

EPIDEMIC  
ALERT &  
RESPONSE

# WHO checklist for influenza pandemic preparedness planning



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# Preface

## Some time in the future

Rumours of an outbreak of unusually severe respiratory illness in two villages in a remote province reach the ministry of health in one of the World Health Organization's (WHO's) Member States. A team is dispatched to the province and learns that the outbreak started about a month earlier. The team is able to identify at least 50 cases over the previous month. All age groups have been affected. Twenty patients are currently in the provincial hospital. Five people have already died of 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 they cannot be further subtyped. The isolates are sent to the WHO Reference Centre for Influenza for further characterization, where they are characterized as influenza A(H6N1), a subtype never isolated from humans before. Gene sequencing studies further indicate that most of the viral genes are from a bird influenza virus, with the remaining genes derived from a human strain. This information is immediately transmitted back to the ministry of health where the cases were first identified, and reported throughout the WHO Global Influenza Surveillance Network.

More cases appear in surrounding towns and villages. The new influenza virus begins to make headlines in every major newspaper, and becomes the lead story on 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, while surveillance is intensified.

Over the next two months, outbreaks begin to take place in neighbouring countries. Although cases are reported in all age groups, young adults seem to be the most severely affected. One in every 20 patients dies. The rate of spread is rapid, and countries initiate travel restrictions and quarantine measures. Educational institutions are closed. Widespread panic begins because supplies of antiviral drugs are severely limited and a suitable vaccine is not yet available.

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

A few weeks later, the first local outbreaks are reported from other continents. Rates of absenteeism in schools and businesses begin to rise. Phones at health departments ring constantly. The spread of the new virus continues to be the major news item in print and electronic media. Citizens start

to clamour for vaccines, but they are still not available. Antiviral drugs cannot be obtained. Police departments, local utility companies and mass transit authorities experience significant personnel shortages that result in severe disruption of routine services. Soon, hospitals and outpatient clinics are critically short-staffed as doctors, nurses and other health-care workers themselves become ill or are afraid to come to work. Fearing infection, elderly patients with chronic medical conditions do not dare to leave home. Intensive care units at local hospitals are overwhelmed, and soon there are insufficient ventilators for the treatment of pneumonia patients. 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. Over the next 6–8 weeks, health and other essential community services deteriorate further as the pandemic sweeps across the world.

### ***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 (or global epidemic) occurs when a new influenza virus subtype appears, against which no one is immune. This may result in several simultaneous epidemics worldwide with high numbers of cases and deaths. With the increase in global transport and urbanization, epidemics caused by the new influenza virus are likely to occur rapidly around the world.

### ***A new influenza virus: how it could cause a pandemic***

Annual outbreaks and epidemics of influenza are caused by influenza A and B viruses. They are the result of 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 the influenza A virus can cause pandemics. When a major change in either one or both surface proteins of the influenza A virus occurs, no one will be immune, as this represents a completely new virus. When the virus also has the capacity to spread from person to person, a pandemic may develop.

Global pandemics have been reported for many hundreds of years. The best 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 20th century, 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. The specific characteristics of a future pandemic virus cannot be predicted. Nobody knows how pathogenic a new virus would be, and which age groups it would affect. The impact of improved nutrition and health care needs to be weighed against the effect of increased international travel or simultaneous health threats that weaken the immune system, such as HIV/AIDS. The level of preparedness will also influence the final death toll. However, even in one of the more conservative scenarios, it has been calculated that the world will face up to 233 million outpatient visits, 5.2 million hospital admissions and 7.4 million deaths globally, within a very short period.

In addition to their human toll, epidemics can have enormous social and economic consequences in a closely interconnected and interdependent world. For example, in 2003 the outbreak of severe acute respiratory syndrome (SARS) caused economic losses and social disruption far beyond the affected countries and far out of proportion to the number of cases and deaths. While influenza is distinctly different from SARS, it can be anticipated that a pandemic would have a similarly disruptive effect on societies and economies.

