Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
Pandemic influenza preparedness in the Asia–Pacific region

Richard Coker, Sandra Mounier-Jack

Summary

Concerns are mounting that the threat of another influenza pandemic will become a reality and that the epicentre of the outbreak could be the Asia–Pacific region. We assessed the documents that some Asia–Pacific countries have published as part of preparedness planning for an outbreak of influenza in people. Regional approaches were polarised. Thailand, China, and Vietnam had set out a strategic vision to strengthen future capacity in preparedness planning. By contrast, Hong Kong, Australia, and New Zealand took a strategic approach aimed mainly at harnessing available resources or preparing for the deployment of resources such as stockpiled antiviral agents and vaccines. The plans of Hong Kong, Australia, and New Zealand compared favourably with the best European plans. The plans of resource-poor countries addressed some issues that were largely neglected by most European plans. Other countries (including those that do not yet have plans) could benefit from analysis of the strengths and weaknesses of the plans drawn up by countries in the region and in Europe.

Introduction

The World Health Organization (WHO) has emphasised the importance of the Asia–Pacific region as a potential epicentre of emerging diseases such as severe acute respiratory syndrome (SARS) and avian influenza. During the past three decades, 30 new infectious agents have been detected in this region.1 Since 2003, a total of 49 countries and one special administrative region (Hong Kong) have had outbreaks of the H5N1 subtype of influenza A in birds.2 The H5N1 virus will continue to pose an important public-health threat in the short term.2 More than 80% of the reported deaths from H5N1 have taken place in southeast Asia.

In a resolution issued in April, 2005, WHO expressed concern about the general inadequacy of global preparedness for pandemic influenza. WHO’s global influenza preparedness plan, which was launched in 1999, was updated in 2005. The plan outlines components that countries should include in their national preparedness plans to ensure an effective response.4 In 2005, WHO published a checklist to facilitate preparedness planning.1 The aims of such planning were to reduce transmission; decrease the incidence of new cases, hospital admissions, and deaths; maintain essential services; and reduce the socioeconomic consequences of a pandemic.5

In our own assessment of European national preparedness plans6 we concluded that although Europe was broadly well prepared, important gaps, weaknesses, and inconsistencies remained. We identified a need for operational planning, in particular, to be strengthened. We also suggested that although European countries had explicitly expressed their interest in cooperating with international institutions such as the European Centre for Disease Control and WHO, regional cooperation between countries was inadequate. Here, we have analysed pandemic influenza plans from selected countries in the Asia–Pacific region, emphasising specific concerns about preparedness in this region.

Preparedness in Asia–Pacific region

Using a data-extraction method developed from WHO’s checklist for influenza epidemic preparedness,7 we aimed to assess the national influenza preparedness plans of eight countries (Australia, Cambodia, China [and Hong Kong], Indonesia, Laos, New Zealand, Thailand, and Vietnam) (table). However, we could not obtain copies of any national preparedness plans for Cambodia, Laos, or Indonesia. We included plans that were published between Jan 1, 2002 and Feb 28, 2006. The six plans were reviewed according to seven themes: planning and coordination; surveillance; public-health interventions; health-system response; maintenance of essential services; communication; and putting plans into action.8,9

Some countries—Thailand, China, and, to a lesser degree, Vietnam—had set out a strategic vision to strengthen future capacity in preparedness planning. Others, including Hong Kong, Australia and New Zealand,
took a strategic approach similar to that of most European plans. These strategic plans focused on management of currently available resources and preparation for the deployment of resources such as stockpiled antiviral agents and vaccines. The polarisation of approaches in the region contrasts with the uniform approach taken by countries in Europe. The plans of Hong Kong, Australia, and New Zealand compared very favourably in terms of completeness and quality with the best European plans. However, as in Europe, all of the plans contained some gaps. The plans of lower-income countries in the region addressed several issues that were largely neglected by most European plans. The potential therefore exists for countries (including those which are still formulating their plans) to draw on the strengths of preparedness plans developed by other countries. The panel summarises some strengths, weaknesses, and gaps in the preparedness plans of these selected Asia–Pacific countries. For brevity, differences between countries and areas of coherence are presented by comparing planned public-health interventions.

