



**Kingdom of Bahrain
Ministry of Health
Public Health Directorate**



قسم مكافحة الأمراض
Diseases Control Section

The Contingency Plan

For the highly Pathogenic Avian Influenza (H5N1)

Guidelines for Health Care Facilities 2005

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CONTINGENCY PLAN FOR PANDEMIC INFLUENZA November 2005

The aim of this document is to provide a detailed guide for Bahrain's response to a pandemic influenza threat. This plan targets a wide range of people who will be involved in planning and responding to an influenza pandemic: health planners, public and clinical health care providers, border workers, health departments, essential service providers, and those involved in the media and communications.

Abbreviations and acronyms used in pandemic influenza response operations

A/E	Accident Emergency
BQIS	Bahrain Quarantine and Inspection Service
CDN	Communicable Diseases Network
CDU	Communicable Diseases Unit
COMS	Chief of Medical Staff
CQO	Chief Quarantine Officer
DMM	Directorate of Material Management
DOPR	Director of Public Relations
HCW	Health Care Workers
ICD-10	International Classification of Diseases No 10
ICU	Intensive Care Unit
ILI	Influenza-like illness
M.O.H	Ministry of Health
MOFA	Ministry of Foreign Affairs
NEMRN	National emergency media response network
NAD	Nucleic acid detection
NMS	National Medicines Stockpile
NNDSS	National Notifiable Diseases Surveillance System
OCRS	Outbreak case reporting system
PHD	Public Health Directorate
PHR	Public Health Relations
PPE	Personal protective equipment
WHOCC	World Health Organization Collaborating Centre for Reference and Research on Influenza
MOHAFC	Ministry of Health Avian Flu Committee

FOREWORD

The prospect of an influenza pandemic is real. It is impossible to predict when a pandemic might occur but it is certainly possible to be prepared. The Government has already put in place measures to ensure BAHRAIN is equipped to respond. Among them is a comprehensive guide for the people who will be involved in BAHRAIN's response to any outbreak.

Since bird flu broke out in late 2003, a significant part of the BAHRAIN Government health policy has focused on a response plan to a pandemic outbreak. The Government has funded measures such as the National Medicines Stockpile of antiviral drugs and protective equipment; The Government has already established a national joint committee for Avian influenza pandemic between Ministry of Health and Ministry of Agriculture.

The Diseases Control Section at the Public Health Directorate developed a National Management Plan for Pandemic Influenza 2005 to build national preparedness and capacity for immediate and effective response to any pandemic alert.

The plan centers on the core strategies of containment and maintenance of essential services. This means that, in the early stages, efforts will be concentrated on containing the pandemic to 'buy time' to enable vaccine manufacturers to produce the pandemic influenza vaccine. At best estimates, it will be at least 3 months before a vaccine can be safely given.

If the pandemic becomes widespread, efforts will concentrate on maintaining essential services and, in particular, keeping health services functioning until a pandemic vaccine becomes available.

It is important that Bahraini community has confidence in the decision making processes at all stages. The publication of this interim National Management Plan for Pandemic Influenza 2005 provides a timely opportunity for stakeholders to consider these issues and to contribute to Bahrain's capacity to respond in the event of a pandemic threat.

BAHRAIN is well prepared as any other country to respond to a pandemic flu.

Dr. Nada Haffadh
Minister of Health
2005

Introduction:

***The disease in birds: impact and control measures*¹⁻¹⁵**

Influenza pandemics have historically taken the world by surprise, giving health services little time to prepare for the abrupt increases in cases and deaths that characterize these events and make them so disruptive. Vaccines - the most important intervention for reducing morbidity and mortality – were available for the 1957 and 1968 pandemic viruses, but arrived too late to have an impact. As a result, great social and economic disruption, as well as loss of life, accompanied the three pandemics of the previous century.

Avian influenza is an infectious disease of birds caused by type A strains of the influenza virus. The disease, which was first identified in Italy more than 100 years ago, occurs worldwide.

All birds are thought to be susceptible to infection with avian influenza, though some species are more resistant to infection than others. Infection causes a wide spectrum of symptoms in birds, ranging from mild illness to a highly contagious and rapidly fatal disease resulting in severe epidemics. The latter is known as “highly pathogenic avian influenza”. This form is characterized by sudden onset, severe illness, and rapid death of affected birds/flocks, with a mortality rate that can approach 100%.

All known subtypes of influenza A virus cause infection in aquatic avian species, thus providing an extensive reservoir of influenza viruses. From time to time these viruses spill over from this natural reservoir causing outbreaks of disease in other species.

Migratory waterfowl – most notably wild ducks – are the natural reservoir of avian influenza viruses, and these birds are also the most resistant to infection. Domestic poultry, including chickens and turkeys, are particularly susceptible to epidemics of rapidly fatal influenza.

Direct or indirect contact between domestic flocks and wild migratory waterfowl has been implicated as a frequent cause of epidemics in poultry populations. It is generally accepted that wild birds act as reservoirs for many of the avian influenza subtypes which can be transmitted to domestic populations of birds and to commercial poultry.² Live bird markets can also play an important role in the spreading avian influenza viruses.

The quarantining of infected farms and destruction of infected or potentially exposed flocks are standard control measures aimed at preventing spread to other farms and eventual establishment of the virus in a country’s poultry population. Apart from being highly contagious, avian influenza viruses are readily transmitted from farm to farm by mechanical means, such as by contaminated equipment, vehicles, feed, cages, or clothing. Highly pathogenic viruses can survive for long periods in the environment, especially when temperatures are low. Stringent sanitary measures on farms can, however, confer some degree of protection.

Highly pathogenic strains of avian influenza virus, for example H5N1, have crossed from birds to humans and are known to cause fatal disease. Reports of avian to human transmission continue to be reported.³

Goal and objectives of the plan

a) The Goal

To provide a detailed guide for the Country response to a pandemic influenza threat.

This plan targets the wide range of people who will be involved in planning and responding to an influenza pandemic: health planners, public and clinical health care providers, health departments, essential service providers, border workers and those involved in the media and communications. As such, it is intended to provide national guidance for key stakeholders in developing and operationalising responses across the public and private sectors at all levels to ensure Bahrain is optimally prepared and has the capacity to respond to a pandemic threat.

The National Management Plan for Pandemic Influenza is designed to be used at all times from preparedness to pandemic phases, as preparedness is essential for responding to a pandemic event. Therefore, there are actions that can be taken at all phases in the plan. The phases in the plan are consistent with the revised World Health Organization pandemic plan 2005.¹⁵

b) The objectives:

The objectives of the strategic actions correspond to the principal opportunities to intervene and are likewise phase 15

Phase: pre-pandemic

1. Reduce opportunities for human infection
 2. Strengthen the early warning system
-

Phase: emergence of a pandemic virus

3. Contain or delay spread at the source
-

Phase: pandemic declared and spreading internationally


4. Reduce morbidity, mortality, and social disruption
5. Conduct research to guide response measures

Overall objectives:

- ensure adequate surveillance is in place to detect an emerging threat from the outset.
- adequately prepare Bahrain to enable the smooth and timely implementation of the specific activities required in the various phases of pandemic planning.
- ensure rapid characterisation of a new virus subtype and early detection, notification and response.
- delay entry of a pandemic virus into Bahrain.
- limit pandemic spread through early containment measures to buy time to implement preparedness measures, including vaccine procurement.

- limit morbidity and mortality arising from infection with a pandemic strain.
- ensure maintenance of essential services during a pandemic.
- provide the public, health care workers, the media and other service providers with up to date, authoritative and readily available information at all stages.
- reduce the stress on the health system and other industries as a result of a pandemic through early identification of additional resources required and implementation of public health and social measures aimed at slowing spread of the virus through the community.

Phases in the plan

Period	Global phase	Bahrain Phase	Description of phase	Main strategy
Inter-pandemic		Bah 0	No circulating animal influenza subtypes in Bahrain that have caused human disease.	
	1	Overseas 1	Animal infection overseas: the risk of human infection or disease is considered low.	
		Bah 1	Animal infection in Bahrain: the risk of human infection or disease is considered low.	
	2	Overseas 2	Animal infection overseas: substantial risk of human disease.	
		Bah 2	Animal infection in Bahrain: substantial risk of human disease.	
	Pandemic alert	3	Overseas 3	
Bah 3			Human infection in Bahrain with new subtype(s) but no human to human spread or at most rare instances of spread to a close contact.	
4		Overseas 4	Human infection overseas: small cluster(s) consistent with limited human to human transmission, spread highly localised, suggesting the virus is not well adapted to humans.	
		Bah 4	Human infection in Bahrain: small cluster(s) consistent with limited human to human transmission, spread highly localised, suggesting the virus is not well adapted to humans.	
5		Overseas 5	Human infection overseas: larger cluster(s) but human to human transmission still localised, suggesting the virus is becoming increasingly better adapted to humans, but may not yet be fully adapted (substantial pandemic risk).	
		Bah 5	Human infection in Bahrain: larger cluster(s) but human to human transmission still localised, suggesting the virus is becoming increasingly better adapted to humans, but may not yet be fully adapted (substantial pandemic risk).	
Pandemic	6	Overseas 6	Pandemic overseas- not in Bahrain: increased and sustained transmission in general population.	Maintain essential services
		Bah 6a	Pandemic in Bahrain: localised (one area of country).	
	Bah 6b	Pandemic in Bahrain: widespread.		
	Bah 6c	Pandemic in Bahrain: subsided.		
	Bah 6d	Pandemic in Bahrain: next wave.		

Two phases may be referred to simultaneously, for example, one phase for what is occurring overseas and one phase for Bahrain. The phases are intended to guide actions rather than be a strict categorization of the events.

Description of Bahrain phases.

a) Interpandemic period

Phase Bah 0: No new influenza virus subtypes have been detected in humans. An influenza virus subtype that has caused human infection or disease is not present in animals in Bahrain.

Rationale: Influenza subtypes that have caused human infection and/or disease may not always be present in wild birds or other animal species in Bahrain. The WHO global phases do not include a Phase 0 because globally, it is likely that influenza sub-types that have caused human infection and/or disease will always be present in wild birds or other animal species, but this is not the case in Bahrain. Lack of recognised animal or human infections does not mean that no action is needed. Preparedness requires planning and action in advance.

Phase Overseas 1: No new influenza subtypes have been detected in humans. An influenza virus subtype that has caused human infection or disease is present in animals overseas. The risk of human infection or disease is considered to be low.

Phase Bah 1: No new influenza virus subtypes have been detected in humans. An influenza virus subtype that has caused human infection or disease is present in animals in Bahrain. The risk of human infection or disease is considered to be low.

Rationale: Although the risk of human infection or disease is considered low, there are actions that differentiate this phase from Phase Bah 0. (For example, enhanced surveillance in animals).

Phase Overseas 2: No new influenza virus subtypes have been detected in humans. However, the presence of a circulating animal influenza virus subtype overseas poses a substantial risk of human disease.

Phase Bah 2: No new influenza virus subtypes have been detected in humans. However, the presence of a circulating animal influenza virus subtype in Bahrain poses a substantial risk of human disease.

Rationale: Presence of animal infection caused by a virus of known human pathogenicity may pose a substantial risk to human health and justify public health measures to protect persons at risk.¹²

b) Pandemic alert period

Phase Overseas 3: Human infection(s) with a new subtype overseas, but no human to human spread, or at most rare instances of spread to close contact.

Phase Bah 3: Human infection(s) with a new subtype in Bahrain, but no human to human spread, or at most rare instances of spread to a close contact

Rationale: The occurrence of cases of human disease increases the chance that the virus may adapt or re-assort to become transmissible from human to human, especially if coinciding

with a seasonal outbreak of influenza. Measures are needed to detect and prevent spread of disease. Rare instances of transmission to a close contact- for example, in a household or health care setting may occur, but do not alter the main attribute of this phase, ie that the virus is essentially not transmissible from human to human.

Examples:

1. One or more unlinked human cases with a clear history of exposure to an animal source/ non-human source (with laboratory confirmation in a WHO Collaborating Centre).
2. Rare instances of spread from a case to close household or unprotected healthcare contacts without evidence of sustained human to human transmission.
3. One or more small independent clusters of human cases (such as family members) who may have acquired infection from a common source or the environment but for whom human to human transmission cannot be excluded.
4. Persons whose source of exposure cannot be determined, but are not associated with clusters or outbreaks of human cases.

Phase Overseas 4: Small cluster(s) consistent with limited human to human transmission overseas but spread is highly localised, suggesting the virus is not well adapted to humans.

Phase Bah 4: Small cluster(s) consistent with limited human to human transmission in Bahrain but spread is highly localised, suggesting the virus is not well adapted to humans.

Rationale: Virus has increased human to human transmissibility but is not well adapted to humans and remains highly localised, so that its spread may possibly be delayed or contained.

Examples:

1. One or more clusters involving a small number of human cases, i.e. if a cluster of < 25 cases with the cluster lasting <2 weeks.
2. Appearance of a small number of human cases in one or several geographically-linked areas without a clear history of a non-human source of exposure, for which the most likely explanation is considered to be human to human transmission.

Phase Overseas 5: Larger cluster(s) but human to human spread still localized overseas, suggesting that the virus is becoming increasingly better adapted to humans, but may not yet be fully transmissible (substantial pandemic risk).

Phase Bah 5: Larger cluster(s) but human to human spread still localised in Bahrain, suggesting that the virus is becoming increasingly better adapted to humans, but may not yet be fully transmissible (substantial pandemic risk).

Rationale: The virus is more adapted to humans, and therefore more easily transmissible among humans. It spreads in larger clusters, but spread is localised. This is likely to be the last chance for massive coordinated global intervention, targeted to one or more foci, to delay or contain spread. In view of possible delays in documenting spread of infection during Phase 4, it is anticipated that there would be a low threshold for progress to Phase 5.

Examples:

1. Ongoing cluster-related transmission but total number of cases is not rapidly increasing, i.e. if a cluster of 25-50 cases with the cluster lasting from 2-4 weeks.

2. Ongoing transmission but cases appear to be localized .
3. In a community known to have a cluster, appearance of a small number of cases whose source of exposure is not readily apparent (eg beginning of more extensive spread).
4. Appearance of clusters caused by same or closely related virus strains in one or more geographic areas without rapidly increasing numbers of cases.

c) Pandemic period

Phase Overseas 6: Increased and sustained transmission in the general population overseas.

Rationale: Major change in global surveillance and response strategy, since pandemic risk is imminent for all countries. The national response is determined primarily by the disease impact within the country.

Phase Bah 6a: Increased and sustained transmission in the general population in Bahrain, but cases are still localised to one area of the country.

Phase Bah 6b: Increased and sustained transmission in the general population in Bahrain and cases are occurring in multiple areas of the country.

Phase Bah 6c: Increased and sustained transmission in the general population in Bahrain but the number of cases is subsiding.

Phase Bah 6d: The next wave of the pandemic has reached Bahrain indicated by an increase again in the number of cases.

Rationale: Although a pandemic has been declared, because Bahrain is not as densely populated as other countries, there still exists the opportunity to try to contain the spread of the pandemic in the later phases.

Post-pandemic period

A return to the inter-pandemic period (the expected levels of disease with a seasonal strain) follows, with regularly updated planning. An intensive phase of recovery and evaluation may be required.

BUILDING BLOCKS FOR PANDEMIC

PLANNING

A critical part of pandemic planning is ensuring that the building blocks are in place ahead of an actual pandemic threat. Thus, Bahrain's preparedness for a pandemic rests on a number of major strategic measures including:

- ensuring Bahrain has the laboratory capacity and capability to allow rapid and accurate identification of emerging subtypes, including appropriate biosecure facilities and national guidelines for the handling and testing of specimens
- instituting and maintaining appropriate national surveillance activities to ensure early detection of virus subtypes in both animal and human populations
- consideration of border control measures with the aim of preventing pandemic spread into Bahrain
- consideration of social distancing measures that may need to be implemented in a pandemic
- building a pandemic therapeutic "armamentarium" through development of the National Medicine Stock Bile (NMS) containing antiviral agents, Personal Protection Equipment (PPE) and other equipment required in a pandemic
- ensuring health services can be adequately maintained in the face of a pandemic
- preparedness for pandemic vaccination development and administration
- development and implementation of a detailed communications strategy for all phases
- providing advice and assistance in the event of a pandemic to Bahrainis travelling or residing overseas
- maintaining the A\E room to facilitate a rapid response to national health emergencies
- ensuring that appropriate decision making bodies are in place and have the necessary expertise and authority to make decisions quickly and effectively in the face of rapidly developing situations
- ensuring an adequate civil emergency response can be implemented in region.
- developing the evidence base for decisions, such as implementation of quarantine measures, that need to be considered in a pandemic, including targeted research projects to address gaps in current knowledge
- close collaboration with regions to develop action plans in all jurisdictions that achieve national consistency and coordination of effort.

SURVEILLANCE

1. Monitoring influenza-like illness (ILI)

There are 21 health centers practice surveillance schemes that monitor influenza

2. Surveillance of laboratory-confirmed influenza thorough the National Notifiable Diseases Surveillance System (NNDSS)

Laboratory confirmed influenza is a notifiable disease in all Bahrain and data are sent daily to communicable diseases unit

3. Laboratory surveillance

Surveillance of influenza isolates and identification of novel strains will occur through the coordination of public health laboratories and the WHOCC for Influenza. Pandemic strains will be isolated at the WHOCC.

4. Data collection on possible and confirmed cases of pandemic influenza

The MOH Ministry of Health has a web-based database for collection of demographic, clinical, laboratory and epidemiological data on each possible and confirmed human case of pandemic influenza. The collection of data will be directed by the WHO recommended case definition which will be adapted for emerging clinical features of pandemic influenza, the phases of the pandemic and for Bahrain requirements.

5. Passive reporting of unusual clusters of ILI or acute respiratory disease

Hospitals and health centers will be encouraged to report any unusual clusters of cases of influenza-like illness or other acute respiratory disease to Communicable Diseases Unit (CDU) The significance of these clusters will be determined.

6. Border screening for ILI in travellers from pandemic influenza affected regions

Passengers with fever arriving from affected countries will be referred for examination by nurses and, if necessary, by the CQO. Suspect cases may be hospitalised for examination and management. Health declaration cards for incoming passengers will be implemented to detect human cases of avian influenza once human to human transmission has been confirmed

7. Hospital based surveillance during pandemic, including mortality

Hospital surveillance will cover a range of surveillance activities, shown in the following table. These activities will be undertaken during the pandemic phases only, with the exception of detection of ILI in health care workers (including laboratory workers), which will occur in the pandemic alert phases.