Pandemics do not occur frequently. The last major influenza pandemic was in 1968. Since then, however, highly pathogenic avian influenza (HPAI), which has previously infected only birds, has caused illness in humans several times. HPAI outbreaks remind us that the next pandemic could occur at any time if an influenza virus were to combine the high case-fatality rate associated with HPAI infections in humans 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 enable countries to be prepared to recognize and manage an influenza pandemic. Planning may help to reduce transmission of the pandemic virus strain, 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 new, highly transmissible and/or severe communicable diseases.

### ***How to use the pandemic preparedness checklist***

The capacity of countries for influenza pandemic planning varies, and they may be at different stages of the planning process. The aim of the pandemic preparedness checklist is primarily to provide an outline of the essential minimum elements of preparedness, as well as elements of preparedness that are considered desirable. It is recommended that responsible authorities or institutes in countries that are in the process of planning should consider the specific aspects of the checklist for which they are responsible. Countries that already have a national pandemic prepared-

ness plan in place may use the checklist to evaluate the completeness of the current plan.

In addition to this checklist, a more comprehensive guideline, based on the checklist, is being drafted by WHO to assist countries in the development of a national plan according to 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 started on pandemic planning are advised to read the essential checklist in conjunction with the comprehensive guideline, as soon as it becomes available.

Planning will require the commitment and input of the countries themselves. The checklist cannot be a substitute for 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 and implement a detailed and comprehensive pandemic plan in weeks, or even months. The two main reasons are that there is a need for a multisectoral approach and that the community should be involved.

A multisectoral approach means the involvement of many levels of government, and of people with various specialties including policy development, legislative review and drafting, animal health, public 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 a powerful way to engage people and to build the commitment needed for policy decisions.



# Essential elements of the checklist

Many countries have gained experience in pandemic planning and response through dealing with the threat or reality of SARS and HPAI. Lessons learned during these outbreaks have been used when preparing the checklist, with SARS representing a potential pandemic first recognized in humans and HPAI representing 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 the checklist, as well as the pandemic preparedness plans of countries, will need regular revision.

The checklist is intended to be comprehensive. It has been divided into the following main sections:

- Preparing for an emergency
- Surveillance
- Case investigation and treatment
- Preventing spread of the disease in the community
- Maintaining essential services
- Research and evaluation
- Implementation, testing and revision of the national plan

In order to assist countries to set priorities, a distinction 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 checklist, different views were expressed about the elements that should be considered as essential. Table 1 reflects the expert opinions and the outcome of a consultation,<sup>1</sup> and may be used by countries as appropriate.

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<sup>1</sup> *Informal consultation on influenza pandemic preparedness in countries with limited resources, Kuala Lumpur, Malaysia, 23–25 June 2004.* Geneva, World Health Organization, 2004 (WHO/CDS/CSR/GIP/2004.1).

**Table 1. Essential and desirable elements of the checklist**

Section	Essential	Desirable
<b>1. Preparing for an emergency</b>		
1.1 Getting started	X	
1.2 Comm and and control	X	
1.3 Risk assessment	X	
1.4 Communication	X	
1.5 Legal and ethical issues		
1.5.1 Legal issues	X	
1.5.2 Ethical issues		X
1.6 Response plan by pandemic phase	X	
<b>2. Surveillance</b>		
2.1 Interpandemic surveillance		
— General		X
— Early warning	X	
2.2 Enhanced surveillance	X	
2.3 Pandemic surveillance		X
<b>3. Case investigation and treatment</b>		
3.1 Diagnostic capacity		
3.1.1 Local laboratory capacity		X
3.1.2 Reference laboratory availability	X	
3.2 Epidemiological investigation and contact management	X	
3.3 Clinical management	X	
<b>4. Preventing spread of the disease in the community</b>		
4.1 Public health measures	X	
4.2 Vaccine programmes		X
4.3 Antiviral use as a prevention method		X
<b>5. Maintaining essential services</b>		
5.1 Health services	X	
5.2 Other essential services	X	
5.3 Recovery		X
<b>6. Research and evaluation</b>		X
<b>7. Implementation, testing and revision of the national plan</b>	X	

# 1. Preparing for an emergency

The items discussed in this section are general items that should be considered in the case of any health emergency for which a country is preparing, and do not apply to influenza pandemic preparedness only. While working on these items, it is strongly recommended to look for synergy with existing emergency plans and structures, to prevent overlap and ensure efficient use of resources.

