

# Reducing excess mortality from common illnesses during an influenza pandemic

WHO guidelines for emergency health  
interventions in community settings

Geneva, 2008

DISEASE CONTROL IN HUMANITARIAN EMERGENCIES

EPIDEMIC AND PANDEMIC ALERT AND RESPONSE



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Disease Control in Humanitarian Emergencies  
Epidemic and Pandemic Alert and Response



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For further information, please contact:

[cdemergencies@who.int](mailto:cdemergencies@who.int)

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These guidelines may need to be updated as the epidemiological information evolves or as new information emerges. It is anticipated that the recommendations contained in these guidelines will remain valid until 2010. The Department of Epidemic and Pandemic Alert and Response at WHO headquarters will be responsible for their review at that time.

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## Abbreviations

ACT	Artemisinin-based combination therapy
ART	Antiretroviral therapy
CHR	Community health responder
CMAM	Community-based management of acute malnutrition
GBV	Gender-based violence
HEW	Health extension workers
Hib	<i>Haemophilus influenzae</i> type b
HMM	Home-based management of malaria
IEHK	Interagency emergency health kit
IMAI	Integrated Management of Adolescent and Adult Illnesses
IMCI	Integrated Management of Childhood Illnesses
IPT	Intermittent preventive treatment
LLIN	Long-lasting insecticidal net
MISP	Minimal initial service package
MOH	Ministry of health
MUAC	Mid-upper arm circumference
NGO	Nongovernmental organization
ORS	Oral rehydration solution
PPH	Postpartum haemorrhage
PPP	Pandemic preparedness plan
RDT	Rapid diagnostic test
RUTF	Ready-to-use therapeutic foods
TB	Tuberculosis
TOT	Training of trainers
UN	United Nations
UNICEF	United Nations Children's Fund
WASH	Water, sanitation and hygiene
WHO	World Health Organization

## **Introduction**

### ***Background***

An influenza pandemic occurs when an influenza virus that is efficiently transmissible from person to person appears, against which the human population has limited or no immunity. On average, three pandemics per century have been documented since the 16<sup>th</sup> century, occurring at intervals of 10–50 years. In the 20<sup>th</sup> century, pandemics occurred in 1918, 1957 and 1968. The 1918 pandemic is estimated to have killed more than 40 million people in less than one year. The 1957 and 1968 pandemics were milder, but many countries nevertheless experienced strains on health-care resources. Given the unpredictable behaviour of influenza viruses, neither the timing nor the severity of the next pandemic can be predicted with certainty. If an influenza pandemic virus were to appear again similar to the one that struck in 1918, even taking into account the advances in medicine since then, unparalleled tolls of illness and death could be expected (1). An influenza pandemic has the potential to cause considerable morbidity and mortality for a concentrated period of around 8–12 weeks, with recurrence in waves over 2–3 years.

Communicable diseases are currently the leading cause of preventable deaths worldwide, disproportionately affecting resource-poor settings. Pandemic influenza would add to already unacceptable levels of morbidity and mortality from diarrhoea, malaria, pneumonia, malnutrition, HIV/AIDS and tuberculosis, in addition to causing high maternal and neonatal death rates. A few key conditions cause 90% of deaths from communicable diseases: pneumonia (3.9 million deaths per year); diarrhoeal diseases (1.8 million); and malaria (1.2 million). Malnutrition is a significant contributing factor to this mortality (2).

During a pandemic, these illnesses are likely to increase in resource-poor settings where chronically strained health systems would face even higher patient volumes, severe resource constraints, and absenteeism of critical staff. Therefore strategies are needed to address pandemic influenza within the broad range of health needs, while acknowledging current resource limitations.

### ***Rationale***

In resource-poor settings, pandemic preparedness efforts are best directed broadly, to address not just one potential new illness but also those illnesses currently posing an urgent threat to communities. For example, an integrated preparedness approach might address pneumonia caused by pandemic influenza within a broader framework that focuses on reducing mortality from the common illnesses (e.g. pneumonia, diarrhoea, malaria) responsible for the highest disease burdens.

In addition, existing public health programmes, such as those for tuberculosis, HIV/AIDS, chronic diseases, nutrition and reproductive health, should prioritize activities in order to maintain a minimum level of service during a pandemic, and should assist patients by preparing for a temporary interruption of care and/or supplies.

Many aspects of health-care delivery during an influenza pandemic may be undertaken at the household and community levels. Services provided in the community may help fill gaps during an emergency, reduce demand for health facility-based services, limit exposure to influenza

within the facilities and, perhaps most importantly, are more likely to be accessible to patients. A strengthened community-based approach to common illnesses can benefit communities before, during and after an influenza pandemic.

A supportive policy environment is required to ensure that these measures are in place well before the onset of an influenza pandemic.

### ***Objectives***

- To provide strategies for prevention and treatment, at the community and household levels, of the most likely contributors to mortality from common illnesses during an influenza pandemic.
- To provide recommendations to support a minimum level of continuity for priority public health programmes during a pandemic.

These guidelines are designed primarily for community-level programming in resource-poor settings (urban, semi-urban and rural) but are applicable to a wide range of situations.

### ***Intended audience and purpose***

These guidelines are intended for use by government officials including staff of the ministry of health, nongovernmental organizations (NGOs) involved in health-related activities, Red Cross/Red Crescent societies and United Nations (UN) agencies. Recommendations may be used as a strategic framework for public health authorities, the private sector, health system planners and policy-makers, to approach the care of common illnesses in communities prior to and during a pandemic. They may also be used as the basis for designing public information campaigns promoting behaviours to reduce the risk of transmission in the home as well as encouraging home-based management of certain common conditions.

These guidelines do not contain specific guidance for treatment of patients, but do describe the technical prioritization and decision-making rationale needed to facilitate the training and preparation of community health responders. In areas where community health providers do not exist, these guidelines may be used to advocate for their establishment.

### ***Key principles***

- These guidelines comprise recommendations for the management of selected conditions during an influenza pandemic estimated to last 8–12 weeks, occurring in recurrent waves over 2–3 years.
- The prioritization of key interventions is based on the potential for mortality reduction in the community. These interventions together should constitute a minimum recommended package to be adapted to local needs and requirements.

