

EPIDEMIC
ALERT &
RESPONSE

WHO Influenza Pandemic Preparedness Checklist

November 2004 version

Acknowledgements

This checklist was developed by WHO WPRO and HQ, making use of the following documents:

1. The Canadian pandemic plan checklist (available at http://www.hc-sc.gc.ca/english/media/releases/2004/2004_05.htm) according to the copyright permission allowing use of the Canadian plan for pandemic preparedness.
2. The guide to preparing a pandemic plan published by the US Department of Human Services (available at <http://www.hhs.gov/nvpo/pandemics/index.html> accessed on 4 March 2004). The scenario that begins the US guide was adapted for the scenario that begins this checklist. The web site of the National Library of Medicine, USA, asserts that information on US government sponsored web sites is in the public domain and may be freely copied, with acknowledgement.
3. The Health Sector Emergency Preparedness Guide (WHO 1998, available at <http://www.who.int/disasters/repo/5814.doc>)
4. Public Health response to biological and chemical weapons - WHO guidance 2004 (available at <http://www.who.int/csr/delibepidemics>)

The checklist has been revised following regional and global meetings on pandemic preparedness.

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PART I. Introduction

Sometime in the future...

Rumours reach the ministry of health in one of the WHO Member States of an outbreak of unusually severe respiratory illness in two villages in a remote province. A team is dispatched to the province and learns that the outbreak started about a month earlier. The team can identify at least 50 cases over the previous month. All age groups have been affected. Twenty patients are currently in the provincial hospital. Five die from pneumonia and acute respiratory failure. Surveillance in surrounding areas is increased and new cases are identified throughout the province. Respiratory specimens collected from several patients are tested at the national laboratory and are found to be positive for type A influenza virus but cannot be further sub-typed. The isolates are sent to the World Health Organization (WHO) Reference Centre for Influenza for further characterization. The isolates are characterized as influenza A (H6N1), a subtype never before isolated from humans. Gene sequencing studies further indicate that most of the viral genes are from birds, with the remaining genes derived from a human influenza virus. This information is immediately transmitted back to the ministry of health where the cases were first identified and throughout the WHO network.

Cases appear in surrounding towns and villages. The novel influenza virus begins to make headlines in every major newspaper and becomes the lead story on major news networks. Countries are asked by WHO to intensify influenza surveillance and control activities. Key government officials throughout the region are briefed on a daily basis as surveillance is intensified.

Over the next two months outbreaks begin to appear in neighbouring countries. Although cases are reported in all age groups, young adults appear to be the most severely affected. One in every 20 patient dies. The rate of spread appears to be rapid and countries begin to implement travel restrictions, quarantine measures and closures of educational institutions. Widespread panic begins because supplies of antiviral drugs are severely limited and a suitable vaccine is not yet available, although manufacturers are requested to go into full production.

Several weeks later, there are reports that H6N1 virus has been isolated from airline passengers with respiratory symptoms arriving from affected countries.

A few more weeks pass and focal outbreaks begin to be reported in other continents. Rates of absenteeism in schools and businesses begin to rise. Phones at health departments are ringing constantly. The spread of the new virus continues to be the major news item in print and electronic media. Citizens begin to clamour for vaccines, but they are still not available. Antiviral drugs cannot be obtained. Police departments, local utility companies and mass transit authorities begin to have severe personnel shortages, resulting in severe disruption of routine services. Hospitals and outpatient clinics become severely short-staffed when the doctors, nurses and other health-care workers themselves become ill or are too scared to work. Elderly patients with chronic medical conditions are afraid to venture out for fear of getting infected. Intensive care units at local hospitals are overwhelmed and soon there are shortages of ventilators for treatment of patients with pneumonia. Parents are distraught when their healthy young adult sons and daughters die within days of first becoming ill. Several major airports close because of high absenteeism among air traffic controllers. Further deterioration in health and other essential community services occurs over the next 6–8 weeks as the pandemic sweeps across the region.

Are you prepared?

Are you prepared to prevent or minimize the human morbidity and mortality, the social disruption and the economic consequences caused by an influenza pandemic?

An influenza pandemic

An influenza pandemic occurs with the appearance of a new influenza virus against which none of us has any immunity. This results in several, simultaneous epidemics worldwide with high numbers of cases and deaths. With the increase in global transport and communications, as well as urbanization and overcrowded conditions, epidemics due to the new influenza virus are likely to be established quickly around the world.

A new influenza virus: how it could cause a pandemic

Influenza A and B are two of the three types of influenza viruses associated with annual outbreaks and epidemics of influenza. These epidemics are due to minor changes in the influenza viruses that enable them to evade the immunity we have developed after previous infections with the viruses, or in response to vaccinations.

Only influenza A virus can cause pandemics. When a major change in either one or both of the influenza A virus surface proteins occurs spontaneously, no one will have immunity to this completely new virus. When the virus also has the capacity to spread from person-to-person, a pandemic can occur.

Global pandemics have been reported since the Middle Ages. The most well documented pandemics occurred in 1918 (H1N1, the Spanish flu), 1957 (H2N2, the Asian flu) and 1968 (H3N2, the Hong Kong flu).

Consequences of an influenza pandemic

During the last century, these three influenza pandemics caused millions of deaths, social disruption and profound economic losses worldwide. Influenza experts agree that another pandemic is likely to happen but are unable to say when. In industrialized countries, it has been estimated that the next pandemic may result in up to 130 million outpatient visits, 2 million hospital admissions and 650000 deaths over two years. However the impact is likely to be greatest in developing countries. Deaths due to pandemic influenza in these countries could total many millions.

In addition to their human toll, epidemics have enormous social and economic consequences. For instance, estimates of the cost of the SARS outbreak in 2002/3 range up to \$US50 billion. SARS caused considerable social disruption and public anxiety, even in areas and countries with no cases. Hospitals, schools and some borders were closed. Thousands of persons were placed in voluntary or supervised quarantine. Avoidance of travel to certain areas and the widespread wearing of surgical masks were disproportionate to the risk. Patients and ethnic groups encountered discrimination.

Fortunately, pandemics don't occur very often. The last major influenza pandemic was in 1968. Since then however, avian influenza, that had previously infected only birds, has caused illness in humans several times. Unlike SARS (where clusters of infection resulted from breakdowns in infection control procedures), human-to-human transmission of HPAI infections have seldom been reported since 1997. But nevertheless, the HPAI outbreaks remind us that the next pandemic could occur at any time with potentially devastating consequences to human populations if an influenza virus were to combine the high case fatality rate associated with HPAI and the high transmissibility of seasonal influenza. Governments and their partners need to develop strategies and programmes to prepare for a pandemic.

Why prepare?

The objective of pandemic planning is to allow countries to be prepared to recognize and manage an influenza pandemic. Planning may help to reduce transmission of the pandemic strain virus, to decrease

cases, hospitalizations and deaths, to maintain essential services and to reduce the economic and social impact of a pandemic.

In addition, blueprints for an influenza pandemic preparedness plan can easily be used for broader contingency plans encompassing other disasters caused by the emergence of novel, highly transmissible and/or severe communicable diseases.