**Lessons for future planning**

There were some substantial differences between the strategies described in the Asia–Pacific plans and those in Europe. As any outbreak in an Asia–Pacific country would probably originate in a rural area, all the Asia–Pacific plans focused on this setting, and on early containment strategies. For example, specific situations with cases in animals were included in the planning for human pandemic phases. As a result, the Asia–Pacific countries more closely and explicitly linked their planned responses to human influenza pandemics with those for avian influenza. The Asia–Pacific plans also emphasised the integration of human and animal health more than did the equivalent plans in Europe. The Hong Kong plan was especially strong in its attention to issues that could be important to countries of southeast Asia and that had not been fully addressed elsewhere. These issues included the need for improved exchange of surveillance information between health and animal sectors, the capacity for joint investigation and response, and the education of poultry smallholders and wet-market poultry workers.

Another notable strength of the Asia–Pacific plans was that the countries we selected had incorporated lessons learned from the recent past, including from H5N1 and SARS outbreaks, into their pandemic preparedness plans.11,13 For example, during the SARS outbreak, databases linked to the police system for tracking down criminals were used to coordinate mass-contact tracing. This so-called major incident and disaster support system will, during an influenza pandemic, be used again. A further important difference between the Asia–Pacific countries’ plans and those in Europe was their focus on the early containment of disease, and their coherence in strategies such as social distancing. For example, all countries in the Asia–Pacific region recommended use of travel restrictions or screening measures. Whether this coherence was by design is unclear.

The common reliance on such strategies might also indicate that these countries had few supplies of antiviral drugs and little access to vaccines. Many of the gaps identified in the plans of European countries were more acute in the plans of low-income Asia–Pacific countries. For example, countries had not done sufficient planning to identify priority groups to receive vaccines and antiviral drugs; make logistical arrangements for distribution of scarce resources; develop strategies to maintain essential services; anticipate the probable response of different health systems during emergency situations; or ensure that preparedness plans could be implemented.

**Regional coordination**

Regional institutions can have an important role in encouraging coherent responses to transnational public-health threats. European institutions are coordinating national plans in an attempt to align their approaches. This is proving to be a substantial challenge,19 but one from which other regions might be able to learn. Even in the face of a global pandemic, public health is still governed by the principle of national sovereignty; nation states retain ultimate authority in decision-making, and regional institutions can only offer guidance and support. But guidance and support can be a powerful means of ensuring coherence. By working closely with countries, institutions might be able to plan for and respond effectively to issues that could become politically charged. The new International Health Regulations have been substantially improved by
(Continued from previous page)

Gaps and weaknesses in plans
- Although most identified which organisation would be responsible for achieving a specific response, operational responsibility remained somewhat unclear, especially at the local level.
- All countries organised their responses according to pandemic phases which identify specific alert mechanisms. Because in some plans these phases differ from WHO pandemic phases, confusion could occur during the management of a regional or international crisis.
- Some focused solely on situations involving outbreaks of H5N1 that originated within their borders, and did not discuss measures to address an imported epidemic.
- Several combined short-term and long-term actions. Some needed to create operational plans for pandemic response, to supplement long-term capacity development.
- Most did not detail drug strategies or logistics for provision of antiviral drugs to the population. Most did not identify or enumerate groups within the population who should receive these drugs as a priority. Several described stockpiling of antivirals at a level that would only provide coverage for a very small proportion of the population. They did not clearly specify treatment or use of prophylactics.
- Most had poorly developed policies for vaccination of the population. Some discussed the inadequate vaccine manufacturing capacity in the region, and suggested that access could be very restricted. Several countries (China, Thailand) discussed the possibility of setting up local production. Only a few plans defined priority groups for vaccination.
- Most relied on health care institutions for the treatment of influenza patients (notably special infectious diseases hospitals). Some designated specific facilities as hospitals for infectious diseases. Few developed the possibility of caring for patients at home.
- Many did not make adequate provision for the maintenance of essential services (although this issue might be covered in generic contingency plans).
- Most addressed communication, although some did not plan on a phase-by-phase basis. Strategic communication could prove critical during a pandemic, and needs to be improved in some countries.
- Several did not provide adequate operational procedures for key stakeholders during each phase of the pandemic. The Thai plan in particular retained the format of a strategic framework rather than an operational guide.