- The recommended actions should build on existing national community health programmes, services and resources that will shift to an "emergency mode" for the duration of the pandemic.
- Treatment guidelines for acute illnesses are adapted from existing WHO guidelines; existing national guidelines should be respected.
- During a severe influenza pandemic, the over-treatment of illnesses by health providers (resulting from the presumptive treatment of disease syndromes) for a finite time period (8–12 weeks) is anticipated and accepted.
- Practices such as completion of childhood immunizations and antenatal care interventions (tetanus toxoid vaccination, intermittent preventive treatment for malaria, iron and folic acid supplementation, etc.) should be strengthened prior to an influenza pandemic. Implementation of these interventions will be challenging during an influenza pandemic owing to the scarcity of resources (e.g. health staff, medical supplies) and a temporary reduction of these activities is likely.
- Existing human resources at the community level may be trained to function as community health responders (CHRs), in order to address emergency community health needs during an influenza pandemic.
- These guidelines should be considered as an integral part of the community component of the national pandemic preparedness plan (PPP), and should be integrated into other pandemic preparedness activities.
- Implementation of a community-based strategy, identification of community health responders and training should begin immediately at all levels, to complement national PPPs.
- Triggers for full implementation in response to a pandemic should be determined by local factors (e.g. available resources and local epidemiology of the influenza virus) in accordance with national policy.

## **1. In the home**

This chapter describes simple interventions at the household level to prevent the spread of disease and provide basic treatment of ill family members. These interventions do not require assistance from trained health staff or prescription medications, and represent health practices that are applicable to a wide variety of illnesses and scenarios.

### **1.1 Prevention of illness in the home**

WHO and UNICEF recommend 12 key family practices to improve child survival, particularly in relation to communicable diseases (3). Although these universal practices focus on children, many are useful for the prevention of morbidity and mortality from communicable diseases in the community at large.

Two key measures are hand-hygiene and respiratory etiquette. Additionally, during an influenza pandemic the transmission of the influenza virus and other pathogens can be further reduced by distancing ill household members from those that are well.

#### ***1.1.1 Hand-hygiene***

Hand-hygiene is an important measure to prevent the spread of common communicable diseases including acute respiratory tract infections (e.g. influenza) and diarrhoeal diseases. Coughing or sneezing, or contact with faeces or material that contains potentially infectious respiratory or gastrointestinal pathogens, may contaminate hands, clothes or surfaces (tables, doorknobs/handles, plates, cups, etc.).

- Hands should be cleaned by washing with soap and water for 20 seconds before rinsing, and then dried. Alcohol-based preparations (60–80% alcohol content), if used and available locally, are also effective if rubbed on hands until hands are dry. However, there are safety concerns (i.e. accidental ingestion, fire hazards) that must be addressed before alcohol-based handrubs can be recommended for household use.
- Hand-hygiene must be performed before preparing or eating food; after defecation or changing or cleaning a child; after coughing, sneezing or blowing nose; before and after all contact with sick patients; after cleaning or handling the patient's soiled linen and waste; and after handling animals or animal waste.
- Ensuring an adequate supply of soap and water for washing is crucial. In many low-resource settings, ash is used as an inexpensive substitute for soap.

#### ***1.1.2 Respiratory etiquette***

Transmission of community-acquired respiratory infections occurs most commonly through inhalation of respiratory droplets produced by talking, coughing, spitting and sneezing. Respiratory droplets may also survive for brief periods (depending on the ambient temperature) on hands, clothes and surfaces.

Respiratory etiquette, i.e. "control at the source", involves covering coughs or sneezes with a barrier-like tissue/cloth/mask to prevent the dispersion of respiratory droplets into the air and onto surfaces.

- Coughs and sneezes should be covered with a tissue, cloth (including one's sleeve) or mask.
- Respiratory droplets from coughing and sneezing or talking may land on hands, clothes or surfaces. Hands must be washed after direct contact with respiratory secretions and after contact with sick individuals (i.e. after contact with hands or potentially contaminated surfaces).
- Surfaces should be cleaned regularly with soap and water (or other disinfection fluids such as bleach or chlorine) to avoid self-contamination (i.e. touching the mouth, nose or eyes after touching a contaminated area).
- Masks are not recommended for generalized (community) use.

### ***1.1.3 Specific infection-control recommendations in the home during an influenza pandemic (4)***

Community-acquired respiratory infections such as influenza are primarily transmitted from person to person by large respiratory droplets from coughing or sneezing. Because these droplets can travel a distance of 1–2 metres, the risk of transmission is highest when people are in close contact, generally less than 1 metre (or arm's length). In addition to respiratory etiquette and hand-hygiene, the following measures are necessary to minimize the risk of transmission of respiratory infections.

- Shared spaces should be well ventilated. When homes and living areas are well ventilated (e.g. windows open), respiratory droplets are better dispersed and the risk of transmission of respiratory pathogens is reduced. Thus homes should be kept as open as possible to allow good air flow. This is particularly important in crowded settings.
- The number of caregivers in the home should be minimized to avoid further exposure of family members.
- Family members should limit close contact with an ill person as much as possible.
- Ill persons should cover their mouth and nose with a tissue, cloth (or cough or sneeze into sleeve) or a mask when coughing or sneezing, particularly when receiving care, or while in close contact with others.
- In the home, the caregiver of an ill patient should take proper precautions such as safe distancing (as much as possible), improved airflow to the patient area, hand-hygiene, and minimizing overall contact with the ill family member.
- Recommendations for the use of masks for caregivers in the home should be adapted to the level of resources and the ability to safely implement, and should be accompanied by training on safe use and disposal. Use of masks for caregivers in the home might be beneficial in limiting transmission, but is thought to be less important than the other measures mentioned above.
- Persons at increased risk of morbidity and mortality from illnesses should not care for or be in close contact with the ill person. These persons include pregnant women, children aged under 2 years, persons aged over 65 years, and persons with severe chronic diseases or who are immunocompromised.

- Other types of exposure to an ill person such as sharing toothbrushes, cigarettes, eating utensils, drinks and linens should be avoided.
- Cleaning of the environment should include washing shared surfaces and clothes, bedlinen and scarves that have been in contact with a patient's respiratory secretions or stools. Water and soap should be used for washing, and afterwards hands should be washed thoroughly with soap and water (or cleaning fluids such as bleach or chlorine).