The pandemic preparedness checklist - how to use it

Countries will have various capacities for influenza pandemic planning and response will thus be in different stages of the planning process. The aim of the pandemic preparedness checklist is primarily to provide an outline of the essential minimum aspects of preparedness as well as aspects of preparedness that are considered desirable. It is recommended that responsible people or groups of people (often sub-committees) in countries that are in the process of planning, consider the specific aspects of the checklist for which they are responsible. Countries that already have a national pandemic preparedness plan in place, may use the checklist to evaluate the completeness of the current plan.

In addition to this checklist, a more comprehensive guideline is being drafted based on the checklist, to assist countries with the development of a national plan in a more stepwise approach. This comprehensive guideline will contain more background information explaining why certain activities are thought to be important. Countries that have not yet commenced pandemic planning should read the essential checklist in conjunction with the comprehensive guideline, before proceeding with their own plan.

Planning will require the commitment and input of the countries themselves. This checklist should not substitute a country's preparedness plan.

Pandemic preparedness is not a quick process

It would be unrealistic for any country, unless it has a very small population with a centralized infrastructure and bureaucracy, to consider that it could prepare a detailed and comprehensive pandemic plan in weeks, or even months. Two of the reasons these plans take time is that there is a need for a multisectoral approach and the need to involve the community.

Multisectoral approach means involvement of many levels of government and people with different areas of skill, including policy development, legislative review and drafting, animal health, human population health, patient care, laboratory diagnosis, laboratory test development, communication expertise and disaster management. Community involvement means making optimal use of local knowledge, expertise, resources and networks. It is the only way to engage people and build the commitment needed for policy decisions.

PART II. The Checklist

Many countries have gained experience in pandemic planning and response through dealing with the threat or actuality of SARS and HPAI. Lessons from these outbreaks have been incorporated into the checklist, with SARS representing a potential pandemic first recognized in humans and HPAI a potential pandemic first recognized in birds. Experience with these outbreaks has shown that there is always room for improvement in pandemic preparedness. It is expected that this checklist, like the pandemic preparedness plans of countries, will need regular revision.

The checklist is intended to be comprehensive. It has been developed under the following headings.

- Preparing for an emergency
- Surveillance
- Case investigation and management
- Prevention
- Maintaining essential services
- Research
- Implementation and revision

The essential elements

In order to assist countries to set priorities, a subdivision is made between essential and desirable elements of a national pandemic preparedness plan. Essential elements should be considered by all countries that are developing an influenza preparedness plan, regardless of their resources.

In preparing the draft checklist, different views have been expressed about the elements that should be considered as essential. The table below attempts to reflect the outcome of several consultations and may be used by countries at their convenience.

Summary of the essential and desirable elements of the checklist

Chapter	Essential	Desirable
Preparing for and emergency <ul style="list-style-type: none"> 1. Getting started 2. Command and control 3. Risk assessment 4. Communication 5.1 Legal issues 5.2 Ethical issues 6. Response plan by pandemic phase 	X X X X X	 X
Surveillance <ul style="list-style-type: none"> 7.1.1. Inter-pandemic surveillance - sentinel 7.1.2 Inter-pandemic surveillance - early warning 7.2 Enhanced surveillance 7.3 Pandemic surveillance 	 X X 	X X
Case investigation and management <ul style="list-style-type: none"> 8.1 Local laboratory capacity 8.2 Reference laboratory availability 9. Epidemiological investigation and contact management 10. Clinical management 	 X X X	X
Preventing spread <ul style="list-style-type: none"> 11. Public health measures 12. Vaccine programmes 13. Antiviral drugs as a prevention method 	 X 	 X X
Maintaining essential services <ul style="list-style-type: none"> 14. Health services contingency plans 15. Other essential services contingency plans 16. Recovery plans 	 X X 	 X
Research <ul style="list-style-type: none"> 17. Research and evaluation 		X
Implementation and revision <ul style="list-style-type: none"> 18. Testing and revision of plan 	X	

Preparing for an emergency

The items discussed in this chapter are general items that should be considered for every threat you are preparing for and do not apply to influenza pandemic preparedness only. While working on these items, it is recommended that you look for synergy with existing emergency plans and structures, to prevent overlap and to ensure efficient use of resources.

1. Getting started

Rationale

Pandemic preparedness is not easy. You need human resources to write a plan, and some preventive measures need considerable investments. Decisions need to be taken that affect the whole community. To ensure that decision-makers are willing and able to make difficult choices before and during a pandemic, political and bureaucratic commitments are essential. In order to make the plan and its implementation acceptable for the public, community involvement should be ensured as well.

Questions to be addressed

Is there recognition of the potential human, social and economic impact of a pandemic at the highest levels of government? Is there political and bureaucratic commitment to prepare for such an event? Is it clear how the community is going to be involved in the planning process?

Check

- Recognition of the importance of influenza pandemic preparedness at the appropriate levels of government and acknowledgement of the aim of preparedness.
- Committed funding for the extent of preparedness planning.
- Designation of organization and/or individuals responsible for producing and revising the influenza pandemic preparedness plan.
- Establishment of a realistic timeline for completion of various stages of the plan..
- Identification of individuals and representatives from all organizations that will need to contribute to the plan. These may include:
 - national and regional public health authorities, including preventive, curative and diagnostic services, the national drug regulatory authority, and the National Influenza Centre(s) representatives of associations of physicians (e.g., General Practitioners and Respiratory Physicians), nurses, and pharmacists;
 - important national virologists and epidemiologists and representatives of scientific and university institutions;
 - veterinary authorities and experts in animal influenza viruses;

- representatives of public or private organizations that monitor health indicators, use of health-care facilities and pharmaceuticals;
 - representatives of pharmaceutical manufacturers or distributors;
 - representatives of social services administrations;
 - representatives of military or other government emergency response organizations or teams;
 - representatives of non-governmental and voluntary organizations, such as the national Red Cross or Red Crescent Society;
 - representatives of telecommunications and media relations experts.
- Agreement on the roles and contribution in the planning process from all participating individuals and organizations.
 - Formation of a core national pandemic planning committee, representing relevant organizations mentioned above.
 - Agreement for scheduled periodic meetings of the national pandemic planning committee in the absence of a pandemic and urgent, regular meetings of the committee in the early warning phase of a potential pandemic and when a pandemic is developing locally.
 - Communication to the identified target audience (political, government, professional groups, wider public) that a pandemic plan is being prepared.

2. Command and control

Rationale

In order to be able to make clear and timely decisions and to have a uniform policy that is endorsed by all officials, it is essential to know who is in charge of different activities within communicable disease control, and how that might change if a limited outbreak become a major emergency. In addition, it is essential to know who is in charge of key elements in the response (like travel or trade bans, enforcement of quarantine, etc.).

Questions to be addressed

Who is making the decisions in case of an influenza pandemic: Is this the Prime Minister or President, Ministry of Health or other departments or even regional officers? Who is advising the government on measures to be taken, and what is the status of such advice? Is there a hierarchical structure for deciding on measures and ordering their implementation and is this structure known to other national and sub-national (emergency) departments (agriculture, internal affairs but also police and fire department, etc.)? Does everybody know what to do?

