Pandemic Preparedness in Asia

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Edited by
Mely Caballero-Anthony

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PANDEMIC PREPAREDNESS IN ASIA

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a. Provide a rigorous professional graduate education with a strong practical emphasis,

b. Conduct policy-relevant research in defence, national security, international relations, international political economy, strategic studies and diplomacy, and

c. Build a global network of like-minded professional schools.

Contents

Preface viii
Mely Caballero-Anthony

Abbreviations and Acronyms x

1 **Introduction – The State of Pandemic Preparedness in Southeast Asia: Challenges and the Way Forward** 1
Mely Caballero-Anthony & Julie Balen

2 **An Overview of Pandemic Preparedness in the Western Pacific Region** 8
Satoko Otsu

3 **What is Pandemic Influenza Preparedness? Definitions, Best Practices and Gaps** 13
Richard Coker

4 **ASEAN Cooperation in Pandemic Preparedness and Response** 20
Bounpheng Philavong

5 **Pandemic Preparedness Operations, Systems and Networks: The Indonesian Case** 27
Purnawan Junadi

6 **Thailand's Pandemic Preparedness: Operations, Systems and Frameworks** 35
Wiput Phoolcharoen

7 **The Philippine Framework for Pandemic Preparedness** 43
Carlo I. Panelo

8 **Vietnam's Framework of Pandemic Preparedness** 49
Do Thanh Hai

9 **Influenza Pandemic Preparedness in Singapore: Public Health Perspectives** 57
Jeffery Cutter

10 **On the Efficacy of Border Controls for Pandemic Surveillance and Containment** 63
Tay Joc Cing & Irene Teo Han Yun

11 ***Malaises Sans Frontiers*: Containing and Controlling Pandemics across Borders** 72
Elina Noor

12 **A Multi-Sectoral Approach to Pandemic Preparedness** 79
Ingo Neu

13 **Pandemic Preparedness in the Financial Sector** 84
Gunawan Husin

14 **Surge Response Capability and Pandemic Preparedness** 91
Huang Yanzhong

15 **Continuity in Crisis: Multi-Sectoral Pandemic Preparedness** 103
Richard Fielding

16 **Roles of Non-Governmental Organizations and Faith-Based Organizations in Pandemic Preparedness in Cambodia** 108
Khim Keovathanak

17 **The Role of Non-Governmental Organizations in Pandemic Preparedness** 113
Jemilah Mahmood

18 The Way Forward: Strategies to Strengthen Regional Pandemic Preparedness **117**
Julie E. Fischer

19 Responsible Virus Sharing and Benefit Sharing: A Balance between Human Kind and the Pandemic Threat **123**
Makarim Wibisono

20 Addressing Pandemic Preparedness in ASEAN: The Ways Forward **128**
Anish Kumar Roy

List of Contributors and Editors **133**

Preface

The threat posed by pandemics to the security and prosperity of the world is real. This has clearly been demonstrated by Asia's own experience with the SARS crisis in 2003, the continuing threat posed by H5N1 and the more recent episode of the novel Influenza A (H1N1) virus. It has been estimated that a full-scale influenza pandemic could cost the global economy over US$800 billion within a year, with approximately two million casualties worldwide from the most conservative estimates. The message is clear: We cannot afford to ignore the emergence of pandemics, and must endeavour to contain them before they inflict tremendous damage on the welfare of states and societies across the globe. In this regard, pandemic preparedness has become an important agenda for states in Asia, highlighting the urgent need for heightened vigilance and comprehensive strategies for disease containment and mitigation.

Progress in addressing this issue has been gradual. The World Health Organization (WHO) is coordinating with many countries to ensure the consistency and effectiveness of their national pandemic plans. Some kind of a surveillance system has been put in place, which allows countries to report cases to WHO. Stockpiling of antivirals has also been established, with Singapore as the regional hub for Southeast Asia. Yet much work remains to be done. Operationalizing National Pandemic Preparedness Plans at the local level remains a challenge for all governments in the region. Different standards and models of intervention remain, and coordination between different countries needs to be further improved.

With this concern in mind, the RSIS Centre for Non-Traditional Security (NTS) Studies convened a conference on Pandemic Preparedness in Asia in January 2009. The objective of the conference was to map out the state of pandemic preparedness in the region by critically examining various framings of pandemic preparedness

by Asian countries, identifying the gaps in planning and determining indicators of comprehensive pandemic preparedness frameworks. The conference also examined the roles of different societal actors, as well as the prospects of enhancing regional cooperation in public health emergencies. The conference is an integral part of the RSIS broader project on understanding and assessing the capacity of states and societies in Asia to manage transnational threats, particularly the threats of infectious diseases, and to contribute to the development of crises-management mechanisms in the region. This monograph therefore brings together selected papers presented at the conference.

I wish to acknowledge the contributions of the following people, without whom this monograph would not have been possible. First, my thanks to the authors for their contributions and valuable insights shared during the conference. Second, to the research team at the RSIS Centre for NTS Studies, in particular Julie Balen, Belinda Chng, Roderick Chia and Jaspal Singh for their tireless effort in preparing this monograph. Third, to our colleagues at RSIS who provided support and administrative assistance in organizing the conference. The support given by Mr. Barry Desker, Dean of RSIS, to the work of the Centre is also acknowledged with appreciation.

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NTU

Abbreviations and Acronyms

AADMER	ASEAN Agreement on Disaster Management and Emergency Response
ADB	Asian Development Bank
AED	Academy for Educational Development
AEGCD	ASEAN Expert Group on Communicable Diseases
AI	Avian Influenza
APSED	Asia-Pacific Strategy for Emerging Diseases
ASEAN	Association of Southeast Asian Nations
ASWGL	ASEAN Sectoral Working Group on Livestock
ATWGPPR	ASEAN Technical Working Group on Pandemic Preparedness and Response
AusAID	Australian Agency for International Development
BCM	Business Continuity Management
DDPM	Department of Disaster Prevention and Mitigation
DNA	deoxyribonucleic acid
DOH	Department of Health
DORS	Disease Outbreak Response System
EID	Emerging Infectious Disease
FAO	Food and Agriculture Organization
FBO	faith-based organization
FMD	foot-and-mouth disease
GIP	Global Influenza Pandemic Preparedness Plan
GOARN	Global Outbreak Alert and Response Network
H1N1	Influenza A virus sub-type H1N1
H2P	Humanitarian Pandemic Preparedness
H5N1	Influenza A virus sub-type H5N1
H7N7	Influenza A virus sub-type H7N7
HHS	Human and Health Services
HPAI	Highly Pathogenic Avian Influenza

ICS	Incident Command System
ICU	intensive care unit
IEC	Information, Education Communication
IGM	inter-governmental meeting
IHR	international health regulations
INP (2006–08)	Integrated National Plan for Avian Influenza Control and Human Pandemic Influenza Preparedness and Response
IP	inter-pandemic period
IWE	industry-wide exercise
JAIF	Japan-ASEAN Integration Fund
MARD	Ministry of Agriculture and Rural Development
MBDS	Mekong Basin Disease Surveillance
MEDiCAM	Cambodian umbrella organization of medical and health-related NGOs
MOH	Ministry of Health
NAITF	National Avian Influenza Task Force
NGO	non-governmental organization
NPA	National Plan of Action on Human Influenza Pandemic Prevention and Control in Vietnam
NSCAHI	National Steering Committee for Avian and Human Influenza
NSCAI	National Steering Committee on Avian Influenza Control and Prevention
NTS	Non-Traditional Security
NTS-Asia	Consortium of Non-Traditional Security Studies in Asia
NTU	Nanyang Technological University
OIE	World Organization for Animal Health (or Office International des Epizooties)
OPI	Integrated National Operational Programme for Avian and Human Influenza 2006–2010
P	pandemic period
PA	pandemic alert period
PPE	personal protective equipment
R2P	Responsibility to Protect
RNA	ribonucleic acid

Rp	Indonesian rupiah
RSIS	S. Rajaratnam School of International Studies
SARS	Severe Acute Respiratory Syndrome
SOMHD	Senior Officials Meeting on Health Development
SOP	standard operating procedure
SRC	surge response capability
TB	tuberculosis
UN	United Nations
UNDP	United National Development Programme
UNICEF	United Nations Children's Fund
UNSIC	United Nations System Influenza Coordination
U.K.	United Kingdom of Great Britain and Northern Ireland
U.S.	United States of America
USAID	United States Agency for International Development
USPHS	United States Public Health Service
WB	World Bank
WFP	World Food Programme
WHO	World Health Organization
WHO-WPRO	WHO Western Pacific Regional Office

1 Introduction – The State of Pandemic Preparedness in Southeast Asia
Challenges and the Way Forward

Mely Caballero-Anthony & Julie Balen

It is without doubt that the threat from infectious pathogens is greater today than ever. The outbreak or even resurgence of infectious diseases has shown how these types of diseases could in fact undermine a state's control of what happens within its territory and could in turn threaten regional stability. Yet, it is unclear whether growing recognition of the severity of the threat of infectious diseases has led to adequate policy responses and definitive action by states, particularly in the Asian region. The lack of clarity and uncertainty has raised serious concerns about the capacity of the international community to respond to the possibility of an epidemic of global proportions.

In this regard, it has become all the more urgent to assess the capacity of states in the region to prevent the spread of virulent viruses. Such assessment highlights the necessity of mapping out countries' respective public health capacities to effectively respond to public health emergencies. Among the issues that need to be examined are, first, the capacity of countries in Asia to deal with pandemics and, second, the kind of challenges faced by states in the prevention and management of infectious diseases.

The findings from the conference on Pandemic Preparedness in Asia indicate that so far, pandemic preparedness in most, if not all, countries and regions remain incomplete. The need to act upon this statement is made more urgent by the fact that the precise timing, location and overall impact of a future pandemic remains speculative at best, and by the increasing complacency and setting in of so-called flu-fatigue around the world.

The discussion below presents the summary of the deliberations and findings of the conference. It also suggests some ways forward to build capacity in pandemic preparedness and enhance regional cooperation in managing threats to health and human security.

What has been Done?

Multi-level preparedness

Based on the selected[1] country case studies in this monograph, it can be noted that there is a shared recognition of the threat of a potential influenza pandemic, and the government of each country has shown political will and support towards planning for a pandemic. To a certain extent, each country has followed the general guidelines set out by the World Health Organization (WHO), proposing measures for early containment on the basis that an original outbreak within their country is a likely scenario. This is true also for the Philippines, which has, thus far, remained "bird-flu free". Within each country, specific targets such as strengthening influenza surveillance systems have been set and work is currently being conducted to ensure that these targets are met in a timely fashion.

The Philippine approach includes a system that is heavily reliant on community-based responses, via a reporting chain structure, of which the highest echelon is the National Avian Influenza Task Force while the lowest are local community members, for example poultry owners. Similarly, Thailand has developed a sustainable and integrated management system termed an "incident command system" at various levels of government, the aim of which is to empower provincial and local authorities and to include civil society as the primary force for early warning and monitoring.

Partnerships at global, regional and local levels

With such emphasis placed on local communities, all the five country studies addressed the importance of working hand-in-hand with civil society actors, who maintain a strong presence at the grassroots level, to improve education and awareness among the population. In Thailand for example, public relations and educational materials have already been developed. The involvement of civil society organizations and inclusion of local inputs was seen as vital, and in this respect Indonesia and Thailand have made substantial steps. Indonesia, for example, has a strong campaign from the faith-based organization (FBO) Muhammadiyah in raising awareness with regards to improved hygiene practices. In Thailand, non-governmental organizations (NGOs) and the Thai Red Cross Society are working towards empowering and training the community. Mercy Malaysia has conducted simulation exercises in partnership with the Malaysian government, the World Food Programme and the National Security Council. The exercises simulated logistics situations involving quarantines and airport, port and ground security and transport. These are examples of government-to-government partnerships under the Association of Southeast Asian Nations (ASEAN) framework at the regional level, and also government partnerships with WHO at the global scale, showing horizontal, top-down and bottom-up vertical approaches, respectively.

Pandemic interventions

Furthermore, there were wide-ranging discussions regarding the use of various social distancing measures, including stay-at-home periods and internal and/or international travel restrictions, although the actual effectiveness of these was questioned. Ethical principles that govern access to scarce resources were also a point of discussion, and while Indonesia imported and stockpiled seven million doses of Tamiflu in 2006, they have now all expired. Thailand has also tried to build up essential medical supplies and equipment, while Singapore has included the private healthcare sector in the preparation and implementation phases.

Improvement of surveillance and laboratory capacity

While the case studies recognized the need for strengthening surveillance and reinforcing laboratory capacity in the region, Indonesia, Thailand and particularly Singapore made significant steps towards combining short-term and long-term actions. One such example from Indonesia is the development of the Integrated Epidemiological Surveillance Managing Virus System to control outbreaks in animals through means of bio-security, vaccination, compensation for culling of birds and long-term capacity building of health services.

Attempts at multi-sectoral planning

The Indonesian case has shown efforts by the government to adopt a multi-sectoral approach to pandemic preparedness by bringing together a committee with members from 17 ministries, the National Planning Agency, and the army and police forces. Thailand has clearly prioritized pandemic influenza, together with the management of other types of disasters such as floods, landslides and dangerous chemicals, by developing a sustainable and integrated system. These are notable attempts at broadening the scope of pandemic preparedness by including multi-sectoral approaches. This requires the involvement of major stakeholders from the health, agriculture, business and civil society sectors, as well as substantial collaboration, communication and cooperation between the various actors in order to make it truly multi-sectoral, multi-disciplinary and holistic. In sharp contrast, Vietnam's strategy has focused more on preventive measures such as surveillance, improved hygiene, dissemination of information, vaccination, border quarantine and early containment, rather than on holistic preparedness. It boasts a two-pronged strategy with speed, transparency and high-level government commitment.

Simulation exercises and legal frameworks

In addition to adopting these vital strategies, Indonesia, Malaysia and Singapore have also held preparedness simulation exercises in order to test out their plans. This is important since collective behaviour may not be very rational during a

crisis, and simulation exercises may help to evaluate and improve current plans. Similarly, the Philippines has drafted legal mandates which are open to being challenged and room for improvement as new evidence arises.

Indeed, achievements have been substantial and there has been a dramatic shift in attitudes towards pandemic preparedness in the region as a whole. However, when one takes a closer and more analytical look, it becomes clear that the extent to which this applies at national, sub-national or local levels varies somewhat, and that there are still many challenges on the road ahead.

Common Challenges

Variations in approaches to economic development and in the governing styles and structures of each country have resulted in several core distinctions among ASEAN member states. Furthermore, systemic challenges include a profound lack of economic, technical and human resources and inequitable allocations of such resources, as well as a lack of relevant grassroots-level demographic and health data. In fact, perhaps it is for these reasons that several plans did not provide adequate operational procedures for key stakeholders during each phase of the pandemic, resulting in a lack of clarity and coherence.

The Thai plan, for example, retained the format of a strategic framework rather than an operational guide, and although the organizations responsible for achieving a specific goal were identified, precise operational tasks remained somewhat unclear and unaccountable, especially at the local level. Vietnam has recently experienced numerous shifts in pandemic preparedness approaches, perhaps destabilizing the system somewhat. The current framework is reactionary rather than future-oriented, partly because pandemics are seen to be of socio-economic and medical concern, but not a matter of national security.

Wide geographical area and decentralized authority

Indonesia is challenged both by its vast geographical disconnectedness and its decentralized geo-political organization. There are a total of 440 districts with elected local governments, hence causing major challenges for administration, coordination and continuity of health care provision in crises. While the human population is approximately 220 million, it is unclear what the vast poultry population amounts to, particularly within the more at-risk poultry sectors 3 and 4, or the small-scale farms and backyard farms, respectively. Of the 33 provinces, 23 have endemic Avian Influenza (AI) in poultry while 13 have had outbreaks within the human population. In the Philippines, 50 per cent of poultry comes from backyard raisers and problems arise amidst fragmented financing and compensation. In Cambodia, there are accessibility barriers in reaching remote

villages and little incentive for residents to report disease outbreak because of travel costs and lack of compensation for culled animals.

Stockpiling and accessibility to vaccines
Since stockpiling of antivirals at a level currently feasible will only provide coverage for a very small proportion of the population, tough questions remain about logistics for provision of antiviral drugs and which groups within the population should or would receive these drugs as a priority. There is an inadequate vaccine manufacturing capacity in the region and the representative from Thailand discussed the possibility of setting up local production, although it is estimated that developing an antigenically matching vaccine could take six months or longer. Only a few plans defined priority groups for vaccination, such as health practitioners, the army and so on. On this matter, Indonesia raised the important issue of more equitable sharing of virus samples and open information.

Lack of interconnectedness and cross-border collaboration
Integrating pandemic preparedness and response into general emergency preparedness is also important, and the focus of all but Singapore was on situations involving outbreaks of H5N1 that originated within their borders, without thoroughly discussing measures to address an imported epidemic. This should include the possibility of AI being carried across borders by illegal migration of birds and/or humans. Lastly, there is still a lack of interconnectedness and cross-border collaboration within the region even with the international frameworks currently in place.

Larger threat of emerging infectious diseases (EIDs)
Faced with these challenges, it is sobering to hear about the fact that more than 300 new diseases have emerged in the past 70 years, the majority of which are the result of jumps from wild animals to humans. Experts claim that outbreaks will increase as humans come into ever closer contact with wildlife, and disease multipliers such as environmental degradation and climate change alter the life cycles of disease vectors. Meanwhile, older diseases are rapidly criss-crossing the planet as humans travel to more exotic and distant corners of the world.

Conclusion

Pandemic preparedness activities take place within the context of national priorities, competing activities and limited resources. Joint approaches that foster closer multi-lateral cooperation and promote cross-sectoral participation of the government, policy, academic and civil society communities will generate a more

comprehensive, efficient and cost-effective strategy to prevent future crisis situations. Addressing additional common regional challenges and finding optimized solutions will help tackle not only the symptoms, but also the underlying causes of pandemics. This should include increasing the focus on farming practices, environmental conservation, long-held lifestyle traditions, public misconceptions, media misrepresentations, poverty-line economics and novel compensation funds such as supplementary farm insurance. Plans and procedures must also be reassessed and updated as new technologies and increased information become available, and as the endemic status of infections alters.

In summary, ASEAN countries, predisposed to outbreaks due to social, economic, demographic, environmental and behavioural determinants, and because of their close geographical location to each other, have great incentives to work together to improve individual and combined strategies for preparedness. There may be a need to evaluate and streamline the regional framework to harmonize current approaches, although keeping in mind variations in local settings. For instance, the Mekong Basin Disease Surveillance (MBDS) system may have to be plugged into the ASEAN and the Global Outbreak Alert and Response Network (GOARN) surveillance frameworks since people move frequently across borders. Although there seems to be no "one-size-fits-all" solution, national responses must be plugged into existing regional frameworks, which in turn represent international guidelines and protocols. There is currently a rising window of opportunity within pandemic preparedness activities that must be seized, in order to strengthen essential response capacities required for a growing number of public health emergencies.

The region will benefit from working towards a broader framework that does not just focus on pandemic preparedness, but on an EID framework or a disaster management framework. By doing so, all nations involved will be building up capacity for multi-sectoral preparedness not limited to pandemics, but extending to mitigate threats of other EIDs, natural disasters and other emergencies. This will optimize limited resources, which is very relevant for ASEAN and Asia on the whole, considering the frequency of earthquakes, floods, cyclones, landslides and other similar events.

While effectiveness remains the key, all five countries emphasized the role of ethical and sustainable preparedness and response, and must now strive to include equity, efficiency, solidarity and liberty in all policies. Although the economic cost of these commitments should not be under-estimated, failure to do so may result in much greater social costs including the breakdown of health security for rich and poor alike.

In conclusion, one must bear in mind that in any urgent or emergent public health situation, conflicting individual and population interests must be bal-

anced. To assess and balance these competing interests and values, policymakers can draw on sound ethical principles. Such an ethical approach does not provide a prescribed set of policies; instead it applies principles such as equity, utility, efficiency, liberty, reciprocity and solidarity, in light of local contexts and cultural values. Policymakers can use these principles as a framework to assess and balance a range of interests and to ensure that overarching concerns, such as protecting human rights, are addressed. Any measures that limit individual rights and civil liberties must be shown to be necessary, reasonable, proportional, equitable, non-discriminatory and in full compliance with national and international laws.

Note

1. The five country case studies are: Indonesia, Thailand, the Philippines, Singapore and Vietnam.

2 An Overview of Pandemic Preparedness in the Western Pacific Region

Satoko Otsu

The H5N1 virus has spread throughout Asia and many other parts of the world. To date, more than 60 countries worldwide have reported H5N1 infections in domestic or wild birds. In 2007, eight countries and areas in the WHO Western Pacific Region reported H5N1 infections in domestic or wild birds: Cambodia, the People's Republic of China, Hong Kong (China), Japan, the Republic of Korea, the Lao People's Democratic Republic, Malaysia and Vietnam. In 2008, six countries and areas in the region reported H5N1 infections in domestic or wild birds: the People's Republic of China, Hong Kong (China), Japan, the Republic of Korea, the Lao People's Democratic Republic and Vietnam. The virus is therefore considered to be entrenched in many countries in the Western Pacific Region.

An Overview of the Current Avian Influenza Situation and Pandemic Influenza

To date, numerous countries worldwide have encountered sporadic H5N1 infections in humans. Between 2003 and November 2008, there were 387 human cases of AI, with a total of 245 deaths. Approximately 80 per cent of these cases occurred in the Western Pacific Region and the WHO Southeast Asia Region.

A human influenza virus pandemic could emerge as a result of a mutation, or re-assortment, of an influenza virus. The H5N1 virus is continuously mutating and a number of genetic variations (clades) have been isolated in different parts of the world.

The more frequently AI outbreaks occur in animal or avian populations, the more likely it is that a human influenza virus will emerge. In comparison with other WHO regions, the Western Pacific Region and the Southeast Asia Region, including a number of parts of Asia, have the highest poultry population.

Therefore, the possibility of an influenza pandemic originating in southern Asia appears to be high.

In order to be considered as a pandemic strain, an influenza virus must meet the following three criteria:

- It is a new subtype in humans.
- It causes severe diseases, due to little or no immunity existing in the human population.
- It can be easily transmitted from humans to humans.

At present, the H5N1 virus has met two of the above criteria, missing only the third criterion because it has not demonstrated efficient person-to-person transmission. If this does occur however, H5N1 will very likely become a pandemic.

The threat of pandemic influenza still remains high. While it is not possible to predict when the next pandemic will occur, historical records have shown that pandemic influenza occurs periodically. Prior to 2009, the most recent influenza pandemic occurred in 1968, and given the current situation, the emergence of the next pandemic virus may be imminent. Indeed, the world is currently faced with a novel, but mild, form of influenza A (H1N1), which has recently been deemed a pandemic.

Because evidence of efficient human-to-human transmission of the H5N1 virus has not been observed, we still have the opportunity—and indeed the urgency, as shown by the H1N1 outbreak—to fundamentally strengthen the national and international public health care systems to prepare for the next pandemic.

Ongoing Pandemic Preparation Measures

All United Nations (UN) member states have already developed national influenza pandemic preparedness plans and most of these have been approved by their governments. More than 10 countries in the Western Pacific Region have conducted pandemic preparedness exercises since 2007.

Pandemic preparedness is an ongoing process that requires continuous improvement. Plan development is not the only goal; the plans need to be validated and countries need to prepare for the planned actions. To support pandemic preparedness, the WHO Western Pacific Regional Office (WHO-WPRO) has developed three pandemic preparedness frameworks for all countries: stage-wise intervention, multi-sectoral approach and two-tiered approach.

- **Stage-wise intervention**
  There are three stages in a pandemic intervention. These are averting an outbreak, rapid containment and pandemic response. These stages are

linked to the alert phases described in the WHO Global Influenza Preparedness Plan.

- **Multi-sectoral approach**
  In addition to medical and non-medical interventions that constitute public health measures, social services are vital to keep a society functioning during a pandemic. Preparedness, therefore, requires a multi-sectoral approach, and particularly at the local government level. Strengthening the capacities of local governments is therefore essential, as they will be at the forefront in managing the consequences of the pandemic.

- **Two-tiered approach**
  In this approach, the first tier is developing a plan, which includes "response components" (what to do), while the second tier, increasing readiness, is "preparedness for the components" (what to prepare) to execute the plan. All countries have a national pandemic preparedness plan, although the scopes of the plans differ. Some plans include conceptual issues while others are a combination of response and preparedness components. Furthermore, while a national pandemic preparedness plan may exist, it does not necessarily ensure that the plan can be implemented. Therefore, in order to support preparedness for proper execution of plans, the WHO Western Pacific Regional Office developed such a two-tiered approach.

Challenges in the Western Pacific Region

While pandemic preparedness varies from country to country, the impact of a pandemic will also differ due to variations in social infrastructure and socio-cultural aspects of each country. In developing countries in particular, strengthening the core capacity to respond to emerging diseases is therefore essential.

Pandemic preparedness requires the capacity to conduct "routine activities" to respond to emerging diseases. The Asia-Pacific Strategy for Emerging Diseases (APSED) is a road map for countries of the Asia-Pacific region "to strengthen core capacities required for effective preparedness planning, prevention, prompt detection, characterization, containment and control of emerging infectious diseases". Priority activities under the APSED workplan for averting AI and other influenza pandemics need to be urgently implemented for appropriate pandemic preparedness.

In June 2008, eight developing and seven developed countries in the region completed a survey, in which they rated themselves on a four-point scale survey tool to ascertain their readiness to carry out essential public health activities for pandemic preparedness. The ratings were applied to three main stages of

intervention: averting AI, rapid containment and pandemic response across each of the five APSED areas of activity. Although the results showed progress from an initial baseline assessment, the survey highlighted the need for improvement in the following areas:

- **Surveillance and response**
  It is important to strengthen the ability of member states to detect and respond to suspected AI cases by formalizing their surveillance and response systems, training response teams and increasing coordination with local governments.
- **Zoonoses**
  Seek to improve intersectoral collaboration, information sharing, risk assessment and coordinated responses during the stage of averting AI.
- **Laboratory**
  Increased training is needed for the collection, transport, storage and handling of specimens and further strengthening of communication between laboratories and outbreak response teams.
- **Infection control**
  Ensure the provision and availability of supplies, safe hospital environments and standard infection control training for staff at all three intervention stages.
- **Risk communication**
  Member states should strengthen capabilities for risk communication during the rapid containment stage, and develop protocols for multi-agency collaboration during both the rapid containment and the pandemic response stages.

Global WHO Information Sharing System

Under the International Health Regulations (IHR) 2005, once a new subtype of human influenza occurs in a country, the member state should notify WHO. WHO and the member state will consult to verify and assess the event and share the information through a secured WHO website, to which all IHR national focal points have access. Another official information sharing system provided by WHO is the Disease Outbreak News, available at www.who.int/csr/don/en/. The website provides general infectious disease information. In addition, WHO is developing an influenza information sharing website.

Based on the experience of Severe Acute Respiratory Syndrome (SARS) and on pandemic simulation exercises, there is a necessity for an "information

hub" to act as an unofficial information sharing system. This "hub" will be set up once a pandemic occurs and information sharing is necessary. WHO could assume the role of coordinating the sharing of essential information during the pandemic period.

Recommendations for the Next Steps in Pandemic Preparedness

1. Member states should continue to build core capacities to respond to infectious diseases through APSED, including early warning and response systems.
2. Member states should further develop and test rapid containment plans required to stop or slow down the initial emergence of an influenza virus with pandemic potential.
3. Member states need to ensure pandemic plans are operational, with clear roles and responsibilities identified so that all those involved in preparedness and response are clear about which stakeholders will be doing what and when.
4. All pandemic plans should be validated by implementation exercises, after which the plans will need to be revised as opportunities for improvement are identified, particularly as resources and personnel change.

3 What is Pandemic Influenza Preparedness?
Definitions, Best Practices and Gaps

Richard Coker

The notion of "preparedness" is ill-defined. In reality, only when an influenza pandemic emerges and spreads globally will we, in retrospect, be able to say whether or not we were prepared. And even then, we will only be able to surmise what impact our interventions had in mitigating the consequences of the pandemic. Our preparations should, of course, be coherent with our strategic goal—be they global, national, local or even individual. Strategic goals differ or, in the case of national strategic plans, often remain unclear. For example, most national strategic plans, in our analyses across Europe, Latin America, Africa and selected countries in the Asia-Pacific region, have relatively opaque strategic goals. Broadly, they imply a number of goals including minimizing the public health consequences of a pandemic, ensuring limited economic consequences, and maintaining social stability. These may be co-terminus, that is, all may be achieved through an over-arching strategic and operational national plan. However, they are not necessarily so. Maximizing public health benefits may come at an economic cost. For example, social distancing, while potentially beneficial to public health, may produce economic burdens or impact deleteriously on social stability.