Hospital surveillance during pandemic phases

Type of hospital	Objectives	Data, type and frequency
Surveillance A/E presentations of influenza-like illness and acute respiratory illness	To monitor presentations of ILI as a proxy for influenza activity To assess hospital workloads	Rate of ILI as presenting symptom / 1,000 presentations; daily.
Admissions of influenza and pneumonia cases	To assess admission rates as a proxy measure of respiratory disease To assess hospital workloads	Admissions with diagnosis ICD-10 J10 To J18 per day
ICU bed occupancy by influenza and pneumonia cases	To assess admission rates as a proxy measure of severe respiratory disease To assess critical hospital capacity	Daily ICU bed occupancy by patients with primary diagnosis ICD-10 J10 - J18.
Deaths in hospital from influenza or Pneumonia	To rapidly assess mortality rates in a pandemic	Weekly collation of deaths.
Health care worker (HCW) ILI or respiratory illness	To assess HCW (including laboratory workers) at risk of infection with pandemic influenza	Presentation to staff clinics of ILI Rates of ill staff at designated 'fever' Hospitals
HCW absenteeism	To assess impact of pandemic influenza on hospital services to inform redeployment of HCW to cover shortages	Daily absenteeism rate (3 consecutive days or more) per 100 employees

8. Studies to measure effectiveness of, and adverse events associated with, antivirals and vaccines

Studies will be undertaken in HCW as a proxy for all at risk groups, given HCW are a readily accessible population group. Vaccine effectiveness of pandemic vaccines will be assessed by studies in health care workers. *In vitro* testing of the effectiveness of antiviral drugs against circulating pandemic influenza strains will be carried out throughout the pandemic. Adverse events associated with consumption of antiviral drugs or administration of new influenza vaccines will be measured in health care workers receiving these prophylactics.

9. Monitoring absenteeism of essential services personnel

Essential service will monitor absenteeism rates to ensure adequate staffing to maintain services throughout a pandemic

Surveillance activities in an influenza pandemic

Inter- pandemic

WHO Phase	Bah Phases	Description of phases	Surveillance objectives	Surveillance activities
0	Bah 0	No circulating animal influenza subtypes in Bahrain that have caused human disease	To detect unusual clusters or cases that may be due to a new influenza virus	<p>Conduct routine influenza surveillance National reports from government and private hospitals and clinics</p> <p>Undertake laboratory surveillance to monitor influenza virus isolates and detect local novel influenza strains</p>
1	Overseas 1	Animal infection overseas: the risk of human infection or disease is considered low	As above	<p>Conduct routine influenza surveillance through the health facilities</p> <p>Undertake laboratory surveillance to monitor influenza virus isolates and detect local novel influenza strains in travellers returning from high risk areas overseas</p>
	Bah 1	Animal infection in Bahrain: the risk of human infection or disease is considered low	As above	<p>As for Overseas 1, with addition of:</p> <p>Undertake serosurveys, data collection and epidemiological analysis to identify human respiratory infections associated with exposure to infected animals eg poultry workers, vets and cullers through outbreak case reporting system</p> <p>Monitor passive reporting of unusual clusters of influenza-like illness or acute respiratory disease</p>

2	Overseas 2	Animal infection overseas – substantial human public health risk	As above	As for Overseas 1
	Bah 2	Animal infection in Bahrain – substantial risk of human disease	As above	As for Bah 1, with addition of: Department of Agriculture to compile data on infected flocks and other species. by Department of Agriculture to forward data to PHD.

Pandemic alert

WHO phases	Bah Phases	Description of phases	Surveillance objectives	Surveillance activities
3	Overseas 3	Human infection overseas with new subtype(s) but no human to human spread	<ul style="list-style-type: none"> ▪ To detect the first case/s of pandemic influenza at Bahraini border ▪ To collect and share clinical and epidemiological data on suspect / possible and confirmed cases 	Conduct routine influenza surveillance through National health facilities.
		or at most rare instances of spread to a close contact		<p>Undertake laboratory surveillance to monitor influenza virus isolates and detect local novel influenza strains in travelers returning from high risk areas overseas</p> <p>Implement data collection and epidemiological analysis on suspect, possible and confirmed cases in those with travel history in affected area through outbreak case reporting system</p> <p>Monitor passive reporting of unusual clusters of influenza-like illness or acute respiratory disease</p>
	Bah 3	Human infection in Bahrain with new subtype(s) but no human to human spread or at most, rare instances of spread to a contact	<p>To rapidly detect new clusters of cases in Bahrain</p> <p>To collect and share clinical and epidemiological data on suspect / possible and confirmed cases</p> <p>To provide data to inform policy decisions</p>	<p>Conduct routine influenza surveillance through health facilities.</p> <p>Undertake laboratory surveillance to monitor influenza virus isolates and detect local novel influenza strains in those from high risk areas overseas or in Bahrain</p> <p>Isolate the pandemic virus strain for vaccine production</p> <p>Undertake data collection and epidemiological analysis on suspect, possible and confirmed cases through OUTBREAK CASE REPORTING SYSTEM Annex5</p> <p>Monitor passive reporting of unusual clusters of influenza-like illness or acute respiratory disease</p>

WHO phases	Bah Phases	Description of phases	Surveillance objectives	Surveillance activities
4	Overseas 4	Human infection overseas – small cluster(s), limited human to human transmission, spread highly localised; virus is not well adapted to humans	To detect the first case/s of pandemic influenza at Bahraini border To collect and share clinical and epidemiological data on suspect/possible and confirmed cases	As for Overseas 3, with addition of: Conduct border screening for ILI in travellers from affected regions Annex9
	Bah 4	Human infection in Bahrain – small cluster(s), limited human to human transmission, spread highly localised; virus is not well adapted to humans	To monitor the geographical spread of pandemic influenza within Bahrain To monitor the distribution of pandemic by time, place and person To guide the appropriate allocation of national resources	<p>Conduct routine influenza surveillance through health facilities</p> <p>Undertake laboratory surveillance to monitor influenza virus isolates and detect local novel influenza strains in those from high risk areas overseas or within Bahrain</p> <p>Isolate the pandemic virus strain for vaccine production</p> <p>Undertake data collection, laboratory testing and epidemiological analysis on suspect, possible and confirmed cases through OUTBREAK CASE REPORTING SYSTEM Annex5</p> <p>Monitor passive reporting of unusual clusters of influenza-like illness or acute respiratory disease</p> <p>Conduct border screening for influenza like illness in travellers from affected regions</p> <p>Undertake surveillance of ILI in health care workers exposed to suspect, probable or confirmed pandemic flu cases or their specimens</p>

WHO phases	Bah Phases	Description of phases	Surveillance objectives	Surveillance activities
5	Overseas 5	Human infection overseas – larger cluster(s) but human to human transmission still localised; virus is becoming better adapted to humans (substantial pandemic risk)	To detect the first case/s of pandemic influenza at Bahrain border To collect and share clinical and epidemiological data on suspect/possible and confirmed cases	As for Overseas 4 with addition of: Conduct National surveillance if out of season
	Bah 5	Human infection in Bahrain – larger cluster(s), substantial pandemic risk	As for Bah 4	As for Bah 4, with addition of exit screening

Pandemic

WHO phases	Bah Phases	Description of phases	Surveillance objectives	Surveillance activities
6	Overseas 6	Pandemic overseas – not in Bahrain: increased and sustained transmission in general population	<ul style="list-style-type: none"> ▪ To detect the first case/s of pandemic influenza at Bahraini border ▪ To collect and share clinical and epidemiological data on suspect/possible and confirmed cases 	<p>Conduct routine influenza surveillance through health facilities.</p> <p>Initiate National Surveillance if out of season</p> <p>Undertake laboratory surveillance to monitor influenza virus isolates and detect local novel influenza strains in those from high risk areas overseas or in Bahrain</p> <p>Undertake data collection and epidemiological analysis on suspect, possible and confirmed cases through OUTBREAK CASE REPORTING SYSTEM Annex5</p> <p>Monitor passive reporting of unusual clusters of influenza-like illness or acute respiratory disease</p> <p>Conduct border screening for ILI in travellers from affected regions</p>
	Bah 6a	Pandemic in Bahrain – localised (one area of country)	To monitor the distribution of pandemic by time, place and person	<p>As for Overseas 6, with the addition of:</p> <p>Conduct entry and exit border screening Annex9</p>

		<p>To monitor the impact of the pandemic on health and essential services staffing</p> <p>To measure the effectiveness of pandemic influenza vaccines</p> <p>To define susceptibility of virus to antiviral drugs</p> <p>To monitor adverse events following vaccination with pandemic influenza vaccine</p>	<p>Undertake surveillance of ILI in health care workers exposed to suspect, probable or confirmed pandemic flu cases or their specimens</p> <p>Undertake hospital-based surveillance</p> <p>Monitor absenteeism among essential services personnel</p> <p>Undertake studies to measure effectiveness of antivirals and/or vaccines and adverse events associated with antiviral and/or vaccine use</p>
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6	Bah 6b	Pandemic in Bahrain – widespread (multiple areas)	<p>To guide the appropriate allocation of national resources</p> <p>To monitor the distribution of pandemic by time, place and person</p> <p>To assess if there is adequate staffing to maintain essential services</p> <p>To assess the match between candidate pandemic vaccine and local influenza strain variants</p> <p>To ensure appropriate treatment and prophylaxis</p>	<p>Undertake surveillance through routine and hospital systems</p> <p>Undertake selected laboratory surveillance to isolate local pandemic virus to compare with vaccine strains and assess susceptibility to antiviral drugs</p> <p>Monitor absenteeism among essential services personnel</p>
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Bah 6c	Pandemic in Bahrain – subsided	As above	As above
Bah 6d	Pandemic in Bahrain – next wave	As above	As above

Clinical course and treatment of human cases of H5N1 avian influenza

Published information about the clinical course of human infection with H5N1 avian influenza is limited to studies of cases in the 1997 Hong Kong outbreak. In that outbreak, patients developed symptoms of fever, sore throat, cough and, in several of the fatal cases, severe respiratory distress secondary to viral pneumonia. Previously healthy adults and children, and some with chronic medical conditions, were affected.

Tests for diagnosing all influenza strains of animals and humans vary in sensitivity and specificity depending on the timing of specimen collection and type of test used.

Antiviral drugs, some of which can be used for both treatment and prevention, are clinically effective against influenza A virus strains in otherwise healthy adults and children, but have some limitations. Some of these drugs are also expensive and supplies are limited.

Experience in the production of influenza vaccines is also considerable, particularly as vaccine composition changes each year to match changes in circulating viruses due to antigenic drift. However, at least four months would be needed to produce a new vaccine, in significant quantities, capable of conferring protection against a new virus subtype.

Incubation period

The incubation period for influenza viruses is short – 1-3 days. However with H5N1 the incubation period is currently uncertain.

Case definition for avian influenza (H5N1)_s

a) Suspected case of avian influenza (H5N1)

1- Clinical presentation

- Fever ($>$ or = 38°C) OR history of fever AND respiratory symptoms (cough or shortness of breath) requiring hospitalization.

OR

- **Death from unexplained respiratory illness**

AND

2- Epidemiological criteria

- History of travel in the **7 days prior to onset of symptoms** to any affected area **AND** close contact (within 1 metre) with live or dead domestic fowl, wild birds, or swine in any setting, including bird markets.
- **OR** one of the following

- Close contact (touching/speaking distance) with other case(s) of severe respiratory illness or unexplained death from above areas.
 - Part of a Health Care Worker cluster of severe unexplained respiratory illness.
 - A Laboratory worker with potential exposure to influenza A (H5N1)
- Fever (38°C) OR history of fever **AND** respiratory symptoms (cough or shortness of breath) requiring hospitalization.

b) Probable case of influenza A (H5N1)

Limited laboratory evidence of influenza A (H5N1).

c) Confirmed case definition for influenza H5N1

A confirmed case of influenza H5N1 infection is an individual for whom laboratory testing demonstrates one or more of the following:

- Positive viral culture for influenza A/H5.
- Positive polymerase chain reaction (PCR) for influenza A/H5.
- Positive immunofluorescence antibody (IFA) test to H5 antigen using H5 monoclonal antibodies.
- 4-fold rise in H5 specific antibody titre in paired serum samples.

The laboratory tests for the diagnosis of influenza A/H5 infection included in the case definition are considered the standard for the identification of these viruses.

Exclusion criteria

A case should be excluded if an alternative diagnosis can fully explain their illness.

1. If the patient meets the definition of suspected or probable case, he/she must be isolated in a single room preferably with negative pressure or a single room with non shared air conditioning and ventilation system and with its own bathroom facility.
2. Appropriate disinfections of furniture and environmental surface using hospital grade germicide is recommended.
3. Use complete nursing barrier while taking care of patient.
4. Case Management: No specific treatment known to be specific or effective for treatment of Avian Influenza cases. Empiric therapy should include coverage for organisms associated with any community-acquired pneumonia of unclear etiology, including agents with activity against both typical and atypical respiratory pathogens. The main line of treatment includes supportive treatment, Broad-spectrum antibiotics, antiviral and steroids.
5. Confirm laboratory diagnosis for probable and suspected cases.

Samples to be taken from patients

- Acute and convalescent blood for serology with at least 2 weeks between acute and convalescent samples
- Blood samples: 10 cc of blood for viral culture, PCR and antigen detection.
- Swabs:
 - Nasopharyngeal or throat in viral transportation media
 - Bronchioalveolar lavage
 - Stool for virology in viral transport media

Post mortem specimens

Samples may be taken from dead humans to assist diagnosis, including; all tissues from biopsy or autopsy - fresh and fixed: lung, liver, spleen, brain etc.

Investigation:

The optimal specimen for influenza A virus detection is a nasopharyngeal aspirate obtained within 3 days of the onset of symptoms, although nasopharyngeal swabs and other specimens can also be used. Manipulations of specimens and diagnostic testing should be carried out (biosafety guidelines. **Annex6**)

The strategy for initial laboratory testing of each specimen should be to diagnose influenza A virus infection rapidly and exclude other common viral respiratory infections. Results should ideally be available within 24 hours.

Procedures for influenza diagnosis: (Annex8)

Assays available for the diagnosis of influenza A virus infections include:

1. Rapid antigen detection. Results can be obtained in 15–30 minutes.

- *Near-patient tests for influenza.* These tests are commercially available (Nicholson, Wood & Zambon, 2003).
- *Immunofluorescence assay.* A widely used, sensitive method for diagnosis of influenza A and B virus infections and five other clinically important respiratory viruses (Lennette & Schmidt, 1979).
- *Enzyme immunoassay.* For influenza A nucleoprotein (NP).

2. Virus culture. Provides results in 2–10 days. Both shell-vial and standard cell-culture methods may be used to detect clinically important respiratory viruses. Positive influenza cultures may or may not exhibit cytopathic effects but virus identification by immunofluorescence of cell cultures or haemagglutination-inhibition (HI) assay of cell culture medium (supernatant) is required.

3. Polymerase chain reaction and Real-time PCR assays. Primer sets specific for the haemagglutinin (HA) gene of currently circulating influenza A/H1, A/H3 and B viruses are becoming more widely used. Results can be available within a few hours from either clinical swabs or infected cell cultures. Additionally several WHO Collaborating Centres are developing PCR and RT-PCR reagents for non-typical avian/human influenza strains (Fouchier et al., 2000; Lee & Suarez, 2004).

Any specimen with a positive result using the above approaches for influenza A virus and suspected of avian influenza infection should be further tested and verified by a designated WHO H5 Reference Laboratory i.e. Laboratories that lack the capacity to perform specific influenza A subtype identification procedures are requested to:

1. Forward specimens or virus isolates to a National Influenza Centre to a WHO H5N1 Reference Laboratory for further identification or characterization. **Annex7**

2. Inform the WHO Office in the country or WHO Regional Office or WHO HQ Global Influenza Programme that specimens or virus isolates are being forwarded to other laboratories for further identification or further characterization.

Infection control precautions for H5N1:

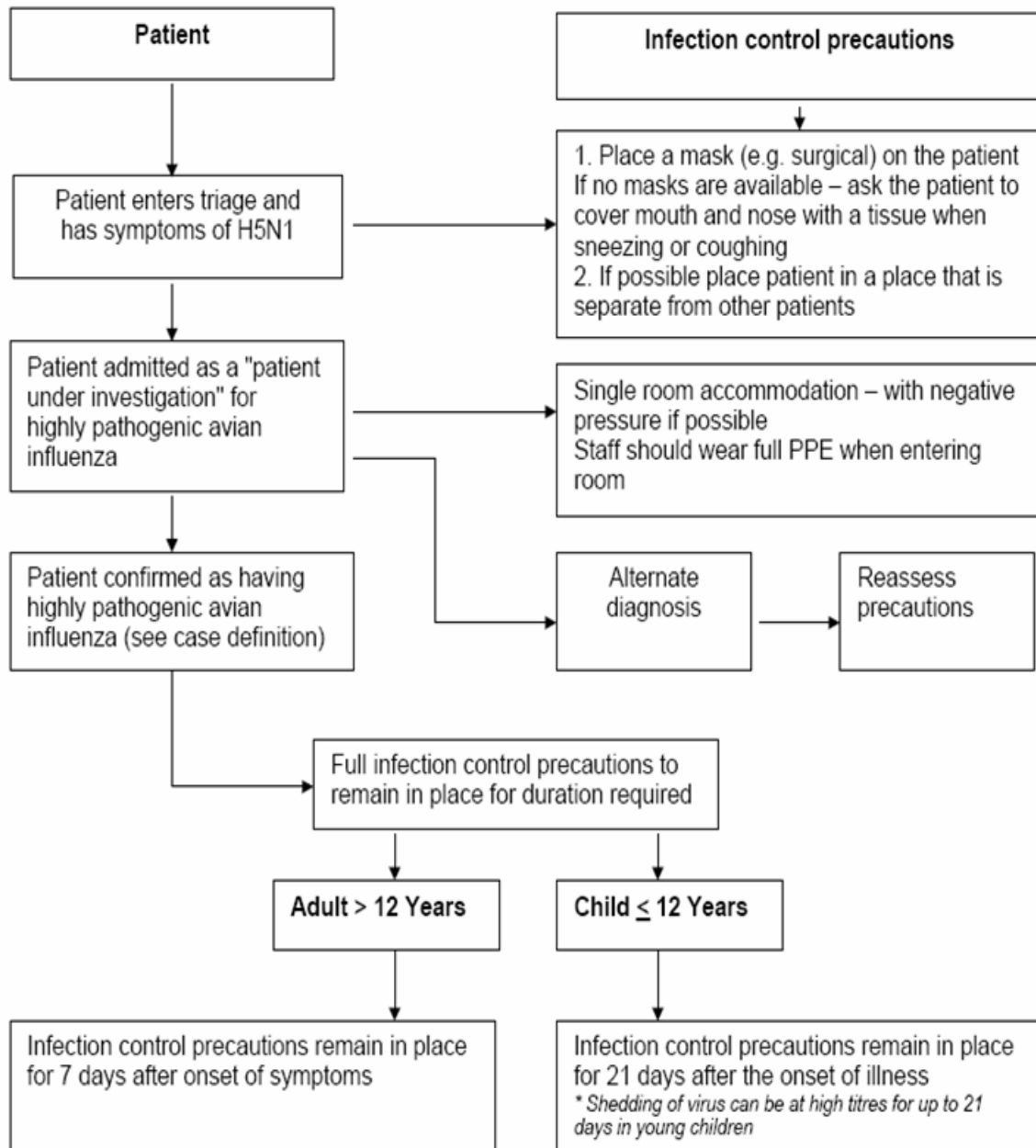
Infection control for H5N1 involves a two-level approach:

- Standard precautions which apply to ALL patients at ALL times, including those who have H5N1; and
- Additional precautions which should include:
 - ◆ Droplet precautions,
 - ◆ Contact precautions, and
 - ◆ high-efficiency mask and negative pressure room if possible*

**Transmission of human influenza is mostly by droplets. Direct or indirect contact and airborne transmissions are also recognized, the latter can involve fine droplet nuclei suspended in the air for considerable duration of time. However, during the last Hong Kong H5N1 outbreak in humans in 1997, droplet and contact precautions successfully managed patients without nosocomial spread of the disease. So far there is no evidence suggesting airborne transmission of the disease from the current outbreaks, but because of the high mortality of the disease and possibility of mutation of the virus to cause efficient human-to-human transmission, WHO is currently recommending the use of high- efficiency masks in addition to droplet and contact precautions for care of human cases of H5N1. For the same reason, a negative pressure room may be preferred if available.*

A combination of these precautions will give the appropriate infection control. Strict adherence to these precautions is required to break the chain of infection transmission. **(Annex1)**

When to initiate infection control precautions in the health care facility



Case management

Assessment of infectious cases by medical practices

During a pandemic, infectious cases may telephone or present to health facilities in this situation, the objective is to prevent transmission to attending medical practice staff and patients.

