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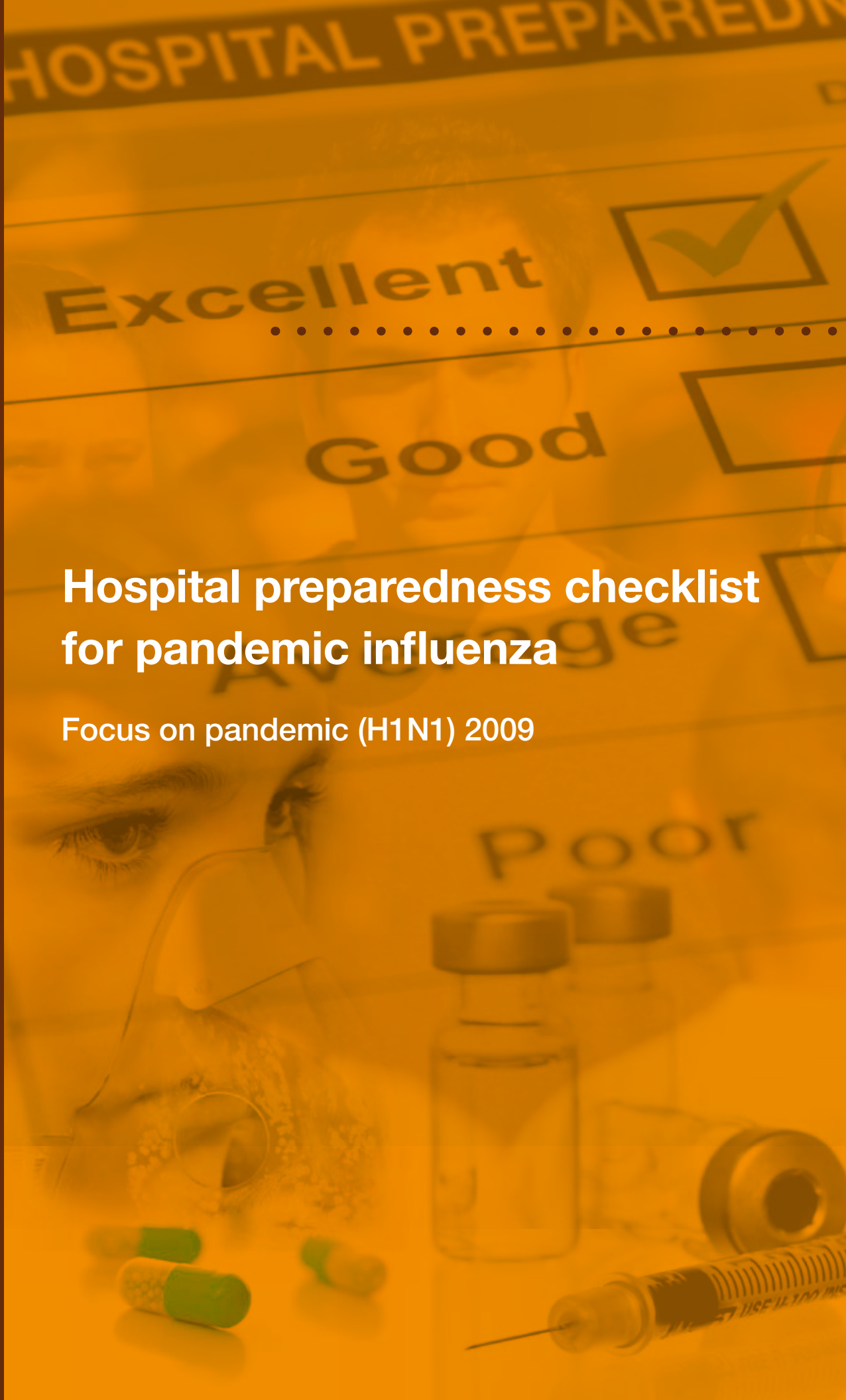

Hospital preparedness checklist for pandemic influenza

Focus on pandemic (H1N1) 2009

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Abstract

Hospitals play a critical role within the health system in providing essential medical care to the community, particularly during a crisis, such as an epidemic or a pandemic. Prolonged and combined outbreaks can lead to the progressive spread of disease with rapidly increasing service demands that can potentially overwhelm the capacity of hospitals and the health system at large. To enhance the readiness of the health facilities to cope with the challenges of an epidemic, a pandemic or any other emergency or disaster, hospital managers need to ensure the initiation of relevant generic priority action. This document aims to provide a checklist of the key action to carry out in the context of a continuous hospital emergency preparedness process.

Keywords

Disease outbreaks

Influenza A virus, H1N1 subtype

Disaster planning

Hospital units - organization and administration

Hospital planning

Health resources - utilization

Europe

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Glossary

Acute respiratory diseases (ARD)
ARD are upper or lower respiratory tract illnesses, usually infectious in etiology, which can result in a spectrum of diseases ranging from asymptomatic or mild infection to severe and fatal disease, depending on the causative pathogen and the environmental and host factors. For the purpose of this document, the definition of ARD is acute respiratory tract illness caused by an infectious, human-to-human-transmitted agent. The onset is typically rapid, over a period of hours but can take up to several days. Symptoms include fever, fatigue, cough, sore throat, headache, myalgia, coryza and dyspnoea. Examples of the pathogens referred to in this document as causing ARD include rhinovirus, respiratory syncytial virus, parainfluenza virus, severe acute respiratory syndrome-associated corona virus and influenza virus.

Adequately ventilated single room
A single room or a side room in a ward with ≥ 12 air changes per hour without controlled direction of air-flow.