What do We Mean by "Preparedness"?

While national strategic goals in terms of public health, economic and social security may remain ill-defined on some occasions, so too do goals within these themes. For example, if states are to focus their resources most efficiently, should they focus them on prevention, containment, mitigation or recovery? What balance should be struck? And how should political decisions be informed by evidence? Many resource-poor countries, most notably in Africa, have to date been focusing their efforts (with the support of external donors) on the con-

trol of AI and enhancing surveillance capacity, in line with the mandate of the new IHR. Strategic planning to support containment and mitigation of human influenza pandemics has received considerably less attention. This is perhaps to be expected for at least five reasons.

First, resource-poor countries often have so few human health system resources that there are huge challenges facing effective rapid containment of early clusters in humans. Logistical issues, for instance, are substantial. Effective mitigation, as opposed to containment, represents an even greater, and potentially insurmountable, challenge.

Second, regarding early containment, many experts believe that, despite outbreaks of H5N1 amongst poultry in several continents, the emergence of the next pandemic is likely to be from Southeast Asia and perhaps southern China. This is because of the history of emerging infectious diseases (e.g. SARS) from these regions, the density of poultry, the close proximity of animals to humans, and the substantial circulating pool of pathogens there. Thus, it might make sense for resource-poor countries in Africa to channel resources away from rapid containment because, if the risk assessments are correct, these countries are quite unlikely to be the epicentre of the next pandemic. Efforts directed towards national rapid containment when a global pandemic has emerged elsewhere are fruitless.

Third, the economic consequences of a pandemic will likely affect economies differently, be they highly developed, sophisticated economies with large service sectors or less developed economies dependent on subsistence farming. For example, Hong Kong, with its large service sector, high dependence on international trade, and overwhelming dependence on functioning essential services is likely to suffer economically, both in total cost and by proportion of gross domestic product compared with, say, the People's Democratic Republic of Laos. A similar comparison might be made between Singapore and Sudan.

Fourth, many developing countries have pressing public health problems which are a current reality, and not a future probable challenge of uncertain magnitude. Policy-makers naturally need to attend to contemporary public health challenges and these should, and do, take precedence over future problems. That said, many countries are acknowledging the benefits that can accrue from strengthening preparedness planning, through gains in public health capacity that extend beyond pandemic influenza to surveillance strengthening and building generic public health crises preparedness.

Fifth, a more contentious issue is a perception that some developing countries will be "left out in the cold" when a pandemic emerges. This notion challenges concepts of global solidarity. If the most developed countries are those that will benefit from costly scarce resources preferentiality because of their

purchasing power, where will that leave poorer countries? If the pandemic is viewed through a "global justice as fairness" prism, surely resources for mitigation should be allocated more equitably? The ongoing debate that is surrounding virus sharing and Indonesia's stance capture much of this tension. In the event of a pandemic whose epicentre is Indonesia, will Indonesia's population be able to gain access to vaccines? Or will rich nations have preferential access to vaccines? With the world's population standing at more than six billion, this far outstrips global vaccine production capacity. The equitable and "fair" distribution of scarce resources remains a major challenge. Currently, while the new IHR is helping to ensure an increase in global surveillance capacity (that is, risk assessment capacity), notions of risk management remain firmly bound by concepts of national sovereignty. While much of the global community will argue that sharing virus samples is a critical component of risk assessment, those who support Indonesia's stance will argue that it is also a critical component of developing and operationalizing an effective risk management strategy. Most developing countries will be unable to have access to the resources that developed countries are now investing in, based on the belief that they offer the greatest protection from a pandemic. Why then, as some might question, should developing countries invest in building surveillance capacity for global pandemics when this simply functions as an early warning system for developed countries but offers only limited public health benefits for developing countries' populations?

How do We Know if We are Prepared?

Despite efforts to support preparedness, there remains no universally accepted, organized method to evaluate preparedness, and concerns have been raised that many national strategic plans may not be realistically implementable. A number of approaches have been attempted to evaluate preparedness, including assessments of national strategic plans, desktop simulations, full scale "wet runs", case studies with site visits to assess health systems, and mathematical modelling exercises. All have their strengths and weaknesses.

I will argue that at least three critically important issues need to be addressed before the question "Are we prepared?" can be answered in the affirmative.

The first concerns which interventions are effective from a public health perspective. Much uncertainty surrounds proposed interventions including hygiene, social distancing, personal protective equipment, anti-viral drugs and vaccines. For example, although the anti-viral Oseltamivir is clinically effective in human cases of H5N1 (and because of this many countries have invested substantially in stockpiling it), there is uncertainty regarding the development

of resistance, should a pandemic emerge. There are also profound operational logistical questions over whether the drug can be delivered to target populations within 24 to 48 hours of symptoms developing. For vaccines, because of the six-month delay between the emergence of a pandemic and strain specific vaccine production, questions have been raised over the likely benefits for pre-pandemic vaccine development versus pandemic strain vaccine development. For pre-pandemic vaccines, questions of who, what, when, where and how exist, and are to date largely unanswered.

The concept of social distancing has received considerable attention, but the evidence in support of this measure remains unclear. While many mathematical modelling exercises now advocate social distancing, the assumptions of benefit that they are based on remain just that—assumptions. Historical evidence of benefits remains unclear. Some question, for example, whether the apparent reduced impact of the 1918 pandemic on St. Louis, in contrast to Philadelphia, was less related to effective social distancing measures than to the greater immunological competence of the St. Louis population. While social distancing may indeed shift and flatten the epidemiological curve to the left (meaning that delays in transmission occur and daily incident cases may be reduced), the area under the curve (that is, the total number of deaths) may not be substantial. Thus, the overall public health benefits may be limited. Importantly, however, a delay and reduction in incidence may offer benefits by reducing the economic impact, reducing panic, and allow health services to function better.

A second critical issue is the capacity to respond. Most assessments of preparedness, although linked to national strategic and operational plans, lack assessments of capacity to respond—that is, determinations of the resources available on site and the potential to mobilize these resources. Without determinations of capacity to respond, the feasibility of effectively and efficiently implementing plans in a time of crisis remains highly uncertain. Several influenza scenarios in Thailand have shown that, with very modest pandemic scenarios, substantial health system resource gaps are likely. These estimated resource gaps include those found in infrastructure, personnel and materials, and limited capacity in surveillance, case investigation, case treatment, and capacity to prevent spread of disease in the community. Thus, while simulation exercises have been performed across all 76 provinces, they may give a false sense of security because the exercises fail to draw upon the reality of limited resources.

A third critical issue that is often ill-addressed is the concept that the challenge posed by pandemic influenza is a challenge that goes far beyond health systems to include all sectors of society. While the UN, through the office of the UN System Influenza Coordination (UNSIC), has promoted this issue and advocated for wider societal engagement, most countries have yet to plan for

this. In Europe for example, the corporate sector is offered advice in only about one-third of national strategies. The current global financial crisis illustrates how inter-connected the world is. In the just-in-time economy under which much of the world functions, constraints to any number of non-health sectors can impact rapidly and profoundly on all levels of society with major economic, social and public health consequences. Michael Osterholm has illustrated this idea by suggesting that, rather than considering the nineteenth century John Snow or Edwin Chadwick to be the most important public health figures of that era, we should instead think of Thomas Edison. Without electricity, almost all public health functions will fail. And a severe influenza pandemic will test our electricity supplies in ways we can only imagine.

Is the Asia-Pacific Region "Prepared"?

Our 2006 analysis of national strategic plans of selected countries in the region suggested a polarization of preparedness, with the most developed countries exposed to SARS being better prepared than developing countries not exposed to the virus. However, much has happened since then as the latter region has devoted considerable effort and resources to pandemic preparedness. National strategic plans have been developed further, with simulation exercises, including numerous table-top exercises at regional and district levels, and a full-scale simulation in Bali. Efforts have been expended on containment and mitigation and, in contrast to the European Union, ASEAN member countries have organized a stockpile of antiviral agents and personal protective equipment in Singapore—illustrating a substantial regional consensus to prepare for rapid containment that in addition addresses notions of regional solidarity.

In their evaluation of preparedness, WHO-WPRO assessed countries on three stages: averting AI in humans, rapid containment and pandemic response. Most questions focused on the first stage. Overall, among developing countries in which laboratory capacity was relatively well-developed, surveillance and response, risk communication, infection control, and zoonotic control all required attention. Developed countries were unsurprisingly better prepared. These results illustrate something of the diversity of the region in terms of the capacity of health systems, political will and resources where cases of H5N1 in poultry continue to occur as do, less frequently, human cases.

Given the importance of the region, Southeast Asia has received considerable external pledges of financial support. That said, pledges have declined over the past year and the funding gap determined by UNSIC and the World Bank (WB) has grown.

The region has shown itself exceptional in one area, which is in cooperation

through the MBDS network in the Mekong Basin. This informal network has shown to be highly functional in terms of cross-border cooperation in surveillance and risk management, although no formal policies exist. UNSIC and others have advocated this network as a formula that others might draw upon.

What Challenges do We Face in Being Prepared?

Many challenges remain in preparing for the next global pandemic. These include, in brief:

- **Fatigue**
  The issue of pandemic influenza had previously, over the past two years, slipped down the policy agenda of national and multinational institutions; pandemic influenza policy fatigue had set in. Although the threat has not receded and the consequences are no different from those once predicted, new crises, both real and imagined, have risen up the agenda. Not least of these is the global financial crisis, which is likely to result in less funding being pledged to work on addressing pandemic influenza.
- **Strategic focus, global and national**
  As noted above, most national governments have ill-defined strategic goals. This is probably not an omission through neglect but a purposeful political decision. That said, without a clear strategic focus—ideally underpinned by clear ethical justification—the allocation of scarce resources becomes problematic. Such decisions should not be left to a time of crisis, but planned ahead of an emergent pandemic. At a global level, while notions of risk assessment through the response to the IHR have been strengthened, risk management remains bound by national sovereignty. Thus a tension exists which challenges global responses to global public health challenges.
- **Capacity and operationalization allied to strategies**
  While many national strategic plans have been written, and most tested in some form through simulation exercises, few have drawn upon the reality of resource and governance constraints.
- **Policy coherence**
  Even though most countries now have national strategic plans, these plans are often not coherent with their neighbours'. Although examples of good cooperation in reality have developed in Southeast Asia, these have yet to be embedded in formal policy statements. This is true of much of the world. Thus in the heat of a crisis, these informal arrangements are likely to come under pressure.

- **Upstream challenges**
  Perhaps absent from much debate on pandemic influenza preparedness is the greatest challenge we face, that of our relationship with food, animals and trade. Our increasing exposure to zoonoses is one of the prices we pay.
- **Downstream challenges**
  Acute challenges to health systems include operationalizing plans and developing a stronger evidence base for interventions. Recognizing and planning for the multi-sectoral nature of a pandemic is also a challenge.

4 ASEAN Cooperation in Pandemic Preparedness and Response

Bounpheng Philavong

The SARS outbreak in 2003 and the more recent episode of Highly Pathogenic Avian Influenza (HPAI), caused by the H5N1 virus, had a detrimental impact on the socio-economic development of several ASEAN member states. The diseases resulted in tremendous losses to the regional poultry industry and posed a serious threat to public health, livestock production, trade, tourism, and socio-economic development in the region. They also created a fear of a potential pandemic caused by the emergence of novel influenza strains around the world.

ASEAN Frameworks

The ASEAN Health Ministers and ASEAN Ministers on Agriculture and Forestry have directed their senior officials and respective expert/working groups (i.e. Senior Officials Meeting on Health Development (SOMHD), ASEAN Expert Group on Communicable Diseases (AEGCD), ASEAN Sectoral Working Group on Livestock (ASWGL) and ASEAN Highly Pathogenic Avian Influenza Task Force to formulate a coordinated multi-agency and multi-sectoral approach to prevent, control, and eradicate HPAI in the region. The ASEAN member states are also working closely with WHO, the Food and Agricultural Organization (FAO) and the World Organization for Animal Health (Office International des Epizooties, or OIE), to synergize efforts for an effective regional response.

ASEAN member states, both individually and in partnership, have been taking serious measures to address a potential pandemic outbreak. These include the endorsement of a Regional Framework for Control and Eradication of HPAI (2006–2008) by the ASEAN Ministers of Agriculture and Forestry in September 2005, the implementation of the ASEAN+3 Emerging Infectious Diseases Programme, the ASEAN-Japan Project on Regional Stockpiling of Oseltamivir (Tamiflu) and personal protective equipment (PPE) against potential influenza

pandemic, and the ASEAN Project on Pandemic Preparedness and Response.

The ASEAN Agreement on Disaster Management and Emergency Response, signed by the Foreign Ministers of ASEAN in July 2005, also provides a comprehensive framework covering all phases and spectra of disaster management, and encourages an integrated approach involving all relevant sectors. The newly established ASEAN Technical Working Group on Pandemic Preparedness and Response (ATWGPPR) will also address the issue in collaboration with relevant sectors at the regional and country levels. At the same time, the ASEAN Secretariat has established the ASEAN Secretariat Working Group on One Health to strengthen internal coordination among relevant units to support these efforts and initiatives.

Many international organizations and ASEAN dialogue partners are assisting the relevant sectoral bodies of the regional bloc in pandemic preparedness and response. Individually, ASEAN member states have also been collaborating with donor countries and international organizations. The following summarizes keys activities carried out by the said initiatives in addressing pandemic preparedness and response in the ASEAN region.

ASEAN+3 Emerging Infectious Diseases Programme Phase II

The Australian Agency for International Development (AusAID) funds A$5 million for a three-year programme from 2007 to 2009 through the ASEAN-Australia Trust Fund. This programme focuses on four areas to tackle emerging infectious diseases including AI. The programme aims to enhance regional preparedness and capacity through integrated approaches to prevention, surveillance and timely response to emerging infectious diseases; and covers four main areas, including ASEAN member states and ASEAN Secretariat Institutional Strengthening, Enabling Environment for Preparedness, Prevention and Risk Reduction, and Surveillance and Response. The programme has enabled the achievement of the outcomes in the ASEAN-Japan Project, as elaborated below.

ASEAN-Japan Project on the Stockpiling of Tamiflu and Personal Protective Equipment against Potential Influenza Pandemic

The initiative for the project came from Japan out of its interest to support ASEAN's work on addressing AI. At the ninth ASEAN-Japan Summit on 13 December 2005, the Prime Minister of Japan announced that Japan would provide ASEAN with 500,000 courses of Tamiflu and PPE for 700,000 persons.

On 27 March 2006, Japan and ASEAN established the Japan-ASEAN Inte-

gration Fund (JAIF) from which an amount has been allocated for fighting AI and preventing human influenza pandemics. The project was formally launched on 2 May 2006 in Jakarta.

The project also provides for the procurement of an additional 500,000 courses of Tamiflu for individual national stockpiles. Fifty per cent of the stockpiles of PPE have been delivered to all ASEAN member states for rapid response and rapid containment.

A pre-pandemic table-top emergency exercise was successfully held on 2–3 April 2007 by the ASEAN Secretariat, in close collaboration with WHO-WPRO, Japan, the Japan International Cooperation System, and ASEAN member states to test the efficiency of coordination among all parties involved in the delivery of the Tamiflu stock during a pandemic.

ASEAN and Japan have agreed on the guidelines on the release and transportation of Tamiflu and PPE to ASEAN member states. The health ministries of these states are the national focal-point agencies responsible for coordinating the distribution of Tamiflu and PPE stocks within their respective countries when a pandemic occurs. Nevertheless, to further ensure facilitation of the delivery and distribution of stockpiles in such events, ASEAN states have assigned national consignees by person, as well as provided details on national custom clearance rules and procedures for the Tamiflu and PPE consignments at each country's main airport.

WHO provides technical assistance to the project and assists in building capacity on rapid response and rapid containment and management of antivirals and PPE. WHO also collaborates with the ASEAN Secretariat to conduct the assessments on the arrival of antivirals and training workshops on outbreak response logistics for all ASEAN member states.

ASEAN Project on Pandemic Preparedness and Response

This project is supported by the United States Agency for International Development (USAID) through the ASEAN-U.S. Technical Assistance and Training Facility. Under the public health activity stream, the USAID-funded project has these main objectives:

- Improve coordination among ASEAN member states in pandemic preparedness and response strategies, activities and plans.
- Promote the multi-sectoral approach (between the health and the non-health sectors) both at the regional and national level.

The first phase of the project was implemented from January to November 2007. The main activities implemented under Phase I included the following:

- A Mapping Exercise to review National Pandemic Preparedness Plans

- A Regional Workshop on ASEAN Mapping Exercise for Pandemic Preparedness and Response
- ASEAN Regional Workshop on Multi-sectoral Coordination in Pandemic Preparedness and Response

Key activities implemented under Year 1 of Phase II (2008) of the project included the following:

- ASEAN Joint Planning Meeting on Strengthening Multi-sectoral Coordination in Pandemic Preparedness and Response
- ASEAN Workshop on Advocacy for Promoting Multi-sectoral Responses to Pandemic Preparedness and Response
- ASEAN Meeting on Development of Indicators to Monitor Pandemic Preparedness and Response Plan

Planned activities for 2009 comprise the following:

- Develop multi-sector pandemic preparedness and response indicators to be used as minimum requirements in the region and as the basis for monitoring the progress of national pandemic preparedness and response plan formulation.
- Conduct country assessment to identify the level of preparedness, and based on country situation, recommend activities to strengthen capacity and institutions.
- Strengthen national capacity in multi-sectoral operational continuity and contingency planning for pandemics.
- Strengthen on-scene command and response system during pandemics through the use of an Incident Command System (ICS).
- Organize Regional Initiatives Consultative Meeting to discuss the development of ASEAN Regional Pandemic Preparedness and Cross-border and Resources Sharing Response Plan.

ASEAN Agreement on Disaster Management and Emergency Response

In addition to the projects dealing with AI and other emerging infectious diseases, ASEAN has also established mechanisms for dealing with disasters. ASEAN member states signed the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) on 26 July 2005 in the People's Democratic Republic of Laos. The Agreement seeks to provide effective mechanisms to reduce the loss of lives during disasters, as well as protect the social, economic and environmental assets of member states, and to jointly respond to disaster

emergencies in the ASEAN region.

The Agreement requires, among others, the establishment of a regional inventory called the ASEAN Standby Arrangements for Disaster Relief and Emergency Response, which is being compiled based on the earmarked assets and capacities of ASEAN states. Under AADMER, states have developed a regional standard operating procedure (SOP) which provides guidelines for the mobilization of regional standby arrangements, utilization of military and civilian assets and capacities in disaster emergencies, and coordination of joint disaster relief and emergency response operations. Full-blown regional simulation exercises (code-named "ARDEX") have also been conducted annually to enhance regional preparedness and validate the SOP.

ASEAN Technical Working Group on Pandemic Preparedness and Response

The idea on the establishment of a working group on Pandemic Preparedness and Response was discussed at the ASEAN Regional Workshop on Multi-sectoral Coordination in Pandemic Preparedness and Response held from 29–30 November 2007 in Bangkok. Subsequently, the ASEAN Joint Planning Meeting on Strengthening Multi-sectoral Coordination in Pandemic Preparedness and Response, held on 27–28 March 2008 in Kuala Lumpur, agreed to form this working group which aims to promote multi-sectoral planning and coordination in pandemic preparedness and response, and provide political support and commitment for multi-sectoral coordination at the regional and national level. Currently, the focal points of ATWGPPR are representatives from the respective countries' Ministry of Health, Ministry of Agriculture and ASEAN Committee on Disaster Management. The first meeting of ATWGPPR was held from 21–23 July 2008 in Medan, Indonesia to discuss taking steps towards multi-sectoral pandemic preparedness and response readiness.

Strengthening ASEAN Secretariat Capacity for Regional Coordination in the Control and Eradication of HPAI in ASEAN

In partnership with FAO and OIE, ASEAN, through its Secretariat, implemented an Asian Development Bank-funded sub-project on Strengthening ASEAN Secretariat Capacity for Regional Coordination in the Control and Eradication of HPAI over a period of two and half years beginning from 2006. A series of four regional workshops to coordinate member states' efforts against HPAI and prepare for a potential human influenza pandemic have been implemented. An

ASEAN Regional Strategy for the Progressive Eradication of HPAI (2008–2010) was endorsed by the 29th Meeting of the ASEAN Ministers on Agriculture and Forestry on 1 November 2007.

ASEAN Secretariat Working Group on One Health

The International Ministerial Conference on Avian and Pandemic Influenza held in New Delhi, India from 4–6 December 2007 brought forward the concept of "One World and One Health" as a contribution to pandemic preparedness and human security. This encourages each government to strengthen functional links between the human and animal health systems, while investing in sustainable capacity for preventing and controlling high-risk infectious diseases in animals within a country and with neighbouring countries.

The recent developments and decisions at global and regional levels, however, have necessitated closer coordination among relevant units within the ASEAN Secretariat to be able to promote multi-sectoral coordination and planning within the region. Therefore, there is an increasing need to promote and ensure proper coordination and integration of initiatives within the ASEAN Secretariat, thus maximizing utilization of resources and promoting efficiency and integration. This requires effort on the part of a specific segment of the ASEAN Secretariat that will ensure strong coordination among the different units working on combating HPAI, pandemic influenza and other emerging infectious diseases, and trans-boundary animal-borne diseases.

The ASEAN Secretariat Working Group on One Health was established in early 2008 with the following roles:

- **Coordination**
  Facilitate and support the ASEAN coordinating structure for pandemic preparedness and relevant sectors/working bodies of ASEAN in moving forward multi-sectoral coordination and planning for pandemic preparedness and response in the ASEAN region.
- **Advice**
  Provide support and technical advice to the ASEAN Secretary-General to provide appropriate responses at the preparedness level as well as in times of a pandemic.
- **Advocacy**
  Raise the awareness of pandemic issues among relevant units within the ASEAN Secretariat and get their support in advocating pandemic issues to their working bodies; facilitate and support the ASEAN coordinating structure for pandemic preparedness and relevant sectors/working bodies

of ASEAN in mainstreaming and advocating pandemic issues in other sectors/working bodies/coordinating councils in ASEAN.

- **Resource mobilization**
  Facilitate and support the ASEAN coordinating structure in mobilizing resources to promote multi-sectoral coordination and planning for pandemic preparedness in the ASEAN region.

Conclusion

Through regional cooperation as well as individual national efforts, ASEAN member states continue to address pandemic preparedness and response at different levels and platforms. These include the following:

- Strengthening institutional linkages within countries and across borders
- Setting up partnerships with all stakeholders in the public and private sectors, and civil society
- Sharing information, knowledge, good practices and lessons learned
- Exerting leadership and instituting coordination in order to be able to manage a crisis or situation

Due to the fact that avian and human influenza seem to be harbouring in the Southeast Asian region, calls for a concerted response by ASEAN member states are needed. Collectively, and in close collaboration with other countries and international organizations, ASEAN states, especially high-risk ones, need to be ever vigilant. Past experiences with other diseases show that, beside the lack of public awareness and lack of knowledge about preventive steps, human nature is such that people may become complacent and live with the disease over time. When this occurs, preventive and eradicative efforts will become even more difficult.

5 Pandemic Preparedness Operations, Systems and Networks
The Indonesian Case

Purnawan Junadi

In 2005, WHO published its revised influenza preparedness plan in which the different phases of influenza pandemic preparedness were redefined and recommendations made on the national measures required by WHO.[1] Applying this scheme to AI, the world reached Phase 3 of the pandemic alert stage in 1997 during the Hong Kong outbreak, with 18 human cases and six deaths. This was one year after the first reports of the highly pathogenic H5N1 virus in Guangdong province, China in 1996.

The Years in Perspective

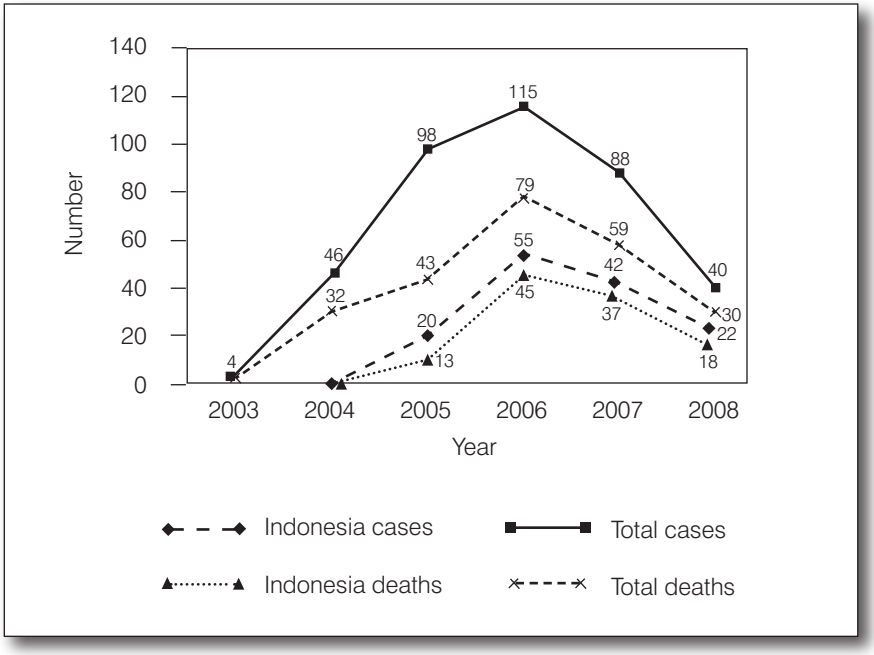
After the Guangdong outbreak, Indonesia reported, on 2 February 2004, the first outbreaks in poultry in 11 provinces. One year later, Indonesia reported its first human case, which indicated that the country had reached pandemic alert stage. Over the next three years, Indonesia reported the highest number of cases and deaths every year. A cluster outbreak in Kubu Simbelang in May 2006 that involved four related families, three of whom lived in that same village, received global attention. Out of 21 family members, eight had contracted the illness, of whom seven died.[2] Experts had diverging opinions on whether this cluster was caused by avian-to-human transmission, or passed from humans to other humans, which could become Phase 4 of the pandemic alert stage. However, human-to-human transmission has not been confirmed. At the time of writing, Indonesia is still in Phase 3 of the pandemic alert stage.

As of 15 December 2008, Indonesia has become the country with the highest number of AI infections: 139 cases, with 113 deaths out of a total of 247 worldwide.

Worst-Case Scenario

Looking at the five-year trend, AI in Indonesia reached its peak in 2006 with 55 cases and 45 deaths, decreased in 2007 with 42 cases and 37 deaths, and continued to decrease in 2008 with 22 cases and 18 deaths. AI cases around the world have reflected the declining trend, implying that the number of AI cases is diminishing, along with the probability of an epidemic (see Figure 5.1).

Figure 5.1
Five-year trend (2003–2008) of avian influenza cases and deaths in humans, shown for Indonesia and the world



However, an AI pandemic may still occur if there is a new subtype of the virus as a result of an antigenic shift, as evolution of influenza viruses cannot be predicted. This has caused a growing concern, particularly with respect to the huge economic and financial implications for Indonesia and the world's population. The Department of Health (DOH) made two estimates of the impact, using the Hong Kong outbreak as the moderate-level estimate and the Spanish Flu as the severe-level estimate. The worst-case scenario for Indonesia was projected at 66 million people infected with 1.5 million deaths, as depicted in Table 5.1.

Table 5.1
Estimated impact of H5N1 pandemic in Indonesia[3]

	Scenarios	Moderate level (Asia / Hong Kong Flu) (million)	Severe level (Spanish Flu) (million)
1.	Infections	66 (30% of pop.)	66 (30% of pop.)
2.	Outpatients	33 (50% of infections)	33 (50% of infections)
3.	Hospitalizations	633,600 (1.92% of outpatients)	7.26 (22% of outpatients)
4.	Intensive care unit (ICU)	94,280 (15% of hospitalizations)	1,089,000 (15% of hospitalizations)
5.	Ventilator usage	47,298 (50% of ICU)	544,500 (50% of ICU)
6.	Deaths	153,120 (0.232% of infections)	1,395,240 (2.114% of infections)

Preparedness and Responses

There is currently a high level of commitment to prepare for, prevent and contain an AI pandemic in Indonesia. In 2005, the national committee for AI pandemics was established to coordinate concrete actions.

In a speech addressing the Sixth Annual Conference of the Parliamentary Network of the World Bank, in Helsinki, Finland, on 23 October 2005, the president of the Republic of Indonesia, said

> … All our development calculations and projections would be ruined, if humanity were to experience an avian flu, human influenza pandemic. This could happen, if there is a mutation of the avian influenza virus that can spread between humans. And this virus can mutate anywhere, in China, in Europe, in Southeast Asia … . The impact of a new pandemic on the economies of the world would be totally disastrous … that is why we must all be on high alert … .