Check

- A command and control structure should be in place outlining the management and decision-making processes of all organizations involved in response to a health emergency, including:
 - Relation between health and other emergency sectors
 - Relation between national and local or regional sectors

- Existing structures for emergency command and control should be optimally used and respected
- Everyone involved should know their role and responsibilities during a pandemic. This should be reflected in the operational plans for each organization.
- Standard operational procedures for essential functions need to be developed. These may include procedures for:
 - Alert and outbreak verification;
 - Criteria for establishing an operational emergency team;
 - Information flows: drafting of situation reports, briefings, back up of information;
 - Political decision-making;
 - Getting medical / scientific consensus in times of crisis (including guideline development);
 - Development and dissemination of public information;
 - Human resource management during an emergency;

3. Risk assessment

Rationale

In order to better focus the strategy, it is recommended that the expected impact of the pandemic be estimated, not only on the health-care sector but also on other essential services.

Questions to be addressed

Have you prepared models or estimates of the effect of an influenza pandemic on general practice or community clinics, hospitals and morgues? Do you know how a pandemic might affect essential services?

Check

- Conduct modelling studies on the impact of an influenza pandemic based on varying attack rates and patterns of attack (different risk groups). Impact measures can include the estimated number of health centre attendances, outpatient clinic or general practice consultations, hospital admissions and deaths. Alternately models from other jurisdictions can be used or adapted for one's own population. The Centres for Disease Control and Prevention (Atlanta, USA) have published free software on their web site to support other countries (FluAid and FluSurge¹.)
- In addition, an assessment of the economical impact may be helpful to create 'evidence' for pandemic preparedness activities.
- Estimate the effect of potential interventions with antiviral medication and/or pandemic strain influenza vaccine in various (risk) groups through modelling.

¹ see <http://www.cdc.gov/flu/references.htm>

- Assess the need to address specific groups and cultural issues before and during a pandemic (language, access to media, religious practices, etc.).

4. Communication

Rationale

Communication strategies are an important component in managing any infectious disease outbreak and will be essential in a pandemic. Accurate and timely information at all levels is critical in order to minimize unwanted and unforeseen social disruption and economic consequences and to maximize the effective outcome of the response.

Questions to be addressed

Do you have a scientific committee to assess risks or research and define its public health relevance? Do you have a plan for communication at all levels, from exchanging information with international organizations to keeping the public health sector, health-care sector, and the wider population of your country informed of the progress and impact of the pandemic? Did you assess all available media and its ranges? Do you have a chain of responsibility and designated spokespersons?

4.1 Public communication plan

Check

- Develop a communication plan that addresses different target groups (e.g. press, general public, health-care workers, parliament, specific risk groups), key messages you want to bring across, possible materials that are needed (web sites, leaflets, information in different languages, etc.) and distribution mechanisms to reach the target groups.
- As part of the plan, consider establishing an official national or regional influenza pandemic web site. Link this web site with similar ones developed by other countries, after evaluation of the quality and relevance of the information provided on these other sites.
- Ensure a good relation with technical people who can help you develop accurate and timely messages, before and during a pandemic.
- During the inter-pandemic period, develop fact sheets or other general available information on pandemic preparedness for distribution to various target groups including professional and community groups. Ensure national consistency of locally produced fact sheets.
- Nominate pandemic spokespersons at the national and regional levels. These persons would be responsible for all media presentations to the wider community. Ensure adequate technical support at the national and regional levels for these spokespersons.
- Ensure that during events, media briefings are held regularly. Daily briefings will be necessary when the pandemic is established locally and may be appropriate before then.
- Ensure that during a pandemic the materials are regularly reviewed and updated with new (relevant) knowledge that may become available.

4.2 Communication among people involved in the response

Check

- Designate a group (preferably already existing) within the department or ministry of health responsible for coordinating the collection and dissemination of information related to the pandemic in all its phases and levels. Members may include representatives of departments or ministries of health, agriculture and emergency services, medical colleges, general practice organizations and consumer organizations. A representative of this group should be part of the national pandemic planning committee.
- Ensure mechanism for information sharing between the national authorities, WHO and other United Nations agencies. Coordinate with, or use existing mechanisms set up for the implementation of the International Health Regulations.
- Ensure that a mechanism exists for the timely and consistent distribution of information between national bodies and regional (supra-national) authorities. Such information would include, but should not be limited to, the case definition for suspected and confirmed cases, policies on vaccine and antiviral drug use, clinical management guidelines, the number of cases identified and their location, deaths due to pandemic strain influenza and effect of the pandemic on essential services.
- If not yet available, establish a mechanism for the timely and consistent distribution of information from the national level to the local level and to individual health-care facilities, including emergency facilities that may be established in the community.
- If not yet available, put in place the necessary technology and networks needed for rapid communication within the country e.g. teleconference and fax equipment, internet and e-mail capacity.

5. Legal and ethical issues

5.1 Legal issues

Rationale

During a pandemic, it may be necessary to overrule existing legislation or (individual) human rights. Examples are the enforcement of quarantine (overruling individual freedom of movement), use of privately owned buildings for hospitals, off-license use of drugs, compulsory vaccination or implementation of emergency shifts in essential services. These decisions need a legal framework to ensure transparent assessment and justification of the measures that are being considered and to ensure coherence with international legislation (like the revised International Health Regulations).

Questions to be addressed

Do you have the legislative framework for your response plan, including contingencies for health-care delivery, maintenance of essential services and the public health measures you may choose to implement?

Legal issues that are highlighted in other parts of the checklist are brought together as a separate checklist here. Other issues are added.

Check

- Identify the advantages and disadvantages of declaring a state of emergency during a pandemic.
- Each jurisdiction needs to assess legality of all public health measures that are likely to be proposed, including:
 - Travel or movement restrictions (leaving and entering areas where infection is established);
 - Closure of educational institutions;
 - Prohibition of mass gatherings;
 - Isolation or quarantine of infected persons or persons suspected of being infected or persons from areas where pandemic strain influenza infection is established.
- Assess standing policy on and legal basis of influenza vaccination of health-care workers (HCWs), workers in essential services (see sections chapter 14 and 15) or persons at high risk. Decide if this policy needs refinement to increase uptake during a pre-pandemic and pandemic period. Consider the use of both seasonal and pandemic vaccine for these groups.
- Address liability, insurance and temporary licensing issues for retired health-care workers and volunteers who may be working in areas outside their training and competence in health and emergency services.
- Consider liability for unforeseen adverse events attributed to vaccine and/or antiviral drug use, especially where the licensing process for a pandemic strain vaccine has been expedited. Liability issues may affect vaccine manufacturers, the licensing authority and people who administer the vaccine.
- Ensure a legislative framework for compliance with the International Health Regulations.
- Consider including (pandemic) influenza in national legislation for the prevention of work-related diseases.

5.2 Ethical issues

Rationale

Ethical issues are closely related to the legal issues as mentioned above. They are part of the normative framework that is needed to assess the cultural acceptability of measures like quarantine or selective vaccination of pre-defined risk groups, etc.

