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## Primary care physicians' response to pandemic influenza in Hong Kong: a mixed quantitative and qualitative study

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### SUMMARY

**Objectives:** The current study was conducted to use a developed framework to appraise the public primary care response to pandemic 2009 influenza A H1N1 virus in Hong Kong in 2009.

**Methods:** A cross-sectional survey was conducted of 300 doctors working in public primary care clinics. In addition, a qualitative study was conducted in two selected general outpatient clinics (GOPCs) with 10 doctors between September and December 2009.

**Results:** We found that there was an increase in clinical service demand for public primary care doctors and that there was lower compliance with hand washing as compared to the wearing of masks among GOPC doctors during the study period.

**Conclusions:** Since hand hygiene and influenza vaccination are effective methods to prevent the spread of influenza infection, future studies should explore the reasons for non-compliance with these preventive behaviors among doctors. More education and training in dealing with influenza A H1N1 infection may be needed.

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### 1. Introduction

In April 2009, the influenza A H1N1 virus surfaced and spread rapidly across the globe. On June 11, 2009, the World Health Organization (WHO) declared a pandemic caused by the influenza A H1N1 virus. In any healthcare system, primary care is at the forefront of the response to any emerging epidemic. Since the outbreak of severe acute respiratory syndrome (SARS),<sup>1</sup> there has been a growing recognition of the need for an integrated preparedness approach to deal with public health threats, to include acute clinical care, public health, and emergency management systems.<sup>2</sup> Preparing for health threats is particularly important in primary care – the first point of contact for patients entering the healthcare system.

In 2008, Patel et al.<sup>3</sup> developed a framework that can be used to facilitate the systematic planning of the primary care response to pandemic influenza and to appraise the coverage of key elements in the preparedness to deal with a pandemic. This framework

consists of four functional domains that include clinical care, the internal and macro-environment of the primary care/general practice, and the public health responsibilities of doctors. These functional domains were first identified by the authors through a review of the peer reviewed and gray literature that included strategies relevant to general practice at the time of an influenza pandemic, and the framework was later validated through interviews with general practitioners and practice nurses and senior decision-makers. It was subsequently used to evaluate 89 publicly available jurisdictional plans in five countries.<sup>3</sup>

Since the provision of primary care is organized differently in different countries, studying how each primary care system responds to a pandemic may generate transferable learning for other primary care systems.

Recent research has studied the knowledge, attitudes, and practices, or vaccination acceptability in dealing with an influenza A H1N1 pandemic among primary care practitioners in Singapore,<sup>4</sup> Australia,<sup>5</sup> France,<sup>6</sup> and the Netherlands.<sup>7</sup> However, few studies have been conducted using a previously developed framework to evaluate the response of primary care to an influenza A H1N1 pandemic before the escalation of the pandemic alert and during the influenza A H1N1 pandemic. The current study was conducted

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to use a developed framework to appraise the public primary care response to pandemic 2009 influenza A H1N1 virus in Hong Kong in 2009. To better understand the responses of primary care doctors to the influenza A H1N1 pandemic, both a quantitative survey and a qualitative study were conducted.

## 2. Methods

### 2.1. Setting and study subjects

The peak activity of the pandemic H1N1 virus in Hong Kong occurred during July through September 2009. This was also the time when our survey study was conducted. From July 20, 2009 to August 18, 2009, 300 questionnaires were mailed to doctors who worked in 54 general outpatient clinics (GOPCs) distributed across five major geographical clusters in Hong Kong: 11 in the New Territories East cluster, 8 in the New Territories West cluster, 6 in the Kowloon Central cluster, 23 in the Kowloon West cluster, and 6 in the Hong Kong West cluster. In Hong Kong, the Hospital Authority manages all government run GOPCs in primary care in seven geographic clusters. The role of the GOPCs is to provide access to quality clinical care in the form of primary care services to the financially vulnerable, the elderly, and patients with chronic diseases. Most GOPCs are located in the community and are often the first point of contact with public clinics among the elderly and the financially vulnerable.