The government timeline for preparedness and responses is summarized as follows:

- December 2005: Completion of Strategic Plan (2006–2008)
- March 2006: Established the National Committee for Avian Influenza and Pandemic Influenza Preparedness

- September 2006: 10 Steps Refocusing Strategy formulated
- March 2007: Presidential Instruction 1/2007 on Managing and Controlling Avian Flu
- March 2007: National workshop on AI – 6 Steps Refocusing Strategy
- August 2007: Guidelines on National Pandemic Preparedness & Response Plan
- March 2008: National Pandemic Preparedness & Response Plan
- August 2008: Guidelines for Managing Epicenter of Influenza Pandemic by the Ministry of Health

The National Committee for Avian Influenza Control and Pandemic Influenza Preparedness (subsequently referred to as the National Committee) was organized as follows:[4]

- Committee Members: 17 ministries, National Planning Agency, Army and Police
- Executives in six sections
- Section 1: AI control in animals
- Section 2: Management of AI human cases
- Section 3: Procurement and distribution of medicine and vaccine
- Section 4: Information, public communication and networking
- Section 5: Research and development
- Section 6: Planning and cooperation
- Panel of experts: 23 members from various fields

In 2007, the president increased the preparedness stage by outlining Presidential Instruction 1/2007. This consists of the four following subjects:

- Coordinating four ministries, the Army, governors and district/city heads, with the Ministry of Welfare as the head of the National Committee
- Concrete and efficient measures for handling and controlling AI
- CIE in high risk and endemic areas
- Governor/district heads to coordinate local action and allocate necessary funds, assisted by the army

Six strategic steps, which resulted from the workshop after the president's instructions, were drawn up, as follows:

- Information, socialization, communication and education
- Restructuring Poultry System
- Integrated Epidemiologic Surveillance
- Managing viruses at the source: disease control in animals through biosecurity, vaccination and culling plus compensation
- Capacity building and empowering health services

- Pandemic preparedness and simulation

Should all the strategies be implemented, the government would need about Rp 15.7 trillion (US$1.5 billion) between 2006 and 2008.

Several cities/districts have conducted simulation exercises. In 2007, district/city simulation exercises were conducted in Serang City and Tanggerang District. In 2008, simulation exercises were conducted in Bekasi City, Makasar City, Menado City and Kebumen District. In addition, local health agencies in Depok City and Jakarta Metropolitan also conducted simulation exercises with the help of the armed forces.[5]

The Department of Health also carried out a full-scale field simulation exercise in Jembrana District, Bali Province from 25–27 April 2008. The simulation involved multiple ministries and agencies across the central, provincial and district levels of government and WHO, with a total of 933 participants, 176 national observers, 14 international observers, and over 70 journalists. Approximately 156 media outlets reported on the simulation through websites, print media, radio, and television.[6]

To date, the national committee has developed the following documents:

- Hierarchy flowchart for command and control
- Management guidelines for pandemic influenza epicenter
- Protocol for non-pharmacy intervention of pandemic influenza epicenter (MOH)
- Protocol for patient handling in containing pandemic influenza epicenter (MOH)
- Guidelines for delivering antiviral prophylaxis, masks and vaccines in containing pandemic influenza epicentre (MOH)
- Protocol for human traffic control in airports (MOH)
- Protocol for command and control in containing pandemic influenza epicentre (MOH)
- Protocol for resource mobilization especially logistics (MOH)
- Protocol for pandemic preparedness in eight other ministries
- Ministry of Cooperative, Small and Medium Enterprises
- Army and Police
- Indonesian Red Cross
- Department of Communication and Information
- Department of Internal Affairs
- Department of Education
- Department of Transportation (Sea and Air)
- Department of Culture and Tourism

Issues and Challenges

The first issue is related to the budget. To date, no free information is available on how much was spent during the last three years, but it seemed to have fallen short of expectations as some donor agencies have not delivered on the grant amounts pledged towards pandemic preparedness.

Another issue is that of vaccine stockpiling. From a medical standpoint, full immunity from the virus can be achieved via two doses of the vaccine, to be taken over three weeks. However, stockpiled vaccines will unlikely be antigenically matched with pandemic viruses, with matching vaccines taking at least six months to be developed, by which time it may be too late. In addition, logistical challenges include the need for a complex cold-chain system for the maintenance of a million doses of vaccine with a high efficacy rate, particularly for remote areas, and the capability to vaccinate approximately 150 million people in a limited timeframe. However, Indonesia has a relatively good record with its annual National Immunisation Weeks, where it successfully vaccinates 10 million children within one or two weeks. In case of a full-blown AI pandemic, the authorities must prepare 10 times the amount of resources to be able to vaccinate 150 million people. The issue is further complicated by the costs involved. With vaccine costs at around US$12–20 per dose, Indonesia will need to spend at least US$180 million for vaccines alone, on the assumption that supply is available. With this in mind, Indonesia has raised on the global stage the issue of more equitable benefits from virus sharing and affordability of vaccines for developing countries.[7]

A vaccine is effective only before one contracts a disease. Once a person is infected with AI, the only drug currently widely available is Oseltamivir (Tamiflu). The problem of logistics persists: how should the authorities provide prophylaxis to 80 per cent of the population and 90 per cent of the patients within two days. If treatment could be initiated within two days, it would lower mortality rates significantly. However, an extensive study in Indonesia showed that the median onset to treatment was seven days. Only one out of 127 cases received treatment within two days. This was caused by the fact that symptoms for the first two days were mostly non-specific symptoms which could have been caused by several other infectious agents.[8] An additional problem includes the fact that Oseltamivir tablets have an expiry period of two years. In Indonesia, the seven million doses imported in 2006 expired in 2008.[9]

Furthermore, the geography, size and diversity of Indonesia present an immense challenge. As of 2008, the estimated population was 137 million, with a high poultry population and diverse animal types, especially birds, which are susceptible to influenza. This translates into a very wide area to cover—1.9 million square kilometres of land area in which the influenza is endemic in

almost all provinces. For poultry, the influenza is endemic in 23 out of 33 provinces. For humans, it is currently endemic in 13 out of 33 provinces.[10] To complicate this further, Indonesia is decentralized and divided into more than 400 districts with elected local governments. Much of the power to control the health and agricultural sectors is in the hands of local governments. This will undoubtedly give rise to many problems in the event of a cross-district outbreak.

The poultry production structure in Indonesia is another barrier to containing avian-to-human transmission. There are four sectors of production differentiated by their scale, comprising the industrial, medium, small and backyard farms. Although the last two account for 0.26 billion chickens, which is only 20 per cent of the poultry population, the farms are spread across several provinces. Furthermore, 30 million households operate backyard farms.[11]

Conclusion

The only way to prepare and control AI in Indonesia is by going upstream. There is a need to contain the pandemic period at stage 3 and gradually lower the stages. Apart from AI preparedness and responses, it is essential to stay focused on animal controls and public health programmes. This should involve public private partnerships in each of these activities, with large-scale changes, as discussed above.

At the global level, the best defence for AI is in Asia, where most of the small-scale and backyard poultry farming is located, coupled with long-held lifestyle traditions and poverty-line economics. Public misconception and ignorance are still prevalent, with a tendency for the government to think that an outbreak could be covered up and "fixed".[12] As globalization causes the world to become increasingly interconnected, the international community should focus its attention on Asia in the efforts to contain the spread of AI. Allowing the disease to become a pandemic is unthinkable, as Michael Osterholm, a researcher from the Minnesota University Research and Infectious Disease Policy Center, said, "… if that happens, we will witness an influenza pandemic with countless casualties, more than AIDS, 9/11, all the wars of the twentieth century and the tsunami combined".[13]

This focus again restates the importance of "One World One Health", which in essence states that overcoming diseases of the twenty-first century while ensuring the biological integrity of the Earth for future generations requires interdisciplinary and cross-sector approaches to disease prevention, surveillance, monitoring, control and mitigation as well as, more broadly, environmental conservation.[14]

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6 Thailand's Pandemic Preparedness
Operations, Systems and Frameworks

Wiput Phoolcharoen

Throughout the past century, influenza pandemics have caused serious and devastating impacts every 10 to 40 years. Thailand has increasingly encountered such a threat of pandemics, which has the potential of causing enormous loss of human life and assets. With the current rate of global travel and interconnectedness, a new strain of influenza virus could spread rapidly throughout the world, resulting in high levels of global morbidity and mortality. Previous influenza pandemics have all originated from animal strains of the influenza virus and hence there is concern among the global community regarding animal-transmitted viruses such as AI.

Thailand: High Risk of a Pandemic

Outbreaks of the HPAI among poultry in many countries, together with human infections and deaths, prompted WHO to recommend that member states rapidly prepare for an influenza pandemic. Indeed in 2004, Thailand was faced with a serious outbreak of the H5N1 strain of AI among poultry, which later spread to humans. This increased the likelihood of Thailand being the place of origin for an influenza pandemic.

Strategy and Plan

Concerns about a potential pandemic rapidly permeated to broader sectors of society, particularly because domestic and exported poultry are a major source of income. With the support of WHO and the U.S. Centers for Disease Control and Prevention, the Ministry of Public Health formulated a policy and operational plan to cope with the situation. The Ministerial cabinet approved the National Strategic Plan on Influenza Pandemic Preparedness on 25 January 2005, which includes three principal objectives:

- To prevent the outbreak of an influenza pandemic
- To reduce the morbidity and mortality from influenza
- To be prepared to respond effectively to the influenza pandemic

The plan comprises five key strategies to accomplish these objectives. These strategies are listed below, together with further points of elaboration.

- Strengthening influenza surveillance systems
  - Accelerate and intensify the surveillance systems in both animals and humans.
  - Systematically link information between the animal and human surveillance systems.
  - Strengthen the capacity of influenza surveillance networks in humans, including community, medical, hospital and laboratory networks.
- Preparedness of essential medical supplies and equipment
  - Stockpile adequate quantities of essential medical supplies, diagnostic test kits and the necessary personal protective equipment for use when necessary.
  - Develop efficient stockpiling and storage systems for drugs, vaccines and medical supplies.
  - Support research, development and production of vaccines and antiviral drugs, in order to be self-sufficient in the long term.
  - Set up criteria for the fair distribution of available but limited medical supplies, antiviral drugs and vaccines.
- Pandemic preparedness responses
  - Set up standard operating procedures for all organizations.
  - Develop the capacity of medical and public health officials, and various groups of volunteers to be ready to provide appropriate care.
  - Strengthen the readiness and capacity of hospitals and prepare plans for patient care systems during pandemics.
  - Develop public health emergency plans and measures.
  - Develop a financial support system for activities considered necessary or urgent.
- Public relations and education
  - Publicize information to create knowledge and understanding on the prevention and care of influenza.
  - Develop risk communication skills for the officials concerned.
  - Set up working groups comprising all concerned sectors to officially communicate and coordinate on the provision of information to the public.

  - Formulate a communications plan with the use of public communications tools at the national and local levels, in addition to establishing networks with the media during pandemics.

- Developing sustainable and integrated management systems
  - Develop mechanisms for influenza knowledge management, during the pandemic alert period.
  - Develop efficient mechanisms to effectively manage the situation during pandemics.

The third of the above objectives—pandemic preparedness responses—has not been underpinned as a target of achievement. This may reflect existing constraints of collaborative missions across other responsible sectors.

Targeting of the plan

Importantly, the overall target of the plan emphasizes the medical and epidemiological mandates, including the five main objectives:

- Strengthening an effective influenza surveillance system, including clinical surveillance in communities, workplaces, educational institutions, public health facilities, as well as establishing 12 laboratories as viral surveillance centres throughout the country in 2007
- Ensuring readiness of Thailand's public facilities for efficient management of emergency situations during a potential influenza pandemic by 2006
- Setting up stockpiles of antiviral drugs (Oseltamivir) for treatment of up to 325,000 patients (3.25 million tablets), and stockpiles of raw materials for domestic manufacturing of antiviral drugs (Oseltamivir) for up to 1.625 million patients by 2010
- Developing the capacity to manufacture and stockpile influenza vaccines by 2010. In case of an influenza pandemic, hospitals throughout the country have the capacity for taking care of up to 100,000 influenza patients in critical condition.
- Ensuring that in case of outbreaks in specific areas, field hospitals with 5,000-bed capacity will be available

Disaster Response Management

The incidence of major disasters has been rising and is increasingly financially damaging. The Department of Disaster Prevention and Mitigation (DDPM) was hence established in the Ministry of Interior in 2003. It is the national body responsible for coordination and cooperation with a broad range of collaborative partners in the country, as well as international agencies, in protecting the people

from humanitarian disasters. In 2007, the Disaster Prevention and Mitigation Act was promulgated to authorize the central, provincial and local authorities in disaster response management.

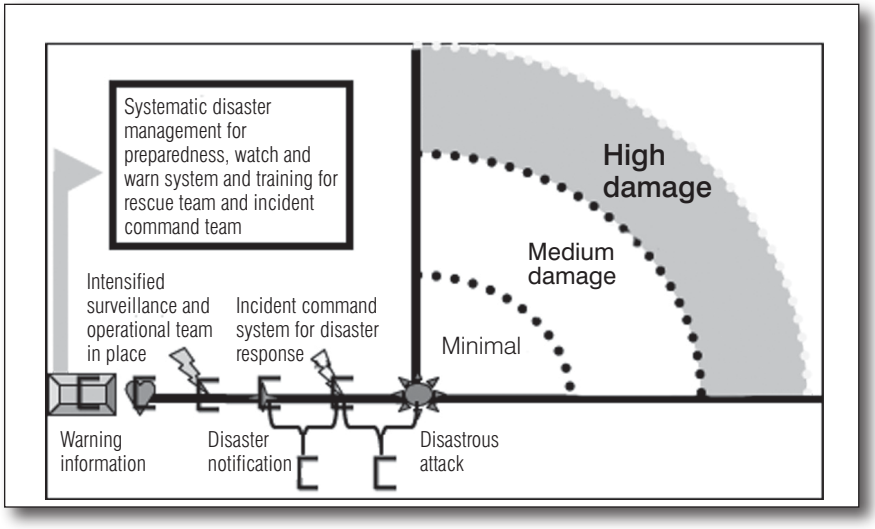
However, legislative measures and preparedness planning have not served as a firm foundation for the support of local and central authorities' disaster responses. According to systematic reviews conducted in 2006 and 2007, the responses to emergences of disaster events were always delayed and coordination efforts were chaotic. This was caused by unclear warning and notification information, as well as non-specific authorized personnel in charge of emergency management, and was further intensified by poorly informed and unprepared civilians behaving anxiously.

It is hence clear that there is a large gap between laws, regulations and plans for disaster emergency responses, and the actual preparedness of government officers, civil society actors and the community. Reviews have highlighted a crucial demand to actualize the existing regulations and plans into practice, particularly for organizations responsible for technical support and actions carried out by local authorities and communities.

Civil protection is based on the concept of integrated emergency management. Accordingly, preparations for disaster management and rapid response to emergencies focus on the effects of events, rather than on the causes. Hence there is a generic framework for responding to emergencies, regardless of the scenario. Hence, there is a generic framework for responding to emergencies, regardless of

Figure 6.1

Scope of the role and functions for timely disaster response



the scenario, as illustrated in Figure 6.1. Furthermore, emergency response and recovery is grounded in what local responders do, albeit delivered on a larger scale and with greater urgency. Preparation and response should therefore be undertaken as an extension of local responder's activities. The underlying aim of integrated emergency management is to develop flexible and adaptable arrangements that will enable effective joint responses to any emergency.

For reasons of practicality, the Civil Defence Plan for disaster response and technical schemes or procedures to handle a broad array of hazards should be integrated into provincial, local and community-feasible operations. This will need to be based on available human resources, equipment and capacity of each local area. In addition, the central and technical support for preparedness and response should be facilitated and modified to fit into provincial and local authorities' own adaptable and effective responses.

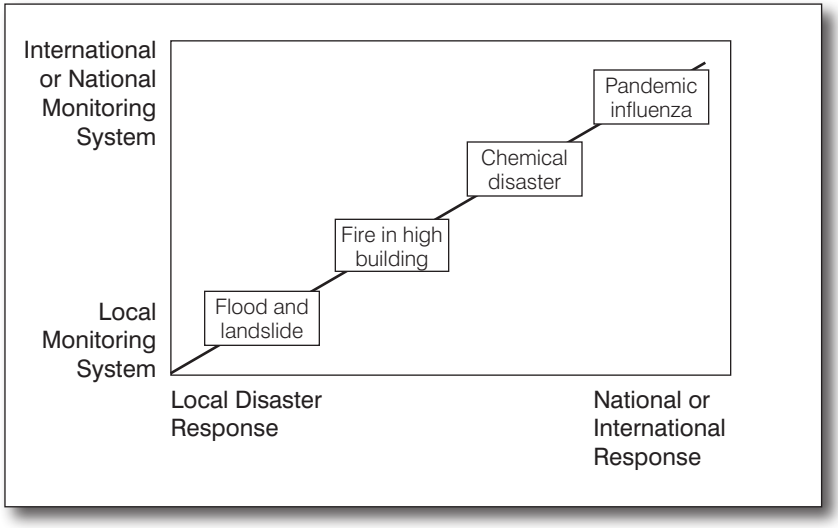
The pilot study focuses on developing the means to assist the community, local authority, the province and the central back-up teams to engage in early intervention before a disaster strikes. Well-prepared and unified actions during an emergency situation will likely diminish adverse societal effects.

Gap in National Pandemic Preparedness Response

The main focus of the pandemic preparedness response has highlighted the practical actions at the provincial, local and community levels. There is a demand for establishing and developing a backup system for the disaster management system from the national level down to the provincial level, together with an effective disaster surveillance and warning systems, and to conduct post-disaster evaluation to further improve the rules of engagement at the local level, as indicated by Figure 6.2. Thus, the central authority that is responsible for each disaster management has to be continually supported to improve the procedures for coping with disasters, surveillance and warning systems, and to conduct post-disaster evaluation to further improve the rules of engagement at the local level.

Based on the joint study of the central support disaster management system, the extent of technical support required from external sources for each disaster is varied. The occurrence and frequency of floods and landslides should be monitored and managed by the local community. In case of fire in a high building, the preparedness of the building owner and local authorities has to be gauged. Chemical disasters have their own complex systems and need joint engagement from a broad array of authorities that are responsible for control of the warehouse to the industrial site and to transportation. So the monitoring system and rescue for chemical disasters demands high technological support.

Figure 6.2
The range of demand to support local and community response



In case of pandemic influenza that has not occurred yet, the surveillance and notification of a pandemic has to be approved by an international agency. The socio-economic response has to be directed by the government as the medical response may require vaccine and medicine from international sources.

Accordingly, the pandemic preparedness response for the central authority needs to take into account this range of technical and political responsibilities. With a greater need for broad cooperation and sophisticated technology, high-level government engagement will be essential. Thus, the incident command system will develop at different levels of the governing structure.

The Preparedness of an Incident Command System

To effectively comply with the Disaster Prevention and Mitigation Act, the involvement of the Ministry of Public Health and the Provincial Public Health alone is insufficient. Further development of the functional structure to empower civil collaboration on pandemic preparedness response will be needed. These may include the following:

The central role of an Incident Command System in pandemic preparedness response

A series of joint learning programmes among the relevant personnel at all levels has confirmed the demand for a clear and structured incident command

system. Officers and volunteers in related organizations and communities should commit and comply with joint operations and contingency plans for pandemic preparedness response. They will have clear-cut scopes of duty under a unified incident command system that can recruit available pooled material, equipment and vehicles for its purpose.

Guidelines and exercise for all related sectors to fulfil local preparedness

The actual master plan for disaster prevention and mitigation has been laid out as the framework for pandemic preparedness response in every province, local authority area and community. However, based on the disaster incident reviews, there is a lack of human resources, equipment and an efficient command system. This was caused by the lack of capacity of each provincial and local authority to respond to disasters.

To address these constraints, the guidelines and preparedness exercise should allow the teams responsible to manage their needs and resources. Doing so will allow each incident command post to ascertain the need and level of assistance required from the central rescue team.

Preparation of partners' warning system

Technological advancement will continuously improve the surveillance of causal determinants of each disaster. An effective warning system will provide precise forecasting and allow sufficient time to alert the people before the onset of a disaster situation. A critical factor will be the rendering of warning signs into understandable and credible messages that can instruct both people in an affected community and the authorized personnel in charge of an incident command post.

The pandemic influenza warning system is complicated because an epidemic must first be confirmed by the laboratory authority under the relevant international organization. However, it is advisable to develop an information channel to give the public quick updates on the situation.

Empowerment of the incident command post

The command post exercise should allow authorized personnel from different chains of command to discuss their roles and functions during various scenarios. The critical change may be demonstrated in terms of the assignment of duties, as well as pooled vehicles and equipment, in disaster situations. The military should join the exercise to share the authority and resources in an incident command system.

According to the lessons learnt, a clear protocol for disaster exercises at the provincial level should be developed. Annual exercises and drills should be required and supported by the DDPM. Critically, most civil servants in prov-

inces have never learnt about the incident command system. As a consequence, the administrators of the provincial sectors and local authority have not been concerned with or committed to disaster preparedness.

Conclusion

The inter-sector incident command system will complement the pandemic preparedness response plan by fulfilling the need for disaster management at the provincial level, and also empower local community organizations to establish a disaster preparedness system. At the same time, the central government sectors responsible for supporting operations in the field have to be assigned to and engaged with their roles at the system's national level and develop sufficient capacity for rescue teams. The principal elements, comprising the framework for the pandemic incident command systems, include the following:

- The national system manager
- The watch and warn system
- Role and function of multiple partners in the incident command system

These core structures will be elaborated and developed at the national, provincial, local authority and community levels. DDPM will be assigned to support further development.

7 The Philippine Framework for Pandemic Preparedness

Carlo I. Panelo

This chapter intends to provide a brief description of the Philippine preparedness plans and efforts related to AI pandemic preparedness. The feasibility of these preparedness plans and actions are also examined in terms of the SARS experience. While not the same disease entity, the experience with SARS has raised serious operational questions on the capacity of the health system to mount an effective response against AI and other potential pandemics. The chapter closes with strategic and specific recommendations on how the preparedness framework can be further strengthened.

Status of Avian Influenza and Socio-Economic Implications

At present, the Philippines remains "bird flu free". However, the threat of AI and other pandemics is imminent considering that the country is part of the migratory route of birds, with human settlements encroaching on bird nesting sites, as the human population continues to expand. The southern border of the Philippines is also close to Indonesia and Malaysia, where AI infections have been reported. As part of centuries-old trade and migration routes, these "back doors" are natural migration destinations, with minimal border control.

However, apart from experiencing potential health impacts in the future, the US$3 billion poultry industry and other service sectors are under immediate threat. A study by the Asian Development Bank (ADB) has estimated the overall economic impact of a pandemic to range between 1.2 and 2.8 per cent of gross domestic product, depending on how long the pandemic lasts. Furthermore, aside from economic impacts, the health system will most likely be overwhelmed. During the SARS epidemic, the cost of care was estimated at US$40,000 per case. If the rate of infection equals 25 per cent of the population, the costs will be staggering. Cost implications will also be adverse for families as the out-of-pocket spending rate for healthcare in the Philippines is around 50 per cent.

Strategic Approach to AI Preparedness and Response

The strategic approach to pandemic preparedness is anchored on eight overlapping strategies:

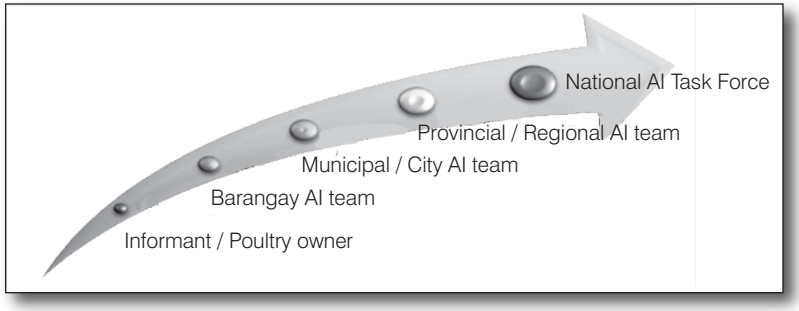
- First, preventing entry of the virus into the country by preventing the entry of poultry from affected countries and of patients infected with AI
- Second, preventing bird-to-bird transmissions of the virus by isolating local fowl from migratory birds, and by containing AI infections in bird populations through measures such as isolation and culling within a three-kilometre radius of an infected area
- Third, preventing bird-to-human transmission by ensuring that farm workers wear protective equipment when handling infected birds
- Fourth, managing avian and pandemic influenza cases to prevent explosive spread through measures such as the use of antivirals, employing infection control measures and quarantine
- Fifth, slowing down the spread of the virus among humans by quarantine, border controls and personal hygiene
- Sixth, managing explosive spread by social distancing and maintenance of essential services
- Seventh, managing public anxiety by making judicious use of the mass media to prevent panic and educate the populace
- Lastly, mitigating socio-economic impacts by employing multi-sectoral actions and implementing corollary policies

Response Structure

The pandemic preparedness structure can be described in terms of its reporting and decision-making system. The Philippine preparedness plan is anchored on

Figure 7.1

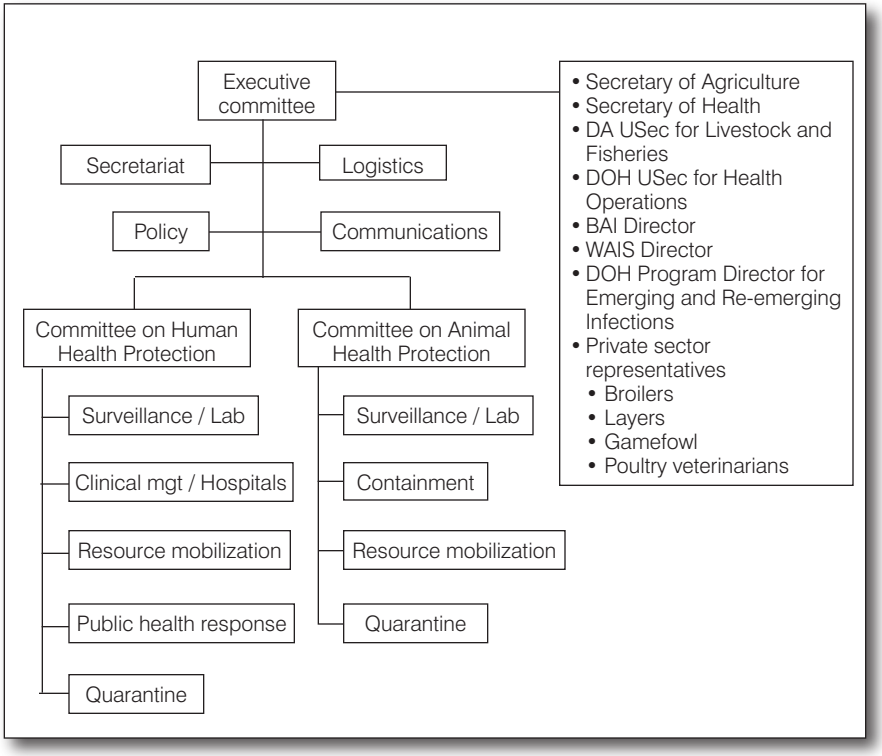
Task forces and their communications, and reporting chain of command



community-based surveillance. As such, cases of fowl or human infection are reported up a chain of task forces that are mandated to validate the information, perform the appropriate mitigation measures and report the incident to higher-level bodies, as per Figure 7.1.

At the topmost tier of this chain is the multi-agency National AI Task Force (NAITF). Headed by the Department of Agriculture, NAITF is tasked with coordinating the overall AI preparedness effort. The NAITF structure is shown in Figure 7.2.

Figure 7.2
Structure of the National AI Task Force



The designated lead agency for NAITF depends on the stage of the pandemic. When the Philippines is free of bird flu, the Secretary of the Department of Agriculture is designated as AI "czar" by the President. Table 7.1 illustrates the various phases and stages.

Table 7.1
Phases and stages of an influenza pandemic and relevant lead agencies

WHO pandemic phases	Philippine AI stages	Lead agency
Inter-pandemic phase		
Phase 1: No poultry outbreaks	Stage 1 – AI-free Philippines	Department of Agriculture
Phase 2: Poultry outbreaks, no human cases	Stage 2 – AI in domestic fowl	Department of Agriculture
Pandemic alert phase		
Phase 3: Human infections but no spread	Stage 3 – Confirmation of bird-to-human spread	Department of Health
Phase 4: Small clusters of human infection	Stage 4 – Spread of pandemic influenza nationwide	
Phase 5: Large clusters of human infection		
Phase 6: Pandemic phase		
Post pandemic phase and return to inter-pandemic phase		

Operational Capacity

At present, 20 high-risk areas around the country have been identified. As a result, four AI testing labs have been established to provide diagnostic services for infected fowl. In cases of human transmission, five hospitals owned by the DOH have been designated as AI end-referral centres, with the rest of the 67 tasked with screening and referring cases. Community-based early warning systems have been established in these 20 high-risk areas. It was also reported that rapid response teams can be deployed in any of these areas within 24 hours. Barangay (village) health emergency teams can also be mobilized if there are cases of human-to-human transmission.

