Influenza pandemic and the duties of healthcare professionals

Voo T C, Capps B

ABSTRACT

Preparing for an influenza pandemic presents significant scientific and administrative challenges. Governments can learn from measures implemented during past infectious disease epidemics and pandemics, and organise the nation's infrastructure and resources, particularly human resources, for efficient and effective mobilisation for such future events. This should include both the biomedical and ethical dimensions. In this paper, we discuss a critical ethical issue that will arise in preparation for and in response to an influenza pandemic, namely, the role and duties of healthcare workers. It is the aim of this paper to highlight the basis and scope of healthcare workers' duty of care during a pandemic.

Keywords: duty of care, healthcare workers, medical ethics, pandemic, public health

Singapore Med J 2010;51(4):275-281

INTRODUCTION

The Severe Acute Respiratory Syndrome (SARS) epidemic in 2003 and the pandemic potential of avian flu pushed governments and health organisations worldwide to step up their pandemic preparedness and response planning efforts. The chance to test these plans came with the outbreak of influenza A (H1N1), which became a pandemic in June 2009. While the H1N1/09 flu presents mild to moderate symptoms in most cases, at present, there are significant cases of the disease causing severe respiratory failure. Moreover, there are concerns that the virus may mutate into a more virulent form.[1] Strategies, informed by clinical data, and the availability of medical technologies, such as high-speed genetic sequencing, indicate that countries can be expected to be better prepared than at any time before. Indeed, in the early days of H1N1/09, some governments and public health agencies were quick to point out that they were ready, should the worst happen, and that they had comprehensive and effective measures to monitor and adapt to the rapidly emerging data. However, preparing for an emerging infectious disease also involves an acute awareness of the uncertainty in predicting when, where and how pandemics will develop.[2] There is a need for renewed urgency in examining the wide range of issues posed by pandemic influenza that should not be limited to academic and public administration circles.

Beyond questions of scientific effectiveness, many ethical issues and considerations arise in pandemic preparation and response. For therapeutic countermeasures of vaccines and anti-virals, national prioritisation strategies for these drugs raise concerns of their equitable distribution and how this relates to the effectiveness of the strategies for achieving the various objectives of the pandemic plan, which include the preservation of key human resources to carry out the plan and the reduction of the spread of infection in the population. There are also concerns about vaccine distribution at the global level, highlighting the problem of the availability and equitable sharing of stocks and other resources. At the time of our writing, in a climate of limited global manufacturing capacity for flu vaccines, officials around the world were debating how to balance vaccine production for the evolving unknown threat of the A(H1N1) flu, which has been shown to be resistant to the seasonal flu vaccine, and for the known threat of the seasonal flu virus.[3] The heightened anxiety that dominated these high-stress situations led some to question whether there were enough anti-virals, despite many countries reassuring the public that they had enough for the population (which had more to do with there being enough to treat the proportion of the population who would be expected to fall ill). This led to a rush to accumulate private supplies of the anti-viral medications Tamiflu (oseltamivir) and Relenza (zanamivir), personal protective equipment and other medical provisions.

Another ethical issue that calls for discussion is the imposition of traditional public health control measures. At the height of SARS, multiple non-pharmaceutical interventions, even though evidence of their effectiveness was largely historical and anecdotal,[4] were implemented in the countries affected because of scientific uncertainty about the aetiology and transmission pattern of SARS, its high fatality rate and the lack of effective therapy. These measures were widely considered to have been successful in limiting the human and socioeconomic cost of the SARS pandemic in many countries. Among the strategies used were quarantine and isolation, hospital

Centre for Biomedical Ethics, National University of Singapore, Yong Loo Lin School of Medicine, 10 Medical Drive, Singapore 117597

Voo TC, BA, MA
Adjunct Research Fellow

Capps B, BSc, MA, PhD
Assistant Professor

Correspondence to:
Mr Teck-Chuan Voo
Tel: (65) 6516 3331
Fax: (65) 6778 9527
Email: medvtc@nus.edu.sg

closures and delays to elective procedures and outpatient care, visitor restrictions to nursing homes and hospices, social distancing and community restrictions (for example, cancelled public events, school closures and curriculum delays) as well as border controls and travel restrictions. The stringent, rigid imposition of all these different targeted interventions may help to manage an influenza pandemic, although they have yet to be tested to the degree expected of a worst-case global outbreak of a 1918 Spanish flu-type mutation (Category 5 on the Centers for Disease Control and Prevention Pandemic Severity Index). It is expected that well-targeted and timed interventions, while unlikely to prevent a pandemic, can help delay the effects of the pandemic temporally, thus easing the burden on the healthcare system and allowing time for vaccine and anti-viral production and distribution, which would allow the full actuation of the pandemic plan. This includes scope for education, prevention, containment and treatment measures, which would potentially save lives, in addition to limiting economic and social costs.[5,6]

