Original Article

A Cross-sectional Study of Primary-care Physicians in Singapore on Their Concerns and Preparedness for an Avian Influenza Outbreak

Teck Yee Wong,[1] *MBBS, M Med (Fam Med)*, Gerald CH Koh,[1] *MBBS, M Med (Fam Med), FCFP*, Seng Kwing Cheong,[1] *MBBS, M Med (Fam Med), FCFP*, Meena Sundram,[2] *MBBS, M Med (Fam Med)*, Kelvin Koh,[3] *MBBS, M Med (Fam Med), MCFP*, Sin Eng Chia,[1] *MBBS, MSc (OM), MD*, David Koh,[1] *MBBS, PhD, FAMS*

Abstract

Introduction: During an avian influenza (AI) pandemic, primary-care physicians (PCPs) are expected to play key roles in the prevention and control of the disease. Different groups of PCPs could have different concerns and preparedness level. We assessed the concerns, perceived impact and preparedness for an outbreak among PCPs in Singapore. Materials and Methods: A cross-sectional survey of PCPs working in private practice (n = 200) and public clinics (n = 205) from March to June 2006 with an anonymous self-administered questionnaire on concerns (12-items), perceived impact (10 items) and preparedness (10 items) for an outbreak. Results: Two hundred and eighty-five PCPs responded – 149 (response rate: 72.7%) public and 136 (response rate: 67.3%) private. The majority were concerned about risk to their health from their occupation (95.0%) and falling ill with AI (89.7%). Most (82.5%) accepted the risk and only 33 (11.8%) would consider stopping work. For perceived impact, most felt that people would avoid them (69.6%) and their families (54.1%). The majority (81.3%) expected an increased workload and feeling more stressed at work (86.9%). For preparedness, 78.7% felt personally prepared for an outbreak. Public PCPs were more likely to be involved in infection-control activities and felt that their workplaces were prepared. Conclusions: Most PCPs felt personally prepared for an outbreak but were concerned about their exposure to AI and falling ill. Other concerns included social ostracism for themselves and their families. Public PCPs appeared to have a higher level of preparation. Addressing concerns and improving level of preparedness are crucial to strengthen the primary-care response for any AI outbreak.

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Key words: Impact, Bird flu, Planning, Response

Introduction

Outbreaks of avian influenza (AI) caused by the H5N1 subtype in several Asian countries have raised concern all over the world.[1] AI is endemic in several parts of Asia. To date, there have been more than 200 human cases of AI virus infection, mainly as a result of poultry-to-human transmission, with a mortality rate of over 50%.[2] Most deaths in the past few years have occurred in Indonesia and nearly all of the human cases resulted from close contact with infected birds.[3] Currently, the virus has not yet developed the ability to be transmitted easily from human-to-human but a mutant or re-assorted virus capable of efficient human-to-human transmission could potentially trigger a pandemic.

Any healthcare system would be tested to the limit in the event of any pandemic. The expected need for increase in health manpower and resources would have a huge impact on primary care and in particular primary-care physicians (PCPs).[4,5] This is because patients with AI are expected to manifest influenza-like illness in the early stages and most likely will present to PCPs first. Moreover, involvement of PCPs would be pivotal in the prevention and control of any AI pandemic.[6]

Different models of general practice are found in different countries: publicly-funded, privately-funded or both.[7] In Singapore, primary-care is provided by PCPs working in both private and public clinics (called polyclinics). Polyclinics provide subsidised care for patients in a group

[1] Department of Community, Occupational and Family Medicine, National University of Singapore, Singapore
[2] National Healthcare Group Polyclinics, Singapore
[3] SingHealth Polyclinics, Singapore
Address for Correspondence: Dr Wong Teck Yee, Department of Community, Occupational and Family Medicine, Yong Loo Lin School of Medicine, National University of Singapore, Singapore 117597.
Email: cofwty@nus.edu.sg

practice setting with nursing and support staff. Private PCPs may work in single-person practices (solo-practices) or in larger group practices. Locally, private PCPs provide about 80% and public PCPs 20% of all primary-care outpatient visits respectively.[8] There is currently little data on the concerns, perceived impact and preparedness of an AI pandemic among PCPs working in Asia. We examined and compared the concerns, perceived impact and preparedness among PCPs working in both private and public primary-care outpatient clinics for a possible AI pandemic.