Legal Mandates

AI preparedness efforts emanate from three basic mandates: the Constitution, the Communicable Disease Act of 1939 and the Executive Order 280 signed by President Arroyo. While these mandates have so far been sufficient, there is concern that legal challenges may be mounted, particularly towards the culling of birds without adequate compensation. Local governments may also decide to be belligerent and pass the responsibility to other local governments. To execute the preparedness plans, corollary policies such as local ordinances have also been passed.

Financing Gaps and Sources

AI financing is largely viewed as contingent spending, where minimal funds are currently earmarked but the implicit policy is to have draw-downs during emergencies. Standby funding can be expected to come from calamity funds, which are equivalent to 10 per cent of local government budgets. Current efforts are mainly financed by development partners. These include advocacy and public information campaigns, provision of technical assistance to NAITF and local government units, as well as the establishment of diagnostic laboratories. Public spending for AI comes from multiple sources. Potentially, AI efforts tap into the budgets for quarantine (US$2 million), surveillance and control (US$7 million), health emergency management (US$3 million) and the cheaper medicines programme (US$16 million). The social health insurance system has also developed a benefit package that pays US$2,000 per case of AI.

Key Observations

The Philippines pandemic framework can be described by the following:

- Pandemic preparedness mainly to mitigate health effects
- Combination of surveillance, disease control and health emergency tools
- Multi-agency involvement is not necessarily multi-sectoral
- Presumption of central command-and-control capacity in a decentralized system
- Heavy reliance on community-based response
- Legal framework may be challenged
- Contingent financing approach amidst fragmented financing

Severe Acute Respiratory Syndrome as a Gauge for Response Capacity

The Philippines has little experience with modern pandemic preparedness. It is proposed that its capacity to respond to a pandemic can be gauged based on how it handled SARS, particularly in terms of containing human-to-human transmission. Border control is particularly challenging given porous borders, and the lack of diagnostic resources and border control personnel. With only minimal economic growth over the past decade, the economy is particularly vulnerable to economic disasters such as the collapse of the poultry industry. The government does not have the capacity to adequately compensate for such vast losses of livelihood.

The health services in particular run the risk of being overwhelmed. The DOH budget and bureaucracy was under strain when there were just 14 SARS

cases. While substantial support has been provided by development partners, a widespread regional pandemic may also strain the resources of developmental partners. The capacity of the DOH to mobilize and spend contingency funds was likewise challenged, as demonstrated by a SARS fund of about US$2 million that was not fully utilized. Furthermore, the enforcement of health-related restrictions and guidelines may encroach on civil liberties and result in legal challenges. Lastly, valuable lessons learnt in public information and media management during the SARS crisis could help improve AI preparedness.

Recommendations

These comprise two categories: strategic and specific. The former takes into account global conventions on public health practices and local frameworks; the latter consists of specific aims that include support, funding and education.

Strategic recommendations

There should be a clarification of the pandemic preparedness framework in the context of international health and trade conventions in terms of the following:

- Health as a public good
- Allocation of vaccine supply based on common risk
- Burden of responsibility should be proportional with market size/benefit

In addition, the harmonization of local frameworks, protocols and standards with regional and international guidelines is needed, particularly in the following areas:

- Nomenclature
- Best-practice standards
- Periodic preparedness assessments

Specific recommendations

This area comprises the following:

- Strengthening logistics and other forms of support
- Establishing a comprehensive infection control policy that covers various levels of implementation
- Setting up indemnity/compensation funds (e.g. supplementary farm insurance)
- Establishing a health emergency fund or providing rules for drawing resources from multiple sources
- Strengthening legal mandates and issuing corollary policies
- Educating the media

8 Vietnam's Framework of Pandemic Preparedness

Do Thanh Hai

Over the last decade there have been complicated developments in infectious disease epidemiology and epidemic outbreaks in Vietnam. In January 2003, the first case of SARS was found in Vietnam. After SARS, an AI pandemic appeared in late 2003. Overall, 32 provinces and municipalities reported human infections at the time of writing, the majority of which were concentrated around the Red River Delta provinces in the north and the Mekong Delta Region in the south, matching the distribution of poultry outbreaks. At the peak of the epidemic in Vietnam, 24 per cent of communes and 60 per cent of towns were affected, and by March 2004, about 17 per cent of the poultry population had died or been culled, amounting to about 45 million birds.

Vietnam's Recent Experience with Infectious Diseases and Pandemics

Vietnam has been one of the most affected countries in the case of the H5N1 epizootic. Human H5N1 cases emerged over a period of 17 months, with 93 confirmed cases and 42 deaths by the time it was brought under control in November 2005. Despite initial success in curbing the pandemic, the AI virus has not been eliminated but has lingered in small and dispersed municipals. Since early 2008, AI has been found in many localities in 13 provinces and cities, with four deaths. Information about these three pandemics is updated on a daily basis on the Department of Animal Health website. The country is therefore always on high alert for large-scale outbreaks of infections.

The H5N1 epidemic resulted in significant social and economic costs, particularly among Vietnam's millions of farm households with small numbers of poultry. It is estimated that the direct economic impact of the epidemic was a reduction of 0.5 per cent of GDP in 2004, affecting some eight million of Viet-

nam's 11 million households thought to be engaged in poultry production. At the same time, the blue-eared pig disease and foot-and-mouth disease (*aphtae epizooticae*) both crippled the country's livestock industries. A human influenza pandemic could have devastating economic and social consequences, including large-scale loss of life and livelihoods. Vietnam, like other affected countries, confronts difficult choices in balancing preparation versus action, both of which have economic costs.

In late 2007, acute diarrhoea affected over 1,800 people in the country, with nearly 300 cases testing positive for cholera virus, according to the MOH. Since the first case was reported on 24 October 2007, acute diarrhoea was soon detected in 10 provinces and in the capital Hanoi. According to authorities, the main cause was an unhygienic diet, specifically the habit of eating shrimp paste bought in open markets. To eliminate the disease, Vietnam has taken drastic measures including monitoring food safety, ensuring environmental hygiene and intensifying publicity on acute diarrhoea, especially in food-selling localities.

Pandemic outbreaks have been a real threat to the socio-economic development of the country. Every year, about 3.5 million people become victims of infectious diseases and thousands die. Over the last fifty years, there have been 30 new types of diseases found and many are infectious diseases such as cholera, malaria and tuberculosis, which have evolved in a way that makes them more challenging to deal with. Furthermore, environmental degradation, as a result of natural disasters, inappropriate industrialization and urbanization, lays more fertile ground for pandemic outbreaks. About 100 floods have afflicted Vietnam over the last 50 years, and urbanization has grown from 11 per cent in the early 1990s to nearly 40 per cent in 2007. Every year, at least 10 typhoons cause inundation to many regions. Partially a result of ineffective governance, urban waste, everyday sewage and industries pose huge problems in Vietnam, and contribute to the threat of diseases and pandemics. Recently, Vedan Vietnam, a Taiwanese monosodium glutamate maker, was found to have dumped large amounts of untreated effluents into the Thi Vai River. Other rivers in Vietnam face a similar threat of water contamination.

Legal Frameworks for Pandemic Prevention and Control

In recognition of the threat of pandemics and their severity, in late 2007, Vietnam adopted the Law on Prevention and Control of Infectious Diseases, which took effect on 1 July 2008. This law provides an important legal framework which enhances the leadership, specifies the responsibilities of agencies at different ministries and administrative levels, as well as the coordination among them, to effectively prevent and control the spread of infectious diseases and pandemic

outbreaks. It also bans the concealment of relevant related information. When SARS first emerged, the relevant ministries and agencies seemed to be passive and uncertain of the measures that should be taken. Indeed, there were allegations that adequate information had not been provided on time, as in the case of China. It was claimed that when the AI pandemic emerged and caused huge losses to tens of thousands of farmers and endangered their livelihoods, local authorities tried to conceal the information and inevitably contributed to the spread of the disease.

The law that was adopted codifies four principles for the prevention and control of infectious diseases:

- Prevention is of highest priority. The main measures are dissemination of information, education and communication, and surveillance of infectious diseases. Health and medical expertise should be combined with social and administrative measures in the prevention and fight against infectious diseases.
- Inter-agency coordination and social mobilization in the prevention and control of infectious diseases, and integration of prevention and control measures into socio-economic development programmes.
- Publication of precise and timely information about pandemics.
- Pro-activeness, promptness and thoroughness in the prevention and control of pandemics.

To be well-prepared for a possible AI pandemic, the Vietnamese government, in collaboration with WHO, FAO, the United National Development Programme (UNDP), the United Nations Children's Fund (UNICEF) and the World Bank, formulated a number of action plans. The National Plan of Action on Human Influenza Pandemic Prevention and Control in Vietnam was introduced in November 2005. The Integrated National Plan for Avian Influenza Control and Human Pandemic Influenza Preparedness and Response (INP) 2006–2008 was adopted in January 2006. The Integrated National Operational Programme for Avian and Human Influenza 2006–2010, was published in May 2006. A third publication identifies and outlines activities envisaged by the government to achieve the objectives and outputs identified in the January 2006 national plan.

Operational Responsibility

According to the stipulations of the Law on Prevention and Control of Infectious Diseases, the main responsibility of the state administration on prevention and control of human infection is to be borne by the MOH, in which its Department of Preventive Medicines plays the central role. Meanwhile, the Ministry of Agri-

culture and Rural Development is assigned to lead and coordinate all efforts by different ministries and authorities at different levels to deal with the disease.

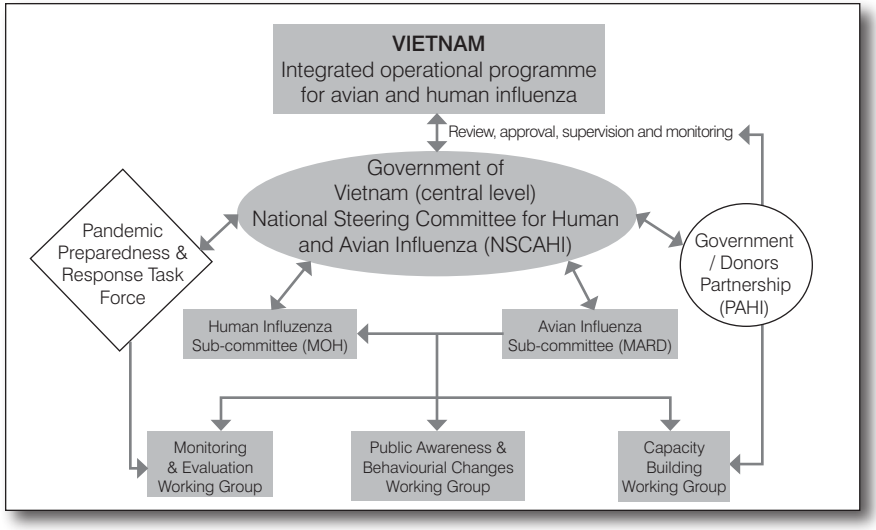
The law also stipulates that once a pandemic is underway, steering committees of different levels, which are composed of representatives from the health, financial, information-communication, military, home affairs and other areas, should be established. The national committee may be headed by the Prime Minister, Deputy Prime Minister or the Minister of Health.

The National Committee for Avian Influenza Disease Control and Prevention was established in January 2004 as the national coordination mechanism for HPAI planning and supervision. It is chaired by the Minister of Agriculture and Rural Development. The Ministries of Health, Public Security, Transportation, Trade, Foreign Affairs, Culture and Information, Science and Technology, and Natural Resources and Environment are members. This committee meets on a weekly basis to brief the government on any developments and to report on the implementation of control measures. The Prime Minister and Deputy Prime Minister have chaired several of these meetings. The National Committee has also been entrusted with the responsibility for government-donor coordination and has met several times over the last six months, at the time of writing, with members of the international community.

More specifically for human health aspects, a National Steering Committee for H5N1 Avian Influenza among Humans, chaired by the Minister of Health, evolved from the National SARS Steering Committee which was established in

Figure 8.1

Coordination framework for Vietnam's pandemic preparedness plans



2003 with the participation of other concerned ministries and sectors. Sectoral responsibilities were to be delegated to a newly-created sub-committee in the Ministry of Agriculture and Rural Development (MARD) and an existing one in the MOH.

Coordination mechanisms at the central level, which are replicated at the provincial and, in many cases, at the district level, are run by the National Steering Committee for Avian Influenza (NSCAI) and National Steering Committee for Avian and Human Influenza (NSCAHI), as indicated in Figure 8.1. NSCAI has been entrusted with the responsibility for government-donor coordination and has met on a regular basis with members of the international community. In particular, the Department of Animal Health, assisted by the International Cooperation Department in MARD, has played a central role in government-donor coordination in recent months, especially in the Joint Government-UN Programme to fight AI, which receives funds from seven bilateral donors. National coordination is to be enhanced by the expansion of membership and of the mandate of the current national committee, through the over-arching NSCAHI. The role of this committee is to coordinate all activities related to animal and human influenza, including pandemic preparedness and response.

At the provincial and, in some cases, the district level, Steering Committees for Avian Influenza have also been established under the People's Committees. They play an important role in local coordination, although the role varies from one locality to another.

Operational Capacity of the Healthcare Network for Pandemic Prevention

Vietnam has an extensive health care delivery network with a very strong primary health care component (9,806 commune health centres and more than 600 district hospitals), its large supply of health workers, and very well-organized national public health programmes such as the Expanded Programme on Immunization.

In Vietnam, the system of surveillance of infectious diseases has long been established, from central to communal levels. The MOH has issued general regulations on pandemic surveillance and assigned responsibilities to the Department of Preventive Medicine, national and local research institutes and centres of preventive medicine in all the cities/provinces and districts/communes. Updates on 26 types of infectious diseases are reported on a regular basis. Regularity is defined as urgent, daily, weekly, monthly or yearly, according to the situation.

Data is collected and processed across different levels, beginning with the grassroots level of communal health stations to district centres, then to the provincial and central centres of preventive medicines, research institutes and

hospitals, on a weekly and monthly basis. The role of health stations, centres of preventive medicine and centres of hygiene and epidemiology is to collect, process, and report according to the scope of their responsibility. The provinces then submit their respective data to four regional institutes of hygiene and epidemiology, as well as to the Department of Preventive Medicine, MOH. Monthly meetings are conducted at the district and provincial levels, while weekly meetings are conducted at all levels, in order to analyse and monitor pandemic developments at each locality.

However, it should be noted that data analysis can only be conducted at the central and provincial levels. To date, Vietnam has not had a standard analytical model to produce common indicators on a weekly and monthly basis. Health workers at the grassroots level do not have the required skills, training or resource capacity to make reliable diagnoses of a pandemic. The outbreaks of SARS, HPAI, AI and foot-and-mouth disease unveiled many weaknesses in terms of facilities and manpower of the human and animal healthcare system in Vietnam. The quality of human and animal health workers at the lower levels, especially at the communal and district levels, is generally poorer due to a lack of sufficient training and equipment to detect and deal with pandemic outbreaks.

The majority of infections at the communal, district and even provincial levels are only clinically diagnosed. No tests are conducted at the communal and district health centres. Medical samples are sent to 64 provincial hospitals and research centres, or to regional or central health care centres, which have been equipped with facilities to test for 26 listed dangerous infectious diseases. The four main research institutes for detecting infectious diseases are the Central Institute for Hygiene and Epidemiology, Pasteur Institute of Ho Chi Minh, Pasteur Institute of Nha Trang, and Institute for Hygiene and Epidemiology of the Highland. The H5N1 virus can only be tested at the Central Institute for Hygiene and Epidemiology, Pasteur Institute of Ho Chi Minh City.

The shortage of skilled health workers and the limitations of the facilities for testing and research purposes are challenges to effective disease surveillance, diagnostic capacity, virus research, virus control and outbreak containment. However, it should be noted that the Vietnamese authorities and international donors are highly committed to strengthening surveillance and early warning systems and to strengthening control and outbreak containment through capacity building activities.

Effective Inter-Agency Coordination for Pandemic Preparedness

The goal of an integrated national preparedness effort is to coordinate objectives and activities across the human and animal health sectors. Achieving this

goal will require sustained national-level planning and coordination among concerned ministries, from the top level to the grassroots level.

For this to be realized in the fight against HPAI, the Integrated National Operational Programme for Avian and Human Influenza (OPI) will require the following:

- Regular revision of National Plans
- Regular updates of operational plans by the ministries and local authorities
- Coordinated simulation exercises of disease outbreaks in animals and humans

OPI will support these three activities by financing national and international technical assistance, workshops and training materials, including incremental operating costs. The National Plan will develop the policy agenda and define actions and responsibilities under different scenarios for all ministries. This will include funding sources and mechanisms. Stockpiling of resources such as anti-viral drugs and medical equipment will also be ensured. Operational plans for ministries and local authorities need to address linkages with other sectors to reflect OPI coordination and management arrangements.

Coordination has worked well under the leadership of NSCAI and will continue to require strong government leadership to ensure that the efforts of donors and international non-governmental organizations are consistent with national priorities. Accordingly, the OPI institutional framework proposes four measures:

- Strengthening national coordination
- Enhancing coordination at the provincial level
- Strengthening the coordination of Official Development Assistance through the establishment of a government-donor Partnership for Avian and Human Influenza Control
- Establishing thematic working groups for public awareness and behavioural change, monitoring and evaluation, and capacity building

Information and Public Communication

Effective public awareness, Information, Education and Communication (IEC) are critical cross-cutting areas which can have a real and measurable effect on the well-being of the community through what is said, and the speed and sincerity with which it is delivered.

The fight against HPAI shows that raising public awareness is a vital component of HPAI control, through the implementation of effective behavioural change strategies. In Vietnam, many government and non-governmental organizations have been involved in HPAI public awareness and behavioural change and communication since the first HPAI outbreaks occurred in late 2003. However,

although some degree of collaboration exists, there is not yet a formal coordination and communication mechanism between ministries or among various agencies. This has led to some overlaps and a waste of resources, as well as confusion among the audience receiving inconsistent messages, unnecessary competition for the audience's time and attention, and the potential for low-impact results due to technically incorrect information. In addition, monitoring and evaluation of activities and behavioural surveillance need to be improved, and the capacity of government agencies and the mass media needs to be further strengthened.

A workshop on Avian Influenza/Pandemic Preparedness Communication was held on November 2005 with the participation of representatives from key ministries and WHO, FAO, UNDP, UNICEF, as well as other organizations such as the Academy for Educational Development (AED) Care and Plan International. Prior to the Tet (Lunar New Year) Festival in 2006, a nation-wide IEC campaign focused on key messages to prevent transmission from poultry to humans, using the mass media, civil society organizations, and communication officers and health facilities as the main communication vehicles. MARD, the MOH and the Ministry of Culture and Information will work within the National Steering Committee to coordinate IEC strategies, messages, target audiences and timing of campaigns.

The recently passed Law on Prevention and Control of Infectious Diseases has clear stipulations on information, education and communication regarding the prevention and control of pandemics, as well as the responsibilities of the Ministries of Health, Information and Communication, Education and Training, Labour, Invalid and Social Affairs, the local authorities and mass media. In Vietnam, thanks to effective public administration, the mass media can be easily mobilized for the dissemination and broadcasting of information related to diseases and pandemics. Article 7 of the Law on Prevention and Control of Infectious Diseases stipulates that the Father Front of Vietnam—an umbrella organization which has a strong base in all localities of the country with mass participation and popular mobilization—is responsible for informing and persuading the people to prevent and control infectious diseases, and for supervising implementation of the law.

Recent events around the fight against pandemic influenza have shown that the mass media plays a vital role in influencing behavioural changes that may be necessary in order to curb a pandemic in urban areas. In the rural areas, where mass media was less able to be utilized, the local authorities, health care institutions, educational institutions, military units and Father Front of Vietnam and its affiliates can be effective.

9 Influenza Pandemic Preparedness in Singapore
Public Health Perspectives

Jeffery Cutter

Singapore has established a systematic preparedness framework in response to the threat of AI. This chapter provides a brief description of the Singaporean preparedness plans and efforts related to infectious disease pandemics. The response phases have been separated into pharmaceutical and non-pharmaceutical measures, for clarity. The chapter also looks at the roll of pandemic exercises in further strengthening the evidence base and feasibility of existing pandemic preparedness plans.

Strategies and Desired Outcomes in Responding to Pandemic Influenza

The main strategies against pandemic influenza in Singapore are effective surveillance, mitigation of the pandemic's impact and vaccination. When a pandemic hits Singapore, the aim of the response is to achieve the following three outcomes:

- Maintenance of essential services to limit social and economic disruption
- Reduction of morbidity and mortality through treatment
- Decrease and limitation in the spread of influenza, to reduce the surge on healthcare services

The Ministry of Health's National Influenza Pandemic Preparedness and Response Plan

Planning assumptions

The MOH has made use of the U.S. Center for Disease Control and Prevention's FluAid modelling software for this purpose. Projections based on infection rates

of 15 per cent, 25 per cent and 35 per cent were calculated but the "average" infection rate of 25 per cent was chosen for planning purposes. Using this 25 per cent infection rate and a population of 4.8 million, FluAid predicted that 650,000 persons would require outpatient care, 13,500 persons would need to be hospitalized and 2,300 deaths would occur.

Other planning assumptions used were that the pandemic would start outside of Singapore, that any warning period before the onset of a pandemic would be short, that it would spread quickly and cause high morbidity and mortality, that it would spread to Singapore within days to weeks, that pandemic vaccine would take at least four to six months to be developed and that neuraminidase inhibitors, e.g. Oseltamivir (Tamiflu) would be the only effective drugs.

Pandemic alert phases

A colour-coded flu alert system has been drawn up. This will guide national responses before and during a pandemic.

- Alert GREEN 0: There is no circulating novel influenza subtype that has affected humans.
- Alert GREEN 1 (Singapore's status at the time of writing): The public health threat to Singapore is minimal and the disease is an avian disease without any human-to-human transmission.
- Alert YELLOW and ORANGE: There is inefficient human-to-human transmission of influenza outside Singapore. In ORANGE, human-to-human transmission becomes more efficient compared to YELLOW and there is a larger cluster of cases outside Singapore, but the virus is still contained to those areas. The risk of importation of cases into Singapore is elevated. Where there are isolated imported cases, such cases have not resulted in sustained local transmission.
- Alert RED:The pandemic is underway and has spread to Singapore. There is significant risk of acquiring the disease from the community.
- Alert BLACK: Morbidity and mortality rates are high, and emergency measures are needed to bring the situation under control.

The priorities during Alert Phases Green, Yellow and Orange (pre-pandemic phases) are early detection and containment. Once the pandemic hits Singapore (Red/Black), the priority will be to mitigate its impact.

Medical response

The medical response covers aspects of diagnosis and medical management. In the pre-pandemic period, a diagnosis of H5N1 has to be confirmed through laboratory testing via polymerase chain reaction methods. In the pandemic

period, it will not be possible to confirm the diagnosis via laboratory testing due to the very large numbers of cases. The diagnosis will have to be based on clinical criteria. Medical management at the outpatient level would mainly involve treatment with Oseltamivir and other symptomatic treatments. Patients who are prescribed Oseltamivir will have their personal particulars entered into a web-based database known as the Health Check System. Inpatient management will, in addition, involve possible intensive care, where necessary.

Surveillance

During the pre-pandemic period, diagnosis of influenza is to be performed on the basis of symptoms and signs of pneumonia, with a history of exposure to live poultry in countries affected by AI.

During an influenza pandemic, diagnosis of influenza is to be made on the basis of clinical criteria, with or without a history of exposure. In addition, surveillance activities during an influenza pandemic will include monitoring the number of patients seen for influenza symptoms at outpatient clinics, the number of hospital admissions, the number of intensive care unit (ICU) admissions and the number of deaths from influenza. Other surveillance measures to be monitored during a pandemic will include the infection rate and the case fatality rate.

Isolation, contact tracing and quarantine

During the pre-pandemic period, confirmed cases of H5N1 will be isolated in negative pressure rooms at the Centre for Disease Control at Tan Tock Seng Hospital. Suspected cases will initially be isolated in their primary hospital of admission while awaiting the results of laboratory testing for H5N1.

Contact tracing and quarantine will play an important role in preventing the spread of AI at the early stages of an influenza pandemic. Contacts will be quarantined in their own homes and given 10 days of prophylaxis with Oseltamivir.

Provision of outpatient and inpatient care

Health care facilities are likely to be overwhelmed by the large numbers of patients. Provision of outpatient care for pandemic influenza will be provided in all public polyclinics and private general practitioner clinics. Strict infection control measures to minimize the risk of non-influenza patients being infected by influenza patients will have to be instituted.

All hospitals, both public and private, will manage influenza patients during a pandemic, and will postpone elective procedures and discharge as many patients as possible to create bed capacity when the pandemic is imminent. Hospitals

have drawn up detailed plans on how they are to manage their operations during a pandemic, including manpower deployment.

A critical resource that is highly likely to be insufficiently available is intensive care beds. A significant proportion of patients who are hospitalized due to pandemic influenza may require intensive care. The MOH has worked with specialists from the public sector hospitals to review how intensive care facilities could best be expanded during a pandemic. It was found that the main limiting factor was the availability of trained personnel. As a result, expansion of ICU beds during a pandemic will be limited. Some ICU beds will also have to be set aside for non-influenza conditions, e.g. injuries and myocardial infarcts. It is hoped that widespread treatment of influenza patients with Oseltamivir will reduce the demand for inpatient care and ICU care by 50 per cent. This will help reduce the daily patient load and enable hospitals to better cope with the anticipated surge.

Pharmaceutical Response Measures

Antiviral drugs

Singapore has stockpiled the neuraminidase inhibitor, Oseltamivir, as part of its influenza pandemic preparedness strategy. Only two neuraminidase inhibitors are available—Oseltamivir and Zanamivir. As Oseltamivir can be taken orally but Zanamivir has to be inhaled, it was decided that the former should be stockpiled in preparation for an influenza pandemic. Although FluAID projections show that there will only be 650,000 outpatients, many more people may seek outpatient care due to the availability of Oseltamivir and the perception that Oseltamivir treatment is necessary. The national stockpile will thus be built up to cater for 25 per cent of the population. Some Oseltamivir is also being stockpiled to provide pre-exposure prophylaxis for essential personnel.

Vaccines

Vaccines have been advance-ordered from a pharmaceutical company. The contract allows a maximum order of two doses of vaccine per person, up to 10 million doses for an eventual total population of five million.

As the first doses of vaccine will not be available until four to six months into a pandemic, such vaccines will most likely arrive after the first pandemic wave. Vaccine protection for the first wave will have to rely on "pre-pandemic vaccines", i.e. vaccines that are produced before a pandemic. Pre-pandemic vaccines can be stockpiled and used when a pandemic is imminent. The efficacy of these vaccines will depend on their ability to cross-protect against a drifted strain of the same sub-type of the influenza A virus. Singapore has decided to stockpile a limited

quantity of pre-pandemic H5N1 vaccines to cater for essential personnel, persons at higher risk of developing complications and young children.

Personal protective equipment
During the SARS epidemic in 2003, PPE such as masks, gloves and waterproof gowns were in short supply. After SARS, the Health Ministry has maintained stockpiles of PPE sufficient for at least five to six months use by all frontline healthcare workers.

Non-Pharmaceutical Response Measures

Delaying the spread of pandemic virus to Singapore
At the earliest signs that an influenza outbreak has reached the pandemic stage, border controls such as temperature checking and health screening will be stepped up in an attempt to delay the spread of the virus to Singapore. The effectiveness of such screening is limited, however, as infected persons who are pre-symptomatic or asymptomatic may pass through the checks. Such persons may also be infectious.

Depending on the severity of the pandemic, other border control measures that can be implemented include the imposition of immigration visa requirements and quarantine of incoming travellers, including residents, the aim of which will be to minimize non-essential travel to Singapore.

Social distancing
Limiting social contacts will help to slow the spread of influenza in the community and will reduce the height of the peak of the epidemic, although overall infection rates over time may remain the same. This may help healthcare services cope, and will decrease the likelihood that healthcare services will be overwhelmed.

Social distancing measures will take the form of closure of all schools and most public places, e.g. shopping malls, cinemas and swimming pools. Public gatherings at mass events such as concerts and sporting events will also be cancelled. Such measures will be instituted when the pandemic arrives in Singapore and will last for the duration of the local epidemic.