It may be argued that some interventions rolled out during SARS, such as temperature screening at the entry points of schools, offices, airports and other public sites, though questionable in terms of helping to contain the spread of infections, posed only small inconveniences but can have the important psychological effect of assuring the public to carry on life as usual.[7] The measures used to control an emerging infectious disease can also have deep adverse consequences for civil liberties, society and the economy. H1N1/09 puts such a view into question because it was a different virus; it is important to monitor the effectiveness of such measures for a disease that is, for instance, contagious while the infected person is asymptomatic.

Of critical importance, then, is the need to evaluate which interventions, or combination of interventions, are most effective, and how they can be implemented in the least restrictive way at each stage of the pandemic.[4,5] (We can postulate that healthcare workers [HCWs] have an intrinsic interest in the effectiveness of at least some non-pharmaceutical interventions, such as quarantine at a designated facility, as they would be the ones monitoring the health of asymptomatic but potentially infectious individuals, thus putting themselves at risk of infection, psychological distress and depression, as well as stigmatisation by the public). While it is difficult to set up controlled trials to evaluate the effectiveness of some of the interventions, as they are difficult to blind, progress has been made, including a systematic review of physical interventions used to interrupt or reduce the spread of respiratory virus infections.[8] For the ethically controversial intervention of quarantine, probabilistic modelling has been done to determine the conditions under which quarantine is expected to be useful.[9] It has also been shown that quarantine at the borders of small island nations (with one airport) could contribute significantly to at least delaying the arrival of pandemic influenza,[10] giving important extra time to implement national plans.

Evidence, ethics and effectiveness will inevitably intertwine in the bid to apply the lessons learnt from the SARS response in proportion to the variables of potential pandemics. (To quote the Health Minister of Singapore: "*… we must stick to good science and sound evidence, not emotion or prejudice. We certainly must not be trapped in old SARS mindset…*"[11]) Failure to do so may result in unnecessary "collateral damage" which includes the impact on social and economic activities. Importantly, responses ought not to encourage reactions, from disproportionate alarm to insufficient concern, which would impede future response efforts from the public in the event of a manifestly worse, or different (in terms of transmission and aetiology) viral pandemic. In Singapore, while a survey (carried out by the Health Promotion Board with about 1,000 respondents) showed high satisfaction in general with the government's response to SARS,[7] resentment with the public health measures implemented was also expressed in a separate survey.[12]

Given these ethical issues and more, an ethical framework publicly discussed and disseminated in advance is thus essential to a pandemic plan. It would help foster public trust and confidence, promote compliance and cooperation, and minimise social disruption and economic loss.[13] In addition, the framework will prepare HCWs in their deliberation and decision-making during a pandemic, and preclude the misconception that "the ethical work is done once actions are in place to minimise mortality in a population."[14] An issue that would especially concern HCWs, in particular, medical professionals, is their duty of care during a pandemic, which differs in scope and approach from routine clinical decision-making. The absence of any analysis may create the practical problem of obtaining the voluntary participation of HCWs in a local pandemic plan, and "create problems of justice if and when, for example, people are dismissed for not fulfilling a mistakenly attributed duty",[15] or an insufficiently understood one. It is the aim of this paper to highlight the basis and scope of HCWs' duty of care during a pandemic.

COMMITMENT TO A DUTY OF CARE

The history of the 2003 SARS epidemic is often described

as a war that was fought and won through the commitment and sacrifices of HCWs. During the epidemic, HCWs, clinical and non-clinical, professional and non-professional, in some of the affected countries were dubbed "soldiers" and "warriors"; those who continued to work at the "frontline" were honoured as heroes for taking on disproportionate risks of serious morbidity and mortality, as well as the burdens of high psychological distress.[16,17] The epidemic is said to have demonstrated the "dedication of a medical profession that might have been weakened by increasing commercialisation, poor morale, an emerging preference for easier professional lifestyles and the pervasive self-centred individualism of the larger society."[18] A closer look at the aftermath reveals that HCWs in some countries were threatened with punishment if they failed to meet their medical obligations.[19,20]