Ethics approval for this study was granted by the Survey and Behavioural Research Ethics Committee of the Chinese University of Hong Kong.

### 2.2. Data collection and survey instrument

Using an anonymous questionnaire, primary care doctors who worked in these clinics were asked to report four domains of primary care practice with respect to a published framework for planning to cope with pandemic influenza in primary care. The questionnaire was developed to include five major domains of primary care practice that have been found to be relevant in the planning to manage pandemic influenza. These include: (1) changes in clinical services and clinical care for influenza; (2) changes in the internal environment of primary care practice such as preventive behaviors of doctors, including hand washing and wearing a mask; (3) changes in the macro-environment of primary care practice such as the use of guidelines, training, or measures; (4) public health responsibilities such as in primary care; and (5) the impact of influenza A on quality of life, assessed using three questions: “Has influenza affected the quality of your life?”, “Did you feel depressed in the past 2 weeks?”, and “Did you feel emotionally stressed in the past 2 weeks?”. The questionnaire had a multiple choice design and the respondents could tick one or more of the alternatives. Moreover, the primary care practitioners were asked about whether they would be willing to be vaccinated when a vaccine was available. The survey also included questions on demographics such as age and sex, as well as educational background, postgraduate qualifications, and the type of clinic the doctor worked in. A sample of the questionnaire is provided as [Supplementary Material](#). The questionnaire was piloted on 30 primary care practitioners before the actual distribution, and modifications were made as a result of the comments and suggestions received from the primary doctors.

To further explore the responses of primary care physicians to pandemic influenza in Hong Kong, individual interviews were conducted among physicians at two randomly selected GOPCs. The interviews were conducted using a discussion guide covering two areas: workload during pandemic influenza and the acceptance of influenza vaccination. To allow a greater expression of views on

these sensitive issues, individual interviews were used instead of focus groups. Ten individual interviews were conducted in the selected GOPCs until data saturation was reached.

### 2.3. Statistical analysis

Descriptive statistics are presented. Chi-square tests were used for the analyses of categorical variables, and analysis of variance was used for continuous variables. An analysis was performed to explore the relationships between having encountered patients with suspected influenza A H1N1 and the responses to the five domains in the clinical services questionnaire using Chi-square statistics. All statistical analyses were performed using SPSS for Windows v. 16.0 (SPSS, Chicago, IL, USA), and the level of significance was set at 5%.

For the qualitative study, the content of individual interviews was transcribed and coded using NVivo 7.0. Data were analyzed by two independent researchers (ELYW and AWLC) based on the discussion guide. During the analysis, data within themes were scrutinized for agreement in views across the range of participants.

## 3. Results

### 3.1. Quantitative study results

Of the 300 questionnaires sent to the primary care doctors of GOPCs, 126 were completed and returned, giving a response rate of 42%. Demographic information for the doctor respondents is shown in [Table 1](#). Since there is no primary care registry in Hong Kong, we were unable to compare the demographic information of the respondents to those of the rest of the primary care doctors in Hong Kong. When compared to the findings of the 2009 Health Manpower Survey on all registered doctors, we found a higher proportion of female doctors in our survey than in the Health Manpower Survey (57% male and 43% female as compared to 72% male and 28% female). The mean age of doctors in our survey was 36 years as compared to a median age of 45 years in the Health Manpower Survey. In our survey, 96% of doctors worked full time and 77% had a postgraduate qualification, with 55% having a diploma in family medicine, 10% a masters in family medicine, and 44% a fellowship in family medicine.