Aerosol-generating procedures
Procedures reported to be aerosol-generating and associated with a documented increased risk of pathogen transmission include endotracheal intubation and related procedures, cardiopulmonary resuscitation, bronchoscopy, autopsy and surgery where high-speed devices (e.g. a saw) are used.

Capacity
The combination of all of the strengths, attributes and resources available within an organization that can be used to achieve agreed goals *(1).*

Case
A patient suspected of or confirmed as being infected with a pathogen causing an epidemic- or pandemic-prone ARD.

Contingency planning
A management process that analyses specific potential events or emerging situations that might threaten society or the environment and establishes arrangements in advance to enable timely, effective and appropriate responses to such events and situations. Contingency planning results in organized and coordinated courses of action with clearly-identified institutional roles and resources, information processes, and operational arrangements for specific actors at times of need. Based on scenarios of possible emergency conditions or disaster events, it allows key actors to envision, anticipate and solve problems that can arise during crises. Contingency planning is an important part of overall preparedness. Contingency plans need to be regularly updated and exercised *(1).*

Disaster
A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources *(1).*

Emergency
A sudden and usually unforeseen event that calls for immediate measures to minimize its adverse consequences *(2).*

Epidemic
The occurrence in a community or region of cases of an illness, specific health-related behaviour, or other health-related events that are clearly beyond normal expectancy *(3).*

Health-care-associated (nosocomial) infection
An infection acquired while receiving treatment for a separate condition in a hospital or other health-care setting.

Incident action plan
A document that guides the response for the operational period. It contains the overall incident objectives and strategy, general tactical actions, and supporting information to enable successful completion of objectives *(4).*

Incident command group (ICG)
A multidisciplinary body that provides the overall technical leadership for and oversight of all aspects of crisis management, coordinates the overall response, approves action plans and serves as an authority on all activities and decisions. The composition of the ICG may vary according to local capacity and hospital size. Small hospitals with limited resources and services may manage with a more simplified command structure than is required for larger hospitals.

Incident command system
The combination of facilities, equipment, personnel, procedures and communication operating within a common organizational structure designed to aid in the management of resources for emergency incidents *(4).*

Memorandum of understanding
A formal document embodying the firm commitment of two or more parties to an undertaking and setting out its general principles but falling short of constituting a detailed contract or agreement *(5).*

Pandemic
An epidemic occurring worldwide, or over a very wide area crossing international boundaries, usually affecting a large number of people *(3).*

Policy
A formally advocated statement or understanding adopted to direct a course of action (*5).*

Preparedness
The knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent or current hazard events or conditions *(1).*

Resources
Personnel, funding, facilities, and major supplies and equipment items available or potentially available in the case of a hazardous event.

Response
The provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected *(1).*

Surge capacity
The ability of a health service to expand beyond its normal capacity to meet an increased demand for clinical care *(6)*.

Surveillance
Systematic ongoing collection, collation and analysis of data and the timely dissemination of information to those who need to know so that action can be taken *(3).*

Introduction

Hospitals play a critical role within the health system in providing essential medical care to the community, particularly in a crisis, such as an epidemic or a pandemic. Prolonged and combined outbreaks can lead to the progressive spread of disease with rapidly increasing service demands that can potentially overwhelm the capacity of hospitals and the health system at large. To enhance the readiness of the health facilities to cope with the challenges of an epidemic, a pandemic or any other emergency or disaster, hospital managers need to ensure the initiation of relevant generic priority action. This document aims to provide a checklist of the key action to take in the context of a continuous hospital emergency preparedness process.