Based on the general response of HCWs to SARS and other recent infectious disease outbreaks, it seems that we should rest assured that the virtue of the healthcare profession—the disposition to a duty of care—would be largely unwavering during an influenza pandemic. Nevertheless, we should note that while SARS and some future influenza pandemics may share many common features, there are potential important differences that may affect the HCWs' pandemic response. For one thing, SARS, though highly lethal, was low in infectivity compared with the other members of the corona virus family; it was predominantly a nosocomial disease that involved mainly hospital staff to address its threat. An influenza pandemic phase, on the other hand, may involve a new viral subtype that is highly infectious and lethal. Moreover, in a pandemic, the frontline will be within the general population and an effective response will depend heavily on the participation of primary care doctors, including those in the private sector. Thus, it is hard to predict whether a sufficient number of HCWs would take on the challenge of providing care for influenza patients (as well as non-influenza patients) during a worst-case pandemic. Empirical surveys, although they can at best gauge potential responses,[21] do provide useful information that helps governments and healthcare employers develop policies and approaches that increase HCWs' voluntary participation. In this regard, knowledge of the importance of one's role during a pandemic has been shown to be a crucial factor associated with healthcare workers' willingness to work.[20] A cross-sectional survey in Singapore concluded that while most Singapore primary care doctors said they would continue to provide care during an avian influenza pandemic, it is important that a pandemic preparedness plan addresses their various concerns, such as the risks to their health and to their family members.[22]

THE BASIS OF A DUTY OF CARE

The extent to which HCWs are bound by a duty of care during an influenza pandemic is contestable. This question leads to a larger issue: how will medical professionalism be viewed if healthcare professionals could disclaim the duty of care in the face of a deadly pandemic?[23]

The debate on the limits of duty of care in the early response to acquired immune deficiency syndrome/human immunodeficienly virus (AIDS/HIV) generated a consensus within bioethics circles and many, if not all, healthcare communities that HCWs have an ethical duty to treat patients with infectious diseases even if this puts them at risk of getting infected. Various bases for this duty have been put forward, including: (1) an explicit or implicit consent to accept such risks as part of a professional career in medicine; (2) part of the oath or code of ethics that HCWs undertake when they enter the profession; (3) special training and expertise that render in HCWs a higher burden of responsibility than laypersons to care for infected patients; and (4) a social contract with the public in return for receiving benefits such as subsidised training, high income, social prestige and the privilege of professional self-regulation and autonomy.[15]

In their article "Ethics, pandemics, and the duty to treat", Malm et al submitted that none of the above arguments are sufficient for claiming that all HCWs have to adhere to a duty to treat infected patients during a pandemic, especially when their competing responsibilities to themselves and their family are taken into consideration. The authors opined that when a pandemic poses high risks of morbidity and mortality, HCWs can disclaim the duty to treat without breaching clinical responsibility. According to them, there is a need to ensure, as part of pandemic planning, that HCWs explicitly and voluntarily acknowledge this duty, with due compensation for its acceptance.[15] In response to Malm et al's article, the Canadian Joint Centre for Bioethics Pandemic Ethics Working Group argued that the *duty to treat* is narrow in scope for framing HCWs' duty of care during a pandemic.[24] The duty of care needs reaffirming: HCWs have a responsibility "to pursue a variety of ends to mitigate the negative effects of a pandemic;"[24] all HCWs therefore have a duty of care and thus a commitment to support a pandemic response in different ways. We elaborate on this further below.

To prevent HCWs from taking Malm et al's proposed "personal choice and economic contract" approach to their duties during a pandemic or other public health

emergencies that may significantly undermine the healthcare system's capacity to deal with a pandemic, some governments have considered or implemented legal provisions for the conscription of HCWs to work.[19] A UK survey[21] on the attitudes of HCWs toward their professional and ethical responsibilities in a pandemic crisis revealed that the majority of respondents felt that the law should not force them to work. Thus, it can be argued that the notion of the duty of care, which focuses on the doctor-patient relationship, is better framed as the *duty to serve* when considered in terms of addressing the public dimensions of medicine during a national crisis.[25] This shift in context from meeting the needs of the individual patient to meeting those of the public (what may be termed "the public good") becomes more apt as the severity of a pandemic increases in terms of infectivity and lethality. A duty to serve signals the commitment that is required to "shore up the frontline", given the magnitude of the threat to national security and the demand on medical human resources. Indeed, to some commentators, this picture of the duty to care is not distorted since the role of HCWs during an influenza pandemic would be significantly shaped by the measures and instructions of government and public health authorities.[19] To comply with the objectives of a pandemic plan, HCWs may need to become "enforcement agents" as the distinction between public health measures and national security becomes blurred.[26] To act in the interests of the public, they need to depart from the rules and rituals of the traditional doctor-patient relationship. Nevertheless, HCWs will continue to be the ones closest to the patients, and often the only people able to meet their individual medical needs; what is changed is the magnitude of this duty during a pandemic.