## 1.1 Getting started

### Rationale

Pandemic preparedness is not easy. Human resources are needed to write a plan, and some preventive measures require considerable investments. Decisions must 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 render the plan and its implementation acceptable to 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 there a clear strategy on how to involve the community in the planning process?

### Check

- The importance of influenza pandemic preparedness should be recognized at the appropriate levels of government, and the aim of preparedness should be acknowledged.
- Funding should be committed relative to the anticipated preparedness planning.
- Organizations and/or individuals responsible for producing and revising the influenza pandemic preparedness plan should be designated.
- A realistic timeline for completion of the various stages of the plan should be established.
- Identify 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; the national influenza centre(s); and representatives of physicians' associations (e.g. general practitioners and respiratory disease specialists), nurses and pharmacists;

- recognized national virologists and epidemiologists, and representatives of scientific and academic 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 service administrations;
  - representatives of military or other government emergency response organizations or teams;
  - representatives of nongovernmental and voluntary organizations, such as the national Red Cross or Red Crescent Society;
  - representatives of telecommunications, and media relations experts.
- There must be agreement on the roles and contribution in the planning process from all participating individuals and organizations.
  - Establish a core national pandemic planning committee, representing relevant organizations mentioned above.
  - There should be 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.
  - Inform the identified target audience (political, government, professional groups, wider public) that a pandemic plan is being prepared.

## 1.2 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 becomes a major emergency. In addition, it is essential to know who is in charge of key elements in the response (e.g. travel or trade bans, enforcement of quarantine).

### Questions to be addressed

Who is making the decisions in case of an influenza pandemic: the Prime Minister or President, the ministry of health or other departments, or 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 subnational (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 should 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 during a crisis (including guideline development);
    - development and dissemination of public information;
    - human resource management during an emergency.

### 1.3 Risk assessment

#### Rationale

In order to better focus on 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

Are there national models or estimates of the effect of an influenza pandemic on general practice or community clinics, hospitals and morgues? How will a pandemic affect national 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 clinics or general practice consultations, hospital admissions and deaths. Alternatively, models from other government authorities may be used or adapted for the population concerned. The Centers for Disease Control and Prevention (Atlanta, United States of America) have published free software on their web site to support other countries (FluAid and FluSurge).<sup>1</sup>
- In addition, an assessment of the economic impact may be helpful to justify the need 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.

<sup>1</sup> 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.).

## 1.4 Communication

### Rationale

Communication strategies are an important component in managing any infectious disease outbreak, and are essential in the event of 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

Is there a scientific committee to assess risks or interpret research and define its public health relevance? Is there an operational plan for communication that addresses all levels, from exchanging information with international organizations to keeping the public health sector, health-care sector and the wider population of the country informed of the progress and impact of the pandemic? Is there an overview of all available media? What is the chain of responsibility, and who are the designated spokespersons?

### 1.4.1 Public communication

#### Check

- Develop a communication plan that addresses different target groups (e.g. press, general public, health-care workers, parliament, specific risk groups), key messages to be put 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 professional specialists able to help with the development of accurate and timely messages, before and during a pandemic.
- During the interpandemic period, develop fact sheets or other general 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 broader 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 also be appropriate sooner.

- Ensure that during a pandemic the materials are regularly reviewed and updated with new (relevant) knowledge that may become available.

#### **1.4.2 Communication among those involved in the response**

##### Check

- Designate a group (preferably an already existing one) 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 that mechanisms exist for information sharing between 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 (supranational) 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 the effect of a pandemic on essential services.
- If not yet available, establish a mechanism for the timely and consistent distribution of information from the national 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 for rapid communication within the country, e.g. teleconference and fax equipment, Internet and e-mail capacity.

