



4th Draft

Ministry of Health
TRINIDAD AND TOBAGO

**PANDEMIC INFLUENZA
PREPAREDNESS AND
RESPONSE PLAN**

DECEMBER 2005

Revised 29 May 2006



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Preface

Influenza A viruses periodically cause worldwide epidemics, or pandemics, with high rates of illness and death. Advanced planning for a large scale and widespread health emergency is required to optimize health care delivery during a pandemic. Unlike other public welfare emergencies, an influenza pandemic will impact on multiple communities across the Caribbean and Trinidad and Tobago simultaneously. Each local jurisdiction must be prepared to respond in the context of uncertain availability of external resources and support. Therefore, contingency planning is required to mitigate the impact of an influenza pandemic through planning and preparation by the co-ordinated efforts of all orders of government in collaboration with their stakeholders. The Office of Disaster Preparedness and Management, the Ministry of Health, and the health sector will play a critical role in the event of an outbreak of Pandemic Influenza.

The Trinidad and Tobago Pandemic Influenza Plan (the Plan) consists of an introduction and a background section, followed by the preparedness, response and recovery sections, which are consistent with the general principals of emergency response. Each section aims to assist and facilitate appropriate planning at all levels of government for the next influenza pandemic. WHO Global Influenza Preparedness Plan, WHO Checklist for Pandemic Influenza, excerpts from the Canadian and Singapore Pandemic Influenza Plan and relevant national documents, have been consulted in the development of this plan.

The Plan and the annexed guidelines, checklists and other documents were developed to assist all jurisdictions with the main components of planning, including surveillance, vaccine programs (if and when available), use of antivirals, health services, emergency services, public health measures and communications. The most effective public health intervention to mitigate the impact of a pandemic is through immunization with an effective vaccine against the novel virus, but this will not be available until sometime after the pandemic has begun. Control would be through social distancing, good hygienic practices, provision of care, and to a lesser extent through the use of antiviral drugs.

Comprehensive planning requires that appropriate surveillance capacity is in place, and that the health sector, emergency services and communities as a whole are informed and equipped to deal with a pandemic. The prevention and preparedness activities facilitate the response and recovery during, and after an influenza pandemic. The response to a pandemic will require close cooperation between all levels of government. The response section of the Plan addresses the operational activities for an effective national response, including essential regional and local coordination. The recovery section provides guidance on coordinated post-event activities for the health and emergency response sectors.

The overall goal of pandemic influenza preparedness and response is first to minimize serious illness and overall deaths, and secondly to minimize societal disruption among

citizens of Trinidad and Tobago as a result of an influenza pandemic. The Plan is intended to be dynamic and iterative, and will be updated and revised regularly.

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Section I

INTRODUCTION

Magnitude of the Problem

The world is presently under threat of an influenza pandemic due to influenza A / H5N1. Since December 2003 a growing number of countries have reported the presence of H5N1 in birds, with several laboratory confirmed human cases of avian influenza A/ H5N1. The mortality rate has been above 50% in these human cases. The spread of H5N1 is alarming, as well as its potential to mutate and become transmissible from person-to-person. With the rapid movement of people, diseases can spread internationally at very fast rates. It is therefore important that Trinidad and Tobago makes itself prepared for a possible pandemic by developing plans to respond to such an eventuality.

Influenza Pandemic Preparedness and Response

The Plan targets a wide range of people who will be involved in planning and responding to an influenza pandemic; emergency responders, health planners, health care workers, public health laboratories, as well as those involved in the manufacture, registration and supply of pharmaceuticals. However, the primary audience for this plan are the regional and local health authorities, as the provision of health care and essential services is the jurisdiction of the these bodies.

The goal of influenza pandemic preparedness and response is:

- To minimize serious illness and overall deaths, and
- To minimize societal disruption among citizens of Trinidad and Tobago as a result of an influenza pandemic.

The objectives of the Trinidad and Tobago Pandemic Influenza Plan (TTPIP) are as follows:

- To develop a National Plan that comprehensively address the issues with respect to an influenza pandemic and is acceptable and applicable to all stakeholders.

- To indicate the intersectoral relationships and to identify their respective roles and responsibilities.
- To provide clear and comprehensive guidelines to ensure optimal operational viability; and a Plan that is flexible enough to incorporate new developments, as well as to ensure consistencies with best practices.
- To provide planning considerations for the appropriate prevention, care and treatment before and during a pandemic.
- To provide suggestions for planning considerations for appropriate communications, resource management and preventive measures to minimize societal disruption.

Overview of Trinidad and Tobago Pandemic Influenza Plan

The Plan consists of an introduction and a background section, followed by the preparedness and response sections, which are consistent with the general principals of emergency response. A recovery section will be added in due course. Using this framework the types of planning and response activities needed for comprehensive pandemic planning can be summarized as follows.

- ***Prevention*** activities might be classified as planning actions to ensure that all existing or known or unavoidable risks are contained. Immunization with vaccines is the primary means of prevention and forms the basis of the pandemic response in Trinidad and Tobago, if they are available. The annual vaccine infrastructure is the building block utilized to develop this pandemic vaccine response. A second component of prevention is mitigation management to reduce risks. These types of activities are undertaken to ensure that the consequences of a pandemic remain manageable and do not escalate beyond a control situation.
- ***Preparedness*** activities include preparing the actual plans, training, simulation exercises to pre-test the plans, communications and other interfaces to inform the public and other stakeholders.
- ***Response/Implementation*** of the plans, tested or untested, is the step where activities are directed to controlling the pandemic and repressing direct outcomes (mortality, morbidity due to influenza), and indirect associated effects (social disruption).

The focus of the Response Section of the Plan would involve a series of escalating and potentially varying (but harmonized) responses as the pandemic unfolds across the country. Implementation also involves documenting activities and outcomes to determine if a more extensive response is required or whether adjustments to the planned response are necessary.

- **Post-Event Recovery** activities may start at different times across the country as the Pandemic waves move through the various jurisdictions. These activities involve the organization of post-event activities to ensure restoration. Dismantling of alternative care sites, phasing out of alternate care workers, and the commencement of new services that may be required are examples of these types of activities. Activities would continue through the declaration of the end of the pandemic in Trinidad and Tobago until the pre-pandemic status is restored.

The Preparedness Section of the Plan addresses prevention and preparedness activities during the inter-pandemic period. This section is the result of work that began after the first national meeting of all stakeholders at the national, regional and local levels held in May 2005, and is based on the deliberations and input of professionals and other organizations. The purpose of this section of the Plan is to provide information and guidelines that can be used in the development of plans for national, regional, and local management in the event of an influenza pandemic.

Each component for a comprehensive pandemic influenza plan including, surveillance, vaccine programs, the use of antiviral, health and emergency services, public health measures and communications, has been addressed in terms of current status, including outstanding issues, planning principles and assumptions. A list of potential planning activities in the form of a checklist has also been included.

The Response Section of the Plan will address the operational activities for an effective national response, including essential national/regional/local coordination.

Section II

BACKGROUND

Epidemiology of Pandemic Influenza

Influenza is one of the infectious diseases that annually produce the greatest global burden of disease. Influenza, or flu, is an acute viral disease of the respiratory tract, characterized by airborne transmission through respiratory secretions. It can generate pandemics, understood as epidemics that spread to many countries and are associated with high morbidity, increased mortality, and major social and economic disruption.

The 20th century witnessed three influenza pandemics: the Spanish flu in 1918-19 (A/H1N1 virus); the Asian flu in 1957-58 (A/H2N2 virus); and the Hong Kong flu in 1968-69 (A/H3N2 virus). The most well-known of these is the Spanish flu, which is believed to have caused 40 to 50 million deaths worldwide. One of the main characteristics of this pandemic was its rapid spread and high mortality in young adults.

The other pandemics also resulted in high mortality, although less than the Spanish flu, but mainly affected individuals over the age of 65 and people with chronic diseases.

There are three types of influenza virus: A, B, and C. The most important strains of human influenza are types A and B, which are responsible for major outbreaks each year. Only type A causes pandemics.

The influenza A and B viruses have two surface glycoproteins: hemagglutinin (HA) and neuraminidase (NA). Influenza A has several subtypes; of these, H1N1, H3N2, and recently, H5N1, are of epidemiological significance.

Two important phenomena are associated with changes in influenza viruses:

1. **Antigenic drift:** A phenomenon characterized by constant, usually small, changes in antigenic composition due to viral instability. **Antigenic drift** is what forces vaccine producers to alter the composition of the influenza vaccines each year.
2. **Antigenic shift:** The appearance of a new viral subtype that populations have no immunity against is a serious problem from the public health standpoint, owing to the risk of a pandemic. This risk arises when there is a sudden, critical transformation of the influenza A virus due to mutation, gene exchange between an animal (generally avian) influenza virus and the human virus in a single host susceptible to both (for example, the pig). This risk also arises with the transfer of the entire virus between host species.

If these new viruses acquire the ability to cause disease in the human host with efficient person-to-person transmission, the disease can quickly spread far and wide, resulting in a pandemic.

Historical records suggest that the pandemic strains first appeared in China in the 1957, and 1968 pandemics. Many communities in China raise pigs, ducks, and chickens. There are also wide variations in climate between the north and south, which means that human influenza infections occur year-round. This combination of factors may be the key to the origin of pandemics. Agricultural practices and the area's ecology may offer continuous opportunities for co-infection of humans, domestic fowl, and swine with the influenza virus.

Pandemics can occur in several waves and may last from one to three years. Afterward, most of the population has usually acquired some degree of immunity, and the virus moves on to cause annual epidemics. Epidemiological models forecast that another influenza pandemic could result in 57 to 132 million medical consultations, 1 to 3.23 million hospital admissions, and 280,000 to 650,000 deaths in less than two years in the industrialized countries alone. World Health Organization estimates, based on 1957-58 epidemic that 2 million to 7.4 million deaths worldwide will occur in another influenza pandemic.

Pre-requisites for a Pandemic:

- 1) The emergence of an influenza A virus with a hemagglutinin subtype different from that of the strains circulating among humans in previous years;
- 2) A high proportion of individuals in the community with an absence of or low antibody titers for the hemagglutinin of the new virus;
- 3) High person-to-person transmissibility of the new virus, causing disease in humans.

Pandemic Potential of the H5N1 Virus

In 2004, outbreaks of highly pathogenic avian flu caused by the H5N1 virus in birds occurred throughout much of Asia. This virus has crossed the species barrier and infected humans, demonstrating the capacity for person-to-person transmission; this capacity, however, is very limited for the moment and insufficient to cause a pandemic. The first known influenza A/H5N1 infection in humans was detected in Hong Kong in 1997. In the year 2003 only Vietnam has reported 3 laboratory confirmed human cases with influenza A H5N1. In 2004 two countries Vietnam and Thailand reported 29 and 17 cases respectively (total 46), followed by five countries: Vietnam, Thailand, Indonesia, Cambodia and China which reported 61, 5, 16, 4 and 7 respectively (total 93) in 2005.

A reliable case-fatality rate cannot be calculated, since the disease may be present with mild symptoms in the community and go undetected.

The recorded case fatality, in present situation of human cases of A H5N1 is as follows:

Year	No of Countries	No of Cases	No of Death
2003	1	3	3 (100%)
2004	2	46	32 (70%)
2005	5	93	41 (44%)

The table shows that the number of infected countries, and the number of infected cases are increasing, but fatality rate among cases is decreasing. It tells that virus transmission capability is on the increase, as well as early detection of cases and prompt treatment has been enhanced. Overall case management strategies are getting more effective.

In 2006, the number of cases have increased markedly as more countries become infected , with a fatality among the cases up to March of over 60%.

The lesson learnt from Vietnam shows that in first year mortality of cases was 100%, whilst in the following consecutive years mortality rates dropped to 69% and 31% respectively. In Thailand, the case fatality rate was 71% in the first year, followed by 40% in the next year.

Countries are experiencing high death rate among cases in the first year of attack, however, improved case management has resulted in a decrease in case fatality in

following years. In the first year Vietnam, Thailand, Cambodia, Indonesia and China have experienced fatality rate 100% (3 of 3 cases), 71% (12 of 17 cases), 100% (4 of 4 cases), 69% (11 of 16 cases) and 71% (5 of 7 cases) respectively.

Estimated Impact of an Influenza Pandemic on People of Trinidad and Tobago

The impact of the next influenza pandemic is difficult to predict, and is dependent on how virulent the virus is, how rapidly it spreads from population to population, and the effectiveness of prevention and response efforts. Despite the uncertainty about the magnitude of the next pandemic, estimates of the health and economic impact remain important to aid public health policy decisions and guide pandemic planning for health and emergency sectors.

During “normal” influenza epidemics which occur almost every winter in North America, an average of 5% to 20% of the population becomes ill, but as high as 30% to 50% of the population may become ill during severe influenza A epidemics. The highest rates of infection and clinical illness occur in children but serious complications and death occur mainly in the elderly. During a pandemic, historic data shows that over 50% of a population may become infected with the novel virus and the age-specific morbidity and mortality may be quite different from the annual epidemics with a higher proportion of deaths in persons under 65 years of age. In 1918–1919 pandemic, young adults had the highest mortality rates, with nearly half of the influenza-related deaths occurring persons 20-40 years of age.

During the 1957–1958 and 1968–1969 pandemics in the U.S., persons under 65 years of age accounted for 36% and 48% of influenza-related deaths respectively.

Although the influenza pandemic in Trinidad and Tobago may cause considerable illness and death great uncertainty is associated with any estimate of pandemic influenza impact. While the results can describe potential impact at gross attack rates from 15% to 35%, no existing data can predict the probability of those attack rates actually occurring.

WHO has used a relatively conservative estimate of 2 million to 7.4 million deaths world wide. This estimate is based on the comparatively mild 1957 pandemic. According to population ratio Trinidad and Tobago might have death toll ranging from 400 – 1400. The attack rate of the virus varies from 15% to 35%. The number of infected people may be from 200,000 to 400,000; out-patient department (OPD) will be in the vicinity of 100,000 to 200,000 visits and hospitalization may be needed for 1,400 to 5,400 patients. All estimates of the number of deaths and others are purely speculative, but it is important as it provides a useful and plausible planning target.

Table: Estimated health impact of H5N1 in TT

Number of infected person	200,000 – 400, 000
OPD attendance	100,000 – 200,000
Number of hospitalization	1,400 – 5,400

Number of Death	400 – 1,400
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PANDEMIC PHASES

The World Health Organization (WHO) pandemic influenza phases will be used throughout the Plan to assist with the organization of the staged response activities. This common terminology will facilitate communication especially for joint planning and response efforts among countries of the Caribbean, and international stakeholders. Once WHO has declared the Pandemic Influenza (Phase 4), the Trinidad and Tobago Pandemic Phase will become operational.

The following describes the WHO phases:

Inter-pandemic period

Phase 1

There is no detection of new influenza virus in human population. If perhaps there is a new influenza virus circulating in birds, it poses LOW risk of human disease.

Phase 2

There is no detection of new influenza virus in human population. But there is new influenza virus circulating in birds. It now poses SUBSTANTIAL risk of human disease.

Pandemic alert period

Phase 3

New influenza virus is detected in humans (1 or more cases). The source of infection is birds/animal or very close contact. Certainly there is no evidence of person to person transmission.

Phase 4

Evidence suggests person to person transmission has taken place in the affected human population, but the number of infected population is small (less than 25), and the period of infection is less than 2 Weeks. It is highly localized, and demonstrates that the new influenza subtype virus is not well adapted to human population. It has low pandemic risk.

Phase 5

Evidence suggests person to person transmission has taken place in the affected human population and the number of infected population is large (between 25 – 50), and the period of infection continues for 2 - 4 week. It appears to be localized. It demonstrates that new influenza subtype virus is increasingly becoming adapted to human population, and it has substantial pandemic risk.

Pandemic period

Phase 6

It is the phase of pandemic. The new influenza subtype virus is well adapted, and has high level of transmissibility from person to person. There is increased and sustained transmission in general population. Generally pandemic wave lasts for 6-8 weeks. It affects many countries. Next wave generally follows after 3-9 months latter of first wave.

CASE DEFINITION

The case definition of influenza is sub-categorized into probable and confirmed cases. In view of the time required for laboratory confirmation of pandemic influenza infection, the probable case definition will be the working definition for operational considerations and the confirmed definition has been developed in relation to this.

- a. **Probable case.** Persons are considered probable pandemic influenza cases when the following conditions are fulfilled:
- (1) Abrupt onset of fever more than or equal to 38 degrees Celsius (except in persons aged 60 years and above); and
 - (2) Non-productive cough; and either
 - (a) a positive epidemiological link (travel to country with pandemic influenza or contact history with an infected person); or
 - (b) a positive rapid test kit result, if available.
 - (3) Fever may often be absent in persons aged 60 years and above. Therefore, in the absence of fever, any of the following symptoms, in addition to non-productive cough, should raise a high index of suspicion for persons in this age group:
 - (a) malaise;
 - (b) chills;
 - (c) headache;
 - (d) myalgia.
- b. **Confirmed case.** Persons are considered confirmed pandemic influenza cases when there is laboratory confirmation of infection with pandemic influenza.

LEGAL CONSIDERATIONS:

Legal adviser of the Ministry of Health of Trinidad and Tobago has suggested the following regarding the threat of pandemic influenza:

“Currently Avian Flu is not considered an infectious or dangerous infectious disease under the Public Health Ordinance Chap. 12:04.

As you are aware, Avian H5N1 is a strain with pandemic potential since it might ultimately adapt into a strain that is contagious among humans. Once this adaptation occurs, it will no longer be a bird virus, it will be a human influenza virus.

Accordingly, in light of its infectious nature the disease should be so deemed.

Section 103 provides that the President may by proclamation declare any disease to be an infectious disease or a dangerous infectious disease.

Section 105 provides that the Minister of Health shall have the direction of all measures dealing with dangerous infectious disease and may make regulations with regard inter alia the control of any dangerous infectious disease.

- *The restraint segregation and isolation of persons suffering from any dangerous disease, or likely from exposure to infection to suffer from any such disease.*
- *The removal to hospital and the curative treatment of such persons.*

Accordingly two actions will have to be taken, namely the declaration of the ‘Avian Flu’ as a dangerous infectious disease and the preparation of appropriate regulations.”

ETHICAL CONSIDERATIONS

As part of the development of the Plan, the Ministry of Health looked at ethical and related issues that may emerge, for each of the planning components examined.

As a result of this, attempts were made to identify with relevant ethical principles, rules and values, and to develop a reasoned position in dealing with problematic measures and questions raised by each of the planning components. The Plan recognises that the main objective of planning for pandemic influenza response is to identify all measures that can diminish, as much as possible, the impact of the pandemic on our whole population and to assess the benefits and burdens, (including the costs) of these measures.

Section III

PREPAREDNESS

Introduction

Background

The *Preparedness Section of the Trinidad and Tobago Pandemic Influenza Plan*, addresses prevention and preparedness activities during the inter-pandemic period. It is based on the deliberations of a number of pandemic influenza planning/ preparedness stakeholder groups and organizations. The specific issues in the Plan have been developed with guideline and reference documents annexed in the Plan. These include Surveillance, Vaccines, Antiviral Drugs, Public Health Measures, Communications and Health Services. Each annexed document has been created to address specific issues related to the overall goal of minimizing serious illness and overall deaths, and secondly minimizing societal disruption among Trinidad and Tobago nationals as a result of an influenza pandemic. The annexes were based on the data available and prevailing beliefs and approaches to pandemic planning at the time they are written; they may be updated separately as needed, to ensure that they remain current and realistic.

The purpose of this section of the Plan is to provide information and guidelines that should be used in the development of more specific operational plans for national/ regional and local management of an influenza pandemic.

Populations under Trinidad and Tobago Jurisdiction

Across Trinidad and Tobago, various public departments and private agencies provide a varied range of health services to a number of “populations”. These “populations”(e.g. military bases, prisons), could potentially cause an unprecedented increase in demand for health services during a pandemic. Advanced planning is required to ensure that all RHAs, Counties, and the private health facilities in close proximity to these populations, with the Ministry of Health, have agreed upon roles and responsibilities in the event of a pandemic. The current status, outstanding issues and next steps for coordinated planning for all populations (including the diplomatic corps, foreign residents and tourists) will be addressed. National level discussions have been initiated to ensure that there is full and comprehensive private sector participation within the context of a co-ordinated pandemic response.

Key Elements for Influenza Pandemic

The key elements in managing the outbreak:

- a. **The Pandemic Influenza Committee (PIC)** - This forum is an Inter-Ministry Committee, and comprises representatives from other stakeholders and relevant agencies involved in responding to the outbreak. PIC is the main platform to co-ordinate inter-ministry actions/response to deal with the outbreak. It is anticipated that PIC will report directly to the Office of Disaster Preparedness and Management (ODPM), at such time when PIC is asked to consult on a real, actual or perceived threat of pandemic influenza. The mandate of the PIC includes providing advice, expertise and recommendations, liaison and other activities associated with the inter-pandemic, pandemic and post-pandemic phases to support the health and safety mandates of all orders of government. PIC will also provide advice, assistance and expertise concerning the development, maintenance, testing and evaluation of the Trinidad and Tobago Pandemic Influenza Plan.
- b. **Task Force** - The Task Force comprises members of the Ministry of Health with varying backgrounds, and focuses on all aspects of Pandemic Influenza Plan including coordination, disease prevention and control, and case management.
- c. **Office of Disaster Preparedness and Management (ODPM)**. In coordination with Ministry of Health/ PIC, ODPM will play a vital role in crisis management at different levels.
- d. **Ministry of Health:** Ministry of Health is the lead agency to coordinate the national health response to manage the crisis. This will be led by the Permanent Secretary with Technical Support from the Chief Medical Officer.
- e. **Regional Health Authority (RHA):** In prevention and control of infection, management of cases, establishment of non-traditional health clinics and coordination of all related activities at the ground level.
- f. **Local Health Authority (LHA):** County Medical Office for Health (CMOH) and health/public health section of Regional Corporation (RC), which is under Ministry of Local Government form the first-line of response to deal with the community as they provide prevention and control guidelines, and treatment at the community-based health centres, as well as health promotion services to the community.

In anticipation of a possible multi-dimensional crisis (in safety and security, communications, economic, diplomatic, transport, environment etc.) due to influenza pandemic the following different ministries/ agencies are advised to have a crisis group within their respective ministries to respond the influenza pandemic crisis:

- a. Safety & Security - led by the Ministry of National Security, in collaboration with the MoH and Office of Disaster Preparedness and Management (ODPM). To manage all civil defence and civil security type of incidents, including terrorism related threats and civil emergencies.
- b. Public Education/Communications - led by The Ministry of Health (Communication Department and Health Education Division), in collaboration with the Government Information Service of the Ministry of Public Administration & Information - To formulate public communications policies and plans to manage information flow to all citizens in an appropriate, acceptable, efficient and timely manner.
- c. Diplomatic Support - led by the Ministry of Foreign Affairs, in collaboration with MoH and ODPM . To provide diplomatic support and to take such measures as may be required by Trinidad and Tobago to fight the influenza pandemic.
- d. Public Utilities – led by the Ministry of Public Utilities & the Environment. To ensure the provision of essential services of potable water, electricity , communication and postal services.
- e. Economic Sustainability - led by the Ministry of Finance/Ministry of Trade and Tourism. To maintain public confidence in the economy so that economic activities and normal life would go on.
- f. Transport - led by the Ministry of Works and Transport. To formulate plans to ensure availability and continuity of air, land and sea transportation services critical to the economy of Trinidad and Tobago.
- g. Tourism - led by the Ministry of Tourism – To formulate plans to ensure confidence of tourist during an Influenza Pandemic as it is critical to the economy of Tobago.
- h. Social Support - led by the Ministry of Social Services. To formulate plans for provision of social support to the population during an Influenza Pandemic.
- i. Environment - led by the Minister with responsibility for the environment to manage any impact on the environment and on environmental public health issues and advise on related issues.

Levels of Key Elements

- **National Level:** PIC, Task Force, ODPM and Ministry of Health are referred as national level bodies.
- **Regional Level:** Regional Health Authority (RHA).

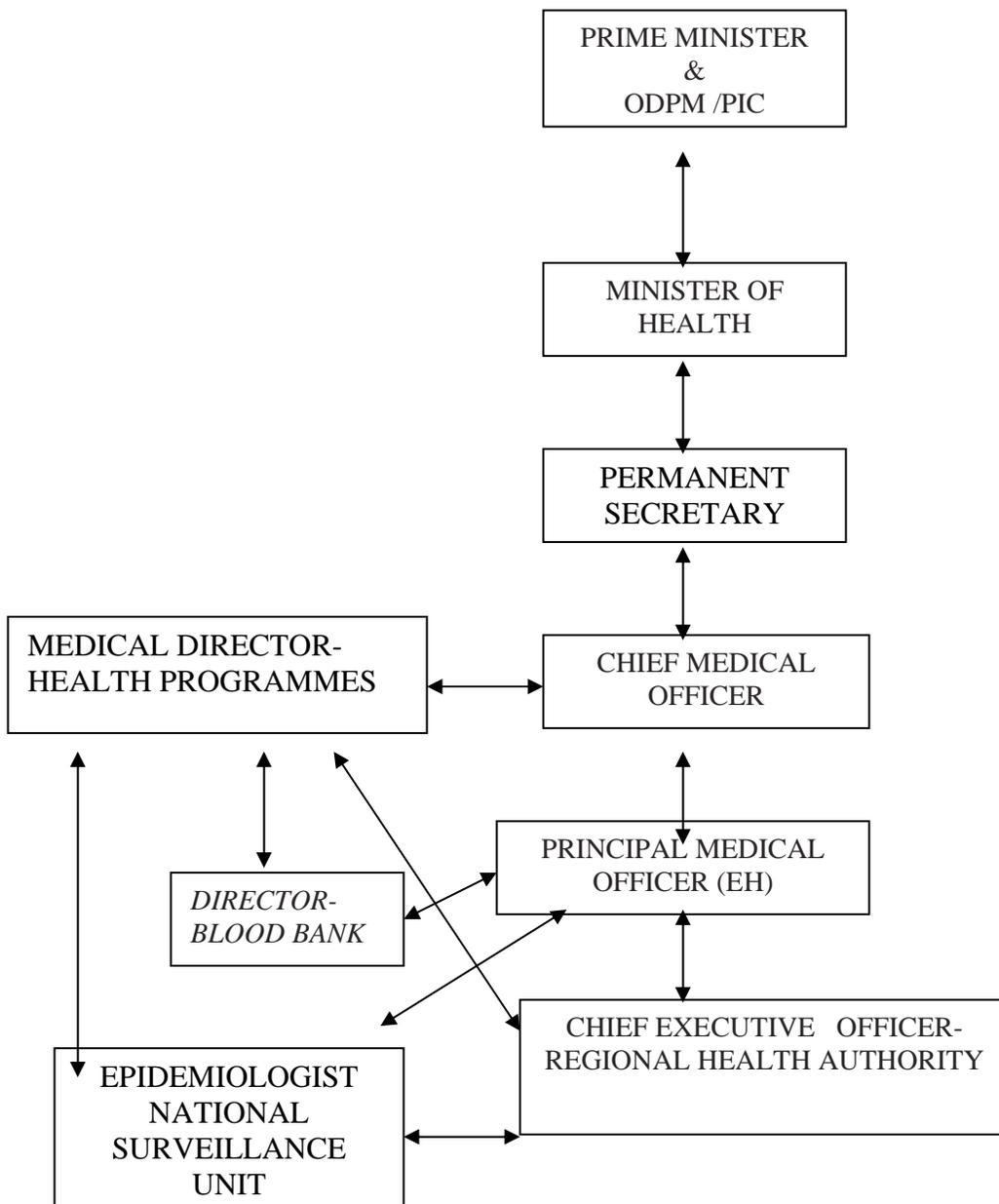
- **Local Level:** County Medical Office for Health (CMOH) as well as Health/ Public Health section of Regional Corporation are considered as local level bodies.

In the event of a pandemic, the Office of Prime Minister will participate actively.

Leadership, organization and co-ordination - The chain of Command

WITHIN AND BEYOND MINISTRY OF HEALTH

CHAIN OF COMMAND FOR INFLUENZA (H5N1)





ROLES AND RESPONSIBILITIES

A coordinated response to pandemic influenza requires collective infrastructures, response capacities and coordinated activities that will permit the national/ regional and local health authorities and their representatives to anticipate problems, monitor for adverse outcomes and respond to minimize the impact of pandemic influenza within their jurisdictions. The roles and responsibilities of the Pandemic Influenza Committee (PIC) and the national/regional/local (N/R/L) levels are as follows:

- **PIC/ODPM** is responsible for ensuring Inter-Ministerial coordination at the national level.
- **Ministry of Health** holds responsibility for the nationwide coordination of the pandemic influenza health response, including surveillance, international liaison with health agencies, and coordination of the vaccine response (infrastructure procurement, vaccine allocation, management and funding).
- **Joint responsibilities of the health sector at the national/ regional/ local levels** will ensure distribution of health plans to all organizations that may be involved in the pandemic response and liaison with these partners on an ongoing basis. They may also be involved in planning simulation exercises once plans are in place. Development of cost estimates and options for decision makers will also be a joint national/regional/local levels responsibility.
- **The Regional (RHAs) and Local levels (Counties/Regional Corporations)** hold responsibility for mobilizing their contingency plans and resources. Health emergency response would be provided at the local level and regional levels, and directed and support by the Ministry of Health.
- **Local health authorities (counties & regional corporations)** are responsible for planning the local/community response to an influenza pandemic with direction from both the regional (RHAs) and national level. This involves liaising with local partners (e.g., emergency responders, hospitals, mortuary services) in advance of a pandemic to facilitate a coordinated response when pandemic influenza strikes in the community. It is likely that the local public health authorities, through existing or enhanced surveillance, may be the first ones to detect influenza in their community. It is essential that the lines of

communication within the community and up the line to the regional /local and national levels are clear and established in advance of a pandemic.

Inter pandemic Period

Joint Responsibilities (PIC, N/R/L)

- developing, maintaining and enhancing routine surveillance activities for influenza and other related disease factors/events that are required, including adverse influenza vaccine and antiviral drug reactions;
- developing and maintaining coordinated communication strategies, plans and frameworks during the inter-pandemic period for use during pandemic periods;
- developing and participating in coordinated training and simulation exercises, including the coordination of emergency and contingency plans, designed to achieve emergency preparedness and to test, assess, evaluate and adjust pandemic influenza response capacity;
- mobilizing required resources (e.g., medical, scientific, technical, emergency response and other resources, etc.) within their respective jurisdictions to respond to the influenza pandemic in the context of the Trinidad and Tobago PIP (TTPIP);
- stockpiling essential emergency supplies that might be routinely and ordinarily associated with the planning and preparation for an influenza pandemic (e.g., mobile hospital beds, syringes, etc.); and
- develop and maintain the TTPIP.

PIC Responsibilities

- identifying and/or developing a framework for evaluating the process and the outcome of the individual and the collective responses of all partners (ministries and agencies of government and other national stakeholders) to an influenza pandemic;
- drafting safety and performance evaluation criteria against which to evaluate the activities of all partners and their handling of pandemic influenza;
- coordinating preparatory activities;

- equitable allocation of available influenza vaccine during a pandemic; and
- policy issues requiring immediate resolution and referring them to the Ministry of Health, N/R/L and other stakeholders

Ministry of Health Responsibilities

- conduct and be responsible for coordinating national surveillance activities
- entering agreements and arrangements with international organizations such as the WHO/PAHO to support surveillance; coordination and investigation activities;
- providing expertise, advice and recommendations concerning public health, care and treatment, microbiology, immunology, epidemiology, and ethics including:
 - ongoing and timely medical, scientific and public health advice;
 - review of the pandemic influenza response capacity;
 - modification to pandemic influenza surveillance activities or special studies/investigations to be carried out by the parties and estimating resulting costs;
- producing, allocating, and overseeing the distribution of specialized diagnostic reagents and technical information to public and private health laboratories;
- receiving and characterizing viral isolates and sending representative strains to the CDC, a WHO collaborating centre;
- providing liaison with the CDC and the WHO for influenza surveillance and epidemiology, including issues related to laboratory diagnostic methods and the 'sub-typing' of strains;
- designing, organizing and supporting special national studies required to better define burden of disease or evaluate pandemic influenza response capacity;
- pursuant to Government legislation, for licensing establishments and influenza vaccines and antiviral drugs for sale;
- instructing manufacturers/fabricators/suppliers pursuant to contractual provisions to obtain, from time to time, appropriate quantities of a specified seed virus identified by the WHO/PAHO for the purpose of manufacturing domestic and/or off-shore influenza vaccine supplies;

- assisting in the identification of alternative potential sources of influenza vaccines, as required;
- instructing relevant agencies that administrative contractual services be provided to acquire influenza vaccine and antiviral drugs for the pandemic period;
- making reasonable efforts to enter into agreements with foreign governments and or international agencies that have sources of influenza vaccine supply in order to enhance the protection of citizens of Trinidad and Tobago during an influenza pandemic by identifying secure supplies of influenza vaccine and antiviral drugs during inter-pandemic periods;
- providing technical support for PIC;
- developing and maintaining the Trinidad and Tobago Pandemic Influenza Plan;
- assisting in the planning for international coordination of influenza vaccine supplies during an influenza pandemic and consulting with RHA's on the potential impact of this activity on their influenza vaccine supply;
- making available influenza vaccine and antiviral drugs for specific populations, and coordinating with RHA's in the distribution and administration of influenza vaccine and antiviral drugs to those specific populations; and
- acting as lead Government authority on this health matter, to involve all other appropriate stakeholders (e.g., Defense Force, Finance etc.) in effecting an emergency response.

RHA's/ Local Responsibilities

- providing Influenza prevention, treatment and control consistent with policies and procedures within their jurisdictions, including the distribution of influenza vaccine and antiviral drugs;
- coordinating with the Ministry of Health about the distribution of influenza vaccine and antiviral drugs to Nat. Security, health personnel, essential services;
- ensuring that their respective pandemic influenza contingency plans are developed and adopted and that these contingency plans and appropriate guidelines are regularly updated;
- participating in national surveillance activities by monitoring and reporting diseases caused by influenza virus and related diseases/conditions, and use their best efforts to take steps within their Authority to cooperate with the Ministry of Health and PIC with regard to national surveillance activities;

- investigating outbreaks and clusters of influenza-like illness;
- sending influenza virus isolates and reporting the extent of influenza-like illness to National Surveillance Unit and Trinidad Public Health Laboratory;
- designing, organizing and supporting special studies of local and regional focus required to better define burden of disease or evaluate pandemic influenza response capacity;
- considering in a timely manner the recommendations of PIC and taking steps to adopt those that they have accepted and that fall within their scope of responsibilities as identified in the national plan;
- undertaking promotional and other activities to decrease annual morbidity and mortality due to Influenza;
- acting as lead authorities in their respective jurisdictions on this health matter, to involve all other appropriate agencies in effecting an emergency response; and
- undertaking periodic reviews of immunization prioritization schemes for influenza vaccines and antiviral drugs.

THE PANDEMIC PERIOD

Joint Responsibilities(PIC,N/R/L)

- monitoring, reviewing and assessing any issues where immediate intervention may be required to ensure the health and safety of citizens of Trinidad and Tobago;
- ordering influenza vaccine and antiviral drugs and considering the need for, and ordering if necessary, any additional influenza vaccine in preparation for a second wave of pandemic influenza;
- refining coordinated and targeted communication strategies to keep the public, health professionals and any other persons or groups informed particularly in regards to the influenza pandemic and the recommendations on the use of influenza vaccines and antiviral drugs;
- disseminating communication and educational information concerning the first and second waves of the influenza pandemic and providing communication and educational information concerning the potential for a second wave of pandemic influenza; and

PIC Responsibilities

- confirming that the conditions for pandemic influenza have been met, based on an independent assessment of information/intelligence, and subject to a declaration by the WHO, recommend to the Minister of Health that contingency plans for pandemic influenza be activated;
- recommending vaccine composition, number of doses, priority groups to receive influenza vaccine and antiviral drugs, standards or acceptable rates for adverse influenza vaccine and antiviral drug reactions, mechanisms and time frames for reporting, the equitable distribution of available products to prevent or treat pandemic influenza, modifications to Influenza surveillance and communications strategies;
- assessing influenza vaccine coverage, disease impact, making recommendations regarding vaccine composition and updating guidance concerning use, and equitable distribution of influenza vaccines;
- taking into account influenza vaccines and antiviral drugs that may remain following the first and second waves of the influenza pandemic, make recommendations concerning their alternate use and redistribution;
- recommending enhanced surveillance and targeted studies to better monitor and define the influenza pandemic in Trinidad and Tobago, and refine safety and performance evaluation criteria;
- proposing or developing criteria that can be used by itself or others to assist in the post pandemic evaluation of recommendations concerning processes and outcomes during the influenza pandemic; and
- recommending the influenza pandemic ‘be declared over.’

Ministry of Health Responsibilities

- declaring the activation of the pandemic phase of the TTPIP;
- providing liaison with other countries and international health organizations;
- allocating scarce influenza vaccine and antivirals on an equitable basis to RHA’s, based on the recommendations of PIC;
- collaborating with other government departments, in consultation with Office of Disaster Preparedness to activate emergency response teams (e.g. Health Personnel, Defense Force, others) as required;

- communicating on an urgent basis with RHA's and Local Agencies to resolve any urgent policy and operational issues identified by PIC or others that will impact any pandemic influenza response capacity; and
- considering in a timely manner the recommendations of PIC and taking steps to adopt those that fall within the Ministry of Health's responsibilities set out in the National Plan.

RHA's/Local Responsibilities

- activating, operationalizing and/or implementing their respective contingency plans; and
- communicating on an urgent basis together with their Ministry of Health's colleagues to resolve any urgent policy and operational issues identified by PIC or others that will affect any pandemic influenza response capacity.

THE POST-PANDEMIC PERIOD

Joint Responsibilities(PIC,N/R/L)

- reviewing, evaluating and taking measures to improve or enhance their respective roles following the conclusion of an influenza pandemic; the pandemic influenza response capacity; and collaborative research activities.

PIC Responsibilities

- recommending post-pandemic studies to assist in evaluations of the pandemic influenza response capacity including, any medical, scientific and technical aspects; and submitting to all relevant stakeholders a report together with its recommendations for future pandemics.

Components of the Preparedness Section

The components of the Pandemic Influenza Plan include surveillance, vaccine programs, use of antivirals, health services, emergency services, public health measures and communications. Each of these components has been addressed in this section in terms of current status, including outstanding issues and planning principles and assumptions. A list of potential planning activities has also been included.

In order to make the plan more comprehensive, and similar in scope to other emergency plans, a component focusing on psychosocial issues should be added. It is anticipated that this new component will be developed subsequently, and incorporated into future versions of this plan. In the interim, national/regional and local planners are encouraged to think about the psycho-social implications of pandemic influenza when developing their own plans both in terms of preparedness and response activities.

Surveillance

Influenza surveillance is required to determine when, where, and which influenza viruses are circulating; the high risk populations; the intensity and impact of influenza activity; and to detect unusual events (e.g., infection by unusual influenza viruses, unusual syndromes caused by influenza viruses, and unusually large or severe outbreaks of influenza). Both virologic and disease surveillance are necessary for identifying influenza virus variants and for determining their ability to spread and cause disease. Surveillance data will drive the pandemic response as it will be used to determine the pandemic phase, and to track progression through the phases.

Laboratory surveillance involves the isolation of influenza viruses for analysis of antigenic and genetic properties. This activity is essential for monitoring the antigenic drift and shift of influenza viruses circulating among humans. Because the signs and symptoms of influenza are similar to those caused by other respiratory pathogens, laboratory testing must be conducted to definitively diagnose influenza. Rapid identification of a novel influenza virus and timely tracking of virus activity throughout the duration of the pandemic is critical to the success of a pandemic response. Prompt identification of a novel strain increases lead-time for the development of a vaccine and implementation of prevention and control measures. The collection of epidemiologic data regarding influenza-like illness (ILI), and influenza related hospitalizations and deaths is essential for determining the extent and severity of influenza epidemics. This is particularly important during epidemics or pandemics associated with a newly recognized

influenza variant. Epidemiologic data will help guide prevention and control strategies (e.g., the prioritization of limited vaccine supplies).

Current Status of Surveillance in Trinidad and Tobago:

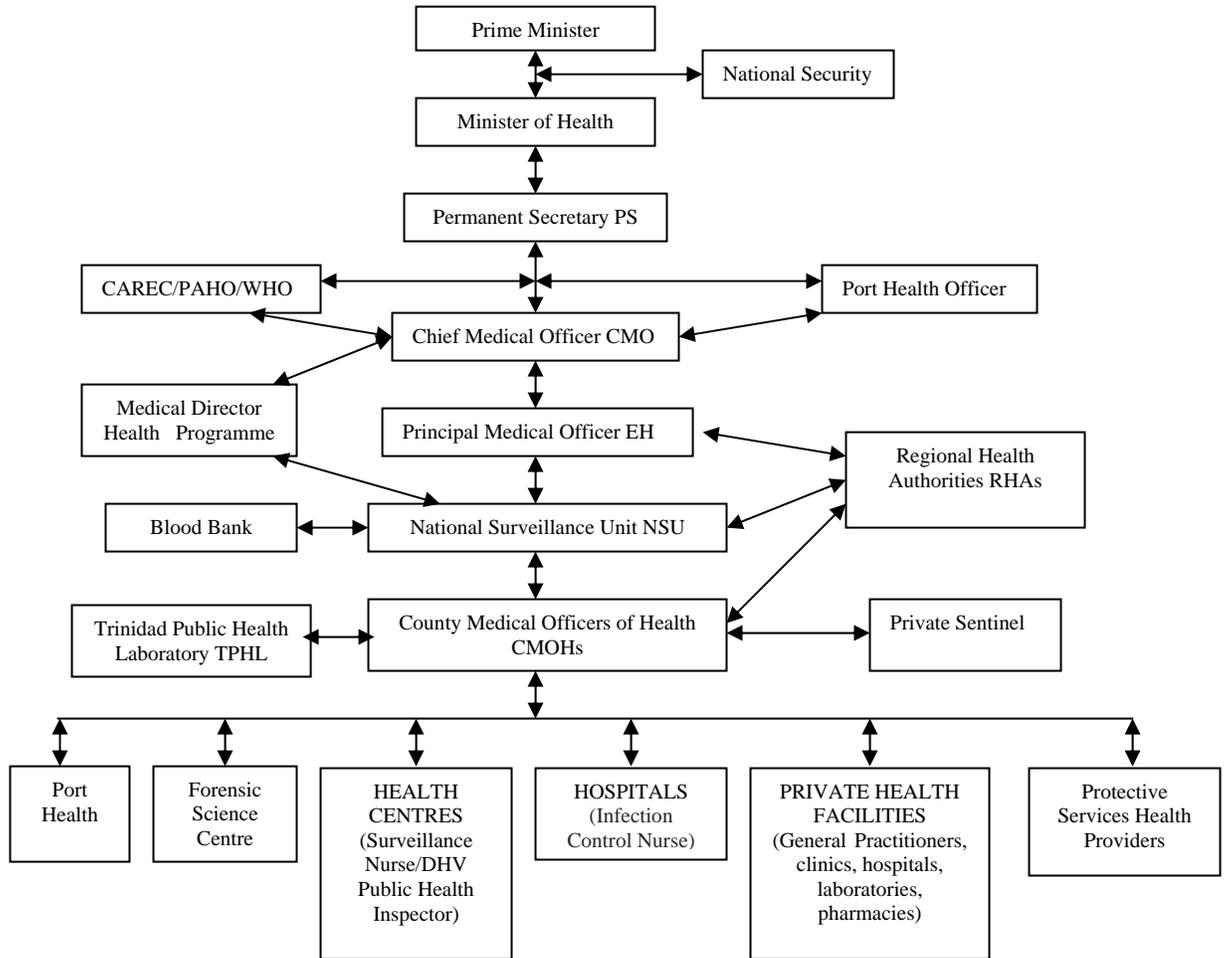
The identification of suspected influenza cases may be done at the Health Centres, Hospitals, Accident and Emergency Departments, Child Welfare Clinics, Health Office Sessions and General Practitioners Office. These cases are reported to the County Medical Officers of Health. Treatment is then recommended. There is an ongoing programme in viral analysis between the Ministry of Health and CAREC. Routinely, on average, ten samples are analysed per month to monitor circulating viruses.

This information is then tabulated and forwarded to the National Surveillance Unit for further analysis. Presentation will be made to the Chief Medical Officer, Ministry of Health, CAREC, PAHO, County Medical Officer's of Health and other key stakeholders. An average of 90,000 cases of influenza-like illnesses is reported to the National Surveillance Unit each year. Seasonal fluctuations occur especially in the rainy season. These cases are not severe and usually do not result in fatality.

The two (2) Surveillance Nurses attached to the National Surveillance Unit along with the Infection Control Nurse at each major Hospital and the surveillance nurses at the counties conduct Active Surveillance, and report daily any incidence of suspected cases to the National Surveillance Unit, Ministry of Health.

Trinidad and Tobago Public Health Laboratory (TPHL) is well equipped and has trained personnel to conduct influenza virus typing. In addition TPHL has support from CAREC and CDC to do virus sub-typing.

**MINISTRY OF HEALTH
AVIAN INFLUENZA A (H5N1) SURVEILLANCE FLOW CHART**



Planning Principles and Assumptions

Since surveillance data will drive the pandemic response it is important that physicians and other health care workers are educated and updated on an ongoing basis as to their role in the system about the importance of surveillance and reporting of Influenza-Like Illnesses (ILI). Surveillance systems must be established in advance of a pandemic, as there will be little time to augment capacity at the time of a pandemic. At the time of a pandemic, surveillance and laboratory testing capacity will be reduced (e.g., due to staff absenteeism and supply shortages) as compared to inter pandemic period, and only streamlined, resource efficient systems will continue to function. Special study protocols if required, (e.g., to determine epidemiology or to investigate reported vaccine-associated adverse events) at the time of a pandemic must be developed and pre-tested in the inter pandemic period, recognizing that refinements may be necessary at the time of a pandemic.

The intensity and methods of virologic surveillance will differ depending on the phase of the pandemic. Initially, efforts should be directed toward detecting the arrival of the novel virus into previously unaffected areas and collecting epidemiologic data on infected persons. This data will be used to characterize virus activity and better target prevention and control measures. In addition, arrival of the novel virus into a particular area will guide the mobilization of resources needed to implement control measures. After the virus has spread throughout the country, virologic surveillance must continue in order to track the intensity of virus activity and detect any changes in the virus, including the development of resistance to antiviral drugs in different populations. Targeted studies may include serologic studies of immunity to the virus in different populations.

Studies of the etiologic agents responsible for secondary complications of influenza and their susceptibility to antimicrobial drugs will also be important, especially in times of short supply. In addition, surveillance data and targeted studies will be useful in assessing the impact of the pandemic on the health care system, as well as social and economic impact.

Vaccine and Immunization Programs

Influenza vaccines are normally developed by growing the seed viruses in fertilized chicken eggs. The time between the identification of the strain and the availability of the vaccine is 6-8 months.

The vaccine against seasonal influenza has been available for over 60 years, and its safety and efficacy have been demonstrated. The reduction in the number of hospitalizations and deaths in high-risk populations is well known. As influenza viruses are constantly evolving, each year the vaccine formula is altered to include the most important strains identified by the Global Influenza Surveillance Network. Coordinated by WHO since 1948, the Network is comprised of 112 National Centers in 83 countries and 4 Collaborating Centers devoted to reference and research on influenza. These latter are

located in Atlanta, the United States; London, the United Kingdom; Melbourne, Australia; and Tokyo, Japan. Twice a year, (February for the Northern Hemisphere and September for the Southern Hemisphere), WHO holds a consultation with the directors of the Collaborating Centers and representatives from the national laboratories to issue recommendations on the composition of the trivalent vaccine, containing a type A virus (H3N2), another type A virus (H1N1), and a type B virus. Since 1972, WHO has recommended over 40 changes in the influenza vaccine formula.

PAHO's Technical Advisory Group on Immunization recommends that countries offer vaccination against seasonal influenza to at-risk groups identified by WHO, giving priority to the elderly. Vaccinating these groups has proven to be one of the most cost-effective interventions in public health. Another advantage of making better use of the seasonal vaccine is that it will help boost productive capacity to respond to a pandemic. Vaccination against seasonal influenza is gradually being introduced in the Region of the Americas. Global vaccine production currently stands at around 300 million doses and is concentrated in Australia, Europe, Japan, and North America. The vaccine is 70% to 90% effective in young adults and 30% to 40% in the elderly, when the vaccine antigen is very similar to the strains of the circulating virus. The vaccine reduces the severity and incidence of complications by 50% to 60% and mortality by 80%

Influenza vaccines are essential for an adequate response to a flu pandemic. However, in all likelihood, it will be impossible to have vaccines for the initial phase of the pandemic, and when vaccines are available, they will be in very short supply. This will result in wide disparities in their administration, especially in non-vaccine-producing countries. Several aspects should be considered when producing a vaccine with a pandemic virus, namely:

- Cutting vaccine production time, which would include early preparation of the viral seeds for the production of the vaccines and early preparation of reagents to test the potency of the vaccine, or other time-saving approaches;
- Investigating strategies to economize antigen use. This should be a priority, as should the production of monovalent vaccines and the inclusion of adjuvants to boost efficacy using low doses of antigen, even though immunologically virgin populations may require two doses to guarantee protection;
- Developing alternative production methods. Since egg orders for vaccine production using the current technology must be placed 6 months in advance of production start-up, other production methods using fermentation technology should be explored--for example, growth of the virus in tissue culture or antigen production with recombinant DNA technology.

However, the imminent vaccine shortages during the initial phase of the pandemic will force countries to make hard choices about which populations should be the first to receive the existing vaccines and drugs.

Setting goals and priorities involves logistical, ethical, moral, cultural, and legal considerations, as well as continuous analysis of the epidemiological situation to target measures to the most-affected groups.

This country will rely on the Pandemic Influenza Committee (PIC), in which all the sectors are amply represented, to help policymakers set goals and priorities. Before the pandemic hits, country pandemic preparedness plans should already indicate the amount of vaccine required, the groups to vaccinate, the strategies to employ, and the supply of vaccines. This information will provide the data and incentives needed to boost global production. Estimates of global vaccine requirements are based on the estimates in the national plans. Given the existing constraints to vaccinating their entire population, Trinidad and Tobago has prioritise the vaccination for high risk population groups (Annex - C)

The objectives of the Pandemic Vaccine Program are:

- To provide a safe and effective vaccine program to all people of Trinidad and Tobago as soon as possible;
- To allocate, distribute and administer vaccine as rapidly as possible to the appropriate groups of people;
- To monitor safety and effectiveness of vaccination programs.

Current Status

Ministry of Health together with WHO/PAHO has identified high-risk groups among the population of Trinidad and Tobago totaling 183,802.

Two doses of the pandemic vaccine will be required to achieve a protective response when it becomes available.

Based on recommendation by PAHO/WHO the Ministry of Health (MOH) has placed an order for purchase of 26,000 doses of seasonal influenza vaccine, that will be administered to high risk groups (see Annex C).

Planning Principles and Assumptions

At the time of a pandemic, it is assumed that monovalent vaccines containing only the pandemic strain will be used. At this time, it is assumed that in a pandemic caused by a novel virus subtype, all persons will lack previous exposure and will likely require two

doses of vaccine. When vaccine becomes available, initial supplies will not be sufficient to immunize the whole population and prioritization for vaccine administration will be necessary. The N/R/L authorities will control the allocation and distribution of influenza vaccine during a pandemic and will implement specific recommendations regarding priority groups for immunization. Priority groups have been proposed in Annex C; however, these may change when more is known about the epidemiology of the pandemic. It is assumed that with a two-dose program, completion of the second dose should be carried out as soon as possible (one month apart) to effect immunity and this should not wait until every priority group has received a first dose.

This strategy will require extensive planning involving tracking and recall mechanisms. In a pandemic, the current aim is to vaccinate the whole Trinidad and Tobago population over a period of four months on a continuous prioritized basis after receipt of the pandemic seed strain. This would require a minimum of three million monovalent doses (750,000 doses per month).

Trinidad and Tobago does not produce vaccines and as such the Ministry of Health has developed a vaccination priority list. It has been realized that the country has to put emphasis on prevention of infection transmission and control measures.

For vaccine program planning purposes it is important to be prepared to immunize 100% of the population; however the actual proportion of the population that will voluntarily seek vaccination will depend on public perception of risk and severity of the disease. Therefore the demand, manifest as clinic attendance, will likely vary between jurisdictions and within each jurisdiction as the pandemic evolves. In industrialized countries previous experience with outbreak related immunization clinics indicates that it would be prudent to prepare for an initial demand of 75% of the target population. It is recommended that planning activities also focus on delivering a two-dose program to ensure that the public health response is ready to deal with this possibility.

In a pandemic, while immunization activities would be expected to greatly increase, reporting of vaccine associated adverse events through normal channels could be delayed due to reallocation of human resources or staff absenteeism. In this situation, information on potential vaccine associated adverse events must still be communicated in a timely manner from the local to national public health authorities and on to the National Surveillance Unit which may need to contact other government departments/ agencies. Therefore there is a need to establish a plan to monitor vaccine safety and ensure timely communication of any potential vaccine associated adverse events during the pandemic. Specific targeted studies and surveillance activities may be required if an adverse event suspected to be due to the new vaccine is detected.

Antivirals

Antivirals (anti-influenza drugs) are effective for both treatment and prophylaxis and may have a role as an adjunctive strategy to vaccination for the management of pandemic influenza. Antivirals will likely be the only virus-specific intervention during the initial pandemic response. Protection afforded by antivirals is virtually immediate and does not interfere with the response to inactivated influenza vaccines.

The objectives of the antiviral initiative are:

- . to recommend a strategy for the use of antivirals during a pandemic
- . to address issues around the security of supply of antivirals;
- . to monitor drug resistance during the pandemic;
- . To facilitate planning in ensuring the distribution of available antiviral drugs to appropriate groups of people during the pandemic.

Current Status

Only Oseltamivir (Tamiflu) is licensed in Trinidad and Tobago for both prophylaxis and treatment of influenza A infections.

The national Antivirals Working Group is a collaborative effort of MOH and CAREC. This group has developed strategic options on the use of antivirals during a pandemic, including identification of priority groups (Annex C).

Security of supply is an issue that needs to be addressed as the existing supply of antivirals is very limited in Trinidad and Tobago, and is primarily distributed within the private sector. It is expected that global supplies of antivirals will be consumed very rapidly at the start of a pandemic. Antivirals are prescribed by individual physicians on a first-come first-served basis. Prioritization of supplies, and distribution and diversion of any available antivirals for public health use during a pandemic remains to be addressed. Other outstanding issues include the development of a protocol for monitoring of drug resistance during the pandemic. The Ministry of Health has placed an order to obtain Antiviral Drug- Oseltamivir phosphate (Tamiflu) for use in the country.

Planning Principles and Assumptions

An effective intervention with antivirals will require:

- a secure supply;
- a well planned distribution and monitoring system under the direction of N/R/L governments in collaboration with suppliers;
- ability to target priority groups;
- the availability of rapid diagnostic tests;
- enhanced surveillance for the detection of the virus, resistance of the virus to antivirals and drug associated adverse events;
- clinical guidelines for the appropriate use of antivirals;
- study protocols to further assess the effectiveness of antivirals for treatment and prophylaxis during a pandemic; and
- effective communication and education materials on antivirals for health care workers and the public.

During a pandemic, antiviral strategies should utilize all anti-influenza drugs available to Trinidad and Tobago, and be adaptable to changing disease epidemiology and vaccine availability. **It is recommended that neuraminidase inhibitors be reserved for treatment of cases.**

Health Services Emergency Planning

During the pandemic there will be a marked increase in demand for people (health care workers and others) to care for the sick, and appropriate locations and equipment to facilitate the provision of health care. Communities and health care organizations will need to have plans in place that will address what will be done when the health care system is overwhelmed and care must be provided by persons, both health care workers and volunteers, doing work which is not normally part of their daily activities and potentially in settings not usually used for health care.

The objectives of health services emergency planning are:

- To identify issues that will require multi-level collaborative planning during the inter-pandemic period
- to facilitate awareness of the potential impact of a pandemic on the health care system

- . to prepare resources and guidelines that may be adapted during a pandemic.

Current Status

The spectrum of illness seen with influenza is extremely broad, ranging from asymptomatic infection to death, frequently due to secondary bacterial pneumonia or exacerbation of an underlying chronic condition. Influenza is endemic in Trinidad and Tobago. The morbidity and mortality during any given influenza season is largely dependent on the circulating strain(s) of influenza virus, and the susceptibility of the population. Those normally at high risk of influenza complications are the elderly, persons with chronic cardiac or respiratory conditions and the immunocompromised.

Health services guidelines have been developed to assist acute and chronic care institutions, health care planners, clinicians, and other stakeholders with planning for and coping with large numbers of influenza cases, some of whom may have severe disease or life-threatening complications. These documents are included as annexes to this plan for ease of use, and can be broadly classified into the following categories: clinical (F), infection control (E), resource management (G), and non-traditional settings and workers' guidelines (H), which correspond to the main responsibilities of health services to be provided. The annexed documents provide options, worksheets and guidelines to facilitate planning for a consistent and comprehensive response within the health sector. The Plan provides for training and education modules for health care workers, volunteers and the public.

Planning Principles and Assumptions

Due to the broad scope of these planning activities this section has been sub-divided to correspond to the sub-groups that have been working on the different aspects of this component. Where relevant, documents or tools in the Annex will be referenced.

(i) Infection Prevention and Control

The incubation period for influenza usually ranges from one to three days, typically two days. Influenza is spread from person-to-person by inhalation of small particle aerosols, by large droplet infection, by direct contact, or by contact with articles recently contaminated by nasopharyngeal secretions. Contact with respiratory secretions and large droplets, appears to account for most transmissions of influenza. Influenza is highly contagious; it can spread quickly in settings where large groups of people are gathered together, for example, among institutionalized populations

The period of communicability for influenza virus is during the 24 hours before the onset of symptoms, and during the most symptomatic period, usually three to five days from clinical onset in adults and up to seven days in young children. In adults, the amount of viral particles shed for instance, while sneezing or coughing, is related to the severity of

illness and temperature elevation. For those receiving antiviral therapy, the duration when virus particles are shed is likely to be shorter.

Survival of the influenza virus, outside the body, varies with temperature and humidity. It generally survives 24-48 hours on hard, non-porous surfaces, 8-12 hours on cloth, paper and tissue, and five minutes on hands. Survival of the virus is enhanced under conditions of low humidity and in the cold.

During the next pandemic it will be imperative to keep health care workers as healthy as possible. Occupational health issues, which need to be considered, include: vaccination of health care workers, use of personal protective equipment, work exclusion/fitness to work criteria, and work reassignments.

The institutional infection control guidelines (Annex E) contain sections for both acute and long-term care institutions. The issues addressed include: immunization, hand hygiene, use of personal protective equipment (masks, gloves, gowns), patient isolation/accommodation, restriction of visitors, staff cohorting, environmental cleaning, and education for staff, patients and visitors.

The community infection control guideline (Annex E) contains sections pertaining to the general public, health care workers providing services in the community, as well as office-based medical and non-medical health care providers (public health clinics, physicians' offices, dental offices, physiotherapy clinics, and alternative health care providers). The issues addressed include: hand hygiene, the use of personal protective equipment (masks and gloves), cohorting persons with influenza-like illness (ILI), as well as temporary closure of schools, day cares and large, "non-essential" businesses.

(ii) Clinical Management of Influenza

The last two influenza pandemics occurred in 1957–1958 and 1968–1969. Therefore, the majority of currently practicing clinicians would have little or no experience with pandemic influenza disease and may not be aware of its potential variant presentation.

The clinical guidelines that have been developed (Annex F) provide recommendations on the triage of pediatric and adult patients and on the management of patients within Long-Term Care Facilities (LTCF). Clinical Management of Influenza forms have been developed in order to assist health care staff with case management (Annex F). One form contains sections on investigations, which should be considered, treatment recommendations, as well as information pertaining to the selection of patients (children and adults) for hospital admission and for admission to intensive care. Standardized admission and primary care forms, with a triage component, have also been developed to help to ensure consistency and minimize paper work.

During a pandemic, it will be essential to inform both the public and health professionals about the symptoms and treatment of influenza, as well as when to seek advice and refer (see Annex F). Fact sheets regarding the clinical features of influenza and secondary complications have been developed to assist health care providers with diagnosis, and the

general public with self-treatment (Annex F). These fact sheets include information pertaining to children, adults and the elderly. Any educational materials require advanced preparation in addition to an efficient and timely distribution plan.

(iii) Resource Management

Although the impact of a pandemic is unpredictable, for planning purposes it is advisable to expect a major disruption in critical community services. The health care system's response to this situation will be crucial. Regional, local and institutional planners will need to assess their health resource utilization and their health system capacity to cope during severe influenza epidemics and compare this to the estimated capacity required to respond to a pandemic for their catchment area.

It is expected that a substantial proportion of the work force may not be able to work for some period of time during the pandemic due to illness in themselves or in their family members. Health care workers are likely to be at higher risk of illness due to their exposures. During the 1957–1958 pandemic, the United Kingdom experienced an estimated 20% absenteeism rate in the general population and one-third of the staff in one hospital was ill during the peak of the pandemic.

Although in the majority of instances influenza is an acute, self-limiting upper-respiratory infection, complications do occur. In influenza epidemics and pandemics the overall attack rate is relatively high and occurs during a few weeks in any one location.

Consequently, even a low frequency of complications result in marked increases in rates of hospitalizations. It is important to consider that while the waves of the pandemic tend to last for six to eight weeks in any locality, the demand on the health care system will not be at a constant rate during this period as the number of new cases seeking health services is likely to increase, peak, and then decline. The next pandemic wave may closely follow the first wave leaving little time for recovery. Resource needs will need to be reassessed continuously during this potentially overwhelming situation. It will be a challenge for acute care facilities to manage high ward census, high intensive care unit census, and high emergency department volumes in the face of reduced availability of health care workers and limited respiratory support equipment (see Annex H). Advanced consideration should be given to the management of adult and pediatric patients with respiratory distress when oximeters, ventilators, and other respiratory support equipment must be rationed.

Each facility needs to evaluate its human resources. As health care and hospital workers encompass a vast number of different individuals and occupations, a list of health care workers has been developed to assist with planning (Annex G). Emergency reallocation of staff and maintenance of staffing levels will be essential. Health care worker training and continuing education to encourage workers to maintain their skills, incentives to maintain training, and on-going communication are all important and should be planned for during the pre-pandemic period. During the pandemic, child care, emotional support and grief counseling needs to be addressed to facilitate maintenance of adequate staffing levels.

Pandemic influenza historically has been associated with excess mortality. It will be essential for jurisdictions to include a corpse management plan as part of their pandemic plan. Guidelines for the management of mass fatalities (Annex I) have been developed to assist with this process. Issues, which are addressed, include morgue capacity, corpse storage, transportation, management, burial/cremation, and grief counseling.

Planning needs to be undertaken by all orders of government and health service institutions throughout the country to anticipate and put into place strategies to meet a greatly increased demand for services in conjunction with staff shortages.

(iv) Non-Traditional Workers: Health Care Workers and Volunteers

Communities and health care organizations need to have strategies in place that will address what will be done when health care facilities are overwhelmed and medical care must be provided in non-traditional settings. Temporary hospitals and outpatient clinics may need to be set up to provide care. Guidelines for the provision of care in non-traditional settings have been developed to assist with this task (Annex H). The issues addressed include: administrative options for non-traditional hospitals, potential resources and sites, critical characteristics and support services needed, type of work done within the sites, and liability protection.

Guidelines have also been developed addressing the potential sources of additional labour during a pandemic, volunteer recruitment and screening, liability and personal insurance of workers, temporary licensing of workers, roles and responsibilities, and training programs (Annex H).

Emergency Services

Emergency services personnel should be engaged in all levels of pandemic planning. While it is expected that health authorities will lead the pandemic response in terms of surveillance, vaccine usage, use of antivirals and public health measures, and emergency service providers will play a critical role in coordinating the overall emergency response. The deployment of these services will be staged in accordance with the Trinidad and Tobago Pandemic Phases, and will depend on the severity and impact of the pandemic.

The objectives of emergency service planning are:

- to encourage collaboration between emergency service personnel and public health authorities to ensure that the planned pandemic response will be coordinated;
- to facilitate a continuous state of “readiness” through ongoing education, testing and revision of response plans.

Current Status

Emergency service authorities have been advised to develop pandemic plans.

Planning Principles and Assumptions

Public Health authorities will need to work with those in the emergency service field in their jurisdiction in addition to other key stakeholders. The formation of a multidisciplinary committee with clear authority and ability to coordinate pandemic planning and response in the Regional and Local levels is essential. Roles and responsibilities during each pandemic phase need to be assigned to individuals and organizations during the inter-pandemic period with mechanisms in place to compensate for staff turnover and attrition.

Public Health Measures

There are certain decisions that will need to be made at each level of government as the threat of the pandemic emerges. Local public health officials will be asked about what measures can be taken by the public and within the community in order to prevent or control pandemic influenza in their jurisdiction. These decisions will range from population-based recommendations, for example whether to cancel public gatherings or close schools, to individual measures like whether members of the public should wear masks. The effectiveness of these types of measures for the control of disease within a population has not, for the most part, been systematically evaluated. In addition, the potential impact of these measures will vary based on the phase of the pandemic in the particular community and the availability of other interventions such as vaccines and antivirals. The purpose and effectiveness of these measures may also be different in isolated communities compared to large urban centres.