## **1.2 Treatment of illness in the home**

Families can be taught to recognize, prevent and treat mild symptoms from common illnesses, including influenza, in the home. With little training and with little or no medications, these common symptoms can be treated with supportive care delivered by a family member.

### ***1.2.1 Fluids and nutrition***

Ensuring adequate nutrition and preventing dehydration are key practices that may contribute to limiting morbidity and mortality from common illnesses, particularly diarrhoea. Families should be instructed to continue to feed and offer additional fluids (including oral rehydration solution (ORS), soups, broths, etc.) when a family member is sick, including continued (and increased) breastfeeding. Family members should be instructed to recognize and manage signs of dehydration (such as weakness, decreased saliva/tears, poor skin turgor and decreased urine output) in the home.

### ***1.2.2 Management of common symptoms***

In addition to increasing fluids and ensuring adequate nutrition, common symptoms such as fever, fatigue, body aches, cough, sore throat and nasal congestion may be managed symptomatically at home with medications such as paracetamol.

### ***1.2.3 Following the advice of health workers***

Families should be encouraged to follow the advice of health workers regarding treatment, follow-up and referral. Follow-up should be conducted at the community level as much as possible. Health facilities are likely to be overwhelmed by patients with influenza-related illnesses, and referral should be weighed against the risk of potential transmission of the virus in the facility setting.

### ***1.2.4 When to seek care***

Families can be taught to recognize when sick family members need treatment outside the home, and to seek care from appropriate providers (see section 2.2.2 below). As mentioned above, messages for health-seeking behaviour should be geared towards seeking care within the community to avoid health-facility visits when possible.

## **2. In the community**

### **2.1 Community mitigation**

In addition to household-level interventions during an influenza pandemic, measures taken by communities, such as social distancing, are important to minimize disease transmission and to reduce or delay disease and death. Specific triggers are not discussed here, as broad implementation of distancing measures must be authorized by local governments according to national pandemic preparedness plans.

#### **2.1.1 Social distancing**

To reduce disease transmission, efforts to reduce crowding and close contact and to minimize gatherings of people are critical (5). Interventions aimed at reducing close physical contact depend on individual behaviour, community mobilization, implementation of national policy, and cultural norms. To be most effective, these interventions should be implemented early, targeted to settings where high transmission is likely (e.g. schools) and layered to provide multiple levels of prevention activities.

- Ill people should be encouraged to remain at home (voluntary isolation) as soon as symptoms develop, and to restrict close contact with others (see section 1.1.3).
- Household contacts of patients with respiratory illness should be encouraged to remain at home (voluntary quarantine) and avoid contact with the patient – unless they are the designated caregiver.
- Gatherings of children (e.g. schools and child-care facilities) may need to be closed, sporting events postponed, etc.
- Contact of adults, such as in the workplace and places of worship, should be reduced as much as is feasible; large public gatherings should be discouraged, including funerals. If funerals and other ceremonial/religious events do proceed, close contact should be minimized.

In addition, population movements to and from communities should generally be discouraged, and movement of both symptomatic patients and staff should be avoided. Food and water distribution should be decentralized as much as feasible to discourage large gatherings of people. One designated healthy member of a household might be assigned to water/food collection. Delivery of goods and services to the place of residence is preferred if possible.

### **2.2 Treatment of acute illness in the community during a pandemic**

This section focuses on the prevention, assessment and treatment of common causes of morbidity and mortality at the community level. This may be performed by CHRs using a few simplified key strategies. These recommendations take into account the increased incidence of fever, pneumonia (including from primary influenza respiratory infections and from bacterial infections

secondary to influenza) and diarrhoea during an influenza pandemic, and assume that health staff and resources will be available to carry out the activities.

This section contains guidance to be adapted to the local context for pneumonia, fever, malaria and diarrhoeal disease (see sections 2.3, 2.4 and 2.5). Guidance for the management of common causes of morbidity and mortality have been adapted from Integrated Management of Childhood Illnesses (IMCI) (6,7) and Integrated Management of Adolescent and Adult Illnesses (IMAI) (8) guidelines.

### **2.2.1 Community health responders**

As the management of acute illnesses moves to the community during a severe influenza pandemic, the responsibility for the prevention, assessment and treatment of these illnesses will be with the CHRs.

#### *Tasks of the CHR*

The primary role of the CHR is to provide a minimum amount of health-care delivery during an influenza pandemic. This can either be in the form of providing health communications or health education messages for families or communities, or delivering direct patient care. The level of implementation will depend on the training of the CHR, as well as the availability of resources at the local level.

Community-level health providers in a variety of contexts can be a valuable part of the health system, and as such are able to increase access to preventive and curative health care for families and communities. Examples include lady health workers (9) in Pakistan, and extension health workers in Ethiopia (10, 11) (see *Boxes 1 & 2*). Community health responder programmes may support national pandemic preparedness by providing key health services in the community. Benefits include improved community access to prevention and treatment programmes and a relative reduction in crowding at health facilities.

#### **Box 1 Lady health workers, Pakistan**

The National Programme for Family Planning and Primary Health Care of the government of Pakistan initiated its Lady Health Worker programme in 1994 to improve child and maternal health in rural areas through increased access to health care for communities. There are over 90 000 lady health workers trained to provide basic health services such as family planning, immunization, hygiene, and maternal and child health. One lady health worker is deployed to provide services for a village of at least 1000 people or 150 households. These health workers are equipped with a kit of supplies for the treatment of diarrhoea, pneumonia, malaria, and contraceptives for family planning. They are also trained to assist with referral to the nearest health facility, when appropriate.

## **Box 2 Health extension workers, Ethiopia**

The government of Ethiopia has instituted a national community-based public health programme to address the low coverage of child and maternal health services. The Health Extension programme was implemented to deliver maternal and child care at the community level. The government is deploying 30 000 female health extension workers (HEWs) to address the major causes of child and maternal mortality, with emphasis on household-level interventions. The programme advocates for access to affordable health care and helps to bridge the gap between the health sector and communities. The HEWs undergo a one-year training programme to provide community-based services for hygiene and sanitation, family health services including maternal and child health, immunizations, reproductive health and nutrition, disease prevention and control, and health education.