### **1.5 Legal and ethical issues**

#### **1.5.1 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 (International Health Regulations).

### Questions to be addressed

Is there a legislative framework in place for the national response plan? Does this framework include contingencies for health-care delivery and maintenance of essential services, and for public health measures to be implemented?

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 the legal basis 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 of persons suspected of being infected, or persons from areas where pandemic strain influenza infection is established.
- Assess standing policy on, and legal basis for, influenza vaccination of health-care workers, workers in essential services (see sections 5.1 and 5.2) or persons at high risk. Decide if this policy needs refinement to increase uptake during pandemic alert and pandemic periods. 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 those who administer the vaccine.
- Ensure a legislative framework for compliance with the International Health Regulations.
- Consider including influenza or pandemic influenza in national legislation for the prevention of occupational diseases.

### **1.5.2 Ethical issues**

#### Rationale

Ethical issues are closely related to legal issues as mentioned above. They are part of the normative framework that is needed to assess the cultural acceptability of measures such as quarantine or selective vaccination of predefined risk groups.



### Questions to be addressed

Have ethical aspects of policy decisions been 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 health-care workers 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.

## 1.6 Response plan by pandemic phase

### Rationale

To facilitate quick and adequate response during a crisis, all those concerned should know what to do and in what order. Although WHO will recommend to countries activities to be carried out at each stage of a pandemic, countries need to adjust these general recommendations to their local organization and infrastructure. Therefore response plans for each phase should be developed, bringing together all other aspects of preparedness.

### Questions to be addressed

Is there a response plan in place that identifies the responsibilities and tasks of organizations and individuals at varying stages of a pandemic?

### Check

- Develop a response plan by pandemic phase. The response plan should indicate the specific response during each phase of a pandemic, 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 *WHO global influenza preparedness plan: the role of WHO and recommendations for national measures before and during pandemics* (in preparation) should be used as guidance.<sup>1</sup>
- The response plan should include a mechanism for identifying triggers that will change the level of response.
- The response plan should indicate the organization and, if possible, the unit within the organization responsible for the designated response at each phase.

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<sup>1</sup> Check for the latest information: <http://www.who.int/csr/disease/influenza/pandemic/en/>

## 2. 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 is considered to be needed and feasible in the country concerned? Who should be responsible for data collection and analysis and who should use the information for policy development? How will the national surveillance system coordinate with regional (supra-national) systems (if they exist) and with WHO?

### Check

- Define surveillance objectives for the interpandemic, pandemic alert and pandemic periods. Surveillance strategies will depend not only on the epidemiological situation in the country or region concerned, 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 under development.
- Ensure that there is dedicated funding and trained surveillance personnel for interpandemic 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.

### 2.1 Interpandemic surveillance

#### Rationale

Interpandemic surveillance may be needed to assess the seasonal burden of influenza and to justify or optimize implementation of an interpandemic 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 for every country to have a (basic) early warning system for human disease. The type and complexity of the system may differ according to the circumstances.

By participating in the Global Influenza Surveillance Network, a country is in a position to contribute to a global alert mechanism for the emergence of influenza viruses with pandemic potential.

### Questions to be addressed

Does the country concerned have a system to monitor the burden of seasonal influenza? How will the emergence of a new strain be detected? Is there a system to 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 participating 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 section 3 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 to hospital;
  - surveillance of unexplained deaths caused by acute respiratory illness, or of clusters of severe acute respiratory illness in the community;
  - surveillance of unexplained deaths caused by 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 antitussive drugs (to relieve or prevent cough).
- Identify other sources that may informally notify clusters of unusual diseases or syndromes. These sources may include, but would not be limited to, occupational health physicians, community practitioners not part of a sentinel network, staff of care facilities for the elderly, hospital emergency departments and schools.