The implications of these potential measures, which range from local school closures to Quarantine recommendations for ports of entry into Trinidad and Tobago, must be recognized by all potential stakeholders and discussed during the inter-pandemic period.

Current Status

A working group is currently refining the list of issues that need to be addressed and actively seeking literature and expert opinion on these issues. A guideline document will be developed. Ministry of Health has started to sensitize health professionals as well as communities regarding possible H5N1 influenza pandemic.

The objectives of public health measures planning are:

- . to make recommendations regarding public health measures such as quarantine, cancellation of public gatherings, and school closures,

- to encourage planning at government level that will raise awareness regarding potential impact of these measures so that necessary partnerships and consultations with external stakeholders can take place during the inter-pandemic period.

Planning Principles and Assumptions

Since there is a lack of scientific data on the effectiveness of these types of disease control measures, especially in conjunction with other influenza control measures, it is unlikely that the benefits of these measures will be quantifiable, especially in advance of the population being exposed to the pandemic virus. Therefore, in the absence of any conclusive data, the group will be making recommendations for the purpose of facilitating consistency between jurisdictions, which is considered to be valuable during the response phase. Regional and local level planners are encouraged to explore the feasibility and implications of these types of control measures within their jurisdictions and to educate stakeholders (e.g., school boards, local business owners such as theatre owners etc.), should it become advisable to implement these types of restrictive measures during a pandemic.

Communications

During the Pre-pandemic phase it is necessary to educate the general public on what is influenza, avian influenza and pandemic influenza; the implications of each type of influenza and how they should respond to each. This is necessary to reduce public anxiety and to empower the public to take control of their health and wellbeing.

There is much confusion as to the difference between the current H5N1 avian influenza and the possible human pandemic influenza. Should the H5N1 come to Trinidad and Tobago and infect wild and domestic birds, there may be undue panic in the population to any influenza type symptoms. This Plan is for Pandemic Influenza, but a parallel plan for Avian Influenza is being developed by the Ministry of Agriculture. The appearance of H5N1 in the Country would have human health implications, such as increased influenza surveillance, and increased caution in handling poultry. Experience of other countries where H5N1 is present, there has been few human cases, except in China, Vietnam and Indonesia, where poultry is raised in close contact with family members.

During an influenza pandemic, two main messages will need to be expressed: what the Ministry or other organization is doing and what the public can do. As the pandemic evolves the number of organizations that will become involved with the media on this issue will be enormous; there will be financial issues, human resource issues, social issues — issues affecting every area of society. Due to this broad scope it will be difficult to have any “control” over the information. The focus instead should be on information management. Information management has three components: meeting the demand for information, acknowledging the limits of government capacity to solve every problem,

and using consistent and complementary messages. Unlike other types of emergencies where the media coverage is much shorter, the information demands during a pandemic will be sustained over a long period, resulting in tremendous information demands. Sustaining public confidence over many months will be a huge challenge that will be based in part on consistency. All key audiences (external, internal and international) must receive consistent, comprehensive and relevant information in a timely manner during any type of emergency.

The objectives of communication planning are to:

- ensure that health partners are prepared to respond to enormous public communication challenges
- identify specific activities to promote consistent, coordinated and effective public communications
- describe options to ensure that the public communications demands of various scenarios are met, clarify what activities should occur during the specific phases of the pandemic
- clarify what activities should occur during the specific phases of the pandemic

Current Status

Presently Ministry of Health has planned to develop communication materials on influenza. Most communication materials and strategies targeting the general public, media, health care workers and other community organizations (considered to be “external” key audiences) are geared at promoting immunization and reducing unnecessary hospital visits.

A secure website will be set-up to facilitate pandemic planning and sharing of key resources among recognized stakeholders. The role of this website as a communication tool will likely be expanded during the pandemic. Communication with “internal key audiences”, mainly government decision makers and policy advisors, occurs at all levels of government.

Planning Principles and Assumptions

The Communications annex for the TTPIP (Annex J) makes references to strategic considerations, target audiences, and recommended notification and public communication activities for consideration when planning for pandemic influenza. It is important to ensure that all participants in the national/ regional/local communications network have identified fully trained back-up personnel that can step in if the original

member is not available. When planning for this type of event, where the onset is unknown, succession training must be considered an ongoing activity.

The identification of spokesperson(s) and establishment of new, or evaluation of current distribution mechanisms also should occur during the inter-pandemic period. Templates for fact sheets, briefing notes and media communications may also be prepared in advance.

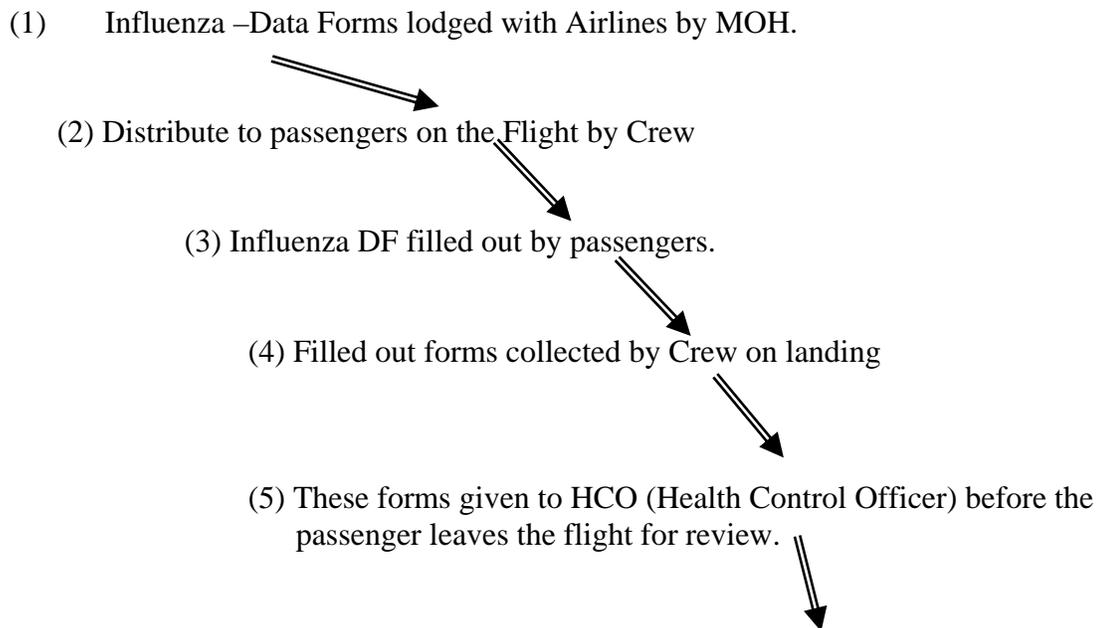
Port Health

At the global level WHO has established Port Health as a priority in the revised Health International Regulations. Port Health Services and Surveillance in Trinidad and Tobago, become increasingly important due to steady increase in international trade and travel, with the concurrent increase in risk for spread of diseases between countries.

The SARS outbreak two years ago brought to the forefront the need of implement and improve surveillance at all ports of entry in Trinidad and Tobago. The current Port and Airport Logistics for Influenza Pandemic Surveillance and quarantine is showed in the following flowchart:

AIRPORT LOGISTICS FOR INFLUENZA PANDEMIC SURVEILLANCE/QUARANTINE

Distribution/Completion and Collection of Influenza Pandemic Declaration Forms
Referral/Quarantine

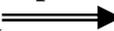


(6) In the event of a suspected/or probable case of Influenza –
Medical Officer 1 on call informed by HCO.



(7) Based on MO1s opinion the suspected case is quarantined or
referred to one of the major hospitals. (Via EHS Ambulance)



(8) If the MO1 is of the opinion that the rest of the passengers need isolation (due to a
suspected case). For **Piarco Airport the 'old terminal'** is to be used for the
Whole Flight to be quarantined  MOH (Ministry of Health) informed –
CMO for further directives.

Planning and Preparedness Checklist

Planning activities can be broadly divided into three categories: prevention, preparedness and response/implementation activities. Post-event recovery/after care will be addressed in due course. In the inter-pandemic period, activities will focus on prevention and preparedness. Implementation of the response activities occur once an alert for a pandemic has been issued.

In order to manage an emergency effectively it is essential to have a comprehensive response plan in place. The plan needs to be communicated to all potential stakeholders, and related organizations and individuals who would be involved in the pandemic response. If possible advance testing and simulation of these plans should be coordinated with a mechanism to provide feedback. This section of the document includes checklists specifically for influenza pandemic planning. This section is designed to facilitate national/ regional and local planning, possibly through the adaptation of existing emergency response plans.

Pandemic Planning Checklists

Planning for a pandemic involves consideration of what activities are necessary for optimal management of each stage of the pandemic. In this part of the document, activities have been listed and grouped according to the following components of the Plan:

- Surveillance
- Vaccine Programs
- Antivirals
- Emergency Health Services
- Communications

This is a preliminary list of planning activities that will need to be reviewed on a regular basis and updated as planning activities are completed. These planning activities should occur during the inter-pandemic period, recognizing that when novel strains are detected or pandemic activity starts plans will need to be reviewed and adapted as necessary.

Surveillance Checklist

Improve disease-based surveillance, in collaboration with MOH and NSU. Includes improvements to the current system and consideration of enhancements (e.g., emergency room surveillance and real-time influenza mortality surveillance)

- Improve virologic surveillance capability by improving the capability of TPHL to isolate and subtype influenza virus.
- Establish link with avian/swine influenza surveillance contacts within agricultural surveillance regions
- Develop protocols/guidelines for prioritization of laboratory services during times of high service demand and staff and supply shortages.
- Develop/improve communication mechanisms for the rapid and timely exchange of surveillance information between MOH, NSU and local stakeholders.
- Together with public health response, consider how recovered cases, who are presumably immune to the novel virus, can be identified by occupation (e.g., health care provider or essential service worker) and location, thus facilitating development of a “list” of immune workers that may be strategically deployed.
- Determine what information needs to be collected and how this will be done, to facilitate evaluation of surveillance activities in the post-pandemic period (including socio-economic evaluations).

Vaccine Programs Checklist

- Enhance annual influenza vaccination coverage rates in the country recommended “high-risk” groups, particularly groups with low coverage levels.
- Increase annual influenza vaccination coverage rates among health care and essential services workers.
- Increase pneumococcal vaccination coverage levels in the country recommended “high-risk” groups (to reduce the incidence and severity of secondary bacterial pneumonia).
- Consider regional/ local modifications or refinements of nationally defined priority target groups depending on local circumstances. For example, there may be specific groups of people in selected region/ local areas whose absence due to influenza illness could pose serious consequences in terms of public safety or disruption of essential community services (e.g. air-traffic controllers at major airports, workers who operate major telecommunications or electrical grids).
- Develop contingency plans for storage, distribution and administration of influenza vaccine through public health and other providers to nationally-defined high-priority target groups, including:
 - Mass immunization clinic capability within the country,
 - Locations of clinics (e.g., central sites, pharmacies, work place),
 - Vaccine storage capability – identify current and potential contingency depots,
 - Numbers of staff needed to run immunization clinics,
 - Plans to deploy staff from other areas from within and outside public health to assist in immunization,
 - Advanced discussions with professional organizations and unions regarding tasks outside routine job descriptions during a pandemic,
 - Training plan for deployed staff, and
 - Measures to be taken to prevent distribution to persons other than those in the priority groups.
 - Determine how receipt of vaccine will be recorded and how a two-dose immunization program would be implemented in terms of necessary re-call and record-keeping procedures.
 - Determine the number of people within the area who fall within each of the priority groups for vaccination (i.e., high-risk groups, health

care workers, emergency service workers, specific age groups, also poultry workers).

- Verify capacity of suppliers for direct shipping to health districts.
- Develop plans for vaccine security: During transport, storage, at clinics
- Ensure appropriate legal authorities are in place that will allow for implementation of major elements of the proposed distribution plan.
- Enhance VAAE (Vaccine Associated Adverse Events) surveillance, in collaboration with MOH/NSU.
- Determine what information needs to be collected and how this will be done, to facilitate evaluation of pandemic vaccine program activities in the post-pandemic period (including socio-economic evaluations).
- Review and modify plans as needed on a periodic basis.

Antivirals Checklist

- Consider the need for and availability of antiviral drugs including mechanisms for ensuring a secure supply of antiviral drugs.
- Modify/refine guidance provided by the Antivirals working group, as needed for national/ regional and local application (e.g., plan how to distribute available antivirals based on priority groups).
- Determine what information needs to be collected and how this will be done, to facilitate evaluation of an antiviral response in the post-pandemic period (including socio-economic evaluations).

Emergency Health Services Checklist

- Develop national/regional/local guidelines for prioritizing health care needs and service delivery, accessing resources and implementing infection control measures during a pandemic.
- Using available software (eg. Flu Surge) determine emergency health needs based on various attack rates and intensity of the disease.

- Ensure that liability/insurance/ temporary licensing issues for active and retired health care workers and volunteers are addressed with licensing bodies. Define the extent of care that health care workers/volunteers can perform according to the national laws.
- Bulk purchase and stockpile extra medical supplies. Explore the options for stockpiling extra medical supplies and identify sources for additional supplies.
- Develop mechanisms for coordinating patient transport and tracking/managing beds, e.g., central bed registries, call centre and centralized ambulance dispatch.
- Develop detailed regional and facility-level plans for providing health services during a pandemic, including the type of care to be delivered at different health care settings and the triage across sites; human resource, material and financial resource needs should be identified and consideration provided for prioritizing patient care.
- Assess health care personnel capacity: estimate number of HCW by type (physician, nurses, respiratory therapists, radiology technicians, etc), and by work setting (hospital, community, paramedical etc); estimate number of non-active HCW (retired)
- Determine sources from which additional HCWs and volunteers could be acquired, include NGOs (Red Cross etc.) in pandemic planning.
- Determine the number and type of health care facilities, and estimate their capacity: hospital beds, ICU beds, swing beds, emergency department, ventilatory capacity, oxygen supply, and antibiotic supply.
- Determine potential alternative sites for medical care (possible sites could include shelters, schools, gymnasiums, nursing homes, day care centres).
- Identify sources of extra supplies needed to provide medical care in these non-traditional sites.
- Determine the capacity of mortuary/burial services, as well as social and psychological services for families of victims.
- Co-ordinate clinical care and health services plans with bordering jurisdictions to avoid migration to centres of perceived enhanced services.
- Develop contingency plans to provide food, medical and other essential life-support needs for persons confined to their homes.
- Ensure communication between Ministry of Health, ODPM, as well as other Ministries, which would be impacted by a pandemic.

- Within region and local level, estimate numbers of emergency services workers including police, fire, correctional, military, funeral services, utilities, telecommunications and national/regional/local leaders (political leaders, managers of response teams) essential to pandemic response.
- Identify military personnel and voluntary organizations, which would assist during a pandemic.
- Develop listing of essential community services (and corresponding personnel) whose absence would pose a serious threat to public safety or would significantly interfere with the ongoing response to the pandemic.
- Replacement personnel could come from lists of retired personnel and/or government or private-sector employees with relevant expertise.
- Critical personnel in the non-health sector should also be considered as high-priority candidates for vaccination and/or chemoprophylaxis.
- Conduct environmental assessments of surge capacity of hospitals, alternate care sites, and other facilities.
- Develop aftercare/recovery plans/ guidelines.
- Determine what information needs to be collected and how this will be done, to facilitate evaluation of the emergency response in the post-pandemic period (including socio-economic evaluations).
- Conduct simulation exercise(s).

Communications Checklist

- Refine/modify national/regional/local communication plans as needed, and ensures consistency with the emergency preparedness and response framework.
- Develop scenarios extending from the main Plan, and for each circumstance establish 1) Communications lead, 2) strategic considerations, 3) draft initial response
- Develop inventories of existing communication systems (hardware and software)
- Identify gaps in the existing systems that will require additional resources.
- Develop plans and mechanisms for communicating quickly and consistently with other jurisdictions and organizations to ensure names/numbers/e-mails are up-to-date and document sharing is possible.

- Develop plans and mechanisms for communications with all relevant audiences, including media, key opinion leaders, stakeholders, and employees.

(Note: To prevent and control an outbreak of avian influenza H5N1 in poultry of Trinidad and Tobago “Animal Emergency Preparedness Plan has been developed by the Ministry of Agriculture, Land and Marine Resources Annex N)

Section IV

RESPONSE

Introduction

In the Response Section of the Trinidad and Tobago Pandemic Influenza Plan, activities corresponding to each component (i.e., surveillance, vaccine programs, the use of antivirals, health services, emergency services, public health measures and communications), have been organized by Pandemic Phase. The tables presented include the key actions necessary to facilitate a comprehensive and consistent response to an influenza pandemic. It is recognized, however, that additional details and modifications will need to be added when the pandemic unfolds. For example, since it cannot determine in advance of a the appearance of a novel virus when an effective vaccine might be available, all activities listed under the “Vaccine Programs” component may occur at different phases than as currently listed in this document.

Phased Approach

The use of the WHO Pandemic Phases is helpful for planning purposes and to succinctly describe “the big picture” as the pandemic unfolds. For responders at the time of a pandemic, the focus will be on more localized “triggers” which may or may not correspond to the global situation. However, because of rapid global travel, infectious diseases can move quickly from country to country and within a country, and all precautions must be taken to slow down this spread, including the closure of borders, restriction of in-country population movement and social distancing.

Planners at all levels in the health and emergency service sectors, are encouraged to think about what “phase” their jurisdiction is in order to operationalize an appropriate response, and also to recognize that their plans will be affected by the epidemiology of the pandemic nationally and globally. For example, the use of antiviral drugs may not be an option, if global supplies are exhausted by other countries affected early in the pandemic.

Other unknown factors like the age distribution and severity of the illness caused by the pandemic strain and efficiency of transmission from human to human will also affect the response measures. This plan assumes the worst-case scenario and therefore may need to be significantly modified if the epidemiology does not support aggressive measures.

National Emergency Response

Planning at the national level has resulted in the development of a generic emergency management structure. This structure, which indicates roles and responsibilities of specific groups in response to an emergency, is included. It is envisioned that for pandemic influenza, the Task Force Committee (TFC) will be headed by the Minister of Health and provide technical advice in regards to health sector response, while the “Pandemic Influenza Committee” (PIC) would make decisions and coordinate at the national level. The specific composition, roles and responsibilities of the “Pandemic Influenza Committee” still needs to be determined. Tables in the following sections align response activities with the pandemic phases. This tool provides a visual overview of the response from a national perspective.

The Trinidad and Tobago Pandemic Influenza Plan is a disease specific plan

Experience to Date

Prior to 2003, when Severe Acute Respiratory Syndrome (SARS) was a global public health emergency, the vast majority of health care professionals, and certainly the general public, had limited knowledge with respiratory infections of pandemic potential.

The SARS outbreak caused an exponential increase in the knowledge with this type of health threat - severity of the illness, method of spread and infection control and prevention- even though there were no reported positive cases.

Those involved in disease surveillance and pandemic planning saw this as a type of “dress-rehearsal” for pandemic influenza, recognizing that many of the response issues would be the same, but on a much larger scale for pandemic influenza. The response to pandemic influenza would need to be sustained for a longer period of time and would likely include a mass immunization effort on top of the acute care demands.

The SARS experience reinforced the need for preparedness activities as cited in the Preparedness Section of this plan. In particular the need for resources and surge capacity within the health system to deal with public health emergencies was highlighted. Advanced preparation and removal any potential barriers in communication systems, data management technology, acquisition and mobilization of supplemental health care workers and settings, are just a few of the other needs identified in the Plan, and which were validated by the SARS experience.

This experience has flagged key action items that have been utilized in drafting this section of the Plan.

Key Response Activities by Pandemic Phase

The key response activities listed below have been organized by the component of the response that they relate to, and the phase at which the action should take place. As previously discussed, there needs to be flexibility in the response since the availability of resources, such as vaccine or antiviral drugs, may necessitate deviation from the proposed sequence of response activities. It is expected that many of the response activities within each phase will need to occur simultaneously. The action items have not been prioritized within each phase.

The tables also include “Response level” designations which have been provided for guidance only. It is likely that many activities, especially those currently designated as a “national-level response” will be carried out by the Task Force Committee (TFC). Other non-governmental responders (e.g. Red Cross) will likely be involved in the response but have not been specifically identified in this plan since it is anticipated that their respective roles/activities would be developed in conjunction with needed other ministries as well as public health authorities.

Phase 3 - Novel virus identified in a human

Component	Focus	Actions	Level
Surveillance	Heighten existing surveillance systems	Heightened Surveillance for influenza. Collect and compile epidemiological data from involved countries. Increase sample submissions for laboratory diagnosis Improve Laboratory capacity.	MOH, CMOH/Health Centres, TPHL, Hosp/RHAs (lead: NSU)
Vaccine Programs	Mitigation of potential complications of influenza through use of vaccine resources. Increase immunity	Promote seasonal influenza vaccination. Procure seasonal vaccine and administer to “high-risk” groups including health workers and other essential workers. To reduce the incidence and severity of secondary bacterial pneumonia. Promote the use of pneumococcal vaccines for high risk groups, such as immuno-compromised, old persons 65 years and above.	MOH, EPI, CMOH

Antivirals	Stockpile Oseltamivir (Tamiflu), and develop priority distribution and protocols for use	Procurement and protocols for use. Security and distribution and priority use.	MOH (lead by Hosp &TFC)
Health Services	Evaluation of Laboratory capacity. Information gathering Infection control Increasing hospital patient care capacity Establishment of alternate care facilities	Enhance capability of Trinidad and Tobago Public Health Laboratory for typing of Influenza virus. Establish a good working relationship with CAREC. Continue refresher training to health professional for collection of throat swab. Estimate number of HCW by type (physician, nurses, respiratory therapists, radiology technicians, etc), and by work setting (hospital, community, paramedical). Estimates number of non-active HCW by type (retired). Triage and isolation of febrile patients Ensure use of personal protective measure at high risk area (eg. Emergency ward, flu ward etc.) Prepare for maximum number of critical care patients that can be accommodated with HCWs available. Determine additional equipment required (ventilators, monitors, suction equipment, oxygen etc.) and procure. Consider this possibility and make plans for implementation	MOH (Lead by TPHL) MOH, CMOH, RHAs, RHAs/Hospitals. RHAs, Hospitals RHAs. Hospitals. MoH RHAs/Hosp.
Emergency Services	Information sharing	Notification of emergency service managers (e.g. Emergency Health Services, Social Services). * Would include Emergency Health Services and Emergency Social Services managers at the County Level	MOH, CMOH <i>(Lead: Each RHA/CMOH for their respective area)</i>
Public Health Measures	Health education materials and relevant for health care workers and the	Review of existing public materials on seasonal influenza and influenza pandemics Review, update and create educational materials on all aspects of influenza for health care professionals, other special audiences and	MOH, CMOH, RHAs MOH, CMOH,

	<p>general public</p> <p>Information preparation</p> <p>Simulation Exercises</p>	<p>the general public.</p> <p>Make ready equipments for delivery of health educational message.</p> <p>Initiate programme</p> <p>Conduct simulation exercises (table top and drills) for all HCW and inter-sectoral partners)</p>	<p>MOH, CMOH, Health Centres</p> <p>ODPM, MOH, RHAs</p>
Communications	<p>Develop a national pre-pandemic public communication programme.</p> <p>Evaluation of emergency/rapid Communication capacity.</p> <p>Information collection and dissemination</p>	<p>Implement the developed programme</p> <p>Notification of communications staff with international and non-governmental Organizations.</p> <p>Reviewing existing communication systems (e.g., emergency contact lists, toll free capacity, dedicated Internet site capacity, information sharing systems)</p> <p>Ensure names/numbers/emails are up-to-date and document sharing is possible</p>	<p>MOH with Information Division of Ministries of Agriculture and Public Administration</p> <p>MOH, CMOH, RHAs</p> <p>MOH, CMOH, RHAs</p>

Phase 4 – HUMAN to HUMAN INFECTION CONFIRMED – cases localized

Component	Focus	Actions	Level
Surveillance	<p>Monitoring of evolving situation</p> <p>Dissemination of data</p>	<p>Enhance community surveillance.</p> <p>Increase collection of throat swab for virological test.</p> <p>Ongoing collection and compilation of epidemiological data from involved country (s).</p> <p>Review/Revise standard reports for dissemination of epidemiological data</p>	<p>MOH (Lead by NSU)</p> <p>MOH (Lead by NSU)</p>

	Port Health - airports and sea ports	Dissemination of epidemiological data Implement strict Port Health Surveillance. Consider international travel advisories	MOH, CMOH (Lead: TFC) PIC, MOH, CMOH
Vaccine Programs	Inventory and resource assessment Increase coverage with seasonal influenza immunization.	Conduct initial availability assessment of supplies (e.g., syringes, adrenalin, sharps disposal units), equipment and locations potentially required for a vaccine-based response Vaccination of priority groups, including health workers with seasonal influenza vaccination. Review educational materials re. Administration of vaccines and adapt/update as needed Ensure that any legal issues that may impede rollout of a mass immunization program are addressed	MOH, CMOH, Hosp MOH, CMOH, Hosp MOH/EPI
Antivirals	Antiviral strategy	Perform an inventory assessment (drugs, formulations, and expiry dates) and ensure secured distribution. Determine the appropriate use of existing supplies	MOH, CMOH RHAs MOH
Health Services	Review and revision of Guidelines. Infection control	Review protocols/guidelines for prioritization of laboratory services during times of high service demand and staff and supply shortages Ensure that any legal/insurance issues that may impede recruitment and use of active and retired health care workers and volunteers have been addressed with licensing bodies Prepare/update communications defining the extent of care that healthcare workers/volunteers can perform Triage and isolation of febrile patients Ensure use of personal protective measure at high risk area (eg emergency ward, flu ward etc).	MOH, CMOH (Lead: TPHL) MOH/RHA RHA/MOH Hospital, HC

	Readiness measures	Make sure that all preparatory measures are in place to receive a surge in patients. Advice home quarantine as per need. Readiness of ambulance services.	
Emergency Services	Education of HCW	Review results of any previously conducted simulation exercises and consider what (if any) significant changes have occurred since the exercise was conducted. Educate new staff about pandemic influenza	MOH, RHA/CMOH, Hosp MOH, CMOH, Hospital
Public Health Measures	Resource assessment and preparation Legislation/legal issues	Review staffing requirements for implementation of a pandemic response including mass immunization clinics, control measures, and public education Preparation of educational material for public inquiry phone-line staff Legislative agenda considerations.	MOH, RHA/CMOH, Hosp MOH, Office of the Attorney General
Communication	Review and adjust communication programme and continue implementation	Continue implementation at all levels	ODPM, MOH, RHAs, CMOH, Information Division.

Phase 5 - HUMAN TO HUMAN TRANSMISSION CONFIRMED – larger clusters of patients.

Component	Focus	Actions	Level
Surveillance	Heighten existing surveillance systems	Collect/ compile/ distribute epidemiological data from involved country (s). Develop any new/updated case definitions (if needed). Implement border-based surveillance (depending on origin of cases)	MOH (lead by NSU) MOH, CMOH, Hosp

	<p>Port Health - Traveller issues</p> <p>Establish surveillance or increase current surveillance activities</p> <p>Plan for streamlined data collection</p>	<p>Including notifications to ill and well travellers.</p> <p>Consider implementation of emergency room surveillance (especially in areas known to receive a lot of travellers from affected areas)</p> <p>Implement real-time influenza mortality surveillance</p> <p>Determine what information needs to be collected on cases and screening measures and how this will be done (e.g., data collection forms, database issues, data flow)</p>	<p>MOH, CMOH (Lead:TFC)</p> <p>MOH, CMOH</p> <p>CMOH, Hosp</p> <p>MOH, CMOH, Hosp</p> <p>MOH, CMOH, Hosp</p>
Vaccine Programs	<p>Planning for vaccine distribution and administration.</p>	<p>Review and modify if necessary, contingency plans for storage, distribution and administration of influenza vaccine through public health and other providers to nationally defined high-priority target groups</p> <p>Ensure staff are trained and infrastructure is in place to record immunizations, including requirements for a two-dose immunization program (i.e., re-call and record-keeping procedures)</p> <p>Review estimates of the number of people within the CMOH who fall within each of the priority groups for vaccination Vaccination of high-risk groups i.e. health care workers, emergency service workers, specific age groups) and access strategies</p> <p>Promotion of seasonal influenza vaccination (to decrease the likelihood of re-assortment between the currently circulating strains and the novel strain</p>	<p>MOH, CMOH (Lead: TFC)</p> <p>CMOH, Hosp</p> <p>MOH, CMOH (Lead: EPI)</p>
Antivirals	<p>Supply of antiviral drugs</p> <p>Planning for antiviral drug distribution and tracking</p>	<p>Perform an inventory assessment of available supplies</p> <p>Review/revise recommended priority groups and plans for antiviral use based on available epidemiological</p>	<p>MOH, RHAs, CMOH</p> <p>MOH, CMOH (Lead: TFC)</p>

		<p>data</p> <p>Review and modify, if necessary, contingency plans for the availability, distribution and administration of antiviral drugs through public health and other providers to nationally defined high-priority target groups</p> <p>Review estimates of the number of people within the CMOH who fall within each of the priority groups for receipt of antiviral drugs (i.e., high risk groups, health care workers, emergency service workers, specific age groups) and access strategies</p> <p>Ensure staff are trained and infrastructure is in place to track who is receiving the drugs for the purpose of treatment and prophylaxis</p>	<p>MOH, CMOH</p> <p>MOH, CMOH, Hosp</p> <p>CMOH, Hosp</p>
Health Services	<p>Management of suspect cases detected through enhanced surveillance</p> <p>Preparation for increased demand on acute care sites</p> <p>Preparation for providing supportive care in Hospitals and Health Centres</p>	<p>Implement/Review infection control precautions for case management Triage and Isolation of febrile patients</p> <p>Use of full personal protective measure by personnel working in high risk area.</p> <p>Review/ update local and CMOH data on the number & type of health care facilities, and capacity: hospital beds, ICU beds, swing beds, with enhanced level of care, emergency department, ventilatory capacity, oxygen supply, antibiotic supply.</p> <p>Conduct availability assessment of medications, supplies and equipment potentially needed for the response</p> <p>Disseminate strategy for collection/monitoring of data on health care service use/demands</p>	<p>MOH, CMOH, H(Lead: NSU)</p> <p>MOH, CMOH, Hosp</p> <p>MOH, CMOH, RHAs/Hosp</p> <p>MOH, CMOH, RHAs</p> <p>CMOH, RHAs/Hosp</p>
Emergency Services	Resource assessment and classification	Ensure that estimates of numbers of emergency services workers including police, fire, correctional, military, funeral services, utilities,	MOH, CMOH, RHAs/Hosp, ODPM

		telecommunications and MOH, CMOH, leaders (political leaders, managers of response teams) essential to pandemic response are current and that lists are available for dissemination	
Non Traditional Influenza Clinic (if necessary)	Selection of place for the clinics Appointing Volunteers, Health workers	Establishing non traditional influenza clinics Appointing health workers, health volunteers	RHA, CMOH (Lead RHA)
Public Health Measures	Preparation of educational materials and public health resources	Review national recommendations for public health management of cases and other control measures and modify if necessary Ensure adequate resources are available to implement recommended public health measures including isolation of cases Prepare/revise educational and guidance materials for health workers (who will be on the front lines with respect to prevention and control measures), the general public; some documents for the public should emphasize infection control in homes, schools, places of work	MOH, CMOH, Hosp (Lead: TFC) CMOH, Hosp MOH, CMOH, Hosp
Communications	Ongoing timely communication with stakeholders	Increased engagement with international partners Establish ongoing communications with media, partners and public Activate Emergency Communications processes (as set out in the Emergency Communications Plans within each implicated organizations) Implement plans and mechanisms for communications with all relevant audiences, including media, key opinion leaders, stakeholders, employees	MOH MOH, CMOH, RHAs/Hosp MOH, CMOH, RHAs/Hosp

Phase 6 - PANDEMIC CONFIRMED

Component	Focus	Actions Response	Level
Surveillance	Timely collection, compilation and dissemination of epidemiological and clinical data	Collect/compile/distribute epidemiological data from involved counties Estimate burden of disease	MOH (Lead NSU)
		Define clinical spectrum of disease (based on feedback from local level experts), revise case definitions as necessary	MOH, CMOH, H/C
Monitor surveillance activities; compile and report outcomes		MOH, CMOH (Lead NSU)	
Distribute data collection forms and database transmission instructions/ protocols		MOH, CMOH (Lead NSU)	
Review protocols for special studies and establish dedicated teams to activate the studies in collaboration with NSU		MOH, CMOH, Hosp (Lead NSU, TFC)	
Evaluate active Surveillance System			
	Port Health	Determine ongoing surveillance needs for both documentation of end of first wave and detection of any new cases/outbreaks	
		Increase border control. Consider border closure.	PIC/ODPM, MOH
Vaccine Programs	Implementation of mass immunization clinics	Pandemic vaccine purchase	MOH
		Review/revise recommended priority groups for immunization with pandemic influenza vaccine based on available epidemiological data	MOH, CMOH
		Modify/refine other aspect of the national guidelines, as needed for CMOH and local application	MOH, CMOH (Lead TFC)
		When vaccine is available... Activate immunization clinic capability Implement streamlined VAAE	

		surveillance, in collaboration with NSU Collect and compile reports of total people immunized with one and/or two doses	
Antivirals	Strategic and controlled use of antiviral	Based on local epidemiology and available supplies, consider administering antiviral prophylaxis and treatment to priority groups If anti-virals are being used, implement adverse drug reaction reporting system Ongoing monitoring of anti-viral availability Evaluate effectiveness of strategic antiviral use Summarize and report antiviral resistance data Summarize and report adverse drug reaction data	MOH, CMOH (Lead TFC) MOH, CMOH, Hosp MOH, CMOH, Hosp MOH, CMOH, Hosp, EPII
Health Services	Use of optimal infection control practices Management of increased demand on health care system	Triage and isolation of febrile patients Use of full personal protective measures in high risk area Review/revise guidelines for the management of mass fatalities, including burial and mortuary services Summarize, evaluate and report social, counselling services Access sources of additional HCW and volunteers i.e., NGOs (Red Cross) Open more non-traditional sites as needed Implement strategy for tracking of recovered, presumably immune, cases	MOH, RHA, CMOH, MOH, RHA, CMOH,
Emergency Services	Mitigation of potential health care and societal disruption due to pandemic activity/public fear of influenza	Activate plans to provide food, medical and other essential life-support needs for persons confined to their homes by choice or by direction from	MOH, RHA/CMOH /Hosp

		<p>national/regional/local health officials.</p> <p>Consider travel advisories within Trinidad and Tobago, and Regionally/Internationally</p> <p>Declare state of Emergency if necessary</p> <p>Evaluate need for military assistance.</p>	<p>MOH, RHA/CMOH, Hosp</p> <p>MOH,</p>
Public Health Measures	<p>Implementation of public health response</p> <p>Port Health</p>	<p>Evaluate interventions and revise recommendations as necessary</p> <p>Review/update/disseminate national recommendations regarding containment strategies (i.e., cancellation of public gatherings, school closures)</p> <p>Monitoring/tracking of compliance with containment recommendations</p> <p>Document lessons learnt</p> <p>Evaluate the effectiveness of public health measures</p> <p>Consider border closure</p>	<p>MOH, CMOH,</p> <p>CMOH, Hosp</p> <p>MOH, CMOH,</p> <p>MOH/CMOH,</p>
Communications	Ongoing communication with stakeholders and public	<p>Institute daily conference calls of the MOH, ensure it is integrated with TFC meetings</p> <p>Ongoing communication with global partners/international agencies</p> <p>Ongoing communications with media, partners and public etc.</p> <p>Launch multi-media campaign targeting specific target groups including the general public, health care workers and local community support networks</p> <p>Evaluation of communication strategy</p>	<p>MOH</p> <p>MOH</p> <p>MOH, CMOH, Hosp</p> <p>PIC, MOH Information Division</p>

Phase 6 - SECOND OR LATER WAVES

Component	Focus	Actions Response	Level
Surveillance	Early detection of second wave	Ongoing surveillance related activities	MOH, CMOH, Hosp, NSU
Vaccine Programs	Immunization of the non-immune	Ongoing immunization of non-immune population	MOH
Antivirals	Strategic and controlled use of available antiviral drugs	Based on local epidemiology and available supplies, and lessons learned from previous wave (s), recommend administering antiviral prophylaxis and treatment to priority groups	MOH, CMOH (lead TFC)
Health Services	Gearing up to meet increasing demands and control of spread	Implement activities as per updated guidelines	MOH, CMOH, Hosp
Emergency Services	Optimal use of emergency resources	As per updated guidelines	RHA, CMOH, Hosp
Public Health Measures	Efficient and Strategic public health response	Building on lessons learned	MOH,RHA,CMOH
Communications	Ongoing communication with stakeholders and public	As per previous phases	MOH

RETURN TO INTER PANDEMIC PERIOD - POST-PANDEMIC/RECOVERY

Component	Focus	ActionsResponse	Level
Surveillance	Review, evaluation and return to routine operations	Resume routine ongoing laboratory and disease surveillance Estimate burden of disease during outbreak periods	MOH, CMOH, Hosp MOH, CMOH, Hosp
Vaccine Programs	Review, evaluation, resumption of routine programs	Provide recommendations for routine prevention and control including recommendations for vaccines	MOH, CMOH (lead TFC, EPI)
Antivirals	Review and evaluation	Provide recommendations for the strategic use of anti-virals during a pandemic based on lessons learned within Trinidad and Tobago, and internationally	MOH, CMOH (lead TFC)
Health Services	Review, evaluation, return to routine operations	Review/activate aftercare/recovery plans/guidelines	MOH, CMOH, Hosp
Emergency Services	Review, evaluation, return to pre-emergency activity level	Review/activate aftercare/recovery plans/ guidelines	MOH, CMOH
Public Health Measures	Review, evaluation, resumption of routing programs	Provide recommendations for routine prevention and control including recommendations for any control measures other than vaccines and antivirals Provide lessons learned for ourselves and the public and prepare for the next emerging infectious disease	MOH, CMOH, Hosp (lead TFC) MOH, CMOH, Hosp
Communications	Review, evaluation, return to routine operations	Review performance measurement criteria and evaluate response	MOH, CMOH, Hosp

List of Abbreviations

CDC	-	Centre for Disease Control and Prevention
CMOH	-	County Medical Officer of Health
TTPIP	-	Trinidad and Tobago Pandemic Influenza Plan
N/R/L	-	National/Regional/Local
SARS	-	Severe Acute Respiratory Syndrome
MOH	-	Medical Officer of Health
TPHL	-	Trinidad Public Health Laboratory
PAHO	-	Pan American Health Organization
R/L	-	Regional/Local
WHO	-	World Health Organization
MoH	-	Ministry of Health
H/C	-	Health Centres
CFDD	-	Chemistry Food and Drug Division
EPI	-	Expanded Programme on Immunization
NSU	-	National Surveillance Unit
CAREC	-	Caribbean Epidemiological Centre
TFC	-	Task Force Committee
VAAE	-	Vaccine Associated Adverse Event
SARS	-	Severe Acute Respiratory Syndrome

ANNEX A

Glossary of Terms and Acronyms

A

Acute Short term, intense symptomatology or pathology, as distinct from chronic. Many diseases have an acute phase and a chronic phase. This distinction is sometimes used in treatments.

Acute Care Acute care refers to services provided by physicians and other health professionals and staff in the community and in hospitals. These include emergency, general medical and surgical, psychiatric, obstetric and diagnostic services.

Alternate Level of Care (*See also Acute Care, InterQual Criteria*)

This term refers to alternative care that, had it been available, would have been more appropriate for a person in an acute care hospital who does not meet the criteria for acute care.

Amantadine An antiviral agent indicated in adults and children >1 year for the treatment of illness due to influenza and for prophylaxis following exposure to influenza type A viruses. It has no effect against the influenza type B virus.

Antigen Any molecule that is recognized by the immune system and that triggers an immune response, such as release of antibodies.

Antigenic drift A gradual change of the hemagglutinin or neuraminidase proteins on the surface of a particular strain of influenza virus occurring in response to host antibodies in humans who have been exposed to it. It occurs on an ongoing basis in both type A and type B influenza strains and necessitates ongoing changes in influenza vaccines.

Antigenic shift The movement of a type A influenza virus strain from other species into humans. The novel strain emerges by reassortment with circulating human influenza strains or by infecting humans directly. Because they flourish in the face of global susceptibility, viruses that have undergone antigenic shift usually create pandemics.

Antibody Protein molecules that are produced and secreted by certain types of white cells in response to stimulation by an antigen.

Antigen Any substance that provokes an immune response when introduced into the body.

B

Bed (*Institutional Bed*) In any institution a “bed” includes infrastructure support, including staffing, which is required to care for the patient in that “bed”. Therefore the requirements for a “bed” in an intensive care unit, for example, include all the support required for a patient to be cared for at that level.

C

Case Weight A measure representing the relative resources consumed by different types of hospital cases, distinguishing simple from complex cases. (See Resource Intensity Weights).

CDC Centers for Disease Control and Prevention – an American federal agency of the HHS

CIDPC Centre for Infectious Disease Prevention and Control

CMOH County Medical Officer of Health

CROSS-RESISTANCE The development of strains of a pathogen that not only withstands the effects of a given antimicrobial agent, but other chemically related agents as well.

D

E

Epidemic An outbreak of infection that spreads rapidly and affects many individuals in a given area or population at the same time.

Epidemiology The study of epidemics and epidemic diseases

F

Flu Another name for influenza infection, although it is often mistakenly used in reference to gastrointestinal and other types of clinical illness.

G

Goblet cell A mucous gland in the epithelial lining of specific mucus-secreting passages of the respiratory tract. Mucigen droplets swell the upper portion of the cell, giving it a goblet-like shape.

H

H1N1 A strain of influenza type A virus that caused the pandemic infection of 1918-1919 and that continues to circulate in humans. **H3N2** A strain of influenza type A virus that caused the pandemic infection of 1968-1969. Of the three influenza viruses that currently circulate in humans, this type causes the greatest morbidity and mortality.

H5N1 A strain of influenza type A virus that moved in 1997 from poultry to humans. While the outbreak of this virus was rapidly contained, it produced significant morbidity and mortality in persons who became infected, probably from direct contact with infected poultry.

Health Care Workers (Pandemic)

Health Care Workers are professionals, including trainees and retirees, non professionals and volunteers, involved in direct patient care; and/or those working/volunteering in designated health care facilities or services.

For the purposes of this definition, Health Care Workers are those whose functions are essential to the provision of patient care, and who may have the potential for acquiring or transmitting infectious agents during the course of their work. This group would also include public health professionals during the pandemic.

Health Status The state of health of an individual or a population, as in community health status.

Hemagglutinin An agglutinating protein antigen spiking from the surface of the influenza virus. Differences in the amino acid sequencing of the HA antibody give rise to the different subtypes of type A virus.

High-Risk Groups Those groups in which epidemiologic evidence indicates there is an increased risk of contracting a disease.

I

Inactivated vaccine A vaccine prepared from killed viruses, which no longer retain the irinfective properties.

Infection Condition in which virulent organisms are able to multiply within the body and cause a response from the host's immune defences. Infection may or may not lead to clinical disease.

Infectious Capable of being transmitted by infection, with or without actual contact.

Influenza A highly contagious, febrile, acute respiratory infection of the nose, throat, bronchial tubes, and lungs caused by the influenza virus. It is responsible for severe and potentially fatal clinical illness of epidemic and pandemic proportions.

Influenza type A A category of influenza virus characterized by specific internal proteins and further subgrouped according to variations in their two surface proteins (hemagglutinin and neuraminidase). It infects animals as well as humans and has caused the pandemic influenza infections occurring in this century.

Influenza type B A category of influenza virus characterized by specific internal proteins. It infects only humans, causes less severe clinical illness than type A, and spreads in regional rather than pandemic outbreaks.

Influenza type C A category of influenza virus characterized by specific internal proteins. It does not cause significant clinical illness.

Inpatient An individual who receives health care services while admitted in a health care facility overnight or longer.

Isolate A pure specimen obtained by culture.

InterQual Criteria (*See also Alternate Level of Care*)

A set of measurable clinical indicators, as well as diagnostic and therapeutic services, reflecting the need for hospitalization. Rather than being based on diagnosis, they consider the level of illness of the patient and the services required; thus they serve as the criteria for all acute hospital care, regardless of location or size of the hospital. The criteria are grouped into 14 body systems, and there are three sets of criteria for each body system: Severity of Illness, Intensity of Service, and Discharge Screens.

J

L

M

MD (*Doctor of Medicine*) An individual holding a doctoral degree in medicine.

Mean (*statistical*) Commonly referred to as the “average”, the mean of a set of quantities is the sum of the quantities, divided by the number of quantities summed.

Median (*statistical*) The value such that for a series of ranked quantities, one half are above the median, and one half are below.

MEDLARS Medical Literature Analysis Retrieval System: The computer on which “Medline” and “AIDS Line” reside at the National Library of Medicine.

MEDLINE Medical Literature Analysis Retrieval System On-Line. A computer searchable database of published medical literature.

MOH Medical Officer of Health

Morbidity Departure from a state of well-being, either physiologic or psychologic illness.

Morbidity Rate The number of cases of an illness (morbidity) in a population divided by the total population considered at risk for that illness.

Mortality Death, as in expected mortality (the predicted occurrence of death in a defined population during a specific time interval).

Mortality Rate The number of people who die during a specific time period divided by the total population.

MOU Memorandum of Understanding

Mutation A permanent, transmissible change in the genetic material of a cell.

N

N/R/L National/Regional/Local

Neuraminidase A hydrolytic protein antigen spiking from the surface of the influenza virus. It dissolves the protective viscosity of cellular mucous lining, allowing release of new viruses into the respiratory tract.

Neuraminidase inhibitors A new class of antiviral agents that selectively inhibit neuraminidase activity in both influenza type A and type B viruses, while having no effect on human neuraminidase.

Non-traditional Site The following is a definition of a Non-traditional Site for the purposes of Pandemic Influenza planning: A Non-traditional Site is a site offering care for influenza patients. These sites are currently not an established health care site, or are established sites which usually offer a different type or level of care. The Functions of an Non-Traditional Site will vary depending on the needs of the community but will focus on monitoring, care and support of influenza patients.

O

ODPM Office of Disaster Preparedness and Management

Opportunistic Infections An infection in an immune compromised person caused by an organism that does not usually cause disease in healthy people. Many of these organisms are carried in a latent state by virtually everyone, and only cause disease when given the opportunity of a damaged immune system.

Outpatient An individual who receives health care services without being admitted to a health care facility.

P

PAHO Pan American Health Organization

Palliative A treatment which provides symptomatic relief, but not a cure.

Pandemic Referring to an epidemic disease of widespread prevalence around the globe.

Parenteral Not through the mouth. Intravenous, intramuscular, and intradermal administration are all parenteral.

Pathogen Any disease-producing microorganism or material.

Pathogenesis The natural evolution of a disease process in the body without intervention (i.e., without treatment); Description of the development of a particular disease, especially the events, reactions and mechanisms involved at the cellular level.

PCR (*Polymerase Chain Reaction*)

A highly sensitive test that can detect and/or DNA fragments of viruses or other organisms in blood or tissue. PCR works by repeatedly copying genetic material using heat cycling, and enzymes similar to those used by cells.

Pediatric Relating to the medical specialty concerned with the development, care and treatment of children from birth through adolescence.

Pneumocyte An alveolar epithelial cell in the lungs.

Potential Years of Life Lost (PYLL) The PYLL rate per 1000 population is the ratio of the total years of life lost between ages 0 and 75 due to a specific cause to the total population. The cause of death selected is the underlying cause of death, which is the cause that initiated the sequence of events leading to death.

Preventive Care A comprehensive type of care emphasizing priorities for prevention, early detection and early treatment of conditions, generally including routine physical examinations, immunization, and well-person care.

Preventive Medicine Taking measures for anticipation, prevention, detection, and early treatment of disease.

Primary Care Primary care is the first level of care, and usually the first point of contact, that people have with the health care system. Primary care involves the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community. It includes advice on health promotion and disease prevention, assessments of one's health, diagnosis and treatment of episodic and chronic conditions, and supportive and rehabilitative care.

Public Health The art and science of protecting and improving community health by means of preventive medicine, health education, communicable disease control, and the application of social and sanitary sciences.

P Value The probability of obtaining a given outcome due to chance alone. For example, a study result with a significance level of $p < 0.05$ implies that 5 times out of 100 the result could have occurred by chance.

Q

Qualitative Of, relating to, or expressed in relative or subjective terms<impossible to precisely quantify.

Quantitative Of, relating to, or expressed in terms of quantity.

R

Raw Data Measurements and observations recorded on study data forms.

Unedited computer-generated listings of data from study data forms, prior to use of reduction and summary procedures needed for data analysis.

Record A paper or electronic document that contains or is designed to contain a set of facts related to some occurrence, transaction, or the like.

Registered Nurse (RN) One who has graduated from a college or university program of nursing education and has been licensed by the state.

Resistance The development of strains of a pathogen that are able to withstand the effects of an antimicrobial agent.

Respiratory epithelium The pseudostratified coverup of internal body surfaces, which lines all but the finer divisions of the respiratory tract.

Respiratory tract Structures contained in the respiratory system, including the nasopharynx, oropharynx, laryngopharynx, larynx, trachea, bronchi, bronchioles, and lungs.

R/L Regional/Local

RHA's Regional Health Authorities

Rimantadine An antiviral agent indicated in adults for the treatment of illness due to influenza and for prophylaxis following exposure to influenza type A viruses. It has no effect against the influenza type B virus.

S

SARS Severe Acute Respiratory Syndrome

Secondary Care Services given by a specialist, normally after a referral from a primary care physician, and often in an acute care hospital. It does not include the services of specialists whose services are only available in major urban centres; this level of service would normally be considered Tertiary Care.

Significance (*statistical*) Infers that an observation was unlikely to have occurred by chance alone. Statistical significance is often based on a p value < 0.05 . Below this level, the smaller the p value, the greater the statistical significance.

Standard Deviation(*statistical*)A statistic that shows the spread or dispersion of scores in a distribution of scores (i.e., a measure of dispersion). The more widely the scores are spread out, the greater the standard deviation. Standard deviation = the square root of the variance.

Statistics, Descriptive The intent of descriptive statistics is to summarize and present data, e.g., measures of central tendency (mean, mode, median) and measures of variability (standard deviation, variance, standard error of the mean).

STD Sexually Transmitted Disease

Strain A group of organisms within a species or type that share a common quality. For example, currently circulating strains of influenza include type A (H1N1), type A (H3N2), and type B (H3N2).

Subacute Care Comprehensive, cost-effective inpatient level of care for patients who: a) have had an acute event resulting from injury, illness or exacerbation of a disease process, b) have a determined course of treatment and, c) though stable, require diagnostics or invasive procedures but not intensive procedures requiring an acute level of care. Typically short-term, subacute care is designed to return patients to the community or transition them to a lower level of care. Subacute care is offered in a variety of physical settings. The philosophy of subacute care is to ensure that patients are receiving the most appropriate services at the most appropriate phase of their illness while ensuring quality, cost-effective outcomes.

Subtype A classification of the influenza type A viruses based on the surface antigens hemagglutinin (H) and neuraminidase (N).

Symptoms Any perceptible, subjective change in the body or its functions that indicates disease or phases of disease, as reported by the patient.

T

TnT Trinidad and Tobago

Toxicity The extent, quality, or degree of being poisonous or harmful to the body.

Toxin A harmful or poisonous agent.

Triage A system whereby a group of casualties or patients is sorted according to the seriousness of their illness or injuries, so that treatment priorities can be allocated between them. In emergency situations it is designed to maximize the number of survivors.

Type A classification of influenza viruses based on characteristic internal proteins.

V

Vaccination The act of administering a vaccine.

Vaccine A substance that contains antigenic components from an infectious organism. By stimulating an immune response (but not disease), it protects against subsequent infection by that organism.

Virology The study of viruses and viral disease.

Virus A group of infectious agents characterized by their inability to reproduce outside of a living host cell. Viruses may subvert the host cells' normal functions, causing the cell to behave in a manner determined by the virus.

Volunteers (Pandemic) A volunteer is a person registered with a government agency or government designated agency, who carries out unpaid activities, occasionally or regularly, to help support TnT prepare for and respond to a Pandemic Influenza outbreak.

A volunteer is one who offers their service of their own free will, without promise of financial gain, and without economic or political pressure or coercion.

W

Wild type A naturally occurring strain of virus that exists in the population.

World Health Organization (WHO) A specialised agency of the United Nations generally concerned with health and health care.

Annex B. Part I

Guidelines for Laboratory testing in case of Influenza Pandemic

In this document laboratory testing, surveillance and data collection, and communication issues are addressed for each WHO pandemic phase. The Ministry of Health/Trinidad Public Health Laboratory and the National Surveillance Unit have developed this document for pandemic planning purposes and to facilitate a consistent approach to laboratory testing for influenza during the interpandemic period. Work will be done in close collaboration with CAREC.

Interpandemic Phase

WHO Phase 1 & 2: no novel Influenza A virus subtypes have been detected.

1. Testing

Normal activities to include virus isolation by cell culture, direct antigen testing, and serology. The Laboratory Sub-committee encourages the use of rapid detection methods in conjunction with cell culture to aid in the timely diagnosis of influenza particularly in outbreak situations. The nasopharyngeal swab is generally recommended as the preferred specimen as it gives the best results in most direct detection kits as well as in tissue culture. However, other specimens such as throat swabs or nasopharyngeal washings may be acceptable or recommended by specific kit manufacturers.

Participation in the Trinidad Public Health Laboratory (TPHL) proficiency programme is required for all laboratories performing **cell culture and/or** serology for influenza. Up to 10% of all season influenza isolates, including at least five early season, five late season, and any unusual isolates, must be sent to the TPHL for viral sub-typing. These isolates must be submitted to the TPHL. The TPHL should give priority to processing these specimens.

TPHL will report results of sub-typing to the submitting lab within a few days of receipt. All laboratories performing cell culture for influenza are expected to submit isolates for sub-typing as described above unless otherwise directed by TPHL. Susceptibility testing will be performed on early season and late season isolates as appropriate, as well as others agreed upon by the TPHL.

The TPHL will develop rapid test(s) for detection of influenza, better sub-typing and molecular and susceptibility methods, and offer training in these methods to Private Health Laboratories (PHLs) as appropriate.

2. Surveillance and data collection

Enhanced surveillance using sentinel physicians, and including laboratory testing, may be set up by TPHL in collaboration with local public health epidemiologists and laboratories.

3. Communication

Enhanced communication must be set up by the Ministry of Health to link the TPHL, PHL and epidemiologists using email, fax and phone / teleconference communication. An up-to-date listing of laboratories must be maintained by TPHL and Ministry of Health.

Each Region should have in place an influenza surveillance committee to ensure good communication between regional epidemiologists, the regional laboratory and the health units. The committee will deal primarily with influenza in the event of a pandemic, but will deal with other surveillance issues at other times as required. The committee should include (at a minimum) a regional epidemiologist, the regional laboratory director or designate, and the chief medical officer of health or designate.

4. Other

Laboratories will participate in regular disaster drills at the request of the National Pandemic Influenza Committee to test the plan and identify areas that need further attention.

WHO Phase: 3

Novel Influenza Subtype Identified in One or More Human Cases

1. Testing

Increased testing (particularly cell culture) to be encouraged to detect new virus rapidly. The TPHL to give priority to reagent preparation for the identification of the new strain in readiness for phase 4.

2. Surveillance and data collection

Heightened surveillance as determined by the NML and the Pandemic Influenza Committee.

3. Communication

Information from WHO, CDC, TPHL, from areas affected by the new virus (information such as subtype, best cell lines to use, usefulness of direct testing, susceptibility pattern,

morbidity, mortality, etc.) to be rapidly disseminated to PHLs by Ministry of Health using the website, fax, email or telephone, depending on the circumstances. PHLs will ensure that other testing labs in province are kept informed. Meetings, teleconference of the laboratory subcommittee or the PHLs, will be coordinated as required by the CPHLN secretariat.

WHO Phase 4.

Trinidad and Tobago Human-to-Human Transmission Confirmed

1. Testing

Increased testing (culture) will be required to detect the first isolate of the pandemic strain in Trinidad and Tobago. Additional supplies of appropriate cell lines may be required. NML will provide to PHLs reagents for identification of the pandemic virus, advise on cell lines, use of rapid test methodologies and bio safety level required etc. Rapid sub-typing of isolates will be performed by NML and designated PHLs. Note that supplies, including cell lines, test kits, and reagents may be in short supply as other North American labs gear up as well. NML should consider in house production of alternate sources of reagent. Also PHLs currently producing their own cells might act as suppliers to other PHLs temporarily.

2. Surveillance and data collection

As in Level 1 and 2 with heightened surveillance as determined by the NML and the Pandemic Influenza Committee

3. Communication

TPHL to rapidly inform labs of first identification of pandemic strain in North America/Canada *via* Ministry of Health, website, fax, email, or telephone as appropriate.

TPHL to keep PHLs informed *via* , fax, email, telephone re: activity of new virus, keep updated on cell lines, direct test methods which can be used. The PHLs will rapidly communicate *via* TPHL their first isolate of pandemic strain, as well as any other local influenza activity. PHLs to ensure other testing labs in province are kept informed.

WHO Phase 5

In case of Pandemic in Trinidad and Tobago

1. Testing

The PHLs will be handling increased testing during this phase of pandemic; they will need to redirect resources to give priority to influenza testing. Each laboratory will decide how to ensure influenza testing gets priority (e.g., restricted testing of other specimens, additional staffing, etc.) Biosafety level required will be reassessed by TPHL using information from WHO and CDC.

Rapid sub-typing of isolates by Public Health Service, TPHL (and designated PHLs).
Susceptibility testing of strains as determined by TPHL in collaboration with the PHLs.

2. Surveillance and data collection

Continued heightened surveillance.

3. Communication

TPHL will rapidly inform the PHLs of the first appearance of pandemic strain in Trinidad and Tobago. TPHL will collaborate with the regions to notify bacteriology testing labs to prepare for an increase in testing for bacterial pneumonia (i.e., strategy for monitoring types of organisms, susceptibility patterns, and best antibiotics to use).

WHO Phase 6

1. Testing

PHLs may have to restrict testing of specimens for influenza. The Laboratory Subcommittee to give guidelines on testing, depending on antiviral susceptibility of pandemic strain and other co-circulating strains.

2. Surveillance and data collection

As in Phases 1 – 3.

3. Communication

As in Phases 2 and 3.

The TPHL will keep the PHLs informed of influenza activity across the country, changes in susceptibility, other circulating strains, morbidity/mortality information, etc.

WHO Post- Pandemic

Return to pre-pandemic activities.

Revised: Oct 14/03

1. The reason for using the Ministry of Health website is because of the MOH role in communication among all PHLs and the TPHL. as well as with others.

2. The Ministry of Health website is a more appropriate tool because its website does not dilute critical lab-related issues with other concerns. The Ministry of Health website will deliver specific-up-to-date and real-time lab info as a one-stop-shopping-for-lab-information site. This site can be accessed by anyone who will need access.

Part II

GUIDELINES FOR THE COLLECTION OF SPECIMENS FROM THE RESPIRATORY TRACT

Preferably specimens should be taken in the first 3 days after onset of symptoms

Appropriate specimen collection, transport, preservation and processing are of fundamental importance in the isolation and identification of the infecting virus. Specimens are collected from the upper or lower respiratory tract, depending on the site of infection. Aspirations of respiratory secretions are the specimen of choice, however special precautions must be observed because aerosols are generated during their collection. Nasopharyngeal swabs and throat swabs may also be used.

Materials for collection.

1. Viral transport media
2. Dacron, rayon and cotton swabs. Calcium alginate is not accepted for the collection of viral specimens
3. Tongue depressor



Upper respiratory tract specimens

Method of collecting a throat swab

1. Hold the tongue down with the depressor. Use a strong light source to locate areas of inflammation in the posterior pharynx and the tonsillar region of the throat behind the uvula
2. Rub the area back and forth with the swab. Withdraw the swab without touching cheeks, teeth or gums and insert into a screw-cap vial containing viral transport medium.
3. Break off the top part of the stick without touching the tube and tighten the screw cap firmly

4. Label the specimen containers with patient's name type of specimen and date of collection
5. Complete the laboratory request form.

Method of collecting Nasopharyngeal Swabs (per-nasal and post nasal swab)

1. Seat the patient comfortable, tilt the head back
2. Insert a flexible swab beneath the inferior turbinate of either nostril or leave in place for a few seconds and move the swab upwards into the nasopharyngeal space.
Rotate the swab on the nasopharyngeal membrane a few times; slowly withdraw with a rotating motion against the mucosal surface of the nostril.
3. Remove the swab carefully and insert it into a screw-cap tube containing transport medium.
4. Repeat the procedure in the other nostril using a new sterile swab
5. The tip of each swab is put into a vial containing 2-3 ml of viral transport media (VTM), and the applicator stick is broken off.
6. Label the vial with patient's name type of specimen and date of collection.
7. Complete the laboratory request form.

Aspirates

1. Nasopharyngeal secretions are aspirated through catheter connected to a mucus trap and fitted to a vacuum source.
2. The nasal aspirates are collected by introducing a few ml of saline into the nose with a syringe fitted with affine tubing or catheter.
3. The catheter is inserted into a nostril parallel to the palate. Then the vacuum is applied and the catheter is slowly withdrawn with a rotation motion.
4. Mucus from the other nostril is collected with the same catheter in a similar manner.
5. After mucus has been collected from both nostrils, the catheter is flushed into a screw cap vial with 3 ml viral transport media
6. Label the vial with patient's name type of specimen and date of collection

Handling and transport

IMPORTANT Transportation Notes!!

All respiratory specimens are to be immediately transported in the appropriate viral transport media to:

**Trinidad Public Health Laboratory
16-18 Jamaica Boulevard
Federation Park, Port of Spain**

Please contact the Laboratory at the following telephone numbers to arrange for prompt collection of the specimens

622-2877

622-5311

622-0951.

If delay is more than 4 hours after collection, the specimen should be refrigerated and send in wet ice; preservation of specimens for more than 72 hours requires dry ice.

I. PLEASE indicate the following on **the laboratory requisition form**:

- a. "LABORATORY INVESTIGATION"
- b. Patient demographics
- c. Clinical signs and symptoms
- d. Date of onset of illness and date of collection of specimen
- e. Type of specimen
- f. 'Travel history' and/or 'contact of known case'
- g. Date of specimen referral

Biosafety

Transmission of influenza viruses is by droplets and fine droplet nuclei (airborne), although direct and indirect contact is also recognized. WHO is currently recommending in addition to Standard Precautions use Airborne, Droplet and Contact Precautions for patients suspected having serious respiratory infections.

1. **Protect yourself:**

- a) Hand washing and antisepsis
- b) Prevention of needle sticks/sharp injuries
- c) Use personal protective equipment (PPE) (mask, gloves, glasses, gowns).
 - i. **PPE used for Avian Influenza (H5N1) includes:**
 - Gloves (non-sterile)
 - Mask (high-efficient mask N95)
 - Long-sleeved cuffed gown
 - Protective eyewear (goggles/visor/face shields)
 - Cap

2. **Protect the patient:**
 - a) Use single materials.
 - b) Disinfect the sampling area
 - c) Spills management
3. **Protect the environment:**
 - a) Use double package for specimen transport.
 - b) Use appropriate waste disposal, double bagging if possible,
 - c) Disinfection, incineration of contaminated material.

OVERSEAS TRANSPORTATION OF DIAGNOSTIC SPECIMEN

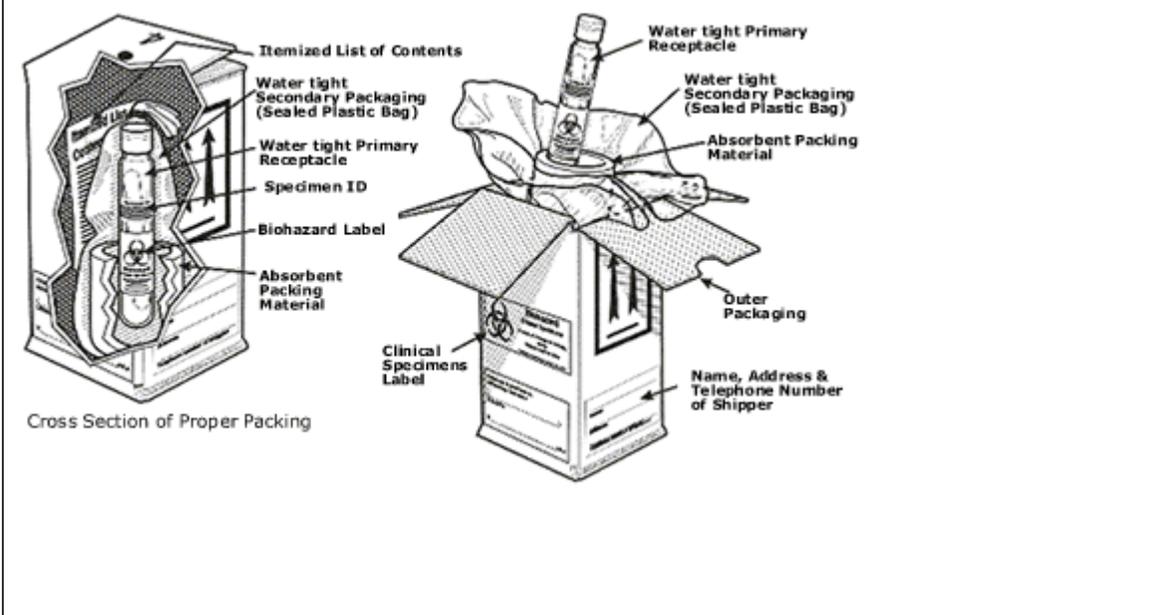
The specimen(s) must be shipped to the Trinidad Public Health Laboratory immediately.

