

Towards a Safer World - Health Chapter

The International Health Regulations (2005)

Key Lessons in Global Health for Pandemic Preparedness

National pandemic preparedness efforts have – over the course of the last ten years – been led by national Ministries of Health who have, in successive World Health Assembly resolutions, sought guidance from the World Health Organization on alert levels, prioritization of health interventions and selection of target groups for response. As national pandemic preparedness efforts advanced, so the health sector increasingly needed predictable relationships with other sectors for effective “whole of society” pandemic preparedness planning. WHO’s 2009 Pandemic Preparedness and Response guidance reflected this reality and encouraged close and effective working relationships between different sectors.

The revised International Health Regulations, approved by the WHO Member States in 2005, is an intergovernmental legal agreement that is binding on 194 States Parties across the globe, including all the Member States of WHO. Their basic purpose is to help the international community prevent and respond to acute public-health risks that have the potential to cross borders and threaten people worldwide (such as pandemics). In January 2010 the WHO Executive Board requested IHR Review Committee to review both the response to the 2009 Influenza A (H1N1) pandemic and the functioning of the IHR.

The Committee’s report (May 2011) noted that decision making in a public health emergency is often based on incomplete information with uncertainty about the threat and the likely effectiveness of response measures. Plans must be adapted to the actual circumstances of the event within the face of competing demands in different sectors, constraints imposed by limited resources, political scrutiny from legislators and pressure from the public and media. Informed decisions are required despite the uncertainty dictated by lack of precise information and the speed of events. The committee concluded that pandemic preparedness should rely even more on multi-sectoral participation and use a risk-based approach that enables a flexible response to different scenarios.

This (TASW) analysis of national experiences with the Whole of Society approach to multi-sectoral pandemic preparedness and response complements the findings of the IHR review. It reveals some of the challenges faced by national Ministries of Health and both regional and global public health authorities as they provide technical and operational leadership to other sectors. They have the unenviable task of providing continuous and reliable information on the nature of an outbreak, its impact on different aspects of society, especially on the maintenance of critical services, and on the advisability and availability of specific interventions. They are expected to do so without frightening the public by exaggerating the potential consequences and without underplaying the risks, even when information available to it is incomplete and in flux. In practice, the best national responses to the 2009 Influenza A (H1N1) pandemic reflected decisions that were taken in concert with partners who represent a broad range of societal interests.

Throughout the pandemic the World Health Organization sought to support national health authorities as they provided technical and operational support to other sectors. The role expected of the health sector was challenging. They were best able to support other sectors when they had – before the pandemic - invested jointly in effective contingency planning together. That has meant building relationships and working practices which would enable the adaptation of responses in the face of differing magnitude and severity. In situations where inter-sectoral working had resulted in rigid protocols reflecting the mandates and operating procedures of different sectors, such adaptability was lacking.

Sectors other than health depended heavily on analysis of real-time disease surveillance using demographically and geographically disaggregated data in order for them to adapt their responses and make them as effective as possible. These analyses were not always forthcoming – not least because the disaggregated data were not available.

Effective whole of society responses have depended on different sectors being ready to apply the entire range of interventions, including those aimed at prevention and the reduction of transmission (by the distribution and administration of vaccines and through non-pharmaceutical measures largely based on social distancing) and those aimed at the provision of health care services both to persons with influenza and those affected by other conditions requiring health care. They rely health authorities to advise them on how these interventions could best be implemented in a prioritized and targeted manner.

The revised International Health Regulations 2005 (IHR) entered into force on June 15, 2007 as an international legal agreement “to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade.” The revised IHR also require all 194 WHO member states to strengthen national capacities to reinforce public health surveillance and response systems, including communication and reporting mechanisms, such as the requirement of countries to report to WHO within 24 hours after identification and assessment of potential public health threats.

Many countries still lack the capacity to identify, prevent and respond to health emergencies. The IHR is a valuable instrument for helping nations to work together when protecting the global public and should continue to be strengthened as a public good. In addition, efforts to establish legal frameworks and agreements for sharing both biological materials and benefits should be sustained given the continuing need for effective response and coordinated action at all levels. As anticipated in the IHR, WHO is increasingly using unofficial reports from other sources to improve surveillance. This will allow for faster information exchange which can be facilitated by newer technologies, such as social media, and should help national and global health authorities implement a more effective and efficient response to public health emergencies of international concern.