## 2.2 Enhanced surveillance (phase 2 and beyond)

### Rationale

When several events with pandemic potential occur that may affect a country, enhanced surveillance will be needed to better monitor developments pertaining to the threat.<sup>1</sup> 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

Is it possible 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 describe the actions that will be based upon the information that is being collected.
- Ensure that there is 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 through its web site<sup>2</sup> whenever revision is needed.
- Define which 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 special emphasis on health-care workers.

Enhanced surveillance may also include the monitoring of the following groups:

- incoming travellers from infected regions, countries or localities to the 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 caring for patients with suspected or confirmed pandemic strain influenza infection (single cases and/or clusters);

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

<sup>2</sup> <http://www.who.int>

- laboratory workers handling clinical specimens from patients with suspected or confirmed pandemic strain influenza infection (single cases and/or clusters);
  - mortuary room workers.
- Rumour surveillance may help to identify possible cases of pandemic strain influenza that might not have been notified by routine or enhanced surveillance.

## 2.3 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 resources such as health-care facilities. It may be possible to adjust data collection to characteristics of the virus and/or the epidemic and make it less labour-intensive. For example: laboratory confirmation may not be needed for cases once the existence of the pandemic is confirmed, since clinical symptoms are sufficient to plan for health-care demand.

### Questions to be addressed

Is there a need to monitor the spread of the pandemic in the country concerned as it is occurring? With which objective? 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. The *WHO global influenza preparedness plan: the role of WHO and recommendations for national measures before and during pandemics* (in preparation) should be used as guidance.<sup>1</sup>
- If routine influenza or ILI surveillance is conducted, decide whether to continue this surveillance in the early phase of a pandemic.
- In later phases of a pandemic, 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 the existence of a system for revising the pandemic case definition, given the availability of additional 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;

<sup>1</sup> Check for the latest information: <http://www.who.int/csr/disease/influenza/pandemic/en/>

- 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 new virus, can be identified by occupation (for example, health-care workers or workers in designated essential services), in order to facilitate the development of a resource of workers presumed to be immune.
  - Ensure a mechanism for data aggregation and interpretation for decision-making.

# 3. Case investigation and treatment

## 3.1 Diagnostic capacity

### 3.1.1 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

What are the resources to test for animal and human influenza viruses, including a possibly new pandemic virus, in the national laboratories of the country concerned? Does the medical profession know which tests should be performed, and where and how samples should be shipped? Are the biosafety levels in the national laboratories compatible with the handling of influenza strains, including new strains with unknown pathogenicity?

#### Check

- In the interpandemic phase, all countries should have access to at least one laboratory able to offer routine influenza diagnosis, typing and subtyping, 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 IF in particular 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 subtyping, countries may 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 subtyping. 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 of respiratory specimens and blood have been developed by WHO and should be used by countries.<sup>1</sup> Protocols should be made available in all clinical settings where patients are likely to be managed.

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<sup>1</sup> See [http://www.who.int/csr/disease/avian\\_influenza/guidelines/en/](http://www.who.int/csr/disease/avian_influenza/guidelines/en/)

- Ensure implementation of general biosafety 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 may 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 should 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 once the pandemic is over.
- A policy on sharing clinical material from confirmed pandemic cases, nationally and internationally, should 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 analysis 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 an NIC designated by WHO, or ensure that the existing NIC meets the terms of reference for these laboratories.<sup>1</sup>
- When there is more than one NIC in a country, one laboratory should be designated to coordinate and communicate with WHO.

### **3.1.2 Reference laboratory availability**

#### Rationale

Even when local laboratory facilities exist, countries should ensure that in case of an emergency, samples can be shipped to a WHO reference laboratory in or outside the country for rapid confirmation or determination.

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



Rapid determination is essential for a proper risk assessment and to better target recommended measures.

#### Questions to be addressed

Is it possible in the country concerned to safely collect samples from animal, bird or human cases and to organize their rapid delivery to a WHO influenza reference laboratory able to identify a possibly new virus?