The Saf-T-Pak can be used as the shipping container provided the specimen can fit in the secondary container. All the IATA regulations will apply:

- a. Wrap the primary container (the container in which the specimen is enclosed such as a vacutainer) with parafilm or sealing tape around the lid. The container must then be wrapped with enough absorbent material to absorb all of the fluid in the primary container. (Note: If using paper towels as absorbent material, use at least one paper towel for each 5 ml of fluid). Additional absorbent should be placed around the container to prevent breakage during transport.
- b. Place the primary container and absorbent wrapping into a sealable plastic bag.
- c. Place the plastic bag into a secure secondary container such as a small cardboard box or mailing tube. This container should prevent crushing of your specimen during transport.
- d. Place the bag in a container of dry ice. The container must not be air tight, a freeze safe shipping container or other insulated box may be used. Dry ice will build up pressure when placed in airtight containers. This may break the inner containers and potentially break the airtight outer container as well. Always use a little more dry ice than recommended to ensure safe arrival of your samples in case of shipping delays. If dry ice is used, a dry ice DOT label must be placed on the bottom right hand corner of the package. No other labels may be placed over this label.

Dry Ice should be placed between the plastic bag and the outer shipping container. Dry ice must be shipped in insulated outer packaging; otherwise the outer packing will become wet and damaged due to condensation of water on the container. Never ship dry ice in an airtight container.

Packing and Labeling of Clinical Specimens



Transportation of specimens

Specimens should be sent as “diagnostic specimens” in accordance with the International Air Transport Association dangerous goods regulations <http://www.iata.org/dangerousgoods/index> and <http://www.hazmat.dot.gov/rules.htm>.

Before sending samples, please contact:

Tel. 622-2877; 622-5311; 622-0951

**Trinidad Public Health Laboratory
16-18 Jamaica Boulevard
Federation Park
PORT of SPAIN Trinidad, West Indies**

Laboratory testing to identify influenza viruses in specimens from patients with influenza-like illness according to WHO recommendations

The laboratory identification of human influenza virus infection is commonly performed using the following approaches:

- 1. Direct influenza antigen detection in the clinical specimen**
- 2. Viral isolation in cell culture**
- 3. Partial genome amplification by reverse transcriptase-polymerase chain reaction (RT-PCR)**

Direct influenza antigen detection.

The assays available for rapid diagnosis of influenza A and B include:

- 1.1 Immunofluorescence assay (IFA). Immunofluorescence staining of virus-infected cells in clinical specimen is a widely use sensitive and specific method for the diagnosis of Influenza viruses. (Lennette & Schmidt 1979). Monoclonal antibodies against influenza A and B and have become available through WHO or commercial source The accuracy of IFA for direct antigen detection in comparison with cell culture ranges between: sensitivity 70-100%, specificity 80-100%, PPV 85-94% and NPV 96-100%. The enzyme immunoassay (EIA) for the detection of influenza A nucleoprotein (NP) using monoclonal antibodies is the alternative method to IFA.**
- 1.2 Rapid diagnostic test or near patient or point of care tests for screening influenza A and B are available from a wide rang of commercial sources. These tests are largely immunoassay of different formats, which vary in complexity, the type of respiratory specimens acceptable for testing and the time needed to produce results. In general the sensitivity of direct test is variable (median 70-74%) (Ruest et al. 2003).**

Limitations

The Directigen Flu A & B test depends on the antigen load and may not correlate with cell culture performed on the same specimen.

Inadequate specimen collection, improper sample handling/transport, or low levels of viral shedding may yield a false-negative result. Accordingly, a negative test result does not totally eliminate the possibility of influenza A, influenza B, or both influenza A and B infection.

Virus isolation and identification

Influenza virus isolation is a highly sensitive and very useful technique with the advantage that virus is amplified from the original specimen and makes it available for further antigenic and genetic characterization required for vaccine preparation and drug susceptibility testing.

MDCK cell are the preferred cell line for culturing influenza virus. The identification of an unknown influenza isolate can be carried out by IFA using monoclonal antibodies or, alternatively by hemagglutination and antigen analysis by hemagglutination inhibition using selected reference antisera provided in the WHO influenza kit.

Unlike other influenza A strains, influenza A/H5 will also grow in other common cell lines such as Hep-2 and RD cells.

Polymerase chain reaction

Polymerase chain reaction (PCR) is a powerful technique for the identification of influenza genomes. The influenza virus genome is single-stranded RNA, and a DNA copy cDNA must be synthesized first using reverse transcriptase (RT) polymerase. The procedure for amplifying the RNA genome (RT-PCR) requires a pair of oligonucleotide primers. These primers are designed on the basis of the known HA sequence of influenza A/H1, A/H3, A/H5, A/H7 and A/H7, which specifically amplify the RNA of one subtype.

Annex C Part I

Recommendations for Pandemic Vaccine in a Limited Supply Situation

Priorities for vaccination need to be established during the interpandemic period in order to facilitate planning for an efficient and consistent pandemic immunization strategy. In keeping with the overall goal of pandemic response, the prioritization process must consider the impact the vaccine will have on: 1) reducing morbidity and mortality by maintaining the health services response and by individual protection of high risk groups, and 2) minimizing societal disruption by maintaining the essential services upon which everyone depends. The pandemic vaccine will become available in lots and supply is likely to be limited during the early stage of the pandemic in Trinidad and Tobago. Furthermore it is likely that two doses of vaccine will be required to achieve a protective response in the vaccinee. Therefore, when vaccine becomes available it is essential that it be distributed in a pre-defined equitable and consistent manner across all counties.

The following recommendations has been developed for the use of vaccine in a limited supply situation, and to provide guidance to PIC and those involved in pandemic planning at the N/R/L levels. **The priority groups will need to be reassessed, and possibly altered, as soon as epidemiologic data on the specific pandemic virus becomes available to ensure that they are consistent with the overall goal of the pandemic response.** Once data on the epidemiology of the pandemic becomes available, the PIC and Task Force committee will be the lead in the final identification and prioritization of population groups to receive influenza vaccine. These recommendations will be distributed as national guidelines as soon as possible, with the expectation that they will be followed by all regions/counties in order to ensure a consistent and equitable program.

Recommended Priority Groups

The estimates of population size made for each group are based on 2003 data. Each region is encouraged to develop their own estimates for these priority groups as a part of their pandemic planning activities.

Group 1: Health care workers, paramedics/ambulance attendants and public health workers (more 1394)

Rationale: The health care and public health sectors will be the first line of defense in a pandemic. Maintaining the health service response and the vaccine program is central to the implementation of the response plan, in order to reduce morbidity and mortality. Health services workers may be considered in the following work settings for vaccine program planning:

- *acute care hospitals
- *long term care facilities/nursing homes
- *private physicians' offices
- *home care and other community care facilities
- *public health offices

- *ambulance and paramedic services
- *pharmacies
- *laboratories

Group 2: Essential service providers (more 23000)

Rationale: The ability to mount an effective pandemic response may be highly dependent on persons, within the groups listed below, being in place to maintain key community services. Those individuals that are essential to the response or to maintaining key community services may vary between regions. Local plans will likely reflect these differences, however they are likely to include:

- *police
- *fire-fighters
- *the armed forces
- *key emergency response decision makers (e.g. elected officials, essential government workers and disaster services personnel) utility workers (water, gas, electricity and essential communications systems)
- *funeral service/mortuary personnel
- *people who work with institutionalized populations (e.g., corrections) persons who are employed in public transportation and the transportation of essential goods (such as food)
- *Poultry workers
- *Employees at the Zoo
- *Veterinaries

Vaccine eligibility criteria should be defined based on the work/duties the individual performs rather than position label.

Group 3: Persons at high-risk of severe or fatal outcomes following influenza infection

Rationale: To meet the goal of reducing morbidity and mortality, persons most likely to experience severe outcomes should be vaccinated. For planning purpose we have based this priority group on the high risk groups identified by the PIC. Additional groups have also been included based on evidence indicating an elevated risk. Prioritization of the following subgroups within Group 3 would depend on the epidemiology of influenza disease in the time of a pandemic.

- A: persons in nursing homes, long-term care facilities, homes for the elderly e.g. lodges (approximately ???????);
- B: persons with high-risk medical conditions living independently in the community (approximately ???????);
- C: persons over 65 years of age living independently and not included in 3A and 3B (approximately ?????????);
- D: children 6 months to 23 months of age (current vaccines are not recommended for children under 6 months of age);
- E: pregnant women * (approximately ???????).

*Currently, EPI does not consider pregnant women as a high risk group in its recommendations for annual influenza vaccination. However, in a pandemic, pregnant women may be at elevated risk.

Group 4: Healthy adults (approximately ????????)

Rationale: This group is at lower risk of developing severe outcomes from influenza. However, it is the major work force and represent the most significant segment of the population from an economic impact perspective. Vaccination of healthy adults would reduce demand for medical services and allow individuals to continue normal daily activities. Simultaneous absence of large numbers of individuals from their site of employment could produce major societal disruption even in non-essential personnel. Medical facilities could also be overwhelmed by demand, even for outpatient services. This might compromise care of those with complications.

Group 5: Children 24 months to 18 years old.

Rationale: This group is at the lowest risk of developing severe outcomes from influenza during annual epidemics but play a major role in the spread of the disease. While children's absence from school might not have the direct economic and disruptive impact of illness in adults, it could have that effect indirectly, since care for ill children would be required.

A decision to vaccinate healthy adults and healthy children (Groups 4 and 5) depends on having an adequate supply of vaccine. A much larger amount of vaccine would need to be used to prevent hospitalization and death than for older persons and those with underlying conditions, because of demographic considerations and differences in risks. Consideration was given to prioritizing the family members of health care workers, however, the decision was made that separating out these individuals would not be logistically feasible or ethically justifiable.

Part II

CONSIDERATIONS ON VACCINATION IN INFLUENZA PANDEMICS

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Summary

Influenza, or flu, is one of the infectious diseases associated with a high burden of disease, owing to seasonal epidemics each year. It can also generate pandemics leading to a high degree of social disruption and substantial economic losses. The Spanish flu pandemic of 1918 was responsible for some 40 to 50 million deaths worldwide. Given the imminence of a pandemic, most likely produced by the A/H5N1 strain, drafting preparedness plans for an influenza pandemic should be a priority in all countries. Epidemiological surveillance and vaccine production are essential for the control of influenza and the prevention of its devastating effects.

The production of vaccines to fight seasonal influenza is very limited. Some 300 million doses are currently produced worldwide, with the full production cycle taking 6 to 9 months once the circulating viruses are identified. In a pandemic, two doses of vaccine will be required to protect each individual; thus, only about 14% of the population¹ would have access to a monovalent vaccine in the early months of a pandemic.

National pandemic preparedness plans should clearly define the high-risk populations that should be given priority in vaccination.

This should be done before the crisis hits, not in the midst of it. Vaccination in pandemics is one of the most effective interventions for influenza control.

However, supplies of the pandemic vaccine will be extremely limited during the first wave of the pandemic, especially in countries that are not vaccine producers.

Key words: Influenza, Pandemic, Vaccination

BACKGROUND

Influenza is one of the infectious diseases that annually produce the greatest global burden of disease. Influenza, or flu, is an acute viral disease of the respiratory tract, characterized by airborne transmission through respiratory secretions. It can generate pandemics, understood as epidemics that spread to many countries and are associated with high morbidity, increased mortality, and major social and economic disruption.

The 20th century witnessed three influenza pandemics: the Spanish flu in 1918-19 (A/H1N1 virus); the Asian flu in 1957-58 (A/H2N2 virus); and the Hong Kong flu in 1968-69 (A/H3N2 virus). The most well-known of these is the Spanish flu, which is believed to have caused 40 to 50 million deaths worldwideⁱⁱ. One of the main characteristics of this pandemic was its rapid spread and high mortality in young adults. The other pandemics also resulted in high mortality, although less than the Spanish flu, but mainly affected individuals over the age of 65 and people with chronic diseases.

There are three types of influenza virus: A, B, and C. The most important strains of human influenza are types A and B, which are responsible for major outbreaks each year. Only type A causes pandemics.

The influenza A and B viruses have two surface glycoproteins: hemagglutinin (HA) and neuraminidase (NA). Influenza A has several subtypes; of these, H1N1, H3N2, and recently, H1N2, are of epidemiological significance.

Two important phenomena are associated with changes in influenza viruses:

1. Antigenic drift: A phenomenon characterized by constant, usually small, changes in antigenic composition due to viral instability. **Antigenic drift** is what forces vaccine producers to alter the composition of the influenza vaccines each year.

2. Antigenic shift: The appearance of a new viral subtype that populations have no immunity against is a serious problem from the public health standpoint, owing to the risk of a pandemic. This risk arises when there is a sudden, critical transformation of the influenza A virus due to mutation, gene exchange between an animal (generally avian) influenza virus and the human virus in a single host susceptible to both (for example, the pig). This risk also arises with the transfer of the entire virus between host species.

If these new viruses acquire the ability to cause disease in the human host with efficient person-to-person transmission, the disease can quickly spread far and wide, resulting in a pandemic.

Historical records suggest that the pandemic strains first appeared in China in the 1957, 1968, and 1977 pandemics. Many communities in China raise pigs, ducks, and chickens. There are also wide variations in climate between the north and south, which means that human influenza infections occur year-round. This combination of factors may be the key to the origin of pandemics. Agricultural practices and the area's ecology may offer continuous opportunities for coinfection of humans, domestic fowl, and swine with the influenza virus.

Pandemics can occur in several waves and may last from one to three years. Afterward, most of the population has usually acquired some degree of immunity, and the virus moves on to cause annual epidemics. Epidemiological models forecast that another influenza pandemic could result in 57 to 132 million medical consultations, 1 to 3.23 million hospital admissions, and 280,000 to 650,000 deaths in less than two years in the industrialized countries aloneⁱⁱⁱ.

Prerequisites for a Pandemic:

- 1) The emergence of an influenza A virus with a hemagglutinin subtype different from that of the strains circulating among humans in previous years;
- 2) A high proportion of individuals in the community with an absence of or low antibody titers for the hemagglutinin of the new virus;
- 3) High person-to-person transmissibility of the new virus, causing disease in humans.

Pandemic Potential of the H5N1 Virus

In 2004, outbreaks of highly pathogenic avian flu caused by the H5N1 virus in birds occurred throughout much of Asia. This virus has crossed the species barrier and infected humans, demonstrating the capacity for person-to-person transmission; this capacity, however, is very limited for the moment and insufficient to cause a pandemic. The first known influenza A/H5N1 infection in humans was detected in Hong Kong in 1997.

As of June 2005, the A/H5N1 virus had caused 108 confirmed cases in humans in Viet Nam, Thailand, and Cambodia, 54 of which proved fatal. It was among these that the first likely case of person-to-person transmission appeared, reported in a family in Thailand in September 2004. Intensive house-to-house surveillance detected no new cases of human transmission of this type, making this an apparently isolated, limited incident. A reliable case-fatality rate cannot be calculated, since the disease may be present with mild symptoms in the community and go undetected.

RECOMMENDATIONS OF THE WORLD HEALTH ORGANIZATION

Concerned about the risk of a pandemic, since 1999 the World Health Organization (WHO) has been issuing technical guidelines for national preparedness plans for an Influenza pandemic, which were updated in 2005^{iv}. In March 2005, WHO published a checklist to assist the countries with their preparedness plans for such a pandemic.

The updating of these recommendations is based on recent developments, such as the presence of repeated H5N1 infections in humans with high case-fatality, the development of new laboratory diagnostic techniques, antivirals, and changes in the international regulations.

This updating also includes the redefinition of the phases to facilitate an earlier response during the pandemic alert period, coordinating global and national activities that can help contain or delay the spread of the virus in humans.

In April 2005, WHO declared **phase 3** of the pandemic alert period, given the presence of human cases caused by the H5N1 strain however, with no person-to-person transmission, or in some cases, transmission only to close contacts.

Considering the serious and growing threat of a pandemic, the 115th Session of the WHO Executive Board, held in January 2005, issued the following recommendations to the 58th World Health Assembly, urging the Member States to:

- 1) Develop and implement national plans for pandemic-influenza preparedness and response that focus on limiting health impact and economic and social disruption;
- 2) Consider developing domestic influenza-vaccine production capacity, based on annual vaccine needs, or working with neighbouring States in establishing regional vaccine production strategies;
- 3) Develop and strengthen national surveillance and laboratory capacity for human and zoonotic influenzas;
- 4) Adopt measures aimed at ensuring rapid and transparent reporting of outbreaks of human and zoonotic influenzas, particularly when novel influenza strains are involved, and facilitate the rapid sharing of specimens and viruses through the WHO Collaborating Centers;
- 5) Communicate clearly to citizens the potential threat of an influenza pandemic and educate the public about effective hygienic practices that may protect them from influenza-virus infection;
- 6) Strengthen linkages and cooperation among the Ministries of both Health and Agriculture in order to prepare for, including by mobilizing resources, and respond jointly to outbreaks of highly pathogenic avian influenza;
- 7) Support an international research agenda to limit the spread and impact of pandemic influenza viruses.

WHO also reiterated the importance of preventing and controlling influenza pandemics and annual epidemics in resolution WHA56.19 of May 2003.

Pandemic Preparedness Plan

It is impossible to predict when a pandemic will occur, but preparedness plans will help countries conduct an adequate risk assessment and effectively manage the risk. This does not imply the ability to prevent a pandemic, but rather, the ability to make the best use of available resources to curb the spread of the disease, mitigate the impact of secondary catastrophes, and prevent panic in the population.

Responsibility for managing an influenza pandemic rests primarily with the national authorities. WHO recommends the creation of National Pandemic-Preparedness Committees^v to devise appropriate strategies for their countries. The Committee should be a permanent body with responsibilities that vary with the global and national influenza situation. Its composition should be flexible and depend on each country's institutional and political framework.

It is suggested that the following types of organizations or experts be represented on or consulted by the Committee: National and regional public health authorities; medical, nursing, and pharmacists' associations; virologists and epidemiologists; personnel in charge of vaccination; ethics committees; veterinary authorities and experts in animal influenza viruses; pharmaceutical producers and distributors; emergency response teams, whether military or governmental; nongovernmental organizations; and the media, among others.

The Pandemic-Preparedness Plan^{vi} should include the following:

- Hospital contingency plan;
- Clinical management protocols;
- Strengthening of the epidemiological surveillance system;
- Vaccination strategies and strategies for the use of antivirals in different scenarios;
- A plan to supply drugs, vaccines, other supplies, and the necessary logistics; and
- Risk communication plan.

Nonmedical interventions: A wide range of nonmedical interventions should be adopted by the national authorities--especially interventions related to public gatherings (school and movie theater closures; curtailment of public transportation) and interpersonal contact, such as handwashing, personal hygiene, covering the mouth when coughing, quarantine in specific situations, and travel restrictions. This information should be part of each country's risk communication plan, since measures of this type can slow transmission at the start of the pandemic. Nevertheless these measures cannot not stop it altogether.

In this paper, the emphasis will be on the available information on vaccination in an influenza pandemic. However, vaccination should be coordinated with other activities through the pandemic-preparedness plan.

INFLUENZA VACCINES

Influenza vaccines are normally developed by growing the seed viruses in fertilized chicken eggs. The time between the identification of the strain and the availability of the vaccine is 6-8 months.

Vaccine against Seasonal Influenza

The vaccine against seasonal influenza has been available for over 60 years, and its safety and efficacy have been demonstrated. The reduction in the number of hospitalizations and deaths in high-risk populations is well known. As influenza viruses are constantly evolving, each year the vaccine formula is altered to include the most important strains identified by the Global Influenza Surveillance Network. Coordinated by WHO since 1948, the Network is comprised of 112 National Centers in 83 countries and 4 Collaborating Centers devoted to reference and research on influenza. These latter are located in Atlanta, the United States; London, the United Kingdom; Melbourne, Australia; and Tokyo, Japan.

Twice a year, (February for the Northern Hemisphere and September for the Southern Hemisphere), WHO holds a consultation with the directors of the Collaborating Centers and representatives from the national laboratories to issue recommendations on the composition of the trivalent vaccine, containing a type A virus (H3N2), another type A virus (H1N1), and a type B virus. Since 1972, WHO has recommended 39 changes in the influenza vaccine formula.

PAHO's Technical Advisory Group on Immunization recommends that countries offer vaccination against seasonal influenza to at-risk groups identified by WHO, giving priority to the elderly. Vaccinating these groups has proven to be one of the most cost-effective interventions in public health.

Another advantage of making better use of the seasonal vaccine is that it will help boost productive capacity to respond to a pandemic.

Vaccination against seasonal influenza is gradually being introduced in the Region of the Americas. Each year, 15 countries, including the United States and Canada, systematically vaccinate at-risk groups against influenza.

Global vaccine production currently stands at around 300 million doses and is concentrated in Australia, Europe, Japan, and North America.

The vaccine is 70% to 90% effective in young adults and 30% to 40% in the elderly, when the vaccine antigen is very similar to the strains of the circulating virus. The vaccine reduces the severity and incidence of complications by 50% to 60% and mortality by 80%

Vaccine against the Pandemic Virus

Influenza vaccines are essential for an adequate response to a flu pandemic. However, in all likelihood, it will be impossible to have vaccines for the initial phase of the pandemic, and when vaccines *are* available, they will be in very short supply. This will result in wide disparities in their administration, especially in non-vaccine-producing countries.

Several aspects should be considered when producing a vaccine with a pandemic virus, namely:

- Cutting vaccine production time, which would include early preparation of the viral seeds for the production of the vaccines and early preparation of reagents to test the potency of the vaccine, or other time-saving approaches;
- Investigating strategies to economize antigen use. This should be a priority, as should the production of monovalent vaccines and the inclusion of adjuvants to boost efficacy using low doses of antigen, even though immunologically virgin populations may require two doses to guarantee protection;

- Developing alternative production methods. Since egg orders for vaccine production using the current technology must be placed 6 months in advance of production start-up, other production methods using fermentation technology should be explored--for example, growth of the virus in tissue culture or antigen production with recombinant DNA technology.

In November 2004, WHO held a meeting to explore ways to speed up the development of vaccines against pandemic viruses^{vii}. This meeting specifically examined what industry, the regulatory agencies, governments, and WHO should do to ensure that these vaccines are available quickly and in the greatest possible quantities. Given the pandemic potential of the A/H5N1 virus, the 115th Session of the WHO Executive Board recommended the wholesale production and stockpiling of this vaccine.

However, the imminent vaccine shortages during the initial phase of the pandemic will force countries to make hard choices about which populations should be the first to receive the existing vaccines and drugs.

Setting goals and priorities involves logistical, ethical, moral, cultural, and legal considerations, as well as continuous analysis of the epidemiological situation to target measures to the most-affected groups.

Countries should rely on the National Pandemic Preparedness Committees, in which all the sectors are amply represented, to help policymakers set goals and priorities. Before the pandemic hits, country pandemic preparedness plans should already indicate the amount of vaccine required, the groups to vaccinate, the strategies to employ, and the supply of vaccines. This information will provide the data and incentives needed to boost global production. Estimates of global vaccine requirements are based on the estimates in the national plans.

Given the existing constraints to vaccinating their entire population, countries could prioritize the vaccination of certain population groups^{viii}. Each country should continually monitor the course of the pandemic to target vaccination to the most affected groups. The groups to consider are:

1. Essential services personnel (to prevent interruption of services during the pandemic): clinical health workers; personnel essential for vaccine and drug production; staff of nursing homes and long-term care facilities; the police; firefighters; the armed forces; and the staff responsible for the operations of other public utilities;
2. People at higher risk of mortality from influenza: residents of nursing homes or long-term care facilities; people aged 65 with chronic heart and lung disease; pregnant women in the second and third trimester; children aged 6-23 months; children 6 months to 18 years under a chronic aspirin regimen; other vulnerable groups, such as indigenous people living in isolated communities; etc.;

3. Individuals in close contact with people at high risk: health workers and nursing home staff; family members in daily contact with people at risk; and people in daily contact with children aged 0-5 months;
4. Preschool and elementary schoolchildren, considered frequent transmitters of the disease in the community;
5. People without risk factors for complications: This is the largest population group and includes healthy adults and children. The main objective is to lower the demand for medical services and enable individuals to continue their daily activities and avoid greater social disruption. This decision depends on the availability of the vaccine and the epidemiological situation.

A plan should be developed to distribute the vaccine and monitor its safety and efficacy. Vaccines can be distributed through other than routine channels. It will be necessary to determine whether the vaccine will be distributed through official government or private distribution channels, or both.

Given the almost certain shortages, it should be underscored that the best way to guarantee an adequate supply of vaccine for a pandemic is to promote national or subregional vaccine production, thus avoiding dependence on external sources. PAHO has promoted meetings with potential producers of the flu vaccine in the Region of the Americas to determine the availability of productive infrastructure. It is estimated that at least two producers will be available in the Region in the medium term.

CONCLUSIONS

An influenza pandemic can impact a very high proportion of the population. Thus, all countries should launch or strengthen preparedness activities, including a vaccination component. Vaccination is the best tool for the prevention and control of a pandemic, but vaccines will be in very short supply during the initial phase of the pandemic.

PAHO is promoting the development of National Preparedness Plans for an Influenza Pandemic in various political and scientific forums in the Region of the Americas. However, the initiative is only in the preliminary phase in some countries. Political and financial priority must be given to the preparation and validation of these plans.

Furthermore, from PAHO's meetings with production laboratories in the Region, it is clear that the influenza vaccine will be available only in the medium term.

It is important to find strategic solutions with other international and national partners, including the private sector, to reduce the global scarcity of influenza vaccines. This includes strategies involving the use of vaccines containing less antigen. The best time for cooperation to heighten preparedness and speed up vaccine development is now, before the pandemic hits.

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Annex. D

Recommendations for the Use of Antivirals

Background

General Considerations

Antivirals (anti-influenza drugs) are effective for both treatment and prophylaxis and could have a role as an adjunctive strategy to vaccination for the management of pandemic influenza. Antivirals will likely be the only virus-specific intervention during the initial pandemic response, given that vaccine is unlikely to be available for the early months of a pandemic.

Protection afforded by antivirals is virtually immediate and does not interfere with the response to inactivated influenza vaccines. Current supplies of antivirals, both within and outside of Trinidad and Tobago, are very limited. Prior to the 1997 Hong Kong avian influenza incident, antivirals were not considered as a component of the Trinidad and Tobago pandemic response, in light of costs and other factors. During the Hong Kong outbreak, several countries rapidly depleted global supplies of anti-influenza drugs. In light of the lessons learnt since 1997, and the licensure of new antivirals, the neuraminidase inhibitors, the Ministry of Health Pandemic Influenza Committee was formed to develop options, recommendations and guidelines for the use of antivirals.

The first “Pandemic Influenza Antiviral Drugs Supply Options” paper was developed in June 2000. This current document contains recommendations that were developed by the Antivirals Working Group in June 2000 and were updated in March 2002 and January 2003.

Classes of Antivirals (Anti-Influenza Drugs)

Two classes of antivirals are currently available in Trinidad and Tobago and have a role in the prevention and treatment of influenza infection: M2 ion channel inhibitors (cyclic amines) and neuraminidase inhibitors. There are important differences in pharmacokinetics, side effects and drug resistance between these two classes of antivirals. Such performance characteristics and costs should be considered in selecting the specific drugs to be used for prophylaxis or treatment.

1. M2 Ion Channel Inhibitors (Cyclic Amines or Adamantanes)

M2 ion channel inhibitors interfere with the replication cycle of influenza A but are not effective against influenza B. Amantadine and rimantadine are examples of M2 ion channel inhibitors. Currently, only amantadine is licensed in Trinidad and Tobago. Amantadine is approved in Trinidad and Tobago for both prophylaxis and treatment of infection due to influenza A.

Amantadine is approximately 70-90% effective in preventing illness from influenza A infection. When administered within 2 days of illness onset, it can reduce the duration of uncomplicated influenza A illness by approximately one day but it has not been shown to

reduce the complications of influenza. Resistance to amantadine has been shown to develop rapidly when this drug is used for treatment purposes.

The Ministry of Health will be investigating the potential role of rimantadine for both prophylaxis and treatment during a pandemic, including whether special permission could be obtained to use this drug if it is not licensed in Trinidad and Tobago at the time of the pandemic.

2. Neuraminidase Inhibitors

Zanamivir and oseltamivir are examples of neuraminidase inhibitors. These drugs interfere with replication of both influenza A and B viruses in three ways: (1) they interfere with the release of virus from infected cells, (2) they cause the aggregation of virus, and (3) they may improve the inactivation of virus by respiratory mucous secretions. The drugs are well tolerated and have been used effectively for the prophylaxis and treatment of influenza A and B infections. When administered within 2 days of illness onset, zanamivir and oseltamivir can reduce the duration of uncomplicated influenza A and B illness by approximately 1 day. Further evidence is needed on their effectiveness in reducing complications of influenza. Recent community studies suggest that both drugs are similarly effective in preventing febrile laboratory-confirmed influenza illness (efficacy: zanamivir 84%; oseltamivir 82%).

Recommendations of the Ministry of Health

The following is a list of recommendations that may assist with planning of the antivirals component of a pandemic influenza response plan.

1. Endorse the goal of influenza pandemic planning as follows:

First, to minimize serious illness and overall deaths, and second to minimize societal disruption among citizen of Trinidad and Tobago as a result of an influenza pandemic

2. Vaccines, if and when available, should be considered the first line for prevention of pandemic influenza.

3. Security of supply for antiviral drugs should be considered as part of planning in the pre-pandemic period.

4. The National, Regional /Local Health authority should control the supply and distribution of available anti-influenza drugs, to the end user, during a pandemic.

5. Antivirals should only be used in a community when the pandemic influenza virus is detected in the community. The trigger for starting the use of antivirals in the community will be decided at the local level and will be dependent on availability.

6. During a pandemic, the amount of amantadine required by persons with Parkinson's disease should be reserved for this indication.

7. During a pandemic, the antivirals strategy should utilize all anti-influenza drugs available to the people of Trinidad and Tobago. Either M2 ion channel inhibitors (e.g., amantadine) or neuraminidase inhibitors (e.g., oseltamivir) can be used for prophylaxis but only neuraminidase inhibitors should be used for treatment.

8. The following priority groups for the use of anti-influenza drugs in times of short supply should be used for planning purposes during the inter-pandemic period.

9. The susceptibility of circulating influenza strains to available antivirals should be monitored.

10. Given the rapidly changing scientific evidence, recommendations and options for treatment and prophylaxis with antivirals should be regularly reviewed.

Rationales for Specific Recommendations

Rationale for addressing supply issues (recommendation #3)

Vaccination with an effective vaccine is the primary public health intervention during a pandemic. However, vaccine production requires the acquisition of the seed virus and therefore cannot be initiated until the pandemic virus is already infecting humans. Once a suitable vaccine seed strain is available to manufacturers, it is anticipated that vaccine production will require at least 3 to 4 months and even then the availability of doses will be staggered and limited. Furthermore each individual may need to receive two doses of vaccine to be protected. At this time antiviral drugs are the only specific medical intervention targeting influenza that will potentially be available during the initial pandemic response. Antiviral drugs can be used to prevent influenza and, unlike vaccines, can also be used to treat cases that are identified early in their illness. The strategic use of these drugs in identified priority groups, therefore, will. The following groups, in descending order of priority, are offered as planning guidance but will need to be re-examined at the time of a pandemic alert when epidemiologic data about the pandemic virus is available.

1. Treatment of persons hospitalized for influenza
2. Treatment of ill health care and emergency services workers
3. Treatment of ill high-risk persons* in the community
4. Prophylaxis of health care workers
5. Control outbreaks in high-risk residents of institutions (nursing homes and other chronic care facilities)
6. Prophylaxis of essential service workers
7. Prophylaxis of high-risk persons* hospitalized for illnesses other than influenza
8. Prophylaxis of high-risk persons* in the community

**Note: during a pandemic the definition of high-risk persons may change based on epidemiologic evidence.*

The mass prophylaxis of children to control a pandemic is currently not recommended. be critical to achieving the goal of minimizing serious illness and overall deaths, and secondly minimizing societal disruption among people of Trinidad and Tobago as a result of an influenza pandemic.

Current supplies of antivirals in Trinidad and Tobago (and outside of Trinidad and Tobago) are very limited and surge capacity is negligible. In 1997 when a strain of influenza that was believed to have pandemic potential was identified in Hong Kong, antiviral drugs rapidly became virtually unavailable for purchase world-wide.

Rationale for governmental control of anti-influenza drugs during a pandemic (Recommendation #4)

During a pandemic, governmental control of anti-influenza drugs will be essential to ensure equitable distribution and appropriate use of these drugs in limited supply. Without strict control over the use of these drugs, it is possible that amantadine will be used for treatment purposes, further increasing the risk of drug resistance. In addition, governmental control may reduce wastage including the use of these drugs on cases presenting more than 48 hours after onset of illness.

Rationale for the roles of amantadine and neuraminidase inhibitors

Neuraminidase inhibitors are preferred for the treatment of pandemic influenza since the emergence of drug resistance during treatment is less likely to occur as opposed to amantadine where emergence of resistance occurs rapidly. In addition, neuraminidase inhibitors are associated with fewer side effects than amantadine. Neuraminidase inhibitors have been shown to be effective at preventing influenza and oseltamivir is now licensed for prophylaxis. These drugs will likely be better tolerated than amantadine, facilitating compliance, and will need to be available for this purpose should the circulating virus become resistant to amantadine.

Rationale for priority groups

Priority groups have to be in keeping with the overall goal of reducing morbidity, mortality and secondly to reduce societal disruption. Since it will not be possible to determine a “risk level” for individuals until the pandemic virus has started causing illness in a population, these groups were identified based on past experience with severe influenza seasons and historic accounts of past pandemics. It is important to recognize that during a pandemic the definition of “high-risk persons” will be based on the epidemiologic data available at that time.

What is known is that in order to ensure an optimal pandemic response it will be imperative to provide as much protection as possible against influenza to health care workers and other essential emergency service workers. Since onset of the pandemic in Trinidad and Tobago is expected to precede the availability of an effective vaccine, antiviral drugs represent one method of preventing infection until these workers can achieve protection through immunization.

Typically immunity is assumed to have been conferred 2 weeks after influenza immunization; however, this may differ for the pandemic vaccine and it may be necessary to give two doses of vaccine to each individual before immunity is assured.

. ***Priority group 1:*** To be consistent with the goal of reducing morbidity and mortality and considering the optimal use of these drugs in relation to onset of illness, those who are hospitalized within the first 48 hours of onset of illness should be highest priority for treatment.

. ***Priority group 2:*** Considering the essential role that health care providers and emergency service workers will have in the pandemic response, influenza cases in these groups that are identified within the first 48 hours of onset of illness should be high priority for treatment.

. **Priority group 3:** Persons with underlying heart and lung conditions or those who are immunocompromised, who present to ambulatory settings within 48 hours of onset of symptoms (before they get sick enough to be hospitalized) will also be considered high priority for treatment since they are at high risk for complications.

. **Priority group 4:** Until an effective vaccine becomes available or during the interval between administration of an effective vaccine (or vaccine series) and induction of immunity, antivirals should be provided for HCWs, including public health staff, since their continuing functions are essential to the pandemic response plan and to the care of patients with other conditions.

. **Priority group 5:** Reducing the impact of influenza outbreaks in institutions where the most vulnerable persons reside will contribute to the objectives of reducing morbidity and mortality and reduce health care demands.

. **Priority group 6:** Emergency service workers (ESWs) will be important for maintaining the pandemic response, key community services and national defence. Prophylaxis of this group will minimise societal disruption. Each P/T should consider the list below as the “main” list and make additions as necessary based on their own unique needs and priorities for ESWs.

- . police, fire, correctional services
- . armed forces
- . key emergency response decision makers (e.g., elected officials, essential government workers and disaster services personnel)
- . funeral services
- . utilities (water, gas, electricity)
- . telecommunications
- . public transport and transportation of essential goods (e.g., food)

. **Priority group 7:** High-risk persons hospitalized for conditions other than influenza related complications will be at risk for acquiring influenza while in hospital, given the large numbers of patients and hospital staff who may be infected during a pandemic. Influenza may result in influenza-related complications in such patients, an increase in severity of their underlying illness, prolonged hospital stay and death. Prophylaxis of this group will contribute to the objectives of reducing morbidity and mortality and reduce health care demands.

. **Priority group 8:** Prophylaxis of high-risk persons who have not received influenza vaccine or for whom the effectiveness of the vaccine may be reduced is a current recommendation of NACI. This group is likely to experience severe illness during a pandemic and prophylaxis with anti-influenza drugs should be considered if an effective vaccine is not available. Prophylaxis of this group will contribute to the objectives of reducing morbidity and mortality and reduce health care demands.

Outstanding Issues

There are several antiviral supply issues including:

- . security of supply;
- . bulk purchasing;
- . control of inventory;
- . sequestering available supply for public health use and Parkinson's disease patients (need to know the amount of drug used by Parkinson's disease patients);
- . buying more drugs at time of pandemic (likely availability and should this be pursued if drugs available)

These supply issues will be further examined by a sub-committee of the Antivirals working group. All antivirals guidelines should be validated during the pre-pandemic period. The recommendations regarding the use of antivirals in short supply for targeted groups requires further consultation including ethics and public opinion. More specific definition of high-risk groups is also necessary.

Further data on neuraminidase inhibitors efficacy as prophylactic agents and evidence that they have a greater efficacy than amantadine for prophylaxis are required. As well, the reduction in cost of these drugs before they can be considered for prophylaxis. While there has been no experience with the use of any of the antiviral drugs for pandemic influenza control, research during the inter-pandemic period is providing reasonable robust evidence upon which the pandemic antiviral drug strategy can be developed.

Communication with health care professionals and the public on the appropriate use of antivirals is needed during the pre-pandemic and pandemic periods. Clinical guidelines on the use of antivirals in the hospital and the community will be developed as part of the clinical care guidelines. Guidelines for delivery/administration of antivirals, the monitoring of drug distribution, uptake, and wastage, including antiviral security still needs to be addressed.

Communication materials for health care providers and the public on the appropriate use of antiviral drugs should be developed and circulated during the pre-pandemic period. Research during the pre-pandemic period and protocols for studies at the time of a pandemic are required to further evaluate the outcomes of specific antiviral prophylaxis and treatment strategies.

Research issues include:

- . The outcomes of specific interventions and the value of antiviral prophylaxis versus treatment.
- . The benefit of antivirals in reducing complications of influenza and death, especially in high-risk persons and in those with severe influenza illness (e.g., severe viral pneumonitis).
- . The efficacy and safety of antivirals for the treatment and prophylaxis of children and select high-risk groups such as infants, pregnant women, immunocompromised persons, elderly with underlying disease.
- . The minimum effective dose and duration for prophylaxis or treatment of complicated and uncomplicated influenza.
- . The use of combination therapy in different populations.

- . The mechanism for resistance to both classes of antivirals and assessment of the biological consequences (infectiousness, virulence) of resistance.
- . The use of laboratory testing including rapid diagnostics to assist in decision making for use of antivirals.
- . The effect of antiviral administration on the response to live attenuated influenza vaccines.
- . The shelf life of antivirals and raw materials, beyond those estimated by manufacturer.

Annex E

The Infection Control and Occupational Health Guidelines during Pandemic Influenza in Traditional and Non-Traditional Health Care Settings

Executive Summary

The Infection Control and Occupational Health Guidelines during Pandemic Influenza in Traditional and Non-Traditional Health Care Settings have been adopted from the Centre for Infectious Disease Prevention and Control. These Guidelines forms one of the annexes of the Trinidad and Tobago Pandemic Influenza Plan.

These guidelines are designed to assist those responsible for managing pandemic influenza in traditional and non-traditional health care settings. Traditional health care settings include acute, long term, ambulatory and community care. Non-traditional health care settings are those settings that are designated for operation prior to an influenza pandemic and become operational only when an influenza pandemic is declared by the World Health Organization (WHO). Non-traditional settings include triage settings, self care settings and temporary influenza hospitals. Organizations that assume responsibility for non-traditional settings are referred to as “parent organizations” in this document. If there is no “parent” organization to plan or operate the non-traditional setting, it is expected another organization would assume this role. Public Health may be in the best position to plan or operate such facilities, although this would need to be negotiated and corroborated.

This document presents an overview of infection prevention and control policies and procedures that will be critical to minimize the transmission of pandemic influenza, with or without the availability of immunization or chemoprophylaxis, and for preventing other infectious diseases. It is recognized that certain recommendations may be feasible only in the early phases of the pandemic as they may not be achievable as the pandemic spreads and resources become scarce.

Part A describes a foundation to develop an infection control/occupational health (IC/OH) plan for the management of pandemic influenza with particular focus on influenza transmission, routine practices, pandemic influenza education and public health restrictions. Major attention is given to the management of health care workers during an influenza pandemic. Recommendations for the use of influenza vaccine and antivirals for health care workers (HCWs) and patients are not included in these guidelines because they are fully outlined in the vaccine and antiviral annex (Annex D) of the TnT Pandemic Influenza Plan. Part A also explains the lack of evidence to support the use of masks to prevent transmission of influenza during previous pandemics. The evidence shows that, in the early phase of an influenza pandemic, it may be prudent for HCWs to wear masks when interacting in close face-to-face contact with coughing individuals to minimize influenza transmission. This use of masks is advised when immunization and antivirals are not yet available but is not practical or helpful when transmission has entered the community. Masks may be worn by HCWs to prevent transmission of other organisms from patients with an undiagnosed cough.

For the purpose of this document, the term mask refers to surgical masks, not to special masks such as high efficiency dust/mist masks or respirators.

Hand Hygiene is emphasized throughout the guidelines because strict adherence to hand washing/hand antiseptics recommendations is the cornerstone of infection prevention.

Proper hand hygiene may be the only preventative measure available during a pandemic.

Part B describes the Management of Pandemic Influenza in traditional settings. Acute care, long term care, ambulatory care and individual community settings are stand-alone sections and are designed to be used in conjunction with Part A to develop an IC/OH plan for the management of pandemic influenza. References to published guidelines are frequent because it is expected that personnel in traditional health care settings are well acquainted with the series of already established infection control guidelines.

Part C outlines the Management of Pandemic Influenza in non-traditional settings. Triage, self-care setting and temporary influenza hospitals are stand alone sections and are designed to be used in conjunction with Part A to develop an IC/OH plan for the management of pandemic influenza. Detailed recommendations, adapted from published infection control guidelines, are provided for non-traditional settings as the planning and operation of such settings will be a novel situation.

Appendix I. The “Guideline Rating System” describes the system of ranking the strength of the evidence used to support the recommendations made in these guidelines.

Appendix II. The “World Health Organization Pandemic Influenza Phases” is the outline of the staged plan for responding to a pandemic threat and is based on the WHO influenza surveillance program.

Appendix III. The “Hand Hygiene Procedures”, A. How to Wash Hands and B. Decontaminating Hands with an Alcohol-based Hand Rub provide specific details related to hand hygiene.

Appendix IV. An “Influenza-Like-Illness (ILI) Assessment Tool” is provided to assist with immediate triage of patients or staff and accommodation/cohort of patients, prior to further OH or clinical management. This ILI triage tool should not be used for clinical management. Clinical management is specified in the “Clinical Care Guideline and Tools” Annex F of the TnT Pandemic Influenza Plan.

Appendix V. Table A, “Cleaning Procedures for Common Items” provides examples of how common items are cleaned. Table B, “Directions for Preparing and Using Chlorine Bleach” describes recommendations for dilutions of specific products and their intended use. These guidelines **do not** discuss **interpandemic** influenza. Infection control and occupational health recommendations for interpandemic influenza are addressed in other guidelines.

Glossary of Terms

Antiseptic hand rub A waterless, antiseptic hand rub product that is applied to all surfaces of the hands to reduce the number of microorganisms present.

Biomedical waste Defined as waste that is generated by human or animal health care facilities, medical or veterinary settings, health care teaching establishments, laboratories, and facilities involved in the production of vaccines.

Cleaning The physical removal of foreign material, e.g., dust, soil, organic material such as blood, secretions, excretions and microorganisms. Cleaning physically removes rather than kills microorganisms. It is accomplished with water, detergents and mechanical action. In certain settings, (e.g., central service or dietetics), the terms decontamination and sanitation may be used for this process. Cleaning reduces or eliminates the reservoirs of potential pathogenic organisms. Cleaning agents are the most common chemicals used in housekeeping activity.

Cohort Two or more patients exposed to, or infected with, the same organism who are separated physically (e.g., in a separate room or ward) from other patients who have not been exposed to, or infected with, that organism.

Cohort staffing The practice of assigning specific personnel to care only for patients/residents known to be exposed to, or infected with, the same organism. Such personnel would not participate in the care of patients/residents who have not been exposed to, or infected with, that organism.

Contact transmission Includes direct contact, indirect contact and droplet transmission as described below:

_ **Direct contact** occurs when the transfer of microorganisms results from direct physical contact between an infected or colonized individual and a susceptible host (body surface to body surface).

_ **Indirect contact** involves the passive transfer of microorganisms to a susceptible host via an intermediate object such as contaminated hands that are not washed between patients, contaminated instruments or other inanimate objects in the patient's immediate environment.

Critical items Instruments and devices that enter sterile tissues, including the vascular system. Critical items present a high risk of infection if the item is contaminated with any microorganism, including bacterial spores. Reprocessing critical items, such as surgical equipment or intravascular devices, involves meticulous cleaning followed by sterilization.

Droplet Refers to large droplets, greater than or equal to 5 μm in diameter, generated from the respiratory tract of the source patient during coughing or sneezing, or during procedures such as suctioning or bronchoscopy. These droplets are propelled a short distance, less than 1 meter, through the air and deposited on the nasal or oral mucosa of the new host.

Decontaminate hands The reduction of bacterial counts on hands is accomplished by performing an antiseptic hand rub or antiseptic hand wash.

Decontamination The removal of disease-producing microorganisms to leave an item safe for further handling.

Disinfection The inactivation of disease-producing microorganisms. Disinfectants are used on inanimate objects; antiseptics are used on living tissue.

Disinfection does not destroy bacterial spores. Disinfection usually involves chemicals, heat or ultraviolet light. Levels of chemical disinfection vary with the type of product used.

Exposure The condition of being subjected to a microorganism or an infectious disease in a manner that enables transmission to occur.

Fit for Work Terminology used in occupational health to communicate a worker's ability to remain at or return to work. This ability includes three categories: fit for work, unfit for work, fit with restrictions. This categorization allows the occupational health nurse to maintain confidentiality about a worker's diagnosis, symptoms, immune status, etc.

_ **Fit for Work** - Fit to work with no restrictions

_ **Unfit for Work** – Defined as a restriction from patient care tasks, co-worker contact and restriction from the workplace.

_ **Fit for work with restrictions** - Allows for the re-assignment of duties or re-integration into the workplace in a manner that will not pose an infection risk to the HCW or to the patients and or other individuals in the workplace.

Hand antisepsis This term refers to either antiseptic hand wash or antiseptic hand rub. A process for the removal or reduction of resident and transient microorganisms.

Hand hygiene A general term that applies either to hand washing, an antiseptic hand wash, an antiseptic hand rub, or a surgical hand antisepsis.

Hand washing Washing hands with plain (i.e., non-antimicrobial) soap and water. A process for the removal of soil and transient microorganisms from the hands.

Health Care Worker (HCW) HCWs are professionals, including trainees, and retirees, nonprofessionals and volunteers, involved in direct patient care; and/or those working/volunteering in designated health care facilities or services. For the purposes of this definition, HCWs are those whose functions are essential to the provision of patient care, and who may have the potential for acquiring or transmitting infectious agents during the course of their work.

High level Disinfection This term refers to the level of disinfection required when processing semicritical items. High level disinfection processes destroy vegetative bacteria, mycobacteria, fungi and enveloped (lipid) and non-enveloped (non-lipid) viruses, but not necessarily bacterial spores. High level disinfectant chemicals (also called chemosterilants) must be capable of sterilization when contact time is extended. Items must be thoroughly cleaned prior to high level disinfection.

Infectious waste The portion of biomedical waste that is capable of producing infectious disease.

Influenza Clinical Case Definition of Influenza When influenza is circulating in the community, the presence of fever and cough of acute onset are good predictors of influenza. The positive predictive value increases when fever is higher than 38°C and when the time of onset of the clinical illness is acute (less than 48 hours after the prodromes). Other symptoms, such as sore throat, rhinorrhea, malaise, rigors or chills, myalgia and headache, although unspecific, may also be present.

Confirmed Case of Influenza Confirmed cases of influenza are those with laboratory confirmation (i.e., virus isolation from respiratory tract secretions, identification of viral antigens or nucleic acid in the respiratory tract, or a significant rise in serum antibodies) or clinical cases with an epidemiological link to a laboratory confirmed case.

Influenza-Like-Illness (ILI) For surveillance purposes, the ILI definition currently used in Trinidad and Tobago says:

_ Acute onset of respiratory illness with fever (>38°C) and cough and with one or more of the following: sore throat, arthralgia, myalgia or prostration, which could be due to influenza virus.

Intermediate level disinfection The level of disinfection required for some semicritical items. Intermediate level disinfectants kill vegetative bacteria, most viruses and most fungi but not resistant bacterial spores.

Low level Disinfection The level of disinfection required when processing noncritical items or some environmental surfaces. Low level disinfectants kill most vegetative bacteria and some fungi as well as enveloped (lipid) viruses (e.g., hepatitis B, C, Hantavirus, and HIV). Low level disinfectants do not kill mycobacteria or bacterial spores. Low level disinfectants-detergents are used to clean environmental surfaces.

Mask A barrier covering the nose and mouth to protect the mucous membranes from microorganisms contained in large droplet particles ($> 5 \mu\text{m}$ in size) generated from a source person during coughing, sneezing, or talking and during the performance of certain procedures that generate droplets (e.g., suctioning) or are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions. Masks may also be used to contain large droplet particles generated by coughing or sneezing persons. The term mask in this document refers to surgical masks, not to special masks, such as high efficiency dust/mist masks or respirators.

Noncritical items Items that either touch only intact skin but not mucous membranes or do not directly touch the patient/resident/client. Reprocessing of noncritical items involves cleaning and or low level disinfection.

Non traditional health care settings are those settings that are predetermined for operation prior to an influenza pandemic and operational only when an influenza pandemic is declared by the World Health Organization (WHO).

Plain soap Products that do not contain antimicrobial agents, or contain very low concentrations of antimicrobial agents that are effective solely as preservatives.

Parent organization The organization responsible for the planning of a non-traditional setting operational only in the event of the declaration of an influenza pandemic. When there is no specific organization, another organization must be identified to assume the role of the parent organization.

Personal protective equipment Attire used by the worker to protect against airborne or droplet exposure and exposure to blood and bloody body fluids, i.e., masks, eye goggles, face shields, gloves and gowns.

Precautions Interventions implemented to reduce the risk of transmission of microorganisms from patient to patient, patient to health care worker, and health care worker to patient.

Semicritical items Devices that come in contact with nonintact skin or mucous membranes but ordinarily do not penetrate them. Reprocessing semicritical items involves meticulous cleaning followed preferably by high-level disinfection.

Sterilization The destruction of all forms of microbial life including bacteria, viruses, spores and fungi. Items must be cleaned thoroughly before effective sterilization can take place.

Traditional health care settings Traditional settings include acute, long term, ambulatory and community care.

Part A. Overview of Pandemic Influenza

Background

The following document provides infection prevention and control guidance for the management of pandemic influenza in traditional and non-traditional health care settings. Non-traditional health care settings are those that are pre determined for operation prior to an influenza pandemic and operational only when an influenza pandemic is declared by the World Health Organization (WHO).

Infection prevention and control guidelines for interpandemic influenza in traditional health care settings, (i.e., acute care, long-term care, ambulatory care and community care), will be addressed in other guidelines. Infection prevention and control guidelines for the management of pandemic influenza in traditional and non-traditional health care settings are based on previously published Guidelines. Although recommendations to prevent the transmission of infection during the delivery of health care, including during a pandemic are important, it is recognized that certain recommendations may be feasible only in the early phases of the pandemic as they may not be achievable when the pandemic spreads and resources become scarce. For the purpose of this document the term mask refers to surgical masks, not to procedure masks, special masks or respirators.

Throughout this document, the term “parent organization” refers to the organization that assumes responsibility for non - traditional settings. Where there is no “parent” organization to plan or operate the non - traditional settings, it is expected that another organization would assume this role. Public Health may be in the best position to plan or operate such facilities although this would need to be negotiated and corroborated.

In this document, individuals who have recovered from or have been vaccinated against the pandemic strain of influenza are considered immune with one important caveat regarding the immune status of the vaccinated individual. Because influenza vaccines are not 100% efficacious, if vaccinated individuals come in contact with influenza patients, the vaccinated individual should be monitored for ILI using the ILI Assessment Tool found in Appendix IV.

During a pandemic, it may be necessary to recruit trainees and volunteers to take on specific responsibilities, for example, basic patient care, that is usually reserved for health care workers. The implication is that these workers will need to be considered, for infection control purposes, as being equivalent to health care workers (see glossary) in terms of risk of exposure and ability to transmit disease.

1. World Health Organization Phases for Pandemic Influenza

The World Health Organization has developed a staged plan, based on its surveillance program, for responding to a pandemic threat. Recognition of a novel influenza strain in humans triggers a series of responses, identified as phases and levels within phases that can ultimately lead to the declaration of a pandemic.

Interpandemic activities are designated in Phases 1 and 2. Isolation of a novel virus subtype from a single human case, without evidence of spread, will result in WHO declaring Phase 3. Phase 4 and Phase 5 is the confirmation of limited human to human transmission of the novel virus. Phase 6 is the Pandemic Phase with increased and sustained transmission in the general public.

Key stages of the WHO response are outlined in Appendix II.

2 Principles of Influenza Transmission

The following section has been adapted from the Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*, 1999.

Modes or routes of transmission of infectious agents have been classified as contact, droplet, airborne, and vector borne. Routes pertinent to influenza are contact, droplet and airborne.

2.1 Contact Transmission

Includes direct contact, indirect contact and droplet (large droplet transmission). Routine practices should prevent most transmissions by the contact route. Although droplet transmission is a type of contact transmission, it is considered separately as it requires additional precautions.

Direct Contact Transmission occurs when the transfer of microorganisms results from direct physical contact between an infected or colonized individual and a susceptible host.

Indirect Contact involves the passive transfer of microorganisms to a susceptible host via an intermediate object such as contaminated hands that are not washed between patients or contaminated instruments or other inanimate objects in the patient's immediate environment.

2.2 Droplet Transmission

Refers to large droplets, greater than or equal to 5 μm in diameter, generated from the respiratory tract of the source (infected individual) during coughing or sneezing, or during procedures such as suctioning or bronchoscopy. These droplets are propelled a distance of less than one meter through the air and are deposited on the nasal or oral mucosa of the new host (newly infected individual) or in the immediate environment. These large droplets do not remain suspended in the air, therefore, special ventilation is not required since true aerosolization (see below) does not occur.

2.3 Airborne Transmission

Refers to the dissemination of microorganisms by aerosolization. Organisms are contained in droplet nuclei, airborne particles less than 5 μm that result from the evaporation of large droplets, or in dust particles containing skin squames and other debris that remain suspended in the air for long periods of time. Such microorganisms are widely dispersed by air currents and inhaled by susceptible hosts who may be some

distance away from the source patients or individuals, even in different rooms or hospital wards. Control of airborne transmission is the most difficult as it requires control of air-flow through special ventilation systems.

2.4 Evidence for the Mode of Influenza Transmission

The following section has been adapted from the Trinidad and Tobago Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*, year -----1999.

Organisms, especially respiratory viruses expelled in large droplets, remain viable in droplets that settle on objects in the immediate environment of the patient. Both influenza A and B viruses have been shown to survive on hard, non-porous surfaces for 24-48 hours, on cloth paper and tissue for 8-12 hours and on hands for 5 minutes. The virus survives better at the low relative humidity encountered during winter in temperate zones. Contact with respiratory secretions and large droplets, appears to account for most transmissions of influenza. In a report of an outbreak in a nursing home, the pattern of spread was suggestive of contact rather than airborne transmission because patients who were tube fed or required frequent suctioning had higher infection rates than those who did not require such care.

Whether or not influenza is naturally transmitted by the airborne route is controversial. An outbreak of influenza on an airliner has been attributed to airborne spread; however, large droplet spread could have been responsible because the passengers were crowded together and moved about for several hours in a small, grounded airplane. Although experimental airborne transmission of influenza A virus to mice has been reported, there is no evidence of such transmission in humans.

2.4.1 Mode of Influenza Transmission

Influenza is directly transmitted primarily by droplet contact of the oral, nasal, or possibly conjunctival mucous membranes with the oropharyngeal secretions of an infected individual. Influenza is indirectly transmitted from hands and objects freshly soiled with discharges of the nose and throat of an acutely ill and coughing individual.

2.5 Routine Practices and Additional Precautions to Prevent the Transmission of Influenza

The following section has been adapted from the Trinidad and Tobago Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*, 1999 year.

Routine practices outline the importance of hand washing before and after caring for patients; the need to use gloves, masks/eye protection/face shields, and gowns when splashes or sprays of blood, body fluids, secretions or excretions are possible; the cleaning of patient-care equipment, the patient's physical environment and soiled linen; the precautions to reduce the possibility of HCW exposure to blood borne pathogens and patient placement. Routine practices are the infection prevention and control practices for use in the routine care of all patients at all times in all health care settings.

This recommendation represents a change because, in the past, it was unclear as to whether or not additional precautions were indicated for adults with influenza. Children and adults who have the physical and cognitive abilities, should be encouraged to practice good hygiene: i.e., use disposable, one-use tissues for wiping noses; cover nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing or using tissues; and, keep hands away from the mucous membranes of the eyes and nose. Therefore, preventing the transmission of influenza is best achieved through strict compliance with routine practices, (i.e., good hygiene) and the use of additional precautions. Routine practices and additional precautions to prevent the transmission of infection during the delivery of health care in all health care settings during a pandemic are important. Certain routine practice and additional precaution recommendations may be feasible only in the early phases of the pandemic as they may not be achievable as the pandemic spreads and resources (equipment, supplies and workers) become scarce. Because the complexity of managing high risk patients will be greatest in acute care hospitals, it seems reasonable that the highest priority for infection control resources should be given to the acute care settings.

Strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventive measure available during a pandemic.

2.6 Use of Masks During a Pandemic

Although there is a lack of evidence that the use of masks prevented transmission of influenza during previous pandemics; in the early phase of an influenza pandemic, it may be prudent for HCWs to wear masks when interacting in close face-to-face contact with coughing individuals to minimize influenza transmission. This use of masks is advised when immunization and antivirals are not yet available but is not practical or helpful when pandemic influenza has entered the community. There is no evidence that the use of masks in general public settings will be protective when the virus is circulating widely in the community.

Masks may be worn by HCWs to prevent transmission of other organisms from patients with undiagnosed cough. For the purpose of this document the term mask refers to surgical masks, not to special masks or respirators. Special masks, i.e., high-efficiency dust/mist masks are required for patients with infectious tuberculosis and for non-immune HCWs entering the room of a patient with measles or disseminated varicella.

When using surgical masks:

- . They should be used only once and changed if wet (because masks become ineffective when wet).
- . They should cover both the nose and the mouth.
- . Avoid touching it while it is being worn
- . Discard them into an appropriate receptacle.
- . They must not be allowed to dangle around the neck.

2.7 Infectivity of the Influenza Virus

The **incubation period** for influenza is from 1-3 days. The **period of communicability** (duration of viral shedding) continues for up to 7 days after the onset of illness, probably from 3-5 days from clinical onset in adults and up to 7 days in children.

Individuals infected with influenza tend to shed more virus in their respiratory secretions in the early stages of the illness and patients are most infectious during the 24 hours before the onset of symptoms and during the most symptomatic period. Viral shedding may be longer in infants, and prolonged in young children and immunodeficient patients. It has not been well established whether elderly long term care residents shed viruses longer than other adult populations. There is no information to determine if the period of communicability will be different with pandemic influenza. The duration of shedding of a novel virus (pandemic strain) is unknown.

It is possible that prolonged shedding could occur with pandemic influenza because the immune system would not have had prior experience with related strains.

Hands can be contaminated with influenza virus by contact with inanimate surfaces or objects in the immediate environment of a patient with influenza infection. Influenza A and B viruses have been shown to survive for 24-48 hours on hard, nonporous surfaces; for up to 8 to 12 hours on cloth, paper and tissues; and on hands for up to 5 minutes after transfer from environmental surfaces.

“The influenza virus is readily inactivated by hospital germicides, household cleaning products, soap, hand wash or hand hygiene products.” Therefore, neither antiseptic hand wash products in health care settings nor antibacterial hand wash products in home setting are required because routine products, along with proper hand washing procedures, will inactivate the influenza virus.

Infectivity of the Influenza Virus

1. Incubation period: 1-3 days.

2. Period of communicability:

Infectious 1 day before onset of symptoms and may be longer than 7 days after the onset of symptoms.

3. Occupational Health and Infection Control Pandemic Influenza Planning

A broad consensus has emerged regarding plans for pandemic influenza: the plans should be aimed at reducing influenza-related morbidity, mortality and social disruption. It is widely recognized that preparation for the next pandemic requires that an infrastructure be in place during the interpandemic period for the following reasons:

(a) the rapid detection of novel variants and disease caused by them,

(b) the production and delivery of influenza vaccines and antiviral agents to high priority target groups,

(c) the rapid dissemination and exchange of information; and

(d) emergency preparedness.

Pandemic plans should outline the responsibilities of the institutions that will be involved in the pandemic response. The plan should be divided into phases that describe, in detail, a step-wise response to the identification and subsequent spread of a novel virus, as well as the ability to cut back the response if a novel virus fails to spread as occurred in 1976 and 1977. Planning for and the management of pandemic influenza is directly related to the strength of the strategy in place for the management of interpandemic influenza; a strong interpandemic plan will affect the outcome of the pandemic plan.

“The trends of modern society, including the increasing availability of rapid human transportation and the urbanization of the rapidly expanding human population, tend to facilitate the spread of influenza and increase morbidity. Modern medicine can reduce the mortality that resulted from complications of infection with influenza virus during earlier epidemics, but the cost of medical interventions has increased to the point that effective methods of epidemic control should be considered.

This challenge provides an opportunity to develop, test, and have in place a strategy for control of interpandemic influenza before the next pandemic”.

During an influenza pandemic, adherence to infection prevention and control policies and procedures is critical to minimize the transmission of influenza and other infectious diseases. It is anticipated that neither influenza immunization nor chemoprophylaxis will be available in the early stages of a pandemic and perhaps not even available in later stages, necessitating an emphasis on infection prevention and control practices.

3.1 Recommendations

1. All organizations responsible for traditional health care settings (i.e., acute, long term, ambulatory, home and community care) and organizations (i.e., parent organizations) responsible for the planning of non-traditional settings (i.e., triage settings, self care settings and temporary influenza hospitals) operational only during an influenza pandemic, should develop an Infection Control and Occupational Health (IC/OH) plan for the management of pandemic influenza. The plan should be developed according to previously developed Trinidad and Tobago country Infection Control Guidelines and with a multi-disciplinary group that includes, but is not limited to:

(a) representatives from traditional and non traditional organizations including:

- . medical administration
- . nursing administration
- . physicians
- . nursing services
- . physical plant and housekeeping
- . occupational health
- . infection prevention and control
- . pharmacy services
- . emergency services
- . respiratory services
- . public affairs
- . educational services
- . laboratory services;

(b) public health personnel;

- (c) community care providers;
- (d) local pandemic planners;
- (e) funeral service workers;
- (f) local disaster planners.

2. Non-traditional settings that are not associated with a “parent” organization must develop their IC/OH plan for the management of pandemic influenza with an organization that would assume this role of “parent” organization. Public Health may be in the best position to plan or operate such facilities although this would need to be negotiated and corroborated.

3. The IC/OH plan for the management of pandemic influenza for traditional and non-traditional settings should be reviewed every 3 years and updated according to current legislation and relevant publications.

4. The IC/OH plan for the management of pandemic influenza for traditional and non-traditional settings should include the preparation of educational information for health care workers (see glossary for HCW definition, see section 4.1 for HCW education and see section 3.5 for management of HCWs during a pandemic).

5. The IC/OH plan for the management of pandemic influenza should include recommendations for the use of influenza vaccine and chemoprophylaxis for health care workers.

6. Pandemic influenza planning should include support for programs to meet Trinidad and Tobago target coverage rates for pneumococcal immunization.