Questions to be addressed

Are ethical aspects of policy decisions well considered? Is there a leading ethical framework that can be used during the response to an outbreak to balance individual and population rights?

Check

- Consider ethical questions related to limiting the availability of a scarce resource, such as rationed diagnostic laboratory testing, pandemic strain influenza vaccine or antiviral drugs.
- Consider ethical questions related to compulsory vaccination for HCWs and workers from essential services.

- Consider the ethical issues related to limiting personal freedom, such as may occur with isolation and quarantine.
- Ensure the establishment of an ethical framework for research, especially when this involves human subjects.

6. Response plan by pandemic phase

Rationale

To facilitate quick and adequate response in times of crises, everybody should know what to do, and in what order. Although WHO will recommend to the countries what activities could be carried out per pandemic stages, countries need to adjust these general recommendations to the local organization and infrastructure. Therefore, response plans per phase should be developed, bringing together all other aspects of preparedness.

Questions to be addressed

Do you have a response plan that identifies the responsibilities and tasks of organizations and individuals at varying stages of the pandemic?

Check

- Develop a response plan by pandemic phase and level. The response plan should indicate the specific response at each pandemic phase and level and should reflect the detail of the preparedness plan. For instance, if a country has elected to consider only the essential aspects of pandemic planning, the response plan would address only these aspects of preparedness. The revised WHO influenza pandemic preparedness plan (publication foreseen in spring 2005) can be used as guidance document.
- The response plan should include the identification of triggers that will change the level of response. These may be WHO designated pandemic phases.
- The response plan should indicate the organization responsible for the designated response at each phase.

Surveillance

7. Clinical and virological surveillance

Rationale

Surveillance consists of ongoing collection, interpretation and dissemination of data to enable the development of evidence based interventions. The objectives of surveillance may differ according to the seriousness of the disease and the possibilities of intervention. Each surveillance activity should have clear objectives.

Questions to be addressed

What type of surveillance do you consider to be needed and feasible in your country? Who should be responsible for data collection and analysis and who should use the information for policy development? How will your surveillance system coordinate with regional (supra-national) systems (if existent) and with WHO?

Check

- Define surveillance objectives for the inter-pandemic period, pre-pandemic period and pandemic period. Surveillance strategies will depend not only on the epidemiological situation in your country or region, but also on the situation in neighbouring regions. Finally, surveillance will depend on whether a potential pandemic strain was first recognized in animals or humans. WHO recommendations to guide this process are currently under development.
- Ensure dedicated funding, trained surveillance personnel for inter-pandemic surveillance
- Establish a coordination centre for (enhanced) surveillance during the response to a pandemic or outbreak with pandemic potential.
- Plan for emergency needs: training, staff mobilization and development of additional national tools or systems.

7.1 Inter-pandemic surveillance

Rationale

Inter-pandemic surveillance may be needed to assess the seasonal burden of influenza and to justify or optimize implementation of an inter-pandemic influenza vaccination programme. In order to be able to detect an unusual cluster or number of cases of illness that may be due to a new influenza virus, it is essential that every country has a (basic) early warning system for human disease. The type and complexity of the system can differ according to the circumstances.

If you decide to participate in the Global Influenza Surveillance Network, you will contribute to a global alert mechanism for the emergence of influenza viruses with pandemic potential.

Questions to be addressed

Are you able to monitor the burden of seasonal influenza in your community? Are you able to detect emergence of a new strain? Can you detect abnormal clusters of influenza like-illness or death?

Check

General

- Establish or enhance surveillance for influenza-like illness (ILI). Establish a consistent surveillance case definition for ILI and criteria for case sampling.
- Consider establishing a sentinel system for virological surveillance of influenza.
- Consider participation in the Global Influenza Surveillance Network by establishing a National Influenza Centre (NIC) or ensure that an existing NIC meets the WHO Terms of reference. NICs ship newly isolated strains to WHO Collaborating Centres for high level antigenic and genetic analysis, the result of which forms the basis for WHO recommendations on the composition of influenza vaccine for the northern and southern hemispheres each year (see also the next paragraph and section 8 for considerations regarding national laboratory capacity).
- Establish links with appropriate representatives of the organizations responsible for routine surveillance of diseases in animals and birds.

Early warning

- Consider the implementation of surveillance designed to detect unusual or unexplained events of acute respiratory illnesses in order to trigger appropriate public health and laboratory investigations. The surveillance activities should be determined by both risk assessment and consideration of the available capacities and infrastructure. One or more of the following activities may be implemented:
 - sentinel hospital-based surveillance for individuals with acute respiratory illness on, or during admission in hospital;
 - surveillance of unexplained deaths due to acute respiratory illness or clusters of severe acute respiratory illness in the community;
 - surveillance of unexplained deaths due to acute respiratory illness in health-care facilities;
 - monitoring sales of antiviral drugs for influenza A viral infection, antimicrobials commonly used for the treatment of acute respiratory infections, respiratory or anti-coughing drugs.
- Identify other sources that may informally notify unusual disease or syndrome clusters. These sources may include, but would not be limited to, occupational health physicians, community practitioners not part of a sentinel network, staff from aged care facilities, hospital emergency departments and schools.

7.2 Enhanced surveillance (pre-pandemic phase)

Rationale

When there are one or several events with pandemic potential occurring that may affect your country, WHO will announce a global pre-pandemic phase¹. Enhanced surveillance will be needed during this phase in order to better monitor developments pertaining to the threat. The type of surveillance will depend on whether a potential pandemic strain of influenza virus has first been recognized in animals, birds or humans and where the new strain is known or expected to be circulating (geographical area).

Questions to be addressed

Are you able to enhance surveillance in order to better monitor spread of a new disease and identify cases in specific risk groups? What kinds of monitoring are possible (and legal) and who will be responsible to decide on implementation? Who will collect, and interpret data and share results?

Check

- Define the objectives of enhanced surveillance and its link to actions that will be based upon it.
- Ensure a system for revision of the case definition for influenza or ILI used in routine surveillance, taking into account early information about the clinical presentation in cases infected with a potential influenza pandemic strain. WHO will offer guidance whenever revision is needed.
- Define what types of enhanced surveillance are feasible and who is responsible for carrying them out. Depending on whether the potential pandemic strain is circulating in humans, birds or animals, the system may include:
 - Early warning of human respiratory infection associated with unexplained or unusual mortality in commercial bird flocks or animal herds.
 - Early warning of unusual respiratory disease clusters or unusual or unexplained mortality associated primarily with respiratory disease in humans at risk, with a special emphasis on health-care workers (HCWs).

Enhanced surveillance may also include the monitoring of following groups:

- Incoming travellers from infected regions, countries or localities to country, state, province or locality, arriving by all means of transport;
- People involved in culling birds or animals infected with influenza (single cases and/or clusters);
- Other people exposed to birds or animals infected with influenza, for example, farmers and veterinarians (single cases and/or clusters);
- Health-care workers (HCWs) caring for patients with suspected or confirmed pandemic strain influenza infection (single cases and/or clusters);
- Laboratory workers handling clinical specimens from patients with suspected or confirmed pandemic strain influenza infection (single cases and/or clusters).
- Mortuary room workers.