Other non-pharmaceutical measures
Other non-pharmaceutical measures that could be instituted during a pandemic include public advice on good personal hygiene such as good cough etiquette and frequent washing of hands. The public could also be advised to stay home as much as possible and wear surgical masks whenever they are in public places including when travelling on public transportation. Members of households with

influenza cases will be asked to practice voluntary home quarantine to prevent possible transmission during the pre-symptomatic phase. The effectiveness of such measures is, however, unknown.

Sustaining essential services
Workers in essential service agencies such as healthcare, energy supply, water supply, waste disposal and law enforcement will be provided with six weeks of prophylaxis with Oseltamivir to minimize their likelihood of being infected with influenza. These agencies have also planned for the provision of services with a certain level of staff absenteeism, e.g. 20 per cent to 30 per cent. It is anticipated that this level of staff absenteeism will not have a major adverse impact on service operations, as this will be similar to staffing levels during the major holiday periods in June and December.

Pandemic Exercises

Government agencies have carried out exercises to test their pandemic preparedness plans. A large exercise (Exercise Sparrowhawk) was carried out in mid-2006 to test preparedness in healthcare settings and at the borders. The exercise was useful in enabling healthcare providers to fine-tune their operational plans for an influenza pandemic. The finance sector also organized an influenza pandemic exercise in September 2008.

Conclusion

These preparations will be severely challenged when a pandemic eventually arrives in Singapore, especially in the case of high morbidity and case-fatality. Healthcare facilities can be quickly overwhelmed and the economy can enter a period of recession. There may be widespread public anxiety and fear. It is thus vital to ensure that preparedness plans are regularly reviewed and updated to incorporate the latest research findings and technology, where feasible. Equally important are exercises that can help to test and fine-tune procedures and plans.

10 On the Efficacy of Border Controls for Pandemic Surveillance and Containment

Tay Joc Cing & Irene Teo Han Yun

Control of vaccine-preventable disease across national borders is a key concern among many governments and health-related organizations today. From past experiences with pathogenic influenza, it appears that coercive travel restrictions and health declarations for contact tracing may yield little towards preventing importations, but are instead likely to incur significant manpower costs and social disruptions. For instance, during pre-spillover regimes of emerging zoonotic diseases when little is or can be known,[1] studies[2] have shown that travel restrictions (or quarantine and isolation) are ineffective in preventing importations, but yet simulation studies have shown a high efficacy of such measures when parameters are properly set,[3] and used in conjunction with prophylaxis and social distancing,[4] or when considering the generational time of the epidemic.[5] Indeed any increase in importation rate will likely increase the local rate of infection.[6] Hence, it is essential that the efficacy of border controls be re-evaluated within an experimental design framework that captures more variables and factors, so as to quantitatively assess their effects on the local rate of infection (and indirectly, the probability of eliminating the epidemic). This will undoubtedly lead to a more accurate decision matrix for when and how to apply border controls.

Border Controls and Their Effectiveness

We propose four factors for prescribing border control actions specific to time and geography. We posit that border controls should be adapted to the nature of the aetiological agent and its natural history (for example, whether it is transmissible from human to human or not), the seasonality and potential for re-assortment with human influenza strains based on the likelihood of the outbreak being exogenously or endogenously founded, the pandemic preparedness

levels of neighbouring countries and not least of all, the generational time of the pandemic. Before we describe these factors in detail, let us briefly review some epidemiological concepts. Any intervention for the purpose of pandemic control will be *effective* if it results in a reduction of the pathogen's transmissibility, or basic reproduction ratio R_0, to a value below 1 (or to eliminate a proportion $1 - 1/R_0$ of transmission). R_0 is defined as the average number of secondary infections generated by a typical primary case within an entirely susceptible population. From the point of view of the source of the outbreak, this can be achieved in three ways:[7]

- Reducing contact rates in the population (through social distancing measures)
- Reducing the infectiousness of individuals (through treatment or isolation)
- Reducing the susceptibility of uninfected individuals (by vaccination or antiviral prophylaxis)

Epidemiologically, elimination of the outbreak occurs either because the treatment strategy reduces R_0 below 1, or because it reduces R_0 to close to 1 when the epidemic is small, thereby enhancing the probability of random extinction.[8] In this context, border controls (through surveillance, quarantine and isolation) facilitates the reduction of contact rates while acting as a complimentary measure with vaccination or antiviral prophylaxis. For instance, Ferguson et al.[9] used a stochastic, spatially structured individual-based model of Thailand, and assumed source eruption to show that a combination of quarantine zones, social distancing and prophylaxis can be effective against highly pathogenic diseases with $R_0 >= 1.8$. Each component plays an important role in boosting the effectiveness of eliminating pathogens of increasing transmissibility, so that not one intervention alone was observed to be sufficient to contain a pandemic of high transmissibility.

Factor I: Source of the outbreak

In the context of Avian Influenza subtype A (H5N1), its natural reservoir is wild birds. It is considered to have first emerged, enzootically in Guangdong province, China, and then zoonotically in Hong Kong, which experienced the first recorded animal-to-human transmission of the highly pathogenic version of H5N1 in 1997.[10] This was found to be due to importation of live poultry from China into wet markets in Hong Kong, coupled with close and persistent contact between live poultry and humans. In this sense, we consider Hong Kong to be an example of a potential source of an avian pandemic, given that it imports half of all its poultry and poultry-related products from China, and its proximity to Guangdong for both trade and migratory bird routes.

Factor II: Pandemic preparedness

The Global Influenza Pandemic Preparedness Plan (GIP) by WHO essentially provides nations with detailed operational recommendations for surveillance and containment of the pandemic through six defined alert levels (or Phases), grouped into inter-pandemic (IP), pandemic alert (PA) and pandemic (P) periods. The authors believe that GIP is limited by its singular public health view, lacking information on logistical support and the issues related to operational realization of its recommendations. While quarantining and isolation are often suggested, challenges to be faced are not considered, for example in a multi-racial society such as Singapore, one must also consider, given religious beliefs, the appropriate types of food (halal-certified food for Muslims for instance) to be sent to each quarantined household, or the protocol or logistics if the infected cases were to be military personnel or incarcerated prisoners, or the need for a dedicated ambulance service to fetch infected or non-ambulant cases. Such detailed operational considerations and their satisfaction are what will really distinguish the prepared and those who think they are prepared but are really not. To this end, Rothstein et al.[11] has provided an excellent operational "companion" manual to GIP, based on lessons learned from SARS. For this factor, we consider countries that have used GIP as a guide *and* implemented all of them[12] as sufficiently prepared.

Factor III: Knowledge of the pathogen

In 1997, Hong Kong experienced the first recorded animal to human transmission of H5N1. With little information on how it would spread, Hong Kong public health officials reacted swiftly to cull 1.5 million chickens in three days, and to cleanse and disinfect the wet market places that provided the reservoirs. The virus continued to evolve and in March 1999, the subtype H9N2 was isolated in two children,[13] while in 2001 clusters of chicken death were attributed to genetic variants of H5N1, eluding the existing surveillance net and resulting in a temporary ban of poultry and related products.[14] H5N1 reappeared in Hong Kong and South Korea, in the Netherlands in 2003 (H7N7),[15] and then spread throughout Asia in 2004, with Thailand, Vietnam and Indonesia reporting the most cases.[16] Of these outbreaks, those caused by H5N1 have been of particular concern because of their high mortality rates and short incubation period. Since 2004, the virus (and its subtypes) has been circulating in herons and falcons. In late 2002, it had acquired the ability to kill its natural host, wild waterfowl, even though these birds were normally more resistant to disease than domesticated birds. The virus has also expanded its host range to include tigers, domestic cats, and more recently, raccoons and red foxes, and has also spread outside of Asia[17] by vectors that the authors believe are likely to be a combination of

both migratory patterns and trade routes.[18] At the time of writing, the H5N1 virus (with pandemic potential) had become endemic in poultry in Asia,[19] with outbreaks having occurred in Vietnam,[20] India[21] and Hong Kong. The virus has shown poor transmission from poultry to humans and there is no conclusive evidence of sustained human-to-human transmission. However, continued and extensive exposure of the human population to H5N1 increases the likelihood that the virus will acquire the necessary characteristics for efficient human-to-human transmission through genetic mutation or re-assortment together with a common human influenza A virus.

Compared with H5N1, SARS is highly infectious among humans with transmission through respiratory droplets and close contact. Most countries have reported a median incubation period of four to five days,[22] but individuals are infectious only upon viral shedding and exhibition of symptoms (i.e. showing respiratory distress). This implies that carriers can potentially evade travel surveillance systems and enter a country undetected while incubating the virus, so as to potentially result in an epidemic. Given this fact, and the experience with SARS in Singapore,[23] we consider Singapore to be a potential source of a SARS epidemic, albeit via undetected importations. A model of SARS transmission by Lipsitch et al.[24] shows that isolation of symptomatic patients within five days of illness onset can reduce the number of secondary transmissions significantly. A study on the viral shedding patterns of SARS patients by Cheng et al.[25] also indicates that overall positive rates of the SARS coronavirus ribonucleic acid (RNA) peaked at 12–14 days after the onset of illness. It was suggested that within that time period, patients were likely to be cared for in hospitals, which explained why health care workers were prone to infection.

Factor IV: Generational time of the pandemic

Seasonality is an important determinant for both the prediction of outbreaks and the emergence of highly pathogenic H5N1.[26] Knowing the dynamics of incidence, specific to season and country, enables further tuning of the effectiveness of surveillance and/or border controls. In order to achieve efficient human-to-human transmission, H5N1 must either undergo a mutation while zoonotically having infected a human, or it must undergo genomic re-assortment within an individual co-infected with the H3N2 strain, for example, which is the prevailing human influenza strain.[27] Therefore, for either mutation to take place, it must require prolonged exposure and frequent re-infections of persons with H5N1 or with persons frequently exposed to the human influenza strain H3N2. As Singapore does not have a large poultry industry (as compared with Vietnam and Thailand, for example), it is believed that Singapore will most likely not experience an indigenous primary infection of H5N1. Therefore, information

regarding seasonality of H5N1 outbreaks in neighbouring countries will provide Singapore with a schedule so as to call for stricter border controls at the correct time. In the second scenario, being a tropical country, Singapore has moderate to high Influenza A incidences throughout the year,[28] with some supporting evidence for increased infection rate during the rainy season. This increases the risk of co-infections with H5N1 and H3N2, should residents be exposed to H5N1 in neighbouring countries, and hence provides greater opportunity for gene re-assortment.

WHO recommendations for border control during the pandemic period

It is noteworthy that in the latest global influenza pandemic preparedness plan set out by WHO,[29] the value of classical border control as a means for containment has been greatly downplayed and, hence, hardly used as a necessary, and indeed coercive, intervention in both the inter-pandemic and pandemic alert periods. The reason for such a change may be because the general public, with sufficient warning and education, are likely to implement self-quarantine. Furthermore, in Phase 6 in particular, where the pandemic is more severe, it is important not to create any additional and unnecessary panic and alarm with the use of coercive methods, as this may lead to further social disruption with significant socio-economic costs. As was clear during Taiwan's outbreak of SARS in 2003, extensive use of quarantine as the main tool for containment resulted in public concealment of mild illnesses (those which did not require hospitalization) for fear of stigmatism. This eventually led to greater prevalence of infections even after WHO removed Taiwan from the list of affected countries.

Adapting border control based on source, knowledge, preparedness and time

We hypothesize that increased information regarding the four factors of Source, Knowledge, Preparedness and Time will lead to a reduced local infection rate, due primarily to decreased time taken for case detection, more targeted containment measures and less socio-economic disruption. They do not by themselves represent a containment bundle, but are guidelines that must be complemented with logistical efficiencies, diagnostic accuracy, quarantine and isolation measures and facilities, hospital-wide infection control, sufficient resources for contact tracing and availability of anti-viral prophylaxis. With the prescribed values for these factors for a particular country, we can make qualitative judgments about how border control measures can be made more effective for that country. Here, we propose three actionable parameters:

- **Specificity**
  This refers to the intensity of border surveillance efforts with respect to time. For seasonal specificity, we propose more intensive surveillance

efforts during the first and third quarters of each year. Actions to be taken include screening and health declarations. For annual specificity, surveillance efforts will cover all quarters to cater for the winter periods of temperate countries and the monsoon seasons for tropical and sub-tropical countries. The actions needed are the same as for seasonal specificity. Implicit in going from seasonal to annual specificity is the reduction in effectiveness of border surveillance (for the same level of resources available), to be traded off with the need for a broader sample.

- **Target**
  This refers to the intensity of border surveillance efforts with respect to geography. For geographic targets, surveillance efforts are focused on specific countries known to be endemic for influenza. Actions to be taken are screening and health declarations. For regional targets, surveillance efforts are to be focused on specific countries known to be endemic for influenza, and for travellers who have been to an endemic country in the last couple of months. For worldwide targets, surveillance efforts apply to all travellers. Implicit in going from a geographic to a worldwide target is the reduction in effectiveness of border surveillance (for the same level of resources available), again to be traded off with the need for a broader sample.
- **Trade**
  This refers to the intensity of border surveillance efforts with respect to trading of poultry and related products. It essentially places restrictions on trade with countries that have known outbreaks.

Table 10.1

Suggested border control action parameters based on non-source, observational knowledge, full preparedness and changing generational time for highly pathogenic H5N1

Decision point	Factor				Border control action parameters		
	Source	Knowledge	Preparedness	Time	Specificity	Target	Trade
1	No	Observational	Yes	IP	Seasonal	Geographic	No ban
2	No	Observational	Yes	PA	Seasonal to yearly	Geographic to regional	Consider ban
3	No	Observational	Yes	P	Yearly	Regional	Ban

Table 10.1 gives one scenario where a country not considered a source of the outbreak has accumulated significant knowledge of the pathogen from an

observational standpoint and has neighbours that have implemented WHO and Rothstein's recommendations. During the inter-pandemic period, we suggest seasonal surveillance with specific controls for countries with known endemicities. Trade barriers are not necessary at this point. As the generational time progresses into the pandemic alert phase, implying that outbreaks have been reported intermittently or consistently, then the focus should either remain at the geographic level or become more broad-based to include more countries (with reported outbreaks) into its spectrum of surveillance. At this stage, the focus of resources should be on containment. Additionally, there is a need to consider banning poultry from affected countries, depending on the level of pandemic preparedness in individual countries (i.e. whether bio-segregation measures were employed).

Conclusion

Our philosophy behind adaptation of border controls involves specific surveillance and (outward-looking) controls in the initial period of pandemic discovery, moving towards general surveillance and (inward-looking) containment measures as the pandemic progresses, assuming the advent of imported cases in the case of H5N1 or endogenous infections in the case of SARS. We have assumed that resources for surveillance and containment are limited, and one objective has therefore been to increase the effectiveness of border control while satisfying resource constraints. This assumption is not always true however, as an afflicted nation may resort to extreme measures like quarantining every in-bound traveller arriving from an affected country in a bid to avoid disrupting air travel, while simultaneously pursuing more stringent containment measures.

Notes

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11 *Malaises Sans Frontiers*
Containing and Controlling Pandemics across Borders

Elina Noor

Diseases and their vectors have always accompanied the opening of borders and the expansion of trade routes, since the plague that raced across the oceans from China to Europe aboard trade ships in the fourteenth century, to the more recent airborne spread of SARS across 25 countries, in under four months in 2003[1]. The explosion in air travel and sea traffic in the past 50 years,[2] made possible due to extensive modernization of transport and technological capabilities around the world, as well as increased globalization, have only accelerated this phenomenon.

The Pandemic "Prophecy"

Over the past 300 years, the world has witnessed 10 pandemics, three of which occurred in the last century. The discovery of at least 39 new infectious diseases in the past 30 years[3] and the re-emergence of older ones, such as tuberculosis (TB), have all revived latent fears. In 2005, there were 8.8 million new TB cases, half of them in the six Asian countries of Bangladesh, China, India, Indonesia, Pakistan and the Philippines.[4] While the effects of TB and mosquito-borne diseases such as malaria and chikungunya extend far and wide, the most widely publicized and infamous pandemic of all is influenza. The last deadly strain—the Spanish Flu—occurred in 1918 and infected one-fifth of the world's population, decimating up to 50 million.[5] With the H5N1 strain having killed 100 per cent of infected poultry and more than 50 per cent of infected human beings, its virulence has been feared to resemble that of the 1918 strain. While 250,000–500,000 people die of the normal influenza and two to three million become seriously ill every year,[6] if the H5N1 mutates into a form that is transmissible from human to human or if it develops resistance, the impact of a new virulent pandemic on global losses will be devastating.

With the exception of the establishment of efficient human-to-human transmission, all prerequisites for a H5N1 pandemic have been met. Asia, in particular, is ripe as its source.[7] Studies have indicated that new strains of virus that produce yearly seasonal influenza epidemics around the world frequently emerge from East and Southeast Asia.[8] Additionally, outbreaks of the H5N1 virus continue to reoccur, despite persistent control measures such as the culling of more than 140 million poultry.[9] In the words of Dr. Michael Osterholm, "Make no mistake about it, pandemics are like earthquakes, hurricanes and tsunamis—they occur."[10] All that remains unclear is just when this will happen and how severe the next pandemic will be.

Assessing Border Control

Common wisdom dictates prevention over cure or mitigation. Disconcertingly, however, WHO warns that in risk-prone countries, the early warning systems are weak, expensive and under-resourced.[11] Vaccination and antiviral drugs—"two of the most important response measures for reducing morbidity and mortality during a pandemic"[12]—will be inadequate given present trends.[13] Even if this problem is resolved before a pandemic phase, ethical questions remain, including how vaccination and antiviral drugs will be equitably delivered, particularly during the start of the pandemic.

Border control is the last line of defence in the event of a pandemic. And yet, with a virtually unstoppable flow of two billion airline passengers worldwide per year,[14] the boom of low-cost airlines in Asia, and China emerging as the largest market for commercial aircraft outside the United States,[15] even this frontier buffer seems highly fallible.

Sheer numbers aside, the effectiveness of border control on curbing a pandemic raises several complications. First, even with departure and arrival screening, the probability of successfully detecting an asymptomatic incubating virus is limited. Without any obvious signs or symptoms of infection, it will be very difficult to detect a known disease, let alone identify a hitherto unknown strain. During the 2003 outbreak of SARS, WHO concluded that the best estimate of the maximum incubation period is 10 days.[16] By contrast, many flights within Asia and onward last less than 24 hours. Thus, an individual who has not displayed symptoms of a pandemic may be free to come into contact with the wider public until displaying symptoms of full onset of the disease. A study of border control measures undertaken in Canada at the height of the SARS outbreak revealed that none of the five SARS patients entering Canada from March through May 2003 showed any symptoms of the disease during transit.[17]

A longer journey time of 48 hours may or may not detect infection, but this

will also depend on the availability of adequate and rapid diagnostic tests at the point of departure or entry. In the event that symptomatic infected individuals do not recognize their symptoms as those of a pandemic, they may not voluntarily present themselves for screening by medical authorities at the port of entry. Worse still, they may falsify information, if they do indeed have information about their disease.

While there were no additional cases of airline transmission of SARS after WHO recommended exit screening on 27 March 2003, research data from China (including Hong Kong and Taiwan) indicated that only one probable case of SARS was detected among 1.8 million travellers who completed exit health questionnaires.[18]

Secondly, in the case of an infected traveller who develops and displays symptoms in-flight hence triggering quarantining, studies of mathematical modelling have shown that the risks of in-flight infection are lower than perceived, assuming that aircraft ventilation and filtration system are operational.[19] In the case of TB, for example, a study published in *The Lancet* revealed that although there is a risk of TB within the aircraft cabin, no case of active TB transmitted by air travel has ever been reported. The likelihood of transmission increases significantly within two seat rows over a flight longer than eight hours. However, the risk drops if 50 per cent of the cabin air is recycled. Even with a highly elevated transmission rate in-flight, the delay of infection remains only marginal.[20] Further, simple practices of good hygiene have been proven to reduce the risk of disease transmission. Although SARS was spread on board five flights in March 2003, no additional on-board transmissions occurred after WHO issued in-flight precautionary guidelines urging passengers to frequently wash their hands, and cover their mouths and noses when coughing. It recommended the use of face masks only for symptomatic passengers.[21]

Thirdly, border controls that include mandatory testing, conditional entry and quarantining raise the spectre of discrimination and violation of an individual's dignity and freedom of movement. These rights and liberties may undoubtedly be derogated in the event of a threat to public health,[22] such as a fatal pandemic, but may appear discriminatory to at-risk and often vulnerable individuals. For example, while WHO clearly state that there is no public health justification for entry restrictions that discriminate solely on the basis of a person's HIV status, over the past two decades more countries have imposed various forms of travel restrictions on HIV-positive people.[23]

Fourthly, border control is not always pragmatic because of its low cost-benefit yield. Travel advisories often create a negative chain impact on the travel, tourism and hospitality industries, causing economic disruption that is not always proportional to the health threat in question. Even though it turned

out that SARS was not as contagious and dangerous as the 1918 Spanish flu, in 2003, in light of SARS, Cathay Pacific reduced its services within Asia by 4 per cent while Qantas reduced its international flights by 20 per cent between April and July 2003.[24] Tourist arrivals dropped from 20 to 70 per cent in April 2003 for the SARS-hit economies in Asia, although as the outbreak tempered, these declines also diminished.[25] ADB priced the total cost of SARS to East and Southeast Asian economies in 2003 as US$18 billion in nominal gross domestic product terms, or US$60 billion in the overall loss of demand and business revenue.[26]

Moreover, entry and exit screening for all passengers not only result in additional delays at airports, but were also found to be not always complete, accurate or easy to instigate. An Australian study of international arrivals at Darwin airport during the SARS outbreak showed that, of the 384 people interviewed from Southeast Asia, 16 per cent did not hear the in-flight announcements for screening and seven per cent did not understand English.[27] More significantly, combined results from Canada, China (including Hong Kong) and Singapore revealed that no cases of SARS were detected by thermal scanning upon entry among more than 35 million international travellers scanned from March to July 2003.[28] Similarly, no cases of SARS were detected through thermal exit scanning among more than seven million travellers.[29] Probable or suspected SARS was diagnosed in 21 (0.03 per cent) of 80,813 travellers into Taiwan, though none of them were detected by thermal scanning upon entry.[30]

Conclusion: Necessary but Insufficient

Certainly, border control of pandemic diseases is essential in a shrinking world where travel times have been shortened and international air travel is now available to the masses on an unprecedented scale. Nevertheless, studies have revealed that non-pharmaceutical public health interventions that target travellers have a limited effect on containing or controlling infectious diseases. In particular, border control can create an illusion of security and reassurance that, measures notwithstanding, can quickly be shattered with the onslaught of a pandemic across borders. Indeed, as WHO has noted, "the value of border screening in deterring travel by ill persons and in building public confidence remains unquantified".[31]

Research results and findings from the SARS outbreak in 2003—the first probable modern-day example of a novel pandemic—show that the resources invested in expensive thermal scanning machines could have been better applied to strengthen screening and infection control capacities at points of entry into the healthcare system.[32] As one study concluded, "short of preventing interna-

tional travel altogether, eradicating a nascent pandemic in the source region appears to be the only reliable method of preventing country-to-country spread of a pandemic strain of influenza".[33] Until such an unlikely time, resources will be better directed to educational, preventive and healthcare frameworks and institutions in this region, within and among countries.

Notes

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12 A Multi-Sectoral Approach to Pandemic Preparedness

Ingo Neu

Due to the experience of the outbreak of SARS in 2003, countries in Southeast Asia, and most other countries in the world, reacted very quickly and strongly when AI emerged in early 2004. When the first human cases of AI surfaced with a very high fatality rate, many were afraid that a new serious infectious disease had emerged. Even though it did not match the speed of SARS and was in no way comparable to the previous cases of influenza pandemics—in 1918, 1956–1957, 1968–1969—the psychological effect was tremendous and resulted in a very fast and rigorous response from the international community. Billions of dollars were made available to developing countries, in addition to investments by developed countries, for poultry and livestock as well as for the human health sectors.

The Evolving Threats of Pandemics and Mutating Viruses

The international community and affected countries were on high alert for a prolonged period of time especially when the number of human cases continued to rise and new countries and continents became affected. However, some years after the initial outbreak, many began to question if the risk of a pandemic was in fact overstated. Many related the risk of a pandemic, and hence the need to deal with avian and pandemic influenza, to the number of human cases that occurred. It is presumed that a deterioration of the situation will be clearly marked by significant increases of human cases and by the appearance of clusters or larger outbreaks. In the absence of these, the perception of risk waned and pandemic influenza fatigue seemed to have set in, at the time of writing. This is a "psychological" reaction rather than a "logical" factor, because the number of human cases of the H5N1 virus does not indicate the threat level of an influenza pandemic. The decrease in human cases of HPAI indicates only improvements

with surveillance systems and biosecurity measures. In order to assess whether the threat of an influenza pandemic that originated from the H5N1 virus remains high, one needs to look at its tendency to mutate into different forms and the frequency of such mutations. Studies have shown that the virus has developed distinct mutations.[1]

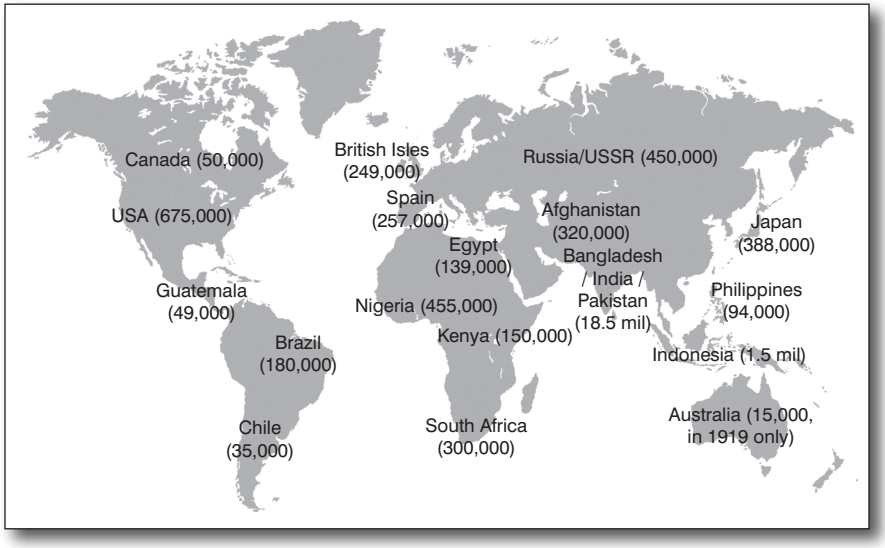
Decisions are not always based on logical reasoning but often on psychological reasoning, thus necessitating investments and efforts to study the frequency or probability of a disaster, and put in place preparedness measures. The human mind also finds it harder to consider potential problems especially without having experienced them previously. As a result, few in Asia will question the necessity of investment to build early-warning systems and put preparedness measures in place for a tsunami, even if this will compete with other important and urgent needs for which resources are limited, because the region has experienced a tsunami and its devastating effects. Conversely, the fact that Asia has had a devastating tsunami in recent times may actually decrease the probability of another one happening any time soon.

Though an influenza pandemic might be a low-frequency event, the impact it may have could be so devastating that the recent disasters (Cyclone Nargis,

Figure 12.1

1918 Spanish Flu pandemic mortality estimates for selected countries

(Population in 1918: 28% of current global population)



Source: Global Mortality of the 1918–1920 Spanish Influenza Pandemic, available at birdfluexposed.com/resources/NIALL105.pdf.

earthquakes, tsunami, etc.) might pale in comparison. The estimated death toll of the Spanish Flu Pandemic in 1918 as depicted in Figure 12.1 shows a death toll in the Asia Pacific that was much higher than that of any disaster since. While taking into account circumstantial factors that are no longer comparable (most deaths which occurred then were due to bacterial pneumonia, for which there is better treatment today), factors such as higher population densities, larger populations, and faster global transportation might counterbalance the "positive" difference.