7. Strict adherence to hand washing/hand antisepsis recommendations (see Appendix III) is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic. Planning should include ensuring that adequate supplies of hand hygiene products are a priority for all health care settings as there may be an interruption to the supply or shortages of hand antisepsis products, soap and hand towels

8. Planning should include the priority of maintaining adequate resources for infection control in acute care hospitals (soap, antiseptic products, masks/eye protection/face shields, gloves, gowns) due to the increased complexity and management issues of hospitalized patients.

9. Planning should include ensuring all HCWs (see glossary for HCW definition) are offered hepatitis B immunization. As resources permit, HCWs should also receive TB skin testing should have proof of measles, mumps, rubella (MMR) immunity and receive a tetanus booster if appropriate.

3.2 Definitions for Infection Control/Occupational Health Management of Patients/Staff with Influenza-Like Illness (ILI)

Influenza-Like-Illness

See glossary term “influenza”.

Refer to Appendix IV for an ILI Assessment Tool. An ILI Assessment Tool is to be used for immediate triage of patients or staff and accommodation/cohort of patients, prior to further OH or clinical management.

Clinical Case Definition

See glossary term “influenza”.

Confirmed Case of Influenza

See glossary term “influenza”.

Immunity to Influenza

During a pandemic, it is likely that most cases of influenza will be caused by the pandemic strain. Data from the 1957 and 1968 pandemics show that the previously circulating influenza strain disappeared from human circulation when the pandemic strain of influenza virus emerged. Therefore, HCWs who have recovered from an ILI during an earlier pandemic phase, may be assumed to be immune to the pandemic influenza strain.

Individuals who have been immunized against the pandemic strain of influenza will also be considered immune, recognizing that the influenza vaccine may not be fully protective. Therefore, unlike individuals who have recovered from pandemic influenza or ILI, vaccinated individuals should be monitored for ILI using the ILI Assessment Tool found in Appendix IV.

3.3 Use of Influenza Immunization during an Influenza Pandemic

See the vaccine annex (Annex D) of the Trinidad and Tobago Pandemic Influenza Plan. Influenza vaccine availability in the early phase(s) of the pandemic is uncertain. When available, vaccine will be provided according to priority groups set by recommendations from the Vaccine Working Group. Health Care Workers and those trainees, volunteers, etc. who are recruited to perform the duties of a HCW are considered to be a high priority.

3.4 Use of Antivirals During an Influenza Pandemic

See the antivirals annex (Annex E) of the Trinidad and Tobago Pandemic Influenza Plan. Antiviral availability in the early phase(s) of the pandemic is uncertain. When available, antivirals will be provided according to priority groups set by recommendations from the Antiviral Working Group. Health care workers and those trainees, volunteers, etc. who are recruited to perform the duties of a HCW are considered to be a high priority.

3.5 Occupational Health Management of Health Care Workers During an Influenza Pandemic

The phrases “fit for work”, “unfit for work”, and “fit to work with restrictions” are used by Occupational Health to communicate a worker’s ability to remain at or return to work depending upon their susceptibility to influenza, immunization status and agreement to use antivirals⁶.

During the early phases of a pandemic, vaccine and antiviral availability will be limited and will be provided to priority groups. Health Care Workers, and those trainees, volunteers, etc. who are recruited to perform the duties of a HCW, are to be one of the priority groups. (See Annexes D and E of the Trinidad and Tobago Pandemic Influenza Plan.)

3.6 Recommendations

1. Fit for Work

(a) Ideally, HCWs are fit to work when one of the following conditions apply:

(i) they have recovered from ILI (see glossary for definition and ILI Assessment Tool, Appendix IV) illness during earlier phases of the pandemic;

(ii) they have been immunized against the pandemic strain of influenza as outlined in Annex D of the Canadian Pandemic Influenza Plan; or,

(iii) they are on appropriate antivirals as outlined in Annex E of the Canadian Pandemic Influenza Plan.

Such HCWs may work with all patients and may be selected to work in units where there are patients who, if infected with influenza, would be at high risk for complications.

(b) Whenever possible, well, unexposed HCWs should work in non-influenza areas.

(c) Asymptomatic HCWs may work even if influenza vaccine and antivirals are unavailable. Meticulous attention should be paid to hand hygiene and HCWs should avoid touching mucous membranes of the eye and mouth to prevent exposure to the influenza virus and other infective organisms.

2. Unfit for Work

Ideally, staff with ILI should be considered “unfit for work” and should not work; nonetheless, due to limited resources, these HCWs may be asked to work if they are well enough to do so (see 3(b) below).

3. Fit to Work with Restrictions

(a) Ideally, symptomatic staff who are considered “fit to work with restrictions” should only work with patients with ILI. Health Care Workers who must work with non-exposed patients (non-influenza areas) should be required to wear a mask if they are coughing and must pay meticulous attention to hand hygiene.

(b) Symptomatic HCWs who are well enough to work should not be redeployed to intensive care areas, nurseries or units with severely immunocompromised patients, i.e., transplant recipients, hematology/oncology patients, patients with chronic heart or lung disease, or patients with HIV/AIDS and dialysis patients.

4. 1 Pandemic Influenza Education for Health Care Workers (Including Emergency Medical Services, mortuary workers, and HCWs in correctional settings)

Recommendations

1. Educational information for workers should be provided as soon as WHO Pandemic Phase 3 is declared (see Appendix II) and repeated at frequent intervals to all staff levels and during all shifts.

2. The pandemic influenza information should be appropriate to the audience and be provided using a variety of methods, e.g., postings in elevators, at facility entrances, brochures, newsletters and web sites.

3. The educational information prepared and provided for workers should include:

(a) an explanation that pandemic influenza is a novel strain of influenza and what a pandemic is;

(b) the facility-specific pandemic influenza plan;

(c) information regarding triage settings, self care and temporary influenza hospitals.

(d) the difference between an upper respiratory infection and influenza;

(e) the mode of influenza transmission;

(f) the criteria for determining, influenza-like-illness (ILI) (see glossary for definition and Appendix IV for an ILI Assessment Tool) and influenza (see glossary for definition);

(g) the risk of infection and subsequent complications in high-risk groups;

(h) the message that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during early phases of the pandemic;

(i) information about the importance of hygienic measures to minimize influenza transmission because influenza immunization and/or prophylaxis may not be available until later in the pandemic;

(j) information indicating that, during the early phase of an influenza pandemic, it may be feasible for HCWs to wear masks when face-to-face with coughing individuals to minimize influenza transmission (particularly when immunization and antivirals are not yet available) but not practical or helpful when transmission has entered the community . Masks may be worn by HCWs to prevent transmission of other organisms from patients with undiagnosed cough;

(k) who will be given the highest priority for immunization when vaccine is available,

(l) the importance of being immunized and safety of immunization;

(m) who will be given what priority for prophylaxis when antivirals are available, the importance of prophylaxis and safety of prophylaxis (see Annexes D and E of the Trinidad and Tobago Pandemic Influenza Plan).

4. Information about the importance of routine practices and additional precautions to prevent the transmission of infection during the delivery of health care in all health care settings during a pandemic. This information should include the caveat that some routine practice and additional precaution recommendations may be achievable only in the early phases of the pandemic and other recommendations may not be achievable as the pandemic spreads and resources (equipment, supplies and workers) become scarce.

5. Priority for infection control resources should be assigned to acute care settings because of the complexity of managing high risk patients in acute care settings.

6. Education about routine practices for those expected to work in non-traditional settings, as outlined in this document, should be available. Refer to Triage Settings, Self Care Settings and for Temporary Influenza Hospitals.

7. Education about Routine Practices in traditional health care settings, as outlined in Trinidad and Tobago Infection Control Guidelines, should be ongoing.

8. HCWs should be provided with the recommendations for Occupational Health Management of workers during a pandemic.

4.2 Pandemic Influenza Education for the Public (including child care workers, teachers, shelter workers, correctional workers, etc.)

Recommendations

1. Provide education appropriate to the recipient, as soon as WHO Pandemic Phase 3 is declared (see Appendix II). Include information about the epidemiology and mode of transmission of influenza using a variety of methods, e.g., postings at facility entrances, brochures, newsletters, web sites, television and radio stations.

2. Educational information prepared and provided for the public should include:

(a) an explanation that pandemic influenza is a novel strain of influenza and what a pandemic is;

(b) information regarding Self Care (see the Trinidad and Tobago Pandemic Influenza Plan) and for the purpose of Triage Settings and Temporary Influenza Hospitals (see the Trinidad and Tobago Pandemic Influenza Plan);

(c) the difference between an upper respiratory infection and influenza (see the introduction to the Preparedness Section of the Trinidad and Tobago Pandemic Influenza Plan;

(d) the mode of transmission of influenza;

(e) the criteria for determining, influenza-like-illness (ILI) (see glossary for definition and Appendix IV for an ILI Assessment Tool) and influenza (see Glossary for definition);

(f) the risk of infection and subsequent complications in high-risk groups;

(g) the message that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during the pandemic;

(h) information about the importance of hygienic measures, i.e., using disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose to minimize potential influenza transmission because influenza immunization and/or prophylaxis may not be available until later in the pandemic;

(i) information that the influenza virus is readily inactivated by plain soap and common household cleaning products;

(j) information indicating that during the early phase of an influenza pandemic, it may be feasible for HCWs to wear masks when coming face-to-face with coughing individuals to minimize influenza transmission (particularly when immunization and antivirals are not yet available) but not practical or helpful when transmission has entered the community. In health care settings, HCWs should wear masks to prevent transmission of other organisms from patients with undiagnosed cough (see Section 2.6);

(k) who will be given the highest priority for immunization when a vaccine is available, importance of being immunized and safety of immunization (See the Preparedness Section of the Trinidad and Tobago Pandemic Influenza Plan);

(l) who will be given what priority for prophylaxis when antivirals are available, the importance of prophylaxis and safety of prophylaxis (see Annex E of the Trinidad and Tobago Pandemic Influenza Plan).

3. Provide information to encourage those who are symptomatic with ILI (see Appendix IV for an ILI Assessment Tool) but do not require formal health care, to remain at home until their symptoms have resolved.

4. Provide information to encourage those with ILI (see Appendix IV for an ILI Assessment Tool) to avoid visiting those who are at high risk for complications if they developed influenza in institutional settings (acute care and long term care) until their symptoms have resolved.

5. Inform the public to avoid public gatherings, as discussed in the following section, to minimize exposure.

Medical Officers of Health, through the Public Health Acts of Trinidad and Tobago, have the authority to quarantine individuals or groups, as deemed necessary, to control infectious diseases.

In an historical review of the 1918 pandemic in the United States, Keen-Payne noted that many other centres used several measures to attempt to curb transmission. In Chicago, persons who sneezed openly or who spit were threatened with arrests and fines. Churches were not closed, but parishioners were requested to stay home if ill, and windows were opened for ventilation during services. By the third week in October 1918, (the peak of

the second wave) closing had extended to theaters, banquets, lecture halls, restaurants and movie shows. In Newark, the state simply banned all public gatherings on October 10. Confusion developed when liquor stores were allowed to remain open for sales but churches were not open for congregating. The churches protested and the ban was lifted on October 21. In San Diego, all public facilities were closed (libraries, pool halls, women's weekly club meeting halls) as were all outdoor meetings except those convened to sell liberty bonds. The ban was lifted and then imposed again as new cases of influenza increased. Citizens were never strongly supportive of these measures.

The suggestion that the spread of influenza from US military camps in the summer of 1918 did not occur until school returned in the fall, has been noted. In the United States, illness rates of nearly 40% were reported among schoolchildren during the autumn wave. Following the 1957 epidemic in Japan, the policy on influenza immunization was changed as it was determined that school attendance played an important part in spreading that epidemic. There were wide-spread school closures, with attack rates as high as 60% in some areas and approximately 8,000 deaths. The new policy stated that "because schoolchildren are the major disseminators of the disease, they should be immunized". In a study to review whether the policy of vaccination of school children in Japan (over a 25-year period) reduced the incidence and mortality attributed to influenza among older persons, the authors concluded that the vaccination of schoolchildren in Japan disrupted the spread of influenza to older persons.

There is evidence that closing schools may change the course of transmission. Studies conducted both during pandemic years and interpandemic years demonstrate that age-specific attack rates are highest among school children. Additional studies noted that the age distribution of culture-positive patients changed during the course of epidemics. Initially, school children were culture positive, followed by a shift to preschool children and adults during the latter part of the epidemic. The authors observed that school absenteeism was often followed by employee absenteeism during the influenza epidemics studied.

It is thought that management of exposure, as an approach to the prevention of a pandemic, is not possible because of the current high levels of international travel and the expansion of populations into many regions of the world. Options for slowing the spread of pandemic influenza have been suggested and include the use of antiviral prophylaxis, limiting congregations of people and, possibly, quarantine, and restrictions on international travel.

In preparation of an influenza pandemic and in an attempt to curtail community transmission, there are neither data nor guidelines to determine which public gatherings to close and when to close them. What constitutes a public gathering and whether some gatherings may be defined as essential versus non-essential needs to be clarified. Examples of public gatherings from the above included: transportation (ground, rail and air), childcare, schools, retail settings, workplaces, places of worship, funerals and community events (cultural/sporting).

The principles to determine when, how, and which public gatherings will be restricted in order to curtail community transmission ought to be based on common sense strategies, and should be consistently applied within, and across, jurisdictions. The severity of the pandemic strain and the stage of the pandemic, as it unfolds globally, should be considered when making this determination. Refer the to Public Health Measures document of the Preparedness Section of the Trinidad and Tobago Pandemic Influenza Plan for more comprehensive public health recommendations than those listed below.

5. Public Gatherings

Recommendations

Medical Officers of Health should develop a predetermined strategy for closing public gatherings. If public gatherings are restricted they should be restricted early enough to affect transmission. The strategy should include but is not limited to:

- (a) the definition of what constitutes a public gathering;
- (b) specifying the time period within the pandemic phases to implement the strategy;
- (c) applicability and consistency across jurisdictions;
- (d) availability of and priority use of vaccine and antivirals.
- (e) consideration as to whether or not school age children are to be considered a high priority for immunization or antivirals in the early phase of the pandemic.

Part B.

Management of Pandemic Influenza in Traditional Health Care Setting

Acute care settings group patients together who have a high risk of developing serious, sometimes fatal, complications related to influenza. In addition, morbidity and mortality related to hospital-acquired (i.e. nosocomial) infections is much greater in acute care populations than in other populations.

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases in the acute care setting with or without availability of immunization or chemoprophylaxis.

1. Recommendations

1.1 Prevention of Pandemic Influenza

Immunization and Antivirals: Adherence to recommendations for vaccine and antivirals for patients and HCWs, as outlined in Trinidad and Tobago Pandemic Influenza Plan, is of paramount importance.

1.2 Control of Pandemic Influenza – Acute care setting

a. Physical Setting

- When Pandemic Phase 6 is declared, open Triage Settings in acute care hospitals as predetermined in the Preparedness Section of the Trinidad and Tobago Pandemic Influenza Plan.
- When Pandemic Phase 6 is declared open cohort areas/units in the hospitals as predetermined in the IC/OH Pandemic Plan.

b. Management of Staff

1. Provide education.
2. Adhere to Occupational Health Management.

c. Infection Control Practices

To prevent hospital-acquired (i.e., nosocomial) infections, acute care facilities should adhere to published guidelines including Trinidad and Tobago Infection Control Guidelines. *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care.*

During a pandemic, special and additional infection control care, are required.

Practices are summarized below:

Hand Hygiene

Staff, patients and visitors should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

- i. Hand hygiene procedures should be reinforced.
- ii. Hands should be washed or hand antisepsis performed after direct contact with patients/workers with ILI and after contact with their personal articles or their immediate environment.

Hygiene Measures to Minimize Influenza Transmission

i. Patients, staff and visitors should be encouraged to minimize potential influenza transmission through good hygienic measures, e.g., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; and the importance of keeping hands away from mucous membranes of the eyes and nose after coughing, sneezing or using tissues followed by hand washing.

ii. Frequent hand washing.

iii. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.

iv. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible, thoroughly, but gently with soap and warm running water.

v. Cleaning, Disinfection, and Sterilization of Patient Care Equipment

i. Acute care settings should adhere to the recommendations for cleaning, disinfection and sterilization of patient care equipment, as outlined in the Health Trinidad and Tobago Infection Control Guidelines *Handwashing, Cleaning Disinfection and Sterilization in Health Care* and *Routine Practices and Additional Precaution for Preventing the Transmission of Infection in Health Care*.

vi. Environmental Control (Housekeeping, Laundry, Waste)

i. Acute care settings should adhere to the recommendations for housekeeping, laundry and waste management as outlined in the Trinidad and Tobago Infection Control Guidelines *Handwashing, Cleaning Disinfection and Sterilization in Health Care* and *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*.

vii. Equipment and surfaces contaminated with secretions from patients suspected or confirmed to have influenza should be cleaned before use with another patient.

viii. Special handling of linen or waste contaminated with secretions from patients suspected or confirmed to have influenza is not required.

Personal Protective Equipment (PPE)

i. Masks

Masks to minimize the transmission of influenza may be worn when face-to-face with coughing individuals during the early phases of the pandemic but are not practical or helpful when influenza transmission has entered the community.

Masks should be worn to prevent the transmission of other organisms when HCWs are face-to-face with undiagnosed coughing patients.

Masks and eye protection, or face shields should be worn to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose.

ii. Gloves

Gloves are not required for the routine care of patients suspected or confirmed to have influenza. Meticulous hand washing with soap and water or performing hand antisepsis will inactivate the virus.

Gloves should be worn to provide an additional protective barrier between the HCWs hands and blood, body fluids, secretions, excretions and mucous membranes to reduce the potential transfer of microorganisms from infected patients to HCWs and from patient-to-patient via HCWs' hands.

Gloves are necessary for HCWs with open lesions on their hands when providing direct patient care.

Gloves should be used as an additional measure, not as a substitute for hand hygiene.

Gloves should not be reused or washed.

iii. Gowns

1. Gowns are not required for the routine care of patients suspected or confirmed to have influenza.

Long sleeved gowns should only be used to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions.

d. Accommodation

Single rooms in acute care settings are limited and should be for those suspected of having or confirmed to have airborne infections, e.g., tuberculosis, measles, varicella and disseminated zoster and those who visibly soil the environment for whom appropriate hygiene cannot be maintained.

Minimize crowding (i.e., maintain a one metre spatial separation) between patients, visitors and workers whenever possible.

e. Patient Triage/Cohorting

When Pandemic is declared, open the following specified *cohort areas/units* in the hospital, as predetermined in the IC/OH Pandemic Plan:

- Influenza-Like-Illness (ILI), Assessment Area (see Glossary for definition)
- Non ILI Assessment Area (patients require acute care assessment for other conditions).
- Suspected/Exposed to ILI, In-patient Units.
- Confirmed Influenza (see Glossary for definition), In-patient Units.
- Not Exposed/Immune* to Influenza, In-patient Units;
- Not Exposed to ILI but at very high risk of complications, In-patient Units (e.g., intensive care areas; nurseries or units with severely immunocompromised patients, e.g., transplant recipients hematology/oncology patients, patients with chronic heart or lung disease or patients with HIV/AIDS and dialysis patients).

In acute care settings, (hospitals), triage ILI patients promptly to a separate designated influenza assessment area onsite, to minimize transmission to others in the waiting room.

In acute care settings (hospitals), triage non ILI patients (but requiring acute care assessment) promptly to specific non ILI waiting and examining areas physically separate from the ILI assessment area to prevent their exposure to ILI.

f. Patient Admission

- When Pandemic is declared, eliminate or curtail elective medical and surgical acute care (hospital) admissions and restrict cardiovascular and pulmonary surgery to emergency cases.
- Patients who have recovered from influenza can be moved into the “Non Influenza” cohort areas after the period of communicability of the pandemic strain has passed.

- As the pandemic progresses, the “Suspect/Exposed” Cohort and the “Confirmed Influenza” cohort may be merged.
- Maintain cohort principles until the pandemic wave has been declared over.

g. Patient Activity Restrictions

- Limit movement/activities of patients including transfers within the hospital, unless the patient has recovered from pandemic influenza.
- Patients with ILI who are coughing should only leave their room for urgent/necessary procedures.
- Patients with ILI who are coughing should wear a surgical mask whenever they need to be out of their room until the period of communicability of the pandemic strain has passed.

h. Visitor Restrictions

1. There are no restrictions for asymptomatic visitors who have recovered from pandemic influenza or who have been immunized against the pandemic strain of influenza.
2. Visitors with ILI should not visit until they are asymptomatic. Close relatives of terminally ill patients can be exempt, but should put a mask on upon entry into the facility and their visit shall be restricted to that patient only.
3. Visitors should be informed when the acute care facility has influenza activity. Those who have not yet had the pandemic strain of influenza or who have not been immunized against the pandemic strain, should be discouraged from visiting. Close relatives of terminally ill patients can be exempt, but they should restrict their visit to that individual only and they should wash their hands on exit from the patient’s room. Wearing a mask upon entry to the facility is only useful if there is no influenza in the community.

Interpandemic influenza is a major cause of illness and death in residents of long term care facilities for the elderly, in part, because the resident’s age and underlying illness increase the risk of serious complications and, in part, because institutional living increases the risk of influenza outbreaks. It is reasonable to anticipate that pandemic influenza would have the same impact in long term care settings.

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases in the long term care setting with or without the availability of immunization or chemoprophylaxis.

1.3 Control of Pandemic Influenza – Long Term Care (LTC) facility

Prevention of Pandemic Influenza

Immunization and Antivirals: Adherence to recommendations for vaccine and antivirals for patients and HCWs, as outlined in Trinidad and Tobago Pandemic Influenza Plan, is of paramount importance.

a. Physical Setting

When Pandemic is declared, open the area for the care of residents who will require “acute influenza care” as predetermined in the Infection Control/Occupational Health (IC/OH) Pandemic Plan to minimize transfer to acute care hospitals.

b. Management of Staff

1. Provide health education.
2. Adhere to Occupational Health Management.

c. Infection Control Practices

To prevent hospital-acquired (i.e., nosocomial) infections, acute care facilities should adhere to published guidelines including Trinidad and Tobago Infection Control Guidelines. *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care.*

During a pandemic, special and additional infection control care, are required.

Practices are summarized below:

Hand Hygiene

Staff, patients and visitors should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

- i. Hand hygiene procedures should be reinforced.
- ii. Hands should be washed or hand antisepsis performed after direct contact with patients/workers with ILI and after contact with their personal articles or their immediate environment.

Hygiene Measures to Minimize Influenza Transmission

- i. Patients, staff and visitors should be encouraged to minimize potential influenza transmission through good hygienic measures, e.g., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; and the importance

of keeping hands away from mucous membranes of the eyes and nose after coughing, sneezing or using tissues followed by hand washing.

ii. Frequent hand washing.

iii. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.

iv. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible, thoroughly, but gently with soap and warm running water.

v. Cleaning, Disinfection, and Sterilization of Patient Care Equipment

i. Acute care settings should adhere to the recommendations for cleaning, disinfection and sterilization of patient care equipment, as outlined in the Health Trinidad and Tobago Infection Control Guidelines *Handwashing, Cleaning Disinfection and Sterilization in Health Care* and *Routine Practices and Additional Precaution for Preventing the Transmission of Infection in Health Care*.

vi. Environmental Control (Housekeeping, Laundry, Waste)

i. Acute care settings should adhere to the recommendations for housekeeping, laundry and waste management as outlined in the Trinidad and Tobago Infection Control Guidelines *Handwashing, Cleaning Disinfection and Sterilization in Health Care* and *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*.

vii. Equipment and surfaces contaminated with secretions from patients suspected or confirmed to have influenza should be cleaned before use with another patient.

viii. Special handling of linen or waste contaminated with secretions from patients suspected or confirmed to have influenza is not required.

Personal Protective Equipment (PPE)

i. Masks

Masks to minimize the transmission of influenza may be worn when face-to-face with coughing individuals during the early phases of the pandemic but are not practical or helpful when influenza transmission has entered the community.

Masks should be worn to prevent the transmission of other organisms when HCWs are face-to-face with undiagnosed coughing patients.

Masks and eye protection, or face shields should be worn to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose.

ii. Gloves

Gloves are not required for the routine care of patients suspected or confirmed to have influenza. Meticulous hand washing with soap and water or performing hand antisepsis will inactivate the virus.

Gloves should be worn to provide an additional protective barrier between the HCWs hands and blood, body fluids, secretions, excretions and mucous membranes to reduce the potential transfer of microorganisms from infected patients to HCWs and from patient-to-patient via HCWs' hands.

Gloves are necessary for HCWs with open lesions on their hands when providing direct patient care.

Gloves should be used as an additional measure, not as a substitute for hand hygiene.

Gloves should not be reused or washed.

iii. Gowns

1. Gowns are not required for the routine care of patients suspected or confirmed to have influenza.

Long sleeved gowns should only be used to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions.

d. Accommodation

Single rooms in acute care settings are limited and should be for those suspected of having or confirmed to have airborne infections, e.g., tuberculosis, measles, varicella and disseminated zoster and those who visibly soil the environment for whom appropriate hygiene cannot be maintained.

Minimize crowding (i.e., maintain a one metre spatial separation) between patients, visitors and workers whenever possible.

e. Transfer to Acute Care

Residents with influenza (see Glossary for definition) or Influenza-Like Illness (ILI) (see Glossary for definition) requiring more acute care should *not* be transferred to acute care settings. Such residents should be cared for in “acute influenza care” areas within the LTC facility as described in the IC/OH Pandemic Influenza Plan.

f. Admission/Re-Admission

- Patients from acute care who have recovered from pandemic influenza or who are immunized against the pandemic influenza strain may be admitted into the LTC facility without restrictions.
- Residents who were transferred to acute care and who have recovered from pandemic influenza or who have been immunized against the pandemic influenza strain may be re-admitted into the LTC facility without restrictions.
- LTC facilities that have already had pandemic influenza through their facility may admit individuals from the community or acute care without restrictions.
- LTC facilities that have remained “influenza free” may admit patients from acute care or the community who have been potentially exposed to influenza. However, such residents must be managed using influenza precautions (maintain one metre of spatial separation, mask if within one metre of the resident and emphasize hand hygiene) for 3 days until past the incubation period if no influenza symptoms occur and until 7 days after the onset of symptoms if influenza develops.

g. Cohorting

Cohorting resident groups (i.e., confirmed/suspected influenza, exposed/not exposed to influenza) is not a feasible measure to control pandemic influenza in a LTC facility. When influenza has been identified in one area of the LTC facility (via residents, staff or visitors) it can be assumed that the facility has been exposed and the following measures should occur:

- Cancel or postpone inside and outside facility procedures, appointments and activities until influenza activity has stopped.
- Encourage coughing residents to remain in their own rooms to prevent the spread of influenza in common areas.

h. Visitor Restrictions

- There are no restrictions for asymptomatic visitors who have recovered from pandemic influenza or have received immunization against the pandemic strain of influenza.
- If the LTC facility has remained “influenza free”, visitors with ILI should not visit until they have recovered. Visitors for terminally ill residents may be exempt, but should put a mask on upon entering the facility and restrict their visit to that resident only.
- Visitors should be informed when the LTC facility has experienced influenza activity.

Those visitors who have not yet had the pandemic strain of influenza and are not immunized against the pandemic strain, should be discouraged from visiting. Visitors for terminally ill residents can be exempt, but should restrict their visit to that resident only and wash their hands on exit from the resident's room. Wearing a mask upon entering the facility is only useful if there is no influenza in the community.

A comprehensive infection prevention and control program forms the basis for a successful pandemic plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases in the ambulatory care setting with or without availability of immunization or chemoprophylaxis.

1.4 Control of Pandemic Influenza – Ambulatory care setting

a. Administration

- 1 When Pandemic is declared, non-urgent and routine ambulatory care visits should be cancelled.
- 2 Consider creating a dedicated “hot line” to provide consistent pandemic influenza information explaining symptoms of Influenza-like-illness (ILI), the purpose of Triage Settings and Self-care guidelines.
- When Pandemic is declared, open Triage Settings in Ambulatory Care, as described in the Preparedness Section of the Trinidad and Tobago Pandemic Influenza Plan).
- Patients attending ambulatory settings for concerns related to ILI should be assessed according to an ILI Assessment Tool.

b. Physical Setting

- If possible, separate well patients from those with ILI by considering the following strategies: (a) minimizing time spent in waiting rooms; (b) providing separate entrance/waiting areas for patients with ILI; (c) placing patients with ILI directly into a single room; or, (d) separating patients as quickly as possible by placing ILI patients in an area of the waiting room separated from non ILI patients by at least 1 metre.
- Remove magazines and toys from the waiting rooms.
- Clean equipment and environmental surfaces, potentially contaminated by coughing patients, as frequently as possible, preferably after each patient.

c. Management of Staff

- Provide health education.
- Adhere to Occupational Health Management of staff.

d. Infection Control Practices

- Ambulatory care settings should adhere to published infection control guidelines to prevent infections, including Trinidad and Tobago Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection In Health Care*.
- Additional Precautions.

Although droplet and contact precautions are recommended in preventing the transmission of influenza during an interpandemic period, these precautions will not be achievable during a pandemic. In contrast, adherence to routine practices is achievable during a pandemic.

Routine Practices are summarized below:

Hand Hygiene

- i. Staff, patients and those attending to a patient should recognize that strict adherence to hand washing/ hand antiseptics recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic. Hand hygiene procedures should be reinforced according to Appendix III.
- ii. Hands should be washed or hand antiseptics performed after direct contact with ILI patients, after contact with their personal articles or their immediate environment.

Hygiene Measures to Minimize Influenza Transmission

Ambulatory care workers and their patients should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; hand washing/hand antiseptics after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.

Personal Protective Equipment

- i. Masks, Eye Protection and Face Shields

Masks to minimize the transmission of influenza may be worn when face-to-face with coughing individuals in the early phase(s) of the pandemic but are not practical or helpful when influenza transmission has entered the community.

Masks should be worn to prevent the transmission of other organisms when HCWs are face-to-face with undiagnosed coughing patients.

Masks and eye protection, or face shields should be worn to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose.

ii. Gloves

Gloves are not required for the routine care of patients suspected of having or confirmed to have influenza. Meticulous hand washing with soap and water or performing hand antisepsis will inactivate the virus.

Gloves should be worn to provide an additional protective barrier between the HCWs hands and blood, body fluids, secretions, excretions and mucous membranes to reduce the potential transfer of microorganisms from infected patients to HCWs and from patient to patient via HCWs' hands.

Gloves are necessary for HCWs with open lesions on their hands when providing direct patient care.

Gloves should be used as an additional measure, not as a substitute for hand hygiene.

Gloves should not be reused or washed.

iii. Gowns

Gowns are not required for the routine care of patients with suspected of having or confirmed to have influenza.

Long sleeved gowns should only be used to protect uncovered skin and prevent soiling of clothing during procedures and resident care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions.

HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible, thoroughly, but gently with soap and warm running water.

e. Patient Activity/Transport

Patients with ILI should not leave the ambulatory care area, except for essential procedures.

1.4 Control of Pandemic Influenza – Home care

Prevention of Pandemic Influenza

Immunization and Antivirals: Adherence to recommendations for vaccine and antivirals for patients and HCWs, as outlined in Trinidad and Tobago Pandemic Influenza Plan, is of paramount importance.

a. Physical Setting. A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases in the home care setting with or without availability of immunization or chemoprophylaxis.

When Pandemic is declared, cancel home care visits that are not absolutely necessary.

b. Management of Staff

1. Provide health education.
2. Adhere to Occupational Health Management of staff.

c. Infection Control Practices

Home care settings should adhere to published infection control guidelines including Trinidad and Tobago Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*.

Adherence to routine practices is achievable during a pandemic.

Routine Practices are summarized below:

Hand Hygiene

i. HCWs, clients and household members should recognize that strict adherence to hand washing/hand antiseptics recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic. Hand hygiene procedures should be reinforced.

ii. Hands should be washed or hand antisepsis performed following direct contact with a client with ILI, articles contaminated by the client and the client's immediate environment.

iii. If running water is not available or when hand-washing facilities are inaccessible, use the following steps for effective hand antisepsis:

. Apply an alcohol-based hand hygiene product to dry hands (moisture dilutes the alcohol) and rub vigorously for the period of time specified by the manufacturer, or until dry.

. If there is heavy microbial soiling, first wipe hands with a towelette to remove visible soiling.

Hygiene Measures to Minimize Influenza Transmission

Home care workers and their clients should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.

Personal Protective Equipment

i. Masks, Eye Protection and Face Shields

Masks to minimize the transmission of influenza may be worn when face-to-face with coughing individuals in the early phase(s) of the pandemic but are not practical or helpful when influenza transmission has entered the community.

Masks should be worn to prevent the transmission of other organisms when HCWs are face-to-face with undiagnosed coughing clients.

Masks and eye protection, or face shields should be worn to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose.

ii. Gloves

Gloves are not required for the routine care of clients suspected of having or confirmed to have influenza. Meticulous handwashing with soap and water or performing hand antisepsis will inactivate the virus.

Gloves should be worn to provide an additional protective barrier between the HCWs hands and blood, body fluids, secretions, excretions and mucous membranes to reduce the potential transfer of microorganisms from infected clients to HCWs.

Gloves are necessary for HCWs with open lesions on their hands when providing direct client care.

Gloves should be used as an additional measure, not as a substitute for handwashing.

Gloves should not be reused or washed.

iii. Gowns

Gowns are not required for the routine care of clients suspected of having or confirmed to have influenza.

Long sleeved gowns should only be used to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions.

HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretion or excretions should be washed as soon as possible, thoroughly but gently with soap and warm running water.

d. Triage

- Perform an ILI assessment of the client and their household contacts by phone (if possible) prior to the appointment or before going into the home. Assess the risk of influenza in the client or household contacts
- Provide clients and family members with information regarding symptoms of ILI and Self Care Guidelines and the purpose of Triage Settings.
- Counsel clients and household contacts to avoid public gatherings to minimize exposure.

e. Visitors

- Only well (asymptomatic/unexposed) visitors should visit severely immunocompromised patients in the home, e.g., transplant recipients, hematology/oncology patients, patients with chronic heart or lung disease or patients with HIV/AIDS and dialysis patients as these patients are at risk of serious complications if infected with influenza.
- Visitors for the terminally ill can be exempt.

f. Accommodation

- Isolate ill person from the rest of the household in a room, preferably with own bathroom facilities.
- Room should have a single access
- Room should have its own ventilation, with outside window.

1.5 Management of Pandemic Influenza in Emergency Responder Settings

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Emergency Responders (see Glossary for definition) are to be a priority group to receive influenza vaccination and chemoprophylaxis when, and if, it is available during a pandemic. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases with or without the availability of immunization or chemoprophylaxis.

Recommendations

a. Pandemic Planning

- Management should ensure the responsibility for Infection Control (IC) and Occupational Health (OH) in the emergency responder setting is assigned to a specific individual.
- Management should develop an interpandemic influenza plan and review it yearly. In addition, an IC/OH Pandemic Influenza Plan should be developed and reviewed every 3 years.
- Provide health education.
- Occupational Health management of emergency responder workers should be in keeping with OH Section.

b. Control of Pandemic Influenza

- Immunization/Chemoprophylaxis
In the early phases of the pandemic, vaccine and antivirals may not be readily available.

Essential workers (including EMS) will be given high priority for immunization when vaccine is available (see the TTPandemic Influenza Plan).

c. Infection Control Practices

Emergency Service Workers should adhere to routine infection control practices. All patients' blood and body secretions should be considered infectious, thus personal protective equipment and barrier techniques should be used accordingly.

Adherence to routine practices is achievable during a pandemic.

Routine Practices are summarized below:

Hand Hygiene

- i. Strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic. Hand hygiene procedures should be reinforced.
- ii. Hands should be washed or hand antisepsis performed after direct contact with individuals with suspected or confirmed influenza and after contact with their personal articles or their immediate environment.
- iii. Waterless antiseptic hand rinses are superior to soap and water for reducing hand contamination and should be made available as an alternative to hand washing. Antiseptic hand rinses are especially useful when time for hand washing or access to sinks is limited.
- iv. When there is visible soiling, hands should be washed with soap and water before using waterless antiseptic hand rinses. If soap and water are unavailable, cleanse hands first with detergent-containing towelettes.
- v. Wearing gloves does not eliminate the need for proper hand hygiene after care is rendered. As soon as feasible, hands must be washed after the removal of gloves.

Hygiene Measures to Minimize Influenza Transmission

Emergency Responders should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.

Personal Protective Equipment

i. Masks

Masks may be worn to minimize the transmission of influenza when face-to-face with coughing individuals in the early phase(s) of the pandemic but are not practical or helpful when influenza transmission has entered the community.

Masks should be worn to prevent the transmission of other organisms when HCWs are face-to-face with undiagnosed coughing patients.

Masks and eye protection, or face shields should be worn to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose.

ii. Gloves

Gloves are not required for the routine care of patients suspected or confirmed to have influenza. Meticulous handwashing with soap and water or performing hand antisepsis will inactivate the virus.

Gloves should be worn to provide an additional protective barrier between the HCWs hands and blood, body fluids, secretions, excretions and mucous membranes to reduce the potential transfer of microorganisms from infected clients to HCWs.

Gloves are necessary for HCWs with open lesions on their hands when providing direct patient care.

Gloves should be used as an additional measure, not as a substitute for hand hygiene.

Gloves should not be reused or washed.

iii. Gowns

Gowns are not required for the routine care of patients with ILI.

Long sleeved gowns should only be used to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions.

HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretion or excretions should be washed as soon as possible, thoroughly, but gently, with soap and warm running water.

d. Patient Triage

Whenever feasible, personnel responsible for answering emergency calls related to influenza-like-illness (ILI) should triage patients according to an ILI Assessment Tool.

e. Environmental Control (Housekeeping, Laundry, Waste)

i. Emergency Responders should adhere to the recommendations for housekeeping, laundry and waste management, as outlined in the Trinidad and Tobago Infection Control Guidelines *Handwashing, Cleaning Disinfection and Sterilization in Health Care* and *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*.

ii. Equipment and surfaces contaminated with secretions from patients suspected or confirmed to have influenza should be cleaned before use with another patient.

iii. Special handling of linen or waste contaminated with secretions from patients suspected of having or confirmed to have influenza is not required.

(f) Patient Care Equipment (Cleaning Disinfection Sterilization)

i. Emergency Responders should adhere to the recommendations for cleaning, disinfection and sterilization of patient care equipment, as outlined in the TT Infection Control Guidelines *Handwashing, Cleaning Disinfection and Sterilization in Health Care and Routine Practices and Additional Precaution for Preventing the Transmission of Infection in Health Care*.

1.6 Management of Pandemic Influenza in Mortuary Care Settings

The risk of influenza transmission to Funeral Service Workers will be through their contact with families and friends of the deceased, not the deceased. There is no additional risk of transmission of influenza to funeral home workers related to handling of bodies of persons suspected of having or confirmed to have died from influenza. Deceased bodies (confirmed of having or suspected to have influenza during interpandemic or pandemic years) require routine handling only. Infection control recommendations for Funeral Services Profession have been published.

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases with or without the availability of immunization or chemoprophylaxis.

Recommendations

a. Planning for Pandemic Influenza

- Management should ensure the responsibility for Infection Control (IC) and Occupational Health (OH) in a funeral home setting is assigned to a specific individual; preferably an individual who has had professional training.
- Management should develop a pandemic influenza plan and review it yearly. In addition, an IC/OH Pandemic Influenza Plan should be developed as outlined in Section 3.1 and reviewed every 3 years.
- Management should provide health education.

b. Control of Pandemic Influenza

- Immunization/Chemoprophylaxis

In the early phases of the pandemic, vaccine and antivirals may not be readily available. Essential workers (including funeral service workers) will be given high priority for immunization when vaccine is available.

- **Infection Control Practices**
Funeral Service Workers should adhere to routine infection control practices in the handling of all deceased bodies regardless of the confirmed or suspected cause of death.

All patients' blood and body secretions should be considered infectious, thus personal protective equipment and barrier techniques should be used accordingly.

Hand Hygiene

- i. Strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic. Hand hygiene procedures should be reinforced.
- ii. Hands should be washed or hand antisepsis performed after direct contact with individuals with suspected or confirmed influenza and after contact with their personal articles or their immediate environment.

Hygiene Measures to Minimize Influenza Transmission

- i. Funeral Service Workers should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

Personal Protective Equipment

- i. Masks
 1. Wearing masks when handling bodies suspected of having or confirmed to have influenza during a pandemic to minimize the transmission of influenza is not required.
 2. Wearing masks when face-to-face with coughing individuals to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community.

1.7 Management of Pandemic Influenza in Child Care Settings

Infectious diseases occur with increased frequency in child care settings. The incidence is affected by the age and immune status of children, the number of children and group size, the degree of close contact between children and attendants and the hygienic habits of children and attendants. Infections acquired in the child care setting may spread to attendants, family members and the community.

Influenza in child care settings can be significant because viral shedding in the nasal secretions usually continues for about 7 days from the onset of illness and can be more prolonged in young children.

Attack rates of influenza in healthy children have been estimated at 10%-40% each year, with approximately 1% resulting in hospitalization.

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases in the child care setting with or without availability of immunization or chemoprophylaxis.

Recommendations

Planning for Pandemic Influenza

- One person in the program must be designated as the individual responsible for the Infection Control (IC) and Occupational Health (OH) program.
- Management should develop an interpandemic influenza plan and review it annually. In addition, an IC/OH Pandemic Influenza Plan should be developed, and reviewed every 3 years.
- Health Education should be provided.

Control of Pandemic Influenza

a. Immunization/Chemoprophylaxis

In the early phases of the pandemic, vaccine and antivirals may not be readily available.

b. Infection Control Practices

Child Care Workers should adhere to routine infection control practices including procedures for washing toys.

Hand Hygiene

Workers, children and their families should recognize that strict adherence to hand washing/hand antiseptics recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic. Hand hygiene procedures should be reinforced.

Hands should be washed or hand antiseptics performed after direct contact with individuals with ILI and after contact with their personal articles or their immediate environment.

Hygiene Measures to Minimize Influenza Transmission

Child care workers, children and their families should be encouraged to minimize potential influenza transmission through good hygienic measures, ie. Use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antiseptics after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

Wearing masks, when face-to-face with coughing children/individuals, to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community.

Staff/Child Management

Child care settings may be closed depending on the epidemiology of the pandemic strain, e.g., severity of infection, high attack rates and severe complications.

1. Children:

- When pandemic has been declared, do not send children to day care if at all possible until the pandemic phase has ended; the child has recovered from ILI or the pandemic has gone through the child care centre.
- Do not send children with signs of ILI to day care and notify the day care of the reason for their absence (unless the pandemic has gone through the centre).
- Do not send children who have been exposed in the past 3 days to an individual with ILI, (unless the pandemic has gone through the centre), to day care.

2. Staff:

- Inform Public Health authorities of staff absence(s) due to ILI.
Staff with ILI should not go to work until their symptoms have resolved.

1.8 Management of Pandemic Influenza in Schools and Student Residences

Risk of influenza transmission in schools can increase with crowded classrooms, poor ventilation and limited emphasis on hygienic practices. Dormitory living enhances this risk due to increased numbers of those considered to be household contacts.

Recommendations

a. Planning for Pandemic Influenza

- Health Services in residence settings should develop an interpandemic influenza plan and review it annually. In addition, an Infection Control (IC) and Occupational Health (OH) Pandemic Influenza Plan should be developed as outlined in Section 3.1 and reviewed every 3 years.
- Health Education should be provided.

b. Control of Pandemic Influenza

- Immunization/Chemoprophylaxis

In the early phases of the pandemic, vaccine and antivirals may not be readily available.

- Infection Control Practices

Hygiene Measures to Minimize Influenza Transmission

i. Staff, students and their household members should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic. Hand hygiene procedures should be reinforced.

ii. Hands should be washed or hand antisepsis performed after direct contact with individuals with ILI and after contact with their personal articles or their immediate environment.

iii. Staff, students and their household members should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

b. Masks

i. Wearing masks when face-to-face with coughing individuals to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community.

c. Staff/Student Management

i. Schools may be closed depending upon the epidemiology of the pandemic strain, e.g., severity of infection, high attack rates and severe complications.

ii. When pandemic is declared consider the following:

Students

i. When pandemic has been declared do not send students to school if at all possible until the pandemic phase has ended; the student has recovered from ILI or, the pandemic has gone through the school.

ii. Do not send students who have been exposed in the past 3 days to an individual with ILI to school unless the pandemic has already been through the school/residence.

iii. Do not send children with signs of ILI to school (unless the pandemic has gone through the school) and notify the school of the reason for their absence.

iv. Well students should avoid contact with students who have ILI (e.g., not visiting rooms of symptomatic students).

Staff

- i. Inform Public Health authorities of absence(s) due to ILI.
- ii. Staff with ILI should not go to work until their symptoms have resolved.

Resident Health Services

- i. Assess symptomatic students according to an ILI Assessment Tool.
- ii. Encourage students with ILI who are well enough to remain in residence to remain in their room while symptomatic (e.g., not congregate in common areas).

1.9 Management of Pandemic Influenza in Workplaces

Planning for Pandemic Influenza

- Provide health education.
- Control of Pandemic Influenza

a. Immunization/Chemoprophylaxis

Immunization will not be available to the general public in the early phases of the pandemic.

b. Hygiene Measures to Minimize Influenza Transmission

- Workers and their household contacts should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic. Hand hygiene procedures should be reinforced.
- Hands should be washed or hand antisepsis performed after direct contact with individuals suspected of having or to have confirmed influenza and after contact with their personal articles or their immediate environment.
- Workers and their household members should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., using disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and understanding the importance of keeping hands away from the mucous membranes of the eyes and nose.
- Masks. When face-to-face with coughing individuals, wearing masks to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community.

c. Staff Management

- Refrain from coming to work with ILI symptoms.
- Provide means to work from home.
- Workplace plans must include contingencies for low worker turn out, especially essential services, including health care facilities.

d. Health Education

- Provide health education.

1.10 Management of Pandemic Influenza in Shelters

The risk of influenza transmission in a shelter setting during a pandemic will be high because of the crowded physical conditions, inadequate health and hygiene of clients and the reduced priority for immunization or chemoprophylaxis in this population.

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. The promotion of hand washing and hygienic practices is imperative to minimize the transmission of influenza and other infectious diseases in the shelter with or without availability of immunization or chemoprophylaxis during a pandemic. Guidelines for Infection Control in shelters have been published.

Recommendations

Planning for Pandemic Influenza

- Designate one person responsible for the infection control program and liaise with local public health. The program should prevent or minimize the occurrence and transmission of communicable diseases such as influenza.
- An interpandemic influenza plan should be developed and reviewed annually. In addition, an Infection Control and Occupational Health Pandemic Influenza Plan should be developed and reviewed every 3 years.
- Shelters that are in the process of being planned should pay special attention to the number and placement of hand washing sinks and methods to reduce overcrowding.
- Provide health education.

Control of Pandemic Influenza

a. Immunization/Chemoprophylaxis

Immunization may not be readily available to this setting in the early phases of the pandemic.

b. Infection Control Practices

Hygiene Measures to Minimize Influenza Transmission:

- Workers and clients should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic. When planning for a pandemic, operators should ensure that adequate supplies of hand hygiene products is a high priority as there may be an interruption to the supply or shortages of soap and hand towels. Hand hygiene procedures should be reinforced.
- Hands should be washed or hand antisepsis performed after direct contact with individuals with ILI and after contact with their personal articles or their immediate environment.
- Workers and clients should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.
- Masks. When face-to-face with coughing individuals, wearing masks to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community.

Triage

Clients and workers with influenza-like illness should be assessed using an ILI Assessment Tool.

1.11 Management of Pandemic Influenza in Correctional Facilities

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases with or without the availability of immunization or chemoprophylaxis.

Planning for Pandemic Influenza

- Designate one person responsible for the infection control program and liaise with local public health authorities. The program should prevent or minimize occurrence and transmission of communicable diseases such as influenza.
- Develop an interpandemic influenza plan and review it annually. In addition, an Infection Control and Occupational Health Pandemic Influenza Plan should be developed, and reviewed every 3 years.

- See Section 3.5 for Occupational Health management of correctional workers.
- When Pandemic is declared, provide additional education to health care workers and inmates.

Control of Pandemic Influenza

a. Immunization/Chemoprophylaxis

In the early phases of the pandemic, vaccine and antivirals may not be readily available. Essential service workers (including correctional officers) will be given high priority for immunization when vaccine is available.

b. Infection Control Practices

Adhere to published infection control recommendations for correctional settings.

Hygiene Measures to Minimize Influenza Transmission

- Workers and inmates should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.
When planning for a pandemic, administrators should make ensuring adequate supplies of hand hygiene products a priority as there may be an interruption to the supply or shortages of soap and hand towels. Hand hygiene procedures should be reinforced.
- Hands should be washed or hand antisepsis performed after direct contact with individuals with suspected or confirmed influenza and after contact with their personal articles or their immediate environment.
- Workers and inmates should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.
- Masks. Wearing masks when face-to-face with coughing individuals to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community.

Triage/Cohorting

- Provide a separate triage area to assess inmates and workers with ILI.
- Place inmates with ILI in cohort units/areas whenever possible. Good hygiene should be emphasized.

Visitors

- Visitors with febrile respiratory illness should be discouraged from visiting if there is no pandemic activity in the facility.
- Visitors should be made aware of pandemic activity in the facility and discouraged from visiting unless they have recovered from ILI or been immunized against the pandemic strain of influenza.

Part C.

Infection Control and Occupational Health in Non-Traditional Settings during an Influenza Pandemic

Upon declaration of pandemic, triage settings will be established in locations as predetermined in the Trinidad and Tobago Pandemic Influenza Plan. The purpose of triage settings is to facilitate efficient and consistent assessment for those with influenza-like illness (ILI). It is important to note that the influenza virus can survive on hands for 5 minutes following the transfer from environmental surfaces. The importance of hand washing/hand antisepsis during a pandemic cannot be overemphasized.

Hand washing/hand antisepsis is the single most important method to prevent the transmission of infection including influenza and will be even more important because of the unavailability of influenza vaccine and antiviral prophylaxis early, during or even late in the pandemic.

There is evidence that overcrowding contributes to the transmission of respiratory-transmitted infections. Crowding and breathing recycled air is identified as risk factors for influenza transmission on airplanes and in long term care facilities.

1. Recommendations

1.1 Prevention of Pandemic Influenza

Immunization and Antivirals

Adherence to the recommendations for vaccine and antivirals for patients and HCWs, is required.

1.2 Control of Pandemic Influenza – Triage setting

a. Physical Setting –

- When Pandemic is declared, open triage settings in hospitals and community locations as predetermined in the Preparedness Section of the Trinidad and Tobago Pandemic Influenza Plan.
- When planning for the location of a triage setting, emphasize the need for spatial separation between patients, those accompanying them and care givers/triage workers.
- Ideally, triage settings should only be placed in an area that has a well maintained ventilation system.
- Prevent crowding in triage settings by ensuring ample room is available in waiting and assessment areas in order to maintain spatial separation of at least 1 metre.

- Consider the need for a separate area for temporary storage of deceased bodies.

b. Management of Staff

- Adhere to Occupational Health Management.
- Provide health education.

c. Infection Control Practices

Hygiene Measures to Minimize Influenza Transmission

- Patients, staff and visitors should minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.
- To prevent nosocomial infections, triage settings should adhere to published guidelines. Infection Control Practices adapted from Trinidad and Tobago Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care* and *Hand Washing, Cleaning, Disinfection and Sterilization in Health Care* are summarized below:

Hand Hygiene

- i. Staff, patients and visitors should recognize that strict adherence to hand hygiene recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic. Hand hygiene procedures should be reinforced.
- ii. Hands should be washed or hand antisepsis performed after direct contact with ILI patients and after contact with their personal articles or their immediate environment.
- iii. Ideally, hand washing facilities should be conveniently located throughout the triage setting. Sinks for hand washing should be used only for hand washing and not for any other purpose, e.g., as a utility sink. There should be access to adequate supplies and soap and towel dispensers in good working order, or liberal use of waterless hand antiseptic agents.
- iv. Plain soap may be used for routine hand washing.
- v. Hand antisepsis with an antiseptic soap or antiseptic hand rinse is indicated before performing invasive procedures such as starting an intravenous (maximal barrier technique in addition to hand antisepsis is required for insertion of central lines).
- vi. When access to sinks is limited, antiseptic hand rinses should be used. Waterless antiseptic hand rinses are superior to soap and water in reducing hand contamination and should be made available.

vii. When there is visible soiling, hands should be washed with soap and water before using waterless antiseptic hand rinses. If soap and water are unavailable, cleanse hands first with detergent-containing towelettes.

viii. Health Care Workers can reduce the frequency of hand washing required by minimizing unnecessary direct contact with patients and their immediate environments.

Hands must be washed:

- between patients,
- after contact with blood, body fluids, secretions (e.g., respiratory secretions),
- after contact with items known or considered likely to be contaminated with blood, body fluids, secretions (e.g., respiratory secretions), or excretions,
- immediately after removing gloves,
- between certain procedures on the same patient in which soiling of hands is likely, to avoid cross-contamination of body sites,
- when hands are visibly soiled.

ix. Hand lotion may be used to prevent skin damage from frequent hand washing. Lotion should be supplied in disposable bags in wall containers by sinks or in small, non-refillable containers to avoid product contamination. Inappropriate handling and management of skin lotions for patient's and care giver's use have been reported as sources of outbreaks.

x. Liquid hand wash products should be stored in closed containers and dispensed from either disposable containers or containers that are washed and dried thoroughly before refilling.

Personal Protective Equipment

i. Masks, Eye Protection and Face Shields

Masks and eye protection, or face shields should to prevent the transmission of influenza should be worn by triage personnel when face-to-face with individuals for ILI assessment.

Masks and eye protection, or face shields should be worn by triage personnel to prevent exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose.

HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.

Masks should be worn by triage personnel to prevent the transmission of other organisms when HCWs are face-to-face with undiagnosed coughing patients.

Wear masks

ii. Gloves

Gloves are not required for the routine care of patients suspected of having confirmed to have influenza. Meticulous hand washing with soap and water or performing hand antisepsis will inactivate the virus.

Appropriate use of clean, non-sterile gloves includes:

- for contact with blood, body fluids, secretions (e.g., respiratory secretions) and excretions, mucous membranes, draining wounds or non-intact skin (open skin lesions or exudative rash);
- when handling items visibly soiled with blood, body fluids, secretions (e.g., respiratory secretions) and excretions;
- when the health care worker has open skin lesions on the hands.

Gloves should be used as an additional measure, not as a substitute for hand washing.

When indicated, gloves should be put on directly before contact with the patient or before the procedure requiring gloves.

Potentially contaminated gloves should be removed and disposed of immediately after completion of care, procedure or specific task, at the point of use prior to touching clean environmental surfaces (e.g., blood glucose or temperature machines, blood pressure cuffs).

Hands should be washed immediately after removing gloves.

Single-use disposable gloves should not be reused or washed.

iii. Gowns

Gowns are not required for the routine care of patients with suspected of having or confirmed to have influenza.

Long sleeved gowns should only be used to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions.

HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible, thoroughly but gently with soap and warm running water.

Environmental Control (Patient Care Equipment, Housekeeping, Laundry and Waste)

The influenza virus survives well in the environment and patients may contaminate their environment with respiratory secretions. On hard porous surfaces the virus can survive for 24-48 hours, can then be transferred to hands and survive for up to 5 minutes.

Equipment and surfaces (i.e., desks, arm rests, etc.) contaminated with secretions from patients suspected of having or confirmed to have influenza should be cleaned before use with another patient.

Recommendations

Process

- “Parent” organizations must provide a specially trained, knowledgeable person to be responsible for the reprocessing patient care equipment, housekeeping, laundry and waste services. Where there is no “parent” organization to plan or operate the triage settings, it is expected another organization would assume this role.
- Reprocessing (i.e., disinfection or sterilization) equipment is not recommended in the Triage Setting but if considered, the “parent” organization must provide a specially trained, knowledgeable person to be responsible for the processes. If soiled equipment is to be transported for disinfection or sterilization, the parent organization must develop processes for the separation of soiled and clean/sterile equipment and the safe handling/transport of contaminated equipment.
- Procedures should be established for assigning responsibility and accountability for the routine cleaning of all patient care equipment and housekeeping services.
- Reuse of single use items is prohibited.

Patient Care Equipment (Cleaning, Disinfection and Storage)

- Equipment that touches the patient’s intact skin should be clean. Equipment that is shared should be cleaned between patients. A hospital grade germicide should be used for routine cleaning.
- Equipment that is visibly soiled should be cleaned promptly.
- Soiled equipment should be handled in a manner that prevents exposure of the skin and mucous membranes and contamination of clothing and the environment.
- Reuseable equipment touching mucous membranes, e.g., respiratory therapy equipment or equipment contacting non-intact skin, should be discarded or it should be treated appropriately using high level disinfectant between patients.
- Reuseable equipment must be thoroughly cleaned (washed with hot soapy water, using an enzymatic cleaner), rinsed and dried before disinfection or sterilization and dried before storage.

- Manufacturers' written recommendations for use of chemical disinfectant should be strictly followed.
- Only disinfectants which is approved by the Ministry of Health Trinidad and Tobago should be used.
- Sterile items must remain sterile until they are used.
- Sterile and clean supplies should be stored in a clean dry area.

Housekeeping

- Surfaces that are frequently touched by the hands (i.e., contaminated) of health care providers and patients/residents/clients, such as the surfaces of medical equipment and knobs for adjustment or opening, should be cleaned at least twice daily and when known to be contaminated, i.e., after use.
- Careful vigorous cleaning of environmental surfaces is effective in removing many contaminants from surfaces.
- A barrier (sheet or paper) should be placed on the examining or procedure table and changed between patients. Alternatively, the table should be cleaned between patients.

Laundry (linen)

- When reusable linen is used, it should be changed between patients. Special handling of linen contaminated with secretions from patients suspected of having or confirmed to have influenza is not required.
- Handling of waste contaminated with secretions from patients with suspected or confirmed influenza should follow the Code of Practice for Bio-medical Waste Management.
- Used needles and other sharp instruments should be handled with care to avoid injuries during disposal or reprocessing. Used sharp items should be disposed of in designated puncture-resistant containers located in the area where the items were used.

Care of the Deceased

Attention to routine infection prevention and control practices is sufficient for handling bodies of individuals who have died from influenza. There is no additional risk of transmission of influenza infection.

Recommendations

- Adherence to routine infection control practices for hand washing/hand hygiene, mask/eye protection/face shields, glove and gown use, as outlined above for handling a deceased body, is highly recommended.

- The body of the deceased should be placed in a body bag or wrapped in a sheet when a body bag is unavailable and, preferably, kept in a cool, dry location until picked up by funeral services.

1.3 Prevention of Pandemic Influenza- Self care guidelines

Providing care to an individual with influenza like-illness (ILI) who are well enough to be cared for at home will be common during an influenza pandemic. Care may be provided by family members, neighbors, volunteers or individuals themselves. Therefore, adapting Routine Practices to the home setting to prevent transmission of other infections (including blood borne pathogens) to those providing care is necessary. Establishment of an isolation room for ill persons separate from the rest of the family is recommended.

It is important to note that the influenza virus can survive on hands for 5 minutes following the transfer from environmental surfaces. The importance of hand washing/hand antiseptics during a pandemic cannot be overemphasized. Hand washing/hand antiseptics the single most important method to prevent the transmission of infection including influenza and will be even more important because of the unavailability of influenza vaccine and antiviral prophylaxis early, during or even late in the pandemic.

Recommendations

Immunization and Antivirals

Adherence to recommendations for vaccine and antivirals for patients and individuals providing self care as outlined in the Trinidad and Tobago Pandemic Influenza Plan.

Control of Pandemic Influenza

a. Physical Setting

- When Pandemic is declared, Triage Settings will be opened as indicated in the Preparedness Section of the Trinidad and Tobago Pandemic Influenza Plan. Patients with influenza-like-illness (ILI) not directed to hospital or temporary influenza settings and will be provided with Self Care guidelines.
- In the home setting, it is recommended that an attempt be made to maintain spatial separation of one metre unless providing direct care. Where feasible, the individuals with ILI should stay in their own room, with single access and outside window ventilation.
- In a household where well (non-ILI) individuals (e.g., an elderly or immunocompromised person, or an infant) require care, it is important to provide their care prior to caring for individuals with ILI.

b. Management of Individuals Involved in Self Care

1. Provide health education.

c. Infection Control Practices

To prevent the transmission of infections, individuals providing care should adhere to the following recommendations adapted from *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care* and *Hand Washing, Cleaning, Disinfection and Sterilization in Health Care*.

Hand Hygiene

- Wash hands before, and after, the care of the individual who has ILI.
- Plain soap may be used for hand washing. Soaps containing antiseptics are not required.
- Bar soap should be stored in such a manner as to allow for drying after use. Liquid hand wash products should be stored in clean closed containers and dispensed from either disposable containers or containers that are washed and dried thoroughly before refilling.
- A waterless antiseptic hand rinse for hand hygiene should be used if hand washing facilities (sink and running water) are inaccessible. If there is visible soiling of the hands, first wipe with detergent containing towelettes, then use the antiseptic hand rinse.

Personal Protective Equipment

i. Masks, Eye Protection and Face Shields

Masks to prevent the transmission of influenza are not helpful when transmission has entered the community.

Wear masks and eye protection, or face shields to protect the mucous membranes of the eyes, nose and mouth during procedures and care activities that are likely to generate splashes or sprays of blood, body fluids, secretions or excretions.

Avoid touching the eyes with the hands to prevent self-contamination with pathogens.

Wear masks.

ii. Gloves

Gloves are not routinely necessary in the care of an individual with ILI. Hand washing is sufficient.

Gloves are an additional measure to protect hands from soiling with secretions and excretions but are not a substitute for hand washing.

Individuals should avoid touching the mucous membranes of their eyes and mouth with their hands; especially when providing care to individuals with ILI.

Dishwashing or utility household gloves may be worn in place of single-disposable medical gloves. They should be used by one individual only and washed and dried between use.

Single-use disposable medical gloves should not be reused or washed.

Single use plastic bags can also be used as gloves to protect hands from gross soiling.

Appropriate use of clean non-sterile gloves includes the following:

- for contact with blood, body fluids, secretions and excretions, mucous membranes, draining wounds or non-intact skin (open lesion or oozing rash),
- when handling items visibly soiled with blood, body fluids, secretions and excretions,
- when the care provider has open skin lesions on the hands.

Gloves should be removed immediately after completion of the procedure for which they were worn and before touching clean environmental surfaces.

Hands should be washed immediately after removing gloves. If not gloves are available, plastic bags may be worn as gloves.

iii. Gowns

Over-garments such as aprons, or gowns are not required for the care of an individual with ILI.

Over-garments should be used to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions (also see laundry instructions below).

Caregivers should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible, thoroughly, but gently, with soap and warm running water.

Environmental Control (Housekeeping, Laundry and Waste)

The influenza virus survives well in the environment and patients may contaminate their environment with respiratory secretions. On hard porous surfaces the virus can survive for 24-48 hours, can then be transferred to hands and survive for up to 5 minutes.

Equipment and surfaces contaminated with secretions from patients suspected of having or confirmed to have influenza should be cleaned before use with another individual.

Housekeeping

- Environmental surfaces and objects that have been touched by an individual with ILI or the caregiver should be cleaned daily with a regular household cleaning agent.
- Products that are labeled “antibacterial” are not necessary.

Laundry

- Special handling of clothing or linen used during the care of an individual with ILI is not necessary.
- Heavily soiled linen should be rolled or folded to contain the heaviest soil in the centre of the bundle. Large amounts of solid soil, feces, or blood clots should be removed from linen with a gloved hand and toilet tissue then placed into a bed pan or toilet for flushing. In order to prevent splashing, excrement (e.g., from clothing, reusable incontinence pads) should not be removed by spraying with water.
- Use of a commercial laundry detergent with household bleach (according to product instructions and where suitable for fabrics) and a normal machine wash and machine dry are sufficient to clean soiled linen in a home care setting.
- Machine drying or hanging clothing and linens on a clothes line at the home care site is a suitable method for drying.

Waste

- Garbage generated during the care of an individual with ILI should be handled with care, but does not require special handling and may be placed with household waste for disposal.
- Medical sharps, i.e hypodermic needles used in the care of an individual with ILI should be placed in an impervious container (e.g., coffee can) with household waste prior to disposal

Care of the Deceased

Attention to routine infection prevention and control practices is sufficient for handling bodies of individuals who have died from influenza. There is no additional risk of transmission of influenza infection.

Recommendations

- Adherence to the routine infection control practices for hand washing/hand hygiene, mask/eye protection/face shields, glove and gown use as outlined above during the care of the deceased body is recommended.

- Individuals who die in a home setting should be wrapped in a sheet (ideally using a plastic bag to protect the mattress) and preferably kept in a cool, dry location until pick up by funeral services.