According to the *Report of the Review Committee on the Functioning of the International Health Regulations (2005) in relation to the Pandemic (H1N1) 2009* the H1N1 pandemic was the first public health emergency of international concern since the IHR revision was put into force

in June 2007. This important review, commissioned by WHO and conducted independently, presented the following conclusions:

Summary conclusion 1

The IHR helped make the world better prepared to cope with public-health emergencies. The core national and local capacities called for in the IHR are not yet fully operational and are not now on a path to timely implementation worldwide.

Summary conclusion 2

WHO performed well in many ways during the pandemic, confronted systemic difficulties and demonstrated some shortcomings. The Committee found no evidence of malfeasance.*

Summary conclusion 3

The world is ill-prepared to respond to a severe influenza pandemic or to any similarly global, sustained and threatening public-health emergency. Beyond implementation of core public-health capacities called for in the IHR, global preparedness can be advanced through research, reliance on a multisectoral approach, strengthened health-care delivery systems, economic development in low and middle-income countries and improved health status.

These are valuable conclusions that are relevant to planning for whole of society pandemic responses. The *Report* attests to the value of a legal global health mechanism like the IHR, but also demonstrated that the world is still not fully prepared for a severe influenza pandemic or similar global emergency and will not be until stronger global and national disaster preparedness and response plans are developed and are able to be implemented. Helping countries gain the capacity to implement the IHR as they are designed would go far towards rectifying the current situation.

The IHR is not the only reporting mechanism for infectious diseases. The World Organization for Animal Health has a list of reportable diseases within animal populations. Further work is underway to bring these two communities and reporting mechanisms together –

* This conclusion addressed allegations that WHO had exaggerated the threat of an influenza pandemic to benefit pharmaceutical companies.

through the Tripartite arrangement between WHO, OIE and FAO - to ensure a timelier public health response.

The World Health Organization's Role in Helping Member States Prepare

The World Health Organization has worked with its Member States to help them prepare for an influenza pandemic and other public health emergencies of international concern. WHO has advocated for on-going global surveillance of influenza as the key to early detection of novel influenza viruses. To accomplish this, WHO has created a network of 136 National Influenza Centres in 106 countries, helping strengthen their surveillance capacity in order to ensure more timely and efficient epidemiological and laboratory detection and response.

Additional support from WHO has included technical support in the development of contingency planning through the creation of National Influenza Pandemic Preparedness Plans. For the global health community, it has never been a question of whether an influenza pandemic would occur, but a matter of when. In 2009, its fears became a reality with the onset of a pandemic due to the novel 2009 H1N1 influenza virus. According to the Report of the Independent Review Committee on the Functioning of the International Health Regulations (2005) in relation to Pandemic (H1N1) 2009, 74% of countries had pandemic preparedness plans in place before the 2009 pandemic.

The investment in pandemic preparedness and the development of plans has proven itself valuable not only in response to influenza outbreaks but also to other threats to public health.

In early 2007, the island of Jamaica experienced an outbreak of malaria for the first time in many years. Using their national influenza plan, Jamaica was able to use one of the hospitals designated for an influenza outbreak as the main treatment hospital for the malaria outbreak. And by adapting their influenza guidance they were able to treat ill

patients and provide communication support to help prevent further cases by educating the public in mosquito control.

However, for the most part existing plans are inadequate in some ways and there is still more work needed in order to strengthen them and, more importantly, to reinforce national capacities to implement them when they are needed. A review of the Humanitarian Pandemic Preparedness (H2P) program (www.pandemicpreparedness.org) found that “[e]xisting national plans will be stronger when they have addressed the existing gaps. Typical gaps in plans include a lack of pandemic influenza focus (due to a principal concern with influenza in avian populations), a lack of clarity regarding the role of civil society in government plans, and the lack of promotion of and preparation for non-pharmaceutical interventions such as social distancing.”