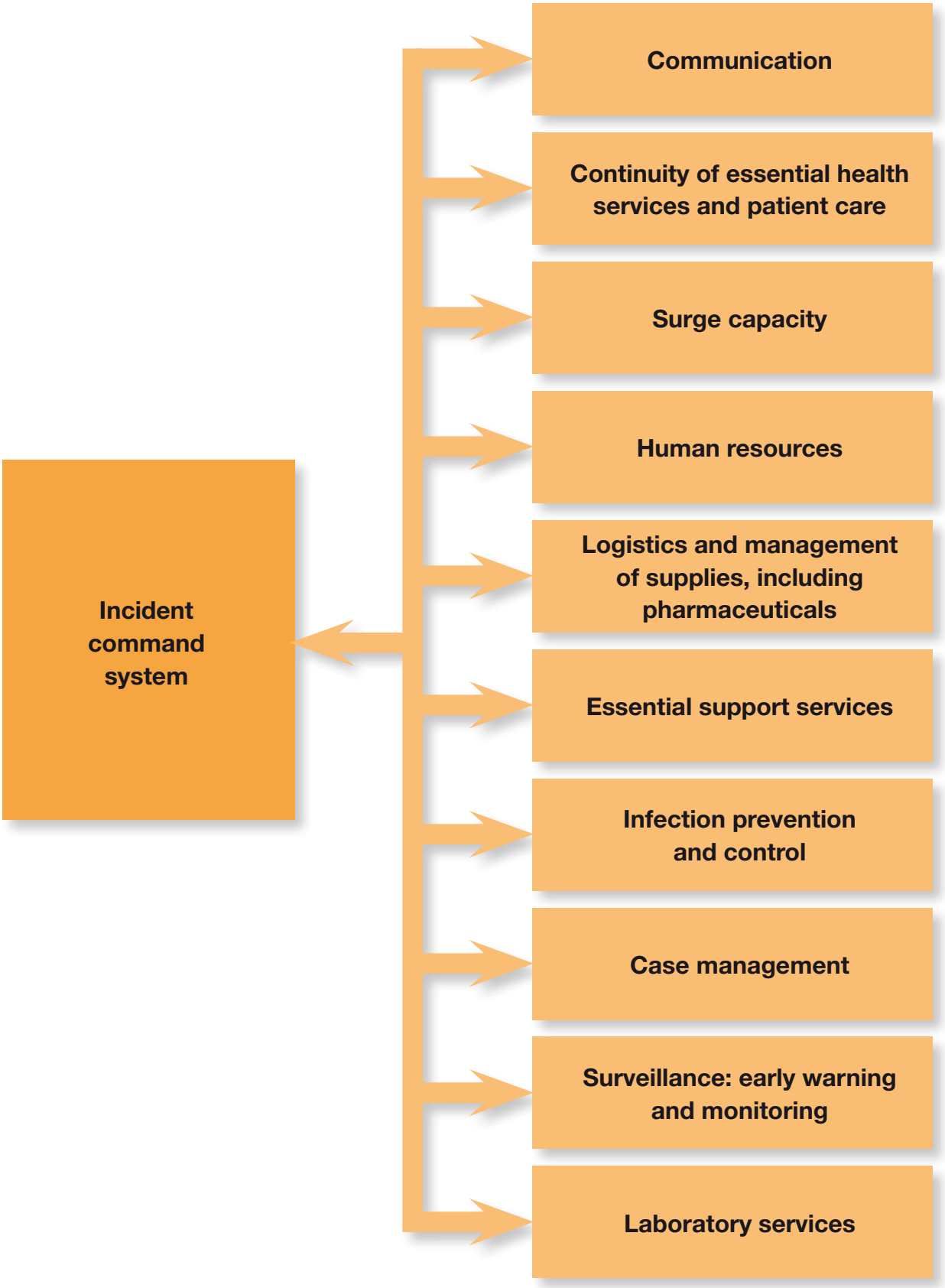
Hospitals are complex and vulnerable institutions, dependent on crucial external support and supply lines. Under normal working conditions, many hospitals frequently operate at near-surge capacity. Consequently, even a modest rise in admission volume can overwhelm a hospital beyond its functional reserve. Well-established partnerships with local authorities, service providers (e.g. of water, power and means of communication), supply vendors, transportation companies and other organizations are required to ensure the continuity of essential services. During an ARD epidemic or pandemic, an interruption of these critical support services and supplies would potentially disrupt the services provided by an unprepared health facility. In addition, a high rate of staff absenteeism is expected. Shortage of critical equipment and supplies could limit access to needed care and reduce occupational safety. Panic could potentially jeopardize established working routines. Even for a well-prepared hospital, coping with the health consequences of an epidemic or a pandemic would be a complex challenge. Despite the difficult demands and obstacles foreseen, the proactive and systematic implementation of key generic and specific pandemic-related action can facilitate effective hospital-based management during a pandemic.

The benefits of an effective, hospital-based epidemic/pandemic response include: (1) the continuity of essential services; (2) the well-coordinated implementation of priority action at every level; (3) clear and accurate internal and external communication; (4) swift adaptation to increased demands; (5) the effective use of scarce resources; and (6) a safe environment for health workers. This checklist has been prepared with the aim of supporting hospital managers and emergency planners in achieving the above by defining and initiating the action needed to ensure a rapid response to an ARD epidemic or pandemic.

The checklist is structured on eleven key components of hospital-based management of epidemic and pandemic ARD. Under each component, there is a list of questions regarding the status of implementation of the recommended action specific to that component. Hospitals experiencing an excessive demand for health services due to an epidemic- or pandemic-prone disease are strongly encouraged to ensure the effective implementation of each action. Hospitals at risk of increased health service demand should be prepared to initiate the implementation of each action promptly. The section on “Recommended reading” lists selected tools, guidelines and strategies relevant to each component, as well as other supportive documentation.

Hospital emergency preparedness is a continuous process that needs to link to the overall national preparedness programme. Many of the principles and recommendations outlined in this tool are generic and applicable to other contingencies. The checklist is intended to complement comprehensive, all-hazard, multisectoral hospital emergency preparedness planning programmes, not replace them.

Fig. 1. Key components of the hospital preparedness checklist for pandemic influenza



Hospital preparedness checklist for pandemic influenza (with focus on pandemic (H1N1) 2009)

1. **If your health facility is experiencing an excessive demand for health services due to an epidemic- or pandemic-prone acute respiratory disease, verify the status of implementation of each recommended action listed below.**

2. **If your health facility is at risk of increased health service demand due to an epidemic- or pandemic-prone acute respiratory disease, ensure that you are prepared to implement each action promptly.**

1. Incident command system

A well-functioning hospital incident command system is essential for the effective management of emergency operations (Recommended reading 1). Consider taking the following action.

Recommended action	Due for review	In progress	Completed
Activate the hospital Incident Command Group (ICG) or establish an ad hoc ICG, i.e. supervisory body responsible for directing hospital-based emergency response operations (Box 1).	○	○	○
Designate a Hospital Command Centre, i.e. a specific location prepared to convene and coordinate hospital-wide emergency response activities and equipped with well-functioning means of communication.	○	○	○
Designate a focal point for each key component provided in this document with the aim of ensuring the appropriate coordination and management of related response activities.	○	○	○
Appoint prospective replacements for directors and focal points to guarantee the continuity of decision-making and resource management in any situation.	○	○	○
To ensure the application of basic management principles in the development and implementation of a hospital pandemic management plan, i.e. an incident action plan, consult core internal and external documents (e.g. of the national health authority, WHO) related to hospital-based epidemic and pandemic response.	○	○	○

Box 1. Ad hoc hospital incident command group (ICG)

If there is no mechanism in place for coordinated hospital incident management, e.g. a hospital incident command group (ICG), the hospital director should promptly convene a meeting with all heads of service in order to create an ad hoc ICG. An ICG is essential for the effective development and management of the hospital-based systems and procedures required for successful epidemic/pandemic response.