1.3 Control of Pandemic Influenza – Temporary Influenza Hospitals

Patients triaged as unable to be cared for at home and not ill enough for an acute care hospital will be sent to Temporary Influenza Hospitals as predetermined in the Trinidad and Tobago Pandemic Influenza Plan. Therefore, patients in these settings will either be ill with the pandemic strain of influenza or will have recovered from the pandemic strain of influenza; thus, patient-to patient transmission of influenza will not be a concern. In this setting, the risk of acute infections other than influenza (e.g., gastroenteritis, other respiratory infections, ectoparasites) will be of concern. Adherence to current Infection Control Guidelines to prevent the transmission of infection is required.

It is important to note that the influenza virus can survive on hands for up to 5 minutes following the transfer from environmental surfaces. The importance of hand washing/hand antisepsis during a pandemic cannot be overemphasized. Hand washing/hand antisepsis is the single most important method to prevent the transmission of infection including influenza and will be even more important because of the unavailability of influenza vaccine and antiviral prophylaxis early, during, or even late, in the pandemic.

Maintaining spatial separation of at least 1 metre between patients in this setting should be maintained because there is evidence that overcrowding has contributed to the spread of respiratory-transmitted infections.

Recommendations

Prevention of Pandemic Influenza – Temporary Influenza Hospitals

Immunization and Antivirals

Adherence to the recommendations for vaccine and antivirals for patients and HCWs, as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan, is vital.

a. Physical Setting

- When Pandemic is declared, open Temporary Influenza Hospitals as predetermined in the Trinidad and Tobago Pandemic Influenza Plan.
- When planning for the location of a temporary influenza hospital, emphasize the need for spatial separation between patients, their families and care givers.

- Maintain at least a 1 metre spatial separation between beds in patient care areas and chairs in waiting areas.
- Plan for separate soiled and clean utility rooms; clean storage areas; dedicated sinks for utility purposes versus hand washing; designate food preparation areas including, dedicated utility versus hand washing sinks; provide an adequate number of toilets; set p a bereavement room and a location to store deceased bodies prior to pick up for funeral services.
- Settings with carpeted floors are discouraged.

b. Management of Staff

1. Provide health education.
2. Adhere to Occupational Health Management.

c. Infection Control Practices

Hygiene Measures to Minimize Influenza Transmission

Temporary Influenza hospitals should adhere to published guidelines to prevent nosocomial infections. Infection Control Practices adapted from Trinidad and Tobago Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care* are summarized below:

Patients, staff and visitors should minimize potential influenza transmission through good hygienic measures, i.e., using disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing or using tissues; and keeping their hands away from the mucous membranes of the eyes and nose.

Hand Hygiene

- Staff, patients and visitors should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic. Hand hygiene procedures should be reinforced.
- Hands should be washed or hand antisepsis performed after direct contact with ILI patients and after contact with their personal articles or their immediate environment.
- When planning for the location and operation of a Temporary Influenza Hospital, it is important to note that, ideally, hand washing facilities should be conveniently located.
- Hand washing facilities should be available in, or adjacent to rooms where care is provided. If a large room is used for several patients, more than one sink may be necessary. Sinks for hand washing should be used only for hand washing and not

for other purposes, e.g., as a utility sink. There should be access to adequate supplies as well as soap and towel dispensers should be in good working order.

- To avoid re-contaminating hands, single-use towels should be supplied for users to turn off faucets.
- Plain soap may be used for routine hand washing.
- When access to sinks is limited, supplies of antiseptic hand rinses and detergent containing towelettes are necessary. Waterless antiseptic hand rinses are superior to soap and water in reducing hand contamination and should be made available in prominent areas throughout the temporary hospital.
- If there is visible soiling, hands should be washed with soap and water before using waterless antiseptic hand rinses. If soap and water are unavailable, cleanse hands first with detergent-containing towelettes.
- Health Care Workers can reduce the required frequency of hand washing by minimizing unnecessary direct contact with patients and their immediate environments. This can be accomplished by the organization of care activities and avoiding touching surfaces in the patient's environment, e.g., bedrails, tabletops.
- Hands must be washed or antiseptic hand rinse used in the following situations:
 - after any direct contact with a patient or their immediate environment and before contact with the next patient;
 - after contact with items known or considered likely to be contaminated with blood, body fluids, secretions, or excretions (e.g., bedpans, urinals, wound dressings, suction apparatus);
 - immediately after removing gloves;
 - between certain procedures on the same patient if soiling of hands is likely, to avoid cross-contamination of body sites;
 - before preparing, handling, serving or eating food and before feeding a patient;
 - when hands are visibly soiled; and,
 - after personal use of toilet, wiping nose, coughing or sneezing.
- Patients and family members and visitors should be taught how and when to wash their hands, e.g., after personal use of toilet, wiping nose, coughing or sneezing.
- When patient hygiene is poor, they should have their hands washed for them. Patients should be helped to wash their hands before meals, after going to the bathroom, when soiled and before leaving their bedspace.
- Hand antisepsis, with an antiseptic soap or antiseptic hand rinse, is indicated before performing invasive procedures.

- Hand lotion may be used to prevent skin damage from frequent hand washing. Lotion should be supplied in disposable bags in wall containers by sinks or in small, non-refillable containers to avoid product contamination. Inappropriate handling and management of patients' or care givers' skin lotions have been reported as a source of outbreaks.
- Liquid hand-wash products should be stored in closed containers and dispensed from either disposable containers or containers that are washed and dried thoroughly before refilling.

Personal Protective Equipment

i. Masks, Eye Protection, and Face Shields

Masks to minimize the transmission of influenza may be worn when face-to-face with coughing individuals in during the early phases of the pandemic but are not practical, or helpful, when transmission has entered the community and temporary hospitals have been opened.

Masks should be worn in the temporary influenza hospital to prevent the transmission of other organisms when HCWs are face-to-face with undiagnosed coughing patients.

Masks and eye protection, or face shields should be worn to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose.

HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.

Wear masks.

ii. Gloves

Gloves are not required for the routine care of patients suspected of having or confirmed to have influenza. Meticulous hand washing with soap and water or performing hand antisepsis will inactivate the virus.

Gloves should be used as an additional measure, not as a substitute for hand hygiene.

Gloves are not required for routine patient care activities in which contact is limited to a patient's intact skin, e.g., when transporting patients.

Appropriate use of clean non-sterile gloves includes the following situations:

- for contact with blood, body fluids, secretions and excretions, mucous membranes, draining wounds or non-intact skin (open skin lesions or oozing rash);
- for handling items visibly soiled with blood, body fluids, secretions or excretions;

- when the health care worker has open skin lesions on the hands.

When indicated, gloves should be put on directly before contact with the patient or just prior to starting the task or procedure requiring gloves.

Gloves should be changed between care activities and procedures with the same patient after contact with materials that may contain high concentrations of microorganisms, e.g., after handling an indwelling urinary catheter.

Worn gloves should be changed:

- between patient contacts,
- if a leak is suspected or the glove tears.

Potentially contaminated gloves should be removed and disposed of immediately after completion of care or a specific task, at the point of use prior to touching clean environmental surfaces (e.g., blood glucose or temperature machines, blood pressure cuffs).

Hands should be washed immediately after removing gloves.

Single-use disposable gloves should not be reused or washed.

iii. Gowns

Gowns are not required for the routine care of patients with suspected or confirmed to have influenza.

Long sleeved gowns should only be used to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions.

HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible thoroughly, but gently, with soap and warm running water.

d. Patient Activity Restrictions

There are no patient activity restrictions as patients and staff will have already been exposed to or infected with influenza.

e. Visitor Restrictions

Notices should be placed at the entrances to the temporary hospital:

- warning visitors that they may be at risk of acquiring influenza and requesting visitors who have not had influenza-like-illness not to visit. Close relatives of terminally ill patients are exempt.
- requiring that visitors with acute respiratory illness not visit as other respiratory illness may be circulating.

f. Patient Care Equipment (Cleaning, Disinfection and Sterilization)

Sterilization and high-level disinfection requires supervision by a trained professional, dedicated space and specialized equipment. Items requiring sterilization or high level disinfection should be disposable or managed by the “parent” organization.

The appropriate cleaning, disinfection sterilization, storage and handling of patient care equipment is an obligatory component of health care and cannot be overemphasized.

Equipment and surfaces contaminated with secretions from patients suspected of having or confirmed to have influenza should be cleaned before use with another patient. The following recommendations apply in all circumstances. Please refer to the Glossary for definition of terms.

Recommendations

Process

- Reprocessing equipment (i.e., disinfection or sterilization) is not recommended but, if considered, the “parent” organization must provide a specially trained, knowledgeable person to be responsible for the processes. Where there is no “parent” organization to plan or operate the Temporary Influenza Hospital, it is expected that another organization would assume this role. If soiled equipment is to be transported for disinfection or sterilization, the parent organization must develop processes for the separation of soiled and clean/sterile equipment and safe handling/transport of contaminated equipment.
- Procedures should be established for assigning responsibility and accountability for routine cleaning of all patient care equipment.
- Reuse of single use items in this setting is strongly discouraged.

Cleaning

- Items that are shared, should be cleaned between patients. A hospital grade germicide should be used for routine cleaning.
- Reuseable items must be thoroughly cleaned before disinfection or sterilization. Items should be washed with hot soapy water, using an enzymatic cleaner.
- Equipment that is visibly soiled should be cleaned promptly.
- Soiled patient care equipment should be handled in a manner that prevents exposure of skin and mucous membranes and contamination of clothing and the environment.
- Commodes and toilets should be cleaned twice daily and when soiled. Ideally, bedpans should be reserved for use by a single patient, labeled appropriately or cleaned between uses.

Personal care supplies (e.g., lotion, creams, soaps) should not be shared between patients.

Disinfection

- Reuseable items must be adequately rinsed and dried before disinfection or sterilization and dried before storage.
- Manufacturers' written recommendations for the use of chemical disinfectants should be followed.
- Only disinfectants approved by the Ministry of Health should be used.
- Respiratory therapy and anesthesia equipment require, at a minimum, high level disinfection.

Sterilization

- Critical items must be sterile¹³⁵.
- The steam sterilization process must be monitored by biologic indicator testing at least daily.
- The sterilization process must be monitored at each cycle by mechanical and chemical indicators. Each pack must contain a chemical indicator.
- A procedure for the recall of items processed from a load that contained a positive biological indicator should be established and followed.
- Flash sterilization is not recommended.
- Microwave ovens, glass bead sterilizers and boiling for sterilization should not be used.

Storage

- After reprocessing, sterility must be maintained until point of use.
- Sterile items must be maintained sterile until use.
- Sterile and clean supplies should be stored in a clean dry area.
- Clean and sterile supplies should not be hoarded.
- Soiled equipment should be kept physically separate from clean/sterile supplies and equipment.

g. Environmental Control (Housekeeping, Laundry and Waste)

The influenza virus survives well in the environment and patients may contaminate their environment with respiratory secretions. On hard porous surfaces the virus can survive for 24- 48 hours, can then be transferred to hands and survive for up to 5 minutes.

Equipment and surfaces (i.e., desks, arm rests, etc.) contaminated with secretions from patients suspected or confirmed to have influenza should be cleaned before use with another patient.

Housekeeping

Appropriate housekeeping is a required component of health care and cannot be overemphasized. The following recommendations apply in all circumstances. Please refer to the glossary for a definition of terms.

Recommendations

Process

- “Parent” organizations must provide a specially trained, knowledgeable person responsible for housekeeping and the policies for cleaning schedules and methods. When there is no “parent” organization to plan or operate the triage settings, it is expected another organization would assume this role.
- Products and procedures should be aligned with, or approved by, the “parent” organization
- An education program for those providing housekeeping services should help them to understand the effective methods of cleaning and the importance of their work.
- Housekeepers, as with other health care workers, should be offered immunization against hepatitis B.

Cleaning

- Daily cleaning of environmental surfaces and noncritical patient care items should be sufficient to keep surfaces clean and dust free. Surfaces that are frequently touched (i.e., contaminated) by the hands of health care providers and patients/residents/clients, such as surfaces of medical equipment and knobs for adjustment or opening, should be cleaned twice daily or when known to be contaminated.
- Careful vigorous cleaning of environmental surfaces is effective in removing many contaminants from surfaces.
- Damp rather than dry dusting or sweeping should be performed, whenever possible, in order not to generate dust particles. Any dry cleaning should be done carefully with a chemically treated dry mop or vacuum cleaner (equipped with exhaust filter) rather than a broom. (Note: carpets are discouraged in this setting).
- Vacuum cleaners, equipped with exhaust filters, should be used on carpeted areas. Expelled air from vacuum cleaners should be diffused so that it does not aerosolize dust from uncleaned surfaces.
- During wet cleaning, cleaning solutions and the tools with which they are applied soon become contaminated. Therefore, a routine should be adopted that does not redistribute microorganisms. This may be accomplished by cleaning less heavily contaminated areas first and also by changing cleaning solutions and cloth/mop heads frequently.

- Wet mopping is most commonly done with a double-bucket technique, i.e., one bucket for soil, one for rinsing. This technique extends the life of the solution because fewer changes are required. When a single bucket is used, the solution must be changed more frequently because of increased soil.
- Tools used for cleaning and disinfecting must be cleaned and dried between uses.
- Mop heads should be laundered daily. All washed mop heads must be dried thoroughly before storage or reuse.

Cleaning agents

- In most areas, detergents are acceptable for surface cleaning. Please refer to Appendix V, Table A, Cleaning Procedures for Common Items.
- Cleaning and disinfecting agents must be mixed and used according to manufacturers' recommendations.
- Protective apparatus: Household utility gloves should be worn during cleaning and disinfecting procedures. Manufacturers' directions should be followed for product use to ensure safe handling practices.
- Disinfectant fogging (spraying disinfectant in a closed area) is not necessary and should not be done.

Blood Spills

- Appropriate personal protective equipment should be worn for cleaning up a blood spill. Gloves should be worn during the cleaning and disinfecting procedures. Care must be taken to avoid splashing or generating aerosols during the clean up. If the possibility of splashing exists, the worker should wear a face shield or safety glasses/mask and gown. For large blood spills, overalls, gowns or aprons as well as boots or protective shoe covers should be worn. Personal protective equipment should be changed if torn or soiled, and always removed before leaving the location of the spill, then hands should be washed immediately.
- The blood spill area must be cleaned of obvious organic material before applying a disinfectant, as hypochlorites and other disinfectants are substantially inactivated by blood and other materials. Excess blood and fluid capable of transmitting infection should be removed with disposable towels. Discard the towels in a plastic-lined waste receptacle.
- After cleaning, areas should be disinfected with a low level chemical disinfectant (e.g., chemical germicides approved for use as 'hospital disinfectants', such as quaternary ammonium compounds) or sodium hypochlorite (household bleach). Concentrations ranging from approximately 500 ppm (1:100 dilution of household bleach) sodium hypochlorite to 5000 ppm (1:10 dilution of household bleach) are effective, depending on the amount of organic material (e.g., blood or mucous) present on the surface to be cleaned and disinfected. Please refer to

Appendix V, Table B, Directions for Preparing Using of Chlorine-based Disinfectants.

Commercially-available chemical disinfectants may be more compatible with certain medical devices that might be corroded by repeated exposure to sodium hypochlorite, especially the 1:10 dilution. Manufacturers' recommendations for dilutions and temperatures of chemical disinfectants approved for use as hospital disinfectants must be followed. Sodium hypochlorite or chemical germicide should be left on surface for at least 10 minutes.

- The treated area should then be wiped with paper towels soaked in tap water. Allow the area to dry. The towels should be discarded in a plastic lined waste receptacle.
- Hands must be thoroughly washed after gloves are removed.

Laundry

Special handling of linen contaminated with secretions from patients suspected of having or confirmed to have influenza is not required. The following recommendations apply in all circumstances.

Recommendations

Process

- Parent organizations must provide a specially trained, knowledgeable person responsible for laundry. Where there is no "parent" organization to plan or operate the triage settings, it is expected that another organization would assume this role.
- Collection and handling
- There is no special handling required for linen from patients suspected of having or confirmed to have influenza.
- All soiled linen should be handled in the same way for all patients.
- Linen should be handled with a minimum of agitation and shaking.
- Sorting and rinsing of linen should not occur in patient care areas.
- Heavily soiled linen should be rolled or folded to contain the heaviest soil in the centre of the bundle. Large amounts of solid soil, feces or blood clots should be removed from linen with a gloved hand and toilet tissue then placed into a bed pan or toilet for flushing. In order to prevent splashing, excrement (e.g., from clothing, reusable incontinence pads) should not be removed by spraying with water.

Bagging and containment

- Soiled linen should be bagged at the site of collection.
- To prevent contamination or soaking through, a single, leakproof bag or a single cloth bag can be used. A second outer bag is only required to contain a leaking inner bag.
- Use of water soluble bags is not recommended. These offer no benefit for infection control and add additional costs.
- Laundry carts or hampers to collect or transport soiled linen do not need to be covered unless odor control is a factor.
- Bags should be tied securely and not over-filled when transported either by chute or cart.
- Linen bags should be washed after each use and can be washed in the same cycle as the linen contained in them.

Transport

- When linen is commercially laundered, adequate separation of clean and dirty laundry in the truck is essential to ensure that there is no opportunity for mixing clean and dirty linen.
- Linen transported by cart should be moved in such a way that the risk of cross contamination is minimized.
- Separate carts should be used for dirty and clean linens. Carts used to transport soiled linens should be cleaned after each use with a cleaning product specified for use in the health care setting.
- Clean linen should be transported and stored in a manner that prevents its contamination and ensures its cleanliness.

Washing and Drying

- If low temperature water (less than 71.0° C) is used for laundry cycles, chemicals suitable for low temperature washing at the appropriate concentration should be used.
- High temperature washes (more than 71.1° C) are necessary if cold water detergents are not used.
- To achieve a level of at least 100 ppm of residual chlorine with household bleach, 2 mL of household bleach should be added for every litre of water.

- In institutional laundry areas, the addition of a mild acidic “souring” agent neutralized the alkalinity from the fabric, water and detergent. This shift in pH, from approximately 12 to 5, may inactivate any remaining bacteria and reduce the potential for skin irritation.

f. Protection of laundry workers

- Workers should protect themselves from potential cross infection from soiled linen by wearing appropriate protective equipment, such as gloves, gowns or aprons, when handling soiled linen. Reuseable gloves should be washed after use, allowed to hang to dry, and discarded if punctured or torn.
- Hand washing facilities should be readily available.
- Personnel should wash their hands whenever gloves are changed or removed.
- Staff in care areas need to be aware of sharps when placing soiled linen in bags. Workers are at risk from contaminated sharps, instruments or broken glass that may inadvertently be contained with linen in the laundry bags.
- Laundry workers, as other health care workers, should be offered immunization against hepatitis B.
- All caregivers and laundry workers should be trained in procedures for handling soiled linen.

g. Waste

Waste generated in temporary hospitals is no more hazardous than household waste. Only sharps contaminated with body fluids require special handling and treatment. Appropriate waste handling is a required component of health care and cannot be overemphasized. Special handling of waste contaminated with secretions from patients with suspected or confirmed influenza is not required. The following recommendations apply in all circumstances.

Recommendations

Process

- Parent organizations must provide a specially trained, knowledgeable person responsible for waste. Where there is no “parent” organization to plan or operate the triage settings, it is expected that another organization would assume this role.
- Written policies and procedures to promote the safety of waste handlers should be established.

- Special handling of waste contaminated with secretions from patients with suspected or confirmed influenza is not required.

Regulations

- Local environmental and health regulations should be followed when planning and implementing treatment and disposal policies for biologic waste.
- Specific categories of biologic waste may be disposed of in a properly managed landfill provided that there are procedures in place to protect workers and the public from contact with the waste.
- Medical waste, (e.g., gloves, sponges, dressings, or surgical drapes that are soiled or soaked with blood or secretions) may be contained in impervious waste-holding bags or double bags and may be disposed of in a landfill, only if incineration is unavailable.
- If local regulations permit it, limited amounts of blood, suctioned fluids, excretions and secretions may be disposed of in a sanitary sewer (central sewer system or septic tank; NOT open drains).
- Used needles and other sharp instruments should be handled with care to avoid injuries during disposal. Used sharp items should be disposed of immediately in designated puncture-resistant containers located in the area where the items were used.
- A biohazard symbol is required on all sharp containers. Provincial or territorial regulations regarding colour coding must be followed.
- The transportation of infectious waste must comply with the *Transportation of Dangerous Goods Act and Regulation, of Trinidad and Tobago*.
- Infectious waste must be stored in a designated location with access limited to authorized personnel. Refrigerated space should be provided for lockable, closed storage of laboratory waste that will be disposed of off site.
- As the waste generator is accountable for waste disposal, ensure careful selection of waste hauling, treatment and disposal firms so all stages of transportation and disposal are carried out in a safe and legal manner.

Waste Handlers

- Waste handlers should wear protective apparatus appropriate to the risks involved, (e.g., protective footwear and heavy work gloves).
- Waste handlers, as with other HCWs, should be offered hepatitis B immunization.

h. Care of the Deceased

Attention to routine infection prevention and control practices is sufficient for handling bodies of individuals who have died from influenza. There is no additional risk of transmission of influenza infection.

Recommendations

- Adherence to the routine infection control practices for hand washing/hand hygiene, mask/eye protection/face shields, glove and gown use, as outlined above during the care of the deceased body, is required.
- The body of the deceased should be placed in a body bag or wrapped in a sheet when a body bag is unavailable and, preferably, kept in a cool, dry location until pick up by funeral services.

Appendix I.

Guideline Rating System

Trinidad and Tobago Guideline Evidence-Based Rating System

Three categories rank the strength of evidence for a recommendation and three grades describe the quality of supportive studies for that recommendation. This format uses an evidence-based approach through the critical scrutiny of evidence from clinical trials research, well designed experimental and observational studies, and places less emphasis on descriptive studies, clinical intuition, and recalled experiences. The rating scale is outlined in the table below.

Strength and Quality of Evidence for Recommendations

Categories for strength of each recommendation

CATEGORY DEFINITION

A Good evidence to support a recommendation for or against use

B Moderate evidence to support a recommendation for or against use

C Insufficient evidence to support a recommendation for or against use

Categories for quality of evidence

GRADE DEFINITION

I Evidence from at least one properly randomized, controlled trial

II Evidence from at least one well-designed clinical trial without randomization; from cohort or case-controlled analytic studies, preferably from more than one centre, from multiple time series; or from dramatic results in uncontrolled experiments

III Evidence from opinions of respected authorities on the basis of clinical experience, descriptive studies, or reports of expert committees

Note: If established regulations are quoted in a document, no ratings are assigned to these legislative requirements

Appendix II.

World Health Organization (WHO) Definition of Pandemic Phases

Inter-Pandemic

Phase 1:

No new influenza A virus sub-type has been reported.

Phase 2:

No new influenza A sub-type has been detected in humans; however, a circulating animal influenza A virus sub-type poses a substantial risk of human disease.

Pandemic Alert:

Phase: 3

Human infection confirmed. Two or more human infections have occurred with a new virus sub-type, but the ability of the virus to readily spread from person-to-person and cause multiple outbreaks of disease leading to epidemics remains questionable.

Phase 4:

Small cluster(s) of cases, with limited human to human transmission, but highly localized, suggesting that the virus is not well adapted to humans.

Phase 5:

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

Pandemic

Phase 6:

The pandemic will be declared when the new virus sub-type has been shown to cause several outbreaks in at least one country, and would have spread to other countries with consistent disease patterns indicating that serious morbidity and mortality is likely in at least one segment of the population.

Outbreaks and epidemics are occurring in multiple countries, and spreading region by region across the world.

End of the first pandemic wave

The increase in outbreak activity in the initially affected countries or regions has stopped or reversed, but outbreaks and epidemics of the new virus are still occurring elsewhere.

Second or later waves of the pandemic

Based on past experiences, at least a second severe wave of outbreaks caused by the new virus would be expected to occur within 3-9 months of the initial epidemic in many countries.

End of the pandemic (back to Interpandemic phase; Phases 1 & 2)

WHO will report when the Pandemic Period has ended, which is likely to be after 2-3 years. The indications for this will be that indices of influenza activity have returned to essentially normal inter-pandemic levels and that immunity to the new virus subtype is widespread in the general population.

Appendix III.

Hand Hygiene Procedures

A. How to Wash Hands (using non-antimicrobial and antimicrobial soap)

- Remove jewellery before hand wash procedure. Rinse hands under warm running water.
Rationale: This allows for suspension and washing away of the loosened microorganisms.
- Lather with soap and, using friction, cover all surfaces of the hands and fingers.
Rationale: The minimum duration for this step is 10 seconds; more time may be required if hands are visibly soiled. For antimicrobial agents 3-5mL are required. Frequently missed areas are thumbs, under nails, backs of fingers and hands.
- Rinse under warm running water.
Rationale: To wash off microorganisms and residual hand washing agent.
- Dry hands thoroughly with a single-use towel. Drying achieves a further reduction in number of microorganisms. Re-useable towels are avoided because of the potential for microbial contamination.
- Turn off faucet without re-contaminating hands, e.g., use single use towel.
Rationale: To avoid re-contaminating hands.
- Keep fingernails short and do not use fingernail polish or artificial nails.
Rationale: Chipped nail polish may increase bacterial load. Artificial nails including wraps, acrylics or tips increase bacterial load. Nail polish and artificial nails impede visualization of soil under nails.

B. Decontaminating Hands with an Alcohol-based Hand Rub

To decontaminate hands that are not visibly soiled* using an alcohol-based hand rub:

- Follow the manufacturer’s recommendations on the volume of product to use;
- Apply product to palm of one hand and rub hands together, covering all surfaces of hands and fingers, until hands are dry.

Note: * Hand wash if hands are visibly dirty or contaminated with proteinaceous material or are visibly soiled with blood or other body fluids by washing with either a non-antimicrobial soap and water or an antimicrobial soap and water.

Appendix IV.

An Influenza-like Illness (ILI) Assessment Tool

An ILI assessment tool is to be used for immediate triage of patients or staff and for accommodation/cohort of patients prior to further OH or clinical management. This is not intended to be used as a clinical management tool. A clinical management assessment tool can be found in Annex G of the Trinidad and Tobago Pandemic Influenza Plan.

ILI Assessment Tool: *Please check the following.*

ILI in the general population is determined by the presence of 1, 2 and 3 and any of 4., a – c, which could be due to influenza virus:

___ () 1. Acute onset of respiratory illness

___ () 2. Fever (>38°C)*

___ () 3. Cough

4. One or more of the following:

___ () a. sore throat

___ () b. arthralgia

___ () c. myalgia or prostration

* May not be present in elderly people

Appendix V. Tables

Table A. Cleaning Procedures for Common Items

Surface/object	Procedure	Special considerations
Horizontal surfaces such as over bed tables, work counters, baby weigh scales, beds, cribs, mattresses, bedrails, call bells	1.Thorough regular cleaning 2.Cleaning when soiled 3.Cleaning between patients/clients and after discharge	Special procedures sometimes called carbolizing are not necessary. Some environmental surfaces may require low level disinfection (e.g., in nurseries, pediatric settings, critical care, burn units, emergency rooms, operating rooms and bone marrow transplantation facilities). Walls, blinds, curtains Should be

		cleaned regularly with a detergent and as splashes/visible soil occur.
Floors	<ol style="list-style-type: none"> 1. Thorough regular cleaning 2. Cleaning when soiled 3. Cleaning between patients/clients and after discharge. 	Damp mopping preferred. Detergent is adequate in most areas. Blood/body fluid spills should be cleaned up with disposable cloths followed by disinfection with a low level disinfectant.
Carpets/upholstery	Should be vacuumed regularly and shampooed as necessary.	
Toys	Should be regularly cleaned, disinfected with a low level disinfectant, thoroughly rinsed, and dried (between patients in acute care setting).	For pediatric settings, toys should be constructed of smooth, nonporous (i.e., not plush) materials to facilitate cleaning and decontamination. Do not use phenolics.
Toilets and commodes	<ol style="list-style-type: none"> 1. Thorough regular cleaning 2. Cleaning when soiled 3. Clean between patients/clients and after discharge. Use a low level disinfectant. 	These may be the source of enteric pathogens such as <i>C. difficile</i> and <i>Shigella</i> .

Table B. Directions for Preparing and Using Chlorine-based Disinfectants

Product Intended use	Recommended dilution	Level of available chlorine
Household bleach hypochlorite solution with 50,000 ppm* available chlorine.	Cleanup of blood spills: Use concentrations ranging from 1 part bleach to be mixed with 99 parts of tap water (1:100), or one part of bleach to be mixed with 9 parts of tap water (1:10), depending on the amount of organic material (e.g., blood or mucus) present on the surface to be cleaned and disinfected	0.05% or 500 ppm 0.5% or 5,000 ppm
	To add to laundry water: One part (one 8 ounce cup) of bleach to be mixed with about 500 parts (28 gallons†) of tap water	0.01% or 100 ppm.
	Surface cleaning: Soaking of glassware or plastic items One part (one 8 ounce cup) to be mixed with about 50parts (2.8 gallons) of tap water 0.1% or 1,000 ppm.	0.1% or 1,000 ppm.
NaDCC (Sodium dichloroisocyanurate) powder with 60% available chlorine.	Cleanup of blood spills: Dissolve 8.5 g in one litre of tap water	0.85% or 5,000 ppm
Chloramine-T powder with 25% available chlorine	<u>Cleanup of blood spills:</u> Dissolve 20 g in one litre of tap water	2.0% or 5,000 ppm

* Parts per million; † Imperial gallon (4.5 litres)

Annex F

Clinical Guidelines and Tools Chapter 1.

Clinical Presentations of Influenza

The spectrum of illness associated with influenza virus infections is wide, and ranges from asymptomatic infection to fatal disease, frequently associated with viral pneumonia. The previous experience of a population with antigenically related virus variants is a determinant of the severity of the disease. *Therefore, with a pandemic strain, which would be new in the population, the anticipated clinical spectrum will be more severe.* Age and pre-existing co-morbidities also influence the outcome. Young children, elderly adults, pregnant women, and individuals with chronic diseases are at greatest risk of complicated influenza

A general “Clinical Case Definition” for an influenza-like illness (ILI) and a review of recent literature describing the most common presentations and complications of influenza in adults and children are given below. This is a general definition and applies mainly to the clinical presentation of interpandemic influenza; it may need modification once the pandemic occurs

Case Definition

The case definition of influenza is sub-categorized into probable and confirmed cases. In view of the time required for laboratory confirmation of pandemic influenza infection, the probable case definition will be the working definition for operational considerations and the contact definition has been developed in relation to this.

- a. **Probable case.** Persons are considered probable pandemic influenza cases when the following conditions are fulfilled:
 - (1) Abrupt onset of fever more than or equal to 38 degrees Celsius (except in persons aged 60 years and above); and
 - (2) Non-productive cough; and either
 - (3) (a) a positive epidemiological link (travel to country with pandemic influenza or contact history with an infected person); or
(b) a positive rapid test kit result, if available.
 - (4) Fever may often be absent in persons aged 60 years and above. Therefore, in the absence of fever, any of the following symptoms, in addition to non-productive cough, should raise a high index of suspicion for persons in this age group:
 - (a) malaise;
 - (b) chills;

- (c) headache;
- (d) myalgia.

b. **Confirmed case.** Persons are considered confirmed pandemic influenza cases when there is laboratory confirmation of infection with pandemic influenza.

Pathogenesis of influenza

The major site of infection by influenza viruses is the ciliated epithelial cell in the mucous layer of the respiratory tract. In the first few days after infection, necrosis of these cells and local edema occur, followed by infiltration by lymphocytes, plasma cells, histiocytes and polymorphonuclears. The incubation period may last 24h or up to 4-5 days (average of two days), varying with the infecting virus, size of the viral inoculum, and immunological status of the individual. The infectious period starts, typically, one day before the symptoms appear, and lasts approximately five days after the onset of clinical illness. This may be longer for children and elderly patients. Infectious virus has been recovered from respiratory secretions 2-3 weeks after the onset of disease. Viral antigens have been detected in cells and secretions for several more days. Asymptomatic carrier state, however, is not associated with influenza

In uncomplicated influenza, repair starts 3-5 days after the beginning of symptoms; however, restoration of ciliated cells and mucous production are not restored until up to 15 days. If there is secondary bacterial infection, the inflammatory destruction of the basal cell layer is greater and the regeneration of the epithelia may take much longer.

Fatal cases of viral pneumonia have varying degrees of interstitial cellular infiltrate, alveolar edema, and hyalin membrane deposition. The virus also infects polymorphonuclear and mononuclear leucocytes, depressing their response to chemotactic stimuli and decreasing cellular functions (phagocytosis, proliferation, costimulation, etc.). This, together with the necrosis and desquamation of the ciliated epithelial cells and the general distortion in mucus secretion, favours the development of bacterial pneumonia (or combined viral/bacterial pneumonia). Bacterial sinusitis and/or otitis media following influenza apparently result through similar mechanisms

The virus replicates throughout the respiratory tract and it is possible to recover infectious particles from the upper and lower tract of individuals naturally or experimentally infected with influenza. The hemagglutinin of the virus (HA) binds to the receptor molecules of cells, while the neuraminidase (NA) facilitates release of viral particles, liquefying the mucous secretions to promote access to new cells. At 1-2 days post infection, there is a peak in virus replication, which decreases over the next 5-10 days. There is a direct correlation between virus shedding and severity of disease, with higher titres and longer shedding, in severely ill individual. Children and elderly patients generally have high titres of virus in their secretions, and continue shedding viruses for longer periods of time (8-13 days); promoting transmission. In some patients, viral antigens may be detected in secretions and cells for prolonged periods, even when virus isolation is negative.

Influenza viruses have been isolated from blood only on rare occasions however, it is possible to isolate the virus from the muscles of patients with rhabdomyositis and from other extrapulmonary sites in individuals with fatal influenza. Foetal transmission is also possible. It has been suggested that the virus may circulate in infected lymphocytes.

An increase in the number of leukocytes in blood is usually detected between days 1 and 3 after influenza infection, with a rise in neutrophils and a fall in lymphocytes. This lymphopenia includes T cells, B cells, and null cells. A recently described protein, encoded by some influenza A virus, is a candidate for inducing apoptosis of human monocytic cells with the CD8⁺T cell phenotype, and may be related to the high lethality of some strains.

The severity of clinical disease during an influenza pandemic is determined by the immunological status of the population and viral factors. For example, the cleavage of the HA molecule in Influenza A, is critical in determining the virulence of two avian strains: the H5 strain, which is very virulent, and the H7 strain, which is almost avirulent. In the less virulent strains, proteases able to cleave the HA were present only in the respiratory and gastrointestinal tracts of poultry, thus limiting virus replication to these areas. Changes in the amino acid composition of the HA (as seen in H5 virions), rendered this protein cleavable by more ubiquitous enzymes and allowed the virions to replicate systemically, causing a generalized, fatal disease. A similar mechanism, i.e., high cleavability of the HA glycoprotein, has been suggested to explain the high human-lethality of H5N1 influenza A infections in Hong-Kong in 1997. Recently, a new viral protein, PB1-F2, was described in some avian influenza virus; this protein may be involved in the ability of avian H5N1 and H9N2 influenza A virus to infect humans and cause disease.

Following infection by influenza virus, antibodies are produced against four major components of the virion: HA (hemagglutinin), NA (neuraminidase), NP (the predominant protein of the nucleocapsid), and M protein (matrix protein). Nevertheless, only antibodies against HA and NA have been linked with resistance to infection by influenza. Anti-HA antibodies are the primary neutralizing antibodies and participate in complement-mediated lysis of infected cells, aggregation of virions, and cell cytotoxicity. Anti-NA, on the other hand, reduce the number of new infectious units released from infected cells, and may reduce the severity of disease and even prevent clinical illness if present in high titre.

In nasal secretions, the neutralizing antibodies are predominantly IgA, but IgM and IgG are also secreted locally. Local antibodies are associated with resistance to infection and can be detected for 3-5 months after illness. There is also local memory.

B cells producing specific IgG, IgA, and IgM can be detected in peripheral blood of normal individuals and of subjects with influenza infection. The level of anti HA and anti NA antibodies in blood has been associated with resistance to infection and with recovery from the disease.

A protective effect for maternally transmitted antibodies can be inferred from the relation existing between age in months of infants and symptomatic influenza, and is supported by studies measuring levels of maternal antibodies in cord serum.

The replication of influenza viruses in a new host activates a cascade of inflammatory cytokines, which is followed by fever and by the symptoms of the disease. Nasal lavage specimens from humans infected with influenza A contain interleukin-6 (IL-6), tumour necrosis factor (TNF), gamma interferon (IFN), interleukin-10, monocyte chemotactic protein 1, and macrophage inflammatory proteins 1 and 2. Studies performed in volunteers with experimental infection and in patients with influenza A of less than 36 h of duration, showed that the levels of IL-6 and of TNF- α in upper respiratory secretions correlate directly with virus replication, fever, respiratory and systemic symptoms, and with an increase in respiratory secretions. High levels of IFN γ , on the other hand, were associated with an early decrease in viral titre. IL-6 is a potent pyrogen that induces fever, chills and fatigue when administered to humans, it is also involved in the initiation of the immune response to the virus. TNF α , on the other hand, correlates with fever but not with symptoms, and recent experiments demonstrated that it has potent anti-influenza activity. Very high levels of both cytokines, IL-6 and TNF- α , were also found in serum and cerebrospinal fluid (CSF) of patients with influenza-associated encephalopathy. In a study done in Japan, IL-6 levels were used for diagnosis and prognosis of the course of the disease: the lower the level of IL-6, the milder the CNS participation. Values higher than 6,000 pg/mL were found in children with brain stem dysfunction, about 150 pg/mL were present in children without brain stem dysfunction and less than 80 pg/mL in controls; children with values higher than 15,000 pg/mL did not survive.

Human monocytes are highly susceptible to influenza A virus and die 24-48 hours after infection. Although the release of complete virus particles from these cells is very low, they secrete several pro-inflammatory cytokines (TNF, IL-1, IL-6, interferon) and chemotactic factors responsible for the mononuclear infiltrate characteristic of influenza infected tissues. In addition, secondary trigger signals, such as very small amounts of LPS (or other secondary bacterial products) could cause an excessive increase in cytokine production and secretion by the monocytes. This priming-triggering effect may be responsible for the severe complications of secondary bacterial super-infections observed after influenza A infections.

It has been shown that H5N1 influenza viruses infecting humans in 1997 can avoid the antiviral activity exerted by TNF- α and by the interferons¹⁸⁶. Post-mortem reports from two patients suggested that virus replication in the respiratory tract caused an increase in the level of inflammatory cytokines, resulting in a reactive hemophagocytic syndrome that was the main cause of death. The authors propose that the synthesis of high levels of cytokines was stimulated after the virus could escape their antiviral effect and continued to replicate.

1.1 Most Common Clinical Presentations

1.1.1 Adults

The typical clinical presentation of uncomplicated influenza is tracheobronchitis with some small airway involvement. The onset of disease is usually abrupt: headache, chills and dry cough, followed by fever of 38-40°C that may peak as high as 41°C within the first 24 hours, together with myalgia, malaise, and anorexia. Physical signs include hot and moist skin, flushed face, injected eyes and clear nasal discharge. Some patients also have nasal obstruction, sneezing, pharyngeal inflammation, excessive tearing and mild cervical adenopathy. Chest x-rays and auscultatory findings are usually normal, with occasional crackles and wheeze. In uncomplicated influenza, the airflow in large airways remains relatively normal. There is, however, a transient increase in bronchial reactivity and some temporary alterations in gas exchanges in small peripheral airways. Bronchial hyper reactivity may continue well beyond the clinical illness, even in subjects without a history of bronchospasm.

In uncomplicated influenza the fever usually declines after 2-3 days and disappears by the 6th day (median three days). Biphaseic fever patterns are usually associated with secondary bacterial infections, but may be observed in some cases of uncomplicated influenza. While the temperature declines, some respiratory symptoms, like cough and rhinorrhea, may increase, followed by the production of small amounts of, usually mucoid, sputum. Cough, weakness and fatigue can persist for 1 to 2 weeks and up to 6 weeks

The disease is more severe in individuals younger than 5 years or older than 65 years. The risk of lower respiratory tract infection (LRTI) is much higher in young children, smokers, geriatric patients and persons with underlying cardio-respiratory disorders (most frequently asthma in younger patients and chronic bronchitis and emphysema in older persons). Viral pneumonitis is most frequent in young children, while bacterial superinfection is common in the elderly. *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis*, and *Staphylococcus aureus* are the most common agents of secondary bacterial pneumonia. Gram-negative bacteria, *Chlamydia pneumoniae* and *Mycoplasma pneumoniae* are also found in some patients.

Different strains of influenza may be associated with different symptoms or severity of disease. Two influenza A subtypes: A (H1N1) and A (H3N2), and one influenza B strain, have been circulating worldwide in the last decade (with minor strain variations) and are associated with yearly epidemics. Influenza A (H3N2) is frequently associated with more severe clinical diseases and pneumonia. It affects young and old equally, and accounts for up to 28% of acute cardiopulmonary hospitalizations of older persons. Focal outbreaks in nursing homes are usually caused by A (H3N2) viruses. Influenza A (H1N1), on the other hand, infects children every year but has only a minor impact in the elderly, and influenza B preferentially causes disease in children, with frequent gastrointestinal symptoms.

During the 2001-2002 season, a new subtype, influenza A (H1N2) was isolated in several countries. These new viruses resulted from gene reassortment between the circulating A (H1N1) and A (H3N2) viruses.

Because both viral proteins were similar to the homologous antigens in the circulating strains and in the vaccine strains, the new viruses did not cause more severe illness or higher influenza activity in this season.

Human infections by influenza A (H5N1) were first detected in Hong Kong in 1997, where six of 18 patients admitted to hospital died. These infections were characterized by a high case-fatality rate, a high incidence of gastrointestinal symptoms in adults, and a high rate of pulmonary, renal, hepatic and haematologic complications in patients without previously identified high risk conditions.

Influenza C viruses are usually associated with mild illnesses, which are sometimes asymptomatic. For that reason, virus isolation has not been performed regularly, and the spectrum of diseases produced by influenza C is not well characterized. Studies in Japan found temperatures of 38-40° C for 2-3 days in young children, who also had coryza and cough lasting for a period of 2 weeks in up to 50% of the patients. Adults had similar but milder symptoms, and complained mainly of malaise, sore throat and headache. In another study, however, the symptoms reported in young adults were as severe as those associated with influenza A infection and lasted longer.

Only influenza A has been associated with pandemics, however interpandemic epidemics can be attributed to both A and B viruses.

Although almost all deaths related to annual epidemics of influenza occur in the elderly or in the very young, and approximately 90% of excess deaths during epidemics occur among persons older than 65 years, in pandemic periods, adults younger than 65 years have accounted for 50% of the deaths. For example, nearly half of the influenza-related deaths during the 1918-1919 influenza A (H1N1) pandemic occurred in the 20-40 years olds. Most of the deaths during the 1968-1969 influenza A (H3N2) pandemic occurred in adults 45-65 years old (half of them were previously healthy and without any detectable co-morbid illness, and a large proportion of influenza-related deaths during the 1957-1958 influenza A (H2N2) pandemic occurred among persons younger than 65 years.

1.1.2 Children

Children have the highest rates attack rates of influenza, and are the major disseminators of the virus¹⁹². In a regular “influenza season”, influenza infections are the most important causes of consultation in outpatient clinics and account for one half of lower respiratory tract infections that result in hospitalizations of children^{80,183}. During most influenza epidemics, influenza viruses supplant all other major respiratory viruses as causes for consultation for respiratory infection in children.

The highest rate of influenza-related serious illness in children occurs in the 6-12 months old age group, after the waning of maternal antibodies. Although uncomplicated influenza in children may be similar to the disease in adults, there are some age related differences in toddlers and infants:

- 1) Young children usually develop higher temperatures (over 39.5° C) and may have febrile seizures.

- 2) Unexplained fever can be the only manifestation of the disease in neonates and infants.
- 3) Influenza viruses are an important cause of laryngotracheobronchitis (croup), pneumonia and pharyngitis-bronchitis in young children. Both types, A and B, are significant causes of low respiratory tract infections.
- 4) Gastrointestinal manifestations, such as nausea, vomiting, diarrhoea and abdominal pain, are found in 40-50% of patients, with an inverse relation to age (mainly in 3 years old or younger).
- 5) Otitis media and non-purulent conjunctivitis are more frequent in young ages.
- 6) A variety of central nervous system findings, including apnea, opisthotonos and seizures may appear in as many as 20% of the infants. Children may also present with symptoms suggestive of meningitis, e.g., headache, vomiting, irritability and photophobia.
- 7) Myositis is a complication in young children, especially after infection with influenza B.

In children over 5 years and adolescents the most frequent symptoms are fever, cough, non-localized throbbing headache, chills, myalgia and sneezing. The fever is usually in the 38-40° C range and a second peak, without bacterial superinfection, may occur around the fourth day of illness. Backache, sore throat, conjunctival burning with watery eyes and epistaxis may be present, but gastrointestinal symptoms are infrequent. Chest auscultation is usually normal, but occasionally coarse breath sounds and crackles may be heard.

Respiratory illness caused by influenza is non-specific and difficult to distinguish from illness caused by other respiratory pathogens on the basis of symptoms alone. Many viral infections (respiratory syncytial virus [RSV], parainfluenza, adenovirus and rhinovirus), as well as other pyrexial diseases, can cause an illness that is clinically indistinguishable from influenza.

1.1.3 Special Populations: High-risk Conditions

Groups to be at “increased risk for complications from influenza” are as follows:

***Adults and children with chronic cardiac or pulmonary disorders (including bronchopulmonary dysplasia, cystic fibrosis and asthma) severe enough to require regular medical follow-up or hospital care.** Chronic cardiac and pulmonary disorders are by far the most important risk factors for influenza-related death.

***People of any age who are residents of nursing homes and other chronic care facilities.** Such residents often have one or more of the medical conditions outlined in the first group. In addition, their institutional environment may promote spread of the disease.

***People ≥ 65 years of age.** The risk of severe illness and death related to influenza is moderately increased in healthy people in this age group, but is not as great as in people with chronic underlying disease.

***Adults and children with chronic conditions, such as diabetes mellitus and other metabolic diseases, cancer, immunodeficiency, immunosuppression (due to underlying disease and/or therapy), renal disease, anemia, and hemoglobinopathy.** Immunosuppressed patients are at increased risk for influenza infection, morbidity and mortality. Influenza may result in significant morbidity and mortality among HIV-infected individuals.

***Children and adolescents (6 months to 18 years of age) with conditions treated for long periods with acetylsalicylic acid (e.g., Kawasaki disease, juvenile rheumatoid arthritis, acute rheumatic fever, and others.** This therapy might increase the risk of Reye's syndrome after influenza.

The Advisory Committee on Immunization Practices (ACIP) and the CDC in the USA also include as "persons most susceptible to complications or death from influenza":

***"Women who will be in the second or third trimester of pregnancy during the influenza season (fall or winter)**

***"Children younger than 2 years of age"**

***The CDC also include people ≥ 50 year old**

1.1.3.1 Pregnant women

Women with influenza infection in their second and third trimesters of pregnancy are at increased risk of hospitalization for cardio-respiratory disorders. This is probably due to the increase in heart rate, stroke volume, and oxygen consumption observed in these months, as well as to decreases in lung capacity and changes in immunological function. Fatal influenza in pregnant women is characterized by the rapid development of cardiovascular and/or pulmonary insufficiency after several days of classical ILI. Fulminating viral or bacterial pneumonia may follow the initial viral infection. In some cases the virus has been isolated from the offspring.

An increase in mortality of pregnant women, miscarriages, premature births and stillbirths was documented during the 1918-1919 and the 1957-1958 pandemics. The reported mortality rate of pregnant women admitted to hospital with influenza in 1918 was 51.4% compared with 33.3% in hospitalized influenza patients from the general population. Mortality rates among these hospitalized women were higher if pneumonia was present, with a peak at 61% during the last month of gestation.

Influenza deaths in pregnant women represented 50% of all deaths in women of childbearing age, and 10% of deaths from influenza during the epidemics of 1957-1958 in New York City and Minnesota. These women experienced illness lasting 1-10 days and died from respiratory insufficiency associated with pulmonary edema and pneumonia (bacterial and/or viral). A review of 30 deaths from pneumonia and influenza in pregnant women in Massachusetts between 1954 and 1974 showed more fatalities towards the last trimester and early puerperium (no deaths occurred in the first trimester), and the risk was higher with increasing maternal age. Only four of the thirty women who died had underlying medical pulmonary or cardiac conditions.

During 17 inter-pandemic influenza seasons¹⁵⁹ the relative risk for hospitalization for selected cardio-respiratory conditions among pregnant women increased more than three times between weeks 14-20 and weeks 37-42 of gestation. The respective increased rates of hospitalization were 1.4 and 4.7 compared with women who were 1-6 months postpartum. Women in their third trimester of pregnancy were hospitalized at a rate comparable with that of non-pregnant women who had high-risk medical conditions (i.e., 250/100,000 pregnant women).

1.1.3.2 Elderly adults in long-term facilities

Excess hospitalization and death, and functional decline, occur in elderly individuals after epidemics of influenza. Community dwelling adults 65 years of age or older, and particularly frail elderly in long-term care institutions, are at increased risk of influenza complications.

Although influenza pneumonia and bacterial pneumonia following influenza are considered the main causes of influenza related hospitalization in the elderly, many influenza related hospitalizations are attributed to the exacerbation of chronic obstructive pulmonary disease or congestive heart failure following the viral infection

The symptoms and signs seen in older adults are similar to those in younger individuals, but most cases are characterized by the presence of dyspnea, wheezing, sputum production, and temperatures of 38°C. In addition, any unexplained acute deterioration in health status associated with fever, may be a manifestation of influenza infection in elderly individuals.

Influenza-like illness in older adults can also be caused by other viruses, mainly RSV or parainfluenza. RSV infections are an important cause of hospitalization and death of elderly individuals and it is impossible to distinguish between RSV and influenza on the basis of clinical manifestations alone.

1.1.4 Preexisting co-morbidity

1.1.4.1 Respiratory

Patients with chronic pulmonary conditions constitute the largest high-risk group, and the exacerbation of pulmonary diseases is the most frequent cause of hospitalization after influenza infection.

Among children and young adults asthma is the most common co-morbidity requiring hospitalization for complicated influenza; emphysema and COPD predominate in individuals older than 45 years, and chronic bronchitis is observed in all ages. Clinical studies have shown that influenza can trigger wheezing episodes in children with asthma. A decrease in mucociliary clearance and phagocytic function (with the consequent reduction in local defences and local immunity) are frequently observed after influenza infection, and can be particularly severe in patients with chronic bronchitis or COPD.

1.1.4.2 Cardiovascular

In several population studies, cardiac disorders were the most common co-morbidity reported as a cause of death in influenza patients. Deaths attributed to heart disease increase during the peak period of culture positive influenza, and precede by two weeks the peaks of pneumonia and influenza deaths.

Although pre-existing cardiovascular pathology is the most frequent cause of death in individuals older than 65 years, serious and sometimes fatal myocarditis may be a complication of influenza infection in otherwise healthy people.

1.1.4.3 Diabetes

Individuals 25 to 64 years old with diabetes were 3.7- 4.0 times more likely than those without diabetes to have pneumonia and influenza as a cause of death during influenza seasons. In addition, individuals 65 years old or older with diabetes were twice as likely to die from pneumonia and influenza than their non-diabetic counterparts. The elevated morbidity and mortality attributed to influenza in diabetics is expected, given the high risk of complications from respiratory infections in this group. Mechanisms of defence like phagocytosis and intracellular killing may be decreased in these patients. *Staphylococcus aureus* and *Streptococcus pneumoniae* are the most frequent causes of bacterial infection. In addition, combinations of risk factors increase mortality rates exponentially, and diabetes is frequently associated with secondary cardiac and/or pulmonary diseases and with immune impairment. Influenza infection may also provoke severe metabolic deterioration and ketoacidosis in diabetic patients, increasing the risks for complications of the diabetes.

1.1.4.4 Immunocompromised patients and patients with HIV

Influenza virus infections in immunosuppressed individuals and transplant recipients may be similar to the immunocompetent population. However, an extended clinical course and prolonged shedding of virus is more common in these patients, as well as more severe, life threatening, diseases.

***Persons Infected with HIV:** Influenza in AIDS patients is prolonged and more frequently associated with complications. In a cohort of young and middle-aged women HIV infected, the risk for cardiopulmonary hospitalization was higher during influenza seasons than during the peri-influenza periods. This risk was even higher than for women with other high-risk conditions, like chronic heart and lung diseases. Influenza-associated excess mortality was found for the adult and adolescent US population with AIDS during three influenza seasons.

Among persons aged 25-54 years, the risk for influenza-related death was estimated at 9.4-14.6/10,000 persons with AIDS compared with 0.09-0.10/10,000 in the general population, and 6.4-7.0/10,000 for persons older than 65 years. Deaths of AIDS patients due to pneumonia and influenza followed a seasonal pattern (and also a virus isolation pattern) with peaks in December-January, as in the general adult population. More than 90% of AIDS deaths occurred in the 25-54 years age group. The excess death rate in this age group was 81-155 times higher in AIDS patients than for the general US population in this age range, compared with the summer. These death rates are comparable and even higher than those seen in the general population 65 years or older. Other studies reported that AIDS patients experience more severe respiratory symptoms and prolonged duration of illness with an increased risk of complications.

***Immunocompromised children:** No prospective studies of influenza in immunosuppressed children or in children with AIDS have been published. It is known, however, that children with HIV commonly have severe and persistent viral respiratory infections, including influenza. Children with cancer receiving immunosuppressive therapy had similar clinical manifestations to control populations, but the duration of the disease was longer. In a study of transplant recipients, two of 19 patients developed severe infections, one child died and the second was febrile for 21 days with persistent virus isolation in respiratory secretions.

1.1.4.5 Other chronic illnesses, neoplastic diseases, renal diseases, etc.

Any patient suffering from a chronic disease that compromises the immune and/or metabolic homeostasis (other than the mentioned above) may develop complications of influenza. These include neoplastic diseases, renal diseases, hemoglobinopathies, some congenital diseases, and illnesses due to autoimmunity.

1.2 Complications of Influenza

Influenza can exacerbate underlying medical conditions (e.g., pulmonary or cardiac disease), lead to secondary bacterial pneumonia, or cause primary viral pneumonia. Influenza infection has also been associated with encephalopathy, transverse myelitis, Reye's syndrome, myositis, toxic shock syndrome, myocarditis, and pericarditis. Hospitalization rates for children aged 0-4 years ranged from approximately 100/100,000 for those without high-risk conditions to 500/100,000 individuals, for those with high-risk conditions respectively. Hospitalization rates are highest among children younger than 1 year of age and adults older than 65 years

Since the influenza A (H3N2) virus pandemic in 1968, influenza-associated hospitalizations have been highest during epidemics caused by type A(H3N2) viruses. Influenza-related deaths during influenza epidemics can result from pneumonia as well as from exacerbations of cardiopulmonary conditions and other chronic diseases. Older adults account for >90% of deaths attributed to pneumonia and influenza. Sudden deaths have also been observed during influenza epidemics.

1.2.1 Lower respiratory tract complications

Involvement of the respiratory tract is found in 10% of cases in individuals 5-50 years old and up to 73% after 70 year of age²¹⁰. Three different syndromes of severe pneumonia have been described as influenza-associated complications in adults and children. Additional presentations of viral and/or bacterial respiratory tract infection are also seen frequently during inter-pandemic outbreaks of influenza.

a) Primary viral pneumonia:

This is actually a manifestation of the disease at the more severe end of the spectrum. It occurs mainly in high-risk patients, although 25% of reported cases are in young healthy individuals, and 13% in healthy pregnant women. Primary viral pneumonia develops abruptly following the onset of influenza illness and progresses within 6 to 24 hr to a severe pneumonia with tachypnea, tachycardia, cyanosis, high fever (>39-40°C) and hypotension. The illness may progress to hypoxemia and death in 1-4 days. Frothy haemoptysis, tachypnea and cyanosis are poor prognostic signs.

Clinical, physiological and laboratory findings are not specific. Bilateral crepitant inspiratory crackles are frequent, as well as mottled densities and diffuse symmetrical interstitial infiltrates or areas of consolidation in the X-rays. The presence of cavitations or pleural infiltrates, suggests bacterial superinfection. The pathology reveals interstitial pneumonitis with severe hyperaemia, broadening of the walls of the alveoli with edema and exudates, intra-alveolar haemorrhage and hyaline membranes, infiltration predominantly mononuclear, and capillary dilatation and thrombosis. Autopsy specimens usually have high virus titres. Nonfatal cases recover 5 to 16 days after the onset of pneumonia, but require up to 4 months for resolution of the x-rays and residual lung damage is frequent.

Milder forms of influenza viral pneumonia involving only one lobe or segment have been described. This “localized viral pneumonia” is less serious than the primary pneumonia described above and is frequently confused with pneumonia due to *Mycoplasma pneumoniae*.

b) Combined viral-bacterial pneumonia

This is three times more common than viral pneumonia, from which it may be clinically indistinguishable. The symptoms usually appear later; chest x-rays frequently show cavitations or pleural effusion. The diagnosis requires isolation of pathogenic bacteria in the sputum or pleural fluid and the radiological findings. The most frequent agents are: *Streptococcus pneumoniae*, *Staphylococcus aureus* or *Haemophilus influenzae*. Mortality of viral or combined viral-bacterial pneumonia is ~10-12%. Some strains of *Staphylococcus aureus* have a synergistic effect with the virus and increased pathogenicity. Decreased leukocyte chemotaxis and tracheobronchial clearance increases the severity of bacterial infections and may lead to the development of fatal pneumonia and toxic shock syndrome (TSS) in healthy young individuals.

c) **Secondary bacterial pneumonia**

After initial improvement from viral infection (~ 4 days), the patient develops chills, pleuritic chest pain, increased productive cough and purulent or bloody sputum. Chest x-rays reveal local areas of consolidation and leukocytosis is common. The fatality rate is about 7%. These patients are more often elderly and have chronic diseases (i.e., pulmonary, cardiac, metabolic, etc.). Gram staining and culture of sputum usually show a bacterial pathogen, most frequently *Streptococcus pneumoniae*, or *Haemophilus influenzae*.

d) **Other pulmonary complications**

In children, pneumonia is less common, although bronchitis or bronchiolitis may also occur as manifestations of influenza infection. It may be difficult to distinguish influenza from RSV or parainfluenza infections. Croup associated with influenza A seems to be more severe, but less frequent than after parainfluenza or RSV210.

Acute exacerbation of chronic obstructive pulmonary disease is frequent seen with influenza infection and can result in permanent loss of function, mainly in elderly patients. Other diseases exacerbated by the virus are asthma and cystic fibrosis.

1.2.2 Otitis media and conjunctivitis

Any viral or bacterial infection of the upper respiratory tract, including influenza A and B, increases the likelihood of otitis media in children^{36,101}. Influenza A and B may cause otitis media either by direct viral invasion or by predisposing to bacterial superinfection. Little is known about influenza conjunctivitis, but the virus has been isolated from the conjunctiva in some patients.

1.2.3 Cardiovascular

Sudden death of young patients has been reported after influenza myocarditis or pericarditis, probably due to arrhythmia¹⁶⁷. Even though influenza primarily involves the respiratory system, 43% of patients with confirmed influenza A had transient electrocardiographic changes in one community with epidemic disease^{167,218}. During the Asian pandemic in 1957, one third of fatal cases with autopsies had signs of focal or diffuse myocarditis.

In a case study of nine patients with influenza-like symptoms and serological conversion for influenza A, cardiac involvement with increasing dyspnea was found after 4-7 days post infection. The ECG and echocardiography showed abnormalities and serum creatine kinase (CK) levels were increased. Two of the patients had fulminant myocarditis and a third patient died of pneumonia. The remaining six patients returned to normal left ventricular function.

Theories explaining the pathogenesis of viral myocarditis include direct invasion of the cardiac muscle, autoimmune mechanisms, or vascular damage. In some cases of myocarditis, the virus could be grown from heart tissue. The most frequent finding in adults, however, is the aggravation of pre-existing cardiac pathologies.

Atrial fibrillation is common in older patients, and myocardial infarction may occur following influenza infection.

1.2.4 Central Nervous System (CNS)

Influenza infection of the CNS has been associated with a wide spectrum of manifestations, from drowsiness and irritability to seizures and severe coma. Two specific syndromes have been described: a sometimes-fatal encephalopathy occurring at the peak of the disease, and occasional postinfluenzal encephalitis, seen 2-3 weeks after recovery.

There is high incidence of serious neurologic manifestations in children in Japan, that has not been observed in other countries. In 5 influenza seasons in this country, 64 infants and children were identified with influenza-related encephalitis or encephalopathy. Forty-three percent of these children died and 20% had neurological sequelae. Generalized vasculopathy was found in an autopsy. Another study identified 217 cases of encephalopathy/encephalitis in children in an epidemics of A H3N2 in Japan, 82.5% were younger than 6 years. Some of these cases were associated with acute necrotizing encephalopathy

Another complication associated with influenza is Reye's syndrome: acute encephalopathy with fatty micro-infiltration of the liver and liver failure. It has been described in children and adolescents younger than 18 years of age (most commonly in the 4-12 year range) with influenza and receiving acetylsalicylic acid (also after acetylsalicylic acid administration to children with chickenpox or other viral diseases). It is rare in adults. The classic presentation is a change in mental status, ranging from lethargy to delirium, seizures and respiratory arrest. The most frequent laboratory abnormality is the elevation of ammonia in blood, seen in almost all patients. As death is usually due to cerebral edema, lowering intracranial pressure is the most effective treatment. The recognition of the association of this syndrome with the use of acetylsalicylic acid lead to the recommendation for the use of other agents to manage children with influenza, and to a decrease in the number of cases.

Guillain-Barre Syndrome and myelitis have also been reported after influenza infections, but epidemiological studies supporting a causal association are lacking.

1.2.5 Muscular system

Acute rhabdomyolysis, with tender leg muscles and elevated serum CK occurs most frequently in children with influenza B infections; but it is also observed, occasionally, in adults or after influenza A infections. The course is usually benign, but sometimes-severe myonecrosis and myoglobinuria may lead to acute, occasionally fatal, renal failure. Influenza viruses have been recovered from affected muscles of some patients.

1.2.6 Systemic: Toxic shock syndrome

Toxic shock syndrome (TSS) is characterized by fever, hypotension, erythroderma followed by desquamation, and multiorgan failure. This syndrome is associated mainly with infections by *Staphylococcus aureus* and the production of an exotoxin (TSST-1 or

exotoxin B); group A *Streptococcus* may also be involved. TSS was originally associated with cutaneous and subcutaneous infections, and with menstruating and postpartum women. A link with post-influenza complications in previously healthy children and adults was found recently, after outbreaks of influenza A and B. The supposed pathogenic mechanism is a change in the colonization and replication of *S. aureus* (patients may be asymptomatic carriers of *S. aureus*) facilitated by the influenza infection. The patient may develop staphylococcal tracheitis or pneumonia and only a superficial infection of the tracheobronchial tree is required for the development of TSS.

1.2.7 Other

Another complication that has been related to influenza infection is the sudden infant death syndrome (SIDS), but a usual relationship has not been demonstrated.

Patient factors which may delay recovery from influenza infection and facilitate the development of influenza-related complications.