#### 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 principles for sharing live viruses.<sup>1</sup>

### 3.2 Epidemiological investigation and contact management

#### Rationale

Alongside laboratory confirmation, an epidemiological investigation should be carried out to identify how suspected human cases of a new influenza strain became infected, to assess the clinical impact of the disease, and to determine the risk that infected persons or their environment may represent for others. Based on this assessment, preventive measures may need to be adjusted and specific actions, e.g. identification and prophylactic treatment of contacts or vaccination of risk groups, may be initiated.

#### Questions to be addressed

What may be the possible source of infection for a suspected case? Is the case contagious, and if so, how should possible contacts be handled? 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 new strain to assess the exposures and the likelihood of human-to-human transmission. Investigators need to describe the characteristics of the disease.
- Designated (and trained) capacity to carry out epidemiological investigations should exist.
- Update the case report form for epidemiological investigation, or ensure proper use of forms provided by WHO.

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<sup>1</sup> See [http://www.iata.org/whatwedo/dangerous\\_goods/download.htm](http://www.iata.org/whatwedo/dangerous_goods/download.htm)

- 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 these 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 sections 4.1 and 4.3).
- 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.

### **3.3 Clinical management**

#### **3.3.1 Case management and treatment**

##### Rationale

To ensure effective and safe treatment of (suspected) human cases of a new influenza strain, it is important that clinical guidelines are ready, supplies are available and staff 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 samples be taken and how should they be transported?

##### Check

- Ensure the development or rapid adaptation and implementation of clinical management guidelines for patients with suspected and confirmed pandemic strain influenza infection. These guidelines should 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 sectors to ensure broad expertise and commitment.

### 3.3.2 Infection control in health-care settings

#### Rationale

Guidelines for infection control are important to clarify the routes of transmission and the ways to interrupt transmission through measures of hygiene. 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 part of pandemic emergency measures.
- Check availability of laboratory biosafety guidelines and assess the need for refinement.
- Consider education and training needs for health-care workers, laboratory personnel, volunteers and others 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 5.1.3.), e.g. personal protective equipment.

# 4. Preventing spread of the disease in the community

## 4.1 Public health measures

### Rationale

As the access to vaccines and antiviral drugs during a pandemic will be extremely limited, especially in countries with limited resources, nonmedical interventions may be the only way to delay the spread of the disease. However, many of these interventions may affect human behaviour and human rights, and therefore need a strong educational, legal and well-supported basis. Moreover, most of the interventions are based on limited evidence. 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 achieve protection and contribute to limiting the spread of the disease? Have the public health measures that might be implemented in the country concerned to limit community spread, such as voluntary or enforced quarantine, been fully considered? Is there a legal framework for such measures? What are the national criteria for implementation and revocation of each specific measure? Are there logistic plans in place to decide, carry out and communicate the proposed measures?

### Check

- Each government authority will need to have a clear understanding of the legal basis 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.
- Check for recommended public health measures in existing WHO publications and guidance.<sup>1</sup>

### 4.1.1 General personal hygiene

#### Check

- Strengthen general knowledge on personal respiratory 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.

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<sup>1</sup> <http://www.who.int/csr/disease/influenza/pandemic/en/>

#### 4.1.2 *Community infection-control measures*

Check

- Be aware of guidelines from departments/ministries of agriculture in relation to measures that will be taken to control animal or bird influenza prior to 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 defined risk groups:
  - Consider the 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 a high risk of spread of infection (homes for the elderly, military barracks, prisons, etc.).

#### 4.1.3 *Social distancing and quarantine*

Check

- 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 revocation:
  - 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.

#### 4.1.4 *Travel and trade restrictions*

Check

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

## 4.2 Vaccine programmes

### 4.2.1 Routine vaccine programmes

#### Rationale

Influenza vaccine is the most effective preventive measure available. The implementation of a routine vaccination programme will 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 may thus contribute to better pandemic preparedness.