When organizing a hospital ICG, consider including representatives from the services dealing with:

- hospital administration
- communication
- medical personnel (e.g. emergency medicine, intensive care, internal medicine, paediatrics)
- nursing administration
- infection control
- respiratory therapy
- human resources
- security
- pharmaceuticals
- engineering and maintenance
- laboratory services
- dietary services
- laundry, cleaning and waste management.

2. Communication

Accurate and timely communication is necessary to ensure informed decision-making, effective collaboration and cooperation, and public awareness and trust (Recommended reading 2). Consider taking the following action.

Recommended action	Due for review	In progress	Completed
Establish mechanisms to streamline sharing of information between the hospital administration, department/unit heads and facility staff.	◯	◯	◯
Brief the hospital staff on their roles and responsibilities within the incident action plan.	◯	◯	◯
Ensure that all decisions on patient prioritization (e.g. adapted admission and discharge criteria), infection prevention and control measures and policies related to use of antivirals and vaccines are communicated to all relevant staff and stakeholders.	◯	◯	◯
Ensure the collection, processing and reporting of information to supervisory stakeholders (e.g. the government, health authorities), and through them to neighbouring hospitals, private practitioners and pre-hospital networks.	◯	◯	◯
Draft in advance key messages addressing a variety of pandemic-related scenarios with different target audiences in mind (e.g. patients, staff, public).	◯	◯	◯
Appoint a public information spokesperson to coordinate communication with the public, the media and health authorities.	◯	◯	◯
Ensure reliable and sustainable primary and back-up communication systems (e.g. landlines, the internet, mobile devices, pagers, satellite telephones, two-way radio equipment, unlisted numbers) and access to updated contact lists.	◯	◯	◯

3. Continuity of essential health services and patient care

An epidemic or pandemic will not dispel an already existing need for essential medical and surgical care (e.g. emergency services, urgent surgical operations, maternal and child-care). Hence, it is necessary to ensure the continuity of essential health services in parallel with epidemic/pandemic management (Recommended reading 3). Consider taking the following action.

Recommended action	Due for review	In progress	Completed
List all hospital services in priority order.	○	○	○
In coordination with the health authorities, neighbouring hospitals and private practitioners, define the roles and responsibilities of each member of the local health-care network to ensure the continuous provision of essential medical services throughout the community.	○	○	○
Identify and maintain the hospital services that your facility must provide at all times and under any circumstances.	○	○	○
Identify the resources needed to ensure the continuity of the identified essential hospital services.	○	○	○
Ensure preparedness across the local health-care network for other high-demand contingencies (e.g. disasters or mass-casualty incidents) (Recommended reading 3).	○	○	○

4. Surge capacity

Surge capacity is the ability of a health service to expand beyond its normal capacity to meet an increased demand for clinical care. An epidemic or pandemic typically produces an increase in demand over a prolonged period of time ("rising tide" as opposed to "big bang", a sudden-onset disaster) (Recommended reading 4). Consider taking the following action.

Recommended action	Due for review	In progress	Completed
Calculate maximal case admission capacity, determined not only by the total number of beds but also by the availability of human resources, the adaptability of facility space for critical care, the accessibility of mechanical ventilators and the availability of other resources.	○	○	○
Use available planning assumptions and tools to estimate increase in demand for hospital services during a pandemic (Recommended reading 4).	○	○	○
Identify ways of expanding hospital in-patient capacity (including physical space, staff, supplies and processes).	○	○	○
Identify potential gaps in the provision of health care, with an emphasis on critical care; address these gaps in coordination with the authorities and neighbouring hospitals.	○	○	○
Release additional capacity by outsourcing care of non-critical patients to appropriate alternative treatment sites (e.g. home for low-severity illness, chronic care facilities for long-term patients).	○	○	○
In coordination with the local authorities, identify additional sites for conversion to patient care units (e.g. convalescent homes, hotels, schools, community centres, gymnasiums).	○	○	○
Cancel the nonessential services (e.g. elective surgery) when necessary.	○	○	○
Adapt the admission and discharge criteria and prioritize patients and clinical interventions according to available treatment capacity and demand.	○	○	○

5. Human resources

Adapted human resource management is required to ensure adequate staff capacity and continuity of operations in response to an increased demand for human resources, while maintaining the identified essential services (Recommended reading 4 and 5). Consider taking the following action.

Recommended action	Due for review	In progress	Completed
Update the staff contact list.	○	○	○
Estimate staff absenteeism in advance and monitor it continuously.	○	○	○
Establish a clear sick-leave policy for staff suspected or confirmed of having an epidemic- or pandemic-prone disease or who have sick family members/dependents.	○	○	○
For each unit or service, identify the minimum number of health-care workers and other hospital staff needed to ensure the sufficient operation of the unit or service.	○	○	○
Prioritize staffing needs by unit or service and distribute personnel accordingly.	○	○	○
Recruit and train additional staff (e.g. retired staff, reserve military personnel, university affiliates/students, community volunteers) according to the anticipated need.	○	○	○
Cross-train health-care providers in high-demand services (e.g. infectious disease wards, emergency and intensive care units).	○	○	○
Provide training and exercises relevant to areas of need, including infection prevention and control, to ensure staff competency and safety.	○	○	○
Vaccinate staff in case of a pandemic, in accordance with the national policy and health authority guidelines.	○	○	○
Identify domestic support measures (e.g. travel, child care, care of ill or disabled family members) that could enhance staff flexibility for shift work and longer working hours.	○	○	○
Through the local social and health networks, ensure the availability of the services of multidisciplinary psychosocial support teams for the families of staff and patients, including social workers, counsellors, interpreters and clergymen (Recommended reading 5).	○	○	○
Address liability, insurance and temporary licensing issues with respect to staff who may be working outside their areas of expertise.	○	○	○

6. Logistics and management of supplies, including pharmaceuticals

The continuity of hospital services and the availability of essential equipment and supplies, including pharmaceuticals, require a proactive approach to resource and facility management (Recommended reading 6). Consider taking the following action.