Medical practice staff who are eligible for antiviral prophylaxis should be provided with the medication (if it is available) and written information about its use, recommended infection control precautions, and what to do if they develop symptoms of infection.

Prior to clinical assessment of an infectious case

Any patient who telephones or presents at a medical practice for an appointment should immediately be questioned to determine if he or she could be an infectious case.

The suspected case should be provided with a surgical mask prior to entering the medical practice, ambulance or assessment by the doctor.

If the patient telephoning the medical practice appears to be an infectious case, then the doctor should refer the patient to the relevant hospital or If the doctor assesses the patient at the medical practice, the patient should wear a surgical mask and be separated from other patients and staff.

If the doctor considers the patient to require immediate hospitalisation, then the doctor should telephone the ambulance service and advise the ambulance officer that the patient is an infectious case and that the attending ambulance officer should wear the recommended PPE and inform the receiving hospital emergency department or clinic prior to the patient's arrival.

If an infectious case presents to the medical practice without telephoning, then the patient should immediately be provided with a surgical mask and separated from other patients and staff prior to assessment by the doctor.

During clinical assessment of an infectious case

The attending doctor or any other person entering the room containing the infectious case should wear full PPE.

Take respiratory and blood specimens for laboratory testing for influenza and other infections as clinically indicated.

Treat with a neuraminidase inhibitor such as oseltamivir as early in the clinical course as possible.

If clinically indicated, hospitalize patients under appropriate infection control precautions as described in previous sections.

If a case is assessed as not requiring hospitalization, educate the patient and his or her family on personal hygiene and infection control measures (e.g. hand-washing, use of a paper or surgical mask by the ill person, and restriction of social contacts), and instruct the patient to seek prompt medical care if the condition worsens. As resources permit, follow up non-hospitalized patients by home visits or telephone contact.

Provide supportive care. Monitor oxygen saturation and treat desaturation with supplemental oxygen as required. As nebulizers and high-air-flow oxygen masks have been potentially implicated in the nosocomial spread of severe acute respiratory syndrome, use these measures only if clinically justified and apply them under strict infection control, including airborne transmission precautions.

Take respiratory and blood specimens serially to check for possible bacterial infection. Consider intravenous antibiotic therapy to control secondary bacterial infections as required.

Do not use amantadine or rimantadine because of the risk of increasing the selective pressure for development of a resistant influenza virus with pandemic potential.

Avoid administration of salicylates (such as aspirin) in children under 18 years of age because of the risk of Reye syndrome. Use paracetamol or ibuprofen, either orally or by suppository, for management of fever as clinically indicated.

Immunomodulators such as corticosteroids should be used only in the context of clinical trials. The immune response of humans with influenza A(H5N1) infection requires further study.

Do not use ribavirin. There is no evidence to support its effectiveness against influenza viruses; moreover, adverse reactions such as anaemia are frequent and may further compromise the patient.

Following clinical assessment of an infectious case

Attending doctors should avoid touching their own eyes, noses and mouths until they have removed themselves from the enclosed space with the infectious cases, disposed of their gloves, eyewear, masks, gowns, and washed their hands.

Used masks, gown, and gloves should be disposed of in a sealed bag in general waste and reusable PPE should be kept in a sealed bag and disinfected as per the manufacturer's instructions.

If the patient is discharged home, then the patient should be advised to avoid contact with other persons until the infectious period has passed, and should be provided with written information advising the patient what infection control precautions to take and what actions to take if the symptoms worsen.

Non disposable equipment used on the patient should be disinfected according to manufacturer's instructions.

Discharge policy

Studies are required to provide better understanding of viral excretion patterns in humans infected with the influenza A(H5N1) viruses associated with the current outbreaks until further evidence is available, WHO recommends that infection control precautions for adult patients remain in place for 7 days after resolution of fever.

Previous human influenza studies have indicated that children younger than 12 years can shed virus for 21 days after onset of illness. Therefore, infection control measures for children should ideally remain in place for this period. Where this is not feasible (because of a lack of local resources), the family should be educated on personal hygiene and infection control measures (e.g. hand-washing and use of a paper or surgical mask by a child who is still coughing). Children should not attend school during this period. **(Annex1)**

Public Health Measures:-

a) Reporting of Cases

Report to the local public health authority all patients for whom the diagnosis of influenza A (H5N1) virus infection is being considered (cases report form). **Annex5**

Anyone who has had contact with a patient with H5N1 should be considered for prophylaxis or treatment with Oseltamivir/Tamiflu

b) Management of contacts

Contact definition

A contact of pandemic influenza is a person who had close (ie within one metre) contact with an infectious case or who has spent more than 60 minutes in a confined space (such as an aeroplane, or an enclosed room) with an infectious person.

When a patient is diagnosed with pandemic influenza, public health units will become involved. They will perform contact tracing to identify close contacts – for example, family members, work or classroom contacts. Once a pandemic is established it may not be possible to do this because of the increasing number of contacts.

Depending upon the transmissibility of the virus and the demands on public health units, contacts will undergo monitoring (passive surveillance or active surveillance) and quarantine. It is likely that contact monitoring will be instituted in Phase Overseas 3, when the first human cases are occurring. Quarantine of contacts, in conjunction with monitoring will be implemented in Phase Overseas 4, when human to human transmission is occurring in small clusters.

When animal disease is present, a person who has had exposure to an animal or its environment in an area known to have outbreaks will also require monitoring through public health units. This monitoring is likely to start at Phase Overseas 1.

Duration of monitoring and quarantine.

Provided the person who is a contact does not become symptomatic, the duration of monitoring and quarantine will be for:

- Two times the incubation period of the virus, from the day of last exposure; OR
- Until the diagnosis of pandemic influenza has been excluded in the index case.

These persons should be monitored for 7 days after their last exposure to the implicated patient or to the common source and asked to check their temperature twice daily. If a person who is being monitored develops fever ($>38\text{ }^{\circ}\text{C}$) and cough or shortness of breath, he or she should be treated immediately.

Monitoring of contacts

- ***Active surveillance***

Public health staff will contact a person daily to assess the person's health, either by telephone or in person. All people on active daily surveillance should measure and record their temperatures twice daily (at least 4 hours after any medications that may lower fever).

- ***Passive surveillance***

Contacts will be asked to monitor their own health, record their temperatures daily and report to the public health unit if they develop a fever or respiratory symptoms.

- ***Quarantine***

Quarantine applies to people who have been exposed to someone with pandemic influenza and may be infected, but are not symptomatic. Separating exposed people and restricting their movements is intended to stop the spread of pandemic influenza. People may be quarantined in their own homes or in another facility. In most cases, quarantine is voluntary; however, the Bahrain government has authority to compel quarantine to protect the public. Those in quarantine will still be monitored.

- ***Antivirals***

Uninfected contacts who are eligible for antiviral prophylaxis should be provided with the medication (if it is available) and written information about its use, recommended infection control precautions, and what to do if they develop symptoms of infection.

Education of contacts (Annex 4)

Uninfected contacts quarantined at home with an infected case are advised to:

- minimise close contact with the infectious case
- use separate living, dining, bathing, laundry and toilet facilities to the infectious case (if available)
- minimise use or handling of (and regularly clean) items or surfaces in the home that might be used/touched by the infectious case
- wear masks (if available), or cover their nose and mouth while in close contact (ie less than one metre) or while in a confined space with the infectious case.

Care of the deceased

The care of deceased pandemic influenza patients raises infection control issues, along with significant social and religious considerations. **Annex1**

Disease control measures

a) Border control

Bahrain, being an island nation, has a greater opportunity than other countries to prevent or delay the entry of pandemic influenza into Bahrain. Accordingly, the Government is prepared to implement border measures with this objective. When pandemic influenza events escalate overseas, detecting cases of pandemic influenza at Bahrain's international airports – while recognising that individuals may be incubating the disease and have no symptoms.

Positive pratique will be required of aircraft commanders replacing the current pratique by exception. Positive pratique requires the aircraft commander to declare the health of all people on board, whereas current pratique requires the commander only to notify if an ill passenger is on board.

Entry screening will include health declaration cards, handed out by airlines and checked by Customs officers. Additional BQIS staff will assist with thermal scanning equipment to detect passengers with a fever. Those identified as possible cases (for example, high temperature on thermal scanner or symptoms of influenza on the health declaration card) will be assessed by a border nurse **annex 9**. Nurses placed at the border will assess the passenger as described by an algorithm (**annex 9**) and contact the CQO as required.

In some situations, large numbers of people arriving at the border may need to be quarantined from others, to prevent transmission of pandemic influenza. If the pandemic reaches Bahrain, and is not widespread in other parts of the world, the PHD will consider instituting exit screening of outgoing passengers. This will also include thermal imaging and health declaration cards and is designed to prevent people with pandemic influenza from travelling to countries that are free of disease. This is in keeping with international obligations to prevent the spread of disease.

b) Measures to increase social distance

Background

During a pandemic of influenza, measures to increase social distance may be instituted or recommended. These measures, which include closure of schools and restricting mass gatherings such as concerts, are intended to prevent transmission of influenza between people. In the setting of influenza, as people may be infectious before the onset of symptoms, measures that reduce contact between people regardless of symptom status may be particularly effective. The *WHO consultation on priority public health interventions before and during an influenza pandemic 2004* recommended that authorities consider measures such as closure of schools, closing workplaces and discouraging mass gatherings, depending upon epidemiological characteristics of the particular virus such as attack rates in different age groups (ie proportion of the different age groups infected) and transmission characteristics.

In recommending measures to increase social distance, other considerations will include mathematical modelling of the effectiveness of the interventions and feasibility of the interventions, given their significant social and economic implications.

Clearly, the nature and timing of implementation of social distancing measures will require careful consideration and judgement in light of the severity and mortality of the pandemic strain.

Restricting mass gatherings

During the 1957-1958 pandemic, a WHO expert panel found that spread within some countries followed public gatherings, such as conferences and festivals. This panel also observed that in many countries the pandemic broke out first in camps, army units and schools; suggesting that the avoidance of crowding may be important in reducing the peak incidence of an epidemic.

Closure of schools

Closure of schools may be particularly effective in a pandemic of influenza because of the role children play in spreading influenza. Also, during the first wave of the Asian influenza pandemic of 1957-1958, the highest attack rates were seen in school aged children. This has been attributed to their close contact in crowded settings. A recently published study found that during an influenza outbreak, school closures were associated with significant decreases in the incidence of viral respiratory diseases and health care utilization among children aged 6-12 years.

c) The National Medicines Stockpile (NMS)

Background

Influenza antiviral drugs will play an important role during a pandemic, particularly during the first wave of infection when pandemic vaccines may not be available. In the absence of vaccines, antivirals are the only medical intervention for providing protection against disease and some therapeutic benefit in those who are ill.

Priority groups

The role of influenza antivirals will be constrained, however, by their finite supply, negligible surge capacity for production, and cost. Because of this, priority groups for their use must be determined to ensure that they are used to Bahrain's best advantage. As the overall aim underlying Bahrain's response to a pandemic influenza threat is to reduce the associated population wide morbidity and mortality, their use will be determined within this principle.

The recommendations can be found in **Annex 13**

Activation and deployment of the NMS

The process to activate the NMS deployment plan is that the COMS of an affected health facility provides written request to the DMM for access to the NMS.

The amount of antivirals deployed will be a decision of the COMS after due consideration. Each requesting place is required to have distribution plans in place, including details of security measures and arrangements for dispensing including supervision, records of

treatment and monitoring of outcomes, including adverse reactions. The DMM has ownership of the stockpile until each item is used/consumed/expired.

In the event of requiring additional drugs - for example antibiotics for secondary chest infections - the above process will need to be carried out for each drug.

d) Health service delivery

Maintaining health services in the setting of unprecedented demands and disruptions will be a challenging, but vital, aspect of the pandemic influenza response.

Stakeholder groups responsible for direct health service delivery are considering the following issues in pandemic planning:

– **Cases identified at the border**

The measures that will need to be implemented in response to the first cases of pandemic influenza being detected at the border.

– **Detecting the first cases of pandemic influenza in community settings**

A national education campaign that focuses on how first line health care workers can identify suspected cases of severe respiratory diseases in returned travellers, the measures they can take to protect themselves and their patients, and the importance of talking to public health units about such patients should be done by the members of the Ministry of Health Committee.

– **Fever clinics and designated isolation facilities**

When cases in Bahrain increase, Avian Flu Committee, will consider setting up fever clinics and designated isolation facilities which are staffed by protected or immune staff. Fever clinics are triage settings in which all suspected cases of pandemic influenza can be assessed to determine whether they are likely to have influenza and where they are best managed. Designated isolation facilities are places where patients that require hospitalisation are managed. The purpose of these clinics/facilities is to streamline the delivery of care to these patients, cope with the rapid increase in illness in the community and lessen the transmission of influenza to patients that are not infected.

– **Home care**

Health authorities, in conjunction with community care services, will consider aspects such as provision of meals and access to medical review and medications for those not admitted to hospital. Community care and hospital in the home arrangements that some hospitals currently utilise will take on increasing importance.

– **Hospitals**

Hospitals may activate their emergency plans enabling them to cease elective admissions and discharge suitable patients. Within hospitals/isolation facilities, providing care for influenza patients will ideally take place in negative pressure isolation rooms, or if these are not available, by collocating influenza patients.

– **Public health units and contact tracing**

Public health units will play an important role in providing information to health professionals and the public about aspects of the management of people with or exposed to pandemic influenza, such as the need for testing, notification, isolation and quarantine. At

least in the early phases, public health units will be involved in contact tracing to identify those who have been exposed to a particular patient and need to be quarantined.

– **Isolation**

Patients who are suspected to be infected with influenza because they are symptomatic need to be isolated from others. This will occur either in the home or a health care setting and will be for the duration of the infectious period. This is to prevent them from infecting others. Patients and their families will be given educational materials which will include advice about infection control practices that can prevent/ reduce transmission between the patient and others.

– **Quarantine**

Depending upon the pandemic phase, those who have been exposed to a person with influenza but do not have symptoms should be quarantined. This is to lessen the chance that, have they been infected, they transmit the infection to others.

– **Clinical care guidelines**

Clinical care guidelines will be a critical tool for all health care workers in triaging, assessing and managing possible and confirmed cases. CDU is currently consulting with infection control clinicians on the content of national guidelines and responsibility for their development.

e) Pandemic vaccination

Pandemic influenza vaccine

The influenza vaccine composition depends upon the particular strain that is causing the pandemic, and this cannot be known in advance. Vaccine production is also subject to complex processes, and although options to shorten the lead-time for vaccine production are being developed, it may take some months before the vaccine is available. Until a vaccine is available, other measures to protect the population, such as PPE, antiviral medications and isolation of affected persons will be utilised.

Initially, the vaccine will be in short supply and its use will have to be prioritised. Priority groups being considered include essential workers such as health care staff and emergency personnel. These priority groups will be continually revised in light of new information that is learnt about the pandemic virus, who it is affecting, and what is required to maintain effective services. When sufficient pandemic influenza vaccine is available, the entire Bahrain population will be offered vaccination.

Other vaccines

Attaining high rates of coverage of the normal seasonal influenza vaccine and the pneumococcal vaccine in identified cohorts and high risk groups during the interpandemic (or non-pandemic period) was identified as a priority in the *Bahrain Action Plan for Pandemic Influenza* (2005). For further details see **annex 12: Pandemic vaccines**.

f) Communications

Information for and management of, Bahrainis overseas

Ministry of Foreign affairs (MOFA) missions provide consular contingency support for all Bahrainis in-country, including mission staff from all agencies, and could be drawn upon quickly in the event of a pandemic.

(MOFA) travel advice, which is developed in consultation with PHD , will continue to be the primary mechanism for informing the Bahraini travelling public about the risk of pandemic influenza (website: www.health.gov.bh). Advice appropriate to the phase of the pandemic and assessed risk will be communicated via travel advisories, including if necessary, a recommendation to avoid all travel to affected areas and urging travellers in the affected regions to return to Bahrain.

Those returning to Bahrain from affected areas may be required to undergo additional disease screening and quarantine measures.

A prepared public through a prepared media

Due to the ongoing concerns about avian influenza outbreaks in Asia, Bahrain has a range of communications activities and tools already in place to inform and reassure the public, and the media, about Bahrain's preparations for an influenza pandemic.

This communications plan outlines the main steps that have already been taken in preparation and steps that will be activated in the event of an Influenza pandemic. The plan follows the WHO and Bahrain's key alert periods and action phases, although the communications plan remains flexible and adaptable to the circumstances of the time.

Free Call Information Line: 17279618-17279610 (8:00AM – 01:00PM) Saturday to Wednesday.