Materials and Methods

Setting

We surveyed all PCPs working in all 18 polyclinics in Singapore (n = 205) and 200 private PCPs throughout Singapore from March to June 2006. All public PCPs were given the questionnaires at their workplaces. For private PCPs, we randomly sampled 449 (25% sampling frame) out of 1633 registered in Singapore Medical Association's doctors directory 2006/2007. Two hundred and forty-seven were excluded due to the following reasons: uncontactable after 3 attempts, not practising in the clinic, on leave or incorrect telephone number; leaving 202 eligible participants. The questionnaires were sent to the doctors at their practising addresses and reminder calls were made to encourage them to participate in our study. A total of 136 private PCPs returned the questionnaires.

Questionnaire

The self-administered questionnaire without identifiers was developed from an earlier survey used in a study of severe acute respiratory syndrome (SARS) and healthcare workers[9] and tested in a recent study.[10] Completed questionnaires were rejected if there were incomplete entries in at least 2 pages of the questionnaire, missing demographic data, unreadable entries, torn or missing pages.

The questionnaire included items about concerns regarding AI that were work-related (8 items) and non-work-related (4 items), perceived impact of AI on personal life and work (10 items), and preparedness for AI outbreak at the workplace (10 items). These items were measured using a 6-point Likert scale (strongly disagree, disagree, not sure but probably disagree, not sure but probably agree, agree and strongly agree).

Analysis

During statistical analyses, we dichotomised this scale into positive response (strongly agree, agree, and probably agree) and negative response (strongly disagree, disagree, and probably disagree). Chi-square analysis was used to compare proportions and logistic regression was used to adjust for all socio-demographic variables for all outcome variables. Significance level was set at $P < 0.05$. For all data analyses we used the SPSS version 15.0 software (SPSS Institute, Chicago, IL, USA).

Results

Response rate and Socio-Demographic Characteristics (Table 1)

We obtained 285 valid responses: 149 out of 205 (72.7%) from public and 136 out of 202 (67.3%) from private PCPs. Private PCPs (mean age = 46.2 years, SD = 10.0) were older than public PCPs (mean age = 35.0 years, SD = 8.1). They were also more likely to be Chinese, male, married and staying with their families compared to public PCPs ($P < 0.05$). They also had more years of healthcare experience (median, 19 years vs. 9 years) and more than 50% were in solo-practices.

Concerns (Table 2)

The majority (95.0%) of PCPs in both groups felt that their occupation put them at risk of AI with almost 90% being afraid of falling ill with the disease. However, 82.5% accepted the risk of contracting AI as part of their job. Only 27.7% felt that they should not be looking after AI patients and only 1 in 10 reported that they might look for another job because of this risk. Both groups were also concerned that people close to them were at high risk due to their occupation (81.4%) and that they would be worried about getting infected by the relative who is a GP (87.0%).

More private PCPs felt that they should not be looking after patients with AI (36.2% vs. 20.1%, $P = 0.003$) but this difference was not significant after multivariate analysis. Public PCPs were more confident than private PCPs working in group practices that their employers would look after their medical needs (85.0% vs. 66.7%, $P = 0.006$).

Perceived Impact (Table 3)

Almost three-quarters of PCPs felt that people would avoid them because of their job and more than half felt that people would avoid their family members during a pandemic. Despite this, the majority of PCPs from both groups would tell other people about the nature of their work (76.2%) and their families about the risk they were exposed to (83.4%). The majority (81.3%) reported that they would have an increase in workload and would have to take on extra work not normally done by them (82.3%).

Compared to private PCPs, a higher proportion of public PCPs reported fears that there would be inadequate staff to handle the increase in demand (66.7% vs. 44.1%, $P = 0.008$) and that they would have to work overtime (85.7% vs. 67.6%, $P < 0.001$) with an increase in workload (85.0%

Table 1. Demographic Characteristics of Study Participants

Characteristics	n = 149 Public PCPs n (%)	n = 136 Private PCPs n (%)	χ^2 *P*
Ethnicity			
Chinese	111(75.5)	126 (94.0)	<0.001
Non-Chinese	36 (24.5)	8 (6.0)	
Age group (y)			
20-29	37 (25.7)	0 (0)	<0.001
30-39	79 (54.9)	37 (28.0)	
40-49	18 (12.5)	58 (44.0)	
50 and older	10 (6.9)	37 (28.0)	
Mean age (SD)	35.0 (8.1)	46.2 (10.0)	
Sex			
Male	81 (55.1)	97 (71.3)	0.005
Female	66 (44.9)	39 (28.7)	
Marital status			
Married	96 (64.9)	120 (88.2)	<0.001
Single/Divorced/Separated	52 (35.1)	16 (11.8)	
People staying with			
Family	130 (88.4)	130 (95.6)	0.028
Alone/Others	17 (11.6)	6 (4.4)	
Type of clinic			
Solo practice	NA	70 (54.3)	NA
Group practice/Locum		59 (45.7)	
Experience (y)			
1-5	48 (32.9)	1 (0.8)	<0.001
6-10	47 (32.2)	13 (9.8)	
11-15	27 (18.5)	28 (21.2)	
16-20	13(8.9)	37 (28.0)	
>20	11(7.5)	53 (40.2)	