¹ for more details on the WHO global phases see <http://www.who.int/csr/disease/influenza/pandemic/en/>

- Rumour surveillance in the pre-pandemic phase may identify possible cases of pandemic strain influenza that might not have been notified by routine or enhanced surveillance.

7.3 Pandemic Surveillance

Rationale

During a pandemic, as declared by WHO, many services will be overwhelmed. Data collection should only be maintained if it serves a clear objective. One reason could be to support planning of the use of scarce resource like health-care facilities. It may be possible to adjust data collection to characteristics of the virus and/or the epidemic and make it less laborious. For example: laboratory confirmation may not be needed for cases once the pandemic's arrival is confirmed, since clinical symptoms suffice to plan for health care demand.

Questions to be addressed

Do you need to monitor the spread of the pandemic in our community as it is occurring? With which objective /related action? If so, what would be the easiest way to collect the necessary data?

Check

- Establish criteria that indicate when to move from one level of surveillance to a higher or a lower level. WHO will provide guidance.
- If routine influenza or ILI surveillance is conducted, decide whether to continue this surveillance in the early phase of a pandemic.
- In later pandemic phases, if the attack rate is high, consideration should be given to limiting or even discontinuing both routine and early warning surveillance. Limited sampling of viruses should be continued to monitor its characteristics.
- Ensure a system for revising the pandemic case definition, given the availability of extra clinical information (WHO will recommend global case definitions according to different global phases).
- Pandemic surveillance may include:
 - Monitoring hospital admissions for suspected or confirmed cases of pandemic strain influenza;
 - Monitoring deaths in suspected or confirmed cases of pandemic strain influenza;
 - Monitoring workforce absenteeism in services designated as essential;
 - Monitoring vaccine usage for routine and pandemic strain influenza vaccines if these are available;
 - Monitoring adverse vaccine events attributed to the pandemic strain vaccine if available;
 - Collecting data for later use in the calculation of vaccine effectiveness for the pandemic strain vaccine;
 - Monitoring pneumococcal vaccine use and adverse events associated with its use, if this vaccine is available and being used;
 - Monitoring antiviral use and adverse events that may be attributed to antiviral use, if applicable.

- Consider how recovered cases, who are presumably immune to the novel virus, can be identified by occupation (for example, HCWs or workers in designated essential services), facilitating the development of a resource of presumed immune workers.
- Ensure a mechanism for data aggregation and interpretation for decision-making.

Case investigation and treatment

8. Diagnostic capacity

8.1 Local laboratory capacity

Rationale

In order to be able to quickly confirm suspected human cases of a new influenza strain, it is essential to ensure access to basic diagnostic capacity. In countries with limited resources, it may be efficient to establish a network of laboratories that have their own expertise.

Questions to be addressed

Do you have resources to test for animal and human influenza viruses, including a potentially novel pandemic virus, in your own national laboratories? Does the medical profession know which tests need to be performed, where, and how samples should be shipped to this (these) laboratory (laboratories)? Do you have biosafety levels compatible with the handling of all influenza strains, including novel strains with unknown pathogenicity?

Check

- In the inter-pandemic phase, all countries should have access to at least one laboratory able to offer routine influenza diagnosis, typing and sub-typing but not necessarily strain identification. These laboratories should be made known to WHO. The minimum laboratory capacity for these laboratories include immunofluorescence (IF) and reverse transcriptase polymerase chain reaction (RT-PCR). Training opportunities should be offered to perform both techniques since particularly the IF is a technique with low sensitivity.
- If local capacity is established, funding should be identified to maintain laboratory capacity and safety.
- In the absence of a laboratory or laboratories able to offer routine influenza diagnosis, typing and sub-typing, countries do occasionally use commercial rapid antigen detection kits. As of November 2004, many of the available rapid test kits were not sufficiently sensitive or specific for routine diagnostic use and none could perform sub-typing. These kits may be used for outbreak investigation only, when there is no other option, and are not recommended for patient diagnosis.
- Protocols for specimen collection and transport for respiratory specimens and blood have been developed by WHO and should be used by countries¹. Protocols should be made available in all clinical settings where patients are likely to be managed.

¹ http://www.who.int/csr/disease/avian_influenza/guidelines/en/

- Ensure implementation of general bio safety protocols and assess need to refine these protocols with respect to a pandemic situation.
- A national inventory of laboratories with Biosafety Security Levels (BSL) 3 and 4 should be available. If a country has no such laboratories, arrangements can be made with BSL3 and BSL4 laboratories in other countries. This can be facilitated by WHO.
- In the early stages of a pandemic, increased testing will be required when the diagnosis of pandemic strain influenza in patients with ILI cannot be assumed. Laboratories need to be able to increase testing at relatively short notice. Laboratory personnel, reagents, funding and training for this increased testing need to be identified in advance, if possible.
- When the pandemic is established, it is unlikely that testing of all cases will be possible. A strategy will be needed for rationing laboratory testing during an established pandemic.
- Facilities for storing clinical specimens (respiratory secretions, serum and animal faeces) from suspected and confirmed cases need to be explored. These specimens could be tested as part of opportunistic research projects when the pandemic has finished.
- A policy on sharing clinical material from confirmed pandemic cases, nationally and internationally, needs to be developed. In particular the policy should address the need for material transfer agreements, distribution of viral isolates and RNA, and sharing the results of sequencing analyses of pandemic strain viruses.
- Laboratories should provide regularly updated advice to health-care workers on the availability (local and through reference laboratories) and interpretation of diagnostic tests for pandemic strain influenza. Again this advice could be published on the laboratory web site if such a site exists.
- For countries whose pandemic preparedness plan includes the use of antiviral drugs, the necessary laboratory facilities will need to be in place for monitoring antiviral drug resistance.
- Consider the establishment of a National Influenza Centre designated by WHO, or ensure that the existing NIC meets the terms of reference for these labs¹.
- When there is more than one NIC in a country, one lab should be designated to coordinate and communicate with WHO.

8.2 Reference laboratory availability

Rationale

Even in the presence of local laboratory facilities, countries need to ensure that in times of urgency, samples can be shipped to a reference laboratory for rapid confirmation or determination. Rapid determination is essential for a proper risk assessment and to better target recommended measures. The laboratory may be in the country, or may be a WHO influenza reference laboratory.

Questions to be addressed

Will you be able to safely collect samples from animal, bird or human cases and to organize their rapid delivery to a WHO influenza reference laboratory capable of identifying a potentially novel virus?

¹ see <http://www.who.int/csr/disease/influenza/en/TORNICs.pdf>

Check

- All countries (whether they have local laboratory capacity or not) should ensure access to a designated reference laboratory by regional networking. The reference laboratory should agree on the level of support it is able to offer.
- Local laboratories should be aware of packing and transport requirements for diagnostic specimens and infectious agents in accordance with the International Air Transport Association (IATA) regulations and WHO procedures for sharing live viruses. (PM Reference to be made).