Phases: Overseas 1, Overseas 2, Overseas 3, Bahrain 0, Bahrain 1 and Bahrain 2

The call centre personnel are well briefed on pandemic and other health emergency issues with an approved set of questions and answers and referrals to other relevant departments where further information can be obtained. In an emergency, this phone line has the capacity to significantly expand its capability and its hours of operation.

Phases: Overseas 4, Overseas 5, Bahrain 3, Bahrain 4 and Bahrain 5

During these phases the hotline capacity would be enhanced

- Coordination between the CDU and hotline.

Phases: Overseas 6, Bahrain 6a, Bahrain 6b, Bahrain 6c and Bahrain 6d

During these phases the hotline capacity would be enhanced

- development of further phone lines

Websites

The MOH website at www.health.gov.bh will play a vital role in informing the public and the media about health measures, warnings and the current situation. It will be particularly useful in providing media with messages, media transcripts, photos and vital public health information.

Phases: Overseas 1, Overseas 2, Overseas 3, Bahrain 0, Bahrain 1 and Bahrain 2

During this phase the website www.health.gov.bh has a dedicated biosecurity website, accessed from the homepage, that links to avian influenza information for the public, health professionals and the media. This site is regularly updated and contains:

- general information about avian influenza and the global situation
- pandemic influenza preparedness
- frequently asked questions (FAQs)
- fact sheets
- a special section for health professionals
- media releases, transcripts and sound bytes
- links to relevant national and international websites.

Phases: Overseas 4, Overseas 5, Bahrain 3, Bahrain 4 and Bahrain 5

During this phase extra attention will be paid to the website to enhance its capacity to be a vital source of information. Actions will include:

- web and online staff capacity increased to give priority to posting pandemic information (PHD web services)
- website to be updated and maintained on a daily basis (Media Unit)
- posting twice daily of avian or pandemic influenza news bulletins from the (Media Unit)
- regular posting of media interviews, including MP3 sound bytes, pictures and educational materials by the COMS and minister (Media Unit)
- regular liaison with other agencies, including medical colleges to ensure consistency of messages and links with their websites.

Phases: Overseas 6, Bahrain 6a, Bahrain 6b, Bahrain 6c and Bahrain 6d

During this phase the website will become even more important and actions to be undertaken to enhance its capacity to include:

- establishment of a separate, dedicated influenza pandemic website (Media Unit/Webs)
- full time webmaster assigned to manage the site (Media Unit).
- regular updating of information including health messages, warnings, educational literature and frequently asked questions.
- special attention given to health professionals' subsite and media centre site.

Media Relations Actions

From the onset of the Asian avian influenza outbreaks, Bahrain's Director of Public Relations (DOPR), has been making himself freely available to a wide range of media, including medical press, in an effort to inform the public and health professionals about Bahrain's preparedness for a pandemic.

Phases: Overseas 1, Overseas 2, Overseas 3, Bahrain 0, Bahrain 1 and Bahrain 2

During this present stage a range of communications activities are being undertaken.

including:

- regular media interviews and briefings by the DOPR.
- special articles and interviews arranged for the DOPR with medical media.
- coordination of media responses.
- formal background briefings between the DOPR and media editors to lay the foundations for what the public may face during an influenza pandemic.
- publicising of announcements on Bahrain health response to a pandemic by minister.

Phases: Overseas 4, Overseas 5, Bahrain 3, Bahrain 4 and Bahrain 5

During this phase communications with the public via the media will be crucial.

Actions will include:

- establishing a dedicated media conference room lectern microphone and sound equipment are on 24 hour standby and a PHR backdrop has been produced (Media Unit).
- activating the Media Liaison surge team –from the Communications Branch of PHR have been identified (with relevant security clearances), to provide surge capacity for media liaison in a health emergency (Media Unit).
- expanding the capacity of existing media relations – additional phone lines to be attached to cope with calls (Media Unit).
- priority for media monitoring and tracking by the existing media monitoring team within the Communications Branch (Editorial and Media Relations Unit).
- production of daily news bulletins from the PHR (Media Unit).
- the holding of one main media conference per day by the PHR, with transcripts and sound bytes posted on the MOH website for downloading and use by media that cannot attend the media conference in person (Media Unit).
- assistance given to the minister to deal with media inquiries or announcements (Media Unit).
- close liaison with public affairs counterparts in other agencies.

Phases: Overseas 6, Bahrain 6a, Bahrain 6b, Bahrain 6c and Bahrain 6d

At this stage media management and communications with the public will be intensified.

Actions will include:

- activation of an expanded media liaison team including coopting emergency trained public affairs officers from other agencies and the private sector (Media Unit/Communications Branch)
- deployment of media liaison officers to key trigger points, such as where antivirals are being sent, areas quarantined etc
- briefing media editors about an orderly flow of information, including setting clear guidelines for media access to the PHR with one main media conference per day, with transcripts and sound bytes posted on the MOH website (Media Unit)
- utilising the media centre for emergency management if required

- enlisting the services of Bahrain Associated Press as a one-stop shop information service
- enhanced media monitoring
- working closely with the National Emergency Media Response Network (NEMRN) including medical colleges and associations.

National Emergency Response Network (NEMRN)

In an effort to spread the message widely, the Media Unit, which supports the PHR, has formed an information sharing network comprising media liaison managers in all health departments

The public affairs officers of all medical colleges and associations are a vital part of this network. The network, which works closely with similar public health, emergency services and national security media liaison groups, meets regularly and holds exercises and workshops to continually refine coordinated public and media responses about new and emerging health crises. NEMRN will play a vital role in informing the public and media during a pandemic.

Phases: Overseas 1, Overseas 2, Overseas 3, Bahrain 0, Bahrain 1 and Bahrain 2

In this period the NEMRN is consulted on a range of health emergencies for Avian influenza vaccine delay and other issues as they emerge. Contact includes:

- NEMRN involvement in emergency health exercises with the PHR (Media Unit)
- keeping in touch on a regular basis about significant health issues that may need a media response, via email (Media Unit)
- holding teleconferences of NEMRN to coordinate responses during health emergencies
- keeping in touch by phone or email on a bilateral basis as the need arises
- involving only health public affairs people if appropriate, or the whole network as required
- ensuring that members of NEMRN are linked in with other media liaison networks such as Ministry of Agriculture , A/E and the national security media.
- holding of exercises and face to face meetings.
- coordination of influenza pandemic communications plans.

Phases: Overseas 4, Overseas 5, Bahrain 3, Bahrain 4 and Bahrain 5

During this phase the role of NEMRN will be vital as the coordinated management of messages to the public and the media will be crucial. Actions to involve the network at this stage would include:

- daily teleconference of the whole network and additional ones with the Health representatives only if required
- daily distribution of relevant information via email
- coordination of website information by all jurisdictions
- clear decisions on which jurisdiction is the spokesperson for the health emergency, or how the media response should be divided up
- activation of conference text messaging service for all members of NEMRN (Media Unit).

Phases: Overseas 6, Bahrain 6a, Bahrain 6b, Bahrain 6c and Bahrain 6d

In this phase it will be essential for the NEMRN to:

- activate coordinated influenza pandemic communications plans
- hold daily teleconferences
- share of information via email
- provide assistance by the Media Unit during Public Health measures

Educational resources

A range of educational resources has already been produced, including for general practitioners, to help doctors and the public prepare for an influenza pandemic. Additional artwork, display stands, a media buying plan and priority printing arrangements are in place to scale up public information resources as required.

Phases: Overseas 1, Overseas 2, Overseas 3, Bahrain 0, Bahrain 1 and Bahrain 2

Resources developed include:

- Incoming Passenger Pamphlet

This pamphlet is a generic respiratory health alert publication which is being given to all incoming international passengers to Bahrain

- Information Kit for HCWS In the event of a pandemic influenza, the public will rely heavily on their doctors and to assist health care professionals in the private sector to prepare, an information kit is being delivered to every doctor outlining precautionary actions along with instructions on what to do in a health emergency. The kit comprises an instructional brochure, posters and fact sheets.
- DVD on Personal Protection

A DVD on how to correctly fit personal protective equipment. The main purpose of the DVD is to train those people without clinical training, like border workers and family physicians, about how to prevent the spread of infectious diseases such as influenza. Posters for the public about infection control developed to be displayed in doctors' rooms.

- Avian flu educational brochures have been printed. 50,000 copies in Arabic and 5000 in English for public

Phases: Overseas 3, Overseas 4, Overseas 5, Bahrain 3, Bahrain 4 and Bahrain 5

Additional resources, on standby, will be produced to improve surveillance and heighten the public's awareness about the need for health vigilance. These include:

• Health declaration card

Copies of a more comprehensive health declaration card to be printed in several languages to be issued to incoming passengers.

• Displays

Art work for displays and health warnings at airports and sea ports to be developed and to be produced to impart important health messages to the public.

• Media buying plan

A media buying plan will be activated to place advertisements and health messages in media as required.

• **Fact sheets**

Fact sheets informing the public about personal protection, infection control and actions they should take to limit their exposure to influenza will be developed and posted on the web and be distributed through shopping centres, public places, schools and by fax or post.

Phases: Overseas 6, Bahrain 6a, Bahrain 6b, Bahrain 6c and Bahrain 6d

Actions in this phase to include:

- developing fact sheets appropriate to the health situation for wide distribution through shopping centres and other community outlets, on the website and available by fax or post on request
- activating the pre-arranged media buying plan, in conjunction with other agencies like BQIS to secure advertising space in the media for important health warnings or messages.
- recording special broadcasts and video providing advice to the community on current public health arrangements including quarantine restrictions if required.

International collaboration

The PHR response team will facilitate international teleconferences with global authorities and other agencies as needed.

Stakeholder engagement

Stakeholder engagement beyond government, and CDN is critical in both the containment and maintenance phases to achieve maximum cooperation and communication across the health and community sectors. Responsibility for implementing the Bahrain management plan will lie with health services, emergency services and governments at all levels. The media, wider community and industry also have key roles to play in ensuring a responsible national response.

The PHR will convene meetings of peak national stakeholder groups in the process of developing the pandemic plan and during the pandemic as needed. Stakeholder representation will include:

- **Medical practitioners:** Medical Colleges, emergency physicians, medical administrators, specialist groups in respiratory medicine, infectious diseases, thoracic surgery, intensive care.
- **Consumers:**
 - Nursing.
 - Public health.
 - Pharmacists.
 - Non governmental hospital sector.
 - Laboratory and mortuary staff.
 - Funeral directors.
 - Education sector.
 - Religious Leaders

Additionally, a stakeholder engagement strategy will be developed to ensure that other key community groups are engaged in the wider community education and dissemination of information.

Glossary

Airborne infection: The infection usually occurs by the respiratory route, with the agent present in aerosols (infectious particles < 5µm in diameter)

Airborne precautions: These are additional to standard precautions and are designed to reduce the transmission of diseases spread by the airborne route.

Anteroom: As an extra precaution to prevent airborne transmission, some single rooms used for isolation purposes may include an anteroom where staff may put on and remove personal protective equipment.

Clinical Waste: Also known as "infectious waste" – includes waste directly associated with blood, body fluids secretions and excretions. It also includes laboratory waste that is directly associated with specimen processing, human tissues, including material or solutions containing free-flowing blood, and animal tissue or carcasses used for research.

Also includes discarded sharps.

Cohorting: For infection control purposes, if single rooms are not available or there is a shortage of single rooms, patients infected or colonised with the same organisms can be cohorted (sharing of room(s)). When cohorting is used during an outbreak, these room(s) should be in a well defined area that has been designated for the purpose and is clearly segregated from other patient care areas in the health care facility used for noninfected/colonized patients.

Contact transmission: Micro-organisms that are transmitted by direct contact with hands/equipment or indirect contact between and infected or colonized patient and a susceptible patient.

Contact precautions: These are additional to standard precautions and are designed to reduce the risk of transmission of micro-organisms by direct or indirect contact.

Disinfection: A process of removing micro-organisms without complete sterilization.

Droplet infections: Large droplets carry the infectious agent (>5µm in diameter)

Droplet precautions: These are additional to standard precautions and are designed to reduce the transmission of infectious spread by the droplet route.

Health care worker: Any person working in a health care facility, for example, medical officer, nurse, physiotherapist, cleaner, psychologist.

Health care facility: Organization that employs health care workers and cares for patients/clients.

Negative Pressure Room This is a term used for an isolation room which receives many air changes per hour (ACH) under negative pressure. In other words, the direction of the air flow is from the outside adjacent space (e.g., the corridor) into the room. It is preferable that the air in a negative pressure room is exhausted to the outside, but may be recirculated if the air is filtered through a high-efficiency particulate air (HEPA) filter.⁶

Personal protective equipment: Includes gloves, gowns, caps, masks – (surgical and high efficiency masks), and overshoes. These items are used to protect the health care worker from splashes of blood, body fluids, excretions and excretions or from droplets or aerosolisation of organisms from the respiratory tract. It is the responsibility of the health care worker to put on the appropriate personal protective equipment in any situation that is likely to lead to exposure of blood, body fluids, excretions and secretions.

Standard precautions: These are applied for all patients at all times regardless of their known or presumed infectious status.

Sterilization: The destruction of all microorganisms. This is defined as a decrease in microbial load. Sterilization can be either conducted by physical or chemical means.

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Annex 1

Infection control precautions for highly pathogenic avian influenza

Characteristics of influenza infection

The management of infectious cases of pandemic influenza and their contacts is determined by the mode of transmission, the incubation period and the infectious period.

Infectious period

The infectious period is usually from the onset of symptoms to:

- seven days since resolution of fever (in those > 12 years); and
- 21 days since onset of illness (in those ≤ 12 years). A small proportion of patients may be infectious from just before symptoms appear.

Standard precautions:

Treating all patients in the health care facility with the same basic level of "standard" precautions involves work practices that are essential to provide a high level of protection to patients, health care workers and visitors.

These include the following:

- Hand washing and antisepsis (hand hygiene).
- Use of personal protective equipment when handling blood, body substances, excretions and secretions.
- Appropriate handling of patient care equipment and soiled linen.
- Prevention of needlestick/sharp injuries.
- Environmental cleaning and spills-management.
- Appropriate handling of waste.

Infection control in health care facility: a quick reference guide for H5N1:

Additional (transmission-based) precautions are taken while still ensuring standard precautions are maintained. Additional precautions include:

Droplet precautions.

Contact precautions. (including the use of high efficiency masks and negative pressure rooms if possible)

A combination of these precautions will give the appropriate level of precaution for H5N1. The precautions should be implemented while the patient is infectious

- Adults > 12 years of age – precautions to be implemented at time of admission and continued until 7 days have lapsed since onset of symptoms,
- Children <12 years of age – precautions to be implemented at time of admission and continued until 21 days have lapsed since onset of symptoms.

*Shedding of virus can be at high titres for up to 21 days in young children

The following precautions need to be taken:

1. Items entering the room or area where patients with H5N1 are present must be cleaned or placed into an appropriate clean container before removal from the environment.
2. All persons (staff/visitors) should ensure that they clean their hands and remove the outside layer of PPE before exiting the room or area.
3. Patients or groups of patients with H5N1 should be placed in a single room – if possible one with negative pressure.
4. Only essential staff/visitors who have been educated about H5N1 should enter the room.
5. All staff/visitors who enter the room should sign a log book.
6. All health care workers (and visitors) must wear personal protective equipment when entering the room.
7. The patient must wear a surgical face mask when in contact with staff/visitors.
8. The infection control equipment trolley should remain outside the door (Annex 2).
9. Patients should have clinical equipment (e.g. sphygmomanometer, thermometer) dedicated to their exclusive use
10. Sterile items should be disposable where possible. Reusable items should be placed in a plastic bag and then into another plastic bag inside the equipment collection bin on the trolley. Request the sterile service department to collect.
11. Alcohol-based handrub should be located in and outside the room.
12. The patient's room must be cleaned each day – including all horizontal surfaces and blinds. Curtains should be thoroughly cleaned (by laundering in hot water) at least weekly.
13. Cleaning equipment must be cleaned after each use. Mop heads should be sent to the laundry for proper laundering in hot water.
14. Pathology specimens must be taken directly to the laboratory. Request form must indicate "highly pathogenic influenza A".
15. Used linen should be placed in a linen bag inside the room and then into another bag outside the room. Take immediately to laundry collection area – treat as per normal soiled/contaminated linen.
16. All waste should be discarded into clinical waste bag inside the room. When waste is to be collected for disposal, place in another bag outside the room and then treat as "normal" clinical/contaminated/infectious waste.
17. A telephone should be set up in the patient's room.
18. Implement and/or reinforce standard precautions.
19. Limit the movement and transport of the patient from the room for essential purposes only. If transport is necessary, minimize dispersal of droplet nuclei by masking the patient.

Single rooms reduce the risk of transmission of infection from the source patient to others by reducing direct or indirect contact transmission. Where possible, single rooms should have the following facilities:

- Hand washing facilities.
- Toilet and bathroom facilities.

Anterooms

Single rooms used for isolation purposes may include an anteroom to support the use of personal protective equipment.

Transportation of patients

Limit the movement and transport of patients from the isolation room/area for essential purposes only. If transportation is required out of the isolation room/area within the hospital, the patient should wear a mask and a gown where possible. All staffs involved in the transportation should wear personal protective equipment. If transportation outside the health care facility is required, the patient should wear a surgical mask and gown and where there is contact with surfaces, these surfaces should be cleaned afterwards. For example, if a patient has been transported in an ambulance, the ambulance may be cleaned inside with a disinfectant such as 70% alcohol.

Personal protective equipment used for H5N1

Personal protective equipment reduces the risk of infection if used correctly. It includes:

- Gloves (nonsterile).
- Long-sleeved cuffed gown.
- Plastic apron if splashing of blood, body fluids, excretions and secretions is anticipated.
- Protective eyewear/goggles/visors/face shields.
- Cap (may be used in high risk situations where there may be increased aerosols).
- Mask (high-efficiency mask).

P2 (N95) masks are expected to minimise air-borne and droplet transmission of respiratory secretions from an infectious case to the attending person. If used, they should be properly fit tested.

Surgical masks are expected to minimise droplet transmission of respiratory secretions from an infectious case to other close contacts. Unless it needs to be removed for examination purposes, the infectious case should wear a surgical mask to minimise exhalation of respiratory secretions when other people are within 1 metre or are in the same room.

Who should use personal protective equipment?

Anyone who enters the isolation room/area, including:

- All health care workers who provide direct patient care (e.g. doctors, nurses, radiographers, physiotherapists).
- All support staff, including medical aides and cleaning staff.
- Family members or visitors.
- All laboratory workers handling specimens from a patient with H5N1.
- All sterilizing service workers handling equipment that requires decontamination and has come from a patient with H5N1.