### *Selection of CHRs*

As noted previously, the CHR concept should build on and support community-based health-provider programmes already in place, and should not be a parallel or additional system.

Human resource mapping with governments, communities and partners is a useful method to identify CHRs, and should be conducted immediately at the district and community levels. CHRs may include community-level health workers, nurses, midwives, national Red Cross/Red Crescent volunteers, local NGOs, traditional healers, pharmacists/drug sellers, and other appropriate volunteers.

### *Training of CHRs*

The training of CHRs should be adapted to the local context, depending on the availability and level of existing community health-provider networks. *Selection of CHRs, identification and training of trainers (TOT), and local adaptation of training materials should begin immediately in all scenarios.* Some examples of scenarios for training follow (although these do not represent all the possibilities available for scaling up community-based programmes).

- *Scenario 1:*  
CHRs may be identified and trained within existing networks of well-established community-based health providers (see *Boxes 1 & 2*). In this context, training for pandemic response may be integrated immediately into the existing training. Rapid refresher training might then be provided as needed. These health providers might deliver a variety of services during a pandemic, including messages for the prevention of influenza, home-based management of mild symptoms of illnesses by families, and the prevention and treatment of common diseases in the community.
- *Scenario 2:*  
CHRs may be identified and trained within existing networks of community volunteers, such as national Red Cross societies. Although these networks may not necessarily be health-focused, volunteers can be trained to provide messages for the prevention of influenza, home-based management of mild symptoms of illnesses by families, and the

prevention and treatment of selected common diseases (such as diarrhoea) in the community. Training may be integrated immediately into the existing curricula. Rapid refresher training might then be provided as needed.

▪ *Scenario 3:*

In countries that do not have existing networks of community health providers or volunteers, these guidelines may be used to advocate for the establishment of such networks. In this scenario, if home- or community-based management of illness is not possible, community members may be identified to provide simple prevention messages for households and communities.

*Triggers for CHR mobilization*

The identification and training of CHRs, as well as triggers for their mobilization, are activities that should occur as part of the national PPP according to local response capacity. These actions should be very closely linked with other community pandemic preparedness and response activities. A method of mobilizing CHRs in the community should also be clearly established, to allow rapid activation when indicated by national authorities.

*Protection of the CHR*

CHR should receive training for self-protection during an influenza pandemic, and be instructed on techniques of hand-hygiene, respiratory etiquette and safe distancing. They should be given supplies such as soap and masks (or next available option) and be provided with training in their use.

A CHR who develops symptoms of influenza should be treated according to the national protocol and instructed to follow home- and community-based prevention and treatment strategies, as outlined in this document.

*Supervision of CHRs*

CHR should receive regular supervision and mentoring if possible during the pandemic. Supervision should ideally be linked with existing networks of supervision as available.

*2.2.1.1 Community health responder supplies*

To respond rapidly and effectively to priority acute illnesses in the event of an influenza pandemic, the CHR will require a minimum amount of supplies. These may include health education messages and/or medical supplies for the treatment of common illnesses. Resources available to the CHR should also include supplies for the protection of the CHR, as noted above.

The recommended essential medical supplies are intended for use by CHRs to treat pneumonia, fever, malaria and diarrhoea in the community during an influenza pandemic and should be adapted to the local epidemiology and national treatment recommendations. If there is an existing national strategy for community-based management of acute malnutrition (CMAM) in place, the recommended supplies may also include a mid-upper arm circumference (MUAC) strip (to assess acute malnutrition) and ready-to-use therapeutic foods (RUTF).

These guidelines provide examples of basic essential medical supplies for use by the CHR quantified for a population size of 1000 for 12 weeks (see *Annex* for quantities and calculations). Examples of calculations are provided to assist the estimation of needs during a pandemic. It is at the discretion of the ministry of health and partners in each country to conduct a gap analysis of existing supplies and to determine the means and methods of ensuring that these will be available during a pandemic.

Medical supplies for continuing individual treatment for chronic conditions such as HIV/AIDS, TB and chronic diseases are not included in the recommended supplies for the CHR, as these require individualized case management. Recommendations for these programmes are given in chapter 3.

### **2.2.2 Referral of severely ill patients**

Many patients with an acute illness arising during a pandemic can be treated safely in the home and community, and can remain at home during convalescence. Severely ill patients that cannot be effectively treated at home will need referral to a health-care facility for definitive treatment.

Examples of danger signs indicating the need for immediate referral include unconsciousness, convulsions, dehydration, difficulty breathing, and severe chest or abdominal pain.

These danger signs should be communicated in the local language for use at the household and community levels.

CHRs and community-based treatment of illnesses, as an integral strategy within the larger health system, should be closely linked with health facilities to be most effective. Health systems should develop a strategy for patient referral during a pandemic, accounting for the limited availability of resources at receiving health facilities. Regular communications between CHRs and receiving health facilities is critical.

During an influenza pandemic, certain infection-control practices should be followed during transfer of severely ill patients to lower the risk of transmission. Patients with fever and respiratory symptoms such as cough should be instructed as to when and where to seek care, and what infection-control precautions should be followed during travel.

The patient should:

- avoid public transportation if possible;
- perform respiratory etiquette;
- try to stay at least 1 metre away from others when in transit or at the health facility;
- practice hand-hygiene as recommended.

## **2.3 Pneumonia**

Pneumonia is one of the most common causes of morbidity and mortality for adults and children, particularly in low-resource settings (12). The burden of disease is highest in children under 5 years of age; pneumonia is responsible for more childhood deaths than any other illness (13). During an influenza pandemic, cases of pneumonia both from influenza and from secondary bacterial pneumonia may be expected to increase, adding to the high burden of pneumonia already seen in community settings.

Treatment of respiratory infections caused by primary pulmonary infection with pandemic influenza should follow national and WHO clinical treatment guidelines (as these become available). See sections 1.1 and 2.1 for respiratory infection-control recommendations for the household and community.

### ***2.3.1 Vaccines for the prevention of pneumonia***

Vaccines targeting pathogens commonly responsible for community-acquired pneumonia – e.g. *Streptococcus pneumoniae*, *Haemophilus influenzae* type b (Hib) – are commercially available for targeted groups (polysaccharide vaccine for adults and conjugate vaccine for children). If given to target populations prior to the onset of an influenza pandemic, these vaccines may have value in the prevention of bacterial pneumonia, not only for typical community-acquired pneumonia but also for bacterial pneumonias secondary to influenza. Recommendations for the use of these vaccines will be updated as more evidence becomes available.