Pandemic preparedness has served to strengthen coordination mechanisms at national and international levels for other emergencies. In many instances countries developed interdisciplinary mechanisms, usually in the form of “task forces” at the national and sub-national levels in order to better coordinate across-the-board responses to the pandemic threat. These task forces included representatives of non-traditional actors such as NGOs, the private sector, and the media, all of which would have critical roles to play in the event of a pandemic or other emergency. In some instances these task forces were used for other public health threats including the recent 2010 yellow fever and 2011 Ebola outbreaks in Uganda and extreme weather in Europe. During the events in Uganda, the multi-sectoral national-level task force was activated for both outbreaks and brought together key stakeholders, actors, and donors. This action fostered better communication between partners and was instrumental in generating a faster and more effective response.

Development of Key Guidance and Resources

Governments, businesses, organizations and communities looked upon the global health community for leadership and guidance for what to do in the event of a pandemic. The WHO released the revised *WHO Global Influenza Preparedness Plan: the role of WHO and recommendations for national measures before and during pandemics* in March 2005 for this purpose in light of the on-going pandemic threat. The 2005 document defined “the phases of increasing public health risk associated with the emergence of a new influenza virus subtype that may pose a pandemic threat,” recommended actions for national authorities, outlined what measures WHO would take for each phase and provided guidance to national authorities for developing the aforementioned national influenza plans.

After two years of work and an extensive review the WHO released the *Guidance Document for Pandemic Influenza Preparedness and Response* in 2009, shortly after the first cases of the 2009 H1N1 influenza pandemic were detected. This new guidance document had 4 key revisions and/or updates to the 2005 document including

- 1) Regrouping and redefining the six-phase system while maintaining its basic structure,
- 2) Highlighting key principles for pandemic planning such as ethical considerations, integrating pandemic preparedness within a national emergency framework, and incorporating a “whole of society” approach that emphasizes the multi-sectoral impact of an influenza pandemic and the importance of a coordinated and collaborative effort by all sectors, not just health.
- 3) Harmonizing the recommended measures with the IHR 2005 and the concurrent development/revision of WHO guidance in pandemic influenza surveillance, disease control, rapid containment, and communications.
- 4) Suggesting general planning assumptions, their implications, and providing selected evidence base to help national level planning.

The second key revision to the 2005 document shifted consideration of an influenza pandemic from that of purely health issue to that of a broader global emergency. A strong emphasis was put on inter-disciplinary integration and coordination within national emergency preparedness and response frameworks. The new document represented a full incorporation of the “whole of society” approach to pandemic control. The need for such approaches is being increasingly recognized at national and local levels - not only for pandemic influenza but also for all public health emergencies of international concern. If it is applied effectively and plans are reviewed routinely as actors change and science is updated, the approach will bring benefits for other emergencies and events. The following points from this guidance remain relevant and should be emphasized in ongoing pandemic planning and preparedness activities.

A “whole-of-society” approach to pandemic influenza preparedness emphasizes the significant roles played by all sectors of society.

- *The national government is the natural leader for communication and overall coordination efforts. Central governments should work to put in place the necessary legislation, policies and resources for pandemic preparedness, capacity development and anticipated response efforts across all sectors.*
- *The health sector (including public health and health care services) provides critical epidemiological, clinical and virological information which, in turn, informs measures to reduce spread of the pandemic virus and its attendant morbidity and mortality.*
- *The diverse array of non-health sectors must provide essential operations and services during a pandemic to mitigate health, economic and social impacts.*
- *Civil society organizations are often well placed to raise awareness, communicate accurate information, counter rumours, provide needed services, and liaise with the government during an emergency.*
- *Families and individuals can help reduce the spread of pandemic influenza through adoption of measures such as covering coughs and sneezes, hand washing, and the voluntary isolation of persons with respiratory illness.*