Recommended action	Due for review	In progress	Completed
Develop/maintain an updated inventory of all equipment, supplies and pharmaceuticals; establish a shortage alert mechanism.	○	○	○
Estimate the consumption of essential equipment, supplies and pharmaceuticals, (e.g. amount used per week) on the basis of the most likely epidemic/pandemic scenario.	○	○	○
Consult with authorities to ensure the continuous provision of essential medications and supplies (e.g. institutional and central stockpiles, emergency agreements with local suppliers, donations).	○	○	○
Assess the quality of contingency items prior to purchase; request quality certification.	○	○	○
Establish contingency agreements (e.g. memorandum of understanding, mutual aid agreement) with vendors to ensure the procurement and prompt delivery of equipment, supplies and other resources in times of shortage.	○	○	○
Identify physical space within the hospital for the storage and stockpiling of additional supplies. Factors to consider include accessibility, security, ambient temperature, ventilation, light exposure and humidity. Ensure an uninterrupted cold-chain for essential items requiring refrigeration.	○	○	○
Stockpile essential supplies and pharmaceuticals according to national guidelines. Ensure the timely use of stockpiled items to avoid loss due to expiration.	○	○	○
Define the role of the hospital pharmacy in providing pharmaceuticals for cases treated at home or other alternative treatment sites.	○	○	○
Ensure a mechanism for the prompt maintenance and repair of the equipment required for the essential services. Postpone non-essential maintenance and repair.	○	○	○
Coordinate with pre-hospital networks and transportation services in establishing a contingency transportation strategy to ensure continual patient transferral.	○	○	○

7. Essential support services

To optimize patient care during an epidemic or a pandemic, it is necessary to identify and maintain essential support services, such as those for laundry, cleaning, waste management, dietary services and security (Recommended reading 7). Consider taking the following action.

Recommended action	Due for review	In progress	Completed
Estimate the additional supplies required by the support services and introduce a mechanism to ensure the continuous availability of these supplies.	◯	◯	◯
Enable the adaptation of the support services to cope with an increased demand.	◯	◯	◯
Implement methods of cleaning and disinfecting the health-care facilities in accordance with the national guidelines and standards.	◯	◯	◯
Implement methods for the disposal of medical and non-medical solid waste in accordance with the national guidelines and standards.	◯	◯	◯
Anticipate the impact of epidemic/pandemic disease on hospital food supplies; take proactive measures to ensure the availability of food.	◯	◯	◯
Ensure the availability of appropriate back-up arrangements for essential life-lines, including water, power and oxygen.	◯	◯	◯
Solicit the input of hospital security in identifying potential security constraints and optimizing the control of facility access, essential pharmaceutical stocks, patient flow, traffic and parking.	◯	◯	◯
Designate an area for use as a temporary morgue; ensure the adequate supply of body bags and shroud packs.	◯	◯	◯
Formulate a post mortem care contingency plan with appropriate partners (e.g. undertakers, funeral services).	◯	◯	◯

8. Infection prevention and control

An operational infection prevention and control (IPC) policy is essential to minimize the risk of transmission of health-care-associated (nosocomial) infection to patients, hospital staff and visitors (Recommended reading 8). Consider taking the following action.

Recommended action	Due for review	In progress	Completed
Ensure that health care workers, patients and visitors are aware of cough etiquette and respiratory and hand hygiene. Provide verbal instruction, informational posters, cards, etc.	○	○	○
Ensure that those caring for suspected and confirmed cases apply standard and droplet precautions.	○	○	○
Ensure that personal protective equipment (PPE) (i.e. medical/surgical masks, gloves, gowns, eye protection) is easily accessible to staff.	○	○	○
If the supply of PPE is limited, prioritize staff caring for cases.	○	○	○
Provide medical/surgical masks to all suspected and confirmed cases during transport; reinforce cough etiquette when mask use is not tolerated.	○	○	○
Identify the premises for placing (cohorting) cases in the same unit/ward. The distance between beds should be at least one metre.	○	○	○
Identify an adequately ventilated single room (optimally ≥12 air changes per hour) for aerosol-generating procedures.	○	○	○
Ensure the use of a particulate respirator[1] during aerosol-generating procedures (e.g. aspiration of respiratory tract, intubation, resuscitation, collection of nasopharyngeal swap/aspirate, bronchoscopy, autopsy).	○	○	○
Optimize ventilation in the health care facility.	○	○	○
Provide clear identification of and restriction to the rooms, routes and buildings used in connection with patient care. Limit patient, staff, and visitor transit through in- and out-patient units (restrict access).	○	○	○
Limit visitors to those essential for patient support and ensure that they take the same IPC precautions as the health-care workers.	○	○	○

Continued on next page

[1] A special type of fit-tested mask with the capacity to filter particles for protection against inhaled infectious aerosols, e.g. the Filtering Face Piece (FFP2) and the N95, which is certified by the United States National Institute for Occupational Safety and Health (US NIOSH).