PCPs: primary-care physicians

Numbers for each item may not add up to the total number of GPs due to missing values.

vs. 77.2%, *P* = 0.022).

Preparedness (Table 4)

The majority of all PCPs (78.7%) who responded felt that they were personally prepared for an AI outbreak. Almost all reported having been recommended to receive influenza vaccination and almost three-quarters in both groups had done so. The majority (84.4%) also reported having received adequate training in use of personal protective equipment (PPE).

Public PCPs were more likely to have received infection control training (82.8% vs. 52.8%, *P* <0.001) and have someone to turn to for help in use of PPE (92.6% vs. 61.0%, *P* <0.001) than private PCPs. Public PCPs were also more likely to feel that their workplace was prepared (93.2% vs. 65.5%, *P* <0.05) and to have a clinic preparedness plan (98.3% vs. 63.6%, *P* = 0.001). However, private PCPs were more likely to have bought anti-bird flu medications (60.7% vs. 1.4%, *P* <0.001) and N95 masks for themselves (84.2% vs. 18.6%, *P* <0.001).

Discussion

A significant proportion of PCPs expressed concern about the risk of contracting AI and feared falling ill themselves. They also expressed concern about people close to them, subjecting them to worry and even the risk of contracting AI. Despite these concerns, most PCPs in our study were willing to provide medical care and accepted the risk as part of the profession. Only a small proportion would consider resigning. Compared to private PCPs from group practices, public PCPs expressed confidence that their employers would take care of any medical needs. This could be due to the positive care shown towards healthcare workers who contracted SARS in the last outbreak by public healthcare institutions. Another important concern from our study was that PCPs expected some degree of social ostracism due to the nature of their job. This even extended to concerns that their family members would be ostracised. Other concerns expressed were about the lack of manpower among public PCPs, leading to an expected increase in workload and working overtime.

The majority of PCPs in both groups felt personally prepared for an AI pandemic. However, public PCPs were more likely to be involved in infection control activities like infection control training. This could explain the high proportion of public PCPs who felt that their institutions were prepared for an outbreak. In contrast, more than half of the private PCPs surveyed were from solo practices with limited resources which could explain why they were less likely to have had infection control training and a clinic preparedness plan. Our study also showed that more private PCPs had bought N95 masks and anti-flu medications. This is probably because private PCPs perceived the need to acquire these items by themselves, unlike public PCPs who were probably confident that they would have adequate supplies of these items. There was a high level of reported influenza vaccination in both groups and the perception of adequate training in the use of PPE.

Our study is the first in Asia to be conducted among PCPs who have had first-hand experience with SARS a few years ago.[11] This is also the first AI preparedness study to compare between private and public PCPs. We expected the responses to our study from the PCPs to be based on their past experiences with SARS. We also had a good response rate from the PCPs compared to other similar studies surveying physicians.[12,13]

Our finding is consistent with another study reporting that Australian GPs would continue to provide their professional service, expressing a sense of personal responsibility for both their patients and colleagues.[14] Another study on Canadian family physicians also showed that about 75% of them were willing to help during public-