WHO Guidance Document for Pandemic Influenza Preparedness and Response

In December 2007, the Centers for Disease Control and Prevention (CDC) of the U.S. Department of Health and Human Services and the U.S. Agency for International Development (USAID) published a brochure entitled *Non-Pharmaceutical Interventions for Use During a Human Influenza Pandemic*. This guidance document was a condensed and adapted version of the CDC Community Mitigation Guidance in accordance with WHO recommendations. It was developed to provide key information on interventions for use in developing countries to help mitigate the impact of an influenza pandemic without the use of drugs or vaccines which might be either in scarce supply or difficult to deliver in many countries during the early stages of a pandemic, when they would be most useful. The rationale for emphasizing non-pharmaceutical interventions (NPIs) was to demonstrate simple and practical measures that could help prevent and/or delay transmission of viruses when introduced early, and in a targeted and layer manner. This would have the effect of reducing the total number of cases and of spreading cases over a longer period of time, thereby lessening the burden on health systems. At the heart of the NPIs are measures that limit human interaction through social distancing.

Additional guidance was developed over the years to address the needs of particularly vulnerable populations and to address issues that could have an important impact on the course of an influenza pandemic and its consequences. The following are some of the documents that were produced for the humanitarian community and for low-resource settings within developing nations. The first such document was published in May 2006. The *Pandemic influenza preparedness and mitigation in refugee and displaced populations – WHO guidelines for humanitarian agencies* and subsequent summary guidance *Pandemic influenza prevention and mitigation in low resource communities* provided practical recommendations for community and individual interventions in the event of an influenza pandemic. The guidance highlighted key

prevention measures including the use of non-pharmaceutical interventions (NPIs), case management of patients at home and within health facilities and the protection of staff and first responders.

In 2008, the WHO released its *Reducing excess mortality from common illnesses during an influenza pandemic – WHO guidelines for emergency health interventions in community settings*. The rationale for this document was to provide technical support to poor communities as part of a broader effort to focus not just on influenza, but also to address conditions that usually represent a high burden of disease, including diarrhea, malaria, pneumonia, malnutrition, HIV/AIDS, and tuberculosis. These diseases will continue to occur during the course of an influenza pandemic and must also be managed successfully in order for communities to avoid incurring excess preventable mortality. The emphasis of this document is on how, during an influenza pandemic, health care services for common conditions could be provided within communities themselves, and even within households. The document presents strategies and recommendations for how best to position the community to address gaps in health care management during an emergency, reduce demand for health facility-based services, and limit exposure to influenza within health structures.

National authorities that implement such guidelines are in a better position to ensure the proper management and maintenance of a minimum level of service during a pandemic, so that users of health care services continue to benefit in the event of a temporary interruption of services, care, and/or supplies. Many governments have recognized that health care services during an influenza pandemic have to be provided at the household and community levels. By providing these guidelines, WHO demonstrated strategies and recommendations for how best to position the community to address gaps during an emergency, reduce demand for health facility-

based services, limit exposure to influenza within health facilities and, perhaps most importantly, maximize accessibility to care for the greatest number of patients possible. The guidelines established the importance and the feasibility of well-prepared community to address common illnesses, both during and in the aftermath an influenza pandemic.

In 2007, the Humanitarian Pandemic Preparedness (H2P) Initiative began working on a community-based training curriculum for health care providers and community leaders. Through the technical leadership of the CORE Group (especially Save the Children (US), CARE (US) and World Vision International) input from several organizations including USAID, IFRC, WHO, and the Academy for Educational Development (now FHI 360) this-health based curriculum was developed by using the WHO guidance previously cited. The health curriculum provides guidance on how humanitarian organizations could continue to provide essential health services, including community-based management of common diseases, health provider protection and infection control, and health communication during a pandemic.

The WHO Pandemic Influenza Preparedness Framework

In May 2011, after nearly 4 years of negotiations, the WHO Pandemic Influenza Preparedness Framework was approved by the World Health Assembly. This framework was created to facilitate the sharing of influenza viruses and access to vaccines. This framework is a step in the right direction for the future of pandemic preparedness and response. It focuses on virus sharing in exchange for access to vaccines and other benefits – it would be useful if - in future iterations - it takes account of the emergency nature of a pandemic and its need for a multi-sectoral approach. It could then bring all actors to the table at the global and national levels to better understand roles and responsibilities, identify and ratify agreements that would be put into force

during a public health emergency like an influenza pandemic, and help promote a more coordinated and efficient response of all actors. Such a framework would be beneficial for not only influenza but other public health emergencies that impact member-states.