Countries can expect a significant level of attrition of HCWs to occur during a pandemic, both from illness itself and from absenteeism in reporting for duty (which can arise from reasons relating to childcare due to school closures.[27] To avoid swinging from a personal choice to a legal compliance approach as a resort to ensure that adequate HCWs are working during an influenza pandemic, what needs to be promulgated is a shift in perspective to a larger social context that embeds HCWs and the scope of obligations and moral choices that they make.[24,28] In today's highly interdependent and interconnected world, the emergence of a novel virus with pandemic potential puts us all in a state of uncertainty about whether we would become victims or vectors (or both, at any given time).[29] Any public health decision-making, at both the policy and individual level, would have significant ripple effects for the society and the world we live in. Thus, the duty of care, as Lynette Reid writes in the aftermath of SARS, should arise "from social reflection on what response to an epidemic would be consistent with our values and our needs, recognising our shared vulnerability to disease and death."[30] In an influenza pandemic, the fulfillment of the duty of care ought not to be decided by simply balancing the interests between patients and HCWs, or prioritising the interests of one group over the other. What needs to be taken into account, as mentioned earlier, are the community, institutional and social roles that constitute the person as a HCW. So, if a HCW considers the various responsibilities and interests that he has—to self, family and society—beyond those of the medical profession, he cannot proclaim a lack of a duty of care. There may be a pandemic severity point when overwhelming burdens and personal sacrifices mean that a duty of care can no longer be professed by all HCWs; any duty from this point onwards is a "service to the state", as social and economic considerations become sidelined, and "the focus for the nation is just to contain the 'damage' and regain control of the situation."[31] However, before this point is reached, the duty of care remains, as a pandemic affects everyone, not just in terms of infection but also civil liberties and social infrastructure. In fact, this means that every person has a distinct "duty of care" during a pandemic. The layperson has a duty to practise good personal hygiene, to voluntarily undergo quarantine if he or she comes into contact with an infected person and to remain compliant to further control measures, and so on. An infectious disease doctor has a different set of duties from a therapeutic radiologist, who may be asked to perform primary care duties if the healthcare system is overly burdened during a pandemic.

If a strong voluntary commitment from HCWs to carry out a duty of care in line with a pandemic plan is to be developed, then clear articulation of what is required of the duty—which should be in touch with the expectations of one's society and culture and which differs for each type of HCW—is required. (As expressed by the World Health Organization's document "Ethical considerations in developing a public health response to pandemic influenza", policies that set forth clearly the obligations of HCWs can be influential even without the use of legal sanctions for non-compliance; if sanctions by governments, professional organisations or healthcare employers are to be considered, then they should be "tailored as narrowly as possible" so as not to place unreasonable burdens on HCWs.[13]) Such direction, which conveys a shift from clinical to public health ethics, should be led by professional healthcare associations and regulatory bodies with support from wide public consultation.[32,33]

Communication of the duty of care during an influenza pandemic, perhaps clearly stated in professional

codes and guidelines, will help guide HCWs and inform public expectations as well as assist pandemic planners in establishing standards and protocols.[32] In addition, the medical curriculum will benefit, with students being made aware and educated in the duty of care and its legitimate expectations, as well as other ethical issues that take centre stage in a pandemic response.