The importance of coherence between national approaches has been acknowledged by political commitment from ASEAN, along with other institutions such as WHO, the UN Food and Agriculture Organisation, and the Asian Development Bank. The first East Asia Summit on avian influenza, held on Dec 14, 2005, promoted the “active cooperation and various regional initiatives of ASEAN in responding to the challenges posed by avian influenza, inter-alia, through strengthening institutional linkages, developing partnership with all stakeholders, sharing information and coordinating regional initiatives”.20 Substantial investment has been planned for efforts to combat avian influenza and pandemic human influenza in the region. National governments have committed additional funds, the World Bank has launched a programme of support, the Asian Development Bank has contributed funds, and a January, 2006, conference in Beijing pledged US$1·9 billion.21,22 Concerns have been raised within the region, however, that much of this money would not be new, that many of the funds would be made available as loans rather than as grants, and that tangible benefits to populations in the region would not be certain. The slow pace of disbursement of funding has also been criticised.21

Conclusion

The quality and completeness with which the plans of Hong Kong, Australia, and New Zealand addressed the most important issues of preparedness planning were high. The key institutions in these countries had developed comprehensive guidance manuals to facilitate national responses to outbreaks of influenza. By contrast, the plans of Thailand, China, and (to a lesser extent) Vietnam consisted of development strategies for building the capacity to detect, prepare and respond to disease in the future. Several countries seemed not to have finalised their plans yet.

We suggest that preparedness plans that focus on developmental strategies need to be complemented with operational guides that provide greater detail about implementation of the plans and management of the available resources and existing health-care capacity. A pandemic might not wait until capacity is developed. These operational guides would need to be modified as capacity grows.

Overall, the weaknesses of preparedness plans in the Asia–Pacific region were much the same as those described for Europe. Most plans did not adequately address operational responsibility at the local level; logistical aspects of vaccination and antiviral stockpiling, distribution, and delivery; or the maintenance of essential services. There were wide disparities in the preparedness of affluent nations and lower-income nations. Perhaps with good reason, several low-income and middle-income countries in the region perceived that they would be disadvantaged in the event of a serious global pandemic, despite the likelihood that they would be at its epicentre.
Under current plans, the distribution of scarce resources (notably antiviral drugs and vaccines) would probably be inequitable. Most affluent countries have stockpiled antiviral drugs and, in the event of a pandemic, could also rely on their capacity to produce vaccines or agreements to obtain vaccine rapidly. By contrast, one could argue that lower-income countries in the Asia–Pacific region would find it difficult to access sufficient quantities of these globally scarce resources. These countries also face challenges in dealing with other communicable diseases.

Without a greater international commitment to share scarce stocks of antiviral drugs and vaccines more equitably, countries in the Asia–Pacific region will not be able to access these resources, or to distribute them effectively. Massive logistical challenges would have to be met for any pandemic, which will probably originate in this region, to be contained at an early stage. If this were to prove unattainable, some have warned of a potential risk that poor countries in the region would be reluctant to cooperate with the international community—eg, by providing information to assist with disease surveillance, or isolates of the virus to facilitate vaccine development and production. Countries might choose not to prioritise these tasks if faced with uncertain returns and a range of other pressing demands.

In an interconnected world, investment in preparedness planning should provide benefits that extend beyond influenza pandemic control. However, the global effort to prepare for and control outbreaks of the disease will need to ensure that the countries that will probably be affected early on in any global pandemic receive support. The necessary support would involve reinforcement of the capacity of health systems in these countries. It would also need to extend to allocation of scarce resources in a globally equitable fashion. The next pandemic will test notions of global solidarity. If the pandemic were to occur tomorrow, we would probably be found wanting.

Role of the funding source
This research was undertaken through an unrestricted educational grant from F Hoffmann-La Roche. The sponsor of the study had no role in study design, data collection, data analysis, data interpretation, or writing the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Conflict of interest statement
We declare that we have no conflict of interest. During part of the research process Richard Coker was seconded part-time to the UK Department of Health. His responsibilities did not include planning for pandemic influenza preparedness.

Acknowledgments
We are grateful to experts and representatives of government ministries who offered their insights and provided references to public documents.