WHO currently recommends that countries with high rates of mortality in children aged under 5 years and countries with a high prevalence of HIV consider introducing pneumococcal conjugate vaccines into the national immunization programme (14). WHO recommends Hib vaccine for infant immunization in all countries (15).

### ***2.3.2 Assessment of patients with respiratory symptoms***

In the context of a severe influenza pandemic, diagnostic resources will be strained, and differentiating between pathogens responsible for pneumonia will be difficult. An approach to treatment based on respiratory symptoms such as cough, as is currently recommended for adults (IMAI) (8) and children (IMCI) (16) in nonpandemic settings, will be necessary and should be used by CHRs.

During an influenza pandemic, patients who present with cough or difficulty breathing and who also have fast breathing (as defined by IMCI and IMAI) or chest indrawing (in children), can presumptively be classified as pneumonia and managed in a standardized way. IMCI and IMAI guidelines currently recommend using respiratory rate, or chest indrawing for children under 5, to assess for pneumonia in patients with cough or difficulty breathing. Fever in a malaria-endemic area should be treated as malaria in children under five years of age. The symptomatic assessment and treatment of fever is addressed below (section 2.4).

### ***2.3.3 Treatment of patients with pneumonia***

WHO and UNICEF recommend home-based treatment of uncomplicated pneumonia in children by community health workers, using antibiotics (16). This strategy offers a model for the

community treatment of pneumonia in all age groups in the unique context of an influenza pandemic.

### *2.3.3.1 Suggested antibiotic use for pneumonia during an influenza pandemic*

A severe influenza pandemic will be associated with viral, mixed viral/bacterial, and secondary bacterial pneumonias. Antibiotics can be a life-saving intervention for bacterial pneumonias secondary to influenza or community-acquired pneumonia. The goal of providing rapid community-based antibiotic treatment is to reduce the number of cases of severe secondary bacterial infection requiring treatment in a hospital facility.

Recommended antibiotics will depend on the type of bacteria causing the pneumonia, local resistance patterns, and the individual patient contraindications or allergies. Data from past pandemics show that the majority of secondary bacterial pneumonias were associated with Gram-positive cocci such as *Streptococcus pneumoniae* and *Staphylococcus aureus*, and Gram-negative rods such as *Haemophilus influenzae*. Therefore the suggested antibiotic of choice, considering cost, availability and spectrum of coverage, is the oral beta-lactam amoxicillin. Depending on availability, other oral beta-lactams such as amoxicillin/clavulanic acid might be used or, in adults, macrolides such as erythromycin. Erythromycin is recommended for treatment of pneumonia in adults only and is not recommended for treatment of pneumonia in children.

Amoxicillin is effective against many of the common bacterial causes of community-acquired pneumonia and is recommended for inclusion in the supplies for the CHR (see *Annex*). As more specific information regarding the spectrum of pathogens responsible for pneumonia secondary to pandemic influenza emerges, this recommendation may be revised.

## **2.4 Fever and malaria**

Fever will be encountered frequently during an influenza pandemic. For patients presenting with fever and without danger signs, one very important factor in determining treatment will be the local risk of malaria. In areas where *P. falciparum* is present, treatment for malaria is recommended for certain age groups presenting with fever. In areas where there is no risk (or low risk) of *P. falciparum*, patients with fever but without danger signs should be assessed for syndromes commonly presenting with fever (common bacterial and viral syndromes), and for other signs and symptoms suggestive of influenza.

The assessment of risk (including the use of diagnostics) and treatment of malaria will depend on local epidemiology and should follow, and thereby reinforce, national policy and guidelines.

### **2.4.1 Assessment of fever**

Children and adults are considered to have a fever if their body temperature is above 37.5 °C axillary (38 °C rectal). In the absence of a thermometer, fever may be assessed clinically by determining if the patient feels hot to touch. Fever may also be recognized based on recent history of fever (within 48 hours).

#### **2.4.2 Treatment of patients with fever**

Patients presenting with fever (and without danger signs) who live in non-malaria-endemic areas may be treated symptomatically with paracetamol and monitored for the onset of other symptoms (e.g. cough, difficulty breathing) requiring further treatment. In addition to medications such as paracetamol, physical methods such as tepid water sponging may be used to reduce fever. Acetylsalicylic acid preparations such as aspirin are not recommended for use in children and adolescents.

Fever in infants aged less than 2 months may indicate a life-threatening bacterial infection. If febrile, these infants should be referred by the CHR to the health facility for further treatment. Treatment with an initial dose of oral amoxicillin may be given prior to referral, but should not delay referral for definitive care.

#### **2.4.3 Malaria**

Malaria caused by *P. falciparum* is a common and life-threatening disease responsible for over 1 million deaths annually. Transmission of malaria will continue during a severe influenza pandemic, but malaria control programmes will be at risk of disruption, potentially leading to a relative increase in patients presenting with fever. Additionally, an influenza pandemic will increase substantially the number of patients presenting with fever. In malaria-endemic areas, distinguishing fever caused by influenza from fever caused by malaria will be challenging at the community level.

##### **2.4.3.1 Prevention of malaria**

Malaria prevention during an influenza pandemic might include use of long-lasting insecticidal nets (LLINs) and intermittent preventive treatment (IPT) in pregnancy, in accordance with national protocols. A separate LLIN should be used for ill persons (which may further reduce contact with well family members).

##### **2.4.3.2 Assessment of patients with malaria**

The assessment of fever in *P. falciparum* malaria-endemic areas depends on the level of risk, which varies according to endemicity and seasonality. In the event of an influenza pandemic, all *P. falciparum* malaria zones should be considered to be at high risk and managed according to national guidelines. In these areas, diagnosis may be made on clinical grounds but should follow national assessment protocols, including the use of rapid diagnostic tests (RDTs).