The grounding of a duty of care is not a tangible document. It exists at the intangible "social contract" level. The duty is thus universal to any kind of state-medical structure, although, as it is suggested here, it can become obscured in a contract-based medical community. This virtue of healthcare professionalism therefore extends to any group where there is an understanding of the pronounced inseparability of self-interest and public interest during a pandemic. In recognition of this inseparability, a pandemic preparedness plan should establish how best to harmonise these interests by establishing what duties a society owes to HCWs who are working to address a pandemic. As recommended by WHO, if HCWs were to assume greater risks to their health and life during an influenza pandemic, then governments and healthcare employers have reciprocal obligations to protect and support them.[13] In short, they have a duty of care towards HCWs. This may include the provision of preventive and protective measures (e.g. personal protective equipment), priority for vaccination and anti-viral medications, recruitment of contingency HCWs and volunteers to cope with surge capacity issues,[34,35] the provision of sufficient training and professional indemnity (especially when the routine practice and competence of many HCWs is limited to a narrow class of patients and procedures due to the current trend of medical subspecialisation),[19] and medical and social benefits in the case of illness and disability, as well as death benefits for family members. Not all duties owed to support HCWs in a pandemic response are economic in nature; death or disability benefits need not be provided if they are already well-covered by personal insurance and institutional policy. Duties owed to HCWs thus depend on understanding the context in which HCWs operate, as well as what concerns and needs they have. Within this framework, organisational values, such as solidarity and trust, take shape and become reinforced. Such values, which are key to addressing a pandemic threat, may not connect meaningfully with policy and decision-making in the economic contract framework suggested by Malm et al.[15]

FURTHERING THE SCOPE FOR THE DUTY OF CARE

The duty of HCWs in a pandemic plan, as pointed out earlier, should not be overly focused on the duty to treat infected patients. As the Canadian Joint Centre for Bioethics Pandemic Ethics Working Group writes, HCWs' duties may "extend towards providing less risky clinical duties or essential non-clinical assistance."[24] In this regard, primary care doctors or general practitioners must be involved in the development of pandemic planning.

One critical role of primary care doctors during a pandemic, which may have been underplayed in importance, is to educate, manage and communicate with the public. In a survey of the public organised by the College of Family Physicians of Canada, an overwhelming majority of the respondents indicated that they should be able to turn to their family doctors for information and advice in the event of a serious medical emergency such as a widespread influenza outbreak.[36] As trusted and credible sources of information, primary care doctors, if well-informed about the spectrum of clinical presentations and severity of the pandemic flu, will play an important role in guiding the public even on mundane decisions such as whether and how to seek medical help.[37] Public guidance increases in ethical significance during a potential or actual pandemic. As has become apparent during H1N1/09, steering effective public measures involves resolving interconnected questions, such as how patients are to be managed depending on the severity of the virus (in particular, how underlying medical conditions or vulnerability affect these decisions), how individuals notify public health officials of their circumstances to maximise the tracking of cases, and how data is put together to provide for surveillance and epidemiological research on the disease.

Another aspect of pandemic preparedness and response that primary care doctors and other HCWs can inform the public on is the use of community hygiene methods and personal protective equipment. For these interventions to be effective in controlling infection spread, they need to be done or used properly, consistently and sustainably, which was not achieved during SARS,[38] and as far as anecdotal evidence has shown, during H1N1/09 as well. It is also essential to inform the public of the ineffectiveness or the uncertainty of the effectiveness of some of the measures, as well as their risks. For example, confusion or misinformation about measures leads to "substantial public anxiety, reliance on word of mouth for knowledge, and purchase of ineffective and expensive products."[39] As Gostin and Berkman argue, this is an issue of distributive justice, as the costs of ineffective communication or rampant circulation of misinformation will impact the most marginalised members of the society. Marginalised members of the society, as defined by Gostin and Berkman, are those without access to alternative, credible sources

of information and those for whom wasted resources would have the greatest adverse effects.[39] In this regard, it might be useful as part of a pandemic plan to gather a core of dedicated HCWs to communicate and inform the public via several channels of communication, including the media, which has the impulse to dramatise events and inflame fear.

CONCLUSION

The medical profession has long been bound by a duty of care. The perseverance of this principle in medicine has led to the inviolability of the patient-doctor relationship, and has justified, in various ways, the supererogatory obligations of HCWs. During national emergencies, a separate set of values comes into play: those that personify a "public interest". While the former may signal virtues such as "integrity, gentleness, disposition to sympathy and a fastidious sense of honour", the latter signals "tenacity and resolution… largeness of design and purpose … [and] habits of leadership".[40] They can appear, therefore, to occupy separate realms of ethics, requiring the exposition of different skills – those of medicine and those of politics. To be sure, both have very different objectives: one signals the interpersonal morality of the *duties of a doctor*, while the other signifies the idea of a *public ethics*; the obligations of collective and impersonal choices that are necessary for the governance of the state. These concepts meet in times of crisis – at the frontline, placing extreme burdens on those trained for such eventualities.