Table 2. Concerns Regarding a Bird Flu Pandemic

Concerns (Agree)	n = 149 Public PCPs n (%)	n = 136 Private PCPs n (%)	n = 285 Total n (%)	Unadjusted OR	*P*	Adjusted OR*	*P*
Work-related concerns							
My job would put me at great exposure risk	139 (94.6)	129 (95.6)	268 (95.0)	1.24 (0.42-3.66)	0.700	1.22 (0.25-5.90)	0.804
I am afraid of falling ill with bird flu	132 (90.4)	120 (88.9)	252 (89.7)	0.85 (0.39-1.83)	0.675	0.70 (0.26-1.94)	0.494
I should not be looking after bird flu patients	29 (20.1)	47 (36.2)	76 (27.7)	2.25 (1.31-3.86)	0.003	1.76 (0.87-3.55)	0.113
The risk I am exposed to is not acceptable	40 (27.8)	34 (25.4)	74 (26.6)	0.88 (0.52-1.51)	0.650	0.71 (0.35-1.45)	0.349
I accept that risk of contracting bird flu is part of job	114 (78.6)	117 (86.7)	231 (82.5)	1.77 (0.94-3.34)	0.077	1.52 (0.65-3.58)	0.336
Might look for another job because of risk	16 (11.0)	17 (12.6)	33 (11.8)	1.16 (0.56-2.40)	0.686	0.99 (0.38-2.6)	0.985
Acceptable if colleagues resign because of their fear	77 (52.4)	81 (59.6)	158 (55.8)	1.34 (0.84-2.15)	0.224	1.73 (0.91-3.29)	0.092
Confident employer would look after my needs if I fall ill with bird flu	125 (85.0)	36† (66.7)	161 (80.1)	0.35 (0.17-0.72)	0.004	0.27 (0.10-0.69)	0.006
Non-work concerns							
People close to me would be at high risk of getting bird flu because of my job	120 (82.2)	107 (80.5)	227 (81.4)	0.89 (0.49-1.63)	0.709	0.81 (0.36-1.79)	0.600
I would be concerned for my:							
Spouse/partner	119 (96.7)	121 (96.0)	240 (96.4)	0.81 (0.21-3.10)	0.762	0.51 (0.06-4.11)	0.525
Parents	125 (95.4)	109 (87.2)	234 (91.4)	0.33 (0.12-0.87)	0.019	0.26 (0.07-1.03)	0.055
Children	90 (96.8)	114 (94.2)	204 (95.3)	0.54 (0.14-2.16)	0.519	0.15 (0.01-1.52)	0.108
Close friends	121 (87.7)	104 (77.0)	225 (82.4)	0.47 (0.25-0.90)	0.021	0.53 (0.23-1.21)	0.129
Work Colleagues	130 (92.2)	119 (89.5)	249 (90.9)	0.72 (0.31-1.65)	0.434	0.71 (0.24-2.07)	0.525
People close to me would be worried for my health	144 (97.3)	131 (96.3)	275 (96.8)	0.73 (0.19-2.77)	0.741	0.24 (0.03-2.04)	0.193
People close to me would be worried as they may get infected by me	133 (89.9)	114 (83.8)	247 (87.0)	0.58 (0.29-1.18)	0.131	0.28 (0.10-0.79)	0.016

PCPs: primary-care physicians

* Adjusted for age, years of experience, sex, marital status, number of children, ethnicity and staying alone.

† Only private GPs working in group practices.

Numbers for each item may not add up to the total number of GPs due to missing values.

Cronbach alpha for all 16 items = 0.725 (public GPs), 0.617 (private GPs).

health emergencies such as serious respiratory epidemics.[13] From a service delivery point of view, we noted that one-third of private PCPs in our study expressed that they should not be looking after patients with AI. This has implications on national AI preparedness plans as private PCPs might close their clinics and adversely affect primary-care delivery at a time when it is most needed, a scenario that occurred during the last SARS outbreak in Hong Kong and Canada.[15] During an influenza outbreak, there would be a sharp increase in the need for healthcare personnel to manage the situation. Private PCPs would be an invaluable part of such an emergency response and their non-

Table 3. Perceived Impact on Personal Life and Work

Perceived impact (Agree)	Public PCPs n (%)	Private PCPs n (%)	Total n (%)	Unadjusted OR	*P*	Adjusted OR*	*P*
I would be afraid of telling my family about the risk I am exposed to	30 (20.4)	17 (12.5)	47 (16.6)	0.56 (0.29-1.06)	0.074	0.49 (0.21-1.15)	0.489
People would avoid me because of my job	103 (70.1)	94 (69.1)	197 (69.6)	0.96 (058-1.59)	0.862	0.91 (0.47-1.79)	0.912
People would avoid my family members because of my job	80 (54.4)	73 (53.7)	153 (54.1)	0.97 (0.61-1.55)	0.900	0.77 (0.41-1.43)	0.403
I would avoid telling other people about the nature of my job	41 (27.9)	26 (19.3)	67 (23.8)	0.62 (0.35-1.08)	0.089	0.48 (0.23-1.02)	0.057
There would be adequate staff at my workplace to handle the increased demand	49 (33.3)	76 (55.9)	125 (44.2)	2.53 (1.57-4.10)	<0.001	2.34 (1.26-4.58)	0.008
There would be more conflict amongst colleagues at work	72 (49.3)	71 (52.2)	143 (50.7)	1.12 (0.70-1.79)	0.628	0.95 (0.51-1.77)	0.876
I would feel more stressed at work	120 (82.2)	125 (91.9)	245 (86.9)	2.46 (1.17-5.20)	0.016	1.70 (0.62-4.62)	0.302
I would have an increase in workload	125 (85.0)	105 (77.2)	230 (81.3)	0.60 (0.33-1.09)	0.092	0.38 (0.17-0.87)	0.022
I would have to work overtime	126 (85.7)	92 (67.6)	218 (77.0)	0.35 (0.19-0.63)	<0.001	0.17 (0.07-0.37)	<0.001
I would have to do work not normally done by me	120 (81.6)	113 (83.1)	233 (82.3)	1.11 (0.60-2.04)	0.748	0.75 (0.34-1.66)	0.473