8. Infection prevention and control – continued

Recommended action	Due for review	In progress	Completed
Ensure adherence to IPC guidelines related to handling laboratory specimens, food preparation, laundry and cleaning services and waste management.	○	○	○
Ensure the cleaning and disinfection of reusable equipment between patient use.	○	○	○
Health-care workers with symptoms of epidemic- or pandemic-prone disease should remain at home.	○	○	○
Consider reassigning staff at high risk for complications of epidemic- and pandemic-prone ARD.	○	○	○
Apply IPC precautions for seven days from the onset of ARD symptoms. For prolonged illness with respiratory complication (e.g. pneumonia), control measures should be used for the duration of acute illness.	○	○	○
If a pandemic (H1N1) 2009 patient is still infectious upon discharge (e.g. discharged within the period of infection), instruct family members on the appropriate IPC measures to take at home.	○	○	○

Box 2. Standard and droplet precautions

Always apply standard and droplet precautions when working in direct contact with suspected or confirmed cases *(7)*.

Droplet precautions

- Wear a medical/surgical mask, if working within ≤ 1 metre of the patient.
- Emphasize hand hygiene before and after patient contact and immediately on removal of the mask.

Standard precautions

For procedures with a risk of splashes on the face and body, PPE should include:

- facial protection (either a mask and eye visor or goggles, or a face shield);
- a gown and clean gloves, and hand hygiene before and after patient contact and after PPE removal.

9. Case management

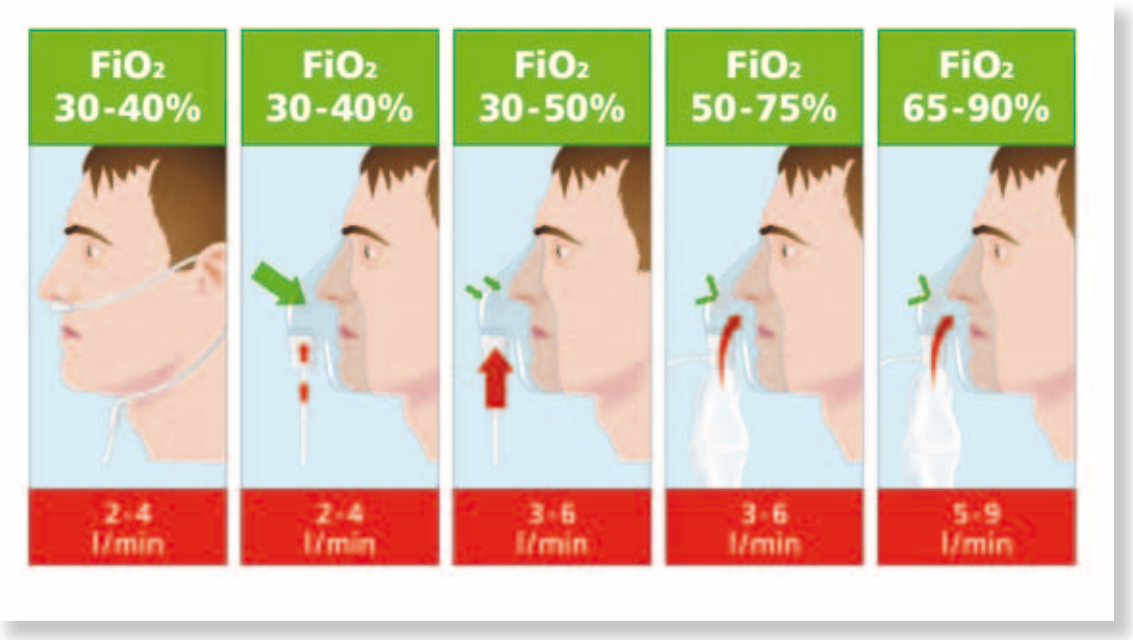
An efficient and accurate triage system and an organized in-patient management strategy are required to ensure adequate treatment of epidemic and pandemic-prone ARD (Recommended reading 9, Box 3). Consider taking the following action.

Recommended action	Due for review	In progress	Completed
Designate an exclusive waiting and examination area for individuals presenting with ARD. The area should be well-ventilated, low-transit and secure.	○	○	○
Consider establishing additional areas for triage of patients on presentation at the hospital, possibly outside the hospital.	○	○	○
Appoint a triage supervisor responsible for overseeing all triage operations.	○	○	○
Establish a triage protocol aimed at ensuring that cases of ARD are recognized and cohorted on presentation at the hospital and that severe cases are isolated and given priority for immediate care.	○	○	○
Ensure the application of standard and droplet precautions at all times.	○	○	○
In coordination with local health authorities, implement the hospital strategy for the admission, internal transfer, referral and discharge of ARD patients, in line with relevant criteria and operational protocols.	○	○	○
Consider home care for mild cases of ARD without comorbidities, recognized as posing a risk for severe or fatal disease associated with pandemic (H1N1) 2009. Identify a caregiver, preferably a family member.	○	○	○
Consider hospital admission for cases of ARD with comorbidities recognized as posing a risk for severe or fatal disease associated with pandemic (H1N1) 2009.	○	○	○
Ensure the availability of staffed beds for the admission of severe ARD cases requiring supportive care and the continuous monitoring of vital signs, regardless of comorbidities, recognized as posing a risk for severe or fatal disease associated with pandemic (H1N1) 2009.	○	○	○
Ensure the availability of staffed critical care beds for those patients requiring intensive care therapy either on presentation at the hospital or during admission to hospital.	○	○	○