The costs of a pandemic can be high, crippling human life and humanity, unless public measures—ultimately on an international scale—are made. These are difficult choices shaped by political will and scientific uncertainty. Inevitably, such measures place heavy responsibilities on those that can help during such a crisis, and the prolonged and ongoing pressure requires encouragement and reassurance of one's duty to meet the inevitable onset of fatigue, and to strengthen coping mechanisms. However, the public and well-meaning praise of those on the frontline may reinforce a duty to serve, in particular, the "medical profession's ethical duty to treat".[41] While these burdens are predominantly and willingly assumed, the demands should not be distorted as merely a heroic gesture; this role is indicative of a commitment to their duty to care for patients. HCWs, unlike others in the population, take on significant risks, and this should instigate an idea of a "public ethics", that the understanding of responsibilities and virtuous disposition of everyone within the community is important. This may include the mobilisation of the population to acquiesce to measures that have been proven to be effective and to volunteer, where and when it is appropriate, to ease the burden on public servants. The special training of HCWs makes them the only ones who can provide the level of assistance and aid necessary to overcome the health aspects of a pandemic (it should also be mentioned that without auxiliary staff, hospital infrastructures would collapse), but they are not expendable as persons and skilled professionals. It would be impossible to replace them, and therefore, it is important that all necessary training and support is provided in recognition of their unique importance during a pandemic.

REFERENCES

1. Fraser C, Donnelly CA, Cauchemez S, et al. Pandemic potential of a strain of influenza A (H1N1): early findings. Science 2009; 324:1557-61.
2. Tambyah P, Lye DC. Responding to the new influenza A (H1N1) 2009 pandemic: moving forward together. Singapore Med J 2009; 50:554-5.
3. Enserink M, Kaiser J. Swine flu outbreak. Devilish dilemmas surround pandemic flu vaccine. Science 2009; 324:702-5.
4. Gostin L. Public health strategies for pandemic influenza: ethics and the law. JAMA 2006; 295:1700-4.
5. Gostin LO. Influenza pandemic preparedness: legal and ethical dimensions. Hastings Cent Rep 2004; 34:10-1.
6. Markel H, Lipman HB, Navarro JA, et al. Nonpharmaceutical interventions implemented by the US cities during the 1918-1919 influenza pandemic. JAMA 2007; 298:644-54.
7. Tan CC. SARS in Singapore – key lessons from an epidemic. Ann Acad Med Singapore 2006; 35:345-9.
8. Jefferson T, Foxlee R, Del Mar C, et al. Physical interventions to interrupt or reduce the spread of respiratory viruses: systematic review. BMJ 2008; 336:77-80.
9. Day T, Park A, Madras N, Gumel A, Wu J. When is quarantine a useful control strategy for emerging infectious diseases? Am J Epidemiol 2006; 163:479-85.
10. Nishiura H, Wilson N, Baker MG. Quarantine for pandemic influenza at the borders of small island nations. BMC Infect Dis 2009; 9:27.
11. Khaw BW. Talking points by Health Minister Khaw Boon Wan at the press conference on influenza A (H1N1) outbreak. Channelnewsasia 2009. Available at: www.channelnewsasia.com/fluoutbreak/khaw_talkingpts.htm. Accessed May 27, 2009.
12. Teo P, Yeoh BS, Ong SN. SARS in Singapore: surveillance strategies in a globalising city. Health Policy 2005; 72:279-91.
13. World Health Organization. Ethical considerations in developing a public health response to pandemic influenza. Geneva: WHO, 2007.
14. Thomas JC, Dasgupta N, Martinot A. Ethics in a pandemic: a survey of the state pandemic influenza plans. Am J Public Health 2007; 97 suppl 1:26-31.
15. Malm H, May T, Francis LP, et al. Ethics, pandemics, and the duty to treat. Am J Bioeth 2008; 8:4-19.
16. Hsin DH, Macer DR. Heroes of SARS: professional roles and ethics of health care workers. J Infect 2004; 49:210-5.
17. Tai DY. SARS plague: duty of care or medical heroism? Ann Acad Med Singapore 2006; 35:374-8.
18. Emanuel EJ. The lessons of SARS. Ann Intern Med 2003; 139:589-91.
19. Kotalik J. Ethics of planning for and responding to pandemic influenza: literature review [online]. Swiss National Advisory Commission on Biomedical Ethics. Bern, 2006. Available at:

www.bag.admin.ch. Accessed May 27, 2009.
20. Upshur R. Draft paper for Working Group Three: the role and obligations of health-care workers during an outbreak of pandemic influenza. Geneva: World Health Organization, 2006.
21. Barr HL, Macfarlane JT, Macgregor O, et al. Ethical planning for an influenza pandemic. Clin Med 2008; 8:49-52.
22. Wong TY, Koh CH, Cheong SK, et al. A cross-sectional study of primary-care physicians in Singapore on their concerns and preparedness for an avian influenza outbreak. Ann Acad Med Singapore 2008; 37:458-64.
23. Kerridge I, Lowe M, Stewart C. Infectious diseases. In: Ethics and Law for the Health Professions. 3rd ed. Sydney: Federation Press, 2009: 684-701.
24. Joint Centre for Bioethics Pandemic Ethics Working Group, Upshur R. The duty to care in a pandemic. Am J Bioeth 2008; 8: 31-3.
25. Klopfenstein ML. Pandemic influenza and the duty to treat: the importance of solidarity and loyalty. Am J Bioeth 2008; 8: 41-3.
26. Eckenwiler LA. Emergency health professionals and the ethics of crisis. In: Moreno JD, ed. In the Wake of Terror: Medicine and Morality in a Time of Crisis. Cambridge: MIT Press, 2003: 111-31.
27. Balicer RD, Omer SB, Barnett DJ, Everly GS Jr. Local public health workers' perceptions toward responding to an influenza pandemic. BMC Public Health 2006; 6:99.
28. Brody H, Avery EN. Medicine's duty to treat pandemic illness: solidarity and vulnerability. Hastings Cent Rep 2009; 39:40-8.
29. Battin MP, Carr-Lee LS, Francis LP, Jacobson JA, Smith CB. The patient as victim and vector: bioethics and the challenge of infectious disease. In: Ashcroft RE, Dawson A, Draper H, McMillan J, eds. Principles of Healthcare Ethics. 2nd ed. Hoboken: John Wiley & Sons, 2007: 623-30.
30. Reid L. Diminishing returns? Risk and the duty to care in the SARS epidemic. Bioethics 2005; 19:348-61.
31. Ministry of Health Singapore. Influenza Pandemic Readiness and Response Plan. Available at: app.crisis.gov.sg/Data/Documents/FluPandemicPlan/MainDocumentPublic_Jan09.pdf. Accessed August 29, 2009.
32. Bailey TM, Rosychuk RJ, Yonge O, Marrie TJ. A duty to treat during a pandemic? The time to talk is now. Am J Bioeth 2008; 8:29-31.
33. University of Toronto Joint Centre for Bioethics. Stand on Guard for Thee: Ethical Considerations in Preparedness Planning for Pandemic Influenza. Toronto: University of Toronto, 2005.
34. Hodge JG Jr, Gable LA, Cálves SH. Volunteer health professionals and emergencies: assessing and transforming the legal environment. Biosecur Bioterror 2005; 3:216-23.
35. Rosychuk RJ, Bailey T, Haines C, et al. Willingness to volunteer during an influenza pandemic: perspectives from students and staff at a large Canadian university. Influenza Other Respi Viruses 2008; 2:71-9.
36. College of Family Physicians of Canada. The role of the family doctor in public health and emergency preparedness [online]. Available at: www.cfpc.ca/local/files/communications/role_fam_doc_dec05.pdf. Accessed May 27, 2009.
37. Stemwedel J. Swine flu outbreaks and the ethics of being sick. In: Adventures in Ethics and Science. Available at: scienceblogs.com/ethicsandscience/2009/04/swine_flu_outbreaks_and_the_et.php. Accessed May 27, 2009.
38. Lo JY, Tsang TH, Leung YH, et al. Respiratory infections during SARS outbreak, Hong Kong, 2003. Emerg Infect Dis 2005; 11:1738-41.
39. Gostin LO, Berkman BE. Pandemic influenza: ethics, law, and the public's health. Admin L Rev 2007; 59:121-76.
40. Hampshire S. Innocence and Experience. London: Penguin Books, 1991.
41. Alexander GC, Wynia MK. Ready and willing? Physicians' sense of preparedness for bioterrorism. Health Aff (Millwood) 2003; 22:189-97.