed alerts (Table 3; RR 1.18, 95% CI 1.02, 1.38). They were also more likely to report that susceptible staff in the practice had been offered MMR vaccine (RR 1.55; 95% CI 0.99, 2.45;  $P < 0.05$ ). This was also true in practices without routine staff MMR vaccination policies ( $P < 0.01$ ).

Associations were stronger when data were analysed by 'fax received' status (i.e. from NSW Health or the AGPN). For the outcome of being aware of the measles outbreak, the RR was 2.56 (95% CI 1.84, 3.56; Table 3). A higher proportion of GPs who reported that they had received a faxed health alert became aware of specific recommendations for measles control, including immunisation of susceptible staff (RR 6.46, 95% CI 2.49, 16.78; Table 3), isolation of patients with possible measles in the practice (RR 3.30, 95% CI 1.83, 5.97), and notification of suspected cases to a public health unit (RR 4.26, 95% CI 1.93, 9.41) (data not shown elsewhere).

GPs who reported they were a member of the local AGPN were more likely to be aware of the measles outbreak than those who were not part of the network (RR 1.20  $P < 0.05$ ; not shown elsewhere). The majority (92%) of GPs who reported receiving a faxed measles health alert from NSW Health and/or the AGPN found it useful, and 65% had considered measles in their differential diagnoses. GPs reported that the preferred method of receiving health alerts was by fax (87%) compared to email (24%). Some GPs preferred alerts to be sent by both fax and email (16%).

**Table 1: Comparison of study respondents with the study sample and sampling frame for characteristics recorded on Database X, stratified by whether a fax was sent**

Variable	Respondents n=243		Sent a fax Sample selected n=725		Sampling frame n=2,743		Respondents n=61		Not sent a fax Sample selected n=231		Sampling frame n=756	
	n	%	n	%	n	%	n	%	n	%	n	%
<b>Location</b>												
Urban	191	79	551	76	2,026	74	44	72	175	76	587	78
Rural	52	21	174	24	708	26	17	28	56	24	169	22
Unknown	0	0	0	0	9	0	0	0	0	0	0	0
<b>Practice type</b>												
Group*	39	16	116	16	416	15	3	5	18	8	70	9
Medical	126	52	354	49	1,328	48	14	23	71	31	153	20
Clinic	7	3	27	4	116	4	2	3	7	3	41	5
Solo	71	29	226	31	869	32	40	66	135	58	492	65
Other	0	0	2	0	14	1	2	3%	0	0	0	0

\* Group practice is defined as a practice with multiple general practitioners in the same geographic location, not a medical practice or clinic

**Table 2: Demographic characteristics reported by respondents, stratified by whether they were sent a fax**

Characteristics*	Sent NSW Health fax			
	Yes n=243		No n=61	
	n	%	n	%
<b>Gender</b>				
Male	152	63	40	66
Female	87	36	17	28
Not reported	4	2	4	7
<b>Age range</b>				
30–49	108	44	20	33
50+	131	54	37	61
Not reported	4	2	4	7
<b>AGPN member</b>				
Yes	217	89	53	87
No	21	9	6	10
Not reported	5	2	2	3
<b>Medical staff (full and part time)</b>				
1	69	28 <sup>†</sup>	39	64
2 or more	156	64	17	28
Not reported	18	7	5	8
<b>Non-medical staff (full and part time)</b>				
1	16	7	8	13
2 or more	167	69	30	49
Not reported	60	25	23	38
<b>Modes of communication available</b>				
Fax available <sup>‡</sup>	234	96	57	93
Email available <sup>‡</sup>	127	52	34	56
Not reported	9	4	4	7

\* Not including 24 surveyed general practitioners of unknown 'fax sent' status.

† Difference in proportions was statistically significant compared to group not sent fax.

‡ Categories are not mutually exclusive.

**Table 3: Self-reported preparedness of GPs during a measles outbreak, by whether a health alert was sent or received**

		Sent NSW Health fax*				RR†	Received any fax				RR†
		Yes n=242		No n=61		95%CI	Yes n=265		No n=58		95%CI
		n	%	n	%		n	%	n	%	
Aware of measles outbreak	Yes	216	89	46	75	1.18	257	97	22	38	2.56
	No	26	11	15	25	(1.02,1.38)	8	3	36	62	(1.84,3.56)
		Sent NSW Health fax*				RR†	Received any fax				RR†
		Yes n=227		No n=54		95%CI	Yes n=247		No n=56		95%CI
		n	%	n	%		n	%	n	%	
Offered MMR to susceptible staff	Yes	98	43	15	28	1.55‡	114	46	4	7	6.46
	No	129	57	39	72	(0.99,2.45)	133	54	52	93	(2.49,16.78)

\* Not including 24 surveyed general practitioners of unknown 'fax sent' status

† Relative risk (RR) (95% confidence interval)

‡ Chi square ( $P < 0.05$ )

## Discussion

The study showed that faxed health alerts were associated with better preparedness among GPs to respond to the measles outbreak. These findings demonstrate the value of faxed health alerts to GPs in the context of measles outbreaks and, potentially, in other situations of public health importance such as an influenza pandemic, where rapid communication is required to provide GPs and other health practitioners with important information needed to manage the situation within the community.

Measles is now a rare disease in Australia, and this creates problems for effective disease surveillance and control. In the setting of low incidence, the positive predictive value of clinical signs of measles is low,<sup>7,10</sup> and consequently, clinicians may not consider measles in their differential diagnosis, nor seek laboratory confirmation of such cases nor institute prompt infection control measures. GPs who were recorded as having been sent a fax, and those who reported receiving a faxed measles alert at the medical practice, were more likely to be aware of the outbreak and be aware of specific infection control and notification recommendations compared with other GPs (i.e. not sent or not received a faxed health alert).

Transmission of measles in the health care setting to unvaccinated health care workers is well documented in Australia.<sup>8,11,12</sup> Offering MMR to susceptible staff was a recommendation applicable to all practices during the outbreak, and we considered it a key element of the public health response. It is particularly relevant that GPs who reported

receiving an alert were more likely to offer MMR to susceptible staff, including those with no known policy for staff MMR immunisation.

Fewer solo-GPs were sent faxed alerts. Presumably, solo-GPs are less likely to receive visits from representatives who collect information for the commercial Database X and are therefore more likely to be excluded from the database, or have incomplete information, which is used by NSW Health for faxing health alerts directly to medical practitioners. While the ideal source of direct contact information for medical practitioners within New South Wales is likely to be medical registration data, because updates are frequent and performed by clinicians themselves, this information source cannot be made available to NSW Health until data sharing agreements have been established for these purposes.

The study had a number of limitations; the most important was a low response rate. Despite this limitation, which is commonly reported in surveys of Australian GPs,<sup>13-15</sup> we were able to demonstrate that respondent GPs were similar to the GPs in the database in terms of whether their practice was rural or urban and the type of practice (clinic, medical, grouped or solo) (see Table 1). A further limitation was that there may have been some misclassification error of outcome factors and whether a fax had been received due to recall error as GPs self-reported information several months after the faxed health alerts were sent.

In conclusion, the results of this study demonstrate the value of faxed health alerts for rapid communication with GPs during communicable disease outbreaks to promote public health practices needed for effective disease control and prevention. Although

sending health alerts by email, or newer web-based technologies, have obvious advantages in terms of timeliness, at the time this study was conducted faxing appeared to be the preferred method for GPs to receive health alerts from the NSW Health.

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