From Avian Influenza Response to Multi-Sectoral Pandemic Preparedness Planning

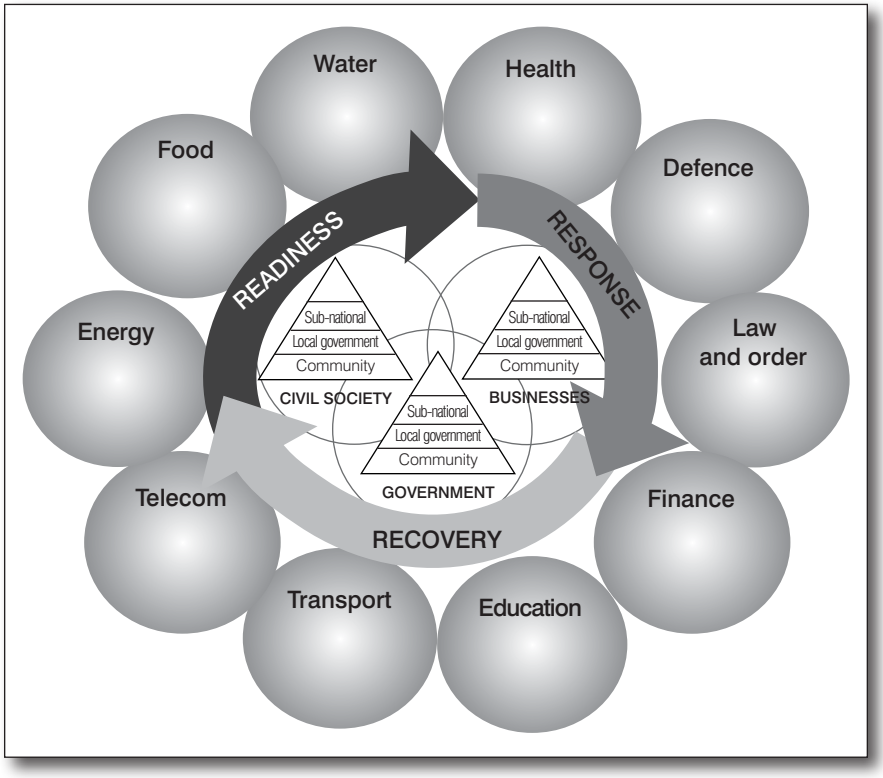
Since 2004, significant measures have been undertaken in order to respond to the threat of avian and human influenza, and most countries have developed national plans to address the problems. In most cases the focus has been on animal health issues in terms of surveillance, culling, vaccination, compensation, communication and biosecurity, as well as human health issues such as surveillance, isolation and treatment, medical and non-medical interventions, vaccine development and communication. The national pandemic preparedness plans of most countries are strongly or mainly influenced by the animal and human health sectors, including communication strategies. Although multi-sectoral committees have been set up, they usually deal with animal and human health issues and how various other sectors can contribute to the current work, or support the government and the health sector in their containment and response efforts during an outbreak. Only a few countries have truly multi-sectoral pandemic preparedness plans that describe measures to mitigate the impact on their respective sectors in order to remain operational and maintain their services.

The main shared impact on different sectors will be caused by a high rate of staff absenteeism due to disease or death, time off work to care for family members or a fear of leaving home. Estimates of the rate of absenteeism range between 30 to 40 per cent, although higher rates may be possible. The impact of absenteeism might lead to a decrease in supplies because of an interruption of production and/or transportation inside the country or because of cross-border issues. Additionally, there may be a decrease in demand, which could burden mostly private-service providers, but certain services (e.g. telecommunications, energy, etc.) are likely to experience a drastic increase in demand, dealing with high absenteeism and other possible problems as well. Based on experiences from previous influenza pandemics that came in waves, the problem of absenteeism may be prolonged. An outbreak could last several weeks or months, at the end of which returning staff levels will depend on the mortality rate.

The "Whole-of-Society Approach" to Pandemic Preparedness

The economic and social consequences of a pandemic will be greater if governments, businesses and civil society groups have not developed plans to maintain the capacity to deliver key, or essential, services in a pandemic. This will require a concerted and collaborative effort by different government ministries, businesses and civil society organizations to sustain essential infrastructure and mitigate impacts on the economy and the functioning of society. While the specific set of essential services varies from country to country, there is a core set of services present in many settings: water and sanitation, fuel and energy, food, healthcare, telecommunications, finance, law and order, education and transport. The failure of one or more of these services can have major economic and social consequences, as well as impacts on other essential services. Public and private service providers are interdependent, and they rely on the goods and services of other sectors in order to sustain their operations.

Figure 12.2
A multi-sectoral whole-of-society approach to pandemic preparedness



Furthermore, pandemic preparedness should be integrated into national, local and regional disaster management plans, processes and structures. Planning should be based around three crisis management stages (readiness, response and recovery). Individual organizations should incorporate pandemic preparedness into existing crises and business continuity management systems.

Multi-sectoral pandemic preparedness requires cooperation and planning involving all levels, the private and public sectors, as well as civil society in a "whole-of-society approach" as illustrated by Figure 12.2.

Multi-Sectoral and Integrated Pandemic Preparedness Plans

Each country will require pandemic preparedness plans for each sector, which is to be linked in with a national pandemic preparedness plan. There is therefore a need for a high-level coordinating body within each government to ensure that plans will be developed, implemented, tested, and if necessary, revised. Its role may be to provide specific guidance (e.g. run scenarios and plan assumptions, establish a national pandemic level coding system) to the public and private sectors in order to assist the development of pandemic preparedness plans.

The government should then coordinate multi-sectoral planning and support the relevant exchange of information within and between sectors in order to ensure that the interdependencies are clear and appropriately addressed in the different plans. Finally, it should also implement the testing of plans at national and local levels.

Individual sectors (public as well as relevant private organizations or businesses) should establish a preparedness planning team to develop pandemic preparedness and business continuity plans. Business continuity plans in each sector should enable the sector to both continue their own functions and assist their respective governments to cope with pandemic outbreaks. Last but not least, pandemic preparedness should be integrated into the national and local disaster management plans, processes and structures.

Note

1. www.who.int/entity/csr/disease/avian_influenza/smaltree.pdf

13 Pandemic Preparedness in the Financial Sector

Gunawan Husin

A pandemic is defined as an outbreak of an infectious disease in humans, which has spread rapidly over large areas. Over the past few years, disease outbreaks such as SARS and AI have led to serious concern on the part of WHO and of many regional governments.

In February 2004, an AI virus was detected in birds in Vietnam, increasing fears of the emergence of new variant strains. Many were concerned that if the AI virus were to combine with a human influenza virus (in birds or humans), the new subtype created could be both highly contagious and highly lethal to humans. Such a subtype could cause a global influenza pandemic, which would put the health of millions at risk and cause serious economic consequences. Compared to SARS, an influenza pandemic could be substantially more damaging in both human and economic terms.

Experts believe that a regional or global pandemic could last between 12 and 18 months. With such a magnitude and duration, the psychological impact will result in the loss of consumer and investor confidence, as well as the potential loss of workforce. AI is a highly virulent disease with human mortality rates of approximately 70 per cent. Most of the victims are believed to have caught the virus from infected poultry but experts fear it could mutate into a form that is easily transmitted from human to human, a vital step in the development of a global human influenza pandemic. Governments in Southeast Asia have hence been on high alert, and have implemented stringent containment measures following an escalation in the number of recent cases, at the time of writing. The 2003 SARS epidemic highlighted the need to plan carefully and early for events which are directly associated with the health of a human workforce.

It is under such an understanding that the financial sector must embed pandemic planning in their existing Business Continuity Management (BCM) capability. Existing BCM programmes should be revisited to add emphasis on pandemic-related strategies or policies in key areas such as human resources,

work priorities, multi-industry interdependencies and communication.

From August to September 2008, Singapore's financial sector held the second Industry Wide Exercise (IWE 2).[1] More than 150 financial institutions along with other government agencies took part in IWE 2. Such participation allows the financial industry to improve its preparedness, by providing each of the participants with an opportunity to review, test and update their plans for managing a pandemic. Such an exercise also provides an opportunity to assess whether there were sector-wide issues that might need to be addressed collectively in order to improve the capability of the financial sector to cope with a pandemic.

The exercise not only enhances risk awareness in the financial industry, but also continues to strengthen Singapore's position as a key global financial hub and a centre of excellence in BCM.

Why Pandemic Preparedness Matters: Need for Business Continuity Programme

In the 1970s and 1980s, businesses were mostly focused on technology recovery in an event of a disaster. A fire that wiped out the major workspace at a key bank in Los Angeles in the mid-1980s was seen as a catalyst for the financial sector to emphasize workspace recovery. This gave rise to the need for BCM. Banks and other financial institutions today are well aware of the need for BCM to protect themselves against unexpected events such as accidents, natural disasters, terrorist acts and disease outbreaks. However, most BCM efforts tend to focus on information technology systems, infrastructure and processes, without sufficient focus on people.

BCM is a living process. Along with business dynamics and its related factors, this process needs to be updated on an ongoing basis. The September 11 attacks in the U.S. re-emphasized a need for BCM. The Federal Reserve in America amended its BCM requirement and introduced more stringent measures within the financial sector. And for many major institutions, BCM has become one of the main business practices integral to key operating procedures.

The threat of pandemics has posed a new challenge for BCM practitioners to improve their methodology. Pandemic preparedness frameworks bring a new focus to the non-availability of people and skills in carrying out essential functions, while systems and infrastructure remain functional.

The financial sector is one of the most regulated sectors in many countries. It is mandated to demonstrate resilience and the capability to resume operation of critical businesses, in the event of any unforeseen disruption. As such, the financial sector allocates an enormous amount of resources to building a robust

BCM programme. Having been hit hard by SARS, planning for a pandemic is important to improve awareness and business resilience. In Singapore, several major banks initiated a pandemic preparedness-planning framework as early as 2004.

Pandemic Preparedness Model from a Banking Perspective

Banking is not all about maximizing profitability, increasing market share, and producing favourable financial ratios. BCM and other risk management measures are integral to overall business operations and are subject to stringent compliance processes. This section describes the incident management process and the pandemic preparedness framework.

An incident management model can be used for any type of incident that prevents people's access to their workspace. To respond to a pandemic, the incident management framework includes processes such as the following:

- Incident detection – Who are the first responders in an incident and who are the parties to escalate potential problems and issues?
- Assessment of the impact to business (direct and/or indirect) – Determining which expert group determines the severity of the incident and the need to activate the incident management team
- Decision-making processes to activate recovery facilities – Determining who makes the decision to activate BCM and when to do so
- Business recovery – Determining who makes the priorities and essential services to be resumed
- Return to normalcy – Determining what steps are to be taken in order to revert to business as usual

A pandemic preparedness framework should include, but not limited to, the following disciplines:

- Business continuity – Analysis of business criticality and strategy in the event of loss of building(s) and people
- Technology – Analysis and implementation of technology options to support a chosen pandemic preparedness strategy
- Workplace infection control – A process ensuring that potential infections within a premise are minimized through social distancing and healthy living
- Workplace infection management – A process of isolating a suspected case and liaising with the government health authorities
- Internal and external communication
- Travel management – A travel ban or restriction during an increased threat level

- Service providers' readiness – Understanding the level of preparedness of key suppliers

Such a framework cannot be developed in isolation. There are formal standards that can be used as a guide, such as those of WHO, and local response mechanisms. In Singapore, a national command and control structure has been established for an effective surveillance system to detect the importation of a novel influenza virus, mitigate the consequences when the first pandemic wave hits and then strive to achieve nation-wide immunity when a vaccine becomes available. The government also aims to maintain essential services in Singapore to limit social and economic disruptions. It has also put in place a generic framework referred to as Disease Outbreak Response System (DORS).

A response system, such as the pandemic phases set out by WHO, then becomes the trigger for certain courses of action. For instance, a Phase 4 alert with cases of human-to-human transmission requires various teams to activate their response plans accordingly, from business continuity and technology to workspace infection control perspectives. The responses include the following:

- Stopping non-critical functions
- Redefining business priorities and determining which processes can be transferred to other office(s), if any
- Splitting operations and working from home for processing of relevant business activities
- Increasing usage of audio/video conferencing
- Restricting business travel during a higher alert level
- Activating succession planning

More detailed information of this model can be found in Table 13.1, where specific actions are plotted according to the different pandemic phases. This provides greater capacity for management to monitor the outbreak and make sound decisions.

Challenges

Even though the financial industry has released pandemic preparedness guidelines and most of these institutions have pandemic plans in place, there remain residual risks. This is due to the following:

- Plans are mostly done in isolation and are institution-specific.
- Despite the industry guidelines, there is no one-size-fits-all solution. Planning assumptions vary amongst banks. For instance, not all banks have a policy of stockpiling anti-viral drugs, due to different risk assessment methodologies and capabilities.

Table 13.1

Sample pandemic response plan

WHO phase	Pandemic working group	BCM	Communications	Facility management	Human resources	Line manager	All staff
Phase 1/2	Business as usual	Business as usual	Business as usual	Stock up PPE	Business as usual	Business as usual	Business as usual
Phase 3	Continuous intelligence building Participate in industry working group	Formulate pandemic preparedness strategies	Prepare communications strategy	Education and awareness	Prepare travel policy	Identify critical staff and work priorities	Avoid contact with poultry Exercise healthy living
Phase 4	Start addressing issues in affected countries Activation of pandemic plan	Activate plans in affected areas Monitor local and international health authorities' advice	Activate communications plans	Activate plans, e.g. daily temperature taking of staff and increased cleaning frequency of internal premises	Travel monitoring for both business and leisure Reduce face-to-face meetings	Activate plans, cross-border support, staff segregation, alternative work strategies	Social distancing Exercise healthy living
Phase 5	As above	As above	Regular / timely internal communications to all staff	Temperature screening of all visitors Recording visitors' details Increased cleaning frequency of internal premises	Exercise travel ban Introduce quarantine period for all returning staff Stop all face-to-face meetings	As above	As above
Phase 6	As above	As above	Regular / timely internal communications to all staff	Temperature screening of all visitors Recording visitors' details Increased cleaning frequency of internal premises	As above	As above	As above
Post-Pandemic	Monitor and manage	Gradual return to business as usual	Regular staff communications	Gradual return to business as usual	Gradual return to business as usual	Gradual return to business as usual	Gradual return to business as usual

- Interdependencies have not been addressed. Financial institutions do not function alone; they require infrastructure support such as clearing houses and exchanges, transportation services, power supply, telecommunications services, security services, and other services. The financial sector's pandemic preparedness plan will hence not be effective without an understanding of the strategies of these other actors.

IWE 2 has revealed several common challenges faced by institutions in the financial sector, which must be addressed by the relevant actors. Some of the key challenges include the following:

- Availability of resources—financial, human and technological—to formulate and implement pandemic preparedness frameworks
- Need for higher awareness of the problem – Some institutions are better prepared, while others treat it as a checklist exercise to pass audit requirements, and most do not have the resources to do so.
- Whether non-financial industries will make it mandatory for their own sectors to have in place pandemic preparedness frameworks
- Whether elements of the national infrastructure, such as telecommunications, can cope with increased bandwidth requests
- Issues of human resources – Current plans assume that people will be available for work even during a pandemic, but in reality it may not be the case as absenteeism may be as high as 60 per cent.

Conclusion: Signs of Success

On a daily basis, news about AI outbreaks appears in various parts of the world. This threat is real and our capability to deal with it is limited due to poor understanding of the behaviour of the avian virus itself.

On the other hand, efforts must continue between all sectors, both public and private, to cooperate and build capacity in managing this threat. From within the financial sector, there is a pressing need to collectively agree on a framework and on triggers for an effective response to a pandemic. This will include, for example, agreement on essential services that the financial sector needs during a pandemic outbreak, strategies on how to deliver such services and communication protocols for stakeholders.

In general, the financial sector has already established minimum standards and response plans on its own. However, it lacks coordination as a whole. Financial regulators and banking associations in many countries have shown leadership, guidance and avenues by which to boost cooperation. This cooperative model is important and may help solve the problem of smaller institutions

where resources are scarce, by learning from other industry players. Crucially, it is never too late to start cooperating.

Note

1. Industry Wide Exercise (IWE) is a key initiative by the banking sector, through the Association of Banks in Singapore, to encourage the public and private sectors to work closely and to increase social resilience. IWE 1 was conducted in May 2006, simulating multiple terrorist attacks in the Central Business District of Singapore. IWE 2 was conducted from August to September 2008, simulating an AI outbreak in Singapore and the region.

14 Surge Response Capability and Pandemic Preparedness

Huang Yanzhong

Given the socio-political, economic and security implications of a future influenza pandemic,[1] it is essential for states to have the capability to minimize or mitigate its consequences should it occur. The concept of surge capacity forms the cornerstone of pandemic preparedness. There is, however, a lack of consensus on what exactly surge capacity is about. Some define surge capacity in a broad manner, as "the ability to expand provision beyond normal capacity to meet transient increases in demand, e.g. to provide care or services above usual capacity, or to expand manufacturing capacity to meet increased demand".[2] Others will define it rather narrowly, as "the ability to add additional beds in time of an emergency".[3]

Focusing on the medical aspect of capacity building, the U.S. Government Accountability Office identified four key components of preparing for a medical surge: increasing hospital capacity; identifying alternative care sites; registering medical volunteers; and planning for an alteration in established standards of care.[4] Similarly, the Agency for Healthcare Research and Quality of the U.S. Human and Health Services (HHS) defines surge capacity as "a health care system's ability to expand quickly beyond normal services to meet an increased demand for medical care".[5] HHS further distinguishes surge capacity from surge capability, in recognition of the differences between dealing with a sudden influx of new patients who do not demand specialized care, and caring for a few patients with a highly contagious illness that demonstrates particular transmissibility in the healthcare setting. If surge capacity is defined as one that challenges or exceeds normal operating capacity, or "the ability to evaluate and care for a markedly increased volume of patients", surge capability refers to "the ability to manage patients requiring unusual or very specialized medical evaluation and care".[6] With this difference in mind, I follow Kelen and McCarthy's usage of "surge response capability" (SRC) to include both dimensions of medical surge.[7]

Components of Surge Response Capability

According to Kelen and McCarthy, SRC is "the ability of surge capacity (i.e. the resources that can be made available) to accommodate the surge (demand for resources)".[8] SRC is therefore a function of both surge (on the demand side) and surge capacity (on the supply side). A disease outbreak will naturally trigger a "surge", leading to a rise in demand for medical and non-medical services in contrast to a baseline demand. The surge itself is a function of the type of the virus, its geographic spread (localized outbreak, epidemic or global pandemic), clinical virulence and the duration of the event in question. Maximizing SRC will therefore entail effective measures to reduce the surge. While certain factors such as epidemiological behaviour of the disease and the characteristics of circulating viruses are beyond human control, the surge in demand can be reduced by a functioning disease surveillance and reporting system, well-developed laboratory and epidemiological capacities, effective and accurate communication with the public about the disease, prompt sharing of disease-related information (including samples) with the international community and effective prophylactic measures (inter alia, vaccines), and non-prophylactic interventions (e.g. isolation, quarantine, school and selected business closures, and public gathering cancellations). These measures will reduce the demand for medical care by reducing fear and panic, limiting the spread of disease and reducing the need for more costly pharmaceutical treatments.[9]

On the supply side, surge capacity consists of components that pertain to patient care. These include treatment space such as hospitals, hospital beds, emergency rooms, ICUs, regular and voluntary medical staff, and supplies and equipment (e.g. ventilators, pharmaceuticals and oxygen). It also consists of systems and processes that are in place to identify resource requirements, mobilize standby resources, and rationalize their use, and those that maximize and sustain such abilities. The emphasis on systems and procedures entails efforts to maximize the delivery of non-medical products or services that are critical to medical services, including food, power supply, security, communications and a chain of command. Unlike epidemics such as SARS, an influenza pandemic will likely cause shocks on the supply side by affecting the health of the labour force. Officials of the U.S. HHS predicted that during the peak of an influenza pandemic, as many as 40 per cent of workers in U.S. firms could be absent, including those who are sick, people who need to care for others and those who are just afraid to go to work.[10] Studies suggest that if 25 per cent or more of a population is sick, fuel and food supplies will be seriously affected,[11] which will in turn significantly affect the functioning of the existing health system and society.

Case Study: U.S. Surge Response Capability during the 1918 Spanish Flu

A close examination of the 1918 Spanish Flu has revealed the importance of controlling the surge while maximizing the surge capacity. Human beings then were dealing with the worst single case of any infectious disease of the previous 300 years. It was 10 times more deadly than any other influenza virus for which we have data; it killed the young, the old and those in the prime years of life. The virus had extreme mutability, came in waves and was interwoven with the First World War. All these contributed to a big surge in demand for medical services, while few effective measures were taken to reduce the surge. Health officials nationwide took a Pollyanna attitude toward the looming pandemic: despite months of indications of an impending disease, the U.S. Surgeon General made no preparations. When the virus finally hit, health officials played down the danger and took little action to prevent the spread of infection—indeed, no national official ever publicly acknowledged the danger of influenza. In part, this could be attributed to the lack of epidemiological capability. Influenza was not made a reportable disease in most parts of the country until after it evolved into a full-blown pandemic. Furthermore, public health departments at various levels were too poorly coordinated to put together data and provide even an estimate of the epidemic.[12] The ongoing war in Europe also played its part. Apparently worrying about hurting morale, local newspapers said little about mortalities caused by the pandemic and full information about the influenza virus was not broadcast around the country. Instead of encouraging social distancing measures, the bond drive would entail "thousands of meetings and rallies, tens of thousands of door-to-door solicitations, and just about everything recommended for the spread of an air-borne disease".[13]

The ensuing rapid spread of the deadly disease, its development into a global pandemic and its lasting effects not only led to the significant surge in demand, but also resulted in widespread fear and panic that undermined the surge capacity of the country. Knowledge about the disease was poor. According to Crosby, neither physicians nor laymen knew more than a few rumours about the Spanish Influenza, providing a perfect climate for "confusion, panic and proliferation of quack remedies".[14] John Barry also noted that "A fear and panic of the influenza akin to the terror of the Middle Ages regarding the Black Plague, [had] been prevalent in many parts of the country",[15] while doctors and nurses were kidnapped and patients starved to death "not from lack of food but because the well are afraid to help the sick".[16]

The lack of qualified healthcare staff available was exacerbated by poor communication and coordination between government agencies, making it extremely difficult to maximize the abilities of existing operational resources. The

U.S. Public Health Service (USPHS), for example, did not have the latest news about the progress of the pandemic to make the most efficient distribution of its services. The need to mobilize healthcare personnel efficiently across the country was met by a fragmented health bureaucracy, for "public health departments and bureaus had never been organized for a unified effort".[17] Boston alone needed 500 physicians, more than the entire USPHS could muster.[18] A civilian-military partnership for fighting the pandemic did not exist. According to Barry, "The military … would confront the virus directly … But the military would give no help to civilians. Instead it would draw further upon civilian resources".[19]

It is worth noting, however, that a robust civil society managed to offset the U.S. government capacity deficit in the battle against the influenza virus.[20] During the second wave of the pandemic for example, many local governments collapsed, but community-based civil associations—from Philadelphia's "bluebloods" to Phoenix's citizens' committees—took over.[21] It was observed that "seemingly every organization in Philadelphia—political, economic, social, Christian, Jewish, and what-have-you—directed its energies to helping the sick".[22] This "weak state, strong society" model was in sharp contrast to the state-society relations in China's 2003 SARS outbreak. Despite the initial cover-up and inaction, strong state capacity led the government to fully mobilize resources for autonomous action after mid-April. Within one week, the government completed the construction of a state-of-the-art SARS hospital that had the capacity to accommodate 1,200 patients. The SARS outbreak was overcome in the absence of an autonomous and robust civil society.[23] Both the above examples suggest that SRC varies across countries and depends on the level of civil society engagement and government effectiveness in overcoming a pandemic, as shown in Table 14.1.

Table 14.1
Level of medical surge response capability

Civil society engagement	Government effectiveness: High	Government effectiveness: Low
High	High	Mixed (e.g. U.S. in the 1918 Spanish Flu)
Low	Mixed (e.g. China in SARS)	Low

Source: Yanzhong Huang. "In-Flew-Enza: Pandemic Flu and Its Security Implications." In Andrew F. Cooper and John J. Kirton (Eds.), *Innovation in Global Health Governance: Critical Cases*. London: Ashgate, 2009, pp. 127–150.

Assessing Surge Response Capability Today

Today we live in a different era, however. In 1918, there were no facilities for intensive care, no antibiotics, no antivirals and no vaccines. In fact, it was not even known what viruses were. Current abilities to respond to a pandemic have been significantly facilitated by a "quantum jump in our ability to detect, prevent and treat infectious diseases resulting from improved technologies".[24] While the field of antiviral therapeutics has exploded, new methods of developing vaccines (reverse vaccinology, deoxyribonucleic acid (DNA) vaccination and the use of new adjuvants, for example) are now available. It is also worth noting that half of the 1918 deaths were from secondary bacterial infections—not viral pneumonia—that could now be treated by antibiotics. Equally important is that we are not in the midst of a world war and that many countries have developed an influenza preparedness plan that covers vaccine development, antiviral medications stockpiling, medical care resources distribution, and interdepartmental and international cooperation.

Other developments have, however, increased the surge level while eroding the surge capacity. Globalization has led to faster and easier spread of infectious diseases. The pandemics of the previous centuries encircled the globe in six to nine months, even when most international travel was by ship. In the recent case of SARS, it took less time for it to spread to Toronto than to Beijing. Given the speed and volume of international travel today, a pandemic virus could spread more rapidly, possibly reaching all continents within three months and having its maximum effect within six months. Indeed, the first cases of the H1N1 were reported in late April 2009, yet its rapid geographic spread prompted WHO to raise the level of influenza pandemic alert from Phase 4 (human-to-human transmission) to Phase 5 (human-to-human spread of the virus into at least two countries in one region) within a week. By 8 May, WHO was already under pressure to further raise the alert level to Phase 6 (a full-blown pandemic), for which the virus clearly qualified based on the existing phase-designation criteria,[25] despite its low clinical virulence and the relatively small number of laboratory confirmed cases worldwide—2,500 at that point in time.

Globalization has also increased our dependence on the rest of the world for many of the goods and services that are indispensible for sustaining and maximizing surge capacity; a disruption in the supply chain can cause huge problems in the manufacturing and delivery of services. The negative impact can be reinforced by the so-called "just-in-time" economy, which can be a problem in developed countries in particular. Lamenting that "virtually no production surge capacity exists", Michael Osterholm noted that while an influenza pandemic raises the demand for critical care products and services, it also can sever supply lines:

> … most of the developed world depends on the last-minute delivery of many critical products (such as pharmaceuticals, medical supplies, food and equipment parts) and services (such as communications support). In the United States, approximately 80 per cent of all prescription drugs come from offshore and are delivered to pharmacies just hours before they are dispensed. An increasing number of U.S. hospitals now receive three rounds of deliveries of drugs and supplies a day to meet their needs. With such long and thin supply chains, a pandemic that closed borders caused worker attrition and suspended travel or the transport of commercial goods would seriously disrupt the delivery of everyday essentials.[26]

This kind of pessimism on SRC in the developed world is echoed by a 37-member task force of American and Canadian experts, who find that current U.S. and Canadian capabilities for critical care during a pandemic are limited, due to shortages in equipment and supplies, staff and treatment space.[27] In addition, many countries face the chain of command problem in combating future pandemics. One does not need to read former Federal Emergency Management Agency chief Michael Brown's post-Katrina interview with *Playboy* to get a sense of how serious the coordination problem was within the U.S. Department of Homeland Security, and between it and other government agencies.[28] Coordination issues can also rise between military and civilian institutions, and between the federal (central) and state (local) governments.

Table 14.2 shows the estimated demand (as percentage of current capacity) for 90 million infected persons in the U.S. (assuming a 25 per cent infection rate),

Table 14.2

Estimated bed and ventilator requirements for influenza pandemic, based on current capacity

Requirements	Estimated U.S. demand		
	Number	Percentage of current capacity	
		Moderate pandemic (1958-like)	Severe pandemic (1918-like)
Hospital beds	840,000	19	191
Intensive care unit beds	90,000	46	461
Ventilators	105,000	20	198

Source: John G. Bartlett and Luciana Borio. "The current status of planning for pandemic influenza and implications for health care planning in the United States." *Clinical Infectious Diseases* 46, 15 March 2008, p. 920.

including 45 million who would seek care over an eight-week period. It suggests that the existing hospital beds, ICU beds, and ventilators could adequately meet the surge during a mild pandemic, but would be quickly exceeded during a severe, 1918-like pandemic.

What can We Do to Maximize Surge Response Capability?

If SRC is a function of both surge (on the demand side) and surge capacity (on the supply side), it makes sense to increase it by reducing the risks. Despite the importance of prevention and preparedness, we tend to adopt a reactive approach, i.e. focusing on surge capacity, in surge response capability building. Moreover, as Thompson and Louie observed, "In the context of competing demands and a false belief that higher priority equals higher risks, authorities often devote all their preparations to the worst possible outcome of such a pandemic, overlooking preventive action that will provide real risk reduction".[29]

Bringing prevention back in

Preventive action should aim at improving both "sensitivity" and "connectivity". The former involves building strong surveillance, laboratory and epidemiological capacities, while the latter mandates ability to interact both vertically and horizontally in communication, collaboration and cooperation. Horizontally, a state's surge response capability requires open and effective interaction between multi-disciplinary groups (clinicians, researchers, epidemiologists, veterinary and medical experts) in multiple sectors (civilian and military, prevention and treatment, public and private, governmental and non-governmental). Vertically, effective capability building depends in part on the ability of clinicians (physicians, nurses, nurse practitioners and respiratory therapists), and public health officials to utilize available technologies and information systems such as phones, computers and databases to formulate and send reports to local, state and federal agencies, in a timely manner. However, vertical communication is not just a "bottom-up" process, it also entails the need to publicize a disease outbreak through media outlets in a way that reduces potential panic and fear and minimizes disturbing effects.