Continued on next page

Recommended action	Due for review	In progress	Completed
Provide continuous monitoring of vital signs (e.g. temperature, blood pressure, pulse, respiratory rate, level of consciousness, clinical signs of dehydration or shock) and oxygen saturation (pulse oximetry or blood gas analyses).	○	○	○
Ensure the availability of oxygen and means of respiratory support, as well as sufficient sedation for intubated patients.	○	○	○
When treating severe hypoxaemia with an oxygen mask, the mask should be equipped with an oxygen reservoir bag. High-flow oxygen should be used (up to 10–15 litres per minute in adults) to ensure a sufficiently high level of inspired oxygen concentration (Figs. 2 and 3).	○	○	○
Provide patient care in accordance with national and international guidelines (Recommended reading 9 and Box 3).	○	○	○
Communicate admission criteria and triage logistics (e.g. location, routes of entry/exit) to the relevant hospital personnel, referring hospitals and clinics, pre-hospital networks and ambulance services.	○	○	○

Fig. 2. Summary of approximate inspired oxygen concentration (FiO2) in adults, as a function of the mode of non-invasive ventilation and oxygen flow



Box 3. Initial and ongoing clinical management of pandemic (H1N1) 2009[1]

Supportive therapy for patients with pandemic (H1N1) 2009

- Maintain oxygen saturation above 90%. Consider increasing it to 92–95% in some clinical situations, for example, during pregnancy.
- If a patient is presenting with respiratory exhaustion (e.g. elevated respiratory rate) and/or oxygen saturation of < 90% (SpO2), consider using non-invasive ventilation (NIV) by mask or nasal cannulae. If the saturation levels do not improve, consider using mechanical ventilation therapy in accordance with evidence-based guidelines.
- Give paracetamol/acetaminophen if considering an antipyretic for patients of less than 18 years of age.
- Give the appropriate antibiotic if there is evidence of a secondary bacterial infection (e.g. pneumonia).
- Consider the need for antivirals (Oseltamivir or Zanamivir), in the light of contra-indications and drug interactions (see table below and Recommended reading 9a).
- Consider alternative or additional diagnoses.

Use of antivirals in treating pandemic (H1N1) 2009[2]

Mild to moderate uncomplicated clinical presentation[a]

At risk population[b,c]	Oseltamivir or Zanamivir
Otherwise healthy population[d]	No treatment needed

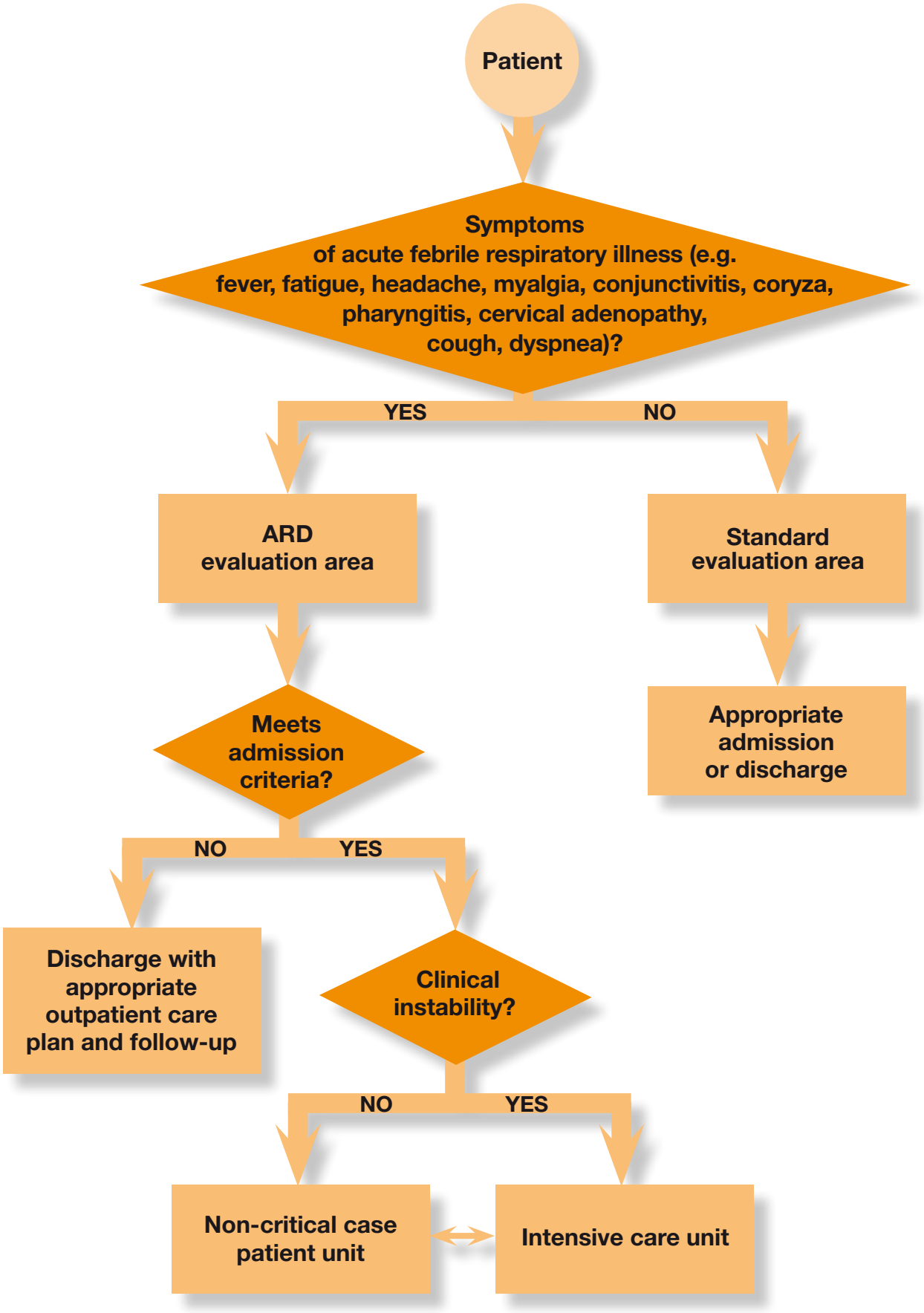
Severe or progressive clinical presentation[a,c,e]