#### 3.1.1. Clinical service

With respect to changes in clinical services, 59% of participating GPs noticed a higher demand for services. Moreover, the majority (86%) stated that influenza A H1N1 had affected their clinical practice; 88% of these doctors reported testing patient

**Table 1**  
Demographics of doctor respondents

	Number (%)
Age group, years	
<30	22 (17.5%)
30–39	75 (59.5%)
40–49	13 (10.3%)
50+	16 (12.7%)
Sex	
Female	54 (42.9%)
Male	72 (57.1%)
Post-graduate training	
No	29 (23.0%)
Yes	97 (77.0%)
Specialty	
FM	47 (37.3%)
GP	49 (38.9%)
Others	24 (19.0%)

FM, family medicine; GP, general practice.

temperature as a routine procedure and 76% insisted every patient wear a mask during consultations. Among all respondents, 63% stated that they had encountered a patient suspected of influenza A H1N1. Among the suspected cases, around 20% were laboratory confirmed.

### 3.1.2. Internal environment

With respect to changes in the internal environment of practice, 94% of participants stated that they always wore a mask during consultations before the influenza A H1N1 epidemic and this percentage increased to 99% during the epidemic. Similarly, 45% of participants stated that they washed their hands between or before patient encounters before the epidemic, while at the time of the survey (during the pandemic), 54% of them stated that they washed their hands between or before patient encounters ( $p < 0.001$ ). Other precautions, in addition to hand washing and the wearing of a mask, included asking all cleaning staff to wear masks (76%), cleaning the work surfaces with antiseptics (70%), and asking staff to check their temperature before going to work (60%). Moreover, 73% of the clinics required nursing/reception staff to wear masks before the epidemic, and during the pandemic, 97% of clinics required reception staff to wear masks.

Among the respondents, 42% stated that they would have the influenza A H1N1 vaccination when it was available. The majority stated that they would not have the influenza vaccination and the reasons given for this were: (1) they did not trust the effectiveness of the new vaccine (57%), and (2) they did not think it is necessary (30%).

The majority of participating doctors stated that the intranet and other communication channels at the clinics they worked for (56%) were their most likely sources of updated information on influenza A H1N1, followed by correspondence from the government or semi-government organizations (38%).

### 3.1.3. Macro-environment

With respect to the macro-environment of primary care practice, 71% of doctors who participated in this survey used guidelines to assist them in making clinical decisions and 56% of these doctors had received training on the use of guidelines. However, 62% continued to want more professional education regarding how to deal with H1N1 influenza. The majority of doctor participants were satisfied with the measures the government had implemented to prevent influenza A H1N1 from spreading in the community and more than half would have liked to have had more involvement in the management of influenza A H1N1 in the community (57%).

### 3.1.4. Public health responsibilities

With respect to public health responsibilities, more than half (59%) of the doctors had not participated in surveillance activities associated with acute respiratory infections. Among those who had, 58% reported suspected cases of influenza A H1N1 to the government.

### 3.1.5. Impact of influenza A on their quality of life

On a scale of 0–100 for 'not affected at all' to 'extremely affected', around 29% of doctor respondents scored 50 or above on the scale with the question, "Has influenza A H1N1 affected the quality of your life?". On a scale of 0–100 for 'not depressed at all' to 'extremely depressed', around 14% of doctor respondents scored 50 or above on the scale with the question, "Did you feel depressed in the past 2 weeks?". On a scale of 0–100 for 'not stressed at all' to 'extremely stressed', 27% of doctor respondents scored 50 or above on the scale with the question "Did you feel emotionally stressed in the past 2 weeks?"

### 3.1.6. Relationships between having encountered patients with suspected influenza A H1N1 and the five domains of practice

In our analyses on the relationships between having encountered patients with suspected influenza A H1N1 and clinical service (Table 2), a significantly higher proportion of doctors who had encountered patients with suspected influenza A reported seeing more patients than those who had not encountered such patients (71% vs. 38%;  $p < 0.001$ ). They were also more likely to have used guidelines when making clinical decisions (77% vs. 60%;  $p = 0.055$ ) and were more likely to have participated in surveillance activities (54% vs. 16%;  $p < 0.001$ ). In addition, they were also more likely to have felt emotionally stressed in the past 2 weeks when compared to those who had not encountered a suspected influenza A infection (mean score: 38.3 vs. 22.4;  $p = 0.001$ ). In terms of training, they were more likely to have a postgraduate qualification (83% vs. 67%;  $p = 0.052$ ) and were more likely to be a family medicine specialist (47% vs. 26%;  $p = 0.055$ ).