Waste disposal

All waste generated in the isolation room/area should be disposed of in suitable containers or bags. All waste from a H5N1 room should be treated as clinical (infectious) waste.

Staff responsible for routinely removing waste from isolation wards/areas should wear full personal protective equipment when removing waste.

One waste disposal bag is usually adequate, providing waste can be placed in the bag without contaminating the outside of the bag. If that is not possible, two bags are needed (double bagging).

Liquid waste such as urine or faeces can be safely flushed into the sewer system if there is an adequate sewage system in place.

Waste disposal bags should include appropriate biohazard labelling, and be treated and disposed of as per the policy of the hospital and in accordance with national regulations pertaining to hospital waste.

Cleaning and disinfection

The survival time for the influenza virus is:²

- 24-48 hours on hard, non-porous surfaces.
- 8-12 hours on cloth, paper and tissue.
- 5 minutes on hands.

The virus is inactivated by 70% alcohol and by chlorine, therefore cleaning of environmental surfaces with a neutral detergent followed by a disinfectant solution is recommended (see Table 1)

Table 1. Disinfectants

Disinfectants	Recommended use	Precautions
Sodium hypochlorite 1% in-use dilution, 5% solution to be diluted 1:5 in clean water	Disinfection of material contaminated with blood and body fluids	<ul style="list-style-type: none"> ▪ Should be used in well-ventilated areas ▪ Protective clothing required while handling and using undiluted ▪ Do not mix with strong acids to avoid release of chlorine gas ▪ Corrosive to metals
Bleaching powder 7g/litre with 70% available chlorine	Toilets / bathrooms -may be used in place of liquid bleach if this is unavailable	Same as above
Alcohol(70%) spirit. Isopropyl, ethyl alcohol, methylated sprit.	Smooth metal surfaces, tabletops and other surfaces on which bleach cannot be used.	<ul style="list-style-type: none"> ▪ Flammable, toxic, to be used in well- ventilated area, avoid inhalation ▪ Keep away from heat sources, electrical equipment, flames, hot surfaces. ▪ Allow it to dry completely, particularly when using diathermy as this can cause diathermy burns.

Specimen collection and transportation:

Following **standard precautions**, all specimens should be regarded as potentially infectious and staff should adhere rigorously to protective measures in order to minimize exposure.

Specimens for transport must be placed in leak-proof specimen bags, which have a separate sealable pocket for the specimen (i.e. a **plastic biohazard specimen bag**.) Personnel who transport specimens should be trained in safe handling practices and decontamination procedures in case of a spill.

The accompanying request form should be clearly marked as "suspected or probable H5N1" and the laboratory notified by telephone that the specimen is "on its way." Specimens should be hand delivered where possible. Pneumatic tube systems should not be used to transport specimens.

Care of H5N1 patients in isolation:

Patients with H5N1 should be cared for in single rooms to prevent direct or indirect transmission **Annex 3**.

Strict adherence to the infection control guidelines is essential to prevent transmission of infection between patients and from patients to health care workers and others.

Care of patients in isolation units becomes a challenge when there are inadequate resources, or when the source patient has poor hygienic habits, deliberately contaminates the environment, or cannot be expected to assist in maintaining infection control precautions to limit transmission of microorganisms (children, patients with an altered mental state, or elderly persons).

In caring for H5N1 patients in isolation the following guidelines are to be followed:

Preparation of the isolation room

1. Ensure additional precautions through appropriate signage on the door
2. Place a recording sheet at the entrance of the isolation room. All health care workers or visitors entering the isolation area should be encouraged to print their details on the recording sheet so that if follow up/contact tracing is required, details are available.
3. Remove all non-essential furniture. The remaining furniture should be easy to clean and should not conceal or retain dirt or moisture, either within or around it.
4. Collect linen as needed.
5. Stock the hand basin with suitable supplies for hand washing.
6. Place appropriate waste bags in the room on a foot-operated bin.
7. Place a puncture-proof container for sharps in the room.
8. Keep the patient's personal belongings to a minimum. Keep water pitcher and cup, tissue wipes, and all items necessary for attending to personal hygiene within the patient's reach.
9. The patient should be allocated his/her own non-critical items of patient care equipment, e.g. stethoscope, thermometer and sphygmomanometers. Any item of patient care equipment that is required for other patients should be thoroughly cleaned and disinfected prior to use.
10. Set up a trolley outside the door to hold personal protective equipment. A checklist may be useful to ensure all equipment is available (see Annex 2).
11. Place an appropriate container with a lid outside the door for equipment that requires disinfection and sterilization. Once equipment has been appropriately cleaned it can be sent to the sterilizing service department.
12. Keep adequate equipment required for cleaning and disinfection inside the patients' room. Scrupulous daily cleaning of the isolation unit is important in the prevention of cross infection.
13. If possible the air conditioning should ensure the direction of the air-flow is from the outside adjacent space (e.g. the corridor) into the room. This is known as "negative pressure". See glossary at the end of the text.
14. Cutlery and crockery should be cleaned in hot soapy water.

Entering the room

1. Collect all equipment needed.
2. Wear personal protective equipment
3. Enter the room and shut the door.

Leaving the room

- Remove personal protective equipment in the correct order:
- Remove gown (place in rubbish bin)
- Remove gloves (peel from hand and discard into rubbish bin)
- Use alcohol-based handrub or wash hands
- Remove cap and face shield (place cap in bin and if reusable place face shield in container for decontamination)
- Remove mask - **by grasping elastic behind ears – do not touch front of mask**
- Use alcohol-based handrub or wash hands
- Leave the room
- Once outside room use alcohol handrub again or wash hands
- Wash hands using plain soap, antimicrobial agent or waterless antiseptic agent such as an alcohol-based hand gel.

Staff health management

Health care workers who are involved in caring for a patient with H5N1 should receive training on the mode of transmission, the appropriate infection control precautions and the exposure protocol.

Staff not involved in direct patient care should be given general advice about avian influenza – see annex 4.

Exposed health care workers

Antiviral prophylaxis and flu vaccination

All health care workers, or field investigators who are expecting to have contact with H5N1 or have had contact with an H5N1 patient or an environment that is likely to be contaminated are recommended to:

1. Be vaccinated with the current WHO recommended influenza vaccine two weeks prior to the event. This will not protect you against H5N1, but it will help to avoid simultaneous infection by human influenza and avian influenza and thus will minimize the possibility of reassortment of the virus's genes.
2. Take one Oseltamivir phosphate (Tamiflu) 75mg tablet each day for at least 7 days beginning as soon as possible after exposure. Antiviral therapy should begin immediately or at least within 2 days of exposure and may continue for up to 6 weeks.

Self-management

1. Check temperatures twice daily and monitor self for other respiratory symptoms especially cough. Where available, daily throat swab sampling is recommended during the high-risk field visits.
2. Where at all possible, keep a personal diary of contacts. The diary should not be taken into isolation areas or into farms.
3. In the event of a fever, immediately limit interactions and exclude yourself from public areas. Notify the infection control team or occupational health team.

Discharging the patient

1. The patient and family should be educated about the appropriate precautions to take when in contact with chickens, wet markets etc (see Annex 4 advice for family and friends)
2. Carry out appropriate cleaning and disinfection of the room.

Care of the deceased

The care of deceased pandemic influenza patients raises infection control issues, along with significant social and religious considerations. detailed guidelines

In the interim, deceased pandemic influenza patients should be sealed for transportation in an impermeable body bag. If the body bag is thought to be permeable then double bagging should occur, and the zip or other openings sealed with airtight tape. Alternatively, the bag may be placed within a large thick plastic outer bag that can be sealed.

All post mortem procedures require adherence to standard precautions. All procedures performed on respiratory specimens from potential cases of influenza due to a new pandemic strain should be undertaken in a PC3 facility using PC3 work practices, until pandemic influenza cases are widespread in the community.

1. Health care workers must follow standard precautions when caring for the deceased patient.
2. Full personal protective equipment must be worn if the patient died during the infectious period (i.e. 7 days after the onset of symptoms in adults and 21 days after the onset of symptoms in children).
3. The body should be fully sealed in an impermeable body bag prior to transfer to the mortuary.
4. No leaking of body fluids should occur and the outside bag should be clean.
5. Transfer to the mortuary should occur as soon as possible after death.
6. If the family of the patient wishes to view the body, it may be allowed to do. If the patient died in the infectious period the family should wear gloves and a gown.
7. Cultural sensitivity should be recognized and considered in situations where a patient with H5N1 dies.

Post mortem⁵

A post mortem examination of someone who had or probably had H5N1 should be performed with caution if the patient has died during the infectious period. If the patient is still shedding virus when he or she dies the lungs may still contain the virus. Therefore when any procedure is performed on the cadaver's lung, full PPE should be worn including high-efficiency mask, gloves, gown and goggles.

Minimizing the risk from an infected cadaver

a) Prevent the production of aerosols – especially when excising the lung, by:

- avoiding the use of power saws,
- conducting procedures underwater if there is a chance of aerosolization,
- avoiding splashing when removing lung tissue.

b) As a general guide follow standard precautions and:

- use the minimal amount of equipment in the autopsy,
- avoid using scalpels and scissors with pointed ends,
- never pass instruments and equipment by hand – always use a tray,
- if possible use disposable instruments and equipment,
- keep the number of staff present to a minimum.

c) Mortuary care/ funeral director's premises

- Staff of the mortuary or funeral home should be informed that the deceased had H5N1. It should be explained that standard precautions are all that is required in the event of exposure to the body.
- Embalming may be conducted as routine.
- Hygienic preparation of the deceased (e.g. cleaning, tidying of hair, trimming of nails, and shaving) may also be conducted.

Annex 2.

Suggested checklist for H5N1 trolley/table

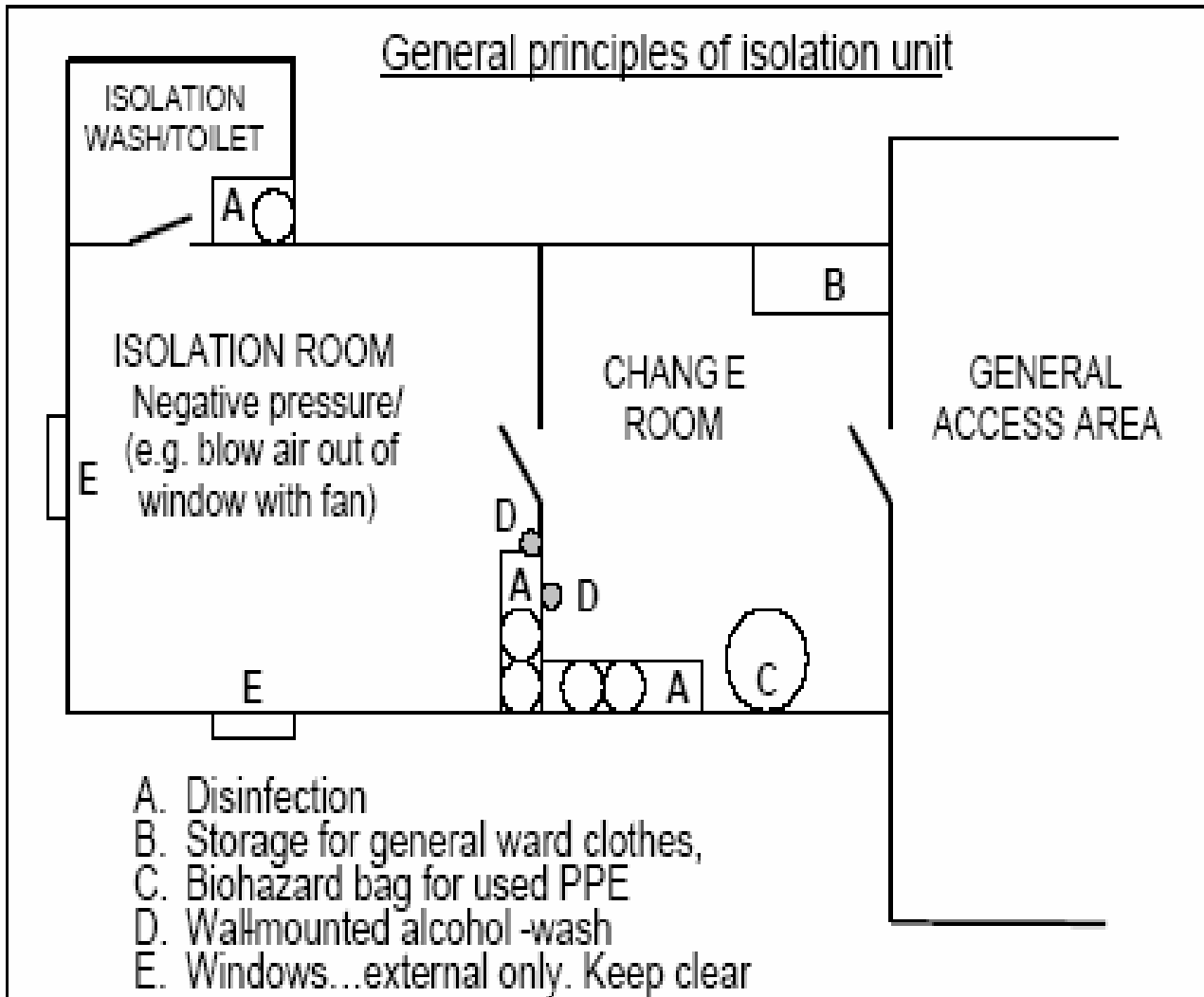
Items should be kept on this trolley at **all times** so that personal protective equipment is always available for staff.

Equipment	Stock present
Face shield/eye protection goggles	
Single use gloves for clinical use (sizes: small, medium, large)	
Gloves (reusable for environmental cleaning)	
Theatre caps (optional for high-risk situations but should be available)	
High efficiency masks	
Surgical masks	
Single-use long sleeved gowns	
Single use plastic aprons	
Alcohol-based handrub or alternative method for washing hands in clean water	
Soap	
Disinfectant	
Clean towel	
Appropriate disinfectant for environmental cleaning	
Pathology equipment Request form Biohazard Pathology Specimen bags FBC tube EDTA tube NPA tubing set or Sterile dacron or rayon swab sticks with plastic shafts and Tube containing Viral Transport Media with a lid Sterile Stool specimen container Sterile Urine specimen container	
Large plastic bags	
Appropriate waste bags	
Linen bags	
Collection container for used equipment	

Annex 3

Isolation room

Typical isolation facility appropriate for patients with highly pathogenic avian influenza



Annex 4.

Infection control advice for non clinical staff

Advice about contact with chickens, ducks or other animals

- Avoid contact with chicken farms, duck farms or any farm where animals have been ill, slaughtered or are thought to harbour Avian influenza.
 - If you inadvertently come into contact with an environment that has had sick/dead chickens – wash hands thoroughly and monitor your temperature for 7days. If you develop a temperature - consult your doctor regarding whether or not you should receive antiviral medication.
 - If you have had contact with any dead chickens that have died from avian influenza or if you have had contact with the faeces of these chickens – monitor your health for 7 days and consult your doctor for advice.
 - If you have chickens that have died in your back yard – you should know how to decontaminate your yard.
1. Wear personal protective equipment – at least cover your face and wear gloves or plastic bags over your hands.
 2. Bury the dead poultry to at least 2.5 meters. This must be away from water supplies.
 3. Clean area of all chicken droppings – scrape or use rake and bury the chicken droppings.
 4. Clean the chicken shed or area where a dropping has been with soap and water.

Advice about visiting friends or relative in health care facilities

- Avoid contact with patients known to have H5N1 during the infectious period of their illness. This is 7 days for adults and 7-21 days for children (< 12years old)
- If you must visit a patient who is suspected as having H5N1 or confirmed as having H5N1 – follow the infection control precautions in place in the hospital for the period the patient is infectious.
- You will need to wear personal protective equipment if you have direct contact with the patient or the patients environment.
- You should receive advice on the proper way to put on the personal protective equipment, especially on how to fit the mask to your face.
- Personal protective equipment you will need to wear includes mask, gown, gloves and goggles
- When you leave the room you must remove these items and wash your hands very well
- After you have been in contact with the patient with H5N1 you should monitor your health for 7 days. If you develop a temperature and sore throat you should consult your doctor for advice regarding antiviral treatment.
- If your illness becomes severe you should seek medical advice immediately and inform them you have been in contact with H5N1.

Advice about respiratory illness

- Anyone with respiratory type illnesses should be careful with secretions from the nose and mouth.

- Cover the nose and mouth when coughing or sneezing – use a tissue and dispose of this once used in the waste
- Always wash hands after having any contact with respiratory secretions.
- Be careful with respiratory secretions (eg. coughing and sneezing) when around other people, especially small children. It may be best to avoid contact with individuals at risk (small children or those people with illnesses) until respiratory symptoms have resolved.
- Avoid contact with secretions of people who have respiratory illnesses.
- Ask people to use a tissue and cover their nose and mouth when coughing or sneezing.
- Seek medical advice if the illness is severe.

Annex 5:

HPAI CASE NOTIFICATION FORM

Unique Identifier

Case No

Reporting Details

Reporting date (dd/mm/yy) ____/____/____

Reporting institution _____

Contact Tel No: _____

Demographic details

Sex Male Female Unknown

Date of Birth (dd/mm/yy) ____ / ____ / ____ **OR** Age (years) ____

Usual country residence _____

Nationality _____

Health Care Worker Yes No Unknown

If NO then occupation _____

Contact Name: _____ Tel No: _____

Address: House No: _____ Road No: _____ Block No: _____

Sign and symptoms

Date of onset of initial symptoms (dd/mm/yy) ____ / ____ / ____

Body temperature higher than 38°C Yes No Unknown

Cough Yes No Unknown

Difficulty in breathing Yes No Unknown

Clinical findings of Respiratory Distress Syndrome Yes No Unknown

Chest X-ray

Chest X-ray performed Yes No Unknown

If yes, evidence of pneumonia or Respiratory Distress Syndrome Yes No Unknown

Responds to standard antimicrobial treatment Yes No Unknown

Hospital Admission History

Has the case been admitted to a Hospital whilst symptomatic Yes No Unknown

If yes, Name of the hospital _____

Date of admission to hospital (dd/mm/yy) ____ / ____ / ____

Has the case been in isolation Yes No Unknown

Has the case been on mechanical ventilation Yes No Unknown

If yes, is the case currently on mechanical ventilation Yes No Unknown

Has the case been admitted to an Intensive Care Unit Yes No Unknown

If not hospitalized, has the case been in home isolation Yes No Unknown

History of exposure

Prior to their onset on illness, did the patient have close contact Yes No Unknown

With a known probable or suspect case of AI

If yes, in what country _____

City _____

Date of first contact (dd/mm/yy) ____ / ____ / ____

Date of last contact (dd/mm/yy) ____ / ____ / ____

During 7 days preceding the onset of illness, did the case Travel to an "affected area" Yes No Unknown

If yes, to which area (s) _____
 During the 7 days prior to onset of illness, did the case travel overseas Yes No Unknown
 To any country besides ones listed above?