Strengthening government effectiveness and empowering civil society groups

As Table 14.1 indicates, both government effectiveness and civil society engagement are crucial in SRC building. Not coincidentally, all the 15 countries with human cases of AI have very low levels of government effectiveness, as measured by the World Bank.[30] Among them only three countries—China, Thailand and Turkey—received positive estimates in measures of government effectiveness.

Most of the countries with low levels of government effectiveness are developing countries. It was observed that developing countries subjected to complex emergencies accounted for 49 per cent of outbreaks identified during the 1997–1999 period, compared with two per cent in industrialized countries.[31] It is therefore imperative for those "front line" countries to increase their government effectiveness in disease prevention and control. The state should consider streamlining a bloated bureaucracy, enhancing capabilities of regulatory control, and facilitating inter-agency coordination and communication. It is therefore worthwhile for governments to establish a national-level committee in charge of pandemic prevention and control. Nevertheless, a government-only approach will be highly unlikely to succeed. A lively and autonomous civil society is critical for SRC because of the following:

- As an alternative source of information, it can ensure health-related demands are channelled into the policymaking apparatus in a consistent, systematic and timely manner.
- As an alternative source of discipline, it facilitates effective policy implementation and helps make governments more accountable and responsive to the people in pandemic preparedness and control.
- As an alternative source of health resources, it can reduce the financial burden of states in SRC building by mobilizing additional health resources (e.g. medical volunteers) when combating a severe pandemic that could quickly overwhelm both normal and expanded surge capacity.

Indeed, one could make the argument that it is precisely the lack of SRC (e.g. absence of health professionals and limited laboratory capacities) in the countries with an increased risk of a public health emergency of international concern that creates their dependence on unofficial sources such as NGOs. Effective civil society engagement can be achieved by empowering health-promoting NGOs, community-based organizations, FBOs and a free media.

Sustaining political and financial commitment to capacity building

During 2005–2006, the spread of AI worldwide and the seemingly high mortality rate of human cases alerted policymakers, public health experts and the general public, prompting countries to take swift action. By December 2006, 75 per cent of priority countries had established early warning networks, international case definitions, and standards for laboratory diagnostics of human and animal samples.[32] Since 2007 however, AI has been reported only occasionally by the media—when it claims another life or when it causes a major outbreak in a local farm in Europe. With the onset of the global financial crisis, the influenza pandemic almost faded off the radar. Amid the H5N1 flu fatigue and the

economic crisis, we were caught off guard by the novel H1N1 outbreak in April 2009. While the outbreak provided a window of opportunity to sustain global pandemic preparedness, it may not be good news for developing countries that have poor surge response capabilities. Given that the economic crisis reduces state capacity when ever-increasing capacity is needed to tackle such challenges, purely endogenous solutions to building capacity are unlikely to be successful and capacity will have to be imported from exogenous sources such as massive foreign aid.[33] Unlike H5N1, which affects populations mainly in developing countries, the H1N1 virus is afflicting both developing and developed countries. The rapid spread of cases in developed countries, such as the U.S., makes it difficult to make a strong case that developing countries are more vulnerable to the virus. This may significantly reduce the incentives for developed countries to share vaccines and anti-viral drugs with poorer countries. In the case of vaccine distribution, for example, current influenza vaccines are made in 13 countries, most of which are in the developed world. Despite the growing vaccine production capacities (which allow the making of one billion doses over five months), they only satisfy one-sixth of the world's needs. Since vaccine sharing remains voluntary (even though sharing virus samples is mandatory under the revised IHR), market purchasing agreements primarily determine how the vaccines will be distributed. This often favours developed countries due to the lack of financial means on the part of developing countries.

Conclusion

Since SRC is a function of the nature of the virus in question, it is important to adopt a risk-based approach in responding to disease outbreaks. Thus, responses should be pathogen-specific and based on the actual risks the outbreak poses to society. Nevertheless, many assumptions of pandemic preparedness are almost solely based on the 1918 Spanish Flu. As a leading health expert has noted, the Spanish Flu is "the benchmark against which we worry about future influenza pandemics".[34] The failure to take into account differences between viruses is indicated in WHO's six-phased approach, which focuses on the geographic spread of the influenza virus but does not take into account its severity. By suggesting that a pandemic was "imminent", the WHO response raised the demand for resources and contributed to the widespread fear of the virus, even though most cases throughout the world have so far been mild, relative to seasonal influenza.

In early May for instance, a group of Canadian students—none of whom had influenza-like symptoms or any known exposure to infected people—was placed under a week-long quarantine in northeast China. Indeed, China reacted

strongly even when the situation in Mexico had stabilized and the U.S. had begun to scale down its pandemic response measures to reduce disruptions to society. Such capacity "overdraft" bode ill for effective pandemic preparedness, not only because it undermines a country's surveillance capacity (people who showed symptoms might choose to shun public health authorities for fear of quarantine or stigmatization), but also because it is generally difficult to sustain government commitment for an extended period (provided the virus continues its spread without significantly increasing its virulence). Governments in affected countries should therefore learn to integrate scientific knowledge into political and financial commitments to pandemic preparedness in general, and surge response capability building in particular.

Notes

1. Yanzhong Huang. "In-Flew-Enza: Pandemic flu and its security implications." In Andrew F. Cooper and John J. Kirton (Eds.), *Innovation in Global Health Governance: Critical Cases*. London: Ashgate, 2009, pp. 127–150.
2. "Pandemic flu: A national framework for responding to an influenza pandemic." London: Department of Health, 2007.
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15 Continuity in Crisis
Multi-Sectoral Pandemic Preparedness

Richard Fielding

There are a number of issues to consider when addressing the topic of multi-sectoral pandemic preparedness. The first issue is that when it comes to preparing for the impact of an influenza pandemic, we can observe collective responses at national, regional, organizational and family levels mirroring those of individuals. The responses follow these themes: it is unlikely to happen to me; if it does, it will be alright because I have survived in the past (which is why I am still here) and so I will continue to survive in the future and—just to be on the safe side—I will keep a box of Tamiflu under the bed. The second issue is that, like stock markets, past pandemic performance is no guarantee of future performance. The third issue is that hubris remains prominent: we have the technology and are smarter than our forebears. The fourth issue depends on a healthy supply of ignorance, indifference and political expediency. Finally, both evolution and the law of unintended consequences tend to be underestimated.

A range of opinions see the likelihood and consequences of a pandemic from the avian H5N1 virus—an HPAI—as inevitable and devastating[1] or low and overblown[2]. Many of the non-medical groups that have considered the probability and impacts of such a pandemic through commercial sources will be reassured that there is little to worry about. If there is a pandemic, Laura M. Kelley, an Associate of the National Intelligence Council on Infectious Disease & Public Health, correctly opined that "… an H5N1 pandemic is not imminent",[3] but then stated that "if it ever becomes transmissible, it could lose all or most of its virulence, and the possibility of it fuelling a deadly pandemic would remain remote". This statement must have proved very reassuring to business and organizational leaders trying to assess the risks to their respective groups. Of course, in the years since 2005, the author and organizational leaders acting on this opinion have been proven correct. Finally, regarding the frequently quoted statement that influenza pandemics occur every 30 years and that we are therefore overdue for one, Kelly correctly took a longer timeline to show that

the inter-pandemic interval over the past 300 years has ranged from nine years to over 100 years,[4] making "imminence" predictions particularly difficult.

Escalation of Pandemics through Antigenic Shifts and the Need for Vaccines

What should we make of the fact that the case fatality rate—the proportion of infected persons who die—worldwide remains at 63 per cent, but reaches a frightening 82 per cent in Indonesia,[5] levels exceeding those recorded of the fourteenth-century Black Death? Despite increasing experience in the clinical management of HPAI in humans, mortality rates remain stubbornly high, and this is particularly worrying. While these mortality levels may not occur in developed countries, if all systems continue to function, they might be seen if systems begin to break down. Most modelled scenarios for interventions failed to consider the immense selection pressures that would be imposed upon the various clades of virus by its rapid spread through populations and the various treatment approaches that would be brought to bear. There is good evidence from the 1918 pandemic that there was an antigenic shift after the first wave of the virus, increasing its virulence during the second wave by up to five times.[6] The rapidly escalating level of viral resistance, already seen with Amantidine, Oseltamivir and probably other antiviral agents, implies that ring-fencing for outbreaks by antivirals and isolation will be an ineffective strategy, as it will have to be done in a highly coordinated fashion within 24–36 hours post oubreak, improbable even in developed nations today.[7] This also assumes that antivirals will remain 100 per cent effective, which is another unlikely factor. Most countries in Asia, Africa, Central and Eastern Europe, and South and Central America, will have serious problems mounting such a response.

It is unlikely that deaths from secondary bacterial pneumonia will be as high as they were during the 1918 Spanish influenza pandemic, because antibiotics are now very widely available. However, if the "cytokine cascade" remains problematic, as it has been in HPAI human infections, this could produce high levels of mortality. Hence WHO now believes the 1918 pandemic reflects a worst-case scenario.[8] Nonetheless, the widespread undernourishment that exists will make poor populations especially vulnerable, if a pandemic arises.

While there has been some increase in spending for pandemic preparedness, the moves to develop, and the means to rapidly manufacture vaccines that are the most efficacious, remain woefully inadequate. Market conditions dictate no return for a vaccine that will not be needed unless the pandemic escalates. In addition, no commercial organization is prepared to take the financial risk, particularly given the current unpredictable nature of the financial markets.

Implications

By October 2007, many business commentators worldwide were warning of the consequences of the burgeoning sub-prime crisis. Nonetheless, it was not until the beginning of November that things began to unravel, and in the subsequent 12 months, no country has remained unaffected. A business-as-usual mentality and political expediency had ensured that almost nothing was done until the situation worsened. The amount of money needed has been truly staggering—over US$1.5 trillion worldwide and rising. This money was "found" by governments to keep the system working. However, in the event of a pandemic, money will not be the solution. Rather, manpower will be the most precious commodity. Additionally, we can also expect optimistic biases in pandemic preparedness.

Food, Business, Communications, Security and Healthcare

All businesses and organizations have risk appetite; that is the amount of risk they are prepared to tolerate around their activities. In some fields such as banking, risk managers clearly failed to model the worst-case scenarios effectively regarding sub-prime mortgages. Short-term expediency ensured that any warnings were overridden, and that the rewards justified the risks. From a public health perspective, there is a salient lesson in the swine influenza panic that gripped the U.S. public health establishment in 1976: 46 million people were vaccinated against an expected epidemic that never materialized and a few dozen people died from reactions to the vaccine. Integrated systems are most vulnerable to disruption at many levels. Food production—from the agricultural labour needed to plant, nurture and gather crops, through to the packing and transportation groups, shipping and airfreight, warehousing and distribution chains, to retail outlets—is likely to be hit hard. This will be felt most acutely in regional urban centres.

Hungry people are angry people, and the unavailability of food poses a major risk for the breakdown of social behaviour. Food production centres could conceivably retain, rather than ship, food under conditions of scarcity, creating serious supply problems worldwide. A similar move towards stopping the shipment of rice from both the Philippines and Thailand was threatened just by price rises. Prices will of course skyrocket, again hitting the poorest worst of all. Assuming that food production is maintained, there remains the question of the impact of interference with logistics and other distribution chains. Logistics are heavily people-dependent activities. A loss of 30 per cent of the workforce will mean that aircraft will not be maintained and shipping schedules not supported. Food distribution is therefore likely to suffer greatly.

Industries reliant on just-in-time supplies will grind to a halt. Very few industries now carry significant production inventories, so the cessation of productivity will be almost immediate. The knock-on effects will be amplification in the disruption of supply chains, as parts and replacements fail to materialize. Conversely, suspending employees will reduce person-to-person contact in occupational environments. Medical supplies will rapidly shrink and, as resources are shifted from non-communicable health problems, deaths and morbidity from these causes will also increase, adding to the burden.

Planning for cross-sector maintenance involves a robust awareness of the likely primary and secondary impacts of manpower loss and supply chain disruption. In addition to the restriction of production materials and workforces from direct effects, there will also be knock-on effects such as healthy employees needing to stay at home to take care of sick family members, their inability to get to work because of public transport disruption and a breakdown in communications networks, as other service suppliers become unable to maintain their services. In a severe situation, this could lead to disruptions of basic services such as power and water. Few organizations have contingency plans for this level of disruption.

Conclusion: Preparing for Inevitable Consequences

While developed countries have sophisticated technology for managing critically ill patients, this also relies on manpower. If significant staffing losses occur, either due to sickness or death, then the ability to maintain complex organizations such as hospitals will be severely challenged. This will further amplify the case fatality rate. It is likely that most governments have contingency plans for the safe disposal of large numbers of dead, but these have never been tested and are likely to fail if the case fatality rate reaches 80 per cent. Any such event will dwarf the Black Death and will become the single most significant culling our species will have ever endured.

This grim scenario may not play out during this decade or the next, but it will, one day. It may not be influenza, but there will be a culling of our species as we are now pushing against the limits of our biological sustainability. Of course, there are likely to be smaller, less devastating pandemics, or perhaps asteroid strikes, a global war involving nuclear weapons or the more mundane slow collapse of civilization(s). In any event, the limited degree of control that we are able to exert as a species ensures that significant consequences are inevitable for a large majority of people. From a security perspective, the question remains one of "when", and not "if".

Notes

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16 Roles of Non-Governmental Organizations and Faith-Based Organizations in Pandemic Preparedness in Cambodia

Khim Keovathanak

Since December 2003 AI H5N1 virus infections have killed millions of domestic fowl, with tens of millions of birds culled in Southeast Asia. The disease has also infected and killed hundreds of people, and its emergence and spread has caused a great concern among world leaders as well as among people, as it has the potential to disrupt the livelihoods, economies and the social order of every country. World leaders have realized this and are now more united in the fight against, and containment of, the disease. Furthermore, in the era of terrorist activities and the threat of bio-terrorism, such biological threats gain an even greater importance.

This chapter presents discussions on pandemic preparedness in Cambodia, specifically the roles of NGOs and FBOs, and the challenges they face in the fight against the spread of AI.

Avian Influenza and Pandemic Preparedness in Cambodia

Cambodia, having been through decades of wars and civil conflicts, is a poor and developing country characterized by an uneven economy, widespread poverty and lack of infrastructure. The World Bank has estimated that in 2004, approximately 35 per cent of Cambodians were living below the poverty line. Cambodia still depends heavily on foreign assistance, which accounts for approximately 50 to 60 per cent of the overall budget. The country has a narrow base economy and largely depends on revenues from the tourism and garment industries. While agriculture is expanding, it accounts for only a small portion of the economy. Cross-border trade with neighbouring countries is expanding and generates a considerable amount of revenue. The infrastructure for health, as well as for pandemic response, is still inadequate, under-developed and far from reliable.

Cambodia did not escape the emergence and spread of AI. To date, eight cases of AI in humans have been confirmed. Seven have been fatal and only one person has recovered. Twenty-two outbreaks in poultry have been detected and thousands of birds have been culled. AI represents a major threat to national security and the economy. The government, despite scarce resources, is doing whatever it can to prevent and contain the disease.

Cambodia's pandemic preparedness response is managed on three levels. At the national level, there is a national coordinating body called the National Committee for Disaster Management. Its membership comprises leaders of major government ministries such as the MOH and the Ministry of Agriculture. Three mechanisms have been established for information exchange. A UN Agencies meeting is held on a monthly basis to obtain updates on the status of AI in Cambodia, and to share relevant information among UN agencies and development partners. A monthly meeting is held at the Cambodian umbrella organization of medical and health-related NGOs (MEDiCAM)—an umbrella organization of health NGOs—to exchange information about AI and coordinate interventions at the grassroots level. Weekly meetings are held at the Ministry of Health by the Department of Communicable Diseases to provide quick updates about AI, and share information about suspected cases, reports from the grassroots and results of investigations.

At the provincial level are departments of the line ministries (e.g. Ministry of Agriculture and MOH). The provincial department of agriculture is charged with oversight of animal disease control and surveillance, while the provincial department of health is charged with surveillance, reporting and investigation of AI in humans. The two departments usually work together, as a rapid response team. All the provincial teams have been trained in surveillance and investigation.

The grassroots or community level sees multiple interventions on AI. These range from community education, information campaigns, IEC dissemination and village dramas to surveillance, reporting and investigation. Due to financial constraints and lack of resources, most of the education and prevention interventions are implemented by local NGOs. Few international NGOs are involved in surveillance and reporting.

The Role of NGOs in Cambodia's Pandemic Preparedness Plans

Cambodia has over two hundred NGOs working in the area of health. About two-fifths of the NGOs are faith-based or have some sort of religious affiliation, Christianity being the most common one. Local NGOs work predominantly with communities at the grassroots levels, while international organizations often

work at both the policy and implementation levels. Currently, there are 66 NGOs working on prevention, disseminating information and raising awareness about AI in communities across the 24 provinces and municipalities in Cambodia. These NGOs receive technical and financial support from major international organizations such as WHO, FAO and ADB, as well as from bilateral agencies such as USAID, AusAID, the Centers for Disease Control and Prevention's Global AIDS Programme and the Department for International Development (U.K.). Local and international NGOs often work in partnership, with international NGOs as grant managers and local NGOs as implementers.

Funding for NGO interventions is a major constraint and characterized by short durations and discontinuities and, sometimes, by informal arrangements. As a result, coverage by NGOs is relatively limited. It is estimated that this coverage in AI interventions ranges from 10 to 15 per cent of the total number of communities in the entire country.

NGOs use several approaches in disseminating information about AI, and funding availability often dictates the scope and method of information dissemination. Among them are community forums organized to spread information in remote inaccessible communities, which are out of the reach of radio or television. Attended by villagers and representatives of local authorities and NGO staff, community forums are designed to be fun and educational, employing a number of approaches such as presentation of information with IEC materials, question and answer sessions and some quizzes. Depending on time constraints, quizzes are usually used to generate more participation and fun where community members compete in answering questions in exchange for gifts. IEC materials, such as caps, T-shirts, leaflets and posters, are always used and widely distributed during the forums.

At present, many NGOs are implementing health education activities in communities, covering a range of health topics such as water and sanitation, communicable diseases, TB, Acute Respiratory Infections, maternal and child health, etc. Many NGOs receive little funding for AI activities and often resort to integrating AI messages in their regular health education activities. Some NGOs do not receive any funding at all, but are willing to, and do indeed, integrate messages about AI within their health education activities upon request from provincial health departments. Time devoted to discussions on AI in community education sessions is therefore often, insufficient.

Part of the information provided to people in the communities about AI is to encourage them to report to the local authorities or village health volunteers when birds die. Many local authorities, such as village chiefs and village health volunteers in areas covered by NGOs, are trained by provincial and district teams, with support from NGOs, on how to handle and relay reports from the

community to the district and provincial levels.

A few NGOs, such as Cooperative for Assistance and Relief Everywhere and Centre for Livestock and Agriculture Development, are also involved in community surveillance. They work closely with communities on activities like pilot model community surveillance programmes, demonstrative construction of chicken pens and poultry quarantine. They help establish links between surveillance teams at the provincial and district levels with those of the community. They assist in providing training to village volunteers, and village and commune chiefs in surveillance mechanisms and reporting, while also disseminating information about AI prevention and methods of quarantining newly infected birds or those suspected of infection. Two hotlines have been established to facilitate reporting of suspected AI cases. Hotline numbers have been widely distributed throughout provinces and municipalities, and also often in communities where there are existing AI education interventions. Consequently, awareness of the hotlines and their purpose remains concentrated within the populations in the target communities. The hotlines were heavily utilized at the beginning, receiving several calls a day during the early days of the 2004 and 2005 outbreaks, but have since seen a steady decline in the number of calls.

Constraints and Challenges

NGOs and the government alike still face several major challenges that are crucial parts of a pandemic preparedness plan. One of them is to encourage people in the communities to report suspected cases or outbreaks. Without reporting from local communities, little can be done to prevent and contain the disease at its source.

There are a number of reasons to account for the lack of reporting from communities. First, the rare occurrence of AI in Cambodia makes people feel they can take it for granted. Over the years, many people seem to have lost the fear of AI and care less about it, regardless of their knowledge about it and its fatal nature. This is because raising poultry has always been customary and a major source of household income, as well as a means of food. The other reason is that since people cannot distinguish between AI and Newcastle disease which is common in poultry, although non-life threatening to humans. Because of their similar signs and symptoms, people are inclined to assume that such signs or symptoms as those of Newcastle disease and, hence, fail to report suspected cases. This is in addition to other constraints in reporting such as travel associated cost and efforts in order to do so.

Another impediment to the reporting of suspected cases by the community is that once AI is confirmed, all their poultry will be culled and they will lose a

significant portion of their income, or even their means of livelihood. Currently there is no policy of compensation to farmers when their livestock is culled; people are more afraid of poverty than of "bird flu".

Coordination between partners is still fragmented, leading to overlapping and under-utilization of resources. There are many partner organizations working on AI interventions. Some have abundant resources and materials while others have too few. The current coordination by MEDiCAM has seemed to become ineffective, as commitments from other NGOs have also diminished, often due to a lack of funding.

Recommendations

The outcomes so far have been mixed. The more positive aspects are that community education has shown a degree of success, as a result of widespread information dissemination. There appears to have been a big increase in awareness among the population about AI and its prevention. A recent survey conducted among primary students and community youth in three provinces indicated that a high proportion of participants knew about AI and how to prevent and report it. Nevertheless, the information campaign needs to be sustained in existing communities and expanded to other less-accessible areas.

In the early stage, the reporting on suspected AI cases was successful. However, over time, people seem to have lost interest in reporting and even began to fear it because of its effects on income generation and due to the lack of compensation. Reporting mechanisms and efforts need to be sustained in order to remain effective. Furthermore, there must be a policy of compensation to farmers in order to encourage them to report suspected cases.

Existing mechanisms for exchanging information and coordination between NGOs, the government and donors have been useful. This needs to be maintained and improved to ensure good distribution of resources, consistency in materials being developed and used by all partners, as well as to ensure that interventions are quick and effective.

17 The Role of Non-Governmental Organizations in Pandemic Preparedness

Jemilah Mahmood

At the time of writing, the world was placed on "Pandemic Alert—Phase 3"—based on the WHO phases of pandemic alert—intended to facilitate pandemic preparedness planning and response. Identified in 1997, with a peak rate of infections in 2003, a new influenza virus subtype (H5N1) brought about the largest and most severe outbreaks of sickness and death on record in wild birds and poultry in 67 countries. Since November 2003, some 383 human cases of H5N1—including 241 deaths—across 15 countries have been laboratory-confirmed and above 60 per cent of these people have died—even after sound medical care in many cases.

A Question of "When" and Not "If"

All nations could be affected by an influenza pandemic—it is a question of "when" and not "if". Developing countries are believed to be among the most vulnerable. When faced with more immediate threats to daily existence, preparing for an influenza pandemic often takes a low priority. When a pandemic hits, it will strike hardest at the poorest, marginalized and most vulnerable groups—those who most likely have had no exposure to awareness of pandemic influenza, let alone preparedness measures.

Bridging the Gap between Knowledge and Practice

With vast increases in the world's population and the higher concentration of people in urban areas, especially in the developing world, NGOs now have the opportunity and the responsibility to play a major role in preparedness, response, impact mitigation and advocacy to lessen the consequences of pandemic influenza in the poorest nations and most vulnerable groups of people.

Most reputable NGOs have the presence, skills and experience to contribute substantially to national pandemic planning and response in countries where they work. NGOs are especially effective in areas of community-based surveillance, education and mitigation of the health—and economic—impacts of a pandemic.

GOARN, under WHO, has, among its Guiding Principles for International Outbreak Alert and Response, a principle that states: "There is recognition of the unique role of national and international NGOs in the area of health including control of outbreaks. NGOs provide support that would not otherwise be available, particularly in reaching poor populations."

In fact, the role of NGOs is so recognized in the pandemic preparedness sector that USAID has funded a US$30 million Humanitarian Pandemic Preparedness (H2P) programme and appointed the International Federation of Red Cross and Red Crescent Societies as the overall coordinating agency.

The H2P Initiative aims to build a fully prepared and deployable capacity at the district and household levels, especially to develop preparedness plans and mechanisms for community resilience in the areas of public health, food security and livelihoods. This initiative has been implemented in various countries, selected by various criteria, such as the projected mortality based on a 1918-like influenza pandemic as well as governments' interest.

AI is now endemic in Asia and is unlikely to be eradicated in the near future. Affected countries include Korea, Japan, Indonesia, Vietnam, Cambodia, Malaysia, Thailand and China. AI has also been detected in Russia and Kazakhstan, where migratory birds were the most likely source. It was also reported in Turkey, Romania and Tajikistan, thus a further spread to Europe is probable.

More than 50 countries have developed, or are developing, pandemic preparedness and response plans. There are four primary ways to reduce the effects of an influenza pandemic: vaccination, antiviral drug use, quality medical care and public health measures to decrease the spread or extent of the disease.

NGOs can contribute to pandemic prevention and preparedness by carrying out community-based programmes to provide information, education and disease control tools. In the case of AI, this will involve finding ways to decrease the risk of human infection from contact with poultry, and suitable ways to handle sick or dead birds.

They can assist in national surveillance activities by identifying and reporting sick poultry, by increasing awareness of the clinical and epidemiological features of infection among medical care providers, and by facilitating dialogue and close collaboration between government public health officials and veterinary staff on the ground.

NGOs can further assist in developing pandemic preparedness and

response plans by joining working groups on national pandemic preparedness and response led by the country's health ministry and supported by the WHO or UN agencies, advocate at national and government ministry for the creation of national pandemic preparedness and response working groups if they do not already exist, and develop strategies, materials and training to facilitate an effective response.

Some of these are already being carried out by NGOs in certain countries. For example, as early as February 2004, CARE, a leading humanitarian organization fighting global poverty, implemented the first AI project in the Binh Dinh province in Vietnam. The project trained veterinary staff and strengthened the province's disease prevention and control network at district and village levels. They also implemented a comprehensive AI impact assessment.

NGO Networks: Sharing and Amplifying

NGO networks are equally important actors in preparedness programmes. There are many lessons to be taken from the role of NGOs and their networks in disaster preparedness. One such NGO network in Asia is the Asian Disaster Reduction and Response Network. This network, which comprises 34 NGOs developed and based in Asia, has worked successfully in promoting disaster risk reduction by producing multilingual educational material, toolboxes, joint training and exchange of experiences. The same methodologies and techniques can be employed to ensure that pandemic preparedness is addressed.

Learning to Prepare Better

Logistics in a pandemic is critical. Recently in November 2008, MERCY Malaysia helped organize the world's first pandemic logistics and learning exercise in Malaysia, involving 200 local and foreign participants. The training programme, called P2LX, was coordinated by the World Food Programme (WFP), with operational support from MERCY Malaysia and technical support from WHO.

The P2LX is a field-based simulation of a logistics humanitarian operation during a pandemic. The simulation is intended to act as a learning tool, allowing experienced logisticians who participate to apply their skills and knowledge in a controlled environment. In addition, during the P2LX, opportunities will be identified to improve the performance of logistics operations and management practices of senior logistics staff, in a pandemic environment.

MERCY Malaysia acted as the liaison between WFP and the government agencies concerned, including the National Security Council. The collaboration between a humanitarian organization and government entities provided a

realistic context for the exercise. Additionally, MERCY Malaysia, as an organization that has been working in emergencies and with an active disaster risk reduction unit, has the experience of working in partnership with grassroots organizations and communities, thereby enabling it to amplify reach for the target population. MERCY Malaysia was able to provide qualified manpower (volunteers or otherwise) and logistics necessities. The exercise involved much exchange of knowledge and provided human capacity development and training for all involved.

The P2LX resulted in the identification of areas necessary for the maintenance of logistics operations in a pandemic operation, for which specific guidelines would be required. It also enabled engagement with the media and promotion of awareness to communities.

Conclusion

Pandemic preparedness is critical. Every sector must play its role in ensuring that communities at risk are aware of, and can take measures to prevent and mitigate pandemic influenza. NGOs are an important sector that can bridge the gap between knowledge and practice. Governments, donors and the international community need to recognize the unique and important roles that NGOs can play in preparedness programmes, especially at community levels. In short, there is an unprecedented need—and now also a unique opportunity—for all stakeholders to play their roles in preparation for a potentially widespread and devastating emergency that is yet to materialize.