#### Questions to be addressed

Does the country concerned have the rationale and resources to implement a routine annual influenza vaccination programme? Could such a programme facilitate the distribution or administration of 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, on cost-effectiveness studies and in relation to other health priorities. The annual burden of influenza can be assessed using one or more of the following types of information:
  - ILI in the community, by age group;
  - hospital admissions as a result of 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 that 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 to a defined target.
- Monitor vaccine coverage and adverse vaccine events, preferably by year and by designated target population.

### 4.2.2 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 on a large

scale. But even then, most countries without production facilities will have no access to vaccines during the first pandemic wave, as a result of 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. Meanwhile, countries without such facilities should prepare for a vaccination programme to be implemented as soon as vaccines against the pandemic become available.

#### Questions to be addressed

If there is national production capacity, can rapid and large-scale pandemic vaccine production, licensing and distribution be ensured? Is the country concerned prepared to accept pandemic vaccines, to distribute and administer them to preselected risk groups? Can it also handle uncertainties regarding safety and liability of the vaccine?

#### Check

- If a country has manufacturing capacity for influenza vaccine, develop timelines for potential pandemic vaccine manufacture, testing, expedited licensing and availability.
- If a country has no manufacturing capability, develop contingency plans for procuring vaccine or for managing a pandemic with no pandemic vaccine available.
- Establish a priority list of groups that should receive pandemic influenza vaccine. For example: animal or bird cullers, veterinarians and farmers in the case of animal or avian influenza; health-care workers and workers in essential services when a pandemic is imminent or established.
- Decide who will pay for influenza vaccine in priority and nonpriority groups.
- Consider how to increase vaccination of health-care workers and workers in essential services during the pandemic alert and pandemic periods, whenever pandemic vaccines are available.
- Develop contingency plans for storage, distribution and safe administration of pandemic and routine influenza vaccine, based on existing plans for other immunization programmes. Plans for pandemic vaccine use should include:
  - designation of mass immunization clinics: locations (mobile, fixed) and strategies for using them, including staffing and training of (temporary) staff;
  - strategies to limit distribution to persons in the priority groups;
  - vaccine storage capacity of the 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 local authorities.
- Enhance vaccine adverse event surveillance (see also section 2).
- Develop a method for estimating pandemic strain influenza vaccine effectiveness (see also section 6).

### 4.3 Antiviral use as a prevention method

#### Rationale

Antiviral drugs can be used for early treatment as well as for prophylaxis in people at risk. The latter can be done on a case-by-case 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 3.3. This section deals with the development of a strategy to reduce the possibility of infection in people at risk.

Owing 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

Does the country concerned 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 decisions on prioritized use of antiviral drugs 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 private stockpiling of antiviral drugs. In the latter case, a formal national policy is needed to ensure the safe purchase and use of these drugs.
- Plan how to distribute available antiviral drugs based on priority groups.
- Monitor antiviral drug use and adverse events, as well as antiviral drug resistance.



# 5. Maintaining essential services

## 5.1 Health services

### Rationale

To minimize the morbidity and mortality caused by a pandemic, it is crucial that health services are kept functioning as long as possible. Several emergency steps should be developed to ensure rational personnel management, and to make optimal use of facilities and available pharmaceutical products. In general, activities in this area should be based on a general health emergency preparedness plan.

### Questions to be addressed

How will a widespread pandemic affect the health services? Are there contingency plans in place for coping with shortages of health-care workers and facilities such as hospital beds during a pandemic? Has every facility implemented effective infection control policies?

### Check

To ensure adequate communication and participation in the development of 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.

### 5.1.1 Health service facilities

#### Check

- Define the levels of health-care facilities where patients should ideally be treated during a pandemic situation, and assess the availability of these facilities (primary, secondary and tertiary referral, including emergency and intensive care unit 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 at other sites.

- Coordinate clinical care and health service plans with bordering local authorities to avoid migration to centres where enhanced services are perceived to exist.