If yes, to which country/countries: (dd/mm/yyyy)	(List as many as needed)
1.	Date arrival ___ / ___ / ___ Date departure ___ / ___ / ___
2.	Date arrival ___ / ___ / ___ Date departure ___ / ___ / ___
3.	Date arrival ___ / ___ / ___ Date departure ___ / ___ / ___

For deceased patients ONLY

Unexplained respiratory illness resulting in death Yes No Unknown
 Autopsy examination performed Yes No Unknown
 If yes, did autopsy demonstrate pathology of Respiratory Distress Syndrome without an identifiable cause Yes No Unknown

Contact tracing

Has contact tracing been initiated Yes No Unknown
 If yes, is any contact currently residing abroad Yes No Unknown
 If yes, have the national Public Health Authorities of the recipient country been informed Yes No Unknown

Initial case classification

Suspect Probable Discarded Date classified (dd/mm/yyyy) ___ / ___ / ___

Please resubmit form when final case classification and the status is determined

Final case classification

Confirmed Probable Discarded Date classified (dd/mm/yyyy) ___ / ___ / ___

Final status

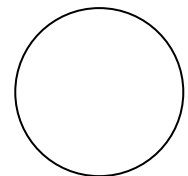
Recovered, if the case was admitted to hospital Date of discharge (dd/mm/yyyy) ___ / ___ / ___
 Died Date of death ___ / ___ / ___
 Left country while symptomatic Medical evacuation Yes / No
 Date of departure ___ / ___ / ___
 Flight details _____
 Destination _____

country _____

Lost to follow-up Date of loss ___ / ___ / ___

Name & Signature of reporting person: _____

Designation: _____



Annex 6

WHO laboratory biosafety guidelines for handling specimens suspected of containing avian influenza A virus

General recommendations

The possibility that an influenza infection in humans caused by avian influenza A viruses could occur following a laboratory accident is a risk to which it is crucial to be constantly alert. Efforts to minimize transmission of infection in humans will be compromised by breaches in laboratory biosafety.

Responsibility for developing a comprehensive safety policy, including a safety manual, and supporting programmes for its implementation normally rests with the director or head of an institute or laboratory. However, laboratory safety is also the responsibility of all supervisors and laboratory employees, and individual workers are responsible for their own safety and that of their colleagues.

Good microbiological technique is fundamental to laboratory safety. The use of safety equipment, combined with good procedures and practices, will help to reduce the risks involved in dealing with biosafety hazards. The most important concepts are outlined below.

- Standard precautions should always be followed; barrier protection (gowns, gloves) should be used whenever samples are obtained from patients. In addition to these standard precautions, eyes should be protected
- Basic containment – Biosafety Level 2 (BSL2) – practices and procedures should be the minimum requirement for handling specimens
- Examples of routine laboratory procedures that require BSL2 include:
 - routine diagnostic testing of serum and blood samples (including haematology and clinical chemistry);
 - manipulations involving neutralized or inactivated (lysed, fixed, or otherwise treated) virus particles and/or incomplete, non-infectious portions of the viral genome;
 - final packaging of specimens for transport to diagnostic laboratories for additional testing; specimens should already be in a sealed, decontaminated primary container.
- Good laboratory practices should be followed. Eating, drinking, smoking, applying cosmetics, and handling contact lenses are prohibited in the laboratory working areas.
- Personal protective equipment (gown, gloves, eye protection) should be worn in the laboratory when handling and processing specimens and performing diagnostic testing.
- All technical procedures should be performed in a way that minimizes the formation of aerosols and droplets.
- Biological safety cabinets or other physical containment devices should be used for all manipulations that may cause splashes, droplets, or aerosols of infectious materials

(e.g. centrifugation, grinding, blending, vigorous shaking or mixing, sonic disruption, opening of containers of infectious materials whose internal pressure may be different from the ambient pressure).

- The use of hypodermic needles and syringes should be limited. They must not be used as substitutes for pipetting devices or for any purpose other than parenteral injection or aspiration of fluids from laboratory animals. Mouth pipetting must be strictly forbidden.
- Adequate and conveniently located biohazard containers should be available for disposal of contaminated materials.
- Work surfaces must be decontaminated after any spill of potentially dangerous material and at the end of the working day. Generally, 5% bleach solutions are appropriate for dealing with bio-hazardous spillage.
- Personnel must wash their hands often – especially after handling infectious materials and animals, before leaving the laboratory working areas, and before eating.
- Personal protective equipment must be removed before leaving the laboratory.

WHO biosafety guidelines for handling specimens that may contain avian influenza A virus

Laboratories must meet basic *BSL2 standards and use BSL3 work practices* to be able to safely:

- aliquot and/or dilute specimens
- perform diagnostic testing that does not involve propagation of viral agents in vitro or in vivo
- perform nucleic acid extractions that involve untreated specimens
- prepare smears using heat or chemical fixation.

BSL3 practices cover the following areas:

- Any procedure that may generate aerosols or droplets should be performed in a biological safety cabinet (e.g. sonication, vortexing).
- Laboratory workers should wear protective equipment, including disposable gloves, solid-front or wrap-around gowns, scrub suits, or coveralls with sleeves that fully cover the forearms, head coverings and, where appropriate, shoe covers or dedicated shoes, eye protection and a surgical mask, or full-face shield, because of the risk of aerosol or droplet exposure when performing specific manipulations.
- Centrifugation of specimens should be performed using sealed centrifuge rotors or sample cups. These rotors or cups should be unloaded in a biological safety cabinet.
- Work surfaces and equipment should be decontaminated after specimens are processed. Standard decontamination agents that are effective against non-enveloped viruses should be adequate if used according to the manufacturer's recommendations. Generally, 5% bleach solutions are appropriate for dealing with biohazardous spillage.

More information on disinfection and sterilization is provided in the *WHO laboratory biosafety manual*.

- Biological waste contaminated with suspect or confirmed influenza A/H5 specimens, should be treated as outlined in the *WHO laboratory biosafety manual*.

When a procedure or process cannot be conducted within a biological safety cabinet, appropriate combinations of personal protective equipment (e.g. respirators, face shields) and physical containment devices (e.g. centrifuge safety cups or sealed rotors) **must** be used.

WHO strongly recommends that the BSL3 precautions described above are adopted and followed for work in BSL2 laboratories with influenza A/H5 virus specimens.

Where laboratory facilities do not meet at least basic BSL2 containment conditions, specimens should be referred to suitably equipped reference laboratories for primary diagnostic tests.

For laboratories that meet BSL3 containment standards and are operated by staff trained in the use of appropriate BSL3 work practices, the following procedures can be undertaken:

- Diagnostic tests that involve propagation of viral agents in vitro or in vivo.
- Work involving the replication of influenza A/H5 virus in cell culture and/or storage of cell culture isolates.
- Recovery of viral agents from cultures of influenza A/H5 specimens.

Manipulations involving growth or concentration of influenza A/H5 virus.

Annex 7



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ANNEX 8:

Laboratory guidelines for sample collection:-

Guidelines for the collection of human specimens for laboratory diagnosis of influenza with pandemic potential

All patients with suspected pandemic influenza should have respiratory tract samples collected for virus detection, as well as acute and convalescent serum samples. Specimens for virus isolation or for detection of viral nucleic acids or antigens should be taken preferably during the first three days after onset of clinical symptoms, but may be taken up to a week after onset, or even later in severely ill or immunocompromised patients. Investigations should also be undertaken for other potential causes of the illness as deemed appropriate by the attending physician.

Type of specimens

In all cases an upper respiratory tract sample should be collected. A swab collected from each nostril, and a throat swab pooled into the same container of viral transport medium is the specimen of choice. Nasopharyngeal swabs may be collected instead of nose and throat swabs. Swabs pose a lower risk of infection of staff than do nasopharyngeal aspirates (NPA) or nasal washes, both of which may generate aerosols. They are suitable for testing by polymerase chain reaction (PCR) which is a rapid, sensitive test employed by most public health laboratories. They can also be used for virus isolation, but are not suitable for antigen detection test such as immunofluorescent antigen detection (IFA).

Where antigen detection tests are the only rapid tests available, then NPA or a nasal wash should be collected, provided that they can be performed within a controlled environment using suitable respiratory precautions. Samples collected for antigen detection tests may also be used for NAD and culture.

In addition to swabs from the upper respiratory tract, invasive procedures such as bronchoalveolar lavage or lung biopsy can be performed for the diagnosis of virus infections of the lower respiratory tract where clinically indicated. Post mortem samples may also be submitted. In all cases these procedures must be performed within a controlled environment using suitable respiratory precautions.

An acute-phase serum specimen (7-10 ml of whole blood) should be taken soon after onset of clinical symptoms and not later than seven days after onset. A convalescent-phase serum specimen should be collected 14 days after the onset of symptoms. Where patients are near death, a second ante-mortem specimen should be collected even if 14 days has not elapsed.

Specimen collection, storage and transport Specimen

Collection poses a risk of aerosol production and recommended precautions should be followed closely. Consult annex 5: Infection control for further details.

Specimens should be packaged and transported as per standard recommendations for infectious substances. Use a 'No Touch' technique when packing samples and ensure that the exterior surface of the package should be clean. Double-bag if necessary. Pneumatic tube

delivery systems should not be used, as any breakage or leakage within the pneumatic system could contaminate an entire institution.

Samples for transport between laboratories should be transported in the usual manner. It is essential that the laboratory receiving the sample is aware that it comes from a potential pandemic influenza case and that it has the facilities required to safely handle the sample.

Where an isolate or suspicious organism is being referred to a reference laboratory for further testing, then transport the specimen as an Infectious Substance (Model Regulations and Packing Instruction 602 of the IATA Dangerous Goods Regulations). Telephone contact should be made with the receiving public health laboratory to facilitate safe and rapid processing of the specimens.

Once cases of influenza are sufficiently widespread in the community this individualised management of specimens may cease by agreement between the laboratory and public health officers.

Nasal swab

A dry swab is inserted into the nostril (only as far as the anterior end of the nasal turbinate), parallel to the palate, and left in place for a few seconds. It is then slowly withdrawn with a rotating motion. Specimens from both nostrils are obtained with the same swab. The tip of the swab is put into a vial of virus transport medium and the applicator stick is broken off. This can be combined with the throat swab and/or nasopharyngeal swab in a single vial of virus transport medium. The virus transport medium should be stored and transported at 4°C and delivered promptly to the laboratory.

Nasopharyngeal swab

A flexible, fine-shafted swab is inserted into the nostril and back to the nasopharynx and left in place for a few seconds. It is then slowly withdrawn with a rotating motion. A second swab should be used for the second nostril. The tip of the swab is put into a vial of virus transport medium and the applicator stick is broken off. This can be combined with the throat swab and/or nasal swab in a single vial of virus transport medium. The virus transport medium should be stored and transported at 4°C and delivered promptly to the laboratory.

Nasopharyngeal aspirate

Nasopharyngeal secretions are aspirated through a catheter connected to a mucus trap and fitted to a vacuum source. The catheter is inserted into the nostril parallel to the palate. The vacuum is applied and the catheter is slowly withdrawn with a rotating motion. Mucus from the other nostril is collected with the same catheter in a similar manner. After mucus has been collected from both nostrils, the catheter is flushed with 3 ml of transport medium. The virus transport medium should be stored and transported at 4°C and delivered promptly to the laboratory. Specimens for direct detection of viral antigens by immunofluorescence staining of infected cells should be processed within 1–2 hours.

Nasal wash

The patient sits in a comfortable position with the head slightly tilted backward and is advised to keep the pharynx closed by saying "K" while the washing fluid (usually physiological saline) is applied to the nostril. With a transfer pipette, 1–1.5 ml of washing fluid is instilled into one nostril at a time. The patient then tilts the head forward and lets the washing fluid flow into a specimen container. The process is repeated with alternate nostrils until a total of 10–15 ml of washing fluid has been used. Dilute approximately 3 ml of washing fluid 1:2 in transport medium.

Throat swab

Both tonsils and the posterior pharynx are swabbed vigorously. The tip of the swab is put into a vial of virus transport medium and the applicator stick is broken off. This can be combined with the nasopharyngeal swab and/or nasal swab in a single vial of virus transport medium. The virus transport medium should be stored and transported at 4°C and delivered promptly to the laboratory.

Serum

Blood should be collected in the usual manner for serum samples. Specimens should be stored and transported at 4°C and delivered promptly to the laboratory.

Specimen processing

Specimens processing and laboratory biosafety

1. Requirements for laboratory staff involved in the collection and processing of samples

Staff from high risk groups for complicated influenza should be excluded from these activities unless absolutely necessary. High standards of personal hygiene are important in minimising the risk to staff.

2. Laboratory staff prophylaxis

Laboratory staff should be vaccinated against the currently circulating influenza strain, and if available, the new pandemic strain. Staff involved in cell culture in BSL3 conditions should be offered prophylaxis with a neuraminidase inhibitor. A protocol for management of accidental exposure of staff to a pandemic influenza strain, including post-exposure prophylaxis with a neuraminidase inhibitor antiviral drug should be in place in laboratories processing respiratory specimens, and doses of an appropriate drug stored in the laboratory for this purpose. As the pandemic progresses, it is anticipated that there will be staff who will have acquired infection in the community and recovered. Those staff should be preferentially used for specimen collection and processing.

3. Personal protective equipment (PPE)

All staff potentially exposed to samples known or suspected to contain pandemic influenza should wear suitable PPE and must be trained in its proper use.

4. Decontamination

Work surfaces and equipment should be decontaminated after specimen processing. Standard laboratory decontamination protocols using 0.5% hypochlorite or 2% glutaraldehyde are sufficient.

5. Specimen processing

Blood and urine specimens processed outside of microbiology or histopathology laboratories should be handled using standard precautions²⁸ in BSL2 laboratories.

For microbiological and anatomical pathology laboratory specimens the following procedures can be carried out under BSL2 precautions:

- pathological examination and processing of formalin-fixed or otherwise inactivated tissues
- molecular analysis of extracted nucleic acid preparations
- electron microscopic studies with glutaraldehyde-fixed grids
- routine examination of bacterial and fungal cultures following the initial inoculation
- routine staining and microscopic analysis of fixed smears
- final packaging of specimens for transport to diagnostic or reference laboratories for additional testing. Specimens should already be in a sealed, decontaminated primary container.

Activities involving manipulation of untreated respiratory specimens may be performed in BSL2 facilities, but with more stringent work practices as described below. These activities include:

- cut up, blocking and macroscopic description of respiratory tissue
- aliquoting and/or diluting specimens
- inoculation of bacterial, fungal and virological culture media
- performing diagnostic tests that do not involve propagation of viral agents
- nucleic acid extraction procedures involving untreated specimens
- Preparation and chemical- or heat-fixing of smears for microscopic analysis.

Stringent measures to be employed for these activities in BSL2 facilities include:

- Medical laboratory staff should wear protective equipment, including disposable gloves, disposable solid front gowns with cuffed sleeves that are either impermeable or covered with a plastic apron, full eye protection²⁹ and respiratory protection, preferably a N-95 particulate filter mask but a surgical mask may be substituted if necessary provided that the work is carried out in a biological safety cabinet. Personnel who cannot wear these masks because of facial hair or other fit-limitations should wear loose fitting hooded or helmeted PAPRs.
- Gowns, gloves and masks should be discarded after the specimens have been processed. Remove the mask after the gown and gloves. Do not touch the mask front

when removing mask from face- the mask tabs only should be touched. Careful attention should be given to hand hygiene after removal of protective clothing and especially before touching the face; contact with eyes and mucosal surfaces should be minimised.

- All specimen manipulations should be carried out in a certified biological safety cabinet class 1, 2 or 3. Aerosol producing procedures should be carried out in a biological safety cabinet and centrifugation should be carried out using sealed centrifuge cups or rotors that are unloaded in a biological safety cabinet.
- The following activities require PC3 facilities and PC3 work practices:
 - viral cell culture procedures other than the primary inoculation
 - initial characterisation of viral agents recovered in cultures.

Once viable virus has been inactivated (for example by addition of guanidinium isothiocyanate in a nucleic acid extraction protocol, use of a solvent fixative such as 2% glutaraldehyde for electron microscopic examination or acetone for immunofluorescent examination, exposure to 50 kG γ -irradiation or other inactivation protocol with demonstrated efficacy) material may be removed from the PC3 facility for further characterisation. Particular care should be taken to ensure that the inactivation protocol is properly executed. The outside of specimen containers must be decontaminated prior to removal from the PC3 facility to ensure no transfer of viable virus.

Testing protocols

1. Nucleic acid testing

In most public health laboratories the test of choice for detection of influenza due to a potential new pandemic strain will be PCR using primers capable of detecting all 16 potential haemagglutinin (HA) types of influenza. The matrix (M) protein is the influenza gene target most commonly employed for such broadly reactive assays. Ideally these broadly reacting tests would be used at all times for influenza diagnosis and surveillance, but as a minimum should be available during periods of heightened risk of cases of pandemic influenza.

Once the identity of a new pandemic strain is known it may be possible to make greater use of HA type specific PCR assays in primary diagnosis. Once cases are widespread in the community, a type-specific laboratory diagnosis of influenza will probably become superfluous, unless multiple different strains are circulating concurrently.

2. Immunofluorescent assays

Immunofluorescent (IFA) assays using standard reagents potentially provide a rapid non-type specific laboratory diagnosis of influenza where PCR is not available. Standard influenza IFA reagents are capable of detecting H5N1 influenza. Specific reagents for H5 influenza are becoming available. IFA's effectiveness in detecting other potential pandemic influenza strains remains to be established, and it is less sensitive than PCR. Therefore, in the early

stages of a pandemic, all samples from suspected cases must be referred for testing by PCR and cell culture in addition.

As IFA usually requires an NPA or nasal wash, laboratories should be aware of the additional infection control precautions required for collection of these specimens.

3. Viral cell culture and rapid cell culture

Viral cell culture procedures, with the exception of initial inoculation of tube cultures with primary specimens, should be performed in a PC3 facility using PC3 work practices. Similarly characterisation of isolates recovered from such cultures should be undertaken in a PC3 facility using PC3 work practices. Material recovered from all cell cultures may be removed from the PC3 facility for further analysis once viable virus has been inactivated by a suitable protocol, as above.

Viral culture using Madin Darby Canine Kidney (MDCK) or Primary Monkey Kidney (PMK) cell lines using standard protocols will detect potential new pandemic strains. PCR provides the most reliable approach to identification of isolates until the effectiveness of IFA against the new pandemic strain is established.