9. Epidemiological investigation and contact management

Rationale

Besides laboratory confirmation, epidemiological investigation should be carried out to identify how suspected human cases of a new influenza strain became infected, what the clinical impact of the disease is, and to determine the risk that infected persons, or their environment, may pose to others. Based on this assessment, preventive measures may need to be adjusted and specific actions, like identification and prophylactic treatment of contacts and/ or vaccination of risk groups may be started.

Questions to be addressed

What may be the possible source of infection for this suspected case? Is the case contagious, and if so, how should we handle possible contacts? Are there any relevant changes in the current understanding of the epidemiology of influenza? Do these findings call for changes in current measures? Who is in charge of the epidemiological investigation?

Check

- Ensure thorough field investigation of confirmed cases of influenza caused by a novel strain to assess the exposures and the likelihood of human-to-human transmission. Investigators need to describe the characteristics of the disease.
- There is need for designated and (trained) capacity to carry out epidemiological investigations.
- Update the case report form for epidemiological investigation, or ensure proper use of forms provided by WHO.
- Ensure a mechanism for daily reporting of cases to national authorities and WHO, including information on the possible source of infection.
- Develop study protocols for basic and enhanced epidemiological studies and implement them.
- Provide clear guidance on how to define and manage possible contacts of the case. Set clear criteria for applying measures targeted at contacts and ensure that people subject to measures are informed and understand the recommendations. Consider among others targeted education, general hygiene measures, medical follow up, isolation, (prophylactic) treatment with antiviral drugs, etc.(See also section 9).
- Set up a mechanism for scientific review of results of epidemiological investigation to determine whether revisions of the case definition are needed and to develop or adjust recommendations to prevent (further) spread of the disease.

10. Clinical management

10.1 Case management and treatment

Rationale

To ensure effective and safe treatment of (suspected) human cases of a novel influenza strain, it is important that clinical guidelines are ready, supplies are available and staff is aware of admission criteria, etc. Moreover, staff should be aware of and trained in infection control measures, see below.

Questions to be addressed

How was this person exposed? Should this person be treated? If so, where and how? Is additional diagnostic testing needed? If so, how should you take samples and how should they be transported?

Checklist

- Ensure the development (or at least rapid adaptation) and implementation of clinical management guidelines for patients with suspected and confirmed pandemic strain influenza infection. These guidelines need to address at least the following aspects:
 - where patients should be managed (community or hospital setting) and admission criteria;
 - appropriate specimen collection, transport of specimens to the laboratory and appropriate laboratory investigations;
 - treatment protocols, including antiviral drugs, antibiotics and other supportive treatment (ventilation, fever reduction).
- Consider the establishment of a clinical working group with experts from the public and private sector to ensure broad expertise and commitment.

10.2 Infection control in health-care settings

Rationale

Guidelines for infection control are important to clarify the routes of transmission and ways to interrupt transmission through hygienic measures. Infection control is an essential part of patient management.

Questions to be addressed

Are people at risk of infection, especially health-care workers, aware of the main routes of transmission? Are they familiar with infection control measures to prevent spread of the disease and do they know how to implement these measures?

Check

- Refine existing infection control guidelines and procedures for use in all levels of health-care facilities, including:
 - health centres;
 - clinical laboratories;
 - community health clinics;
 - general practice facilities;
 - hospitals;
 - long term care facilities
 - mortuaries.
- Adapt infection control guidelines for use in alternative health-care facilities used as pandemic emergency measures.
- Check availability of laboratory biosafety guidelines and assess need for refinement.
- Consider education and training needs for HCWs, laboratory personnel, volunteers and other people who may be working outside their area of competence and training.
- Ensure availability of equipment needed to implement recommended infection control and biosafety measures (see also section 13), like personal protective equipment.

Preventing spread of the disease in the community

11. Public health measures

Rationale

As the access to vaccines and antiviral drugs during a pandemic will be extremely limited, especially in developing countries, non-medical interventions may be the only way to delay the spread of the disease. However, many of these interventions interfere with human behaviour and human rights and therefore need a strong educational, legal and supportive basis. Moreover, most of the interventions have a poor evidential basis. Therefore, transparent decision-making and frank information sharing should go hand in hand with the measures discussed in this section.

Questions to be addressed

Does the general public know how to protect themselves and contribute to limiting the spread of the disease? Have you considered the public health measures you might implement to limit community spread, like voluntary or enforced quarantine? Do you have the legislative framework for such measures and do you have criteria for implementation and withdrawing of each particular measure? Do you have logistic plans for carrying out and communicate the proposed measures?

Check

- Each jurisdiction will need to have clear understanding about the legality of all public health measures that are proposed.
- Every person that will be affected by public health measures should be informed about the expected effects and limitations.

11.1 General personal hygiene

- Strengthen general knowledge on personal hygiene in the community.
- Ensure that personal advice about reducing the risk of transmission is easily available to the public, for instance on an official influenza pandemic web site.

11.2 Community infection control measures

- Be aware of guidelines from departments/ministries of agriculture in relation to measures that will be taken to control animal or bird influenza before the development of human cases.
- Develop or enhance guidelines for the prevention of influenza in humans who have contact with animals or birds infected with influenza. For these (definable) risk groups:

- Consider use of routine influenza vaccine during events with pandemic potential to decrease the chances of dual infection with the seasonal circulating influenza strain and the potential pandemic strain, if there is circulation of more than one influenza strain.
 - Ensure the availability of supplies of antiviral drugs for early treatment. In case of sufficient supplies, consider prophylactic use of these antiviral drugs.
- Assess the need for additional infection control guidelines for non-medical settings, for instance for specific places where people gather or where there is high risk for spread of infection (elderly homes, military barracks, prisons, etc.).

11.3 Social distancing and quarantine

- Consider closure of educational institutions or day-care facilities and discuss possibilities with the responsible partners, for instance the ministry of education. Define criteria for implementation.
- Define how the prohibition of mass gatherings can be carried out and when this should be implemented.
- Ensure that contact tracing, confinement and quarantine (if proposed) can be implemented both legally and practically. Define criteria for implementation and abolishment.
- Consider designation of places where persons can be held in quarantine.
 - Ensure medical care, food supply, social support and psychological assistance for these people.
 - Ensure adequate transport of persons to these places and from there to hospitals or mortuaries.

11.4 Travel and trade restrictions

- Ensure adequate implementation of travel and trade restrictions and discuss possibilities and consequences with the responsible partners, especially the ministry of foreign affairs, international conveyance organizations and the tourist branch.
- Make sure international conveyances have clear instructions how to deal with different epidemiological situations and how to handle possible human cases on board.

12. Vaccine programmes

12.1 Routine influenza vaccine programme

Rationale

Influenza vaccine is the most effective preventive measure available. By implementing a routine vaccination programme you can prevent morbidity and mortality in the target risk groups. Moreover, a routine vaccination programme will contribute to the global production capacity and local infrastructure for vaccinations and thus may contribute to a better pandemic preparedness.

Questions to be addressed

Do you have the rationale and resources to implement a routine annual influenza vaccination programme? Could such a programme facilitate distributing or administering a pandemic strain vaccine in the event of a pandemic?