The novel influenza A(H1N1) 2009 Influenza Pandemic

The global health community and the world were put on alert in 1997 when the highly pathogenic avian influenza (HPAI) H5N1 virus was first identified in humans in Hong Kong. Nearly six years later, the HPAI H5N1 viruses reappeared in Southeast Asia. Once again, global health authorities began preparing for the possibility of another influenza pandemic.

The cause for alarm within the global health community was created by the sustained persistence of the influenza A (H5N1) viruses in poultry and wild birds, the fact that they were so highly pathogenic in those populations, and the knowledge that an influenza pandemic could prove to be significantly costly, both economically and in terms of human disease and death. An influenza pandemic can create a heavy burden on health systems by placing unmanageable strains on health facilities as a result of shortages of health care personnel due to illness, insufficient pharmaceutical resources including antibiotics, vaccines, and antiviral agents due to production, delivery, and technical obstacles, and inadequate beds for a vastly increased patient population. The consequences could be serious not only for influenza patients, but for those seeking care for other illnesses as well. One of the unique characteristics of an influenza pandemic is that it has the ability to create a global emergency, and to create one very rapidly. And though at its core it is a health care issue, it can cause multi-sectoral consequences. In addition, unlike geographically-limited and focal emergencies, external assistance during a pandemic will be limited – every community and country affected will need to look primarily to

their own preparedness and resources, leaving those that usually count on external assistance to fend for themselves.

On June 11, 2009 Dr. Margaret Chan, Director-General of the World Health Organization declared that an influenza pandemic had begun. A novel influenza A virus had been detected and was circulating efficiently among humans around the world. But, contrary to planning assumptions, the virus did not emerge in Southeast Asia or in areas with avian-endemic H5N1, nor was it even an H5N1 virus. Instead, the virus was first detected in April 2009 in Mexico and the southwest United States and it was an H1N1 virus. However, this new H1N1 virus was different than its predecessors and it appeared to have spread to humans from swine. After just two months the virus was circulating globally and causing some of the economic and social consequences that were originally feared, including impacting travel/tourism and business, due to both absenteeism and fear.

Fortunately, the pandemic influenza A(H1N1) virus was for the most part mild to moderate in terms of the levels of morbidity and mortality for which it was responsible. Certain locations and populations did experience significant consequences. The pandemic disproportionately affected children, pregnant women, people with pre-existing health conditions, and indigenous populations. This differential impact emphasized the need for health authorities to consider the social, cultural, geographical and economic factors that might put various groups at heightened risk in the context of a particular disease. But globally the virus did not produce the dire outcomes many had feared.

A key lesson learned from this experience is that no pandemic is like another. The level of severity varies between locations and populations; public health authorities must prepare for different scenarios. The best pandemic plans prepare for adaptable responses to different

pandemic severities. The need for such adaptability has been recognized by WHO which – through the IHR process – seeks to help develop methods for assessing severity and tailoring responses to different scenarios.

One of the major areas of intervention employed in responding to the 2009 H1N1 influenza pandemic was the procurement, distribution, and administration of vaccines. In September 2009 several nations and manufacturers pledged donations of vaccines and related commodities to WHO in support of developing countries. The vaccines were distributed globally for use in specified target groups, including health care workers (to keep essential health care services functioning), pregnant women, and those with pre-existing conditions that increased their risk of death from influenza, as recommended by WHO's Strategic Advisory Group of Experts (SAGE). Limitations in the manufacturing and distribution of adequate quantities of vaccine made it difficult to supply countries in a timely manner. As a result, national governments are seeking to increase their vaccine production capabilities and WHO is providing assistance. Global and national health authorities inevitably have to plan for the eventuality that only limited pharmaceutical resources will be available on time when they are responding to disease outbreaks and pandemics. WHO pandemic preparedness guidance has emphasized the importance of simple and practical measures like non-pharmaceutical interventions including social distancing in limiting consequences: it suggests that these measure be deployed early during the course of a pandemic, as was done in many countries in 2009-2010. Giving communities and households advance knowledge of what constitutes best practices and behaviors in their local context can empower them and help to reduce transmission of disease.