### **5.1.2 Health service personnel**

Check

- Estimate the numbers of health-care workers by professional group at the level appropriate for the country (national, provincial, local).
- Determine sources from which additional health-care workers could be recruited, for instance among those who have retired or who have changed careers.
- Develop a set of health-care roles for which volunteers may be suitable, and discuss this with professional organizations and associations.
- Identify organizations that may be able to provide volunteers, and define a protocol for deciding on their suitability 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 psychosocial support targeted at health-care workers (clinical and laboratory) who may be occupationally exposed to the new pandemic strain virus.

### **5.1.3 Health service supplies**

Check

- Assess the need and explore the options for stockpiling additional medical supplies, including personal protective equipment, and identify sources of additional supplies.
- Determine a range of antibiotics that will be useful for treatment of influenza complications. Develop contingency plans for producing or buying increased supplies of these antibiotics.
- Determine the level of care that might 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.

### **5.1.4 Excess mortality**

Check

- Determine the maximum capacity for the disposal of corpses using culturally appropriate methods.
- Identify emergency capacity for storage of corpses before burial, where applicable.

- Ensure development and implementation of protocols for the safe handling of corpses, respecting cultural and religious beliefs.

## 5.2 Other essential services

### Rationale

Essential services are responsible for those processes that keep a society running. Priorities may differ from country to country, but power and drinking-water supply, transport and telecommunications 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

How will a widespread pandemic affect the delivery of essential services? Have the people that are responsible for maintaining these essential services been identified? Are contingency plans developed 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 lead agency (ministry, department) for coordinating the maintenance of essential services during a pandemic.
- Develop a list of essential community services, and of the corresponding personnel whose reduction or absence would pose a serious threat to public safety, or would significantly interfere with the response to a 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, retirees employed in other areas, or voluntary organizations. Begin discussions with professional organizations and associations regarding the employment of such 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 the 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 whether and how compensation to the worker takes place.

### 5.3 Recovery

#### Rationale

After a pandemic wave is over, it can be expected that many people will be affected in a variety of ways. Many may have lost friends or relatives, suffer from fatigue or have financial losses as a result of the interruption of business. Governments or other authorities should ensure that these concerns can be addressed and support the rebuilding of 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 provide 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 service or organization.
- Define responsibilities for social, psychological and practical support to 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 within 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.

# 6. Research and evaluation

## Rationale

Countries that are dealing with a pandemic or pandemic threat are probably stretched for resources. Nevertheless, the situation might create unique opportunities to increase 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 a pandemic and allowing for adjustment.

## Questions to be addressed

How can the country concerned 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?

## 6.1 Research during phase 2 and beyond

### 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 data needed and develop a strategy for data collection (and if possible analysis) during a pandemic or event with pandemic threat, including funding.

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

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

During a pandemic with widespread human cases:

- Decide whether the country concerned wishes to invest in research activities during a pandemic, and develop plans for data collection. Check the WHO web site for existing research protocols. Research may include:
  - assessment of the impact of a pandemic (morbidity and mortality rates, hospital admissions, etc.);

- effectiveness of public health measures taken to control the pandemic;
- pandemic strain vaccine effectiveness;
- effectiveness of antiviral drugs in the pandemic setting;
- socioeconomic impact of the pandemic.

## **6.2 From research to action**

### Check

- Ensure evaluation of the response to the pandemic, once the first wave is over. 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.

# 7. Implementation, testing and revision of the national 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 dynamic document to ensure that it is widely known, even several years after publication. This can only be achieved if the plan is tested and revised regularly.

## Questions to be addressed

Is there a mechanism in place 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 or HPAI in humans)?

## Check

- Set targets, define indicators or develop a benchmark system that can be used to assess progress in implementation. Define who is responsible for the supervision of progress.
- Consider a desk-top review of the preparedness and response plan, based on imaginary situation descriptions, or carry out a simulation exercise, preferably focusing on specific aspects of the response plan.
- Utilize or create opportunities to test components of the plan, e.g. during smaller outbreaks, the regular influenza 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 should be revised.