High-risk conditions: (Co-morbidity)

- *Age: 2 or 65 years
- *Pregnancy (2nd and 3rd trimesters)
- *Cardiovascular diseases: Congenital, rheumatic, ischemic heart disease, congestive heart failure
- *Bronchopulmonary diseases: asthma, bronchitis, bronchiectasis, emphysema, cystic fibrosis
- *Metabolic diseases: diabetes
- *Renal diseases
- *Malignancies
- *Immunodeficiency, AIDS, immunosuppression, transplant recipients
- *Diseases of the blood, anemia, hemoglobinopathy, oncologic disorders
- *Hepatic diseases, cirrhosis
- *Long-term salicylate therapy and younger than 18 years of age (Kawasaki disease, rheumatoid arthritis, acute rheumatic fever, others)

Complications of Influenza

Respiratory

- *Upper respiratory: Otitis media, sinusitis, conjunctivitis
- *Acute laryngotracheo bronchitis (croup)
- *Bronchitis
- *Bronchiolitis
- *Pneumonia: Primary viral, secondary bacterial, combined
- *Complication of pre-existing disease

Cardiovascular

- *Pericarditis
- *Myocarditis
- *Complication of pre-existing disease

Muscular _

*Rhabdomyositis

*Rhabdomyolysis with myoglobinuria and renal failure

Neurologic

*Encephalitis

*Reye's syndrome

*Guillain-Barre

*Transverse myelitis

Systemic

*Toxic shock syndrome

*Sudden death

COMPARATIVE FEATURES OF PULMONARY COMPLICATIONS OF INFLUENZA

	Primary Viral Pneumonia	Secondary Bacterial Pneumonia	Mixed Viral-Bacterial Pneumonia	Localized Viral Pneumonia
Setting	Cardiovascular Disease Pregnancy Young adult	65 years Pulmonary disease	Any, associated with influenza A or B	? Normal
Clinical history	Relentless progression from classic 3 day flu, rapid deterioration	Improvement and then worsening	Progression from classic influenza or biphasic pattern	Continuation of classic 3-day syndrome
Physical examination	Bilateral findings, no consolidation	Consolidation	Consolidation	Area of crackles
Sputum bacteriologic findings	Normal flora	Pneumococci <i>Staphylococcus aureus</i> <i>Haemophilus influenzae</i>	Pneumococci <i>Staphylococcus Aureus</i> <i>Haemophilus influenzae</i>	Normal flora
Chest x-ray infiltrate	Bilateral findings	Consolidation	Consolidation	Segmental
White blood cell count	Leukocytosis with shift to the left	Leukocytosis with shift to the left	Leukocytosis with shift to the left	Usually normal
Isolation of Influenza virus	Yes	Yes/No	Yes	Yes
Response to antibiotics	No	Yes	Often	No
Mortality	High	Low	Variable	Very low

Chapter 2. Patient Management I

2.1 Initial Assessment Management

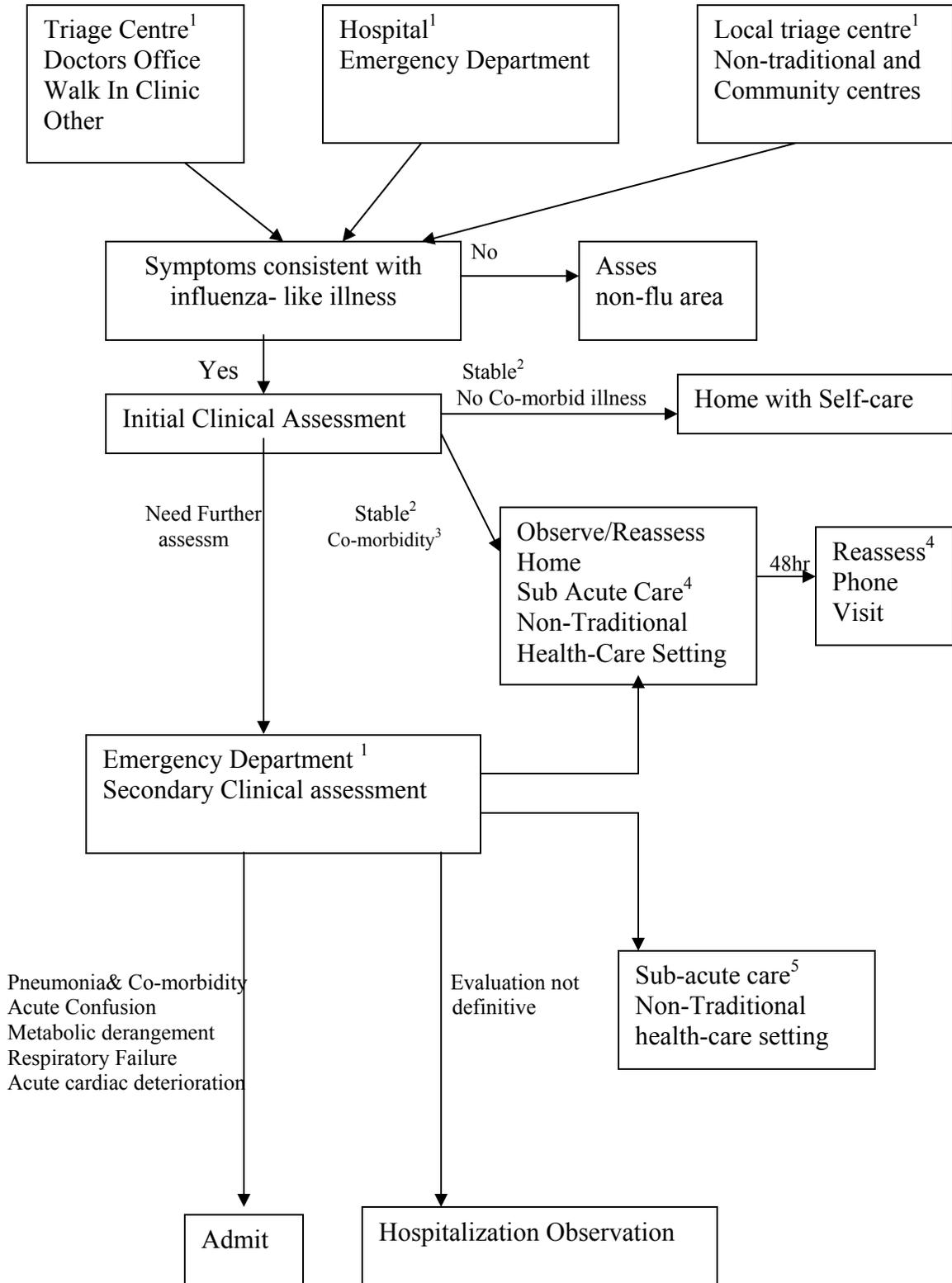
The algorithms shown in this chapter were designed to be used by healthcare staff and also by volunteers with minimal triaging experience to identify influenza patients who present to the health clinics, doctor's offices, emergency rooms, temporary emergency services, or other influenza triaging centres. Assuming that there will be a large number of cases and limited resources during a pandemic, the assessment guidelines are intended to evaluate the needs of each individual, and triage influenza patients efficiently in a crisis situation. Triage personnel will decide when patients can be managed in an ambulatory setting, redirected home, sent to an alternate care site, or admitted to an acute care hospital.

Two algorithms are included in this chapter, one for adults and adolescents, and a second for children. There is no clear age limit for the use of these algorithms. Depending on the age of the patient, place of consultation, and on the number of cases of influenza in a given community, young children and adolescents may be seen by personnel specialized in childcare or by the same staff and volunteers who assess the adult population. Nevertheless, influenza can be more severe in youngsters, and different criteria should be used to judge the seriousness of the illness in children.

Healthy seniors living in the community can be evaluated as other adults. Nevertheless, elderly individuals are also at increased risk for complications of influenza and those over 65 years of age should be monitored closely.

Management of patients/residents in long-term care facilities is also discussed. Because of their age and/or underlying medical condition, most individuals living in long-term care facilities are at increased risk for developing complications after influenza infection. In a pandemic situation it is expected that long-term care residents will remain in the long term care facility for treatment.

TRIAGE OF ADULTS (≥18 YEARS)



Legend:

1) Triage centres may be located at doctor's offices, clinics, and in non-traditional (NT) sites such as schools, churches, community centres, military field hospitals, etc. When possible, hospitals should assign a special "emergency" area for the triage, secondary assessment and treatment of influenza patients, avoiding the passage of these patients through the regular Emergency Department.

2) Stable: Patient with ILI but without abnormalities meeting the criteria for secondary assessment.

3) Co-morbidity:

*65 yr

*pregnancy

*chronic lung disease (e.g., chronic obstructive pulmonary disease, cystic fibrosis, asthma)

*congestive heart failure

*renal failure

*immunosuppression (due to underlying disease or therapy)

*haematological abnormalities (anemia, haemoglobinopathies)

*diabetes

*hepatic disease

*socially unable to cope (i.e., without personal support at home, such patients may need an alternative centre of care). An alternate care arrangement may also be considered if a high-risk individual lives in the same household as the influenza patient.

*Patients on long-term acetylsalicylic acid therapy (increased risk of Reye's syndrome).

4) Neighbourhoods should develop local plans for the support, assessment and control of influenza patients at home (e.g., "Flu-block" watch). Some individuals may not be able to self-care at home and will therefore need community support or an alternate care centre.

When possible, individuals from the same household should be kept together.

5) In addition to providing sub-acute care, some local NT sites may be able to handle patients more critically ill (Please see Non-traditional Site Guideline)

SYMPTOMS CONSISTENT WITH FLU LIKE ILLNESS**Clinical Case Definition:**

When influenza is circulating in the community, the presence of fever and cough of acute onset are good predictors of influenza. The positive predictive value increases when fever is higher than 38°C and when the onset of clinical illness is acute (less than 48 hours after the prodromes). Other symptoms, such as sore throat, rhinorrhea, malaise, rigors or chills, myalgia and headache may also be present. Any case definitions developed prior to the pandemic may need to be modified once the pandemic occurs. A history of contact with another patient with influenza-like illness or with an influenza case confirmed by the laboratory should be sought. If present, it is of diagnostic value.

Adults (≥18 years)**a) Systemic**

*Fever

*Chills

*Headache

*Aching muscles and joints

*Stiffness

*Weakness

b) Respiratory

- *Cough
- *Sore throat
- *Hoarseness
- *Stuffy or runny nose
- *Shortness of breath (patients with influenza and shortness of breath should undergo chest radiography)
- *Chest symptoms: thoracic pain when taking a deep breath, retrosternal tracheal pain, pleuritic pain
- *Red and/or watery eyes
- *Earache

c) Digestive (seen mainly in children and elderly)

- *Vomiting
- *Diarrhoea
- *Abdominal pain

d) Neurological

- *Confusion, drowsiness
- *Convulsions
- *Symptoms suggestive of meningitis (mainly in children)

INITIAL INFLUENZA ILLNESS ASSESSMENT (< 18 YEARS)

Primary Assessment	Results Requiring Secondary ASSESSMENT
Temperature ^a	<35°C or ≥39°C
Pulse	New arrhythmia (irregular pulse) >100 beats/min (if 16 years)
Blood pressure	<100 systolic Dizziness on standing
Respiratory rate	>24/minute (tachypnea)
Skin colour (lips, hands)	Cyanosis
Chest signs or symptoms ^b	Any abnormality on auscultation or chest pain
Mental status	New confusion ^c
Function	New inability to function independently ^c Persistent vomiting (≥2-3 times/24 hr.) ^d
Oxygen saturation ^e	90% room air

a High fever (39°C) in adults or in adolescents needs further assessment.

b Chest pain should always be investigated because it may be a sign of pneumonia (chest pain on inspiration), or may be a sign of cardiac failure. It may also appear as retrosternal pain (tracheal/bronchial pain) or as a pleuritic pain. When positive, it is an indication for secondary evaluation.

c A deterioration in level of consciousness or inability to function independently compared with previous functional status should be further investigated, particularly in elderly patients.

d Vomiting (≥2-3times/24hr.), particularly in elderly patients, requires further assessment.

e Determination of blood gases by pulse oximetry as sign of respiratory failure.

*If no abnormality and no co-morbidities are found: send home with instructions for self-care.

*If no abnormality, but co-morbidity: send home with instructions for self-care and with reassessment after 48 hr; or send to non-hospital domicile. Follow-up.

*Co-morbidities: >65 years, pregnancy, chronic lung disease, congestive heart failure, renal failure, immunocompromised, haematological abnormalities, diabetes, neoplastic disease, hepatic diseases, socially unable to cope (i.e., non supportive household).

*If secondary assessment is required, and the patients are sent to another centre/ward for complementary evaluation (see 2.1.3) each individual should be provided with a summary of the clinical/laboratory data. Some triage centres may have the facilities to perform secondary assessment and treatment without transferring patients.

Secondary influenza illness assessment (≥18 years)

When the patient's secondary assessment has to be completed in a different setting, a new clinical evaluation to confirm the diagnosis at the primary triage centre should precede laboratory studies. Not all the tests mentioned below will be needed for all patients, and clinical assessment should determine which procedures are done, particularly if resources are scarce:

Complementary laboratory studies	Results requiring supervision or admission
CBC (core battery, if appropriate) ^a	Hgb <80 g/l WBC <2,500 or >12,000 Bands ^b >15% Platelets <50,000/L
Electrolytes	Na <125 meq/L or >148 meq/L K <3 meq/L or >5.5 meq/L
BUN, creatinine	BUN >10.7 mmol/L Creatinine >150 μmol/L
Glucose	<3mmol/L or >13.9 mmol/L
CPK (only in patients with severe muscle pain)	CKMB >50% Total CK >1,000 μmol/L
Blood gases, O ₂ saturation (see Appendix 2.III)	Blood gases pO ₂ < 60 room air O ₂ saturation < 90% room air
Chest x-ray (CXR) ^a	Abnormal, consistent with pneumonia or with congestive heart failure
EKG (clinical criteria)	Evidence of ischemia, new arrhythmia

^a Under optimal circumstances, blood work and CXR should be obtained before admission. If resources are limited, priority should be given to patients with co-morbidity or suspected complications (i.e., pneumonia, etc.). Patients with normal gases and normal chest auscultation do not need CXR. Likewise, when the

clinical diagnosis of pneumonia is unquestionable and the resources are scarce, no CXR need to be taken unless there is suspicion of a complication of the pneumonia (i.e., empyema). If antibiotics are limited, however, CXR may be indicated to confirm pneumonia before prescribing any drug. Conversely, if pneumonia is suspected but the radiology resources are limited, antibiotics may be prescribed without radiological confirmation.

b An increase in the number of circulating neutrophil-bands (i.e., immature neutrophils, with an elongated, non-segmented nucleus) suggests bacterial infection. Mean normal values of bands are 12.4% (range 9.5-15.3%). In a typical acute bacterial infection, the ratio bands/segmented neutrophils may go up to values of 16-17%.

Microbiologic Diagnostic tests

Microbiologic diagnostic tests (bacteriologic and/or virologic) may be appropriate for secondary assessment. They will be performed depending on the clinical presentation and availability of resources. Once the pandemic strain is confirmed in a community, virologic tests will be needed only to confirm diagnosis in atypical cases and for surveillance purposes. Rapid tests are useful for diagnostic and treatment decisions (see Appendix 5.II). Isolation and culture of the virus is needed for surveillance purposes.

Ideally, purulent sputum will be analysed by Gram staining and culture to identify infecting bacteria and their susceptibility. In a pandemic, these studies should be reserved for patients admitted to hospitals, especially those in intensive care or those failing initial antibiotic therapy. If culture is not possible, Gram staining should be attempted.

Ideally, blood cultures should be obtained prior to antibiotic therapy in patients with pneumonia. If resources are scarce, blood cultures will be reserved for patients who are very ill, with toxic signs and low blood pressure; for patients who fail to recover after 48 hours of treatment with antibiotics; or for patients admitted to intensive care units.

Sample	Test
Sputum (purulent)	Bacteriologic: Gram and culture
Blood (only for very ill patients or for patients who do not respond to 48h of treatment with antibiotics)	Bacteriologic: Culture
Nasopharyngeal aspirate (only for atypical cases or for surveillance)	Virologic: Virus antigens, RNA, culture

Instructions for self-care of subjects sent home (≥18 years)

No co-morbidity:

*Acetaminophen (adults or children), ibuprofen or acetylsalicylic acid (adults only), to treat myalgia and arthralgia¹.

*Fluids

*Bed rest

*Drink hot liquids

*Decongestants

*Do not smoke or expose to second hand smoke

*Seek help if:

- Increasing shortness of breath
- New pleuritic, chest pain
- New purulent sputum
- Persistent vomiting

Co-morbidity: in addition to above

*Supervision (family, friends, allied health, nurse)

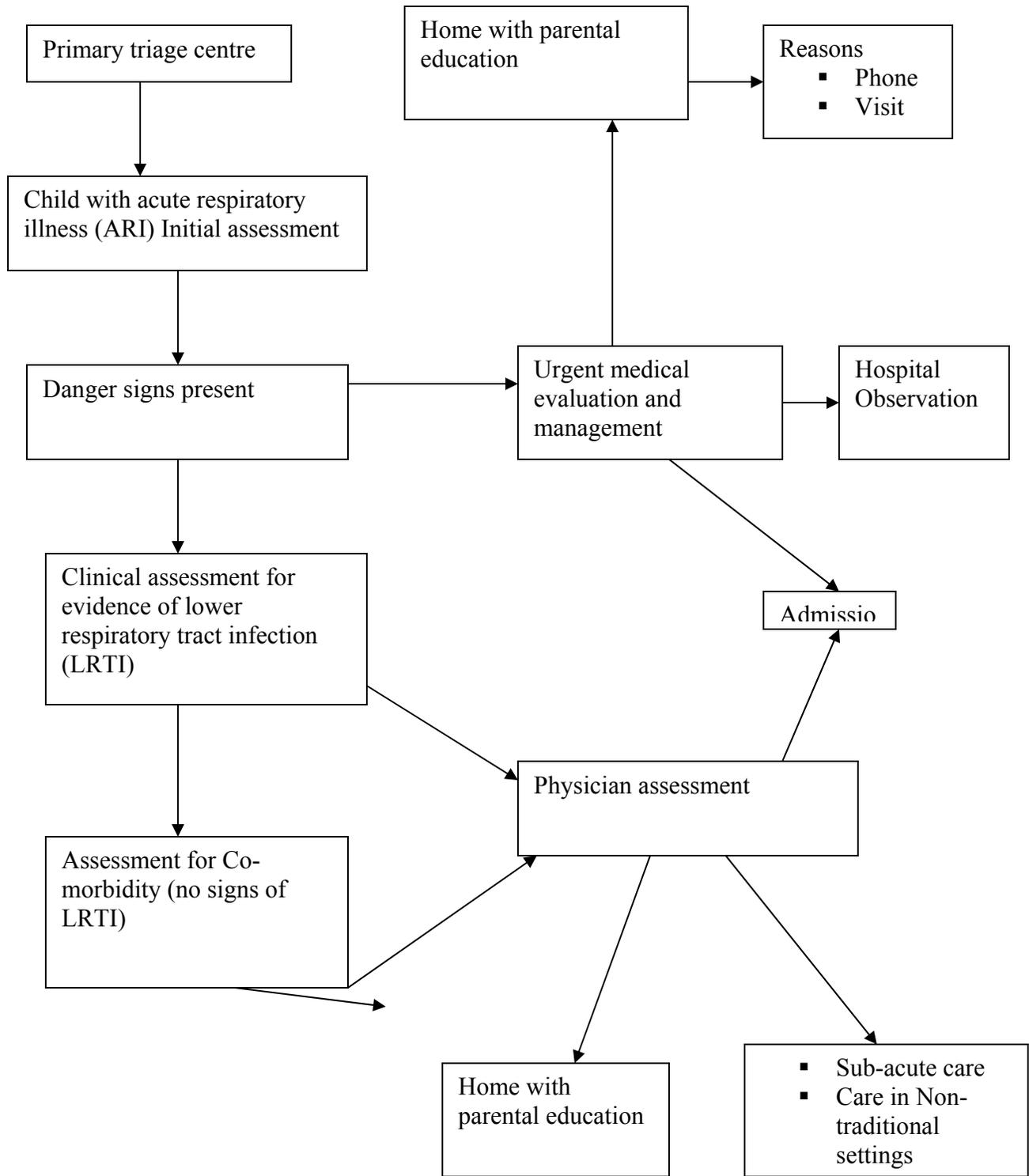
*Antiviral therapy (if seen before 48 hours of onset, contingent on pandemic priorities)

*Follow-up after 48 hours by phone call/ health care worker visit\

¹ A syndrome characterized by acute encephalopathy with fatty micro-infiltration and liver failure, **Reye's syndrome**, has been described in children and adolescents younger than 18 years of age (most commonly in the 4-12 year range) with influenza and receiving acetylsalicylic acid (ASA) e.g., Aspirin^{15,105,129,151,5}. The classic presentation is a change in mental status, ranging from lethargy to delirium, seizures and respiratory arrest. The recognition of the association of this syndrome with the use of acetyl salicylic acid to treat viral symptoms, lead to the recommendation for the use of other agents and a decrease in the number of cases.

2.2 Pediatric Triage

This algorithm was designed to help medical and healthcare staff, as well as lay persons with minimal knowledge and experience, to manage children with influenza-like illness during a pandemic. Triage centres may be located at the doctor's offices, clinics, hospitals, and in non-traditional care settings (schools, churches, community centres, military field hospitals, etc). The numbers in each of the following boxes refer to sections within this document where additional information can be found.



Child with acute respiratory illness (ARI) (i.e., one respiratory symptom and fever)

The most common presentation of influenza in children is fever and cough of sudden onset. The term ARI is preferred for children since most distinguishing features in adults are not characteristic in children until the second decade. Young infants (less than 2 months old) can become ill and progress to severe illness rapidly. They are much less likely to cough with pneumonia and frequently have only non-specific signs such as poor feeding, apnea, and fever or low body temperature.

Systemic:

- *Fever (38°C core temperature)
- *Apnea

Respiratory symptoms:

- *Cough,
- *Nasal congestion and/or rhinorrhea (second most common presentation),
- *Difficulty breathing (including chest retractions, stridor, etc.)
- *Fast breathing² (tachypnea)
- *Hoarse voice
- *Earache

² Definitions of fast breathing (tachypnea)

- < 2 months = >60 breaths per minute
- 2-12 months = >50 breaths per minute
- > 12 months to 5 years = >40 breaths per minute
- 5 years = > 30 breaths per minute
-

Associated non-respiratory symptoms:

- *Not feeling well, malaise
- *Low energy, lethargic
- *Not playing,
- *Needing extra care
- *Poor feeding
- *Vomiting, diarrhoea
- *Irritability, excessive crying, fussy

Initial influenza illness assessment (<18 years)

Primary Assessment	Results Requiring Secondary ASSESSMENT
Temperature ^a	<35°C or ≥39°C
Respiratory rate	< 2 months = >60 breaths per minute 2-12 months = >50 breaths per minute >12 months to 5 years = >40 breaths per minute > 5 years = > 30 breaths per minute
Skin colour and temperature (lips, hands)	Cyanosis, sudden pallor, cold legs up to the knee
Chest signs and symptoms ^b (pain may be difficult to detect in young children)	Chest indrawing, wheezing, grunting, inquire for chest pain
Mental status	Lethargic or unconscious, confused ^c
Function	Unable to breastfeed or drink, persistent vomiting (>2-3 times/24 hr.) ^d Inability to function independently ^e
Neurologic symptoms and signs	Convulsions, full fontanelle, stiff neck, photophobia
Oxygen saturation	<90% room air

a For indications about types of thermometers and how to take the temperature see Appendix 2.I. High fever (39° C) in adolescents is a warning sign and needs further assessment.

b Children with ARI and chest pain should always have medical evaluation, since it may be a sign of pneumonia (chest pain on inspiration). It may also appear as retrosternal pain (tracheal/bronchial pain) or as a pleuritic pain.

c A deterioration of consciousness and functional status, lack of interest in playing and inappropriate sleepiness should be further investigated.

d Vomiting (>2-3 times/24 hr.), particularly if the children are not feeding or drinking well, requires secondary assessment.

e Determination of blood gases by pulse oximetry as sign of respiratory failure (see Appendix 2.III)

Note: If the child must be transported for secondary assessment (see 2.1.3) a summary of the clinical/laboratory data should accompany the patient. Some triage centres, however, may have the facilities to perform secondary assessment and treatment without moving the patients.

Danger signs (paediatrics): (2 months to 5 years old)

- * Difficulty breathing (chest indrawing or nasal flaring or grunting or stridor or fast breathing)
- *Cyanosis
- *Unable to breastfeed or drink
- *Vomiting everything (continuous vomiting)
- *Lethargic or unconscious or confused
- *Convulsions/seizures
- *Full fontanelle
- *Stiff neck, photophobia

When these danger signs are present in infants younger than 2 months, they suggest very severe disease and may be life threatening. These children should always be referred immediately for physician assessment. Additional danger signs in children under 2 months include:

- *The child stopped feeding well (less than half of the usual amount of fluids)
- *Fever or low temperature (high fever can represent a serious infection, but low temperature may also be present)
- *Wheezing
- *Grunting or stridor when calm
- *Severe chest indrawing
- *Abnormally sleepy or difficult to wake
- *Poor circulation: sudden pallor, cold legs up to the knees
- *Less than four wet diapers in 24 hours
- *Signs of pneumonia (pneumonia in young infants is considered very serious and these children should be referred urgently to a hospital for evaluation)

Urgent medical assessment (paediatrics)

While a primary care provider may give first aid, children with danger sign must be seen by a physician.

Secondary assessment (<18 years)

When the patient’s secondary assessment has to be completed in a different setting, a new clinical evaluation to confirm the primary assessment should precede laboratory studies. Not all tests will be needed for all patients, and clinical judgement should be used, particularly if resources are scarce.

Complementary laboratory studies	Results requiring supervision or admission
CBC (core battery, if appropriate) ^a	Hgb ^b <8.0 g/dL WBC ^c <2,500 or >12, 000 cells/l Bands ^d >15% Plateletse <50,000/l
Electrolytes	Na ^f <25 meq/L or <148 meq/L K ^f <3 meq/L or >5.5 meq/L
BUN, creatinine	BUN ^f 0.7 mmol/L Creatinine ^f 50µmol/L
Glucose ^f	<3mmol/L or >13.9 mmol/L
CPK ^f (only in patients with severe muscle pain)	CKMB 50% Total CK 1 ,000µmol/L
Blood gases, O2 saturation	Blood gases pO2 <60 room air O2 saturation <90% room air
Chest x-ray (CXR) ^a	Abnormal, consistent with pneumonia

Legend:

a) Under optimal circumstances, blood work and CXR should be obtained for all patients before admission. When resources are restricted, priority should be given to patients with co-morbidity or suspected complications (i.e., pneumonia, etc.). Similarly, when the clinical diagnosis of pneumonia is definite and resources are scarce, no CXR is needed, unless there is suspicion of a complication of the pneumonia (i.e.,

empyema). When antibiotics are limited, CXR may be an indication to confirm pneumonia before prescribing any drug and, if pneumonia is suspected but the resources for CXR are in short supply, antibiotics may be prescribed without radiological confirmation.

b) Values of haemoglobin for young children are age related. Normal values for different ages are:

Age	Haemoglobin g/dL	Reference values (SI) mmol/l
1-3 days	14.5 - 22.5	2.25 - 3.49
2 month	9.0 - 14.0	1.40 - 2.17
6 - 12 years	11.5 - 15.5	1.78 - 2.40
12 - 18 years (M)	13.0 - 16.0	2.02 - 2.48
12 - 18 years (F)	12.0 - 16.0	1.86 - 2.48

c) Values of WBC for young children are age related. Normal values for different ages are:

Age) Reference values (SI) 10 ⁹ cells/L	Cells/_ L (limits	Reference values (SI) 10 ⁹ cells/L
Birth	9,000 - 30,000	9.0 - 30.0
24 h	9,400 - 34,000	9.4 - 34.0
1 month	5,000 - 19,500	5.0 - 19.5
1-3 years	6,000 - 17,500	6.0 - 17.5
4-7 years	5,500 - 15,500	5.5 - 15.5
8-13 years	4,500 - 13,500	4.5 - 13.5
> 13 years	4,500 - 11,000	4.5 - 11.0

d) In a typical acute bacterial infection, the ratio bands/segmented neutrophils may increase up to 16-17%. Mean values of bands in normal individuals are 12.4 % (range 9.5-15.3%).

e) Normal values for children older than one week are the same as for adults.

f) Values normal for infants/children.

Analyte	Age ranges	Normal values
Sodium	Infants Children Thereafter	139 - 146 mmol/L 138 - 145 mmol/L 136 - 146 mmol/L
Potassium	< 2 months 2 - 12 months > 12 months	3.0 - 7.0 mmol/L 3.5 - 6.0 mmol/L 3.5 - 5.0 mmol/L
BUN	Infant/child	1.8 - 6.4 mmol urea/L 2.5 - 6.4 mmol urea/L
Creatinine Infant	Infant Child Adolescent	18 - 35 μmol/L 27 - 62 μmol/L 44 - 88 μmol/L
Glucose	Child	3.3 - 5.5 mmol/L

Microbiologic Diagnostic tests

See adult assessment

Clinical assessment for evidence of LRTI (paediatrics)

a) Clinical assessment

- *Crackles
- *Wheeze
- *Tachypnea (fast breathing), use of accessory muscles
- *Consolidation
- *Poor air entry

Any young infant (< 2 months) with pneumonia has a severe, life threatening infection. The most important signs to consider when deciding if a young infant has pneumonia are:

- *Breathing rate (60 times/minute)
- *Severe chest indrawing, use of accessory muscles

b) Secondary assessment (laboratory):

- *Chest radiograph (CXR)
- *Respiratory tract specimen for diagnosis (e.g., nasopharyngeal aspirate, sputum on children over 7 years of age)
- *Blood work
- *Other diagnostic tests (as required).

Determine if patient has co-morbidity of concern

(No evidence of lower respiratory tract infection).

Patients at “high risk for complications from influenza” include:

- *Chronic cardiac or pulmonary disorder (bronchopulmonary dysplasia, cystic fibrosis, asthma) severe enough to require regular medical follow up or hospital care,
- *Chronic conditions such as diabetes and other metabolic diseases,
- *Cancer,
- *Immunosuppression (due to underlying disease and/or therapy),
- *Renal disease,
- *Anaemia, hemoglobinopathy,
- *Residents of chronic care facilities,
- *Patients on long-term acetylsalicylic acid therapy (increased risk of Reye’s syndrome).

Asthma and diabetes are the most frequent co-morbidities found in young children. Premature babies and low-weight infants should also be included in this list. All children younger than 2 years of age may be considered as high-risk patients.

Socio-economic issues such as age and education of the parents, single parents, multiple young siblings, support at home by other family members, etc., should also be taken into account when sending a child back home. Similarly, whether other individuals at home have high risk of influenza associated complications (siblings with chronic diseases, elderly grandparents, etc.) should be evaluated.

Children at risk for influenza-associated complications (no signs of LRTI). Consider physician assessment to determine eligibility (in agreement with the pandemic guidelines) for:

*Antiviral therapy (within the framework of antiviral prioritization for pandemic influenza, Appendix 5.III).

*Stopping ASA³

*Immunization of patient and family if not already done (according to the pandemic guidelines).

*Plan follow up

*Setting for care (admission, home, institution etc). When possible, members of the same household should be kept together.

Parental/patient education

Children without co-morbidities presenting with uncomplicated influenza infection may be sent home with parental education regarding:

*Maintaining hydration

*Fever management (avoid salicylic acid³)

*Watching for signs of deterioration, failure to improve

*When to return

*Follow up plan if necessary

*Mothers of young infants should be told to return to the health centre immediately if the child worsens or does not feed well, or if breathing becomes difficult.

*Immunization/prophylactic treatment of high-risk contacts in the household (abide by existing pandemic guidelines).

*Infection control practices such as avoiding close contact with others and paying attention to hand hygiene, proper disposal of tissues, etc.

See Appendix 2.I.: CARING FOR YOUR-SELF: “When a child is unwell” and “how to take a child’s temperature”.

³ A syndrome characterized by acute encephalopathy with fatty micro-infiltration and liver failure, **Reye’s syndrome**, has been described in children and adolescents younger than 18 years of age (most commonly in the 4-12 year range) with influenza and receiving salicylates (ASA). The classic presentation is a change in mental status, ranging from lethargy to delirium, seizures and respiratory arrest. The recognition of the association of this syndrome with the use of acetyl salicylic acid to treat viral symptoms, led to the recommendation for the use of other agents and a decrease in the number of cases.

Appendix 2.I. Caring For Your Self

I. Staying Well

A. Be Informed About Influenza

What is Influenza?

Influenza (flu) is an infection of the cells that line the lungs and airways (the respiratory system). In North America it usually affects people during the winter (November - April). It is caused by one of three types of viruses - Influenza A, Influenza B, and Influenza C. Influenza A usually causes the worst illness, Influenza B is more common in children and Influenza C is rare. **Only influenza A has been associated with pandemics.**

The influenza viruses that circulate every winter are related to those from the preceding epidemics. These viruses spread among people with varying levels of immunity (body defences) following infections earlier in life. Over a period of 2 or more years, this circulation promotes the selection of new viruses that have changed enough to again cause epidemic infection among the general population.

At unpredictable intervals, **“novel influenza viruses emerge, which are totally different from strains circulating the year before. If such viruses have the potential to spread readily from person-to-person, then more widespread and severe epidemics may occur, usually to a similar extent in every country within a few months to a year, resulting in a pandemic.”**

How is Influenza Spread?

Influenza is very contagious. People can pass the virus for up to seven days or more, beginning from the day before they have the first symptoms of the illness. People breathe-in the virus from particles in the air when they are around those who have the flu and who have been talking, coughing, or sneezing. The virus can travel from 1 - 2 meters in the air, and can live several hours on your hands and surfaces. People can also become infected when they touch those who are ill (e.g., kiss them or shake their hand), or contact objects on which viruses have landed (e.g., telephones, door knobs, dishes, handrails), and then touch their own nose, mouth or eyes. It is especially easy for the virus to spread where there are crowds or where people live or work/study close together. The flu virus lives longer in cool, dry places. It can live for one or two days on hard surfaces, and 8-12 hours on cloth, tissue and paper.

What are the Symptoms of Influenza?

A person develops symptoms of the flu within one to three days after becoming infected with the virus. They suddenly develop a fever and possibly chills, and may have a headache and aching muscles, especially in the back and legs. They usually have a dry cough and feel weak and tired. Some people have a sore throat and a runny or stuffy nose. They probably won't feel like eating. In general, people feel very sick and want to stay in bed. The fever usually falls in three to five days, and the person begins to feel better. However, tiredness and a cough can sometimes continue for several weeks.

People often mistakenly refer to stomach upsets and colds as “the flu”. Influenza is quite different from both of these. It rarely causes vomiting and diarrhoea, but may do so in young children or elderly individuals. Unlike influenza, the common cold comes on gradually, rarely causes a fever, and is usually limited to a sore throat, coughing and sneezing, and a stuffy, runny nose. It is generally milder than influenza and people can carry on with their usual activities.

How Serious is Influenza?

Most healthy people recover from influenza without any serious problems. However, there are certain groups of people who are “at risk” of developing complications which can be very serious, and even cause death.

Some people, such as very young children and the elderly, are “at risk” because they have weaker body defenses (immune systems). Pregnant women, particularly those who are in the second and third month of their pregnancies, have also increased risks of pneumonia, lung insufficiency, and death after influenza infections. Similarly, those with diseases such as cancer and HIV/AIDS, people who have had organ transplants and persons who take certain medications frequently develop complications.

Another group of people “at risk” are those who have chronic (long term) conditions such as heart disease, lung disease (asthma, cystic fibrosis, emphysema), kidney disease and diabetes. When a body system is not strong, it is easier for bacteria to invade the cells that have been damaged by the flu virus and cause other illnesses such as pneumonia. Influenza can also stress the body so much, that the underlying chronic illness may be worsened.

Children under the age of eighteen years and who have influenza **should avoid taking acetylsalicylic acid (ASA), e.g., Aspirin**, because they can develop a very serious illness affecting the nervous system and liver, called Reye’s syndrome. It is important for parents of children who need to take ASA on a regular basis for a health problem, to discuss possible complications associated with influenza with their doctor, and find out what they can do to reduce the risk.

For More Information

If there is an outbreak of pandemic influenza in your community, watch the television or listen to the radio for up to date information.

If you have questions about somebody in your household that may have the flu, call the Health Centre in your area.

B. Protect Yourself Against Influenza Immunization

Vaccination is the best way to avoid or to lessen the severity of influenza.

Vaccination is advised once a vaccine with the pandemic strain becomes available. Priorities for vaccination, including the types of individuals that should be immunized

first if vaccine supply is limited, have been identified in the Trinidad and Tobago Pandemic Influenza Plan and will be confirmed at the time of a pandemic.

Who Should Get the Flu Vaccine?

Vaccine supply may be limited during the early stages of the pandemic; therefore the Pandemic Influenza Committee (PIC) will define priority groups, which should be immunized first. This prioritization will evaluate the impact that the vaccine may have on: a) reducing morbidity and mortality by maintaining the health services response, and by individual protection of high-risk groups, and b) minimizing societal disruption by maintaining essential services (as stated in the pandemic guidelines, Vaccines section).

Call the Public Health Centre in your area to learn about vaccine availability and to find out if any of the members of your household belongs to a priority group. They will also inform you where they are holding “Flu Clinics” for immunization. Some doctors may provide the vaccine to their patients. Two shots may be required (as per pandemic guidelines).

The vaccine is safe for pregnant women, breast-feeding mothers and children. It is not effective for children under the age of 6 months.

Who Should NOT get the Flu Vaccine?

People who are severely allergic to eggs should not receive the vaccine, as viruses used in making the vaccine are grown in eggs. Rarely, a person has had an allergic reaction to some other ingredient in the vaccine - a raised itchy rash, swollen throat or tongue, red itchy eyes or possibly a swollen face within 12 hours of getting the injection. These people should not be vaccinated again.

If a person is “at risk” for getting serious complications from influenza and cannot be vaccinated, their doctor may wish to prescribe an antiviral drug to give them some protection during the pandemic. Antivirals stop the flu virus from multiplying. It is a good idea to ask your doctor about this medication, if you are allergic to the vaccine. He/she will need to consider your medical problems, available medications (the Pandemic Influenza Committee will also define priority groups, if antivirals are in short supply), and possible side effects of the drug.

Doctors may also prescribe antivirals for:

1. People at high-risk even though they were vaccinated, if they need extra protection,
2. People who were vaccinated after the virus was present in the community, and need to be protected for the two weeks required for a response to the vaccine.
3. The public at large, if there is a pandemic and the vaccine with the pandemic strain is not available or is insufficient.

If a person has a minor illness, they can still get the flu shot. However, tell your doctor if you have a temperature of 37.8°C (100°F) or more or if you have other symptoms.

What Reactions do People have to the Flu Shot?

Some people think that they will get the flu from the flu shot. This is not possible, because the virus in the vaccine has been killed. The most common reaction to the flu shot is some redness and soreness where the needle entered the skin. This is usually gone in two days. Some people may develop a fever, tiredness and aching after six to twelve hours that may last for a day or two. More serious reactions are rare. The benefits and risks of this vaccine should be discussed with your vaccine provider as part of the informed consent process.

Hygiene

In addition to getting vaccinated, the single most important step people can take to prevent the flu is to wash their hands often.

Wash your hands often, especially after being in contact with someone who has a respiratory infection, or with children who get the virus easily and are the main spreaders of the virus in the community. Do not shake hands. It is good for everyone to get into the habit of washing their hands before meals, after using the toilet, and after they cough or sneeze or blow their nose. The sooner children are taught this, the better. It is best to wash your hands with warm soap and water, scrubbing your wrists, palms, fingers and nails for ten to fifteen seconds. Rinse and dry with a clean dry towel.

Be aware of the times you rub your eyes or touch your nose or mouth, and try to avoid these habits. This can bring the virus into your airways, if you have recently touched someone who has the flu, an object that they have used, or a surface on which the virus has settled.

Remember not to share eating utensils or drinks.

Don't visit people who have the flu unless it is absolutely necessary. If a member of your family has the flu, keep their personal items, such as towels, separate from the rest of the family. Clean surfaces (such as bathroom sinks and taps, kitchen sinks and counters) after the ill person has handled them. Wash hands after cleaning a child's nose.

Avoid large crowds.

Care for Your Self

Taking good care of yourself physically and emotionally strengthens your overall well being and the ability of your body to fight off infections and to stay healthy. Not smoking is particularly important for the health of the lungs and airways, and drinking plenty of water helps to keep the airways moist and able to cleanse the system of unwanted material.

C. Plan Ahead

Spend a little time thinking about what you would need if you got the flu.

If you live alone, or are a single parent of young children, or are the only person caring for a frail or disabled adult, it might be a good idea to:

*Have enough fluids (juices, soups etc.) on hand to last you and your family for 1-2 weeks.

*Have enough basic household items (e.g., tissues) to last for 1-2 weeks.

*Have acetaminophen and a thermometer in your medicine cabinet. Do you know how to use/read a thermometer correctly? If not, don't be shy about asking someone to show you how.

*Think of someone you could call upon for help if you became very ill with the flu and discuss the possibility with him or her.

*Think of someone you could call upon to care for your children if their school or daycare was closed because of the pandemic, and you were required to work, and discuss the possibility with them. If you cannot think of anyone who could help you in such a situation, you can call the Public Health Centre in your area to find out what is available in the community to help with these difficulties.

II If You Are Unwell

A. Is It The Flu?

The most prominent characteristics of the flu are the sudden appearance of a fever (38°C or 100.4°F or more), a dry cough and aching in the body, especially in the head and lower back and legs. Usually the person feels extremely weak and tired and doesn't want to get out of bed. Other symptoms can be chills, aching behind the eyes, loss of appetite, a sore throat and a runny, stuffy nose. After your symptoms first appear you can spread the virus to others for 4-6 days or more.

B. What Can You Do For Yourself?

***Rest** - Probably, you will feel very weak and tired until your temperature returns to normal (about three days), and resting will provide comfort and allow your body to use its energy to fight the infection. You should avoid contact with others while the infection is contagious (at least six days after the first symptom appears).

***Drink plenty of fluids** - Extra fluids are needed to replace those lost because of the fever (sweating). If your urine is dark, you need more to drink. Liquids, especially warm ones like chicken soup, help loosen mucus. Try to drink a glass of juice/water or an equal amount of some other fluid every hour while you are awake.

***Take acetaminophen or ibuprofen** as recommended on the package to bring down your fever and ease your muscle pain (unless your doctor says otherwise). **CHILDREN UNDER 18 YEARS OF AGE SHOULD NOT TAKE ACETYLSALICYLIC ACID (ASA) OR ANY PRODUCTS CONTAINING ASA.** The combination of influenza and ASA in this age group has been known to cause Reye's syndrome, a very serious condition affecting the nervous system and liver. **ANTIBIOTICS ARE NOT EFFECTIVE AGAINST INFLUENZA** because it is a virus, and antibiotics fight bacteria. A hot water bottle or heating pad may also relieve muscle pain. A cup of Epsom salts in a warm bath may be soothing.

***Gargle** - with a glass of warm water to ease a sore throat. Sugarless hard candy also helps, as do lozenges.

***Use saline nose drops or spray** (ones that contain salt water but no medicine) to help soothe or clear a stuffed nose. Try not to blow your nose as this could send infected

secretions into your sinuses. Wipe your nose with disposable tissues and put them in the garbage can immediately. Cover your nose and mouth with tissues when you cough or sneeze and throw them in the garbage as well. **Wash your hands often.**

***Do not smoke** - it is very irritating to the damaged airways.

***If you are a single parent, or you are responsible for the care of someone who is frail or disabled, you may need to call someone to help you until you are feeling better.**

*If you buy medicine at the drug store to treat your symptoms (“over-the-counter” medications), check with the pharmacist to see if it is the best one for you. Mention if you have a chronic illness or are taking any other medicine. Take into consideration that:

*It is better to buy a remedy that treats only one symptom. This way you are not taking in substances that are doing nothing, or that may trigger an adverse reaction.

*Read the label to be sure that the ingredient treats the symptom you have.

*Extra strength remedies contain a higher dose of the ingredient. Try the standard dose first. It may work fine and not have the same risk of side effects.

*Long acting medications tend to have more side effects than short acting medications.

*Read the label and note any possible side effects or interactions with other drugs or health conditions.

*If you have a chronic condition and are taking prescription medications, it is a good idea to ask the pharmacist to suggest a medication that would be safe for you to take, if you have not already discussed this with your doctor.

Muscle pain and fever - Acetaminophen is a good choice because it causes less stomach irritation than other drugs. **Acetylsalicylic acid should not be given to children under the age of eighteen.**

A cough can be helpful if it gets rid of mucus. If a dry cough is keeping you awake, a cough suppressant, Dextromethorphan is safe and effective. If you need help loosening mucus, an expectorant such as Guaifenesin is good. It is not helpful to take a suppressant and an expectorant together.

A stuffy nose - Decongestants help shrink swollen blood vessels in the nose. There are two kinds pills and nose drops/sprays. Nose drops/sprays act in minutes. They work better and have fewer side effects than the pills. However, *they only work for 2 or 3 days, and then they make matters worse.* Oxymetazoline, Phenylephrine and Xylometazoline are nose drops/sprays. If your nose is still stuffy after three days, you may want to switch to the pills. The pills take 1/2 hour to work. They may cause dry mouth, sleep disturbances and other sideeffects. Pseudoephrine is a decongestant in pill form.

Sore throat - Some medications work by numbing the throat, Dyclonine works the best. Others are Benzocaine, Hexylreorcinol, Menthol and Phenol. These are lozenges or throat sprays. Other lozenges act by coating the throat. They may contain honey, herbs or pectin.

Ingredients to avoid:

*Phenylpropanolamine (PPA) has been linked with strokes.

Note: Older people may become much more sensitive to medications in general and may experience more side effects, especially to the nervous system (e.g., confusion). It is best to take no more than three or four medications at a time. This includes both prescription and over the counter drugs.

If you have any questions at all about medications, don't hesitate to talk to your pharmacist.

Generally, people begin to feel better after their temperature returns to normal, in about three days, and are ready to return to their normal activities/work in about a week. It is common for tiredness and a cough to linger on for several more weeks.

C. When To Seek Medical Attention

If you are a normally healthy person **and have been suffering with the flu, it is time to call the doctor, EMS or health help line if:**

- *You become short of breath while resting or doing very little;**
- *Breathing is difficult or painful;**
- *You are coughing up bloody sputum;**
- *You are wheezing**
- *You have had a fever for three or four days and you are not getting better - or you maybe getting worse;**
- *You have started to feel better, and suddenly you get a high fever and start to feel sick again;**
- *It is noted by yourself or others that you are extremely drowsy and difficult to wake up or that you are disoriented or confused;**
- *You have extreme pain in your ear.**

Seek medical care as soon as possible, in order to prevent your condition from worsening. Bacteria may have invaded your damaged tissues. At this point your doctor may consider giving you an antibiotic.

If you have heart or lung disease or any other chronic condition that requires regular medical attention, if you are frail, or if you have an illness or are on treatments or medications that affect your immune system and you get the flu, call your doctor. If you are living with a long-term illness, your doctor may suggest changes to your usual management routine and/or provide you with extra help in treating the flu and preventing complications e.g., antiviral drugs. **These medications must be taken within 48 hour of the first symptoms to be effective so call your doctor right away.**

What your Doctor May Prescribe:

Recently, drugs called antivirals have been developed which can fight viruses. ***To treat influenza, they must be started within 48 hours of the first symptoms of the flu – the sooner, the better.***

At the time of a pandemic, antivirals will likely be in short supply. The Ministry Health will provide advises as to who should get antivirals as a priority. For example, persons with underlying chronic diseases may be one of the first groups to receive treatment with antivirals. If you are in a priority group and you have symptoms of the flu, you should call your doctor straight away. If you are a healthy person and have not been identified as being in a priority group for antivirals, you do not need to call your doctor unless you have the more severe symptoms listed above.

D. When A Child Is Unwell

Older children and teens have the same symptoms of the flu as adults. Very young children and infants probably have similar symptoms, but do not know how to tell people they have sore muscles or a headache. These children may be irritable and eat poorly. They sometimes develop a hoarse cry and barking cough (croup). Younger children may also have diarrhoea, vomiting and stomach pain - especially children under 6 months.

Some of the things you can do for your child are:

*Give acetaminophen or ibuprofen every four to six (ibuprofen) hours for the fever in the dose recommended on the package (unless your doctor says otherwise). **DO NOT GIVE ACETYLSALICYLIC ACID CONTAINING MEDICATION (e.g., Aspirin, Bufferin etc.)** Your pharmacist can provide advice on appropriate over-the-counter medications for treating fever.

*Do not expect to be prescribed antibiotics for uncomplicated influenza, as they will have no benefit. Antibiotics may be prescribed for complications of influenza such as pneumonia or ear infection.

*Dress the child in lightweight clothing and keep the room temperature at 20°C.

*Offer cool fluids frequently when the child is awake.

*Avoid cool baths.

*Allow the child to rest and stay at home if possible for 6 days or more, so the virus isn't spread to other children.

*Use salt-water nose drops to treat a stuffy nose. Throw away tissues as soon as you have wiped your child's nose. Teach the child to cover their mouth when they cough or sneeze and then to throw the tissue away. Wash your hands often and teach your child to do so after wiping the nose.

Take your child to the doctor if your child:

*Has heart or lung disease or any chronic illness requiring regular medical care; has a disease or is taking drugs or treatments that affect the immune system; takes acetylsalicylic acid (ASA) e.g., takes ASA regularly for a medical condition;

*Has trouble breathing;

*Is less than 6 months old and has any temperature over 38.5°C;

*Is constantly irritable and will not calm down;

*Is listless and not interested in playing with toys;

*Has a fever that lasts more than 5 days;

*Drinks so little fluid that they are not urinating at least every 6 hours when awake;

*Has vomiting for more than 4 hours, or has severe diarrhoea;

*Note: green or yellow nasal discharge does not mean a child has a bacterial infection and needs antibiotics.

TAKE YOUR CHILD TO THE HOSPITAL EMERGENCY DEPARTMENT IF YOUR CHILD:

- *Has severe trouble breathing not caused by a stuffy nose
- *Has blue lips
- *Is limp or unable to move
- *Is hard to wake up, unusually quiet or unresponsive
- *Has a stiff neck
- *Seems confused
- *Has a seizure (convulsion/fit)
- *Has not had a wet diaper in 12 hours.

Attachments

A) How To Take A Child's Temperature

There are 4 ways to take a child's temperature:

- *by the mouth (oral)
- *by the bum (rectal)
- *under the armpit (axillary)
- *in the ear (tympanic)

The best method to choose depends on your child's age:

- ***Birth to 2 years:** best choice for an exact reading-rectal, second choice -armpit (to check for fever)
- ***Between 2 and 5 years:** best choice-rectal, second-ear, third-armpit
- ***Older than 5 years:** first choice-oral, second-ear, third-armpit

There are two types of glass thermometers: one for oral and axillary temperatures (it has along slender bulb at one end, containing mercury) and one with a short, stubby, larger bulb for rectal temperatures. As the mercury expands, in response to the heat from the child's body, it moves up the column.

A digital thermometer can be used for rectal, oral and armpit temperature taking. It is made of unbreakable plastic, is easy to read and measures temperature faster than glass. Ear thermometers are available but are expensive.

A fever strip is not recommended because it does not give an accurate temperature reading.

Rectal Method

- **If you are using a glass thermometer*, be sure it is a rectal thermometer.
- *Clean the thermometer with cool, soapy water and rinse (hot water causes the mercury to expand and may burst the thermometer).
- *Hold the thermometer at the end away from the mercury and shake it with firm downward flicks of the wrist so that the mercury goes below 36°C (96.8°F).
- *Cover the silver tip with petroleum jelly (such as Vaseline)
- *Place the baby on his/her back with his knees bent.
- *Gently insert the thermometer in the rectum, about 2.5 cm (1 inch), while holding it with your fingers.
- *Hold for at least two minutes. Remove the thermometer. Hold it near the light and slowly turn it until the line of mercury is seen. Read the temperature where the line of mercury ends.
- *Clean the thermometer with cool soapy water and rinse. Use a cotton swab soaked in alcohol to rub down the thermometer.
- *Store the thermometer in a container to prevent breakage.
- *NB. This method is not recommended for children with illnesses/treatments affecting their immune system.

Armpit Method

- *Use an oral glass thermometer.
- *Clean the thermometer and shake down the mercury as in “rectal method”.
- *Place the silver tip of the thermometer in the center of the armpit.
- *Make sure your child’s arm is tucked snugly against his/her body.
- *Leave the thermometer in place for at least 4 minutes.
- *Remove, read, clean and store the thermometer as in “rectal method”.

To use a digital thermometer:

- *Press the button to turn the thermometer “on”.
- *Put the thermometer under your child’s armpit. The silver tip must touch the skin.
- *Hold the top of the thermometer with one hand and hold down your child’s arm with the other hand.
- *Wait for the thermometer to beep.
- *Read the temperature on the display.
- *To clean a digital thermometer, wash only the tip with soap and warm (not hot) water and wipe off with alcohol after use. Dry well.

Mouth Method

- *Clean the thermometer and shake down the mercury as in “rectal method”.
- *Do not give the child cold or hot liquids for 1/2 hour before taking his/her temperature.
- *Carefully place the tip of the thermometer under the child’s tongue. Tell him/her to close the mouth but not to bite down. (NB. This method is not recommended for children under 5 years of age.)
- *With the child’s mouth closed, leave the thermometer in place for 3 to 4 minutes. Stay with child and make sure he/she remains still.
- *Remove thermometer, Read, clean and store as in rectal method.

Ear Method

- *Use a clean probe tip each time, and follow the manufacturer’s instructions carefully.
- *Gently tug on the ear, pulling it up and back. This will help straighten the ear canal, and make a clear path inside the ear to the eardrum.
- *Gently insert the thermometer until the ear canal is fully sealed off.
- *Squeeze and hold down the button for one second.
- *Remove the thermometer and read the temperature.
- *NB. This method is not recommended for children under one year of age.

Ask the pharmacist any questions you may have when you purchase your thermometer. If you are purchasing a glass thermometer, look for one with a mercury column that is easy to see, and degree markings that are easy to read.

What is a normal temperature?

The normal temperature range varies, depending on the method you use:

Rectum: 36.6°C to 38°C (97.9°F to 100.4°F)

Armpit: 34.7°C to 37.3°C (94.5°F to 99.1°F)

Mouth: 35.5°C to 37.5°C (95.9°F to 99.5°F)

Ear: 35.8°C to 38°C (96.4°F to 100.4°F)

B) How To Take An Adult's Temperature

Normal body temperature is regulated between 35.8°C and 37.2°C in healthy persons, it may vary by 0.5-1 degree during the day. Body temperature shows a definite pattern: low in the morning, gradually increasing during the day, and reaching its maximum during the late afternoon or evening.

There are 3 ways in which an adult's temperature is usually taken:

*by the mouth (oral)

*in the ear (tympanic)

*under the armpit (axillary). This method is less accurate, and is usually only used if the person is extremely drowsy or not clear mentally.

There are two types of glass thermometers: one for oral and axillary temperatures (it has a long slender bulb at one end, containing mercury) and one with a short, stubby, larger bulb for rectal temperatures. (These are usually used with children). As the mercury expands, in response to the heat from a person's body, it moves up the column.

A digital thermometer can be used for oral, armpit (and rectal) temperature taking. It is made of unbreakable plastic, is easy to read and measures temperature faster than glass. Ear thermometers are available but are expensive.

A fever strip is not recommended because it does not give an accurate temperature reading.

Oral Method

*If you are using a glass thermometer, be sure it is an oral thermometer.

*Clean the thermometer with cool, soapy water and rinse (hot water causes the mercury to expand and may burst the thermometer).

*Hold the thermometer at the end away from the mercury and shake it with firm downward flicks of the wrist so that the mercury goes below 36°C.

*Make sure that you/the person whose temperature is being taken has not smoked a cigarette, had a hot or cold drink or taken a hot bath for 1/2 hour, or the reading will not be accurate.

*Carefully place the silver tip of the thermometer under tongue. Close mouth but do not bite down. (NB. This method is not recommended for children under 5 years of age.)

*With mouth closed, leave the thermometer in place for 3 to 4 minutes.

*Remove the thermometer. Hold it near the light and slowly turn it until the line of mercury is seen. Read the temperature where the line of mercury ends.

* Clean the thermometer with cool soapy water and rinse. Use a cotton swab soaked in alcohol to rub down the thermometer.

*Store the thermometer in a container to prevent breakage.

If you are using a digital thermometer:

*Press the button to turn the thermometer "on".

*Put the thermometer tip under tongue and close mouth.

*Wait for the thermometer to beep.

*Read the temperature on the display.

*To clean a digital thermometer, wash only the tip with soap and warm (not hot) water and wipe off with alcohol after use. Dry well.

Ear Method

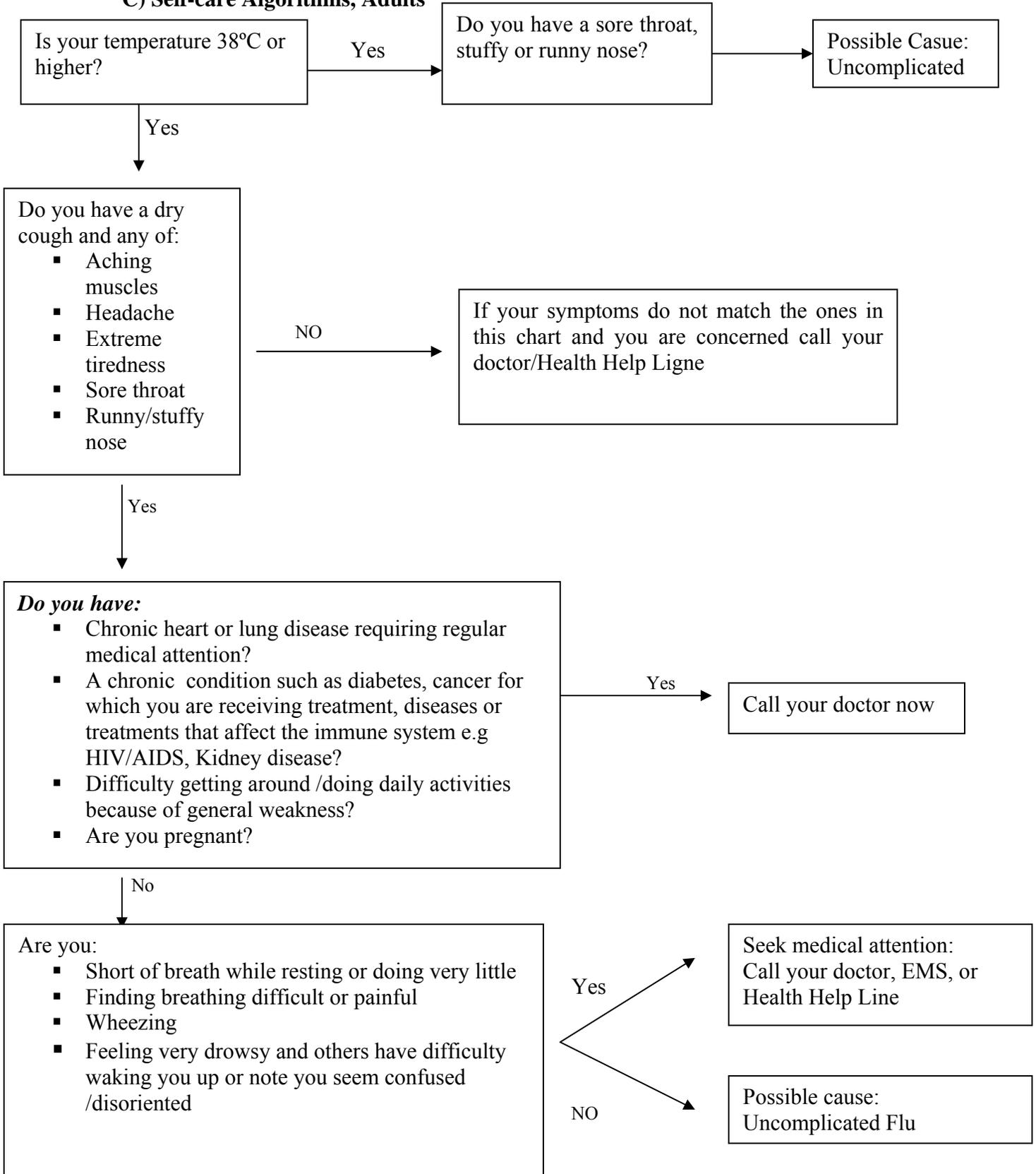
- *Use a clean probe tip each time, and follow the manufacturer's instructions carefully.
- *Gently tug on the ear, pulling it up and back. This will help straighten the ear canal, and make a clear path inside the ear to the eardrum.
- *Gently insert the thermometer until the ear canal is fully sealed off.
- *Squeeze and hold down the button for one second.
- *Remove the thermometer and read the temperature.

Axillary Method

- *Use an oral glass thermometer.
- *Clean the thermometer and shake down the mercury as in "oral method".
- *Place the silver tip of the thermometer in the center of the armpit.
- *Make sure the person's arm is held snugly against his/her body (forearm across chest).
- *Leave the thermometer in place for at least 4 minutes.
- *Remove, read, clean and store the thermometer as in "oral method".

Ask the pharmacist any questions you may have when you purchase your thermometer. If you are purchasing a glass thermometer, look for one with a mercury column that is easy to see, and degree markings that are easy to read.

C) Self-care Algorithms, Adults



*For people older than 75 years, the temperature may be lower, e.g., 37.2°C

What you can do for yourself (uncomplicated flu)

- *Rest-you will probably feel very weak until your temperature returns to normal.
- *Fluids-extra fluids are needed to replace those lost in sweating. If your urine is dark, you need more to drink. Warm fluids help loosen mucus.
- *Take acetaminophen 1 or 2 tablets every 6 hours or ibuprophen as recommended on the package for fever and muscle pain. Children under 18 years of age should not take acetylsalicylic acid (ASA) or any products containing acetylsalicylic acid (ASA). Antibiotics won't help.
- *Treat your symptoms, e.g., cough suppressant.
- *Stay home from work/school for 6 days (while you are contagious), or until you are feeling better.
- *Ask for help from family/friends if you live alone, are a single parent with small children, etc. and are having a hard time taking care of your own/your family's needs.

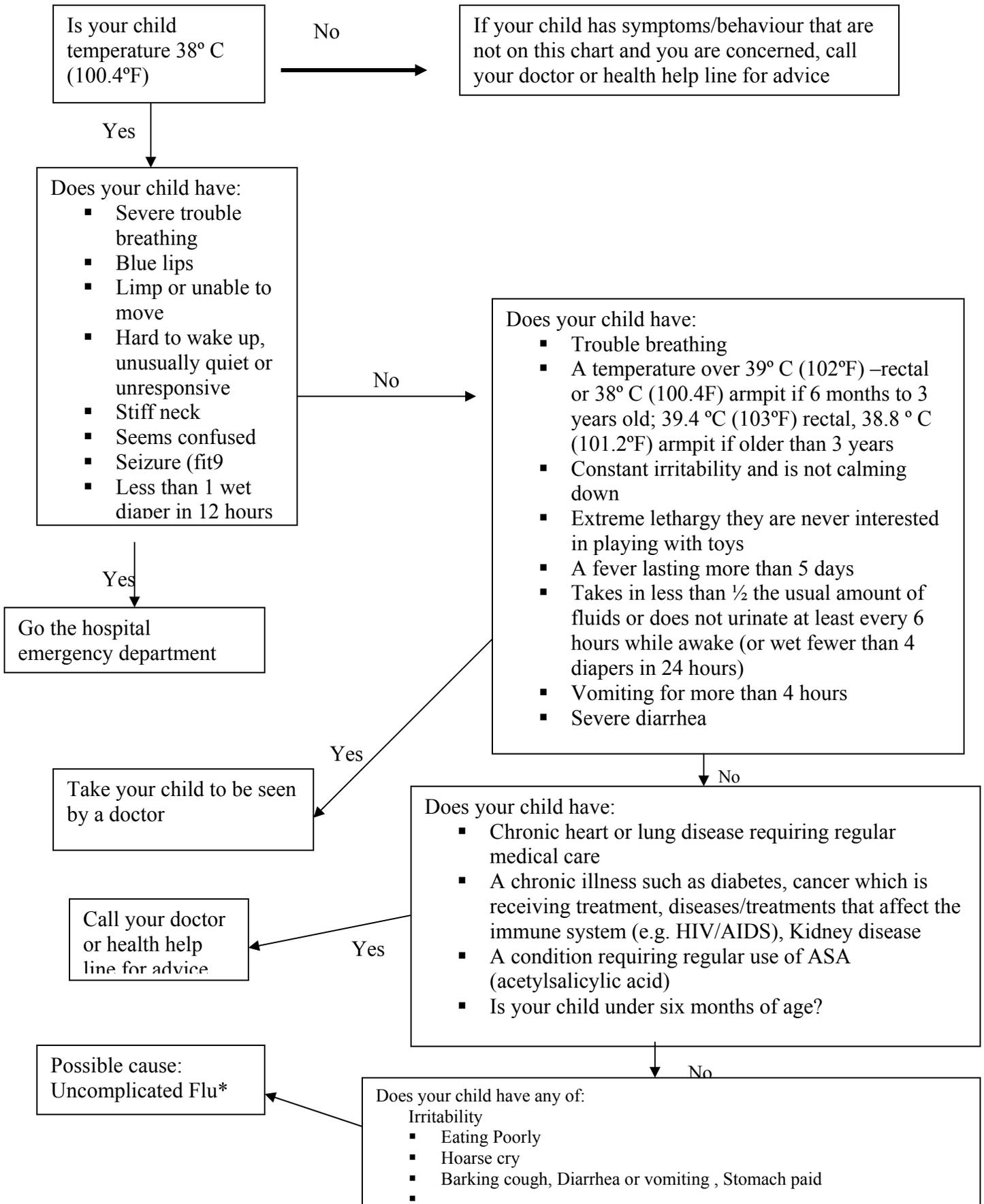
What to expect

- ***Day 1-3:** Sudden appearance of fever, headache, muscle pain and weakness - also dry cough, sore throat and stuffed nose (but overshadowed by previous symptoms)
- ***Day 4:** Fever and muscle aches decrease. Hoarse, dry or sore throat, cough and possible mild chest discomfort become more noticeable
- ***Day 8:** Symptoms decrease. Cough and tiredness may last 1-2 weeks or more.

If any of the following happen during the flu, SEEK MEDICAL ATTENTION (Call your doctor, EMS, Health Helpline or go to the Emergency Room):

- *You are short of breath even while resting.
- *You have pain in your chest when you breathe.
- *If you have heart disease and develop chest pain.
- *You are coughing up bloody sputum.
- *You are wheezing.
- *You still have a fever and are not feeling better after 5 days.
- *You are feeling better and suddenly you develop a fever.
- *You or others note that you are extremely drowsy or are confused/disoriented.

Does Your Infant or Young Child (Birth to 6 Years) Have The Flu?



If your child has symptoms/behavior that are not on this chart and you are concerned, call your doctor or health help line for advice.