18 The Way Forward
Strategies to Strengthen Regional Pandemic Preparedness

Julie E. Fischer

The SARS epidemic of 2003–2004 dramatically revealed weaknesses in global disease detection, reporting and response capabilities. When SARS exacted an economic toll—up to US$80 billion worldwide—far out of proportion to the estimated 8,000 cases, political leaders elevated the importance of cross-border health cooperation to the highest levels. The sudden general awareness that a single nation might, deliberately or through lack of capacity, conceal a public health emergency with international consequences helped catalyse adoption of the new IHR, which emphasize national obligations to detect and report such incidents in near-real time to WHO. The subsequent spread of HPAI throughout much of Asia, Africa, the Middle East and Europe maintained pressures on health authorities and diplomats to develop mechanisms for sharing information on transnational health threats, quickly and transparently. Concerns about health status and public health infrastructure—once primarily the province of humanitarian or development assistance—now routinely appear in foreign policy and security agendas.

Influenza Outbreaks and Disease Response

Over the last five years, many countries have expanded their national biosurveillance programmes and international information-sharing. Most governments have developed a national action plan for avian and human influenza, disaster response, or both, and conducted at least one simulation exercise. Most recently, the 2009 novel H1N1 outbreak tested these new systems robustly for the first time. IHR and regional agreements in North America contributed to swift international notification, allowing states to implement their pandemic preparedness plans, while Mexico voluntarily adopted stringent social distancing measures to limit further disease spread—factors that probably delayed

sustained human-to-human transmission outside of the Americas. The unfolding outbreak revealed unprecedented efficiency in international communications and cooperation, as well as weaknesses at every level of government. Despite the IHR-mandated "responsibility to detect", state capacity to respond effectively to real health crises varies widely. No fixed source of international funding has been established to support IHR compliance. WHO, as a normative agency, can offer guidance and technical assistance, but national governments will ultimately determine their own paths to pandemic preparedness in the absence of a clearly validated model.

Nowhere has the pressure to create seamless regional—and ultimately global—disease and disaster response systems been articulated more urgently than in Southeast Asia. Regional organizations founded to enhance economic cooperation now encompass disease and disaster preparedness coordination missions. Public and private sector actors have created mechanisms for sharing information, training opportunities and responsibility for outbreak detection, and response, at a range of organizational levels. While pandemic preparedness programmes have proliferated, metrics to test their effectiveness still rely primarily on subjective, process-driven indicators. In order to move forward, stakeholders must find ways to test operational readiness and strengthen successful systems, with research grounded in local realities.

Bio-Surveillance: Lessons Learned and Capacity Building

Bio-surveillance comprises the ongoing, systematic collection, analysis and sharing of health-related data to guide effective public health interventions. Public health surveillance systems vary widely in scope and purpose. Despite recent interest in early warning of extraordinary events, most surveillance efforts traditionally focus on tracking the anticipated occurrence of specific high-priority diseases. Surveillance programmes may intensively seek causes of, and risk factors for, common syndromes, such as acute fevers or pneumonia, within a population in a manner limited by the patients within a single hospital system. At the other extreme, WHO-sponsored programmes such as Global Salm-Surv (focused on the epidemiology of the food-borne pathogen *Salmonella*) and the Global Polio Eradication Initiative represent massive international collaborations to detect single diseases with very specific case definitions. Regardless of scale, researchers designing disease surveillance programmes face strategic trade-offs: systems that focus on specific syndromes and diagnostic criteria over time offer greater accuracy in evaluating disease incidence, but may sacrifice the ability to detect unusual events in a timely way.

At least a dozen established international surveillance networks—primarily

vertical programmes focused on specific diseases—span Southeast Asia alone. Some of these already contribute to sub-regional or regional public health information-sharing platforms (such as the MBDS collaboration, or the ASEAN+3 EID Information Centre), or global networks such as DengueNet; others represent academic, public-private and other non-governmental research efforts with no real incentives to integrate into any larger whole. In the midst of the political urgency to meet national, regional and IHR priorities, the lessons that might be learned from these existing disease detection and response systems may go unrecognized, and their resources might be easily overlooked. In order to address such gaps, some areas that can be further examined will include the following:

- Assess the collective capabilities of existing disease surveillance networks within local and regional contexts. Historically, efforts to evaluate the institutional capacities of disease surveillance systems have relied on relatively subjective criteria. Tools and models to evaluate disease surveillance networks more consistently have emerged in recent years. However, they require objective and accurate input data about local capabilities and conditions. Evaluations of existing systems will constitute an important step toward identifying capabilities, critical gaps and areas where local, national, and international, priorities overlap.
- Focus on quality assurance and the human element of capacity building. Externally funded capacity building efforts often reflect donor priorities, while domestically supported programmes can fall to the whims of economic and political cycles. For these reasons, and others, capacity building efforts often focus on near-term investments in physical infrastructure and equipment but fail to anticipate ongoing demands for quality control, quality assurance, and continual training for a workforce with various levels of education and credentials. A global quality assurance framework, if accompanied by the necessary resources, would help ensure compatibility of various existing vertical programmes, in order to increase their reliability and utility for national and regional disease detection. Efforts to build diagnostic capacity must also look beyond the laboratories themselves to the larger network that supports the skilled laboratory staff, from well-controlled specimen transport systems to mechanisms for maintaining sophisticated equipment.
- Put technologies in context. An increasing number of programmes emphasize the use of information technologies, particularly analytical algorithms, to scan public information for unusual health events. However, even the most useful technological tools to increase the speed or sensitivity of health related early-warning systems rely on the kind of baseline data collected

through laboratory and epidemiological analysis. More research will be required to support a robust regional dialogue on how to make the best use of information and geospatial location technologies in the context of local knowledge and needs.

Calculating the Costs of Preparedness

Despite the variety of assessment tools developed by WHO and other national, regional and multilateral organizations, the real costs of compliance with the IHR and other international pandemic preparedness coordination commitments remain difficult to quantify. Beyond the funding consumed directly by the need to create medical and laboratory surge capacity, the total national and regional investment in preparedness must also include the opportunity costs of any other public health interventions bypassed because of limited resources.

It will be highly recommended to identify standards for pandemic preparedness and develop an economic model for compliance. Fortunately, major public health crises occur rarely enough to make statistical evaluation of successful strategies impractical. However, lessons from national and regional disasters and outbreaks can be used to test assumptions about scenarios and process indicators commonly used to predict readiness for catastrophic health events. Using such validated assumptions, national health authorities with detailed health accounts systems and strong public-private sector partnerships should be able to develop a reasonable estimate of the costs of achieving and maintaining various levels of pandemic preparedness. Such financial data would be valuable not only in domestic policy setting, but in creating broadly applicable models and further delineating the reciprocal responsibilities between the (often developing) nations designated as particularly vulnerable to outbreaks with pandemic potential and the international community. In the long run, an objective assessment of pandemic preparedness resource requirements should also encompass WHO's pandemic preparedness efforts and IHR programmes, including GOARN, which remain chronically under-funded in relation to the demands placed on them.

Leadership and Coordination

Urgent pressures to develop early-warning systems for emerging diseases have prompted parallel efforts that, while not necessarily contradictory, are rarely harmonized. Despite ongoing efforts by UN agencies and others to inventory such programmes, public health authorities frequently confront a patchwork

of multilateral, bilateral, governmental, non-governmental, and private sector programmes that communicate via unsystematic personal relationships, if at all. Recent assessments by WHO suggest that, while senior health leaders continue to regard pandemic preparedness as a core mission and a central topic for international dialogues, their counterparts in commerce, finance, agriculture, education, transportation, and other sectors that will be severely taxed by a health crisis, rarely participate consistently even in national pandemic exercises. Even the H1N1 influenza outbreak may fail to elicit long-term commitment from leaders in these areas if the epidemic ultimately proves less severe than models based on historic pandemics. Adequate planning for a potential pandemic requires attention not just from health authorities, but committed and educated cross-sector involvement at every level. The breakdown in communication between sectors, which can manifest in aspects ranging from unrealistic assumptions about the capacities of other stakeholders to failures in command-and-control procedures, is often repeated at every level of governance.

The still-fledgling WHO-sponsored GLaDNet, or Global Laboratory Directory of Networks, aims to support IHR implementation by connecting existing public and private sector resources—from WHO collaborating centres to private laboratories and even individual experts—to coordinate capacity building and facilitate information-sharing. While it is a welcome step, this primarily covers disease detection activities and will not substitute for effective leadership by national and regional authorities in the broader range of issues involved.

Assess Exercises, Events, Routine Disease Detection and Response Activities Objectively

While every nation in Southeast Asia has conducted some type of simulation exercise as a training opportunity for decision makers, the quality of these tests has varied as widely as the capabilities of the participating stakeholders. An objective comparative study of these simulations could help identify redundancies and gaps, serve as a starting point for engaging, or re-engaging, decision makers from beyond the health sector, and assist in validating specific practices and refining exercises. Past regional exercises on pandemic and bioterrorism preparedness have helped political leaders in all areas understand the destabilizing effects of a health catastrophe as well as the limits of WHO and other multilateral actors. The political sensitivity of disclosing weaknesses or even sharing inventories of national activities must be acknowledged, but overly optimistic interpretation of capabilities and excessive protection of information on ongoing efforts may present an unnecessary barrier to improved coordination.

Successful Models for Regional Cooperation

The nations of Southeast Asia, North America and Western Europe have all pursued regional planning to facilitate cross-border planning and cooperation during a pandemic. Within Southeast Asia, this coordination has been effected through the Asia Pacific Economic Cooperation, ASEAN, and many other sub-regional agreements and organizations.

Evaluate the Cross-Regional Coordination Efforts to Identify the Most Successful Models

In many ways, planning in Southeast Asia is at a far greater level of maturity than corresponding efforts in other regions, stemming in part from the region's experiences with SARS and AI and its political leadership's acceptance of non-traditional security (NTS) issues as a matter of international dialogue. After five years of regional engagement, the time is ripe to examine ongoing programmes and to identify the most promising, allowing more focused regional investment as well as providing models that might be adopted elsewhere. Such evaluation should also look beyond these established mechanisms to opportunities for improving cross-border cooperation, based on an increasing body of scientific and medical evidence.

19 Responsible Virus Sharing and Benefit Sharing
A Balance between Humankind and the Pandemic Threat

Makarim Wibisono

Influenza virus can be one of the most serious of infectious diseases and is still uncontained. It has the potential to cause great economic loss and can be responsible for many deaths. The Spanish Flu pandemic in 1918 caused at least 15 million deaths around the world. Recently, the international community was put on high alert by the spread of AI H5N1. The H5N1 virus is highly pathogenic, i.e. able to cause severe disease and deaths in humans. It caused widespread sickness and death in domestic and wild avian populations globally throughout the last decade. From 2003 to April 2007, 291 confirmed human cases (including 172 deaths) of H5N1 were reported to WHO. The most affected countries were Vietnam, Indonesia, Egypt, Thailand, China, Turkey, Azerbaijan, Cambodia, Iraq, Laos, Nigeria and Djibouti.

The Need for New and Equitable Approaches

In context of the above, there is indeed an urgent need to find new approaches to address the serious threats posed by H5N1 and to establish an effective framework for optimal global preparedness in the event of a pandemic. At present, the existing WHO system of sharing influenza viruses, called the Global Influenza Surveillance Network, is not working effectively. The system takes resources from developing countries and provides little to them in return, while leaving developing countries all the more vulnerable to an influenza pandemic. There is a need to replace the existing system with a new system that is just, fair and equitable. Indonesia and other countries have taken the initiative and provided significant pressure to reform the WHO system. They are taking steps in improving public health for all by providing, among other things, fair and equitable access to influenza vaccines at affordable prices.

The Problem of H5N1 Vaccine Scarcity

Due to limitations on the speed of vaccine production after an influenza pandemic, many developing countries are concerned that there will be an acute global shortage of these vaccines. Indeed, developed countries are already spending vast amounts of money to place advance orders for vaccines. Developing countries cannot afford to do so and therefore fear that they will be left with grossly inadequate supplies. The core of the problem lies in the limited global production capacity for producing influenza vaccines. This shortage, as well as the costs, is a huge challenge for developing countries, which will suffer without the vaccines. The health minister of Indonesia, in her opening speech at the Preparatory Meeting for Inter-Disciplinary Working Group on Virus Sharing in Jakarta on 9 July 2007, explicitly mentioned, "There is no guarantee that developing countries would be provided with the vaccines, as world production capacity is only 500 million doses. Thus, there is a huge gap in demand and supply."

The *New York Times* in its editorial on 16 February 2007 stated that "Indonesia has raised a valid point that needs to be addressed: if a pandemic should strike, poor countries would be left without protection … If a pandemic struck, the current vaccine makers could produce only 500 million doses of vaccine per year if they ran 24 hours a day. That is far short of what would be needed to vaccinate all 6.7 billion people in the world." Consequently, it seems that during a crisis, countries that are home to the vaccine makers will tend to provide the vaccines to their own citizens first—or to those willing to pay the highest prices—leaving few or no vaccines for everyone else.

WHO Attempts to Address the Problem

Indonesia's draft resolution, supported by many developing countries, drew the attention of UN member states during the World Health Assembly in May 2007. Eventually, Resolution 60.28, entitled "Pandemic Influenza Preparedness: Sharing of Influenza Viruses and Access to Vaccines and Other Benefits" was adopted after a long and arduous discussion. The resolution, among others, requests member states "to support and promote research to improve the prevention, detection, diagnosis and management of influenza viral infection". The Director General of WHO is requested "to identify and propose … frameworks and mechanisms that aim to ensure fair and equitable sharing of benefits … taking strongly into consideration the specific needs of developing countries". Other issues addressed in Resolution 60.28 include the access to pandemic vaccines through innovative financing mechanisms, acquisition of vaccine manufacturing capacity, technical assistance and technology transfer to developing countries, as well as the formation of an international vaccine stockpile and other measures

to ensure fair and equitable distribution of pandemic influenza vaccines in the event of a pandemic.

To accomplish these and other tasks proposed in the Resolution, an intergovernmental meeting (IGM) was set up and chaired by Jane Halton, the 61st President of the World Health Assembly. The IGM has held a series of meetings that was expected to bring about recommendations resolving all matters raised by Resolution 60.28. At the time of writing, it was planned for the IGM's recommendations to be deliberated and decided upon during the 62nd World Health Assembly in May 2009.

Points of Contention

Some delegations from developed countries argue against the concept of a "state sovereignty" over virus-sharing. Carlos M. Correa in his paper "Patentability of Viruses and Sharing of Benefits arising from their Commercial Exploitation", observed that such a *de facto* sovereignty already exists in international law. In its 20 years of development, the Convention on Biological Diversity, among other international instruments, has recognized national sovereignty over genetic resources, including microbes. Viruses are, unequivocally, genetic resources subject to national sovereignty. In addition, the World Intellectual Property Rights Organization did establish an inter-governmental forum to explore the possible instruments on genetic resources, traditional knowledge and folklore.

Developed country delegations claim that it is "ludicrous" to apply sovereignty to genetic resources that can easily cross borders. Their position, according to Edward Hammond in his blog, belies ignorance of both biodiversity and its related law and policy. As any farmer, biologist or duck hunter can tell you, most genetic resources do, in fact, cross national borders: birds, plants, insects, microbes, crops and practically everything else that is made of DNA (or, as in the case of the influenza virus, RNA). This simple biological truth has not prevented the exercise of sovereignty nor has it stopped international cooperation in the use and protection of biodiversity. Trans-boundary biodiversity issues have been addressed and discussed at length for over two decades by the UN.

The delegations of developed countries also further stated that "WHO has elicited pledges from the world's major drug companies not to exploit international repositories of genetic data for commercial benefit". Such pledges, according to Edward Hammond, even if they existed in the form claimed, are contradicted by fact. Firstly, a number of companies have lodged U.S. and international patent claims over hundreds of H5N1 genetic sequences, while resources from gene repositories were freely given to WHO by Indonesia and other countries. Secondly, major pharmaceutical companies have engaged in

advanced clinical trials by utilizing Indonesian, Vietnamese and other viruses in vaccines. Indeed, one vaccine that used a Vietnamese strain has already been licensed. These companies intend to profit from the sales of the vaccines, while Indonesia and many other resource donor countries will receive nothing from the proceeds. This is a testament to the fact that companies, large or small, benefit massively from resources within the WHO system, while no commensurate benefits accrue to Indonesia and other countries that are, ironically, facing the gravest immediate threat from H5N1.

Convergence of Ideas

There are indications during informal consultations that there is political will from some countries to implement a standard Material Transfer Agreement in defining the rights of parties when viruses are transferred. This is also reflected in a draft chairperson's text prepared by Jane Halton for the IGM meeting in Geneva in December 2008.

There is also a good sign that the concept of prior informed consent and the elements of benefit sharing were items placed under consideration within these consultations. The elements of a benefit sharing system, as reflected in the draft chairperson's text covered, among others, provisions of diagnostic tests and materials, laboratory capacity building, regulatory capacity building, WHO antiviral stockpile, pandemic influenza vaccines, WHO pandemic influenza preparedness vaccine stockpiles and access to vaccines for use by developing, and least developed, countries of the world. In addition, the draft chairperson's text also touched upon technology transfer, tiered pricing, a sustainable financing mechanism and an innovative financing mechanism for national vaccine requirements. In order to be able to monitor the implementation of the recommendations, the outline of a traceability and reporting mechanism, as well as the establishment of an advisory mechanism, were formulated.

Conclusion

The move to reform the WHO Global Influenza Surveillance Network is neither self-destructive nor anti-Western; such reform efforts are designed to make the multilateral system a fairer and more transparent and equitable one.

It is time for the international community to acknowledge the need to reform the virus sharing system so that developing countries can receive fair and tangible benefits for their participation. Indonesia and other developing countries have put concrete and detailed proposals on the table for negotiation in Geneva. The real danger to public health is not the exercise of sovereignty that

is already a reality per se, but the risks stemming from not having these proposals discussed and implemented, leaving the world with a dysfunctional global influenza surveillance system. All of these are happening before our very eyes while the world is facing the fact that AI has the greatest potential for becoming a major catastrophe, causing the loss of many innocent lives and disrupting the socio-economic fabric of our societies.

In this regard, a regional response to the AI pandemic threat is needed. Consequently, such efforts must be complementary to those undertaken at the global level.

20 Addressing Pandemic Preparedness in ASEAN
The Ways Forward

Anish Kumar Roy

The Southeast Asian region first experienced AI outbreaks in early 2004, and is now faced with an influenza pandemic. By the end of December 2008, six ASEAN member states had experienced human H5N1 influenza cases, with the latest case having occurred at the end of November 2008, at the time of writing. As the region may face unprecedented challenges in addressing an influenza pandemic, the ASEAN Secretariat prioritized the following key activities for the ways forward, in order to assist ASEAN member states respond to the threat.

Key Activities

Key activities prioritized by the ASEAN Secretariat include the following:

Strengthen institutional capacity and linkages within countries and across borders

ASEAN is addressing this at different levels and platforms. To specifically address AI, ASEAN Ministers on Agriculture and Forestry established an ASEAN Task Force on HPAI in October 2004. The task force developed an action plan with eight priority areas, ranging from disease surveillance and emergency preparedness to information-sharing, public awareness and effective containment measures.

The human health aspect of AI is monitored by the ASEAN Expert Group on Communicable Diseases, through the ASEAN+3 EID Programme. Under this programme, regional coordination for early warning and response, laboratory diagnostics and epidemiological surveillance are in place.

There is a need to strengthen the institutional capacity of key animal and human health institutions or agencies in the ASEAN member states, as well as the institutional capacity of the ASEAN Secretariat to implement, coordinate and facilitate the following essential activities at the national and regional levels:

- Develop a regional framework for the management and coordination of pandemic preparedness and response initiatives.
- Strengthen collaboration with other partners and the ASEAN+3 countries.
- Strengthen collaboration with international organizations and agencies.
- Strengthen ASEAN's role in promoting awareness and communication.
- Promote best practices and information sharing between ASEAN member states and all key stakeholders.
- Promote the need for inter-sectoral approaches, including both gender and social analysis.

Build enabling environment for preparedness

There is a need to strengthen capacity and collaboration in the region for pandemic preparedness and contingency planning, including building an enabling policy environment, establishing management structures and systems, and undertaking planning and allocating the necessary resources for potential influenza pandemics.

Develop partnerships with all stakeholders

As the impact of AI goes beyond both animal and human health sectors, we are working with various ASEAN Dialogue Partners and relevant UN and international agencies, such as WHO, FAO, OIE, the UN System Influenza Coordination and the UN Office for the Coordination of Humanitarian Affairs, to strengthen regional capacities across sectors so that all relevant stakeholders in the public and private sectors, as well as civil society, can link their efforts effectively.

Partnerships with the private sector, especially pharmaceutical manufacturers, will be necessary to increase the region's vaccine capacity and stockpile treatment medications. Cooperation from sectors other than health and agriculture—such as information, tourism, trade and industry, foreign affairs and finance—is important in maintaining public confidence and dealing with the impact.

Engaging civil society is important because they are at the grassroots of local communities and can assist governments to increase the effectiveness of containment measures.

Ways Forward

Based on recent experiences and the lessons learnt thus far, pandemic preparedness activities in the region, and worldwide, will benefit from the following:

- Regional and inter-regional cooperation, especially on information shar-

ing – There is weak coordination across the range of donors, programmes, initiatives and sectors. It is therefore urgent to improve cooperation at both the regional and inter-regional levels.

- A multinational response team – A team will need to be established, its members properly trained and their capacity developed, along with the provision of adequate resources. In some ways, a multinational response team will almost be the culmination of a number of other achievements, including a regional framework for action on pandemic preparedness and response.
- Stronger multi-sectoral responses, especially between animal and human health agencies, to be underpinned by appropriate and adequate policies (possibly through the Asian Disaster Preparedness Centre)

Furthermore, it is necessary to continue to support the implementation of the work plan (2008–2009) of the ASEAN Technical Working Group on Pandemic Preparedness and Response in the Public Health, Agriculture and Disaster Management sectors, which include the following key activities:

- Develop indicators to monitor pandemic preparedness and response plan formulation for non-health sectors.
- Conduct country assessments in all 10 ASEAN member states on multi-sectoral pandemic preparedness and response, using ASEAN indicators.
- Conduct capacity building in advocacy work with non-health sectors.
- Conduct capacity building in multi-sectoral operational continuity and contingency planning for pandemics.
- Strengthen on-scene command and response systems during pandemics using an ICS.
- Develop the ASEAN Regional Pandemic Preparedness and Cross-Border and Resource Sharing Response Plan.

Share information, knowledge and success

From the SARS experience of 2003, ASEAN learned that an effective means of prevention is to ensure that the public is better informed on the causes of the disease, its main modes of transmission and preventive steps to be taken. Providing researchers and public information bodies with prompt and reliable information on occurrences of AI in either poultry or humans is critical in lessening public fear of the virus. Sharing success stories and lessons learned from each specific case thus far can also help develop and implement better preparedness, surveillance and testing procedures in animal and human health systems.

ASEAN overcame the SARS crisis by acting with transparency. Timely information was provided on preventive measures. Strict quarantine and monitoring measures were instituted. New equipment and technology for thermal

screening at exit and entry points was shared freely. Hotlines were activated to ensure prompt information sharing.

There is also a need for information sharing regarding best practices—especially on pandemic preparedness and response initiatives, technical aspects, as well as national policy and programme development. Strong relationships are central to the sharing of lessons, best practices and dissemination of timely information. If relationships and trust between stakeholders are strong, it will be easy to access information quickly when it is needed.

In addition, risk communication and public awareness information is a tool that can empower communities. There is a need for correct information that will reach its target audience on time. There is a need to improve communication systems and to get appropriate, up-to-date information to the people.

Last but not least, there is the need for more rigorous social- and gender-based analyses, upon which to base interventions and actions. Very little information of this kind currently exists.

Change mindsets in farming and poultry management practices

Quick information sharing will help dispel popular beliefs and old habits hampering preventive measures, particularly with regard to livestock management. Enforcing strict on-farm and personal biosecurity practices can help minimize AI infection and transmission.

Relevant ASEAN bodies dealing with the animal health aspect of AI are undertaking national-level initiatives to encourage farmers to avoid intensive and unhygienic poultry farming that leads to overcrowding of chickens, causing close contact with faecal and other excretions. For example, chicken and other farm animals are not allowed into human dwellings, and coops are constructed to prevent mixing of poultry with wild birds. Close monitoring and control of trade or selling of live chickens with no mixing of different avian species on farms and at live poultry markets will be essential. This means standardizing biosecurity practices in poultry production and maintaining adequate control over transportation of poultry products, especially live poultry.

Exert leadership

Numerous high-level meetings have taken place since 2004 to set directions in addressing such challenges. Several technical meetings were also convened to devise cooperative measures for dealing with both animal and human health aspects of the disease. WHO, OIE and FAO were closely consulted.

At the Second ASEAN-UN Summit in September 2005, ASEAN leaders committed themselves to combating the spread of AI, working together with the UN and relevant agencies.

In addition to strengthening regional systems, networks and procedures for surveillance, early warning and response, urgent steps are being undertaken to improve monitoring and assessment of the risk of pandemic influenza in all member states where the H5N1 virus is present. Importantly, additional resources need to be allocated and mobilized to improve pandemic preparedness and response.

Conclusion

ASEAN's strength is through active and personal engagement in collective responses to crises, particularly those that are multi-dimensional and require coordinated responses. This was shown by the successes of dealing with the SARS outbreak and the 1997–1998 financial crisis, and in coping with the 2004 tsunami. Similarly, ASEAN has shown its determination to deal effectively with AI.

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About the RSIS Centre for Non-Traditional Security Studies

The RSIS Centre for Non-Traditional Security (NTS) Studies conducts research and produce policy-relevant analyses aimed at furthering awareness and building capacity to address NTS issues and challenges in the Asia-Pacific region and beyond.

To fulfil this mission, the Centre aims to achieve the following:

- Advance the understanding of NTS issues and challenges in the Asia-Pacific by highlighting gaps in knowledge and policy, and identifying best practices among state and non-state actors in responding to these challenges
- Provide a platform for scholars and policy-makers within and outside Asia to discuss and analyse NTS issues in the region
- Network with institutions and organisations worldwide to exchange information, insights and experiences in the area of NTS
- Engage policy-makers on the importance of NTS in guiding political responses to NTS emergencies and develop strategies to mitigate the risks to state and human security
- Contribute to building the institutional capacity of governments, and regional and international organisations to respond to NTS challenges

Our Research

The key programmes at the RSIS Centre for NTS Studies include the following:

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  Multi-level and Multilateral Approaches to Internal Conflict
  Responsibility to Protect (R2P) in Asia
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  The Politics and Diplomacy of Climate Change
- Energy and Human Security Programme
  Security and Safety of Energy Infrastructure
  Stability of Energy Markets
  Energy Sustainability
  Nuclear Energy and Security

- Health and Human Security Programme
  Health and Human Security
  Global Health Governance
  Pandemic Preparedness and Global Response Networks

The first three programmes received a boost from the John D. and Catherine T. MacArthur Foundation when the RSIS Centre for NTS Studies was selected as one of three core institutions leading the MacArthur Asia Security Initiative* in 2009.

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The Centre serves as a networking hub for researchers, policy analysts, policy-makers, NGOs and media from across Asia and farther afield interested in NTS issues and challenges.

The RSIS Centre for NTS Studies is also the Secretariat of the Consortium of Non-Traditional Security Studies in Asia (NTS-Asia), which brings together 14 research institutes and think-tanks from across Asia, and strives to develop the process of networking, consolidate existing research on NTS-related issues, and mainstream NTS studies in Asia.

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* The Asia Security Initiative was launched by the John D. and Catherine T. MacArthur Foundation in January 2009, through which approximately US$68 million in grants will be made to policy research institutions over seven years to help raise the effectiveness of international cooperation in preventing conflict and promoting peace and security in Asia.

It is not known when, or where, the next deadly infectious disease will emerge, or how it will spread around the world. Are Asian countries prepared for a pandemic? How are National Pandemic Preparedness Plans to be operationalized at the local level? Are there critical gaps in current planning? Which indicators can accurately determine comprehensive pandemic preparedness frameworks? What are the roles of different societal actors and how are they defined? What are the prospects of enhancing regional cooperation in preparing for pandemics and other public health emergencies?

These are some of the questions that this monograph aims to address. It does so by bringing together selected papers presented at a conference on Pandemic Preparedness in Asia, held in Singapore in January 2009. The conference was an integral part of the S. Rajaratnam School of International Studies' broader project on understanding and assessing the capacity of states and societies in Asia to manage transnational threats, as well as to contribute to the development of crises-management mechanisms in the region.

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