* Adjusted for age, years of experience, sex, marital status, number of children, ethnicity and people staying with.
Numbers for each item may not add up to the total number of GPs due to missing values. Cronbach alpha for all 10 items = 0.711 (public GPs), 0.571 (private GPs).

Table 4. Preparedness for a Bird Flu Pandemic

Statement* (Agree)	Public PCPs n (%)	Private PCPs n (%)	Total n (%)	Unadjusted OR	*P*	Adjusted OR*	*P*
I have received training for infection control at my clinic	120 (82.8)	66 (52.8)	186 (68.9)	0.23 (0.14-0.39)	<0.001	0.13 (0.06-0.28)	<0.001
Received adequate personal protective equipment training	120 (87.0)	101 (81.5)	221 (84.4)	0.65 (0.37-1.15)	0.134	0.36 (0.16-0.80)	0.012
Have someone to turn to if unsure of use of personal protective equipment	126 (92.6)	75 (61.0)	201 (77.6)	0.21 (0.12-0.36)	<0.001	0.15 (0.07-0.34)	<0.001
My clinic has a preparedness plan for a bird flu outbreak	113 (98.3)	77 (63.6)	190 (80.5)	0.41 (0.24-0.68)	0.001	0.23 (0.11-0.47)	<0.001
My clinic is prepared for a bird flu outbreak	96 (93.2)	72 (65.5)	168 (78.9)	0.62 (0.38-1.00)	0.048	0.81 (0.24-0.89)	0.021
I am personally prepared for a bird flu outbreak	80 (74.8)	94 (82.5)	174 (78.7)	1.87 (1.15-3.05)	0.011	1.54 (0.80-2.94)	0.197
I have been recommended to receive flu vaccination	127 (88.8)	116 (90.6)	243 (89.7)	1.37 (0.67-2.82)	0.391	0.55 (0.20-1.52)	0.246
I have received flu vaccination (in the last 6 months)	104 (70.7)	101 (74.3)	205 (72.4)	1.26 (0.74-2.12)	0.393	0.94 (0.46-1.89)	0.854
Bought anti-bird flu medication	2 (1.4)	82 (60.7)	84 (29.8)	112.2 (26.6-472.3)	<0.001	48.46 (11.02-213.07)	<0.001
Bought masks	27 (18.6)	112 (84.2)	139 (50.0)	22.2 (12.00-41.34)	<0.001	13.34 (6.35-28.04)	<0.001

* Adjusted for age, years of experience, sex, marital status, number of children, ethnicity and people staying with.
Numbers for each item may not add up to the total number of PCPs due to missing values. Cronbach alpha for all 10 items = 0.632 (public PCPs), 0.713 (private PCPs).

participation would greatly dampen such a response and be an under-utilisation of national healthcare resources.

During the last SARS outbreak in Singapore, healthcare workers made up 41% of all cases, one of the highest among SARS-affected countries.[16] Against this background, the respondents to our study could have personally known colleagues who have fallen ill or succumbed to SARS. With the possibility that AI could disproportionately infect PCPs, it was not surprising that our respondents were concerned about their personal risks due to contact with patients. Similarly, danger to personal health was one of the most prevalent fears among frontline healthcare workers who experienced significant psychological stress during SARS.[17] One of the ways to address such fears and concerns would be to ensure adequate preparation among PCPs for a future outbreak.