Check

For countries without a routine vaccination programme:

- Define the need for such a programme, based on national information about the burden of disease, cost-effectiveness studies and related to other health priorities. The annual burden of influenza can be assessed using one or more of the following types of information:
 - Influenza-like illness (ILI) in the community by age group;
 - Hospital admissions due to influenza and other causes attributed to influenza during the influenza season, by age group;
 - Influenza deaths and excess deaths from other causes attributed to influenza during the influenza season, by age group.

For countries with a routine vaccination programme:

- Define a target for annual influenza vaccination coverage in recommended high-risk groups and develop a strategy (including a funding strategy) to reach this target.
- Ensure there is an annual supply of routine influenza vaccine available, either by local manufacture or international purchase or a combination of both.
- Decide on a distribution strategy for influenza vaccine and a strategy for the administration of influenza vaccine (for example in the public or private sector, or both).
- Increase annual influenza vaccination coverage among health-care workers (HCWs) to a defined target.
- Monitor vaccine coverage and adverse vaccine events, preferably by year and by designated target population.

12.2 Pandemic strain influenza vaccine programme

Rationale

With the current technologies it will take at least five or six months before vaccines based on a new influenza strain can be produced in large scale. But still, most countries without production facilities will have no access to vaccines during the first pandemic wave, due to limited global production capacity and concentration of these facilities in developed countries. Research into new vaccines may improve the global situation. Countries with production facilities should support and ensure by all means that rapid and large scale production can take place during a pandemic. In the meantime, countries without such facilities should prepare to a vaccination programme once pandemic vaccines become available.

Questions to be addressed

If you have national production capacity, can you ensure rapid and large scale pandemic vaccine production, licensing and distribution? Are you prepared to accept pandemic vaccines, to distribute and administer them to pre-selected risk groups? Can you handle uncertainties regarding safety and liability for the vaccine?

Check

- If a country has manufacturing capacity for influenza vaccine, develop timelines for likely pandemic vaccine manufacture, testing, expedited licensing and availability.
- If a country has no manufacturing capability, develop contingency plans for procuring vaccine or management of a pandemic without pandemic vaccine available.
- Establish a priority list of groups who may receive pandemic influenza vaccine, for example, animal or bird cullers, veterinarians and farmers in the case of animal or avian influenza and HCWs and workers in essential services when a pandemic is imminent or established.
- Decide who will pay for influenza vaccine in priority and non-priority groups.
- Consider how you can increase vaccination of HCWs and workers in essential services during the pre-pandemic and pandemic period, whenever pandemic vaccines are available.
- Develop contingency plans for storage, distribution and administration of pandemic and/or routine influenza vaccine, including:
 - Mass immunization 'clinics': Locations (mobile, fixed) and strategies to use them, including staffing and training of (temporary) staff;
 - Strategies to limit distribution to persons in the priority groups;
 - Vaccine storage capacity for cold chain – identification of current and potential contingency depots;
 - Vaccine security during transport, storage and at clinics (theft prevention).
- Determine how receipt of vaccine will be recorded and how a two-dose immunization programme would be implemented in terms of recall and record keeping.
- Ensure a legal framework for implementation of major elements of the proposed distribution plan, for example use of voluntary or professional personnel working outside their area of training and competence.
- Coordinate proposed vaccine distribution plans with bordering jurisdictions.

- Enhance vaccine adverse event surveillance (see also the chapter on surveillance).
- Develop a method for estimating pandemic strain influenza vaccine effectiveness (see also the chapter on research)

13. Antiviral use as a prevention method

Rationale

Antiviral drugs can be used for early treatment as well as for prophylactic use in people at risk. The latter can be done on a one-by-one basis or can be implemented in groups at risk or essential workers. Antiviral drugs reduce shedding of the virus and are therefore thought to reduce spread of the disease by infected persons. However, there is no evidence that would support widespread use of antiviral drugs in infected persons for the purpose of reducing virus shedding only.

Early treatment is described in section 10. This chapter deals with the development of a strategy to reduce the possibility of infection in people at risk.

Due to high prices, it is acknowledged that some countries may not have routine access to antiviral drugs, while others may have limited access. As there is little surge capacity, antiviral drugs may not be available during a pandemic. However, for those countries with the necessary resources, the following checklist is recommended.

Questions to be addressed

Do you have the resources for the provision of antiviral drugs that may be used during a pandemic? If so, is there a strategy in place to make optimal use of the available capacity?

Check

- Develop a policy for antiviral drug use during a pandemic, when a pandemic strain influenza vaccine is available and when it is not. This policy would include the prioritized use of antiviral drugs, similar to vaccine priorities, and the use of antiviral drugs as treatment or prophylaxis.

Depending on the policy, consider:

- Mechanisms for ensuring a secure supply of antiviral drugs. If a secure supply cannot be guaranteed, consider central or 'personal' stockpiling of antiviral drugs.
- Plan how to distribute available antiviral drugs based on priority groups.
- Monitor antiviral drug usage and adverse events as well as anti-viral drug resistance.

Maintaining essential services

14. Health services

Rationale

It is crucial that health services are kept in service as long as possible. In order to ensure this, several emergency steps need to be developed to ensure a sensible personnel management and to make optimal use of facilities and available pharmaceutical products. In general, activities in this area should be based upon general health emergency preparedness plan.

Questions to be addressed

Do you have an idea of how a widespread pandemic may affect the health services? Have you developed contingency plans for coping with shortages of health-care workers at all levels and shortages of hospital beds during a pandemic? Do you have effective infection control policies in place?

Check

To ensure adequate communication and participation in developing plans for health service contingencies, consider establishing a group with representation from agencies in all affected health-care sectors, community groups that may provide alternative emergency accommodation for health-care facilities and voluntary organizations that may provide health-care personnel.

14.1 Health service facilities

- Define the levels of health-care facilities where patients during a pandemic situation should ideally be treated and assess the availability of these facilities (primary, secondary and tertiary referral, including emergency and ICU capacity).
- Develop detailed regional and facility-level plans for providing health services during a pandemic, including the type of care to be delivered at the specific levels and types of health-care facilities.
- Determine triage and patient flow between health-care facilities at various levels and develop mechanisms for coordinating patient transport and tracking/managing beds, such as central bed registries, call centres and a centralized ambulance dispatch.
- Determine potential alternative sites for medical care. Possible sites could include schools, gymnasiums, nursing homes, day-care centres or tents in hospital grounds or other sites.
- Coordinate clinical care and health services plans with bordering jurisdictions to avoid migration to centres of perceived enhanced services.

14.2 Health service personnel

- Estimate HCW numbers by professional group at the level appropriate for the country (national, provincial, local).
- Determine sources from which additional HCWs could be recruited, for instance among retired HCWs or those who have changed careers.
- Develop a set of health-care roles for which volunteers may be suitable and discuss this with professional organizations and unions.
- Identify organizations that may be able to provide volunteers and define a protocol for deciding the suitability of these people for designated roles outside their area of training and competence.
- Develop protocols for accepting and training volunteers for defined health-care roles. Ensure that liability, insurance and temporary licensing issues for retired health-care workers and volunteers are addressed.
- Consider the provision of psycho-social support targeted at health-care workers (clinical and laboratory) who may be occupationally exposed to the novel pandemic strain virus.