RDTs, in the setting of an influenza pandemic, may have value in the evaluation of adults with fever, particularly in areas where malaria is present but where risk is relatively low. In these areas, adults may have lower background levels of immunity to malaria and therefore may be at higher risk of morbidity and mortality. If RDTs are available and are part of the national community-based malaria control programme, supplies should be allocated for the estimated duration of an influenza pandemic (8–12 weeks).

##### **2.4.3.3 Treatment of patients with malaria**

In malaria-endemic areas, WHO recommends the rapid community-based treatment of fever in children as a strategy to reduce malaria deaths in areas where children are at high risk of malaria

(17). Home-based management of malaria (HMM) with antimalarial drugs provides prompt treatment and has demonstrated effectiveness in low-resource settings.

Febrile children should be prioritized for treatment, owing to their elevated risk of malaria morbidity and mortality. Children aged less than 5 years presenting with fever in high malaria-risk areas should be presumptively treated as outlined below. Adults in malaria-endemic areas, who often have some level of immunity and do not suffer the same level of mortality from malaria as children, may be treated symptomatically with paracetamol and monitored for the onset of further symptoms.

The antimalarial regimen for community-based treatment should be determined by the current national treatment protocol. In many malaria-endemic countries, the first-line therapy for uncomplicated malaria is artemisinin-based combination therapy (ACT) such as fixed-dose artemether plus lumefantrine. ACT has been demonstrated to be an effective treatment strategy (18). The choice of treatment regimens, however, should follow national guidelines.

The drug of choice for women in their first trimester of pregnancy is quinine, as the safety of ACT in early pregnancy has not been established. In the second and third trimester, pregnant women may follow the recommendations for ACT use in adults.

For severe malaria, a single dose of rectal artesunate may be administered prior to referral. In the event that referral is not possible, subsequent doses of rectal artesunate after 24 hours should be considered. If improvement is noted following treatment with rectal artesunate, the treatment course may be completed with oral ACT. Additionally in severe cases, sublingual sugar may be given (for presumptive, symptomatic treatment of hypoglycaemia) in support of definitive treatment.

ACT (oral and rectal), quinine and paracetamol are included in the recommended supplies for CHRs (see *Annex*). ACT may be replaced by other antimalarials if necessary to comply with the national protocol.

## **2.5 Diarrhoeal diseases**

Diarrhoea is a major killer globally, responsible for around 2 million deaths annually. The incidence of diarrhoeal diseases may increase during an influenza pandemic owing to decreased access to safe water, inadequate sanitation, poor hygiene practices, interruption of health services, and in some cases secondary to influenza itself. Cases of diarrhoea that arise during an influenza pandemic should be managed in a standardized way (19) using recommended prevention and treatment strategies (20).

### **2.5.1 Prevention of diarrhoea**

In addition to promoting household practices such as hygiene and exclusive breastfeeding (see section 1.1), primary prevention strategies such as access to a sufficient quantity and quality of water, sanitation and safe food practices may significantly decrease the incidence of diarrhoeal diseases.

Prevention activities should be closely linked with the water, sanitation, and hygiene (WASH) sector and include distribution of clean containers for water transport and storage, soap, and chlorine tablets.

### **2.5.2 Assessment of patients with diarrhoea**

Diarrhoea is defined as three or more loose stools in a 24-hour time period. The patient with diarrhoea should be assessed for dysentery by observing for blood in the stool.

### **2.5.3 Treatment of patients with diarrhoea**

Deaths from dehydration caused by diarrhoeal diseases are preventable with rapid identification and hydration of ill patients. Mortality from acute watery diarrhoea is a result of severe dehydration and occurs in all age groups, but particularly in children aged less than 5 years. Patients with diarrhoea and with danger signs require immediate rehydration and referral for definitive treatment. Patients with diarrhoea and without danger signs can be effectively treated at home with rapid administration of oral rehydration solution (ORS) (20) or other fluids. Zinc supplementation for children decreases the duration and severity of an episode of diarrhoea and decreases the risk of a subsequent episode for 2–3 months (21).

Infants with diarrhoea should continue to be breastfed and encouraged to increase intake, and children who are eating complementary foods should continue to be fed as normal throughout a diarrhoeal episode.

### **2.5.4 Bloody diarrhoea**

Patients with acute bloody diarrhoea require treatment with antibiotics. Ciprofloxacin is generally the most appropriate drug for the management of bloody diarrhoea caused by *Shigella dysenteriae* type 1 (the agent that causes dysentery epidemics), irrespective of the age of the patient (21). Multidrug-resistance to most of the low-cost antibiotics (ampicillin, trimethoprim-sulfamethoxazole) is common. Where ciprofloxacin is not available, the choice of specific agents will depend on local antibiotic susceptibility patterns and should be chosen based on national policy (22).

ORS is included in the recommended supplies for the CHR (see *Annex*). As ciprofloxacin is not recommended for inclusion in CHR supplies, referral for definitive treatment will be necessary.

### **3. Recommendations for priority health programmes**

The previous chapters focused on recommendations for prevention and treatment of common, acute illnesses in the community during a severe influenza pandemic. This chapter provides recommendations for priority outpatient programmes – HIV/AIDS, tuberculosis and chronic diseases, acute malnutrition and reproductive health – that will potentially face interruptions during a severe influenza pandemic.

The clinical management of these illnesses at the health facility is not covered in these guidelines.

#### **3.1 HIV/AIDS, tuberculosis (TB) and chronic disease programmes**

Maintaining care and treatment for patients enrolled in established programmes for illnesses such as HIV/AIDS, TB and chronic diseases will be extremely challenging during a pandemic. Resources and personnel will potentially be severely constrained. In addition, the gathering of patients in areas where programmes are being run or medications dispensed may increase the risk of influenza transmission and should generally be avoided. Therefore, the recommended strategy is to prepare patients for a possible interruption of programme activities for 8–12 weeks.

Many patients enrolled in HIV/AIDS, TB and chronic disease programmes will be very knowledgeable about their drugs, the dosing regimen and side-effects. Health providers should counsel the patient and family in advance of a foreseeable disruption of health services to acquire the necessary medications and supplies.

For treatment programmes such as antiretroviral therapy (ART) for HIV/AIDS and anti-TB medications in the case of TB, the priority should be uninterrupted treatment for established patients. The strategic goals are to avoid morbidity and mortality, prevent drug resistance, and potentially reduce exposure and risk of transmission of influenza. Dispensing an 8–12 week supply of medications is currently recommended in acute emergencies and is also applicable for influenza pandemic planning (23, 24). All aspects of case management should follow national treatment and control programme directives.