## 3.2. Qualitative study results

Twelve individual interviews were conducted among physicians in two selected GOPCs between September and December 2009. Two themes were explored: increased workload and attitudes towards influenza vaccination.

### 3.2.1. Increased workload

The majority commented on the increased workload and the long working hours during the influenza pandemic, because they had to work on current pre-booked chronic cases and also new fever cases. In addition, there was no quota limit for 'walk in fever case'. A typical comment was as follows:

*"Though the office hour is until 5 p.m. but there are still a lot of patients lining up at 5 p.m., we must accept them...unlimited quota but limited manpower..." (C1)*

Also, some physicians revealed that they were too busy to wash their hands between patient consultations:

*"There are many patients walking in for fever consultation, the clinic is open during lunch time as well...and we are even too busy to wash hand..." (C3)*

**Table 2**

Relationship between having encountered suspected patients with influenza A H1N1 and the five domains of practice

	Total number (%)	Have you encountered patients with suspected influenza A H1N1?		p-Value
		No (n = 46)	Yes (n = 80)	
Seeing more patients	74/125 (59%)	17/45 (38%)	57/80 (71%)	<0.001
Using guidelines when making clinical decisions	84/118 (71%)	24/40 (60%)	60/78 (77%)	0.055
Participating in surveillance activity	50/123 (41%)	7/44 (16%)	43/80 (54%)	<0.001
Feeling emotionally stressed <sup>a</sup>	32.7	22.4	38.3	0.001
Having postgraduate qualifications	97/126 (77%)	31/46 (67%)	66/80 (83%)	0.052
Being a family medicine specialist	47/120 (39%)	11/43 (26%)	36/77 (47%)	0.055

<sup>a</sup> Mean scores are reported here.

### 3.2.2. Attitudes towards vaccination

The majority of the physicians agreed to having an influenza vaccination, which was regarded as a healthcare professional's responsibility. However some participants hesitated to receive the swine flu vaccination because of queries regarding efficacy and side effects. Some expressed the view that the swine flu vaccination was not necessary because they had already contracted swine flu:

*"I will receive the vaccination because it is healthcare professional's responsibility...to protect ourselves...to protect public..." (C7)*  
*"Vaccination for swine flu is still new...I will wait to see the efficacy and side effect from more clinical trial" (C11)*  
*"Vaccination may not be necessary...because some of us have been contracted from swine flu already...even my family members have contracted already" (C33)*

## 4. Discussion

In this survey, we found that a significant proportion of public doctor respondents reported an increase in workload as a result of the influenza A H1N1 pandemic. Indeed, one fifth of them stated that they had increased their office hours to cope with the higher demand for services.

With regard to changes in the internal environment of practice, the majority of doctors (99%) who responded to the survey reported that they had always worn a mask during consultations in the past 3 days, although the proportion who had always washed their hands between/before consultations in the past 3 days was much lower (54%).

The lower proportion of doctors who reported always having washed their hands between/before consultations in the past 3 days could be a concern, as previous studies have demonstrated that hand hygiene is an effective method to prevent the transmission of influenza and that hand washing is one of the effective methods to reduce an influenza pandemic.<sup>8–10</sup>

The reasons for the lower self-reporting of hand washing between patients when compared to wearing masks are unknown, but we can speculate that this could be due to the fact that more time and effort is required for washing hands between patients as compared to wearing a mask. This is further supported by findings from our qualitative study, which showed that doctors might have been too busy to wash their hands between patients.