Uncomplicated Flu: Usually the symptoms start to clear up in 5 to 7 days

*Give acetaminophen or ibuprofen for fever (in the dose recommended on the package every 4-6 hours until the child's temperature comes down, unless your doctor says otherwise; do not give more than 5 doses in 24 hours). Do not give ASA. Antibiotics will not help.

*Dress in light-weight clothing and keep room at 20°C.

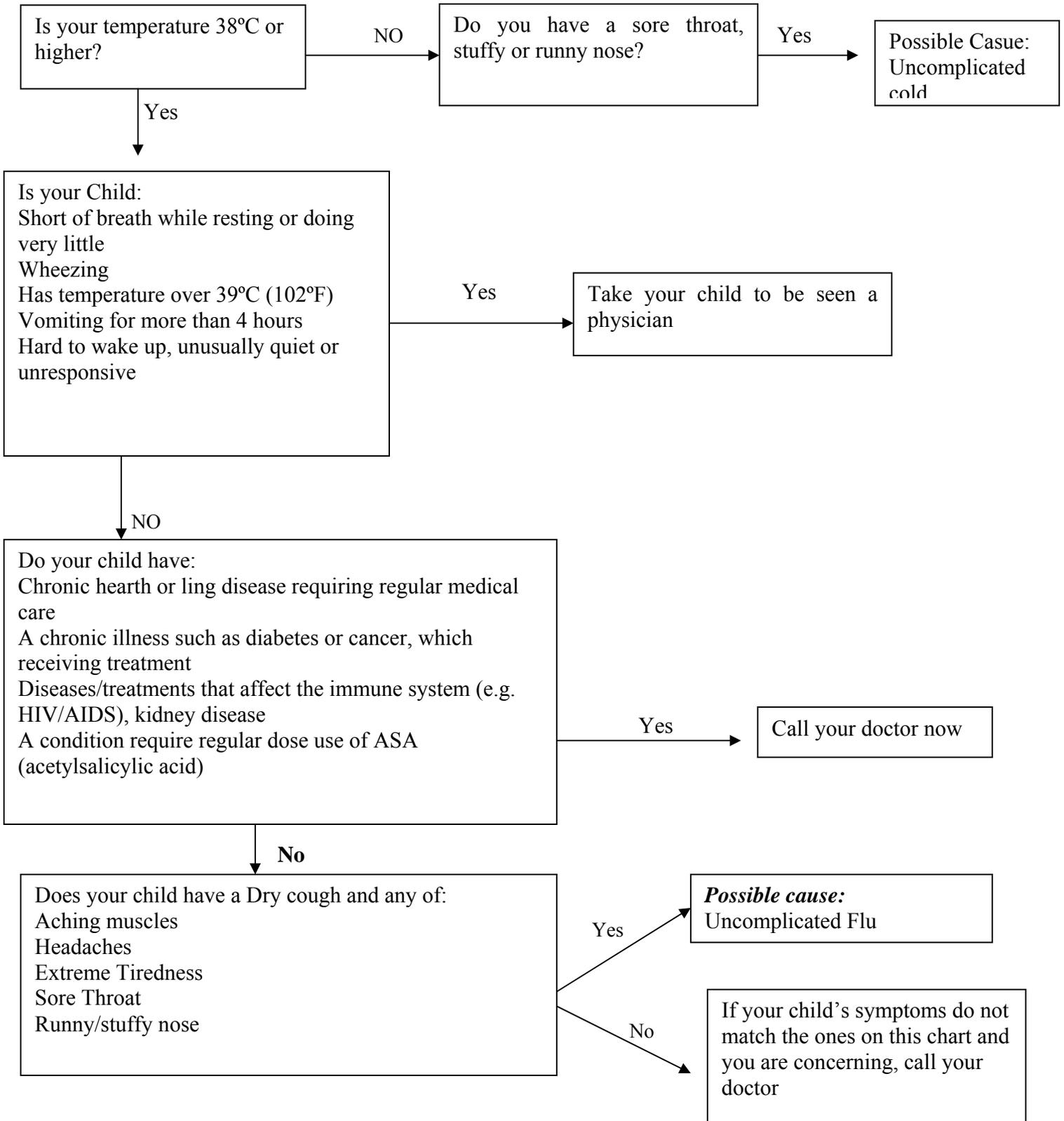
*Offer cool fluids frequently while awake.

*Allow to rest. Keep home for 6 days so the virus isn't spread.

*Use salt-water nose drops to treat a stuffy nose. Teach the child to cover their mouth when they cough and then to throw the tissue away. Wash your hands often and teach your child to do so as well.

*Avoid cool baths.

Does Your Older Child (Age Six Years to Adolescence) Have the Flu?



What You Can Do For Your Child

- *Allow your child to rest. He/she will probably feel very weak until their temperature returns to normal.
- *Offer fluids frequently while awake; extra fluids are needed to replace those lost in sweating. If your child's urine is darker than usual, they need more to drink.
- * Give your child acetaminophen every 6 hours or ibuprofen as recommended on the package for fever and muscle pain. Children under 18 years of age should not take acetylsalicylic acid (ASA) or any products containing ASA. Antibiotics won't help.
- *Treat your child's symptoms e.g., cough suppressant, salt water nose drops . Teach the child to cover their mouth when they cough and then throw the tissue away. Wash your hands often and teach your child to do so as well.
- *Keep your child home from school for 6 days (while they are contagious), or until they are feeling better.

What to Expect

- *Day 1-3: Sudden appearance of fever, headache, muscle pain and weakness - also dry cough, sore throat and stuffed nose (but overshadowed by previous symptoms)
- *Day 4: Fever and muscle aches decrease. Hoarse, dry or sore throat, cough and possible mild chest discomfort become more noticeable
- *Day 8: Symptoms decrease. Cough and tiredness may last 1-2 weeks or more.

If any of the following happen during the flu, TAKE YOUR CHILD TO SEE A DOCTOR:

Your child:

- *Is short of breath even while resting.
- *Has pain in the chest when breathing.
- *Is coughing up bloody sputum.
- *Is wheezing.
- *Still has a fever and is not feeling better after 5 days.
- *Is feeling better and suddenly develops a fever.
- *Is hard to wake up, unusually sleepy or unresponsive.

Appendix 2.II. Assessment Forms

1. Primary triage centre

a) Adults (≥ 18 years)

Identification

Health Care Number:	
Name: _____	
Surname/Family Name	First Name
Age _____ (yrs)	DOB ____/____/____ DD MM YYYY
DATE OF CONSULTATION ____/____/____ DD MM YYYY	

Risk Assessment For Complications Of Influenza

*Does this patient fall into a “high risk group” for complications of influenza? Y/N

High-Risk Groups	Tick all relevant
Women in the second or third trimester of pregnancy	
Chronic cardiac disease (hypertension is not enough)	
Chronic pulmonary disease - asthma	
Chronic pulmonary disease - COAD or emphysema	
Chronic pulmonary disease - other than asthma, COAD or emphysema	
Chronic renal disease	
Non insulin dependent diabetes mellitus	
Insulin requiring diabetes mellitus	
Receiving immunosuppressive therapy, AIDS patients	
Neoplastic disease	
Hepatic disease	
Resident of nursing home	
Resident of other chronic care facility	
>65 year old	

Details of vaccination	Yes	No	N/A	Batch number	Date given DD/MM/YYYY	Tick if given >14 days ago
INFLUENZA vaccine within the last 12 months?						
PNEUMOCOCCAL vaccine within the last 5 years?						

Within last 3 months?	Yes	No	N/A	Date commenced DD/MM/YYYY	Date ceased DD/MM/YYYY	Tick if still taking	Dose
AMANTADINE				/ /	/ /		
RIMANTADINE				/ /	/ /		
ZANAMAVIR				/ /	/ /		
OSELTAMAVIR				/ /	/ /		

Symptoms (adults ≥ 18 years)

Date and time of onset of first symptoms:

Clinical features on history	Yes	No	N/A	DETAILS: e.g., Date of onset, symptoms that predominate
In contact with some one with influenza in the last 3 days?				
Fever				
Chills				
Aching muscles and joints				
Stiffness				
Headache				
Fatigue				
Runny/stuffy nose				
Cough				
Sore throat, hoarseness				
Purulent sputum				
Thoracic pain when taking a deep breath				
Retrosternal soreness (tracheitis)				
Breathlessness				
Anorexia				
Vomiting				
Diarrhoea				
Confusion, drowsiness				
Rash				

Examination Findings (adults ≥ 18 years)

Date / / Time: :
 DD MM YYYY HH MM

Vital signs

Description	Threshold for indication of secondary assessment	Values for this patient
Temperature	<35°C or >39°C	
Respiratory Rate	>24/minute	
Heart rate	>100/minute	
Blood pressure	<100 mmHg Systolic	
Altered mental status	New confusion	
Function	New inability to function independently	
Skin colour	Cyanosis (bluish colour)	
Oxygen saturation*	<90% on room air	

* Some primary or secondary triage centres may be able to perform pulse oximetry (see Appendix 2.III).

Provisional Diagnosis

Please Tick All That Apply

	YES	NO
Influenza		
Suspected		
Recent contact (could be incubating)		
Unlikely but at risk of complications and not immunized		
Unlikely but at risk and immunized		
Unlikely (recovered from documented influenza)		
Other		
Pregnant		
Breastfeeding		

Note: If secondary assessment is required, and patients are sent to another centre/ward for complementary evaluation, each individual should be provided with a summary of the symptoms and signs detected at the primary triage centre.

b) Children ≤ 18 years:

Identification

Health Care Number:	
Name: _____	
Surname/Family Name	First Name
Age _____ (yrs)	DOB <u> </u> / <u> </u> / <u> </u> DD MM YYYY
DATE OF CONSULTATION <u> </u> / <u> </u> / <u> </u> DD MM YYYY	

Risk Assessment for Complications of Influenza

*Does this patient fall into a “high risk group” for complications of influenza? Y/N

Child with

High-Risk Groups	Tick all relevant
Chronic cardiac disease	
Chronic pulmonary disease - asthma	
Chronic pulmonary disease - other than asthma	
Chronic renal disease	
Diabetes mellitus	
Child with cyanotic congenital heart disease	
Receiving immunosuppressive therapy, AIDS patients	
Neoplastic disease	
Hepatic disease	
Resident of long-term care facility	
< 2 years old	

Details of vaccination	Yes	No	N/A	Batch number	Date given DD/MM/YYYY	Tick if given >14 days ago
INFLUENZA vaccine within the last 12 months?						
PNEUMOCOCCAL vaccine within the last 5 years?						

Within last 3 months?	Yes	No	N/A	Date commenced DD/MM/YYYY	Date ceased DD/MM/YYYY	Tick if still taking	Dose
AMANTADINE				/ /	/ /		
RIMANTADINE				/ /	/ /		
ZANAMAVIR				/ /	/ /		
OSELTAMAVIR				/ /	/ /		

Symptoms (Children \leq 18 years)

Date and time of onset of first symptoms:

Clinical features on history	Yes	No	N/A	DETAILS: e.g., Date of onset, symptoms that predominate
In contact with some one with influenza in the last 3 days?				
Fever				
Chills				
Aching muscles and joints				
Stiffness				
Headache				
Fatigue				
Runny/stuffy nose				
Cough				
Sore throat, hoarseness				
Purulent sputum				
Thoracic pain when taking a deep breath				
Retrosternal soreness (tracheitis)				
Breathlessness				
Anorexia				
Vomiting				
Diarrhoea				
Confusion, drowsiness				
Rash				

Examination Findings (Children \leq 18 years)

Date / / Time: :
 DD MM YYYY HH MM

Vital signs

Description	Threshold for indication of secondary assessment	Values for this patient
Temperature ^a	<35°C or >39°C	
Respiratory Rate	< 2 months = >60 breaths per minute 2-12 months = >50 breaths per minute > 12months to 5 years=>40 breaths per minute > 5 years = > 30 breaths per minute	
Skin colour and Temperature (lips, hands)	Cyanosis, sudden pallor, cold legs up to the knee	
Chest symptoms ^b (pain may be difficult to detect in young children)	Chest indrawing, wheezing, grunting, inquire for chest pain	
Mental status	Lethargic or unconscious ^c	
Function	Function Unable to breastfeed or drink, persistent vomiting (>2-3 times/24 hr.) ^d Inability to function independently ^c	
Neurologic symptoms and Signs ^e	Seizures, full fontanelle, stiff neck	
Oxygen saturation ^f	<90% on room air	

a For indications about types of thermometers and how to take the temperature see Appendix 2.I. High fever (>39°C) in adolescents is a warning sign and needs further assessment.

b Signs of dehydration: sunken eyes, no saliva, doughy skin

c Chest pain may be a sign of pneumonia, even in the absence of crackles or wheeze . It may also appear as retrosternal pain (tracheal/bronchial pain) or as a pleuritic pain. When positive, it is an indication for secondary evaluation.

d A deterioration of the consciousness and inability to function, lack of interest in playing and sleepiness should be further investigated.

e Vomiting (>2-3 times/24 hr.), particularly if the children are not breast-feeding or drinking well, is a warning sign and requires a secondary assessment.

f Determination of blood gases by pulse oximetry as sign of respiratory failure (see Appendix 2.III).

Provisional Diagnosis

Please Tick All That Apply

	YES	NO
Influenza		
Suspected		
Recent contact (could be incubating)		
Unlikely but at risk of complications and not immunized		
Unlikely but at risk and immunized		
Unlikely (recovered from documented influenza)		

2. Secondary clinical assessment:a) Adults (\geq 18 years)**Identification**

Health Care Number:	
Name: _____	
Surname/Family Name	First Name
Age _____ (yrs)	DOB ____/____/____ DD MM YYYY
DATE OF CONSULTATION ____/____/____ DD MM YYYY	

Risk Assessment for Complications of Influenza

*Does this patient fall into a “high risk group” for complications of influenza? Y/N

*Which symptoms and/or signs were found at the primary triage centre that required secondary assessment?

Note: When the secondary assessment has to be completed in a different setting, a new clinical evaluation of the patient, to confirm the diagnosis done at the primary triage centre, should always precede the laboratory studies mentioned below. **NOT ALL THE TESTS MENTIONED UNDERNEATH WILL BE NEEDED FOR ALL PATIENTS, AND CLINICAL JUDGEMENT SHOULD ALWAYS PRECEDE ANY PROCEDURE, PARTICULARLY IF RESOURCES ARE SCARCE.**

The primary assessment forms, or part of these forms, may be repeated here.

Investigations in Adults (> 18 years)

Complementary laboratory studies	Results requiring supervision of patient or admission	Results for this patient
CBC (core battery, if appropriate)	Hgb <80 g/L	Hgb:
	WBC <2,5000 or >12, 000 cells/L	WBC:
	Bands >15%	Bands:
	Platelets < 50,000/L	Platelets:
Electrolytes	Na <125 meq/L or >148 meq/L	Na:
	K <3 meq/L or >5.5 meq/L	K:
BUN, creatinine	BUN 10.7 mmol/L	BUN :
	Creatinine 150 µmol/L	Creatinine
Glucose	<3mmol/L or >13.9 mmol/L	
CPK (only in patients with severe muscle pain)	CKMB 50%	CKMB:
	Total CK 1,000 mol/L	Total CK:
Blood gases, O2 saturation	Blood gases pO2 60 room air PH <7.35	PO2: PH:
	O2 saturation <90% room air*	O2 saturation:
Chest x-ray (CRX)	Abnormal, consistent with pneumonia Pleural effusion	
EKG	Evidence of ischemia, new arrhythmia	

*Some primary or secondary triage centres may be able to perform pulse oximetry (see Appendix 2.III)
Under optimal circumstances, blood work and CRX should be done to all patients before admission. If resources are restricted, however, priority should be given to patients with co-morbidity or if complications of the disease are suspected (i.e., pneumonia, etc.). Patients with normal gases in blood and with clear lungs during auscultation do not need CRX. Similarly, when the clinical diagnosis of pneumonia is unquestionable and the resources are scarce, no CRX need to be taken, unless there is suspicion of a complication of the pneumonia (i.e., empyema).

Provisional Diagnosis

Please Tick All That Apply

	YES	NO
Influenza		
Suspected		
Recent contact (could be incubating)		
Unlikely but at risk of complications and not immunized		
Unlikely but at risk and immunized		
Unlikely (recovered from documented influenza)		
Pneumonia, confirmed (C)/suspected (S)/unlikely (U)	C / S / U	
Viral		
Bacterial		
Other		
Pregnant		
Breastfeeding		

Bacterial pneumonia

Confirmed (by chest radiograph), suspected, unlikely.

Influenza viral pneumonitis

Confirmed (by chest radiograph and oxygen transfer), suspected (by oxygen transfer), unlikely.

Admission

Yes:

- *Suspected Flu ward
- *Confirmed Flu ward
- *General ward
- *Observation
- *ICU Admission
- *CCU Admission

If not admitted:

Sent to:

- *Home care with self-care
- *Health worker/Volunteer contacted
- *Not Traditional care centre: Hotel, School, Community Centre, etc.

Provide copy of:

- *Assessment sheet
- *Instruction sheet
- *Contact names/numbers (if get more breathless/deteriorate)

b) Children ≤18 years:

Identification

Health Care Number:	
Name: _____	
Surname/Family Name	First Name
Age _____ (yrs)	DOB ____/____/____ DD MM YYYY
DATE OF CONSULTATION ____/____/____ DD MM YYYY	

Risk Assessment for Complications of Influenza

- *Does this patient fall into a “high risk group” for complications of influenza? **Y/N**
- *Which symptoms and/or signs were found at the primary triage centre that required secondary assessment?

When the secondary assessment has to be completed in a different setting, a new clinical evaluation of the child, to confirm the diagnosis done at the primary triage centre, should

always precede the laboratory studies mentioned below. **Not all the tests mentioned underneath will be needed for all patients, and clinical judgement should precede any procedure, particularly if resources are scarce.**

As with adults, part of the primary assessment forms may be added here.

Investigations

Complementary laboratory studies	Results requiring supervision of patient or admission	Results for this patient
CBC (core battery, if appropriate)	Hgb: Values of Hemoglobin for young children are age related.	Hgb:
	WBC <2,5000 or >12,000 cells/L	WBC:
	Bands >15%	Bands:
	Platelets < 50,000/L	Platelets:
Electrolytes	Na <125 meq/L or >148 meq/L	Na:
	K <3 meq/L or >5.5 meq/L	K:
BUN, creatinine	BUN 10.7 mmol/L	BUN :
	Creatinine 150 μmol/L	Creatinine
Glucose	<3mmol/L or >13.9 mmol/L	Glucose:
CPK (only in patients with severe muscle pain)	CKMB 50%	CKMB:
	Total CK 1,000 mol/L	Total CK:
Blood gases, O ₂ saturation	Blood gases pO ₂ 60 room air pH <7.35	PO ₂ : PH:
	O ₂ saturation 90% room air*	O ₂ saturation:
Chest x-ray (CRX)	Abnormal, consistent with pneumonia Pleural effusion	
EKG	Evidence of ischemia, new arrhythmia	

*Some of these values are age-dependant and appropriate values for each age should be consulted (see Chapter2).

Under optimal circumstances, blood work and CRX should be done to all patients before admission. If resources are restricted, however, priority should be given to patients with co-morbidity or if complications of the disease are suspected (i.e., pneumonia, etc.). Patients with normal gases in blood and with clear lungs during auscultation do not need CRX. Similarly, when the clinical diagnosis of pneumonia is unquestionable and the resources are scarce, no CRX need to be taken, unless there is suspicion of a complication of the pneumonia (i.e., empiema).

Provisional Diagnosis

Please Tick all that Apply

	YES	NO
Influenza		
Suspected		
Recent contact (could be incubating)		
Unlikely but at risk of complications and not immunized		
Unlikely but at risk and immunized		
Unlikely (recovered from documented influenza)		
Pneumonia, confirmed (C)/suspected (S)/unlikely (U)	C / S / U	
Viral		
Bacterial		
Other		
Pregnant		
Breastfeeding		

Bacterial pneumonia

Confirmed (by chest radiograph), suspected, unlikely.

Influenza viral pneumonitis

Confirmed (by chest radiograph and oxygen transfer), suspected (by oxygen transfer), unlikely.

Admission**Yes:**

- *Suspected Flu ward
- *Confirmed Flu ward
- *General ward
- *Observation
- *ICU Admission
- *CCU Admission

If not admitted:

Sent to:

- *Home care with self-care
- *Health worker/Volunteer contacted
- *Not Traditional care centre: Hotel, School, Community Centre, etc.

Provide copy of:

- *Assessment sheet
- *Instruction sheet
- *Contact names/numbers (if get more breathless/deteriorate)

Appendix 2.III.

Pulse Oximetry and Trans-cutaneous Oximetry

Although the measurement of the “in vitro” saturation of arterial blood is still the golden standard for measuring arterial oxygen, it involves repeated sampling of arterial blood, is costly and time consuming, and only gives intermittent and delayed results. Two non-invasive procedures have been developed recently for continuous monitoring of oxygen saturation: pulse oximetry and trans-cutaneous oximetry. Both procedures, however, have some shortfalls; and, ideally, they should be used in combination^{214,172}. In a pandemic situation, this will not be possible in most facilities, and, therefore, clinicians should be aware of the limitations of each device, particularly when testing critically ill patients. Taking the mean of two or more measurements, if possible, can reduce variability and increase reliability.

1. **Pulse oximetry** is a non-invasive, continuous monitoring procedure that has supplanted arterial sampling methods for studying patient’s oxygen saturation. It allows the estimation of the arterial tension of oxygen [SPO₂ is the oxygen saturation (PO₂) measured with a pulse oximeter, given in %] in the ranges that are clinically relevant (i.e., 75-95%). It has been reported to be accurate within 5% (2% for SPO₂ > 70%, and responds to cardiopulmonary changes that affect tissue oxygenation.

Pulse oximetry has, however, some limitations:

*It does not provide information regarding patient’s ventilation and carbon dioxide tension. The patient may have a normal reading and still be hypercapnic and have respiratory failure. Carboxyhemoglobin and methemoglobin, on the other hand, have light absorption similar to oxyhemoglobin, and, therefore, both can modify the SPO₂ readings (similarly: extreme anemia, intravenous dyes used in diagnostic and hemodynamic testing, bilirubin, skin colour, and brown-red nail polish, can also modify the readings).

*Pulse oximeters require careful sensor placement and adequate pulse pressures (>20 mm Hg), and they are prone to movement artefacts (which is a serious shortcoming with young children). Sensors should be placed 2-3 mm apart from each other, and any optical shunt should be avoided (i.e., light received by the sensors without passing through the skin). It must be ensured that all light emitted pass through the tissues, that the receiving diode is located exactly opposite to the emitter, and that both are shielded from ambient light.

*Skin burns are possible and, therefore, the sensors should be checked carefully before use, and patients should be checked each 6-8 hours. Probes may be placed in the ear or in the fingers, although finger probes are considered more accurate.

*Patients with low perfusion states may hinder the performance of pulse oximeters. In these patients the results become blood-flow dependent. During shock, the proportion of wrong or missing values sharply increases. Increased venous pulsations may occur if probes are secured too tightly, or in cases of right heart failure, tricuspid regurgitation, etc. and they may, mistakenly, be detected by the pulse oximeter.

*Although the response time is the time it takes for the blood to travel from the lungs to the sensor, pulse oximeters usually average their values over periods from 2-15 seconds

or from 4-32 heartbeats. This intends to level out any erroneous measurements and minimize false alarms; however, this procedure prolongs the response time, and also may lead to false readings after body movements or may mask intermittent hypoxemia¹⁷². Some brands have the option to be used in a beat-to-beat mode (i.e., without averaging their readings), what may be preferred for some patients.

*Pulse oximeters derive their results from an “empiric” table elaborated with data from healthy adults. Therefore, each instrument should be validated if measurements are done in infants and young children. In addition, saturations < 70-80% were not attained in healthy volunteers, and are, therefore, extrapolated, which may lead to an underestimation of the true degree of hypoxemia.

*There are considerable differences in bias (or systematic error, this indicates the overestimation or underestimation of one brand relative to the other) and precision (variability or random error) between brands, and it is important to determine which brand of oximeters is used, mainly when the values of PO₂ are in the low ranges. Available data shows considerable differences not only between instruments but also between studies. The algorithms used to calculate the SPO₂, and the way these measurements are displayed can partially explain these differences. Users should be aware of this fact and know the brand of oximeter and software they are using. Data from one brand cannot be transferred to another brand.

2. **Transcutaneous sensors** may also be used to determine the tcPO₂ (transcutaneous tension of oxygen, given in mm Hg), a variable that reflects the PO₂ in the peripheral tissue. Sensitivity to PO₂ < 50 mm (hypoxemia) and > 80 mm (hyperoxemia) is approximately 85%. Limitations of tcPO₂ are:

*The tcPO₂ decreases relative to arterial PO₂ with increasing patient’s age.

*Values are influenced by skin thickness (results will be low in areas of thick or poorly perfused skin), sensor temperature (should not be <44°C and it takes 15 minutes to heat the skin, otherwise the values will be unreliable), amount of gel used (if too much gel is used, the values will be wrongly high), and peripheral perfusion. Additionally, the sensor must be regularly relocated (particularly in young children) to avoid skin burns.

*In the presence of severely reduced cardiac output and peripheral perfusion, the tcPO₂ values deviate from the arterial PO₂ and become blood flow dependent. If interpreted correctly, it may provide an early warning of cardiac failure, hypotension, or acidemia.

*Response times are delayed, caused by the time required for the oxygen to travel from the capillaries through the skin into the electrodes. The average response time to a rapid decrease in the PO₂ is approximately 16 seconds and up to 30 seconds.

Normal values

Normal values for children and adults are published in some papers (see below). However, the interpretation of the results obtained with the different brands should follow instructions included with the instrument’s manuals.

1. **Pulse oximetry** (always refer to instrument’s manuals):

* Data on baseline SPO₂, controlled for movement artefacts and taken in a beat-to-beat mode, for neonates, infants and children, was obtained with one brand, Nellcor

oximeters. Baseline SPO₂, during quiet sleep and away of apneic pauses is between 95-100% in preterm infants and 97-100% in older infants and children. The frequency of episodic desaturation varies considerably with age. In children 2-16 years SPO₂ almost never reaches 80% and even reductions to 90% are infrequent, while in newborns short episodes of SPO₂ (80% are quite common).

*In healthy newborns, the mean SPO₂ was 97.2% (1.6% with a median value of 97%). Only age and activity affected the SPO₂ significantly; values obtained while the infants were fussy and crying were lower compared to measurements done when they were sleeping. Values measured in 60 term infants (with a Nellcor N200) in the first 4 weeks of life, detected episodes of desaturation in 35% of the recordings obtained in the first week and 60% in weeks 2-4. The clinical significance of these values remains to be determined.

* Values taken from 150 normal adult volunteers (not arterialised in advance) with a pulse oximeter, resulted in 13.3% individuals with values <94%, none below 90%. When patients receiving anaesthesia were studied, only 1.1% of the patients who received O₂ following anaesthesia had values below 90%, while this value was 16.7% for patients not receiving O₂. The alarm limit for Criticalcare Systems 501 oximeter, used for this study, is 90%.

*In a study of stroke patients, the overall SPO₂ was above 90%, and similar to controls of the same age, when patients were sitting up. Episodes of desaturation were defined as SPO₂ < 90%.

*All night pulse oximetry values from a total of 350 healthy subjects with ages ranging from 1 month to 85 years were compared to 25 individuals with obstructive sleep apnea (OSA) and 21 individuals with asthma. Mean values +/- SD for the healthy patients were: 1) the lowest saturation recorded during the night = 90.4% +/- 3.1; the saturation below which the individuals spent 10% of the night was 94.7% +/- 1.6; and the median saturation was 96.5% +/- 1.5%. No relation was found with sex, obesity, or race. Asthma patients did not have differences with healthy controls, but OSA had significantly lower saturation values. Healthy older subjects (>60 years) had lower O₂ saturation than younger individuals.

2. Trans cutaneous PO₂ monitoring

*Mean tcPO₂ of newborns and infants during both, quiet sleep and wakefulness (excluding feeding or crying) was about 70-80 mm of Hg with a deviation of 6-10 mm of Hg.

*Index values for tcPO₂ in adults have been reviewed by Tremper and Barker.

O₂ in blood

Blood concentration of haemoglobin (Hb) in adults is 14.2 g/dL blood and it can carry about 20ml oxygen per dL, as oxyhemoglobin. The Hb binding sites bind oxygen in accordance with the partial pressure of the gas in solution (PO₂), and the percentage of saturation of the Hb is given by the percentage of binding sites occupied. The relation between the PO₂ and the Hb saturation is non-linear and has the shape of an S which has physiological advantages: In the arterial part of the graph, it is fairly flat, what means that moderate changes in PO₂ cause only small decrements in saturation. However, the curve

is fairly steep in the normal ranges for venous PO₂, which allows delivery of oxygen to the tissues with minor changes in the PO₂. The relative affinity of the Hb for oxygen is given by the parameter P₅₀, i.e., PO₂ at 50% saturation; it is decreased by physiologic factors like pH, PCO₂ and temperature. In clinical practice, patients requiring blood gas measurements also have altered temperatures, blood pH and CO₂ excess. Blood gas machines usually take these factors under consideration.

Chapter 3. Patient Management II

Management of Patients in Long Term Care Facilities

3.1 Long-Term Care Facilities

Long-term care facilities (LTCF) include a heterogeneous group of establishments. Although they accommodate mainly elderly individuals (nursing homes are the most common), the spectrum of services provided is wide and there are establishments for residents with physical or psychiatric disability, pediatric centres and geriatric centres. Some institutions provide permanent custodial care, however other organizations provide only temporary rehabilitation care.

Because of their age and underlying medical conditions, most individuals living in long-term care facilities are at increased risk for developing complications after influenza infection. Health-care personnel and visitors may introduce the virus, and the closed environment will favour transmission. During influenza outbreaks in hospitals or nursing homes, as many as 70% of individuals (either personnel or patients) may become infected. The increased use of invasive devices such as central lines, chronic respirators, feeding devices, etc. facilitate the development of infections and complications.

A goal, in the pandemic situation, will be to manage patients within the facility without transferring them to an acute care facility. This may require that the long-term care facility designate an area for more acute care, where closer monitoring and more intensive nursing care can be provided, and where parenteral therapy and oxygen therapy may be given.

Prior to any pandemic, long-term care facilities should have in place policies to support appropriate management of residents and personnel. The inter-pandemic epidemics suffered almost every year are an opportunity to develop such policies and test their efficacy.

They should include:

- a) An institutional policy for the management of influenza outbreaks;
- b) Immunization of residents and staff;
- c) Plans to establish an area within the facility for management of more acutely ill patients;
- d) Advanced directives for all residents, which should be completed and updated regularly and are consistent with provincial legislation and institutional policy.

The goals of an institutional influenza plan are:

- *To prevent influenza illness and complications in residents and staff;
- *Timely diagnosis and appropriate management of influenza infection in patients;
- *Timely diagnosis and management of an influenza outbreak within the LTCF;
- *To provide care for ill residents within the facility without transfer to another facility.

3.2. Assessment and management of long-term facility residents (LTCFs)

3.2.1 Prevention

a) Yearly influenza vaccine for all residents and staff according to national/local recommendations (interpandemic influenza). If a pandemic is declared, pandemic vaccine priorities will be considered.

b) Pneumococcal vaccination of all residents, consistent with EPI guidelines.

c) Comprehensive, timely surveillance for influenza-like illness in residents and staff, including rapid laboratory confirmation and viral culture (interpandemic influenza). Microbiological tests (bacteriologic and/or virologic determination) may be required depending on the clinical presentation and on the availability of resources. Once the presence of the pandemic strain has been confirmed in the facility, virologic tests will be needed only to confirm diagnosis in atypical cases, and for surveillance purposes. Current rapid tests may be useful for confirmation of diagnosis and treatment decisions

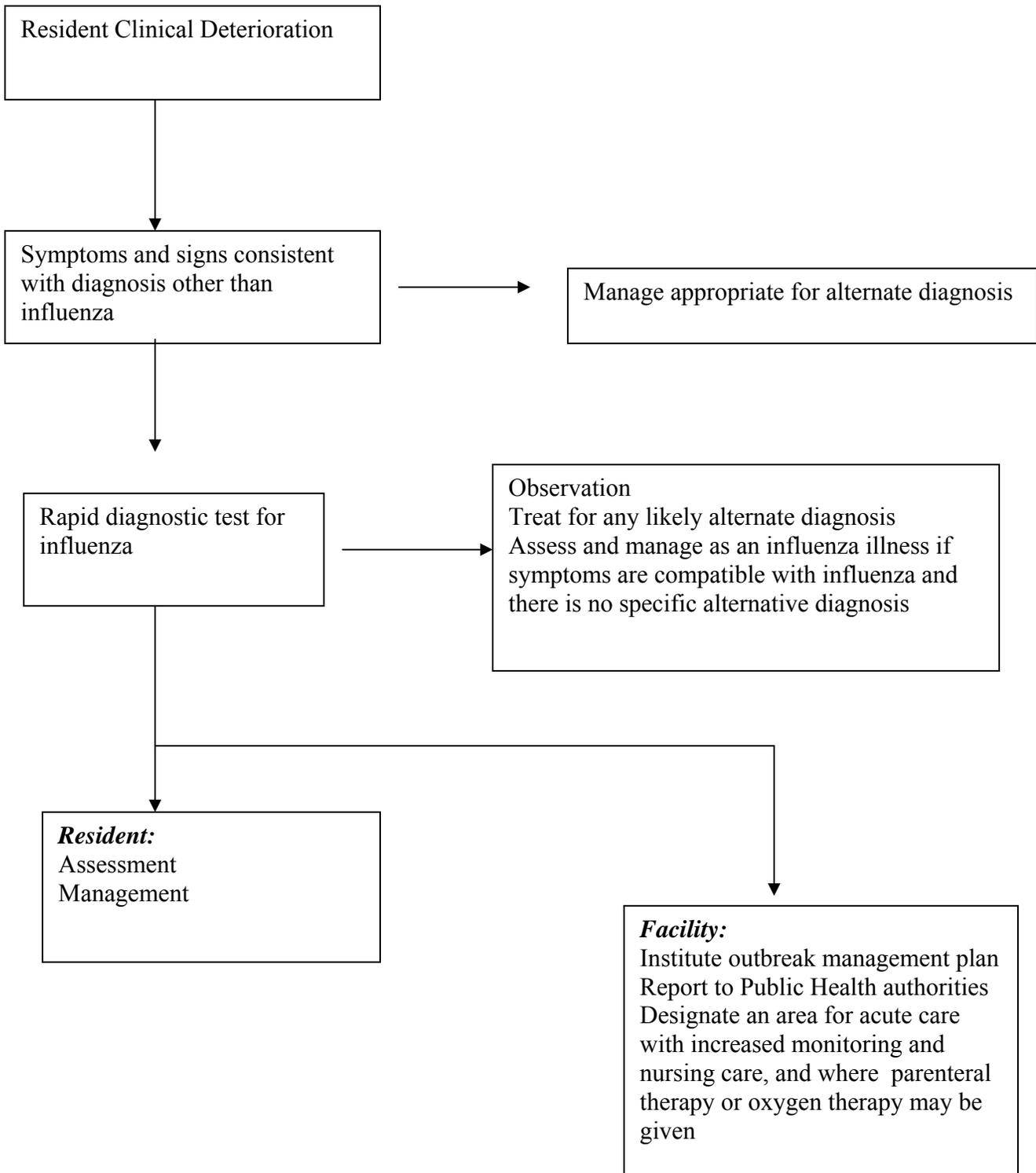
d) Facility guidelines for use of prophylactic antivirals, within the framework of antiviral prioritization for pandemic influenza, should be in place in LTCFs.

The following algorithms are general, and designed for “Elderly Care Homes”, where residents are elderly and have multiple co-morbidities. Nevertheless, the approach is applicable to other LTCFs, although specific needs for other populations should be considered in advance.

3.2.2 Diagnosis and management of residents with influenza

Triage of long term care facility residents

The algorithm suggested in this page is intended to help personnel in LTCFs to identify patients with influenza, to assess the severity of the disease, and to determine follow up during a pandemic.



3.2.2.1 Symptoms consistent with flu like illness. Long-term care facility residents

These recommendations assume that influenza is known to be present in the community or region. In this situation, any resident of a long-term facility who deteriorates clinically and for whom there is no clear alternate diagnosis may have influenza illness.

Influenza infection of elderly residents in a long-term care facility may present with:

- a) Fever (could be only a low grade fever) or hypothermia.
- b) Anorexia
- c) Vomiting
- d) Increased confusion or decreased functional status e.g., a decreased ability to walk independently.
- e) White cell count may be normal, with or without a shift to the left.

Rapid diagnostic tests are useful to confirm or discard influenza in elderly patients with uncertain clinical presentations. They are helpful if antiviral therapy is considered, as these should be started shortly after the onset of disease (within the 48 hours of onset) to get maximum results. Rapid tests may not be available in a pandemic situation and there may be many false negative tests. Therefore, patients with symptoms compatible with influenza should be assessed and managed as such, especially if there are no other obvious diagnoses.

3.2.2.2 Influenza illness assessment. Long-term care facility residents

The clinical presentation of any infectious illness in an elderly impaired long-term care facility resident may be non-specific, and non-classical. Alternate diagnoses must be considered when the patient is initially assessed, including non-infectious causes such as deterioration of co-morbid illness or medication adverse effects. A diagnosis of influenza should be excluded with any non-specific presentation.

The **initial assessment** and evaluation of the residents should be consistent with advance directives, and include the following:

- a) History: age, duration of residence in the facility, co-morbid illnesses, documentation of last influenza vaccination, documentation of pneumococcal vaccination, time of onset of symptoms.
- b) Physical assessment: temperature, skin colour, pulse, blood pressure, respiratory rate, peripheral oedema, chest auscultation, chest pain on inspiration, mental status, function (ability to function independently, continuous vomiting, etc.).
- c) Diagnostic testing should include O₂ saturation. For residents who are clinically stable and not judged to be severely ill this may be sufficient.

In residents where there are concerns about metabolic status, or the degree of illness, additional tests which may be considered include a CBC with white cell count, electrolytes, blood glucose, CPK, BUN and creatinine, an EKG if there is a new arrhythmia or evidence of significant deterioration in cardiac status. A chest x-ray should be considered for all residents with an oxygen saturation of <90% on room air, with new

purulent sputum, or respiratory rate >30 per minute. A sputum culture may be helpful for residents producing sputum, and blood cultures should be considered in individuals who appear to be severely toxic.

Long-term care facilities should have in place arrangements by which portable chest x-rays may be obtained, and should consider a phone reporting system to ensure that results are returned promptly and in a standardized fashion.

In addition to nursing homes, some elderly adults live in residences for the old, where there are basic health services. These residences should be considered as potential sites for triage and care of residents (non-traditional sites) in a pandemic, and should be equipped to provide basic diagnostic tests and healthcare services to residents with influenza.

3.2.2.3 Instructions for the management of subjects remaining in the long term care facility

A written plan for the timely management of patients should be in place. This will include diagnostic and follow-up tests, responsibilities of medical and non-medical personnel, and use of medications.

a) Diagnostic and follow-up tests

*Chest X-Rays (as required)

*Blood tests, urine analysis, etc. (as required)

*Viral/Bacterial studies: sputum, cerebrospinal liquid, nasopharyngeal aspirate, blood culture.

b) General management: The goals of general management are to maintain comfort, to preserve functional status, and to limit complications. Specific aspects of management for influenza and its complications include:

1. **Maintenance of hydration.** This may be achieved through oral fluids or if necessary through parenteral fluids. Where parenteral fluids are necessary hypodermoclysis is an option rather than intravenous therapy and may be more practical in the long-term care setting.

2. **Oxygenation.** Patients with an oxygen saturation of <90% on room air should have oxygen supplementation. This may usually be given by portable oxygen with nasal prongs. Where this is insufficient, patients may require more aggressive efforts of oxygenation including non-intubation methods of respiratory therapy.

3. **Antipyretics and analgesics** may be required to limit discomfort associated with myalgia and arthralgia. Usually acetaminophen will be sufficient.

4. **Other therapies** such as antitussives may occasionally be indicated depending on the clinical features of the given patient.

c) **Specific therapy:** Specific therapy is directed at the influenza infection itself and influenza complications including secondary pneumonia and/or aggravation of pre-existing disease. During the early stages of the pandemic, LTCFs should determine access to antivirals and antibiotics. When antivirals/antibiotics are not available, symptom control and oxygenation may be the only management approaches. Strategies to manage patients pending antivirals should be developed.

1. **Antiviral agents** including amantadine (for prevention), zanamivir, and oseltamivir (for treatment) may be given for the prevention and treatment of influenza. Treatment with these drugs is, usually, only indicated if symptoms have been present for less than 48 hours. They may not be available, depending on supplies and on the priorities for the pandemic situation. When amantadine is used, dosage adjustment for renal function is necessary. Zanamivir may be impractical because it requires cooperation from the individual to use an inhaler. This may not be achievable in many long-term care facility patients, especially those who are acutely ill.

2. **Antibiotics** should be given only for the management of presumed or diagnosed secondary bacterial pneumonia.

3. **Management of preexisting disease:** Cardiovascular, respiratory, metabolic, etc.

4. **For patients who are acutely confused** and in whom correction of oxygenation or limitation of fever are not sufficient to control confusion, management for acute confusion may be necessary.

3.2.3 Discharge Criteria: (from the care sector designated for influenza patients)

It is important to define when patients are clinically stable and can be moved back to the usual residential area. Patients will be considered clinically stable when, in the preceding 24 hours:

*They are not acutely confused

*They are able to be fed orally or by naso-gastric tube

*Their vital signs are stable. Values should be established (e.g., O₂ saturation > 90%, heart rate < 100/minute, respiratory rate < 24/minute, blood systolic pressure > 90 mm Hg, temperature < 38°C).

Once the patients have been clinically stable for 48 hours and intravenous medication has been switched to oral therapy, the attending personnel should consider discharge from the “acute care area”. In the pandemic setting, prioritization for earlier discharge may be necessary due to limitations in resources.

3.2.4 Transfer to and from Acute Care facilities

A goal, in the pandemic situation, will be to manage patients within the same facility. In some special circumstances, however, the transfer to acute care services may be considered and this has to be planned in advance.

3.3 Timely diagnosis and management of an influenza outbreak within the LTCF

The early detection of any outbreak occurring in a LTCF is essential to implement control measures and to stop the diffusion of the disease. In a pandemic situation, the first case of confirmed influenza would likely lead to outbreak management for pandemic influenza.

Every LTCF should have in place surveillance for the early detection and control of an outbreak. This includes:

- 1) Preparation of a written plan for the management of an influenza outbreak, avoiding unnecessary delays. This will include the identification of diagnostic tests, responsibilities of medical and non-medical personnel, and use of antiviral medication.
- 2) Identification of personnel responsible for the surveillance and for the transmission of information within the establishment. This will usually be the individual with responsibility for infection control in the facility. The Public Health authorities will inform this individual if influenza is circulating in the community and he/she will report to the authorities when an outbreak has been detected in the facility.
- 3) Education of all staff and attending physicians in the importance of early identification and notification if a case is suspected.
- 4) A response capacity maintained 7 days per week.
- 5) Specific reporting mechanisms and standardized data collection.

Once the outbreak is confirmed, the authorities responsible should take all the measures required to control the propagation of the virus within the facility (among the residents, and to personnel and visitors; see Infection control guideline). Studies and treatment of patients will be done in the area of the facility assigned for this purpose; and prophylactic treatment of some residents may be initiated (following the existing framework for antiviral prioritization during the pandemic).

Chapter 4. Patient Management III

Management of patients in Non-traditional Facilities and Telephone advice

4.1 Non-traditional facilities (NTF)

Definition

A Non-Traditional Site is a site that is:

- a) currently not an established health care site, or
- b) is an established health care site that usually offers a different type or level of care.

The functions of a Non-Traditional Site will vary depending on the needs of the community but will focus on monitoring, care and support of influenza patients during an influenza pandemic.

It is expected that the number of individuals requiring care during pandemic influenza will exceed the number of beds available in health care institutions. Admitting to hospitals only the seriously ill requiring specialized medical care, and making use of alternative centres (such as rehabilitation facilities, community centres, schools, churches and hotels) for less ill patients, will optimize the provision of care.

Non-traditional health care facilities will be used for two main purposes:

- a) As an extension of overloaded hospitals and clinics, for the care of influenza patients that are not critically ill or not yet well enough to return home, and
- b) As domiciliary care, for individuals unable to care for themselves at home.

Rehabilitation facilities, hotels, and other sites, should be provided with additional basic support equipment (like oxygen therapy supplies). Community halls and schools are equipped with toilets and have some cooking facilities; they may be an alternative to hospitals in case of need.

4.2 Telephone advice

Section to be developed.

Chapter 5. Patient Management IV

Hospital Management: Emergency Room, Short-term observation and Ward management, Intensive Care Unit

Patient management in the hospitals will be similar to interpandemic- influenza care. Changes may be required, however, to operate with limited resources, or if the pandemic strain shows an unusual pattern of disease. Prior planning should consider actions to follow in the event of insufficient resources (beds, personnel, equipment and/or drugs), and alternatives. Cancellation of non-urgent admissions and elective surgery will help to relieve pressure for supplies. Unnecessary admissions of influenza patients should be avoided, and alternative community services should be used appropriately. The pandemic influenza committee and the communications network will activate the influenza contingency plan after the WHO informs them of the onset of the pandemic, and will update the provinces about the evolution of the pandemic.

5.1 Emergency Room

A separate assessment/admission area should be identified for patients with suspected influenza. These patients should be rapidly diverted there to minimize disease transmission. Admission forms will be completed at this point. Patient-triaging and initial assessment are discussed in other sections.

If the patient is not admitted to hospital and is sent home, or to an alternative care centre, provide the patient a copy of:

- a) Assessment sheet
- b) Instructions for self-management
- c) Contact names/numbers to notify if they deteriorate clinically
- d) Arrangements for follow-up as required: usually 48 hours later for adults and 24 hours for children.

5.2 Short-term observation

A special area of the hospital should be assigned for “short-term” observation of those patients whose clinical assessment does not lead to a definitive admission.

5.3 Ward management

Standard ward management of influenza patients should occur. Local plans to address potential shortages of beds, personnel, equipment and/or drugs should be in place.

5.3.1 Diagnostic and follow-up tests

The following tests and criteria for patient management, based on clinical assessment of each case, should be considered on admission to hospital. Availability of resources and the pandemic guidelines must be considered. Tests may include:

- *Chest Radiograph
- *Blood cells count
- *Urea, creatinine, electrolytes
- *Nasopharyngeal aspirate, sputum, cerebrospinal fluid for viral studies (antigen/nucleic acid determination, virus culture), and/or bacterial Gram stain and culture
- *Blood culture
- *Electrocardiogram, urine analysis, blood glucose.

5.3.2 Specific management

5.3.2.1 Anti-viral therapy (see pandemic guidelines)

Antivirals are most efficient when started within 48 hours of onset of symptoms. Since supply is expected to be limited, drugs may be reserved for patients severely ill or those with high risks for influenza-related complications (for priority groups, see section Antivirals in the pandemic guidelines). Clinical guidelines for the use of antivirals are given in other sections.

5.3.2.2 Antibiotics

Antimicrobial therapy is indicated for treatment of patients with secondary bacterial pneumonia. In any upper respiratory tract infection, runny nose and sinus inflammation (Rhinosinusitis) are common. In some cases, when severe symptoms are present or persist for more than 10-14 days, a bacterial sinusitis may be present. Acute sinusitis presents clinically with purulent nasal discharge, maxillary tooth or facial pain (especially unilateral), unilateral sinus tenderness, and worsening of these symptoms after initial improvement of influenza. In children, suspected sinusitis at 10 days to 2 weeks of symptoms would likely be treated, although it may not be in adults. Antibiotics may also be needed to treat bacterial otitis media, which is uncommon in adults but can complicate influenza in children younger than 12 years. Clinical guidelines for the use of antibiotics are given in other sections

5.3.3 General management

- * Fluid therapy. Ensure adequate fluid intake (fluid management in patients with primary viral pneumonia must be well assessed and closely monitored, because some of these patients may develop adult respiratory distress syndrome (ARDS), and under these circumstances restricted intake of liquids may be indicated.

- *Oxygen therapy based on pulse oximetry

- *Management of associated cardiovascular illness

5.3.4 Symptom control

5.3.5 Discharge Criteria and follow-up

A shortage in hospital beds is anticipated; therefore identification of patients who can be discharged or transferred to an alternative care centre must be timely. Patients will be considered clinically stable when, in the preceding 24 hours:

- *Their mental state returned to normal (or baseline)
- *They are able to maintain oral intake
- *Their vital signs remained within a specified threshold. Cut-off values should be established (e.g., O₂ saturation > 90%, heart rate ≤100/minute, respiratory rate <24/minute, blood systolic pressure > 90 mm Hg, temperature <38°C).

Once the patients are clinically stable for at least 24 hours, symptoms and signs have improved, oral therapy is being given, and they are functionally independent, discharge from the hospital with designated follow up may be considered. The use of an alternative centre of care (domiciliary care) should be contemplated if more prolonged observation is necessary for patients with pneumonia, co-morbidities, or for individuals who are not functionally independent.

Release and follow-up:

If the patient is sent home, provide a copy of:

- a) Assessment sheet
- b) Instructions for self-management
- c) Contact names/numbers to notify if they deteriorate clinically
- d) Arrangements for home care/follow-up as required: usually 48 hours later for adults and 24 hours for children.
- e) Arrangements for alternate care may be required by some patients

5.4 Intensive Care Unit (ICU)

Management of patients in the ICU will be similar to interpandemic influenza care. The clinical presentation of the disease and the availability of resources will determine which changes may be desirable throughout the pandemic. Infection control in the ICU, on the other hand, will be essential to avoid transmission of the virus to critically ill, non-influenza, patients. The isolation of influenza patients should be planned in advance .

5.5 Death Registration (see Infection control guideline for information on mortuary care)

A substantial increase in mortality throughout the pandemic is anticipated. To ensure appropriate handling of bodies, a plan for death registration must be developed beforehand.

Death registration is a local responsibility and each Counties and Regions, Therefore, National regulations must be followed.

In the pandemic situation, each jurisdiction should have a body collection plan in place to ensure that there is no unnecessary delay in moving a body to the (temporary) morgue. If the person's death does not meet any of the criteria for needing to be reported to a coroner, then the person could be moved to a holding area soon after being pronounced dead. Then, presumably on a daily basis, a physician could be found to complete the death certificate.

Funeral directors generally have standing administrative policies that prohibit them from collecting a body from the community or an institution until there is a completed certificate of death. In the event of a pandemic with many bodies, it seems likely that funeral directors could work out a more flexible practice if directed to do so by some national authority. These special arrangements must be planned in advance of the pandemic and take the regional differences in resources, geography, and population into consideration.

Appendix 5.I. Admission form

Identification

Health Care Number:	Hospital
Name: _____	
Surname/Family Name	First Name
Age _____ (yrs)	DOB ____/____/____ DD MM YYYY
DATE OF THIS ADMISSION ____/____/_____ DD MM YYYY	

Risk Assessment for Complications of Influenza

*Does this patient fall into a “high risk group” for complications of influenza? Y/N

*Tick all relevant conditional/groupings.

High-Risk Groups(adult/children)	Tick all relevant
Women in the second or third trimester of pregnancy	
Chronic cardiac disease (hypertension is not enough)	
Chronic pulmonary disease - asthma	
Chronic pulmonary disease - COAD or emphysema	
Chronic pulmonary disease - other than asthma, COAD or emphysema	
Chronic renal disease	
Non insulin dependent diabetes mellitus	
Insulin requiring diabetes mellitus	
Child with cyanotic congenital heart disease	
Adult/child receiving immunosuppressive therapy, AIDS patients	
Neoplastic disease	
Hepatic disease	
Resident of nursing home	
Resident of other chronic care facility	
Hepatic disease	
Anemia, Hemoglobinopathy	
Children or adolescent (<18 years) treated for long periods with ASA	
>65 year old < 2 years old	

Details of vaccination	Yes	No	N/A	Batch number	Date given DD/MM/YYYY	Tick if given >14 days ago
INFLUENZA vaccine within the last 12 months?						
PNEUMOCOCCAL vaccine within the last 5 years?						

Within last 3 months?	Yes	No	N/A	Date commenced DD/MM/YYYY	Date ceased DD/MM/YYYY	Tick if still taking	Dose
AMANTADINE				/ /	/ /		
RIMANTADINE				/ /	/ /		
ZANAMAVIR				/ /	/ /		
OSELTAMAVIR				/ /	/ /		

Current Medications

Drug	Details

Symptoms (adults ≥ 18 years)

Date and time of onset of first symptoms:

Clinical features on history	Yes	No	N/A	DETAILS: e.g., Date of onset, symptoms that predominate
In contact with some one with influenza in the last 3 days?				
Fever				
Chills				
Myalgia				
Arthralgia				
Headache				
Fatigue				
Runny/stuffy nose				
Cough				
Purulent sputum				
Chest Pain				
Retrosternal soreness (tracheitis)				
Breathlessness				
Anorexia				
Vomiting				
Diarrhoea				
Rash				
Other symptoms				

Examination Findings

Date ____/____/____ Time: ____:____
 DD MM YYYY HH MM

Vital signs

Description	Threshold for indication of secondary assessment	Values for this patient
Temperature	<35°C or >39°C	
Respiratory Rate	>24/minute	
Heart rate	>100/minute (>16 years)	
Blood pressure	<100 mmHg Systolic	
Altered mental status		
Oxygen saturation*	<90% on room air	
Total Score		

Respiratory examination	Left		Right	
	Yes	No	Yes	No
Reduced chest expansion				
Wheezes				
Crackles				
Bronchial Breathing				
Increased vocal resonance				
Reduced breath sounds				

Investigations

(Not all tests will be needed for all patients, and clinical judgement should be used, particularly if resources are scarce. Under optimal circumstances, blood work and CXR should be obtained before admission).

Description	Detailed findings	Outside Boundaries	Values for this patient
Chest radiograph		Pleural effusion Consistent with pneumonia Congestive heart failure	
Arterial Blood Gas ^a	pH pO ₂ pCO ₂	pH <7.35 < 90% room air > 45 mm Hg	
Pulse oximetry		< 90% room air	
Chemistry	Na K Creatinine Urea	Na <125 meq/L or >148 meq/L K <3 meq/L or >5.5 meq/ Creatinine 150mmol/ ^{lb} BUN 10.7mmol/l ^b	
Liver function	Albumin ALT AST	< 35 g/l > 35 U/L > 35 U/L	
Glucose		<3mmol/L or >13.9 mmol/L	
CBC	Hgb WBC ^c Platelets	Hgb <80 g/L Haematocrit <30% WBC <2,5000 or >12, 000 cells/L Platelets < 50,000/L	

- a Usually not required, except in COPD.
- b One of these tests is enough
- c Laboratories will do cell differentiation only on request.

Other investigations

Investigation	Requested Y/N	Specimen collected Time/date	Result
Sputum Gram stain			
Culture			
Acute serology			
Blood culture X 1			
Rapid viral test NPA			
Viral culture NPA			
Viral culture nasal swab			
CK total			
Electrocardiogram			

Microbiologic diagnostic tests (bacteriologic and/or virologic) will be performed depending on the clinical presentation and availability of resources. Once the pandemic strain is confirmed in a community, virologic tests will be needed only to confirm diagnosis in atypical cases and for surveillance purposes. Rapid tests are useful for diagnostic and treatment decisions. Isolation and culture of the virus is needed for surveillance purposes.

Ideally, all purulent sputum will be analysed by Gram staining and culture (and in some cases, sensitivity tests), to identify infecting bacteria and their susceptibility. If culture is not possible, at least Gram staining should be attempted.

Ideally, blood cultures should be obtained when the white blood cell number is over 12,000/ml, or less than 3,000/ml, the percentage of bands is higher than 15%, or if pneumonia is suspected. If resources are scarce, blood cultures will be reserved for patients who are very ill, with toxic signs and low blood pressure; for patients who fail to recover after 48 hours of treatment with antibiotics; or for patients admitted to intensive care units.

Provisional Diagnosis

Please Tick All That Apply

	YES	NO
Influenza		
Confirmed (by rapid viral test, other)		
Suspected		
Recent contact (could be incubating)		
Unlikely but at risk of complications and not immunized		
Unlikely but at risk and immunized		
Unlikely (recovered from documented influenza)		
Influenza Pneumonitis		
Confirmed (by chest radiograph and oxygen transfer)		
Suspected (by oxygen transfer)		
Unlikely		
Bacterial Pneumonia		
Confirmed		
Suspected		
Unlikely		
Other		
Pregnant		
Breastfeeding		
Other Diagnosis		

Disposition**Admitted**

- *ICU
- *General Ward
- *Other

Not admitted

Sent to:

- *Hospital in the Home
- *Home care with self-care
- *Health worker/Volunteer contacted
- *Not Traditional care centre: Hotel, School, Community Centre, etc.

Provide copy of:

- *Assessment sheet
- *Instruction sheet
- *Contact names/numbers (if get more breathless/deteriorate)

Appendix 5.II.

Rapid Virologic Diagnostic tests

After the first isolation of the pandemic strain in Trinidad and Tobago, diagnostic tests will be needed to follow the course of the pandemic in the country and for the timely detection of the virus in different communities. Early diagnosis will direct prophylaxis and may allow limiting the pandemic spread until vaccines are available. Similarly, in isolated rural areas and in northern communities as well as in semi-closed groups in urban areas (e.g., jails and long term care facilities), the early detection of the virus will permit the institution of appropriate measures to control the spread of the outbreak and to start prophylaxis and/or treatment of high-risk contacts and of indispensable individuals.

Once the pandemic strain has been isolated in a community, virologic tests will be required only for surveillance purposes (virus isolation), and to test atypical cases if the result of the test will change the management of the patient and/or contacts (rapid tests and, in some cases, virus isolation).

Rapid diagnostic tests detect influenza antigens or viral nucleic acids in nasopharyngeal secretions or swabs, nasal wash, or sputum. Rapid tests for novel viruses of pandemic potential should be developed during the inter-pandemic period. At the time of a pandemic, rapid methods that will detect the new pandemic strain will have to be identified; information regarding the reliable and affordable methods should be communicated to the front-line diagnostic laboratories. Samples should be collected within the first 4 days of illness. The quality of the sample is critical for the sensitivity of the test, and nasopharyngeal aspirates are the best samples.

Using culture as the gold standard, the sensitivity for most rapid tests that can be done in a physician's office is approximately 70% and the specificity is about 90% (i.e., that ~30% of samples that will be positive by viral culture may give negative results by rapid tests, and about 10% of positive tests will be false-positives).

Point-of-care tests have a role in the timely diagnosis of outbreaks and in providing guidance for antiviral treatment or prophylaxis. However, rapid tests cannot replace culture but need to be used in combination with viral culture. This is because presently only culture can identify subtypes and aid with surveillance and vaccine planning.

Diagnostic tests for influenza^a

Procedure	Influenza types	Specimens	Time for results	Point-of care
Viral culture	A and B	NP ^b swab, throat swab, nasal wash, bronchial wash, nasal aspirate, Sputum	5-10 days ^c	No
Immunofluorescence	A and B	NP ^b swab, nasal wash, bronchial wash, nasal aspirate, Sputum	2-4 hours	2-4 hours
Influenza Enzyme Immuno-Assay (EIA)	A and B	NP ^b swab, throat swab, nasal wash, bronchial wash	2 hours	No
Directigen Flu-A Bencton-Dickinson	A	NP ^b swab, throat swab, nasal wash, bronchial wash, nasal aspirate	< 30 minutes	Yes
Directigen Flu-A+B Bencton-Dickinson		NP ^b swab, throat swab, nasal wash, bronchial wash, nasal aspirate	< 30 minutes	Yes
Flu OIA (Biostar)	A and B ^d	NP ^b swab, throat swab, nasal wash, bronchial wash, nasal aspirate, Sputum	< 30 minutes	Yes
Quick Vue (Quidel)	A and B ^d	NP ^b swab, throat swab, nasal wash, bronchial wash, nasal aspirate	< 30 minutes	Yes
Zstat Flu (Zyme Tx)	A and B ^d	Throat swab	< 30 minutes	Yes
RT-PCR ^e	A and B	NP ^b swab, throat swab, nasal wash, bronchial wash, nasal aspirate, Sputum	1-2 days	No
Serology: Hemagglutination Inhibition (HAI)/ Complement fixation (CF)	A and B	Paired acute and convalescent serum samples	> 2 weeks	No

a List published by the CDC31, it may not include all test kits approved in Trinidad and Tobago.

b NP = nasopharyngeal

c Shell vial cultures, if available, may reduce the time for results to 2 days

d Does not distinguish between influenza A and B

e RT-PCR = reverse transcriptase polymerase chain reaction

Appendix 5.III.

Antiviral Drugs for preventing and treating influenza

Two classes of drugs, adamantanes (amantadine and rimantadine) and neuraminidase inhibitors (NI, zanamivir and oseltamivir) are currently available for prevention and treatment of influenza. Adamantanes act by inhibiting the activity of the M2 protein, required for the release of viral genetic material inside the cells^{126,211}. These drugs reduce viral shedding and decrease the duration of illness by approximately one day if started within 48 hours of illness onset. However, reduction of complications, or improved outcomes for hospitalized patients has not been adequately evaluated yet.

Intolerance, and the rapid development of resistance to amantadine and rimantadine are major limitations to the use of these agents. Resistance is the consequence of a single point mutation in the M2 gene that completely abolishes the binding of the drug without affecting the transmission to susceptible contacts. Adamantanes have a relatively long half-life, and, since amantadine depends on renal function for excretion, dose adjustments and close supervision are required in cases of renal insufficiency. In addition, central nervous system side effects are relatively frequent after amantadine (10-30%). Teratogenicity as well as embryo-toxic effects have been reported in animals, and studies of pregnant women receiving amantadine to treat Parkinson's disease, show variable adverse effects in the offspring, including miscarriage.

Neuraminidase inhibitors (NI), on the other hand, inhibit the neuraminidase molecule (NA), indispensable for the release of new-formed virus from infected cells. Neuraminidase inhibitors are active against human influenza A (all 9 known NA molecules) and B viruses, and also against avian viruses. Oseltamivir, on the other hand, requires dose reduction for patients with low creatinine clearance (<30mL/min). Gastrointestinal intolerance (usually lasting less than a day) occurs in 5-15% of oseltamivir recipients but seldom (< 2%) leads to drug discontinuation. Oseltamivir causes no other important side effects.

Neuraminidase inhibitors decrease the duration of illness approximately by one day, when used within 48 hours of the onset of illness²¹¹. Although there are no studies to date demonstrating improved outcomes after hospitalizations or reduced mortality after treatment of patients with influenza with NI, a drop in antibiotic use for lower respiratory complications, and fewer secondary complications such as clinically diagnosed bronchitis and sinusitis have been reported. Neuraminidase inhibitors have been approved for clinical use only recently (1999), therefore, more studies are required to confirm their safety and activity in preventing and treating influenza in high-risk individuals.

Prophylaxis and Treatment with Antiviral Drugs

Indications, Doses, Toxicity

The current indications (year 2002) for the use of antivirals in the prophylaxis and treatment of influenza in Trinidad and Tobago are:

1. Amantadine (Symmetrel^R):

Prophylaxis: Prevention of respiratory infections caused by influenza A virus strains.

Treatment: Treatment of respiratory infections caused by influenza A strains.

2. Zanamivir (Relenza^R):

Treatment of **uncomplicated acute illness due to influenza virus in patients 12 years and older who have been symptomatic for no more than 2 days.**

3. Oseltamivir (Tamiflu^R):

Prophylaxis: Since 2000, oseltamivir is licensed in Trinidad and Tobago for prophylaxis in adults and adolescents 13 years of age and older. The safety and efficacy of oseltamivir for prophylaxis in pediatric patients younger than 13 years of age have not been established.

Treatment: of uncomplicated acute illness due to influenza infection in adults who have been symptomatic for no more than 2 days.

Amantadine is protective when used for prophylaxis up to a 6-week period. When used for treatment, the drug does not interfere with the development of protective antibodies. Drug resistance has been induced with amantadine, when used for prophylaxis and concurrent treatment in outbreaks. Special issues need to be considered when amantadine is used for prophylaxis, especially for a long period (6 weeks was the longest period formally studied in controlled trials). These issues include¹ the need for individualized prescriptions for amantadine use due to its low toxic: therapeutic ratio and its dependency on renal function for elimination, the need to monitor subjects for side effects and³ the need to consider the relatively high risk of emergence of drug-resistant virus and to adjust the management of patients when prophylaxis fails and treatment has to be started.

Neuraminidase inhibitors showed efficacy for post-exposure prophylaxis and for treatment of influenza infections. To date, resistance to zanamivir and oseltamivir has been shown to occur infrequently in normal hosts. In one immunocompromised child treated with zanamivir for influenza, zanamivir resistant virus was detected, but to this time, intensive surveillance for resistant mutants has demonstrated that NI-resistance emerges uncommonly during therapy. Intense surveillance for NI-resistance emergence is ongoing. On the other hand, viruses resistant to zanamivir have been isolated in vitro, after passages in cell cultures, and the mutations that abolish the binding of the drug have been characterized. Since the functional groups of the two neuraminidase-inhibitors have some differences in their binding sites, mutants resistant to one drug may be susceptible to the other.