In August of 2010, Dr. Chan announced that the world had moved into the post-pandemic period. In her statement she said that countries needed to remain vigilant as pandemic viruses

are unpredictable and certain populations could remain at risk of infection. This statement remains true today, not only for the H1N1 virus, but also for the H5N1 virus that still circulates within avian populations and that still carries the same risk of inducing a pandemic as it did prior to the influenza A (H1N1) pandemic of 2009.

One Health Movement

The risk of emerging and/or re-emerging infectious diseases is increasing for a variety of reasons, one of the principal ones being the ever closer proximity of human and animal populations. The One Health movement emphasizes the need for close collaboration between animal and human health services so as to better address zoonotic diseases. This would improve preparedness in the form of early detection, control, response (including risk communication), business continuity, and livelihood resilience. Governments and global bodies are increasingly encouraging collaboration between these sectors to ensure that early detection and disease control is integrated within existing emergency preparedness and response plans at national and global levels.

Analyses of Results and Key Lessons

The European Centre for Disease Prevention and Control (ECDC) has analyzed the key lessons learnt in Europe from the 2009 pandemic and suggested ways in which the lessons may be applied:

Table: A selection of the more important lessons to be learnt in Europe from the 2009 Pandemic (9)

Topics	Learning Point	Notes
Planning Scenarios	Countries and plans to be flexible – preparing for a range of scenarios.(2)	
	Undertake more operational planning and preparation at the delivery end (2,3,9)	This means determining how for example how vaccines will be delivered, intensive care capacity

		increased quickly using tools like WHO's Checklist and ECDC's <i>Acid Tests</i> as a starting point.(7,8)
Early analyses	Early assessments should be more structured and rehearsed annually for seasonal influenza.(2)	This was done for the 2010-11 seasonal influenza epidemics in Europe by ECDC and its advisors through a structured risk assessment .
	There need to be more sophisticated descriptions of pandemics, the severity reflecting the inherent complexity of the pandemics and their countermeasures.(2)	ECDC is taking a lead in developing this for Europe working with Member States and WHO using seasonal influenza as a model
	The results of important analyses need to be shared in more timely manner between countries.(2)	Problems arose from the need for independent peer-review and authorities producing analyses but not necessarily thinking who else needed to know the results.
Surveillance	Surveillance needs to be better targeted to answer certain essential questions and particular weaknesses (surveillance in hospitals, mortality surveillance and seroepidemiology) need to be addressed using seasonal influenza as a model.(25)	A general finding was the near impossibility of establishing new surveillance and other systems during a crisis like a pandemic (e.g. surveillance in hospitals). In contrast pre-existing systems , primary care and virological surveillance worked well.
Decision making in the pandemic	There should be more formal if rapid independent reviews of earlier decisions at national and international levels.(26)	This did happen in a number of circumstances learning from earlier recommendations.(26)
	Opinion giving should be transparent with those advising being identified and with public declarations of interest.	An adviser having a conflict of interest does not mean that their advice is incorrect or should be discounted. There are certain areas (e.g. pharmaceutical development) where conflicts of interest are inevitable among those giving advice
Communications	Prepare the population and professionals for a range of possibilities (2,9)	A particular problem was that the public and decision makers thought they had been promised a severe pandemic.(27)
	The opinions, concerns and views of the public and professionals should be monitored at national levels during a pandemic and responded to rapidly.	This was done in a few countries notably the United States. Professionals are especially important for pandemics as it is they who need to deliver the countermeasures like early medical treatments, antivirals and vaccines to the public
	A disconnect between technical epidemiological and virological risk assessments and the politically-driven risk management process was evident and	

	partially fuelled by the media coverage in early days of the 2009 pandemic.	
	Many public health authorities are poorly equipped to deal with the multi-source two-way communication platforms that the internet and social media allows today.	This was one of the reasons leading to a variable public health response in some countries, especially when it came to vaccinations.(28)
Essential Research and Development	It should be more possible to rapidly commission essential research in a pandemic	Some countries were able to do this but current European Union rules and procedures almost make it impossible to use EU monies for this.