Conventional tube culture may take 4-7 days. This can be reduced to 1-3 days using shell vial or multi-well plates and staining after 48 hours of culture with commercially available monoclonal antibodies (Mabs). The efficacy of Mabs against a new pandemic strain would need to be established before this latter approach could be recommended.

4. Typing and subtyping

Definitive typing will be undertaken by the WHOCC using reference methods, including serological typing employing WHO reference antisera, and nucleic acid sequencing.

5. Point of care tests

No point of care tests with demonstrated efficacy in detecting a broad range of influenza subtypes are currently available.

6. Serology

Due to the delays in serological responses, the utility of serology tests for identifying pandemic activity will be limited. However they are likely to find use as a final exclusion of infection, or to maximise the case ascertainment rate in cases, especially where direct detection was not performed or was inadequate. There is a wide variety of approaches to serological testing for influenza antibodies exist and varying capacity and methodology is available in public health laboratories.

Samples from suspected cases should be submitted to the local public health laboratory for testing either at that laboratory or be referred the WHOCC. Tests that will specifically detect antibody to the pandemic strain are required. Traditional haemagglutinin inhibition (HAI) provides a type specific diagnosis by demonstrating a single high titre or,

preferably a rise in antibody between paired sera. This test is currently available for H5 influenza, but would not be available for other pandemic strains until antigen was supplied.

Neutralisation titres (NT) are technically more difficult but can be performed in laboratories that have the appropriate facilities for culture of the pandemic strain. If needed these tests would be made available through the public health laboratories.

7. Diagnostic criteria

During the initial phase of laboratory screening for the first case, or cases of influenza attributable to a new pandemic strain, a highly specific laboratory case definition is recommended.

A laboratory proven case should be defined as one in which two different laboratory methods have given reactive results, or two different specimens have given reactive results, or alternatively in which reactivity has been confirmed in a second laboratory. When pandemic activity is first identified in Bahrain, positive results must be confirmed by the WHOCC by testing of the positive material (eg nucleic acid extract or isolate) and the original sample.

This degree of specificity, and possibly laboratory diagnosis itself will become superfluous as cases become widespread in the community.

ANNEX 9:

Precautionary Measures Against the Importation of H5N1 into Bahrain.

In view of the fact that ships arriving from Avian influenza infected countries may have a person who may be incubating the disease and subsequently develop signs and symptoms of Avian influenza, the following are the control measures to be taken on all arriving ships from Avian influenza infected countries:

1. If the answers to the health questions stated in the Declaration form are negative and 10 days has elapsed since the ship's departure from the infected country, the ship is authorized to come alongside. Public health specialist will board the ship and carry out a medical examination of all the ship's crew. If the findings show that there is no suspected case on board, the port authority will be given permission to commence operation, viz. shore personnel to embark. However the crew members will be permitted to come ashore only after 10 days has elapsed since the ship's arrival in Bahrain.

If there is a suspected Avian influenza case onboard, the ship should not be given free pratique' and should not be brought alongside and the Public Health Authorities must be notified immediately.

- The ship will be boarded by the doctor. The case will be transferred to the hospital and isolated, The crew members will be examined by the doctor to search for any undetected case.
- The ship and all the crew members will be placed in **quarantine for 10 days, beginning from the day the case was isolated. Thereafter the crew members should not be Permitted to come ashore.**
- Disinfection of all articles and surfaces of the rooms **frequented by the case will be carried out.**

Probable Case of Influenza A (H5N1)

- A. Possible case and
- B. Limited laboratory evidence for influenza A (H5N1) (Such as IFA+uslg monoclonal antipodes)

Symptomatic passengers

If a passenger reports or is observed to have symptoms of influenza, and the infectious period has not passed, then:

- the passenger should be isolated as much as possible from other passengers and crew
- the passenger should be given a surgical mask to wear
- attending crew should wear full PPE as outlined under *Personal protective equipment*
- for meals, the passenger should remove the mask and place it in a disposable bag, then wash his or her hands with an alcohol-based hand wash and place it in the disposable bag with the mask, and then dispose of the bag in general waste
- once his or her meal is finished, the passenger should be supplied with a new mask
- the mask should be changed when it becomes moist or damaged
- the captain of the aircraft must report the presence of symptomatic passengers to Bahrain Quarantine and Inspection Service, prior to landing (BQIS).

Attending crew

Crew members should wear full PPE when attending a symptomatic passenger and immediately wash their hands after removing their gloves and masks. If running water and soap are not available, then crew members should use alcohol-based hand wash to wash their hands. Used gloves and masks should be placed in a disposable bag, sealed, and disposed in general waste.

Cleaning passenger aircraft

Once an infectious passenger has left an aircraft, the main source of infection (ie respiratory secretions) has been removed. However, there may be residual respiratory secretions on environmental surfaces (eg seats). Thus, crew members cleaning the interior of passenger aircraft may be infected if they transfer respiratory secretions (eg with their hands) from an environmental surface to their eyes, noses or mouths. Cleaners should wear full PPE, avoid touching their eyes, noses or mouths, and immediately wash their hands after removing and disposing of their gloves in disposable bags in general waste.

Linen

Linen, such as pillows and blankets that have been in contact with a symptomatic passenger, should be transported in leak-resistant, closed laundry bags for washing. Special cleaning of upholstery, carpets and storage compartments is not required.

Sea travel

Transmission of influenza has been reported among ship passengers.

Close contacts of an infectious case are at highest risk of infection.

Ships should have sufficient PPE and hand washing facilities (or alcohol-based hand wipes), to manage infectious cases and protect staff.

Prior to departure, passengers should be advised to immediately report symptoms of Influenza to the crew.

In general, the recommended infection control precautions for sea travel are the same as for air travel. However, the following, additional recommendations apply:

- infectious cases should be isolated from other travelers as soon as possible
- if the infectious case is a crew member, then the person should be relieved of his or her duties and be isolated
- the master of the vessel should immediately inform the BQIS about the suspected case and record the name, the date of onset of symptoms and the symptoms of the suspected case, and the names, cabin numbers, home addresses and phone numbers of the crew and passengers who were on board the vessel at the same time as the infectious case.

Assessment of infectious cases on arrival in Bahrain

Passengers or crew may be referred for assessment because they were symptomatic during travel or on arrival, because they were detected as having a temperature on thermal scanners or because they reported contact with an infectious case. In this situation, an BQIS officer will conduct the initial assessment in accordance with established BQIS procedures.

Clinical assessment of passengers

After initial assessment, passengers may be referred to a nurse or doctor for clinical assessment.

Nurses or doctors should wear P2 (N95) masks, disposable gloves, protective eyewear, and long-sleeve, disposable gowns. In high-risk situations, cap and plastic apron may be required (see *Personal protective equipment*).

Nurses or doctors should avoid touching their eyes, noses or mouths until they have completed the clinical assessment, removed themselves from the enclosed space with infectious cases, disposed of their gloves, eyewear, masks, gowns, and washed their hands. If hand-washing facilities are not available, then an alcohol-based hand wash should be used.

Used masks, gloves, and gowns should be disposed of in a sealed bag in general waste, and reusable eyewear should be disinfected according to manufacturer's instructions.

Clinical equipment, such as stethoscopes, should be disinfected after the examination.

Surveillance protocol Algorithm for ports

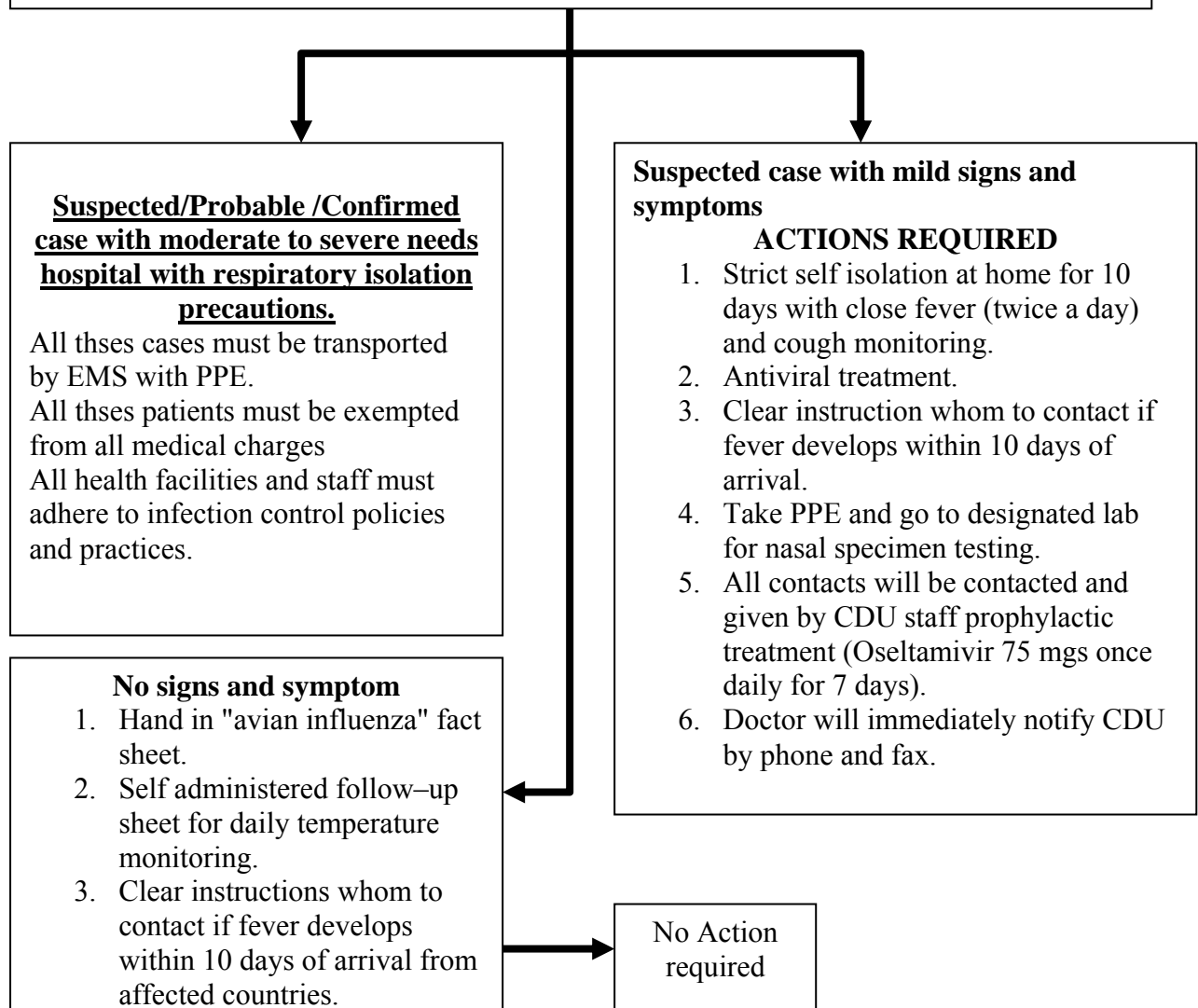
Port of Entry: Seaport and International Airport Ship/pilot/causeway has to inform ground staff by radio call if a suspected passenger or crew is onboard

Self declaration form to be filled by passengers arriving with affected countries within 10 days travel history.

Doctors at Seaport and International Airport will take travel history and clinical assessment. Specific actions required according to cases definition.

Airport doctor to take PPE and conduct:

1. Clinical assessment.
2. Temperature check.
3. Respiratory symptoms.
4. Fill- out data recording sheet.



Avian Influenza "Bird Flu" Guidelines, 2005

To the travelers

During your recent travel, you may have been exposed to cases of "Avian Influenza: You should monitor your health for at least 7 days, if you become ill with fever accompanied by cough or difficulty in breathing, you should consult a physician (primary health care or Emergency department). Please inform the doctor about your recent travel to Far East Asia countries and whether you were in contact with someone who had these symptoms. Please fill – up the follow up form at airport clinic where you will receive preliminary assessment and awareness printed material for further actions.

To the physician

The patient presenting this follow – up form may have recently traveled to "Avian influenza" affected countries with human to human transmission of H5N1 virus. If you suspect influenza like illness (ILI). Please fill personal data form for follow – up/isolation and/or hospital evaluation. For further actions please follow protocol algorithms for specific actions.

PHYSICIANS AT BAHRAIN SEA PORT & BAHRAIN INTERNATIONAL AIRPORT: must review and explain following attached documents to an arriving passenger. (Avian influenza fact sheet, follow – up form), and complete data recording form. Please call Communicable Diseases Unit, staff on call. And advise passengers to call "Avian influenza telephone hot line" in case emergency and further information.

**For further information please contact to Diseases Control Section, Communicable Diseases Unit
Tel: 17279214, 17279234-Fax: 17279290, 17279268**

Border control for pandemic influenza

International airport procedures for border nurse referrals

Border nurses are placed at international airports for the purposes of screening travelers for influenza only. They are not provided for general medical assessment

From the health declaration card, incoming travellers may be referred by Bahrain quarantine and inspection service (BQIS) staff for assessment by a nurse because they are unwell or because they have been in contact with a person with severe respiratory disease. Those identified as being unwell will be issued with a surgical mask and escorted to an interview room.

From the infra-red thermal imaging, incoming travellers may be referred for assessment by a nurse because they are suspected to have a fever, a prominent symptom of influenza. Those identified as having fever will be issued with a surgical mask and escorted to an interview room.

Prior to interview of the 'at risk' traveller, the interviewing border nurse should be aware of the infection control guidelines. (BQIS) staff should organise a medical interpreter if required. Care must also be taken to ensure that the interpreter is adhering to the infection guidelines. In the interview room, the following questionnaire is to be administered to determine whether the unwell traveller should be referred to the Chief Quarantine Officer .

Actions by the border nurse

People who have symptoms of influenza like illness and have been in an affected area should be managed according to the flow chart. Outcomes.

1. Isolate

People who have signs or symptoms of influenza like illness or contact with person(s) with influenza like illness before the onset of illness and have been in an affected area should be provided with a surgical mask.

The nurse should:

- report the case to the chief quarantine officer (CQO) or duty medical officer by telephone; and
- fax this record to an appropriate public health unit.

2. Health advice

People who do not need isolation after the assessment will be released with health advice given by the nurse. The nurse should advise them to continue monitor for any signs or symptoms of influenza like illness. If symptoms occur, these people should seek medical attention immediately and report their travel histories to the physician.

If the person is symptomatic and his/her temperature is less than 38°C, apart from health advice given, he/she should be

- provided with a surgical mask; AND

- provided with printed advice on managing their symptoms; AND
- a telephone number of an appropriate public health unit.

What is the outcome of the assessment of this traveller? (Please circle one of the following)

Isolation & contact CQO / Released with health advice

* Fax the border nurse assessment summary form(s) at the end of each shift to the Public Health CDU Tel: 17279214, Fax: 17279268.

Border nurse

Name _____

Telephone number _____ Date ___/___/___

Border Nurse Assessment Summary

Duty Nurse's Name _____ Date ____/____/____ State /Territory of this Airport _____

Please record the details of the assessed travellers in the table below.

Outcome of assessment 1= released – on contact with a case of flu and not travelled in flu pandemic affected area/other cause of symptoms
 2= released with advice about flu and need to monitor his /her own health.
 3=Chief Quarantine duty officer contacted – record faxed to a public health unit (CDU) 17279290

Name	Sex	Date of Birth	Flight number	Where his flight came from?	Area residence/area temporary stay for visitor	Contactable number/mobile number in Bahrain	Email	Body temperature? ©	Any flu-like symptoms? Please specify (fever, cough, sore throat, fatigue)	Contact with someone who had a respiratory illness?	Referred to a public health unit (CDU)	Outcome of assessment

Fax this form to Chief quarantine office (CQO)

AVIAN OR PANDEMIC INFLUENZA DETECTION CHART

A MODEL PLAN FOR THE DETECTION AND MANAGEMENT OF SUSPECTED AVIAN OR PANDEMIC INFLUENZA CASES

This is based on what is currently known about avian and pandemic influenza and will be updated in light of new information.

SCREENING (over the phone or in reception)
 Patient with respiratory symptoms (such as cough or shortness of breath(a)) AND history of travel in past 10 days to an area affected by avian or pandemic influenza.

Request patient to wear a surgical mask (if no masks, ask patient to cover mouth and nose with tissue when coughing or sneezing) and sit in a spare room, if possible.
 Advise doctor.

CLINICAL ASSESSMENT
 DOCTOR USING PERSONAL PROTECTIVE EQUIPMENT (PPE)
 • Fever ≥ 38 degrees Celsius and respiratory symptoms
 AND
 • Plausible history of exposure within 7 days of symptom onset

Yes

Patient should be considered as a possible case of avian or pandemic influenza

No

-Seek alternative diagnosis
 -Maintain level of suspicion
 -Arrange for follow-up if clinical deterioration

-Report to local Public Health Unit
 -Discuss diagnosis, referral, relevant investigations, treatment, hospitalisation and contact management
 -Contact on-call microbiologist to discuss appropriate laboratory tests, specimen handling and transport

-If indicated, obtain appropriate investigations, following strict standard and additional infection control precautions.
 -If appropriate, arrange hospital admission, alerting staff that patient may have avian or pandemic influenza.

a. Additional clinical symptoms may include fatigue, chills, sore throat, headache, conjunctivitis, muscle aches and pains and gastrointestinal symptoms (such as nausea and vomiting)

c. Risk factors may include contact with affected animals or their environment, contact with cases of severe respiratory illness or being a laboratory worker with potential risk exposure to the disease agent

ANNEX10:

Key infection control messages for the general public

PROTECTING YOURSELF AND OTHERS AGAINST RESPIRATORY ILLNESS

- HANDWASHING IS ONE OF THE MOST IMPORTANT MEASURES TO PREVENT THE SPREAD OF INFECTION
- Anyone with respiratory-type illness should be careful with secretions from the nose and mouth
- Cover the nose and mouth when coughing or sneezing - use a tissue and dispose of this once used in the waste
- Always wash hands after having any contact with respiratory secretions
- Be careful with respiratory secretions (eg coughing and sneezing) when around other people. It may be best to avoid contact with individuals at risk (small children or those with underlying or chronic illnesses such as immune- suppression or lung disease) until respiratory symptoms have resolved
- Avoid contact with secretions of people who have respiratory illnesses
- Ask people to use a tissue and cover their nose and mouth when coughing or sneezing

TRAVEL HEALTH

Have you recently arrived from overseas or returned from overseas?

Do you have fever, bad cough, trouble breathing, or otherwise feel unwell?