Chronic conditions, including cancer, cardiovascular diseases, diabetes, chronic respiratory disease and neuropsychiatric disorders, account for an increasing proportion of the disease burden worldwide (25), currently accounting for 70% of the global burden of disease and 60% of mortality (26). National programmes should therefore consider the burden of chronic diseases in their area and options for the continuation of treatment during programme interruptions.

#### ***Considerations for HIV/AIDS, TB and chronic disease programmes***

Severe disruptions to usual patient care, including routine diagnosis and management, will necessitate adaptations to patient management, including to:

- arrange with patients in advance for necessary medications to cover a possible 8–12 week interruption in supply; or dispense an 8–12 week supply of necessary medications at the beginning of the pandemic period;
- ensure that patients understand that they should continue to take medications as prescribed, despite possible programme interruptions;
- provide necessary preventive measures and home-based diagnostic tools (e.g. condoms for prevention of HIV, home-glucose or blood-pressure monitors according to the national protocol and resource availability);
- discuss options of referral for acute medical emergencies.

### **3.2 Acute malnutrition programmes**

Acute malnutrition is a major contributing factor to morbidity and mortality from common communicable diseases in children aged under 5 years (27). Communicable diseases also contribute to malnutrition. During an influenza pandemic, malnutrition may increase due to lack of access to foods (both locally-produced and imported), increased incidence of influenza and other common illnesses, and decreased access to existing food distribution and feeding programmes. Access to malnutrition treatment programmes may also be compromised.

#### **3.2.1 Prevention of malnutrition**

Key family practices included in chapter 1 and treatment of common illnesses discussed in chapter 2 should be encouraged in order to prevent malnutrition. Pandemic preparedness planning in the health sector should be closely linked with food security to ensure that appropriate food is accessible, that supplementary feeding and food distribution programmes continue for target populations, and that infants are fed appropriately. These programmes may need to be adjusted to avoid large gatherings and the attendant risk of influenza transmission.

#### **3.2.2 Assessment of malnutrition during an influenza pandemic**

In areas without established programmes for treatment, community-based assessment for malnutrition is not recommended. Where treatment is available, community-based assessments of malnutrition may be carried out by community-based health providers or trained CHRs in place of health-facility or health-post visits. Severe acute malnutrition may be assessed using the mid-upper arm circumference (MUAC) (for children 6 months to 5 years), assessment of swelling of both feet (oedema), and inspection for visible wasting.

#### **3.2.3 Treatment of malnutrition during an influenza pandemic**

In areas with a high prevalence of acute malnutrition, community-based management of acute malnutrition (CMAM) programmes increase access to curative care of acute malnutrition at the community level. Existing CMAM programmes should be supported to allow continuation (with adjustments in delivery) during an influenza pandemic if possible. New CMAM programme initiation during an influenza pandemic is not recommended.

Existing CMAM programmes should separate patients to avoid exposing acutely malnourished children to influenza patients. To avoid overwhelming health facilities, the frequency of follow-up visits to health facilities should be decreased or temporarily stopped. Follow-up visits may be

arranged at a much-reduced frequency in the community. Children that are already being treated for severe acute malnutrition with ready-to-use therapeutic foods (RUTF) can receive up to 8 weeks supply of RUTF if no (or little) follow-up at the community level is possible. Where available, locally-produced RUTF is preferred to imported RUTF, to simplify logistic considerations.

Because children with moderate acute malnutrition might be at high risk of deterioration during an influenza pandemic, supplementary feeding programmes should continue if possible (distribution methods should be altered to avoid large gatherings). The community-based provider or CHR may be able to assist in distribution to affected households.

Inpatient therapeutic feeding programmes for severely malnourished populations ideally should continue throughout the pandemic, although feasibility will depend on availability of resources locally. Where they continue to function, therapeutic feeding centres in health facilities should contain a separate isolation area for patients with suspected influenza.

Recommendations for CHR supplies should include MUAC strips and RUTF only in areas where CMAM is the national policy.

### **3.3 Reproductive health programmes**

In resource-poor settings, maternal and neonatal illnesses are the leading causes of death in women of reproductive age and in infants, respectively (28, 29). Priority prevention and treatment programmes for reproductive health, if disrupted, would result in decreased access to interventions to reduce maternal and neonatal mortality.

Key reproductive health interventions during a pandemic should prioritize safe delivery, acute care of the newborn and family planning (such as the provision of 8–12 weeks of usual contraceptives). These interventions are critical components of the Minimal Initial Service Package (MISP) for reproductive health, which is currently recommended for implementation in the acute phase of an emergency (30).

The WHO-recommended interventions for improving maternal and newborn health include key activities that can be carried out through outreach home care by health workers with midwife skills (31). These interventions address common causes of maternal and neonatal mortality. Managing pregnancy at the community level during an influenza pandemic may improve access to care and will decrease potential contact of pregnant women with influenza patients.

Existing programmes should plan for the community-based management of women expected to deliver in the estimated 8–12 week time frame. This includes human-resource mapping to ensure the presence of skilled birth attendants, and ensuring that relevant medical supplies are available at the community level. Redistribution of facility-level skilled birth attendants to the community, where feasible, may augment the number of community-based midwives.

#### **3.3.1 Key interventions for safe delivery**

The majority of maternal deaths are caused by complications of delivery. These include postpartum haemorrhage (PPH), hypertension, and convulsions during pregnancy (eclampsia) (32).

Priority community-based interventions to reduce maternal mortality during an influenza pandemic include the prevention of PPH through the active management of the third stage of labour<sup>1</sup> (33), provision of a clean birth kit<sup>2</sup> to prevent acute infections from unclean delivery, and the early detection and referral of complications.

### **3.3.2 Key interventions for essential newborn care**

Neonatal deaths (within the first 28 days from birth) account for up to two thirds of infant deaths and are one of the leading causes of mortality of children under the age of 5 worldwide. The majority of this mortality is attributed to sepsis, birth asphyxia and complications of premature birth.