Many countries such as Canada, the UK and Singapore have developed and published national pandemic influenza plans.[18,19] Despite this, Hogg et al[13] reported that only 18% of Canadian family physicians were prepared for a serious respiratory epidemic while Cole[20] reported that only 22% of doctors in the UK were prepared for an influenza pandemic.This is in contrast to Singapore where 78.7% of PCPs reported that they were prepared for an AI outbreak. After the last SARS outbreak, Singapore has strengthened its operational readiness and laboratory safety to respond to possible emerging diseases. The Ministry of Health has published an Influenza Pandemic Readiness and Response Plan documenting the medical and public health responses to an AI outbreak.[21] The roles of both private and public PCPs during an epidemic include provision of outpatient care and treatment with anti-virals. There has been extensive local media coverage on issues related to AI (e.g. exercises to test operational readiness such as bird-culling or updates on new AI human cases around the region). A dedicated website with information on AI[22] has also been set-up. Together with a high proportion of PCPs reporting adequate training in PPE, these measures have probably led to a high level of awareness among PCPs. Greater awareness has led to a higher level of preparation and could explain why a high proportion of Singapore PCPs reported being personally prepared for an AI pandemic.

With concerns about falling ill, increased stress and workload, psychosocial support of PCPs will be important in any infectious disease outbreak to prevent possible burn-out.[23] Fear and concern for personal safety and the safety of family members have been mentioned as an important reason for healthcare workers' unwillingness to work in a catastrophic event.[24] Measures suggested to allay such fears would include adequate education, provision of PPE and environmental controls. Singapore's national pandemic plan has provisions for conversion of private primary-care clinics into specialised Flu Clinics and the provision of anti-viral medications specifically for private PCPs.[21] However, our study also found that private PCPs were buying masks and anti-viral medications for themselves, suggesting that perhaps some were unsure if these items would be available to them in an outbreak. It is also likely that some private PCPs in our survey were unaware of the national pandemic preparedness plans, uncertain about their roles in an outbreak and worried about their supply of PPE. Probably more could be done to engage and clarify their roles in any outbreak as all private PCPs would be needed, not only to take care of patients with AI but also continue caring for patients with non-AI medical problems.

During the last SARS outbreak, healthcare workers were ostracised by certain sections of the public.[25] The concerns expressed in our study about social ostracism towards PCPs and their family members were not without basis. These are issues which could affect PCPs morale and their willingness to work in an outbreak. Planning for outbreaks should include measures, with the help of the media, to ensure that PCPs and other healthcare workers have adequate support and not be shunned by the very people they are treating.

Our study also showed a lower level of AI preparation activities among private PCPs. Even though both groups reported themselves as being "personally prepared", activities specifically related to AI preparation were lower among private PCPs. This could be due to the different work environment in which both groups work in. Public PCPs could have greater access to national resources compared to private PCPs as the former has direct links with government organisations. There are also specific staff overall in-charge of overseeing planning and emergency preparedness and a larger pool of nurses and administrative staff to draw upon in an emergency. In each public polyclinic, AI-related planning involves a multidisciplinary team and not only the PCPs alone. Public polyclinic staff have also participated in national emergency exercises and also had experience running fever clinics during the SARS outbreak. All these could explain why public PCPs appeared to have a higher level of preparedness from our study. Public PCPs are aware that these measures are in place to prepare their clinics to be utilised in any AI outbreak. They were understandably more concerned about adequacy of staffing levels and an increased workload compared to private PCPs. An important issue for public PCPs would be to ensure that they do not become over-worked and burnt-out by providing adequate staff, rest periods and even psychological support. One strategy to minimise the impact on public PCPs would be to involve private PCPs more, ensuring that the public clinics do not become over-stretched. Measures could also be taken to

reassure private PCPs that in an outbreak, adequate supply of PPE will not be denied to them. In addition, measures could also be taken to explore the differences in training and preparedness between these 2 groups of PCPs. Improving the level of preparedness among private PCPs would further strengthen the primary-care response in the event of an AI pandemic.

There were several limitations in our study. There was a lack of qualitative design such as a focus-group discussion when we designed the study. A cross-sectional survey with self-administered questionnaires also has its intrinsic limitations such as rating and recall biases. The primary healthcare system in Singapore cannot be generalised to other countries with different systems. However, we suspect that PCPs from other countries would share similar concerns in an AI outbreak.

Conclusion

Primary-care physicians all over the world are expected to play a key role in the prevention and control of any future avian influenza pandemic. Most Singapore PCPs felt personally prepared and would continue to provide medical care but were concerned about the risk of exposure, falling ill and possible social ostracism. Addressing such concerns and supporting PCPs are crucial in the planning for and during any outbreak. Private PCPs appeared to have a lower level of preparedness and improving this aspect would further strengthen our primary-care response to a pandemic.

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