Nicoll A, Sprenger M. Learning lessons from the 2009 pandemic: putting infections in their proper place. Eur J Epidemiol 2011; 10.1007/s10654-011-9575-4
<http://www.springerlink.com/content/fp5436378p762772/fulltext.html>

The last five years of experience of preparedness for and response to risks associated with pandemic has led public health authorities to derive the following lessons from their experiences:

- i) The Health Sector will always need to establish functional links and ways to engage with the other sectors (including the media) that are likely to be involved in responding to a pandemic or other health crisis. This engagement needs to be done in a positive and predictable way. The health sector faces many challenges in trying to guide planning and strategy across multiple Ministries and sectors during a major outbreak or pandemic.
- ii) The Health Sector needs to invest more in being nimble and adaptable in relation to uncertain and rapidly changing infectious events through developing better capacities for advance thinking, contingency planning and flexible responses. This applies to all sectors but in relation to pandemics the Health Sector has a specific and central role because it is the point of reference for all the others of society.
- iii) The Health Sector has to continue to differentiate the potential impact of infectious disease outbreaks and pandemics on different population and age groups, and to anticipate that these variations may change over time – hence the absolute need for

disaggregated real time data harvesting and analysis. This has been greatly facilitated in recent years through the revision of the International Health Regulations but is hampered by lack of consistent cash for surveillance – and for scaling up quickly in the face of new threats.

- iv) The Health Sector has the unenviable task of being expected to provide continuous and reliable information on the nature of the outbreak, the risks it brings for the public, for different industry sectors and for government, and its likely origins while, at the same time, needing to be extremely careful when commenting on intensity and severity when the data are inconclusive.
- v) The Health Sector is expected to provide prescriptions for outbreak and pandemic handling that are adapted (a) to assessments of severity and transmission intensity, and (b) to the available resources in-country.

WHO supported national Health Ministries as they worked hard to develop such attributes in relation to the 2009 Influenza A (H1N1) pandemic. For many, these are a complex addition to an already heavy workload especially when the health system is over-loaded. Hence the absolute importance of (a) high quality guidance and (b) advance planning by all the sectors likely to be engaged in the response. Ensuring all stakeholders receive up-to-date and accurate information on risk – despite inevitable uncertainties – was a critical function for the WHO in the recent pandemic, and will continue to be vitally important in future.

Looking Ahead

It is inevitable that the learning and application of lessons will depend on continuous research, risk assessment, analysis, evaluation and innovation by different stakeholders in pandemic response. Such capacities are routinely employed in all disaster preparedness work but for health challenges, public health authorities and their Ministries play a unique and vital role. To help these authorities better meet the expectations of other sectors, focused research should be commissioned on better systems for real time surveillance, assessing the impact of different interventions and sharing both knowledge and uncertainty. This should be possible under the IHR but is best undertaken as a multi-country initiative. Innovative approaches for new communications tools – such as social networking, podcasting and blanket SMS – also need careful analysis. How can they be adapted to ensure more effective and less costly responses? Future evaluation should include rigorous examination of multi-sectoral strategies both for limiting disease transmission and mitigating its impact and the effectiveness of whole of society preparedness. This would include analyses of different relationship building and networking procedures.

Conclusion

Although there have been important advances in pandemic preparedness over the past decade, with WHO leading the way, the conclusion of the 2011 IHR Review that the world is not in any way adequately prepared for a severe influenza pandemic is sobering. The unfinished agenda extends to preparedness for other global health catastrophes of appreciable magnitude. More must be done to support national governments in improving capacity for preparedness, disease identification and response. The threat of an influenza pandemic remains and always will, and the time of onset of the next pandemic is unpredictable. Continuing effective communication

from authoritative sources about the ongoing threat of a severe influenza pandemic, and the importance of continued efforts to prepare to respond to a severe pandemic at international, national, district, and community levels, will be important for sustaining preparedness work. By adopting a “whole-of-society” approach and by following the lead of international authorities in the public health sector, all nations can continue to prepare for the next influenza pandemic. The result will be a global society better prepared for such emergencies – even those whose scope cannot, at this stage, be foreseen.