References
1. WHO. Asia Pacific strategy for emerging diseases. Geneva: World Health Organization, 2005.
2. Centers for Disease Control and Prevention. Avian influenza: current situation. http://www.cdc.gov/flu/avian/outbreaks/current.htm (accessed March 13, 2006).
3. WHO. 58th world health assembly. Geneva: World Health Organization, 2005.
4. WHO. WHO global influenza preparedness plan, the role of WHO and recommendations for national measures before and during pandemics. WHO/CDS/CSR/GIP/2005.5. Geneva: World Health Organization, 2005.
5. WHO. Checklist for influenza epidemic preparedness. WHO/CDS/CSR/GIP/2005.4. Geneva: World Health Organization, 2005.
6. Department of Health and Ageing, Australia. Australian Management Plan for Pandemic Influenza. Canberra: Department of Health and Ageing, 2005.
7. Ministry of Health, People’s Republic of China. Preparedness and Contingency Plan for Influenza Pandemic (Draft version). http://www.undig.org/documents/7304-Preparedness_.Contingency_Plan_for_Influenza_Pandemic_of_the_Ministry_of_Health_-_PR_China.pdf. (accessed March 13, 2006).
8. Hu X. Speech at the International conference on avian influenza: China perspective. November 7, 2005: http://www.who.int/mediacentre/events/2005/china_perspective.pdf (accessed June 10, 2006).
9. Health, Welfare and Food Bureau, Hong Kong SAR, China. Framework of Government’s preparedness plan for influenza pandemic. Hong Kong: Health, Welfare and Food Bureau, 2005.
10. Health Welfare and Food Bureau, Hong Kong SAR, China. Emergency preparedness for influenza pandemic in Hong Kong. Hong Kong: Health, Welfare and Food Bureau, 2005.
11. Health, Welfare and Food Bureau, Hong Kong SAR, China. Hong Kong’s preparedness for influenza pandemic-prevention and protection. Hong Kong: Health, Welfare and Food Bureau, 2005.
12. Ministry of Health, New Zealand. New Zealand Influenza Pandemic Action Plan, version 14. National Health Emergency Plan: Infectious Diseases, Appendix III. Wellington: Ministry of Health, 2005.
13. Ministry of Health, New Zealand. National health emergency plan: infectious diseases. Wellington: Ministry of Health, 2004. http://www.moh.govt.nz/moh.nzl/238955befbi515b44c25666060ead517c72545e537840cc256ee50004c7b2/OpenDocument (accessed March 13, 2006).
14. Ministry of Public Health, Thailand. Thailand National Strategic Plan for Influenza Pandemic Preparedness, 2005–2007. http://thaiigcd.ddc.moph.go.th/AI_Nationalplan_en_05_07.html. (accessed March 13, 2006).
15. The National Committees on Avian Influenza Control and Influenza Pandemic Preparedness. National Strategic Plan for Avian Influenza Control in Thailand (AD 2005 - 2007). Nonthaburi: Ministry of Public Health, 2005. http://thaiigcd.ddc.moph.go.th/AI_Nationalplan_en_05_07.html (accessed March 13, 2006).
16. Ministry of Health, Socialist Republic of Vietnam. Action plan for human influenza pandemic prevention and containment in Vietnam (Decision 38/2005/QD-BYT). Hanoi: Ministry of Health, 2005.
17. Ministry of Agriculture and Rural Development, Socialist Republic of Vietnam. Vietnam integrated national plan for avian influenza control and human pandemic influenza preparedness and response 2006–2008. Hanoi: Ministry of Health and Ministry of Agriculture and Rural Development, 2006 January.
18. Mounier-Jack S, Coker RJ. How prepared is Europe for pandemic influenza? An analysis of national plans. Lancet 2006; 367: 1045–11.
19. Dow Jones International News Service. EU Fails To Back Anti-Viral Drug Stockpiling For Bird Flu. Dow Jones (Brussels) May 6, 2006.
20. East Asia Summit. Declaration on Avian Influenza Prevention, Control and Response. Kuala Lumpur: Association of South East Asian Nations, 2005.
21. World Bank. Program framework document for proposed loans/credits/grants in the amount of US$500 million equivalent for a Global program for avian influenza control and human pandemic preparedness and response. Report No 34386. Washington: World Bank, 2005.
22. International pledging conference on avian and human pandemic influenza. Beijing Declaration. http://site/resources.worldbank.org/PROJECTS/Resources/40940-11367547813560/beijingdeclaration.pdf. [search=“beijing%20pledging%20conference”] (accessed March 13, 2006).
23. Jack A. UN calls for more funds to tackle bird flu. Financial Times (London), May 20, 2006.
24. Ferguson NM, Cummings DA, Cauchemez S, et al. Strategies for containing an emerging influenza pandemic in Southeast Asia. Nature 2005; 437: 209–14.