14.3 Health service supplies

- Assess the need and explore the options for stockpiling extra medical supplies, including personal protective equipment, and identify sources for additional supplies.
- Determine a range of antibiotics that will be useful for treatment of complications of influenza. Develop contingency plans for producing or buying increased supplies of these antibiotics.
- Determine the level of care that could be provided in alternative health-care facilities and develop a contingency plan for providing these alternative facilities with the equipment and supplies adequate for the level of care that will be provided.
- Develop a strategy for the distribution of stockpiled supplies and medication.

14.4 Excess mortality

- Determine the maximum capacity of disposal of dead bodies using culturally appropriate methods.
- Identify emergency capacity for storage of dead bodies before burial, where applicable.
- Ensure development and implementation of protocols for safe corpses handling, respecting cultural and religious beliefs.

15. Other essential services

Rationale

Essential services are the ones responsible for essential processes that keep the society running. Priorities may differ from country to country but power and drinking water supply, transport and telecommunication are common examples. Consideration of the effect of a pandemic on essential services is an important part of pandemic planning. The majority of the planning should be undertaken by the services themselves, as part of their existing emergency plans.

Questions to be addressed

Do you have an idea of how a widespread pandemic may affect the delivery of essential services? Have you identified people / organizations that are responsible for maintaining these services? Have you developed contingency plans for coping with shortages of workers in these services during a pandemic? Are these plans legally and ethically acceptable?

Check

- Identify the advantages and disadvantages of declaring a state of emergency during a pandemic.
- Decide on the leading agency (ministry, department) for coordinating the maintenance of essential services during a pandemic.
- Develop a list of essential community services, then the corresponding personnel, whose diminution or absence would pose a serious threat to public safety or would significantly interfere with response to the pandemic. Personnel from these essential services may have been identified for priority vaccination with routine or pandemic strain influenza vaccine or for antiviral drug prophylaxis, depending on vaccine and drug availability.
- Identify personnel who may be available to assist in an essential non-health-care role with maintenance of essential services during a pandemic. Replacement personnel could be sourced from the military, retired people, people employed in other areas or voluntary organizations. Begin discussions with professional organizations and unions regarding the employment of these people.
- Develop protocols for accepting and training volunteers and workers from these fields for defined essential service roles. Ensure that liability, insurance and temporary licensing issues for volunteers and workers from other fields are addressed and consider ethical aspects of your plans.
- Each designated essential service will need to refine or develop existing emergency contingency plans so that they could be applied to a pandemic. These should include plans for emergency shifts and should address if and how compensation to the worker takes place.

16. Recovery

Rationale

After a pandemic wave over, it can be expected that many people will be affected in one way or another: many persons may have lost friends or relatives, will suffer from fatigue or may have financial losses due to

interruption of business. Governments or other authorities have the natural role to ensure that concerns can be addressed and to support 'rebuilding the society'.

Questions to be addressed

Is there a plan in place to ensure the quick revitalization of the country after a pandemic? Do essential services have recovery plans? Who should be responsible to give social and psychological support to affected families and companies? Is there a mechanism in place to assess economic losses and to provide financial support to affected groups?

Check

- Ask essential services to develop recovery plans for their services or organization.
- Define responsibilities for social, psychological and practical support for affected families and companies. If needed, organize training and education for personnel involved.
- Assess how existing community groups (religious groups/churches, sports groups, can contribute to rebuilding the society. Identify contact persons for these groups.
- Consider whether recovery after a pandemic needs financial support from the government. If so, develop criteria for financial support and seek ways to ensure availability of funds.

Research

17. Research and evaluation

Rationale

Countries that are dealing with a pandemic or pandemic threat are probably stretched as to resources. Nevertheless, the situation probably creates unique opportunities to increase the understanding of the disease or the impact of proposed measures. National research does not only contribute to the global knowledge, countries can also benefit directly from research, by increasing evidence for the control strategy during and allow for adjustment.

Questions to be addressed

How can your country contribute to the global need for knowledge about pandemic influenza? Is there a system in place to evaluate effectiveness of control measures in order to optimize their effective use?

17.1 Research during the pre-pandemic and pandemic period

Check

- Viral studies will be needed for antigenic and molecular characterization of the pandemic strain virus.
- If a policy is developed to use antiviral drugs during a pandemic, develop a defined strategy for monitoring antiviral drug resistance.
- Develop a strategy for collecting data that will enable an estimation of pandemic vaccine effectiveness. Define the needed data and develop a strategy for data collection (and - if possible - analysis) during a pandemic or event with pandemic threat, including funding.

In an outbreak with widespread animal or bird influenza, but limited human cases:

- Consider conducting a study to determine risk factors for human infection. Define the needed data and develop a strategy for data collection (and - if possible - analysis), including funding.
- Consider conducting a study to determine the likelihood of human-to-human transmission. Define the needed data and develop a strategy for data collection (and - if possible - analysis), including funding.

In a pandemic with widespread human cases:

- Decide whether your country would like to invest in research activities during a pandemic and develop plans for data collection. Research may include:
 - Assessment of the impact of pandemic (sick and death rates, hospital admissions, etc.).
 - Effectiveness of public health measures taken to control the pandemic;
 - Pandemic strain vaccine effectiveness;
 - The effectiveness of antiviral drugs in the pandemic setting;
 - The socio-economic impact of the pandemic.

17.2 From research to action

- Ensure evaluation of the response to the pandemic, when the first wave of the pandemic has finished. Evaluation should focus on the response at all levels and should lead to recommendations for improvement.
- Ensure that results of research studies, both local and international, are made public to support improvement of response strategies and implementation.

Implementation and revision

18. Implementation, testing and revision of the plan

Rationale

To ensure full implementation of the plan at all levels, it is recommended to set targets or define progress indicators that can be used to measure progress.

A pandemic plan needs to remain a 'living' document to ensure that it is in everybody's mind, even a few years after publication. This can only be achieved if the plan is being tested and revised regularly.

Questions to be addressed

Do you have a mechanism to ensure that the plan is being implemented? How is the level of implementation being measured? Is the plan tested? Is there a system to ensure updating of the plan in the absence of a pandemic, and reviewing it after outbreaks of comparable diseases or threats (SARS and HPAI in humans)?

Check

- To ensure full implementation of the plan at all levels, it is recommended to set targets or define progress indicators that can be used to measure progress.
- Set targets, define indicators or develop a benchmark system that can be used to assess progress in the implementation. Define who is responsible for supervision of the progress.
- Consider a desk-top review of the preparedness and response plan, based on fake situation descriptions or carry out a simulation exercise, preferably focussing on specific aspects of the response plan.
- Utilize or create opportunities to test components of the plan e.g. during smaller outbreaks, the regular flu season, or other vaccination campaigns.
- Revise the plan based on experience with new outbreaks, for example, after SARS and HPAI.
- In the absence of outbreaks, nominate a period after which the plan would be revised.