Please see a doctor about your symptoms

- When you see a doctor, tell them about your symptoms and that you have been overseas, without waiting to be asked
- Cover your nose and mouth with a tissue when coughing or sneezing
- Throw the tissue away in a bin afterwards and then wash your hands with soap and water

ANNEX 11:

Agriculture response relating to a human influenza

Pandemic

Background

All commercial or domesticated poultry and numerous wild bird species are susceptible to infection with avian influenza virus. However, disease outbreaks occur most frequently in chickens and turkeys.

Avian influenza viruses can be brought into Bahrain by nomadic or migratory wild birds and then cycle through Bahrain wild or free-living waterfowl. The virus is more commonly associated with waterfowl (especially geese, ducks and swans) that generally show no signs of disease. However, if infected wild birds or their excretions (especially through contaminated water) come into contact with, and infect, domestic poultry outbreaks of severe disease can occur.

Animal infection overseas- low human public health risk (in Bahrain)

Current policy involves increased security at points of entry into Bahrain, upgraded biosecurity for poultry owners and a substantial on-going awareness campaign.

Animal infection overseas-substantial human public health risk (current situation)

As above, but more intensive.

Animal infection in Bahrain- low human public health risk

A consultative committee is convened and intensive surveillance aimed to identify potential new cases instituted. Because of the risk of spread of virus by personnel, equipment and vehicles, the following procedures would be adopted to enable continuing surveillance while minimising multiple farm visits by inspectors and industry personnel:

- dead bird pick-up and transport to a laboratory, for sampling and sending samples to a laboratory
- report on flocks by visits or telephone
- telephone survey
- serological testing.

There would be three phases for surveillance:

- early in an outbreak to define the extent of infection by clinical signs and virus isolation
- later in an outbreak to re-enforce that the extent of infection has been determined when recovered flocks have seroconverted

- if the disease becomes established and control procedures are applied, such as vaccination, some surveillance would continue to determine where infection has spread.

If the disease is designated to be highly pathogenic for poultry ‘stamping out’ would be instituted. This involves destruction of the infected poultry plus the sanitary disposal of the carcasses and any contaminated poultry products to remove the source of infection.

Animal infection in Bahrain- substantial human public health risk

As above, plus increased testing of other bird species in particular waterfowl will be carried out in the vicinity of the flocks. The extent of this will be determined by the consultative committee.

Any other species exhibiting influenza-like illness will be tested and appropriate testing and surveillance of additional species as deemed appropriate by the Ministry of Agriculture.

Ministry of Agriculture will compile data on infected flocks and other species and provide this to Bahrain.

Inter-pandemic (or non-pandemic) period

The aim is to undertake a risk assessment and to then develop a surveillance program that will encourage a better understanding of avian influenza virus in birds in Bahrain. Such a system, although far from ideal due to the usually low prevalence of the virus, would also provide an early warning system.

Although Bahrain is considered free of swine influenza some testing poultry may also occur.

Testing for avian influenza through the Bahrain quarantine strategy would also continue

WHO advice on the preparation of poultry for consumption

- 1) Avoid contamination :
Separate raw meat from cooked or ready – to eat foods. Do not use the same chopping board or the same knife for preparing raw meat and cooked or ready – to – eat foods. Do not handle both raw and cooked foods without washing your hands in between and do not place cooked meat back on the same plate or surface it was on before it was cooked.
- 2) Cook thoroughly:
Thorough cooking will inactivate influenza viruses. Either ensure that the poultry meat reaches 70 °c or that the meat is not pink and there are no pink juices.
- 3) Be careful with eggs:
Egg, too, may carry pathogens, such as the bird - flu virus inside or on their shells. Care must be taken in handling raw eggs and shells. Wash hands afterwards. Egg yolks should not be runny or liquid. Do not use raw or soft- boiled egg in foods that will not be cooked.
- 4) Keep clean:
After handling raw or thawed raw poultry or eggs, wash your hands and all surfaces and utensils thoroughly with soap and water.

Annex 12

Pandemic vaccines

Types of vaccines, doses, and dosing schedule

Current influenza vaccines contain either inactivated influenza virus antigens or living, attenuated virus. Although there is some progress to registration of vaccines prepared from viruses grown in cell culture, the great majority are prepared from influenza cultivated in embryonated chicken eggs. Currently only inactivated, egg grown, vaccine are licensed for use in Bahrain.

Annual influenza vaccine formulation follows recommendations made by the World Health Organization

Current influenza vaccine development and production

Currently, only influenza viruses that have been isolated and passaged exclusively in embryonated chicken eggs, or primary cell cultures derived from these, are permitted for use as vaccine strains. Reference viruses suitable for preparation of vaccine seed viruses are prepared and made available to vaccine manufacturers through the WHO Global Influenza Program.

In Bahrain, only single dose containers are currently approved and vaccines are supplied packaged as a 0.5ml dose in single-use syringes.

Vaccine development and production in the event of a pandemic

Registration of influenza vaccines for use in a pandemic may differ in a number of respects from the normal inter-pandemic vaccine. This may include use of a monovalent formulation, changes in antigen content, use of whole virus vaccines, incorporation of adjuvants, and distribution in multi-dose containers.

It is proposed that, in Bahrain, these changes will be expedited by a process of licensing ahead of the time when the pandemic vaccine strain is known.

It is expected that reference viruses for development of vaccine strains will be available through the WHO network as usual. However, viruses that show pandemic potential, or that have started to spread in pandemic fashion, may present particular problems, requiring different approaches to inter-pandemic viruses, including the need for higher levels of biosecurity in their handling.

Distribution of the pandemic vaccine

Bahrain planned to sign agreements with pharmaceutical companies to supply the normal seasonal influenza vaccine for the next three influenza seasons and to made with the manufacturers a contractual commitment to provide sufficient vaccine to treat Bahrainis in the event of an influenza pandemic.

The Government will place purchase orders for the supply and delivery of pandemic vaccines supplies with the vaccine manufacturers in the event that a pandemic is declared or notified by WHO.

Pandemic vaccine priority groups

Initially, the vaccine will be in short supply and so its use will have to be prioritized. Figure 1 identifies some of the likely priority groups for pandemic influenza vaccination when available and the prioritization rationale.

Figure 1: Priority groups for pandemic vaccine

<i>Group Rationale</i>	
Health care workers	<ul style="list-style-type: none"> • Health care workers are at increased risk of acquiring infection and passing it on to vulnerable patients. • Health care workers perform essential services. • Having health care staff available to care for the sick will reduce morbidity and mortality
Other essential workers such as emergency personnel	<ul style="list-style-type: none"> • To maintain essential services.
Other groups most likely to transmit the virus such as children	<ul style="list-style-type: none"> • Consistent with the goal of containment.
Those at risk of severe outcome	<ul style="list-style-type: none"> • Reduction in demand for health care services. • Reduction in morbidity and mortality.

Even when the recommended priority groups are determined, they will be continually revised in light of new information that is learnt about the pandemic virus.

When sufficient pandemic influenza vaccine is available, the entire Bahrain population will be offered vaccination.

Seasonal influenza vaccine

The seasonal influenza vaccine normally contains three strains of virus, two current influenza A subtypes and influenza B, representing recently circulating viruses. The composition of vaccines for use in Bahrain is determined each year by the recommendations from the WHO.

During the lead up to a pandemic, when the seasonal influenza vaccine is still in production, it will have an important role to play in preventing simultaneous infection with the seasonal influenza strain and a novel influenza strain. There is the small possibility that if a person is infected with both of these viruses at the same time, the virus could share genetic material to produce a new and highly transmissible virus that poses the threat of a pandemic. Therefore, it is recommended that poultry workers who are, or will be exposed to infected or potentially infected poultry or their environment, receive the seasonal influenza vaccine.

Attaining high rates of coverage of the normal seasonal influenza vaccine and the pneumococcal vaccine in identified cohorts and high risk groups during the nonpandemic period was identified as a priority in the *Bahrain Action Plan for Pandemic Influenza* (2006).

Seasonal influenza vaccination is also recommended for certain high risk groups to lessen the morbidity and mortality associated with seasonal influenza infection.

Annual influenza vaccination recommended for the following groups:

1. All individuals aged 65 years and over.
2. Children (\geq six months of age) and adults with chronic cardiac conditions including cyanotic congenital heart disease, coronary artery disease and congestive heart disease.
3. Children (\geq six months of age) and adults with chronic suppurative lung disease, including bronchiectasis, cystic fibrosis and chronic emphysema.
4. Children (\geq six months of age) and adults with chronic illnesses requiring regular medical follow-up or hospitalisation in the preceding year.
5. Persons with immune deficiency, including HIV, malignancy and chronic steroid use.
6. Residents of nursing homes and other long-term care facilities, due to high rates of transmission during outbreaks.
7. Contacts of high risk patients, including health care providers, staff of nursing homes and long-term care facilities.

For further details about recommendations, transport, storage, handling, dosage, administration, adverse events, precautions, contra-indications, and use in pregnancy refer to Bahrain immunization manual 2004.

The pneumococcal vaccine

Many deaths and severe infections precipitated by influenza are due to secondary infection with bacterial pathogens such as *Streptococcus pneumoniae*. The pneumococcal vaccine, administered to high-risk groups of the population, can significantly reduce the incidence of this secondary infection and hence reduce the morbidity and mortality associated with influenza. Increasing pneumococcal vaccine coverage in high risk groups will therefore have a role in potentially lessening the impact of an influenza pandemic.

The 23-valent pneumococcal polysaccharide vaccine recommended for:

1. All individuals aged 65 years and over.
2. Adults who have any of the high risk underlying conditions.
3. Children aged 5 years and over who have underlying chronic illnesses predisposing to invasive pneumococcal disease (including asplenia and immunocompromise).
4. Individuals aged over five years with asplenia, either functional or anatomical.
5. Immuno-compromised persons aged over five years at increased risk of invasive pneumococcal disease (eg patients with HIV infection before the development of AIDS, acute nephrotic syndrome, multiple myeloma, lymphoma, Hodgkin's disease and organ transplantation).
6. Immunocompetent persons aged over five years at increased risk of complications from invasive pneumococcal disease because of chronic illness (eg chronic cardiac, renal, or pulmonary disease, diabetes, alcohol-related problems).
7. Persons with CSF leaks (aged over five years).
8. As a booster dose, at four-five years of age, following a primary course of the 7-valent pneumococcal conjugate vaccine, in children at risk of either high incidence or severity of invasive pneumococcal disease because of predisposing medical conditions.

The 7-valent pneumococcal conjugate vaccine recommended for:

Children under the age of two years with underlying medical conditions predisposing them to invasive pneumococcal disease:

- Diseases compromising immune response to pneumococcal infection such as congenital immune deficiency, immunosuppressive therapy, compromised splenic function, HIV infection before and after the development of AIDS, renal failure and Down's syndrome
- Anatomical or metabolic abnormalities associated with higher rates or severity of IPD such as cardiac disease, premature infants with chronic lung disease, infants born at less than 28 weeks gestation, cystic fibrosis, insulin-dependent diabetes mellitus, CSF leaks and intra-cranial shunts and cochlear implants.

For further details about recommendations, transport, storage, handling, dosage, booster doses, catch-up schedules, administration, adverse events, precautions, contraindications, and use in pregnancy refer to *The Bahrain Immunization manual 2004*.

Annex 13:

Antivirals

Background to the National Medicines Stockpile (NMS)

Influenza antiviral drugs will play an important role during a pandemic, particularly during the first wave of infection when pandemic vaccines may not be available. In the absence of vaccines, antivirals are the only medical intervention for providing protection against disease and some therapeutic benefit in those who are ill. Unlike pandemic vaccines, antivirals are expected to be immediately effective.

Activation and deployment of the NMS

The process to activate the NMS deployment plan is that the Chief of the Diseases Control section at the public health provides written request to the DMM for access to the NMS.

The amount of medication deployed will be a decision of the DCS after discussion with the MOH avian flu committee members. Each Department requesting is required to have distribution plans in place, including details of security measures and arrangements for dispensing including supervision, records of treatment and monitoring of outcomes, and adverse events. The DMM has ownership of the stockpile until each item is used/consumed/expired.

In the event of PHD requiring additional medicines – for example, antibiotics for secondary bacterial chest infections – or personal protective equipment, the above process will need to be carried out for each request.

Priority groups

The role of influenza antivirals will be constrained, however, by their finite supply, negligible surge capacity for production, and cost. Because of this, priority groups for their use will be determined to ensure that they are used to Bahrain's best advantage. As the overall aim underlying Bahrain's response to a pandemic influenza threat is to reduce the associated population-wide morbidity and mortality, their use will be determined within this principle.

The DCS made recommendations about antiviral priority groups in light of the current evidence. New evidence will need to be considered continually and the recommendations revised accordingly. Determination of the use of antivirals will be:

- assessed by the DCS.
- reviewed by the MOH AFC.

The recommended priority groups will be based on the best available evidence.

Currently this includes:

- antivirals–neuraminidase inhibitors– are effective in preventing influenza.
- if given within 48 hours, antivirals are effective in reducing the severity of the symptoms of influenza and shortening of the course of illness
- it is unproven that the use of antivirals for treatment also reduces transmission of the virus

- it is unproven that antivirals used for treatment of influenza reduce mortality in humans, although in some animal studies mortality is reduced. During a pandemic, urgent research will be undertaken to determine transmission dynamics and efficacy of treatment.

Containment phase

During the early phases, containing the spread of a pandemic, and thus preventing infections from occurring in the first place, will be the strategy for reducing morbidity and mortality. During these phases, antivirals may be best used to prevent entry of the virus into Bahrain or limit the spread amongst those who are exposed to human or animal cases of pandemic influenza. With this approach, antivirals may be given as post-exposure prophylaxis to those who have been exposed (health care workers, border workers and poultry cullers).

Treatment

In the early phases, a proportion of the antiviral stock will be set aside for identified cases and their close contacts.

Prophylaxis

With regard to prophylaxis, it is recommended that the antivirals are used in the containment phase for those individuals:

- who are exposed to a person or animal likely to be infected with pandemic influenza
- who work in areas where there is a high likelihood of exposure, such as:
 - poultry workers and animal disease control officers exposed to HPAI
 - border workers who are at higher risk of exposure
 - health care workers caring for influenza patients or patients with undiagnosed respiratory disease in which pandemic influenza is a differential diagnosis
 - staff at quarantine facilities
 - Public health staff exposed to potential cases
 - Laboratory staff at high risk of exposure.

Maintenance of essential services phase

During the later phases, containment may not be possible and the optimal strategy for reducing morbidity and mortality will be to maintain essential services. This will ensure minimal disruption to the provision of health and emergency services to the community. It will be vital, therefore, to provide antivirals as prophylaxis to essential service workers.

Teams providing essential services will need to be designated by all governments and may include:

- Health care workers at designated-influenza treatment facilities
- Laboratory personnel
- Power supply
- Water supply
- Telecommunications personnel
- Sewerage workers
- Funeral workers
- Emergency service workers
- Key decision makers.

Longer-term prophylaxis

Review of priority groups

It is recommended that the designation of antiviral priority groups is reconsidered both in containment and maintenance of essential services phases frequently in relation to:

- Location of cases
- Rate of transmission
- Attack rates in different age groups
- Clinical severity in different age groups (for example isolated overseas outbreak)
- Potential strategies for control
- Depletion of the antiviral stockpile.

Resistance

The efficacy of the antivirals and the development of clinical resistance in the pandemic virus need to be monitored for both treatment and prophylaxis. The H5N1 strain of influenza A currently (2005) circulating in some parts of the world is resistant to amantadine.

Influenza antivirals available in Bahrain

The current antiviral medicines can shorten the course of infection if given early in the disease (treatment) and provide short-term protection against influenza (prophylaxis). These are: oseltamivir and zanamivir. Oseltamivir is registered for supply in Bahrain.

Antiviral available in Bahrain

<i>Drug class</i>	<i>Generic name (Brand name)</i>	<i>Route of administration</i>	<i>Indication *</i>
<i>Neuraminidase inhibitor</i>	<i>Oseltamivir (Tamiflu)</i>	<i>Oral Tablet or Suspension)</i>	<i>Prophylaxis - Age > 13 years Treatment – Age > one year</i>

** When used for treatment, neuraminidase inhibitors must be commenced within hours of onset of symptoms. After this time, they are not effective.*

1. OSELTAMIVIR

Marketed as Tamiflu; supplied by Roche Products Pty Ltd and gelfar

Oseltamivir phosphate is a pro-drug of the active metabolite oseltamivir carboxylate. The active metabolite is a selective inhibitor of influenza virus neuraminidase enzymes, which are glycoproteins found on the virion surface. Viral neuraminidase is essential for the release of recently formed virus particles from infected cells and the further spread of infectious virus in the body.

Oseltamivir inhibits neuraminidases of influenza viruses of both types A and B. The active metabolite also inhibits influenza virus growth in vitro and inhibits influenza virus replication and pathogenicity in animal models. Oseltamivir is approved for both treatment of infections due to influenza A and B viruses in adults and children aged one year and older and prevention of influenza in adults and adolescents 13 years and older.

Treatment should commence as soon as possible, but no later than 48 hours after the onset of the initial symptoms of infection. Vaccination is the preferred method of routine prophylaxis against infection with influenza virus.

Resistance

The incidence of viral resistance in samples derived from clinical isolates is about 2%, depending on viral subtype. The limited resistance data available relates predominantly to H3N2 isolates, with few H1N1 or B virus isolates currently studied.

Precautions

Influenza with complications eg pneumonia; renal impairment; repeated courses (no data); fructose intolerance (oral suspension); pregnancy, lactation, children < one yr.

Adverse reactions

Gastrointestinal upset; insomnia; headache; fatigue; others.

Dosage and administration

Oseltamivir is administered as an oral capsule of 75mg, or as an oral suspension of 12mg/ml.

Treatment of influenza: Adults and adolescents. The recommended oral dose of oseltamivir in adults and adolescents 13 years of age and older is 75 mg **TWICE** daily for five days. Oseltamivir can be given to patients one year of age and older.

Prophylaxis of influenza: Adults and adolescents. The recommended oral dose of oseltamivir in adults and adolescents 13 years of age and older is 75 mg **ONCE** daily for five days. Oseltamivir can be given to patients one year of age and older.

Safety and effectiveness have been shown in patients taking oseltamivir for up to six weeks.

Acknowledgments

Kingdom of Bahrain

The Ministry of Health

Contingency plan for pandemic influenza 2005 brings to get the contributions from

Dr. Abdulwahab Mohammed Abdulwahab	Assistant Under Secretary for Primary Care and Public Health
Dr. Sameer Abdulla Khalfan,	Director, Public Health Directorate
Dr. Jalila S. Jawad	Medical Doctor – Diseases Control Section
Dr. Adel Al Sayad	Family Physician
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Updated: 05/12/05