Almost half of the respondents (42%) reported that they were willing to have the influenza A vaccination, and for the other respondents the two most common reasons for refusal to have the vaccine were not trusting the effectiveness of the new vaccine and not thinking it necessary. These findings were further confirmed by the data from our qualitative study. Moreover, the additional reason of thinking that they had already been infected with influenza A H1N1 might have further reduced the willingness to accept the influenza A H1N1 vaccination. These findings among doctors in our study are similar to those recently reported in Hong Kong among hospital healthcare workers, which showed community nurses having the lowest willingness to accept vaccination.<sup>11</sup> Starting in 2010, all seasonal influenza vaccines have included the swine flu component. Whether this will help to ease some fear is unknown. Of note, current available surveillance data suggest no increase in adverse events with swine flu vaccines compared to seasonal flu vaccines.<sup>12</sup> Acceptability of pandemic influenza vaccination was found to be higher in studies conducted in general practice in France and the Netherlands, at 60% and 80%, respectively.<sup>6,7</sup> Similar to findings from previous studies on the same issue, the major concerns for both nurses and doctors with respect to influenza A H1N1 vaccination were fear of side effects and concerns regarding the

efficacy of the new vaccine.<sup>6,7,11–14</sup> Annual vaccination against influenza has been considered to be the best way to reduce sickness and death from influenza in high-risk populations, to reduce absenteeism from work in healthy adults, and to minimize healthcare-associated transmission of influenza.<sup>15–17</sup>

With respect to the use of guidelines in dealing with pandemic influenza and the need for further training and education for dealing with pandemic influenza, we found that more than half of the doctors who worked in public clinics were likely to use guidelines (71%), but at the same time wanted to have more training on how to deal with pandemic influenza (62%). The high proportion of public doctor respondents who reported using guidelines could likely be due to the use of an intranet within large organizations, or more standardized behavior among employees in the same organization, although this is not supported by findings from our community nurses. Despite the reported use of guidelines by healthcare workers, a significant proportion continued to state the need for more training in dealing with influenza A H1N1.

With regard to assuming public health responsibilities, the rate among public doctors was 41%. We could speculate that this is due to the more standardized instructions or supervision among doctors who work in the same organization as compared to doctors who work in private settings who may work solo or work in small groups.

Not surprisingly, among doctors who had encountered a suspected influenza A H1N1 infection, a higher demand for services and higher emotional distress in the past 2 weeks were reported when compared to those who had not encountered a suspected influenza A H1N1 infection. Increased stress related to dealing with novel infections has been reported previously and our findings are consistent with previous findings.<sup>4,18</sup> Moreover, we found that doctors who reported having more training in family medicine were more likely to have reported suspected influenza A H1N1 infections. Whether this is due to the greater training received, which increased their awareness and alert in detecting or suspecting influenza A H1N1 infections in patients, is unknown, but as a group we failed to find any significant differences in terms of protective behaviors such as washing hands or wearing masks in the past 3 days, or having an influenza vaccination, between those with and without postgraduate qualifications.

A major limitation of the survey was the low response rate. Thus, we are unsure about the representativeness of the results from these studies. An additional limitation is that we have only analyzed self-reported behaviors and attitudes. We did not directly observe their behavior and there could have been a social desirability bias for respondents to have a 'better' response in order to look good, especially among those in public clinics.

Public community doctors responded that they would like to have more education and training for dealing with pandemic influenza. Future policies from the government should look into the educational needs of healthcare workers to increase their confidence in dealing with influenza pandemics. Another finding was the lack of willingness of healthcare workers to have the pandemic influenza vaccination. Future work to determine effective interventions to increase uptake, which may include designing interventions based on the ecological model, is called for; the need to address low influenza vaccination rates in this high-risk group is urgent in the context of a pandemic response.

Another key finding was the low level of compliance of the doctor respondents with hand washing between patients. Due to the possibility of social desirability bias, we believe that the rate of hand washing may have been even lower than that reported in this study. As shown in the results, this low rate of hand washing between patients could have been a bigger problem. More education may be needed or more research is needed to explore

the reasons for the lack of hand washing among frontline doctors, which may put both doctors and patients at risk of cross-infection.

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*Conflict of interest:* The authors declare that they have no competing interests.

### Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <http://dx.doi.org/10.1016/j.ijid.2012.03.015>.

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