Priority interventions that can be implemented at the community level to reduce neonatal mortality include interventions to prevent asphyxia, infections, hypothermia and hypoglycaemia, with emphasis on airway aspiration and resuscitation of the newborn, clean cord care, infant warming (skin-to-skin contact, covering the baby and baby's head and not bathing the baby until after 24 hours); early (within the first hour of birth) and exclusive breastfeeding; and detection, treatment and referral of ill newborns.

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<sup>1</sup> Active management of the third stage of labour includes administration of 10 IU oxytocin IM, early cord clamping and cutting, controlled cord traction, and uterine massage.

<sup>2</sup> A clean birth kit includes a clean razor, two pieces of clean string, a plastic sheet, one bar of soap and a clean cloth.

## Annex

### Community health responder supplies for the treatment of acute illness

The upper limit of the estimation of the number of persons affected by pandemic influenza who will seek care during an 8–12 week pandemic wave is 300/1000 (see *Table 1*).

**Table 1: Estimated number of persons affected by pandemic influenza per 1000 population for resource-poor settings**

Description	Estimated during pandemic	Estimates for crowded, low-resource settings	Number of persons affected over a 2–3 month pandemic wave
Ill from influenza	15–35% (of the general population)	Up to 50–60% (of the general population)	Up to 500–600
Secondary bacterial pneumonia (needing antibiotics)	2.5–5% (of those ill)	5–10% (of those ill)	25–60
Health-care seeking for influenza (outpatients)	30–50% (of those ill)	30–50% (of those ill)	150–300

The number of visits due to illnesses not directly associated with influenza is difficult to predict; however, the Interagency Emergency Health Kit (IEHK) can be used as a planning basis. The basic unit of the IEHK includes medications for the treatment of common illnesses in a population of 1000 for the 12-week period.

Additional supplies to cover patients whose illnesses are directly or indirectly attributable to pandemic influenza should be added to the quantity recommended by the IEHK; the exact amount and type of medications necessary will depend on local treatment policy (see *Table 2*).

**Table 2: Estimated CHR supplies per 1000 population**

Medication	Unit	Quantities in IEHK	Additional quantities estimated for influenza pandemic	Total
Amoxicillin	Tablets 250 mg	3000	5000	8000
Paracetamol	Tablets 500 mg	2000	5000	7000
ORS	Sachets for 1 litre	200	200	400
Artemether 20 mg + lumefantrine 120 mg	6 x 1 tablet	5 boxes	2 boxes	7 boxes
Quinine sulphate	Tablets 300 mg	2000	600	2600

### Sample calculations

#### *Assumptions*

- Up to 300 patients per 1000 population will present with symptoms of influenza in addition to the number of usual consultations.
- One visit per person over the 8–12 week period of a wave of pandemic influenza is estimated.
- Approximately half of the population is aged  $\leq 15$  years.
- Standard guidelines for the treatment of syndromes are used.
- The presumptive treatment of disease syndromes due to diagnostic challenges at the community level may result in overtreatment.

#### *Example amoxicillin*

1. IEHK: quantity of amoxicillin, 250 mg tablets: 3000 tablets.
2. Estimated 300 new consultations for symptoms of pneumonia:
  - a. age  $> 15$  years: 500 mg x 2 per day for 5 days (20 x 250 mg tablets) x 150\* = 3000 tablets;
  - b. age  $\leq 15$  years: 375 mg x 2 per day for 5 days (15 x 250 mg tablets) x 150 = 2250 tablets.\*\*
3. IEHK: 3000 tablets + 5250 (rounded to 5000) tablets = 8000 tablets of amoxicillin 250 mg for 12 weeks.
  - \* Assuming that half of the 300 consultations are over 15 years old.
  - \*\* The dosage regime for ages 12 months to 14 years has been used, overestimating the number of tablets.

***Example paracetamol***

1. IEHK, quantity of paracetamol 500 mg tablets: 2200 tablets.
2. Estimated 300 new consultations for fever, and/or symptoms of influenza:
  - a. age > 15 years: 500 mg, 2 tablets x 4 per day for 3 days (24 tablets) x 150 = 3600 tablets;
  - b. age 5–14 years: 500 mg x 4 per day for 3 days (12 tablets) x 90 consultations\* 5–14 years of age = 1080 tablets;
  - c. age 2 months to 4 years: 500 mg tablets, ½ tablet x 4 per day for 3 days (6 tablets) x 60 consultations 2 months to 4 years\*\* = 360 tablets.
3. IEHK: 2200 (rounded to 2000) tablets + 5040 (rounded to 5000) tablets = 7000 tablets of paracetamol 500 mg for 12 weeks.
  - \* Assuming 30% of the 300 consultations are between the ages of 5 and 14 years.
  - \*\* Assuming 20% of the 300 consultations are aged under 5 years.

***Example artemether 20 mg + lumefantrine 120 mg***

1. IEHK quantity of artemether 20 mg + lumefantrine 120 mg: 5 boxes of 6 x 1 tablet (30 treatments) for children ≤ 5 years of age.
2. Estimated 60 new consultations\* for children ≤ 5 years of age with fever in malaria-endemic regions.
3. Dosage of artemether 20 mg + lumefantrine 120 mg; 1 tablet x 2 per day for 3 days for children ≤ 5 years of age (or 5–14 kg).
4. IEHK: 5 boxes of 30 treatments of 6 x 1 tablets + 2 boxes of 30 treatments of 6 x 1 tablet = 7 boxes of artemether 20 mg + lumefantrine 120 mg 6 x 1 tablet.
  - \* Assuming that 20% of the 300 consultations are ≤ 5 years of age.

***Example quinine sulphate***

1. IEHK, quantity of quinine sulphate 300 mg: 2000 tablets.
2. Estimated 15\* new pregnant consultations for fever in malaria-endemic regions.
3. Dosage of quinine sulphate, 300 mg tablets: 2 tablets x 3 per day for 7 days (42 tablets), for 15 new consultations = 630 tablets.
4. IEHK: 2000 tablets + 630 (600 rounded) tablets = 2600 tablets.
  - \* Assuming that 5% of the 300 consultations for fever may be pregnant.

The recommendations for supply of ORS should allow for the treatment of increased diarrhoea cases and management/prevention of dehydration for ill patients. This may require a doubling of the IEHK quantity of ORS.

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