At risk population[b]	Oseltamivir (Zanamivir should be used where virus is known to be resistant to Oseltamivir, or if Oseltamivir is unavailable)
Otherwise healthy population[d]	

[a]For case description see Section 2 of: *WHO guidelines for pharmacological management of pandemic (H1N1) 2009 influenza and other influenza viruses*. Geneva, World Health Organization, 2009 (Recommended reading 9a).
[b]Infants and children of less than 5 years of age, the elderly (> 65 years), nursing-home residents, pregnant women, patients with chronic comorbid conditions, such as cardiovascular, respiratory or liver disease and diabetes, and patients with immunosuppression related to malignancy, HIV infection or other diseases.
[c]WHO recommends treatment with Oseltamivir as quickly as possible. Studies show that early treatment, preferably within 48 hours after onset of symptoms, is strongly associated with better clinical outcome. Provide treatment for patients with severe or deteriorating illness, even if started later.
[d]All those not covered by the at-risk definition under [b] above.
[e]All patients requiring hospitalization.

[1] Adapted from: *Influenza A (H1N1) patient care checklist*. Geneva, World Health Organization, 2009 (http://www.who.int/csr/resources/publications/swineflu/patient_care_checklist/en/index.html *(8)*.
[2] Table adapted from: *WHO guidelines for pharmacological management of pandemic (H1N1) 2009 influenza and other influenza viruses.* Geneva, World Health Organization, 2009 *(9)*.

Fig. 3. Triage of patients presenting with symptoms of pandemic-prone ARD



10. Surveillance: early warning and monitoring

Health-care workers recognizing and immediately reporting unusual health events (e.g. clusters of cases, atypical clinical presentations, etc.) occurring in health care facilities are the cornerstone of the early-warning function. During an influenza pandemic, unusual health events might signal the emergence of novel influenza viruses or changes in the characteristics of circulating influenza viruses – increased virulence, resistance to antivirals, increased transmissibility – warranting investigation. In addition to serving the early warning function, the laboratory and epidemiological data obtained through systematic collection and analysis allows the public health authorities to monitor the progression of severe influenza-related disease and inform interventions on those at the highest risk of severe outcome (Recommended reading 10), and helps hospital managers to plan accordingly. Consider taking the following action.

Recommended action	Due for review	In progress	Completed
Appoint a hospital epidemiologist with the overall responsibility for activities related to early warning and monitoring in the hospital.	◯	◯	◯
Identify the information that needs to be collected and define the objectives for its use.	◯	◯	◯
Promote the reporting of unusual health events by health-care workers by establishing communication channels and procedures within the hospital and with public health authorities	◯	◯	◯
Implement data collection and reporting mechanisms in accordance with the national health policy and directives.	◯	◯	◯
Comply with standardized case definitions, recommended levels of surveillance and triggers for surveillance escalation or de-escalation in accordance with national criteria.	◯	◯	◯
Immediately investigate reports by health care workers of unusual health events and/or unusual signals detected through monitoring activities.	◯	◯	◯
Ensure prompt distribution to hospital clinicians and other relevant decision-makers of information obtained through monitoring activities and/or the investigation of unusual health events and/or signals.	◯	◯	◯
Ensure that testing of persons hospitalized for pandemic (H1N1) 2009 complies with the standardized case definitions, recommended levels of surveillance and triggers for surveillance escalation or de-escalation, in accordance with the national criteria.	◯	◯	◯

11. Laboratory services

Maintenance of the essential laboratory services is necessary for the appropriate clinical management of both pandemic and other patients, as well as for the hospital-based surveillance of influenza (Recommended reading 11). Consider taking the following action.

Recommended action	Due for review	In progress	Completed
Ensure the continuous availability of basic laboratory testing (e.g. complete blood count, chemistry profile, electrolytes, blood gas analysis, blood culture and sputum examination).	○	○	○
Identify essential laboratory supplies and resources and ensure their continuous availability.	○	○	○
Identify back-up laboratory personnel and/or alternative laboratory services.	○	○	○
For the purpose of hospital-based surveillance, ensure mechanisms for the prompt provision of laboratory data to the physicians and health authorities responsible for clinical management and surveillance.	○	○	○
Prioritize testing for respiratory viruses (e.g. influenza) according to clinical requirements and hospital-based surveillance needs. Use a panel of respiratory pathogens for differential diagnosis when required.	○	○	○
Establish a laboratory referral pathway for the identification, confirmation and monitoring of epidemic/pandemic pathogens, (including changes in virus characteristics, such as virulence, transmissibility and anti-virus resistance).	○	○	○
Establish transportation procedures for specimen referral in accordance with national and international transport regulations and requirements.	○	○	○
Ensure the application of biosafety measures in accordance with international standards and national codes of practice.	○	○	○

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Recommended reading

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Mass casualty management systems: strategies and guidelines for building health sector capacity. Geneva, World Health Organization, 2007 (http://www.who.int/entity/hac/techguidance/MCM_guidelines_inside_final.pdf, accessed 5 November 2009).

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The WHO Regional Office for Europe

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Hospital preparedness checklist for pandemic influenza

Focus on pandemic (H1N1) 2009

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