Recommended doses

Drug (trade name)	Prophylaxis (P), Doses	Treatment (T)c, Doses	Level of evidence and Grade of Recommendation*
Amantadine (Symmetrel ^R)	Children: 1-9 years, according to their weight ^a	Children: 1-9 years, according to their weight ^a	Children: Prophylaxis: I/A Treatment: I/A
	Adults: 100 mg/ 2 times per day ^a	Adults: 100 mg/twice daily, 5 days ^a 65 years: 100mg/day ^a	Adults: Prophylaxis: I/A Treatment: I/A
Zanamivir (Relenza ^R)	Not yet approved	Children: 7 years, 10 mg/ 2 times per day, 5 days ^b	Children: Prophylaxis: no data Treatment: I/A
		Adults: 10 mg (2 puffs)/2 times per day, 5 days ^b	Adults: Prophylaxis: I/A Treatment: I/A
Oseltamivir (Tamiflu ^R)	Adults and adolescents older than 13 years of age ^d	Children: (1 year according to their weight ^e	Children: Prophylaxis: no data Treatment: I/A
		Adults: 75 mg/2 times per day, 5 days	Adults/adolescents: Prophylaxis: I/A Treatment: I/A

*Level of evidence (I-V) and Grade of Recommendation (A-C)³. Grade A recommendation for therapy (i.e., good support) requires the support of level I evidence (i.e., evidence from at least one properly randomized controlled trial, or from trials with large samples, or from meta-analysis of multiple smaller studies with consistent results).

a For children 1-9 years of age the recommended doses of amantadine are: 5.0 mg/kg per day, up to a maximum of 150mg/day, in two divided doses. For children (10 years old, who weigh > 40 kg, the recommended doses are 200 mg/day in two doses. Treatment will continue until defervescence, up to a maximum of 3-5 days. For prophylaxis up to 6 weeks. Doses have to be reduced and monitored in individuals with seizures (100 mg/day) and in individuals with renal dysfunction.

b Zanamivir is inhaled orally; therefore, children younger than 5 years and elderly adults may require assistance in the use of the DiskhalerTM provided by the manufacturer.

c Treatment should be initiated as soon as possible and no more than 48 hours after onset of symptoms (better after 36 hours or less), because the earlier is the start the more effective are the results.

d Please refer to the current product monograph for dosage recommendations.

e Recommended dose of oseltamivir oral suspension for pediatric patients < 1 year.

Amantadine dosage

No renal impairment		
Age	Dosage	
1-9 years	5 mg/kg once daily, or divided twice daily, total daily dose not to exceed 150 mg	
10-64 years	200 mg once daily, or divided twice daily	
≥ 65 years	100 mg once daily	
Renal impairment		
Creatinine clearance ml/min/1.73 m²	Dosage for those 10-64 years of age	Dosage for those ≥ 65 years of age
80 ml/min	100 mg twice daily	100 mg once daily
60-79 ml/min	60-79 ml/min Alternating daily doses of 200 mg and 100 mg	Alternating daily doses of 100 mg and 50 mg
40-59 ml/min	100 mg once daily	100 mg every two days
30-39 ml/min	200 mg twice weekly	100 mg twice weekly
20-29 ml/min	100 mg three times/week	50 mg three times/week
10-19 ml/min	10-19 ml/min Alternating weekly doses of 200 mg and 100 mg	Alternating weekly doses of 100 mg and 50 mg

Doses of oseltamivir in children

Body Weight in kg	Recommended dose for 5 days
<15 kg	30 mg twice daily
> 15 to 23 kg	45 mg twice daily
> 23 to 40 kg	60 mg twice daily
> 40 kg	75 mg twice daily

Doses should be reduced by one-half in patients with creatinine clearance <30 mL/min, although oseltamivir does not cause dose-related side effects (specifically more nausea and vomiting at higher doses).

Side effects and adverse reactions

Side effects	Amantadine*	Zanamivir**	Oseltamivir
Gastrointestinal	Vomiting Nausea Anorexia		Nausea Vomiting severe if (less taken with food)
CNS	Nervousness Anxiety Insomnia Seizures Delirium Hallucinations		
Cardiovascular	Arrhythmias, in over dosage		
Respiratory		Bronchospasm Exacerbation of underlying chronic respiratory disease	

* Side effects are usually mild and diminish or disappear after one week taking the drug. Serious effects have been observed, however, associated with high plasma concentrations of the drug. Toxicity is observed more frequently in individuals with renal insufficiency, seizures, in the elderly, or after higher doses.

** Zanamivir is not recommended in individuals with asthma or chronic obstructive pulmonary disease; however, if the benefits surpass the risks, the drug should be used with caution and under proper monitoring and supportive care.

Drug interactions

Limited clinical data are available regarding drug interactions and careful observation is recommended when administered concurrently with drugs that affect the nervous system, antihistamines, or drugs that may interfere with the excretion by the kidneys (i.e., probenecid). **Package inserts should be consulted.**

New developments

New drugs are being developed for the prevention and treatment of influenza infections, and such developments may change the existing guidelines. Particularly, a single dose dimerized zanamivir is presently in early trials, and may be a good candidate in case of a pandemic.

Pandemic use of antivirals

Limited data are available about the potential of antivirals to prevent infection and/or treat disease in pandemic situations. Amantadine was observed to be efficacious and safe for prevention and treatment of infection due to influenza A/Hong Kong/68 in the year after its appearance in 1968.

During a pandemic, the antiviral strategy should utilize all anti-influenza drugs available to Trinidad and Tobago citizens. Either M2 ion channel inhibitors (e.g., amantadine) or

neuraminidase inhibitors (e.g., oseltamivir) can be used for prophylaxis but only neuraminidase inhibitors should be used for treatment.

Rationale for the roles of amantadine and neuraminidase inhibitors:

1. Rapid emergence of resistance has been observed during amantadine treatment but resistance has been uncommonly observed during therapy with neuraminidase inhibitors.
2. Neuraminidase inhibitors are currently approved for treatment. Oseltamivir is now licensed for prophylaxis in adults and adolescents over 13 years of age .
3. Although neuraminidase inhibitors are associated with fewer side effects and viral resistance may be less likely to develop as compared to amantadine, evidence that they have a greater efficacy than amantadine for prophylaxis is still required. The cost of these drugs is substantially greater than that of amantadine.

Chemoprophylaxis is not a substitute for vaccination; however, it is expected that vaccines are not going to be available (or will be available only in limited amounts), during the first months of a pandemic. In addition, not all patients can be vaccinated and some individuals may need supplementary protection until their antibodies reach a protective level or because their immune system is defective. Since the pandemic strain will be new for the population, a second dose of the vaccine may be required before protective immunity is developed; therefore, protective prophylaxis may be needed for up to 6 weeks: 4 weeks after the first dose and 2 after the second dose.

It is expected that there will be a limited supply of anti-influenza drugs available during a pandemic; therefore, priorities for the use of these agents have been established. Epidemiological surveillance during the pandemic will confirm these priorities or identify new priority groups.

(Preliminary) priority groups

The following groups in descending order of priority, are offered as planning guidance but will need to be re-examined at the time of a pandemic alert when epidemiologic data about the pandemic virus is available.

1. Treatment of persons hospitalized for influenza
2. Treatment of ill health care and emergency services workers
3. Treatment of ill high-risk persons* in the community
4. Prophylaxis of health care workers
5. Control outbreaks in high-risk residents of institutions (nursing homes and other chronic care facilities)
6. Prophylaxis of essential service workers
7. Prophylaxis of high-risk persons* hospitalized for illnesses other than influenza
8. Prophylaxis of high-risk persons* in the community

***Note:** during a pandemic the definition of high-risk persons may change based on epidemiologic evidence.

The mass prophylaxis of children to control a pandemic is currently not recommended.

Appendix 5.IV.

Antibiotics

Antimicrobial therapy will be indicated for treatment of patients with secondary bacterial pneumonia. Acute bacterial sinusitis is another secondary bacterial infection, but antimicrobials are not indicated for this complication unless symptoms are severe. Otitis media, another potential bacterial superinfection, is uncommon in adults but very common in children. Diagnosis of secondary bacterial pneumonia should be considered with:

1. Clinical deterioration after a period of clinical improvement following the initial onset of influenza; especially if there is a new onset of purulent sputum or dyspnea.
2. Radiographic consolidation.

Purulent sputum without radiographic consolidation is not an indication for antimicrobial therapy, unless the patient has pre-existing chronic obstructive pulmonary disease. Expectoration of purulent sputum with a normal chest radiograph, concomitant or shortly after the onset of influenza (up to 14 days), however, suggests bacterial bronchitis. If it is severe, or occurs in individuals vulnerable to superinfection, the use of antibiotics should be considered.

In any upper respiratory tract infection, runny nose and sinus inflammation (Rhinosinusitis) are common. In some cases, when severe symptoms are present or persist for more than 10-14 days, a bacterial sinusitis may be present. Acute sinusitis presents clinically with purulent nasal discharge, maxillary tooth or facial pain (especially unilateral), unilateral sinus tenderness, and worsening of these symptoms after initial improvement of influenza. In children, suspected sinusitis at 10 days to 2 weeks of symptoms would likely be treated, although it may not be in adults. Acute bacterial sinusitis does not require antibiotic treatment if symptoms are mild or moderate. Most patients with a clinical diagnosis of rhinosinusitis improve without antibiotic treatment and, therefore, only appropriate doses of analgesics, antipyretics and decongestants should be offered. Only patients with severe or persistent symptoms and clinical findings specific for bacterial sinusitis should be treated with antimicrobials. Narrow spectrum antibiotics are reasonable first line agents for these patients.

Issues to be considered in providing antimicrobial therapy in the pandemic influenza setting include:

*The availability of antimicrobials during a pandemic may be limited because of increased demand. Provincial and federal governments should have antibiotics stockpiled for such a contingency. However, the potential limited supply means antimicrobials should be prescribed judiciously. Influenza infection, by itself, without secondary bacterial complications, should not be treated with antimicrobials.

*A wide variety of antimicrobial agents will be effective for the treatment of secondary bacterial pneumonia. As a general rule, it is not desirable to treat all individuals with the same antibiotic, as this may promote resistance to that antimicrobial and limit efficacy. A

variety of antimicrobials that are effective. **Antimicrobials for empiric treatment should be reviewed and updated regularly, considering the availability of new antimicrobials and the evolution of bacterial resistance among respiratory pathogens.**

**Staphylococcus aureus* is a pathogen isolated frequently in secondary bacterial pneumonia and initial antimicrobial therapy should include coverage for methicillin susceptible *Staphylococcus aureus*. Other common bacteria include *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis*, and group A streptococcus. Antimicrobials which provide a broader coverage for resistant organisms should be considered in selected circumstances: patients known to previously have had infection with a resistant organism; patients who have failed or recurred following initial antimicrobial therapy; and patients who have severe clinical presentations including respiratory failure or hemodynamic instability.

*Antimicrobial resistance is a consideration in antimicrobial selection. Current levels of resistance are low but increasing, and the clinical impact of antimicrobial resistance in respiratory infections remains controversial. The prevalence of antimicrobial resistance in common respiratory pathogens should be monitored in the pre-pandemic period and during the pandemic in patients with bacterial pneumonia. This information must be provided to practicing physicians in a timely manner.

*For adult patients hospitalized with a diagnosis of bacterial pneumonia, a sputum specimen for culture and susceptibility testing should be obtained, whenever possible. Once culture results are available, usually in 48-72 hours, antimicrobial therapy should be reassessed and modified based on these results. Sputum specimens from ambulatory patients would not be routinely recommended, but should be obtained if patients have recently received antimicrobial therapy, or if the clinical response to initial antimicrobial therapy is sub optimal.

- Patients not admitted to hospital may be treated with oral therapy. Patients admitted to hospital will usually require parenteral therapy, but oral therapy may be considered for selected cases. Parenteral therapy should be modified to oral therapy once the patient has stabilized. The selection of an antimicrobial agent will be based on sputum and blood culture and sensitivity results, patient tolerance, local prevalence of antimicrobial resistance, and availability.

Suggested empiric antimicrobial therapy for the treatment of acute secondary bacterial pneumonia (adults ≥ 18 years)

Oral: First line
Second generation cephalosporin (e.g., cefuroxime, cefaclor) clarithromycin* azithromycin* erythromycin* doxycycline trimethoprim/sulfamethoxazole (TMP/SMX)
Increased likelihood of high level resistance
Amoxicillin/clavulanic acid levofloxacin moxifloxacin gatifloxacin
Parenteral
Second generation cephalosporin (e.g., cefuroxime) Third generation cephalosporin if septic (e.g., ceftriaxone, cefotaxime) piperacillin/tazobactam levofloxacin gatifloxacin imipenem (if septic) meropenem (if septic)

* Macrolides should only be used as a first line agent when bacteremia is unlikely.

Antimicrobials for the treatment of secondary bacterial pneumonia in patients with influenza where the infecting organism and susceptibility are known from sputum or blood culture (adults ≥ 18 years)

Organism	Antimicrobial
<i>Streptococcus pneumoniae</i> -penicillin susceptible	penicillin G, amoxicillin, erythromycin*, clarithromycin*, azithromycin*, doxycycline
-penicillin high level resistance	amoxicillin (high dose), levofloxacin, gatifloxacin, moxifloxacin, third generation cephalosporin (e.g., ceftriaxone, cefotaxime)
<i>Haemophilus influenzae</i> -beta lactamase negative	amoxicillin, ampicillin (IV), cefuroxime, clarithromycin, azithromycin
-beta lactamase positive	TMP/SMX, second generation cephalosporin (e.g., cefuroxime), third generation cephalosporin (e.g., cefotaxime, ceftriaxone), clarithromycin*, azithromycin*, amoxicillin/clavulanic acid, ciprofloxacin, levofloxacin, gatifloxacin, moxifloxacin
<i>Staphylococcus aureus</i> methicillin susceptible	cloxacillin, TMP/SMX, first generation cephalosporin (e.g., cephalexin, cefazolin), clarithromycin*, azithromycin*
methicillin resistant	vancomycin, linezolid (use clindamycin or TMP/SMX if sensitive)

Note: when organisms are isolated from cultures, definitive antibiotic therapy will be guided by susceptibility testing (if done) and availability of specific antibiotics.

* Macrolides should only be used if bacteremia is absent.

Management of Bacterial Pneumonia in children

Once bacterial pneumonia is diagnosed (or strongly suspected), therapy with antibiotics should be initiated without delay. When possible, the Gram stain of sputum or tracheal aspirate should be obtained. If not, an empiric treatment should be started (based on the frequency of pathogens for the different age groups and on the most common agents identified in the community). Children with mild disease can be treated at home; however, hospitalization (or alternative centre of care) will be indicated for very young children (first year of life), those children with severe disease, those who look toxic and/or have severe pulmonary dysfunction, and also for those children who may not receive appropriate care at home.

Suggested empiric antimicrobial therapy for the treatment of acute secondary bacterial pneumonia in children

Age	Outpatient (oral)	Inpatient	Inpatient with signs of sepsis, and/or alveolar infiltrate or pleural effusion
3w- 3m	Afebrile: Erythromycin or Azithromycin Admit if fever or hypoxia	Afebrile: Erythromycin* Febrile: Add Cefotaxime	IV Cefotaxime IV
4m- 4y	Amoxicillin	Ampicillin IV	Cefotaxime IV, or Cefuroxime IV, or Ampicillin IV
5-15y	Erythromycin, or Clarithromycin, or Azithromycin, or Doxycycline (>8 years)	Erythromycin* IV, or Azithromycin* IV, or Doxycycline IV (>8 years)	Cefotaxime IV, or Cefuroxime IV consider adding Azithromycin IV

- Macrolides should only be used as a first line agent when bacteremia is unlikely

Antimicrobials for the treatment of secondary bacterial pneumonia in children with influenza, where the infecting organism and susceptibility are known from sputum or blood culture (< 18 years)

Organism	Antimicrobial
<p><i>Streptococcus pneumoniae</i> -penicillin susceptible</p> <p>-penicillin high level resistance</p>	<p>penicillin G (IV, IM), Penicillin V (oral), clarithromycin*, azithromycin*, TMP/SMX</p> <p>third generation cephalosporin (e.g. cefotaxime or ceftriaxone), Vancomycin</p>
<p><i>Haemophilus influenzae</i> -beta lactamase negative</p> <p>-beta lactamase positive</p>	<p>Amoxicillin, ampicillin, azithromycin*, clarithromycin*</p> <p>second generation cephalosporin (e.g., cefuroxime,) third generation cephalosporin (e.g., cefotaxime, ceftriaxone), amoxicillin/ clavulanic acid, azithromycin*, clarithromycin* and TMP/SMX</p>
<p><i>Staphylococcus aureus</i> methicillin susceptible</p> <p>methicillin resistant</p>	<p>Cloxacillin, first generation cephalosporin (e.g. cephalazolin), cephalexin</p> <p>Vancomycin, linezolid (use clindamycin* or TMP/ SMX if sensitive)</p>

Note: when organisms are isolated from cultures, definitive antibiotic therapy will be guided by susceptibility testing (if done) and availability of specific antibiotics.

* Macrolides should only be used if bacteremia is absent.

The drug of choice for pneumonia due to *S. pneumoniae* is penicillin G. Cefotaxime or ceftriaxone should be used if the isolate is resistant to penicillin, and vancomycin if it is resistant to both.

Chapter 6. Special Circumstances

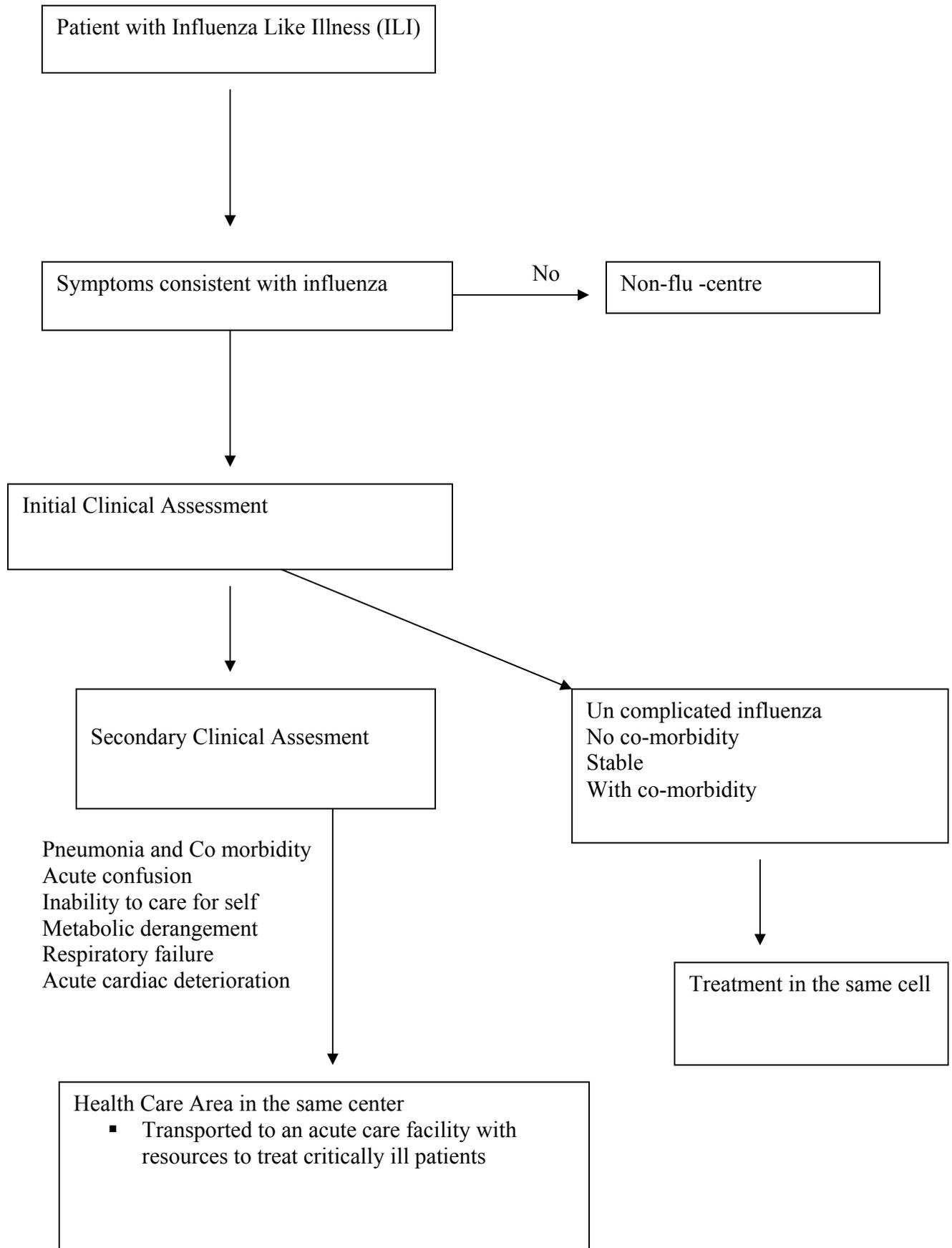
6.1 Correctional and penal institutions

6.1.1 Federal Correctional Institutions

Health resources

Health services in correctional institutions are provided by health care professionals. Access by inmates to health services is available on a 24-hour basis. It can be provided through on-site coverage (nursing care coverage fluctuate from eight to twenty-four hours, depending on the institution security level and location), on an on-call basis, or community services. Contracted medical care is provided in every correctional facility, either on-site or off-site.

6.2. Correctional and penal institutions
Triage of patients in correctional institutions*



Legend for

1. A special “emergency” area should be assigned for the triage, assessment and treatment of influenza patients. All patients will be evaluated following the primary assessment algorithms, and some patients more seriously ill may need further evaluation

2. Some influenza patients will be able to care for themselves in their cells; contains some helpful self-evaluation criteria and instructions for self-treatment. Other patients, however, may need more intensive care in a special area assigned for this purpose. Only critically ill patients may be transported to an acute care centre.

A goal, in the pandemic situation, will be to manage patients within the same institution without transferring them to an acute care facility. This will require that each institution designate an area for the acute care of inmates, with some monitoring and nursing care. Most large federal institutions, and some provincial institutions, already have an area for sub-acute care that can be used for this purpose in case of a pandemic.

Prior to any pandemic, correctional institutions should develop policies that will support appropriate management of inmates and personnel. The inter-pandemic epidemics suffered almost every year are excellent opportunities to develop such policies and test their efficacy. Non-compulsive vaccination of inmates in federal correction centres is performed every year, before the beginning of the “flu-season”.

Pandemic preparedness should include:

- a) An institutional policy for the management of influenza outbreaks.
- b) Implement immunization of inmates and personnel when/if vaccine is available.
- c) Plans for the establishment of an area within the facility for management of more acutely ill patients. These plans should also include 24 hours of nursing care for influenza patients who require close observation or care.

6.2.1. Initial assessment of patients with an influenza like illness: The initial assessment and evaluation of the inmates will include

- d) History: age, length of residence in the detention centre, co-morbid illnesses, documentation of previous influenza vaccinations, time of onset of symptoms.
- e) Physical assessment: temperature, skin color, pulse, blood pressure, respiratory rate, peripheral edema, chest auscultation, chest pain on inspiration, mental status, function (vomiting, etc.).
- f) For individuals who are clinically stable and not judged to be severely ill this may be sufficient.

6.2.2. Secondary assessment

If there are concerns about metabolic status, or the degree of illness of an inmate, additional tests may be done, as required by the clinical presentation (ideally CBC with white cell count, electrolytes, blood glucose, CPK, BUN, creatinine, an EKG if there is a history of cardiovascular disease and/or evidence of significant deterioration in cardiac status). Some correctional institutions have the facilities to do blood work regularly - in

some institutions it can be done daily or biweekly (depending mostly of the size and location of the institution).

Depending on the availability of resources, the determination of O₂ saturation in patients severely ill will be desirable. Individuals with an oxygen saturation of (90% on room air, with new purulent sputum, or respiratory rate (30 per minute should have a chest X-Ray performed. A sputum culture may be obtained from patients who are producing sputum and appear to be severely toxic or who have pneumonia.

Most federal maximum and medium institutions have X-Ray equipment and technician in place (the number of clinics per week depends of the size of the institution). Minimum-security institutions are affiliated with larger institutions with which they share the ground and some health care services such as radiography and laboratory services. Some provincial institutions also count with X-Ray equipment.

Correctional centres should have in place arrangements by which timely chest X-Rays and laboratory results may be obtained, and should also consider a phone reporting system to ensure that results are returned promptly and in a standardized fashion.

6.2.3. Co-morbidities

Some inmates may suffer from diseases that will increase their risk for complicated influenza, like diabetes, COPD, asthma, etc.. In addition, the percentage of offenders who smoke is very high and high rates of infectious diseases such as hepatitis C (up to 22% in some jails), HIV/AIDS (1.6% in some federal jails), tuberculosis, etc. are frequently observed in this population. The presence of one or more of these co-morbidities should be considered when treating or preventing influenza infections in inmates.

6.2.4 Instructions for the management of subjects remaining in correctional establishments

A written plan for the management of more seriously ill influenza patients who stay in the establishment should be in place in each institution. This will include diagnostic and follow-up tests, responsibilities of medical and non-medical personnel, and use of medication (consistent with the national pandemic plan).

a) **Diagnostic and follow-up tests:** as required:

*Chest X-Rays

*Blood tests, urine analysis, etc.

*Viral/Bacterial studies: sputum, nasopharyngeal aspirate.

b) **General management:** Specific aspects of management of influenza and its complications may include:

1. **Oxygenation.** Patients with an oxygen saturation of <90% on room air should have oxygen supplementation. This may usually be given by portable oxygen with nasal prongs. Where this is insufficient, patients may require more aggressive efforts of oxygenation including non-intubation methods of respiratory therapy.

2. **Antipyretics and analgesics** may be required to limit discomfort associated with myalgia and arthralgia. Usually acetaminophen will be sufficient.

3. **Maintenance of hydration.** This may be achieved through oral fluids or if necessary through parenteral fluids.

4. **Other therapies** such as antitussives may occasionally be indicated depending on the clinical features of the given patient.

c) **Specific therapy:** Specific therapy is directed at the influenza infection itself and influenza complications including secondary pneumonia and/or aggravation of pre-existing disease. When antivirals/antibiotics are not available, symptom control and oxygenation may be the only resources.

1. Antiviral agents including amantadine (for prevention), zanamivir, and oseltamivir (for treatment) may be given for the prevention and treatment of influenza. Treatment with these drugs is, usually, only indicated if symptoms have been present for less than 48 hours. They may not be available, depending on supplies and on the priorities for the pandemic situation. When amantadine is used attention to renal function must be assured

2. Antibiotics should be given only for the management of secondary bacterial pneumonia

3. Management of preexisting disease: Cardiovascular, respiratory, metabolic, AIDS/hepatitis C, etc.

6.2.5 Transfer to and from Acute Care facilities

A goal, in the pandemic situation, will be to manage patients within the same correctional institution; however, some patients may need to be moved to an acute care facility for more intensive treatment. The regulation of these transfers should be planned in the interpandemic period.

Annex G

Resources Management Guidelines for Health Care Facilities during Influenza Pandemic

Introduction

During influenza epidemics and pandemics when the overall attack rate is relatively high, even a low frequency of complications will result in marked increases in rates of hospitalizations. Pandemic influenza usually occurs in waves lasting 6 to 8 weeks in any one location. Therefore the demand on health care services provided at health care facilities can be expected to increase, peak and decline during the weeks in which any one location is affected.

It is estimated that between 15% and 35% will be the attack rate during the next pandemic in Trinidad and Tobago. This will put enormous stresses on all aspects of the medical system and medical resources will be stretched beyond capacity.

This document is divided into a background section and two main guidelines sections: one regarding the management of resources in health care facilities, and the other, on the need for and identification of additional human resources as part of pandemic planning activities involving health care facilities. These guidelines identify activities for the interpandemic, pandemic and post-pandemic periods.

Although these guidelines focus on resource management in health care facilities, health services are delivered in many other settings, including: triage centres; telephone health support; physician clinics; ambulance/paramedical services; patient transport services; home care; long term care facilities, and public health. In addition, “non-traditional” health care sites may be set up for the pandemic response (e.g., mobile health units, acute /sub-health care facilities). Regional and county planners will need to address resource management issues for all health services settings.

1. Background

1.1 Planning Assumptions

Current disaster plans primarily address multi-casualty, short-term, localised emergency situations. In a pandemic the impact is virtually world-wide and the duration of the “emergency” will be longer. Since multiple jurisdictions will be affected simultaneously, the sharing and exchange of resources may not be possible between jurisdictions.

For the purposes of resource planning for pandemic influenza the following assumptions have been made.

a) It is unlikely that there will be a “Declaration of Emergency”.

Regional Pandemic Plans should not assume that a National Emergency will be “declared”, as this is unlikely to occur in the event of a pandemic.

b) The health care system may be overwhelmed.

There will be an increase in physician visits, hospitalizations and deaths putting the health care system under extreme stress.

*Trinidad and Tobago institutions are presently running at or close to maximal bed capacity and budget cutbacks and staff shortages have meant that many jurisdictions have already reduced elective admissions.

*Increasing or even maintaining existing bed capacity requires committed human resources. During a pandemic, shortages of personnel, supplies and equipment can be expected to limit the ability of institutions to respond to a significant increase in patient volume.

c) The best use of resources will be achieved through system-wide prioritization.

A pandemic will require prioritization of needs and resources, across the health care system, not just a review of resources at a single institution. For example, in terms of human resources, health care professionals may need to be moved from vaccination clinics to hospitals or from one hospital to another. Beds, ventilators and other equipment may need to be moved to non-traditional sites. This will require a review of logistical, ethical and practical issues.

d) There will be limited transfer of resources.

The global nature of the crisis will mean that resources from other jurisdictions cannot be depended upon for meeting additional requirements during a pandemic.

e) The usual supply lines will be disrupted.

The demand for medications, medical/surgical and other supplies will increase substantially around the world and across the country. Suppliers may experience difficulties responding to increased demand, due to staff shortages, raw material shortages and transportation disruptions. Additionally, because most medications, equipment and supplies are produced outside of Trinidad and Tobago, there will be

barriers to obtaining supplies which include embargoes of medications, cross border issues and transportation issues due to staff shortages.

f) A pandemic vaccine may be unavailable.

There will likely be no vaccine available until well into the first wave of a pandemic or later, depending on the time necessary to find a suitable vaccine seed strain, and for development, testing and production. When a vaccine does become available, immunization clinics targeting health care workers may need to be established inside health care facilities.

g) Anti-influenza drugs will be in short supply.

Currently no raw materials or anti-influenza drugs are produced in Trinidad and Tobago. Existing supplies are very limited and insufficient to form the basis for an effective antiviral response strategy. Stockpiling of these medications is being considered. When and if antiviral drugs are made available, treatment and prophylaxis for people seeking health care services at health care facilities will need to be prioritised according to national recommendations.

h) The number of essential service workers will be reduced.

The availability of health care workers, and service providers essential to limiting societal disruption during a pandemic, may be reduced due to illness in themselves or family members.

i) The pandemic will occur in waves.

The pandemic will likely occur in successive waves of approximately six to eight weeks duration in any one community followed by a recovery period of unknown duration. Between the waves substantial resources will be required to “catch up” with elective procedures, delayed treatments for cancer or cardiac care and other treatments. Maintenance on equipment, restocking of supplies, and other activities necessary to recover and prepare for another pandemic wave will need to occur during this time frame.

1.2 Projecting the Impact

No one can predict how serious the impact of the next influenza pandemic may be. Estimates emanating from Canada and the United State have been calculated based on attack rates for symptomatic illness of 15% and 35%, however, higher attack rates are possible. Local estimates of the potential impact of a pandemic (the number of ill persons, the number of hospitalisations, number of deaths, etc.) can be projected using software programs, e.g., the “FluSurge” and “FluAid” software developed by the Centers for Disease Control and Prevention in the U.S.

This software presents some challenges and has some limitations based on the fact that it is geared to the U.S. health care system and health seeking behaviours, which may be quite different from Trinidad and Tobago. Currently there are no reliable tools for estimating rates of incubation, which would assist in planning for equipment such as ventilators.

2. Resource Management in Health Care Facilities

2.1 Resource Management During the Interpandemic Period

The following activities should take place during the interpandemic period. Further detail is provided below this list.

- *Review emergency preparedness legislation
- *Identify triggers for intervention
- *Planning for increased bed capacity
- *Plan for patient prioritisation
- *Plan for critical equipment and supplies

2.1.1 Review Emergency Preparedness Legislation

Emergency Preparedness Legislation makes many provisions for the management of a crisis, obtaining and accessing materials, and other resources, implementation of crisis plans and also provides for a crisis management structure. This includes the recruitment of professional and other paid staff as well as volunteers, managing human resources and protection of people who volunteer. Pandemic planning should be integrated with the emergency legislation as well as emergency plans of the jurisdictions in order to make best use of existing plans and resources.

Important Note: National Health planners should assess issues such as workers compensation and liability insurance, maintaining and supporting workers and other aspects of the plan that may arise.

The national support framework is not contingent upon a declaration of a national emergency. It is recommended that all regional and counties' planners review Emergency legislation to determine how to integrate plans within the framework of emergency legislation.

For example it is important to identify what provisions of legislation are particularly applicable to obtaining use of property and materials in a crisis. These provisions would include but likely not be limited to:

- *the ability and responsibility of authorities to requisition property for use as Non-Traditional Sites,
- *access to transportation, materials, administrative staff and other resources, and
- *compensation for requisitioned property.

2.1.2 Identify Triggers for Implementation

Existing legislation and emergency plans at the government and institutional level already identify criteria that would trigger the implementation of specific plans. The Trinidad and Tobago Pandemic Influenza Plan will also describe general points of action.

In co-ordination with existing legislation and plans, National, Regional and Local authorities and institutions should identify key criteria and methodologies that would

trigger the phased implementation of plans regarding resource management activities in their jurisdiction. The CEO/RHAs and local medical officer/s of health, together with the local pandemic response team, will decide when to initiate the pandemic influenza plan for their jurisdiction.

Since it is unlikely that the pandemic will start in Trinidad and Tobago, the first trigger may be reports of the severity and epidemiology of the pandemic from other countries. This will likely be the first indicator of what to expect when the pandemic reaches Trinidad and Tobago in terms of demand for health care services.

Local health care resources and local disease epidemiology, for example, the number of confirmed influenza cases in the community, or data on the impact of pandemic influenza on other Regions or Counties, will determine the triggers for health services emergency plans.

These triggers may include:

- *The proportion of emergency room visits attributable to influenza.
- *The proportion of influenza cases requiring hospitalisation.
- *The capacity of the hospital to accommodate influenza cases.

Other triggers may include reports from sentinel physician or walk-in clinics that they cannot accommodate all of the patients requesting appointments for influenza-like-illness. Ambulance re-routing to other acute care setting due to full emergency rooms may serve as another trigger for reallocation or acquisition of resources. The trigger points and surveillance protocols should be defined during the interpandemic period.

National, Regional and Local authorities and institutions may designate points at which the following specific actions are taken.

- *Changing staffing ratios, job duties
- *Reducing surgical slates, admissions
- *Consolidating services
- *Procuring additional supplies
- *Calling on alternative staff
- *Re-routing of ambulances

2.1.3 Planning for Increased Bed Capacity

In any institution a “bed” includes infrastructure support, including staffing, which is required to care for the patient in that “bed”. Therefore the requirements for a “bed” in an intensive care unit, for example, include all the support required for a patient to be cared for at that level.

Planning to increase bed capacity during a crisis includes:

- *identifying the strategies in advance,
- *planning for the consequences of these strategies, and
- *identifying trigger points at which the options will be implemented.

Various options to increase bed capacity have been identified, including:

- *reducing elective admissions and surgeries to maximise medical bed capacity, and to maximise critical care beds,
- *changing protocols or requirements for early discharge,
- *increase home care staffing,
- *increase the number of residential beds, long-term care and hospice beds,
- *re-opening capacity currently closed,
- *using reserved critical care capacity,
- *using emergency ventilation facilities in recovery and operating rooms,
- *assessing associated sites such as clinics, extended care facilities and psychiatric facilities for use by non-influenza patients, and
- *creating “flex” beds during the influenza season.

The Management of Bed Capacity play a key role in the transfer/placement of critical care patients across the country, thus ensuring that staffed beds are used to maximum advantage. The Resource Management subgroup has recommended that each Region create a centralized bed registry, call centre and centralized ambulance dispatch.

2.1.4 Plan for Patient Prioritization

During a pandemic it will be a challenge to manage high ward and intensive care unit censuses, and high emergency department volumes in the face of reduced availability of health care workers and limited respiratory support equipment.

The pandemic may have a first wave of approximately 6 to 8 weeks and there may be one or more subsequent waves. Cancellation of elective admissions and surgeries, as a way of managing limited resources, could have serious consequences for some patients, including cancer and cardiac patients. Since elective surgeries are not all equivalent in terms of necessity and risks of delay, health authorities must consider within their region, and/or facility how patients scheduled for elective admissions/surgeries will be prioritized if beds are limited.

Prioritization of health resources at times of critical shortages will also need to be considered. Local community-based centres and hospitals need to take a multi-disciplinary approach and include ethical and legal considerations when developing any prioritization processes. The recommendations on the assessment and management of influenza and non-influenza patients during a pandemic, including algorithms on the triage of adults and children based on their clinical presentation and risk factors or comorbidities should be utilised. However, if supplies, equipment, and access to intensive care must be rationed, a fair and equitable prioritization process will need to be established.

A general approach to ethical considerations will be developed by the national pandemic planning working group and public consultations. With the ethical considerations and goal of the pandemic response in mind, each community will need to make their own decisions on prioritization, depending on the availability of resources, stage of the pandemic in the community and management decisions made up until the point that

rationing/prioritization becomes necessary. Since there are so many variables and contingencies, it is highly unlikely that a nationally developed guideline would be detailed enough to meet the needs of those involved in these types of decisions at the local level.

2.1.5 Plan for Critical Equipment and Supplies

A pandemic will likely result in shortages of medications, medical supplies, and potentially, operational supplies. Since multiple jurisdictions including other countries will potentially be affected by these shortages, the response plan should not rely heavily on outside assistance in terms of the provision of supplies and equipment. Some of the issues directly affecting supplies will be:

**Interrupted transportation lines* — Supplies are often obtained from the U.S. and other nations. Difficulties at border crossings may substantially affect supply lines. In addition, a loss of up to 30% of workers, drivers, and other transportation staff may affect the production and delivery of supplies.

**Lack of inventory*—In an effort to reduce costs, most health regions have moved to “just-in-time” inventory systems that keep minimal supplies on hand.

**Embargoes* — The majority of medical supplies are not produced in Trinidad and Tobago. In past pandemics and health crises other nations have banned the export of critical vaccines, medications and supplies. Therefore all efforts should be placed in securing medical supplies in advance.

Recommendations for the use of vaccine and antivirals during a limited supply situation are provided in other chapters. Other resources such as the Infectious Diseases Society of America (IDSA) Guidelines lists medications considered to be critical in the treatment of influenza and pneumonia. These guidelines should be distributed to and reviewed by healthcare facilities during the interpandemic period since these issues will affect the management patients and resources, including medications, within the facility.

Stockpiling

Regional and local health authorities may wish to review the possibility of rotating stockpiles of critical supplies for health care facilities within their own jurisdictions. Counties may specifically wish to keep some older equipment such as beds, which need little maintenance and have no specific “shelf life”. Appropriate assessment should be made of the maintenance and training required to ensure the safety and effectiveness of older equipment, training needed by staff to use unfamiliar equipment, etc.

After such a critical assessment, institutions and health authorities may consider maintaining certain critical pieces of older equipment such as ventilators.

The stockpiling of antiviral drugs will be discussed at the national level, however, the need to and feasibility of stockpiling critical medications for the management of patients with influenza and secondary pneumonia, should be addressed at the Regional and local

levels. In addition, provinces and territories will have to discuss with local pandemic planners the need to stock larger quantities of medications and equipment to manage persons with co-morbidities, e.g., chronic cardiac and respiratory disease, diabetes, renal failure, that may be exacerbated by influenza infection. Guidance on antibiotics for the treatment of secondary pneumonia must be provided. The antibiotics currently stockpiled at the national level will be reviewed to determine whether these can be utilized in a pandemic, in addition to, further discussions on the need for additional national stockpiles.

Local Production

During a crisis some items, which are usually ordered from centralized sources, may be produced locally. Procurement specialists may wish to review which supplies could be obtained or produced locally if prior arrangements are made. Possible suppliers and suppliers of alternative products should be contacted to explore this possibility.

2.2 Resource Management During the Pandemic Period

Prior to the onset of the pandemic it not known which populations will be most affected by the novel virus, and what the prominent symptoms of the disease, and the most common complications will be. Once the WHO has identified a “Novel Virus” and confirmed “Human to Human Transmission”, this information will gradually become available. Planners should review the epidemiology of the disease in light of the demographics of their own population and in terms of their existing resources and revise plans for the allocation of resources based on this information.

The following activities, with respect to health care facilities, should occur during this phase of the pandemic when the triggers indicate the need for action.

- *Implementation of emergency plans.
- *Increase bed capacity.
- *Review critical equipment and supplies.

2.2.1 Implementation of Emergency Plans

Based on the previously identified triggers for action and existing legislation and plans, the phased implementation of pandemic response plans will be initiated at this time.

2.2.2 Increase Bed Capacity

To increase bed capacity, based on the plans made during the interpandemic period, the following activities may occur during the pandemic:

- *re-open closed wards and hospitals,
- *cancel elective surgeries and admissions based on the prioritization process determined earlier,
- *centralize the tracking of bed capacity,
- *use of reserved critical care capacity,
- *preparation and use of emergency ventilation facilities in recovery and operating rooms,
- *cohorting infectious and non-infectious patients in alternative sites such as clinics or extended care facilities, and
- *discharge as many patients as possible based on revised criteria for discharge.

National and Regions authorities should review and consider any existing legislation that may put restrictions on patient and staff movement.

2.2.3 Review Critical Equipment and Supplies

Review and revise supply needs and plans based on WHO epidemiologic projections.

*Order additional supplies.

*Establish alternate transportation/distribution arrangements if required.

*Establish domestic production of supplies where possible.

National and Regional authorities will notify jurisdictions of the status of stockpiles, embargoes, and emergency production facilities. Vaccine and antiviral supplies and recommendations on their use in times of shortages will be co-ordinated at the national level.

2.3 Resource Management during the Post-Pandemic Period

Activities at health care facilities during this pandemic phase will focus on the implementation of recovery plans to return the facility to its normal, interpandemic, operating state. Beds may be closed and additional supplies acquired during the pandemic may be return or put into storage. The pandemic response should be reviewed and evaluated so that plans may be revised as necessary during this or the interpandemic period.

3. Guidelines for Human resources Management in Acute Care Settings

3.1 Introduction

During an influenza pandemic there will be an increased need for people with health care training to deal with the increased demands on the health care system. This may involve the re-locating of health care workers to different settings within an acute care facility or expansion of the services usually provided at these facilities (e.g., to include immunization clinics for health care workers). In addition, non-health care workers or retired health care workers may need to be hired/contracted to provide supplementary services essential to meet the demand for services at health care facilities. Volunteers will also be a potentially vital source of human resources to facilitate the management of health care services during a pandemic.

During an influenza pandemic the shortage of trained medical staff will be one of many barriers to the provision of adequate care. A significant proportion of the workforce may be unable to attend work for a period of time due to illness in themselves or family members. Communities and health care organizations will need to have specific guidelines in place to address what will be done if the health care system is overwhelmed and non-traditional sites must be established or current service sites expanded. This section of the document will therefore focus on human resource issues in acute care settings.

3.2 Human Resource Management during the Interpandemic Period

Health authorities may make preliminary estimates of staffing needs based on estimates of the impact of a pandemic and the demographics of the region (see Section 2.1).

The following list of activities is provided to assist with planning for the optimal use of human resources, including health care workers, trainees, retirees and volunteers, at health care facilities. Further details are provided in the following sections.

- *Plan for optimal use of health care workers and volunteers
- *Review emergency legislation pertaining to health care workers and volunteers
- *Provide training
- *Consider insurance and licensing issues
- *Immunization of Health Care Workers, including volunteers
- *Plan for support for Health Care Workers, including volunteers

3.2.1 Plan for Optimal Use of Health Care Workers

The work involved in identifying current health care workers who could be re-located within an institution and recruiting additional health care professionals, other health care workers and volunteers that could offset some of the increased demands on health care workers that will occur during a pandemic, should be initiated during the interpandemic period.

a) Appoint a human resource management team

Identifying current health care workers; recruiting additional professionals, non-professionals and volunteers; and managing the training, assignment and support of

health care workers to various locations and tasks will be some of the most important pandemic preparedness tasks. Establishment of a team or subcommittee that could take on these responsibilities in each jurisdiction is an important first step. A combination of professionals with expertise in human resource issues, pandemic planning, health care administration, infection control, occupational health and safety, and volunteer organizations would be desirable for this planning team/subcommittee.

b) Placement of personnel

During a pandemic health care workers may need to be reallocated from their usual roles and settings. For example, trained, health care professionals, may be required to expand their role to include the supervision of volunteers and other staff in the acute care settings, affiliated clinics and non-traditional sites.

While it is likely that all health care workers will be needed at their usual acute care facility, consideration should be given as to the source of staff for other sites including:

*Triage Sites – community triage sites: at clinics, non-traditional sites, attached to an existing hospital.

*Non-Traditional Sites – including emergency care centres, emergency hospitals, support hotels, nursing stations, etc.

*Vaccination Clinics –clinics in acute care sites, etc.

However, it is important to recognize that the expertise needed for the clinical management of influenza patients predominantly resides within the health care facilities. Positioning some staff at these sites may offset the demands on other critical health care facilities and ultimately lead to the optimal use of human resources.

Health authorities must review the needs of their own communities to determine whether more emphasis should be placed on supporting community care options and which staff will be needed where.

c) Review scopes of practice

Even in acute care settings, delegation of tasks and authority will, by necessity, change during a pandemic. A shortage of staff and increase in the number of patients may necessitate cancellations of surgery, tests and other procedures. Staff may be reassigned from their usual roles to make best use of their skills. Retired and foreign-trained personnel may be asked to step in.

Negotiations and planning must take place within each RHA, in order that the process of reassignment and delegation may take place quickly and as smoothly as possible. Prior negotiation with bargaining units to facilitate changing of job descriptions and the use of alternative workers during a pandemic will ease the transition and make the process more efficient. In the interpandemic period we recommend the jurisdictions take the following actions:

*Establish a process, in conjunction with existing emergency plans, to assess the work needed and skills required for each task. Jurisdictions need to look at the process of

intake, reception, triage, clinical care, clean up, etc. and assess additional workers or sources of workers who already have the skills to be slotted into these jobs.

*Review the recommendations on patient assessment and management in the Clinical Care Guidelines which will indicate the needs for various skills at various points in patient care, and determine who may provide those during a pandemic.

*Communicate with health care professionals about pandemic needs.

d) Recruit professional staff for the pandemic response

Within facilities, consideration should be given to reassigning medical and nursing personnel with administrative, research and educational assignments to clinical duties.

Alternate sources of HCW would include, but are not limited to:

*retired physicians/nurses (need to be assurance that work during a pandemic would not affect their pension plans)

*physicians/nurses currently not working in clinical health care (i.e., working in education, administration, research, private industry)

*trainees (i.e., medical students and nursing students)

*registered nursing assistants

*patient care assistants

*emergency medical technicians

*veterinarians

*pharmacists

*therapists (respiratory/occupational/physiotherapist)

*technicians (laboratory, radiography)

*health care aides

Consider how best to recruit persons with health care qualifications but not currently working in the health services. Work with professional associations to determine how to communicate with their members prior to the pandemic about pandemic issues, and how they might communicate during the pandemic.

Regions/Counties may work with professional associations to ensure that persons with health care qualifications but not currently working in the health services maintain their qualifications and competencies. It is also important to establish a method for assessing professional qualifications and competence during the pandemic when people are being hastily recruited.

Developing and maintaining databases of staff is a time consuming and expensive task. Databases are only useful if kept up to date with licensing, skill set and contact information.

Most health care facilities will already have some type of database of their staff. Local facilities or authorities may wish to develop databases of workers with specific training

(through licensing bodies and associations) or establish a co-operative arrangement with licensing bodies, associations or volunteer agencies that already maintain these lists.

Regions/Counties are encouraged to review professional and privacy legislation to determine how best to maintain such lists. It may be most appropriate both legally and effectively to ask professionals to volunteer their names as pandemic workers. It may also be appropriate to provide some form of incentive in the form of free training, subsidized license fees etc. to encourage professionals to volunteer their names.

Develop methods to ensure:

- *Qualified workers can be contacted quickly and easily,
- *Workers are placed where they are needed most, and
- *Workers' training and qualifications are on record to ensure people have appropriate qualifications.

3.2.2 Review Emergency Legislation Pertaining to Health Care Workers

Emergency Preparedness Legislation makes many provisions for the management of workers during a crisis. This includes the recruitment of professional and other paid staff as well as volunteers, managing human resources and protection of people who volunteer. Pandemic planning should be integrated with the emergency plans of the jurisdictions as much as possible, in order to make best use of existing plans and resources. There is no assurance that a national emergency will be declared; jurisdictions should be prepared to operate under either condition. Therefore human resource planning should be based on existing plans without a declaration.

The following provisions of legislation are particularly applicable to human resource issues including:

- *authority regarding licensing and scope of practice issues, and the ability of government to make unilateral changes during a crisis;
- *safety and protection of workers, (one of the primary responsibilities);
- *fair compensation;
- *insurance, both site insurance, workers compensation and other forms of insurance;
- *training;
- *provision of clothing and equipment;
- *protection of the jobs of workers who take leave to assist during the crisis.

Compelling Workers

Under Emergency Legislation Regions/Counties may have the authority to designate "Essential Services" and workers and have the ability to compel people's time or property with due compensation *as a last resort*.

This issue has been raised both because of the existing shortage of health care workers and concerns that health care workers and others may refuse to work during a pandemic due to changed job responsibilities, fear of infection, family responsibilities or other reasons. However, the Subgroup notes the extreme difficulty of enacting or enforcing

such legislation and would strongly encourage the jurisdictions to review all other methods of obtaining health care workers, in advance of a pandemic.

3.2.3 Provide Training

Health Care professionals, both those currently working in their fields and those working elsewhere or retired, as well as volunteers may benefit from training and communication regarding pandemic plans. As well as looking at specific skills, training and communication may focus on preparedness, changing roles and responsibilities, supervising volunteers, crisis management and emergency planning.

a) Start training and awareness building now

There will be very little time for effective training, once a pandemic is underway. Therefore, training should be incorporated into existing programs provided during the interpandemic period. By incorporating the skills needed during a pandemic into existing training, we reduce costs, improve efficiency and enhance readiness.

Training and awareness building will be needed in order to:

- *motivate development of a response capacity, including identification of responsibilities and preparation activities, in acute care settings,

- *facilitate an understanding of pandemic consequences, vaccination and ethical issues, among health care providers, prior to the pandemic,

- *recruit workers willing to take on new responsibilities during the pandemic

- *encourage health care workers to maintain skills and licensing while working elsewhere, and

- *to develop specific skills related to pandemic influenza.

b) Identify skill/knowledge requirements

Health care workers will need to be skilled and knowledgeable in the fields of infection control, crisis management, worker supervision and working with grieving families, which may not be a significant part of their current responsibilities. In addition, it would be useful to expand and maintain the number of health care professionals and others with training in oxygen therapy and the use of ventilators and care of patients on ventilators.

Clerical skills in terms of patient tracking procedures will also be needed in overwhelmed health care facilities, as will people who can train patients and families in “self-care” thereby facilitating early discharge of patients. Ideally all health care workers should be trained in the principles of self-care, since they will be the primary conduit of information to their patients, families and communities.

However, it is recognized that because of the difficulty of maintaining many of these skills without constant use, training programs targeting these skills should be developed for quick and efficient implementation once a pandemic is declared.

It is also advisable to develop a plan specifically for training or re-training of health care workers who are not currently working in health care, for example retirees.

c) Train the trainer

Health authorities and existing volunteer agencies, may establish programs to “train the trainers”. Through this process a pool of trained individuals can be maintained, during the interpandemic period, that would be available to implement training programs as quickly as possible at the onset of a pandemic.

To facilitate this process it would be essential to:

*identify and train those with knowledge of the tasks and adequate communication skills to act as trainers during the pandemic,

*identify training resources of use to on-the-job trainers,

*ensure there are adequate, easy to use procedures/instruction manuals for tasks such as admissions, patient tracking, etc., and

*use and share existing training programs and materials which can be adapted for pandemic influenza.

d) Plan now for training during the pandemic period

A great deal of training will have to be done once a Pandemic is declared. Staff not currently working in health care and volunteers may only come forward once a pandemic is declared. In addition, it may be necessary to update training closer to the pandemic period. In order to ensure that this is done swiftly and efficiently during the pandemic, the following preparations should be made in advance:

* identify training which will take place following the declaration of pandemic,

*identify and obtain training resources which can be tested and used during the pandemic period,

*train the trainers -(see above), and

*plan for where and how training will be delivered during the pandemic.

3.2.4 Consider Insurance and Licensing Issues

Insurance and liability coverage should be provided for trainees, volunteers, retirees and any other workers that are recruited to provide health care services during a pandemic. While these issues will be investigated at the national level, each region will need to review existing legislation and policies to determine how this might be accomplished in their respective jurisdictions.

a) Liability/insurance for workers and volunteers

The need to expand scopes of practice may have implications for liability protection/malpractice insurance.

b) Workers' compensation

Issue concerning registered volunteers or persons compelled/conscripted for emergency service work are protected by workers' compensation during emergency response, as long as they are registered must be addressed.

In some circumstances, volunteers who register with designated agencies may be covered by workers' compensation under emergency legislation. However, there are a number of issues to be resolved with workers compensation boards at the regional level:

*Does the policy require a declaration of Emergency and, at what level of government, or would the insurance come into effect once Minister of Health declares a pandemic?

*Definition of health care workers for this purpose.

*Definition of volunteers for this purpose.

*Compensation is usually based on loss of income, however, in some cases volunteers may be retired, homemakers, or self-employed. Would compensation cover costs of the person's other responsibilities, such as family care?

*Would compensation be available if volunteers became ill rather than injured?

*Does this include Death and Dismemberment insurance?

Ensure such insurance is available independent of the need for a "Declaration of Emergency."

3.2.5 Immunization of Health Care Workers

While it is unlikely that a vaccine for the pandemic strain of influenza will be available in advance of the arrival of the pandemic in Trinidad and Tobago, health care workers should be up-to-date with the other routinely recommended immunizations. Because immunizations require varying amounts of time and some require more than one dose for a person to develop immunity, it will likely be impossible to provide all of these once a pandemic is declared, or to provide them within an appropriate time frame given the lack of supplies and human resources.

Once a pandemic vaccine becomes available the vaccine will be distributed according to nationally agreed upon recommendations for prioritisation of vaccine recipients. A preliminary list of priority groups has been developed by the Vaccines Sub-group and is provided in the Plan. The priority and composition of these groups may change based on the epidemiology of the pandemic. However it is widely recognized that health care workers are critical to the pandemic response and should be considered high priority for immunization during a pandemic.

3.2.6 Supporting Health Care Workers

During a pandemic, health care workers will need considerable personal support in order to keep working. During the interpandemic period, it is important to plan for how these services may be provided. Some strategies may require changes in policy, or even in

legislation to ensure the availability of health care workers during the pandemic. Support provided to health care workers may include:

- *Basic Personal support – ensure food and services are available to health care workers on the job.

- *Emotional support/Grief Counselling (aimed at permitting workers to continue to work and reduce loss of staff due to grief or traumatic stress).

- *Family Care (for children, seniors, sick family members who do not require hospitalization). This poses significant infection control concerns if gathering children or the elderly together for group care.

- *Job protection for HCWs who move from other jobs during pandemic.

- *Job protection for spouses who do family care to allow HCWs to work in health care.

In order to develop crisis programs, health authorities may build on existing employee support programs. This may involve:

- *contacting existing support services,

- *working with Chaplains, counsellors and grief counsellors to develop crisis support programs including grief support and traumatic stress counselling,

- *determining whether child, or family care, programs would be appropriate for the site(s) and where and how they would be set up (eg. Contract with NGO's), and

- *reviewing legislation to determine if there is protection for spouses who take on child care responsibilities to permit health care workers to continue to work.

3.3 Human Resource Management during the Pandemic Period

If the pandemic arrives in other countries prior to arriving in Trinidad and Tobago, information on the epidemiology of the pandemic strain will be circulated internationally as it becomes available. Planners will need to consider each piece of new information in terms of how this might impact their own population and potentially revise plans for the allocation of human resources based on this information.

The following steps/actions will need to occur during the pandemic period to optimise the human resource dependent response:

- *organize the deployment of health care workers

- *work with emergency management personnel and use emergency preparedness legislation as required

- *implement training and communication plans

- *manage insurance and licensing issues

*address immunization needs

*support health care workers

3.3.1 Organize the Deployment of Health Care Workers

At this point it will be necessary to activate the Human Resource Planning Team and recruit new members that may be vital to the implementation of previously developed plans. This will facilitate the coordinated management of human resource issues. Next steps are listed below.

*Identify key and supervisory positions and the people to fill them.

*Based on current staffing levels, and assuming a similar attack rate for staff as for the rest of the population, estimate additional staff needs for each region.

*Reassign staff where necessary.

*The Team, in conjunction with the RHA, should update the inventory of current staff, number of beds, and acute care settings.

*Review worker and volunteer databases established in the interpandemic period.

*Call for staff - Communicate with the public and with health care workers that are not currently working, regarding the possible need for additional staff.

*Screen additional staff.

*Train - existing staff in special tasks and train additional staff.

*Deploy staff.

3.3.2 Coordinate Response with Office of Disaster Management (ODPM) Personnel

During a Pandemic the relationship between emergency response personnel, and medical authorities will determine the overall response to the national crisis. The best deployment of health care workers and other essential workers will result from well established, coherent communication between ODPM and Health Authorities.

Advance planning should focus on establishing communication strategies and protocols which will permit on-going direct, daily integrated communication during the period of the pandemic. Knowledge and implementation of existing legislation, strategies and resources and a transparent means of communicating with health care workers and other essential workers, as well as the public will permit authorities to efficiently implement adequate human resource management strategies during the crisis.

3.3.3 Implement Training and Communication Plans

During the pandemic period staff and volunteers will be identified who need additional training. This will include training such as: working with ventilated patients, and basic support skills such as sterilization procedures, management of admissions etc. to permit

licensed trained health care workers to take on additional tasks. It is vital that the training be quickly and easily available in formats that are short, manageable and preferably “on-the-job” where possible.

*Identify experienced people, those with knowledge of the tasks and adequate communication skills and provide them with resources to permit them to train others. (See Train the trainers above.) Ensure trainers and experienced people remain available for consultation and training on an on-going basis.

*Review training programs and emphasize skill sets based on the epidemiology of the disease.

*Use the time between the WHO declaration of pandemic, and the arrival of the first wave in the Country to train as many staff and volunteers as possible in general and specific tasks.

*Call on existing agencies such as St. John Ambulance and the Red Cross to ramp up existing training programs with an emphasis on tasks required to treat influenza patients.

*Maintain records of trained individuals to ensure best deployment of those individuals.

3.3.4 Manage Insurance and Licensing Issues

It will be important to communicate any necessary changes to licensing and insurance provisions to all stakeholders. This will require a thorough review of provisions for insurance, a review of licensing issues and communication with licensing bodies, associations, colleges, etc. regarding this issue.

If insurance and/or licensing arrangements require activation of some form of legislation, by law or declaration, inform the Minister of Health and other appropriate authorities.

Inform Chiefs of Staff, Managers, Supervisors and Human Resource professionals in health care settings, of changes in licensing and insurance and what that will mean for flexibility in staff deployment, additional staffing, requirements for deployment, or any other provisions of legislation, licensing or insurance with which the institution must comply.

3.3.5 Address Immunization Needs

Health care facilities may have to provide qualified personnel capable of administering immunizations, under the guidance of public health authorities, to staff clinics targeting staff and volunteers at their site.

3.3.6 Support Health Care Workers

Review plans made during the interpandemic period to provide support to all health care workers including volunteers and retired persons, to enable them to continue working. During the pandemic authorities may:

*Establish personal support services providing on-site food delivery, nap rooms, etc.

*Set up counselling services (find an office, determine a schedule).

*Call in additional counsellors, grief counsellors, chaplains, clergy, clerical support.

*Set up child/family care services.

*Notify staff of how to access these services.

*Notify staff of legislated protections such as protection for job of spouse while caring for children.

3.4 Human Resource Management during the Post-Pandemic Period

Activities during this period will focus on the demobilization of staff and volunteers. The pandemic response, in terms of human resources, should be reviewed and evaluated so that plans may be revised as necessary during this or the interpandemic period.

Consideration should be given to methods to formally recognize the efforts of all workers involved in the pandemic response.

Appendix A Evaluation of Bed Capacity

These worksheets have been designed to assist facilities in planning for an influenza pandemic. It can be used to complement centralized bed management systems, or used on their own to evaluate bed capacity and how to achieve maximum bed utilization. Facilities should determine the maximum number of beds available and the numbers of hours of care needed to staff the beds. During an influenza pandemic there would most likely be a change in acuity of beds.

Who has responsibility for collecting this information? (Check your facility's emergency plan.) Position Title		
Who will have authority and responsibility to apply this information during a Pandemic? Position Title		
1. What is the total number of non-ventilated beds, without oxygen supply, which are:		
a) Currently open and staffed?		
b) Which could be available during an emergency if extra resources were available in the short term? What are the limiting factors (staffing, equipment, physical space, other)?	In 72 hours	In 7 days
2. What is the total number of non-ventilated beds, with oxygen supply, which are:		
a) Currently open and staffed?		
b) Which could be available during an emergency if extra resources were available in the short term? What are the limiting factors (staffing, equipment, physical space, other)?	In 72 hours	In 7 days
3. What is the total number of ventilated beds which are:		
a) Currently open and staffed?		
b) Which could be available during an emergency if extra resources were available in the short term? What are the limiting factors (staffing, equipment, physical space, other)?	In 72 hours	In 7 days
4. If a directive came to stop all elective surgery/admission:	In 72 hours	In 7 days
a) How many beds would become available?		
b) How many beds, with oxygen supply, would become available?		
c) How many ventilated beds would become available?		
5. How many extra emergency ventilatory beds could your hospital create? [NB. Consider use of all ventilator capacity, including time-cycled ventilators, anaesthetic machines, and the availability of oxygen/suction and air-supply, recovery and operating rooms and neuroscience beds.]	In 72 hours	In 7 days
a) Assuming current staffing levels (redeployment of staff permitted) b) Assuming additional resources for staffing: What are the limiting factors (staffing, equipment, physical space, other)?		
6. Does your hospital have any excess capacity to assist other health care facilities or the community, such as provisions of meals, sterilization capacity?		
7. Does your hospital have an affiliation with a Health Care Facility, which may have extra bed capacity?		
Affiliation	Number of Beds	
Number of Beds		
Long-Term Care Facility		
Acute Detoxification Unit		
Rehabilitation Facility		
Crisis Unit		
Other Type		

Inventory of Beds (Work Sheet)

Type of Bed	Total number of physical beds in facility	Number of physical beds with oxygen supply	Number of currently operating beds (opened and staffed)	Number of currently operating beds with oxygen supply	Estimate current proportion of elective vs emergency cases/beds	Number of beds able to be staffed using current resources	Space for beds available, with oxygen outlet, no physical bed available	Space for beds available, no oxygen outlet no physical bed available	Comments (e.g., unique equipment, special purpose)
Medical									
Down									
Special medical/Step									
Surgical									
Special surgical									
Coronary care*									
Intensive care*									
Paediatric									
Obstetric									
Special Care									
Nursery									
NICU									
Day ward									
Recovery room*									
Sleep laboratory									
Closed wards									
Other									
TOTAL									

* denotes areas currently used for ventilation which could be used for emergency ventilation

Inventory of Ventilators (Work Sheet)

Types of ventilators	Intensive Care	Coronary Care	Special medical/stepdown	Recovery room	Operating room	Emergency department	Storage	In repair	Sleep study laboratory	Physiotherapy	Other
Oxylog											
Bird											
CPAP spont. breathing											
BiPAP spont. breathing											
TOTAL											

Emergency ventilatory capacity considerations (Work Sheet)

Property	Intensive Care	Coronary Care	High dependency	Recovery room	Operating room	Emergency department	Neuro-science	Sleep study laboratory	Other
Suction									
Oxygen outlet									
Medical air outlet									
Airflow (negative pressure)									
Airflow (positive pressure)									
Room monitoring									
Physical bed									
Space, but no physical bed									

Annex H

Guidelines for Non-Traditional Sites

Introduction

In influenza pandemics over 50% of persons may be infected and the majority of illnesses and deaths would tend to occur over a period of six to eight weeks in any one location. Epidemiologic data from influenza epidemics and past pandemics show that 15% to 35% of the population could become clinically ill. Consequently, even a low frequency of complications, result in marked increases in rates of hospitalizations. An estimate of the health and economic impact of a pandemic in Trinidad and Tobago has been performed.

The estimation is purely speculative but it is very important from a planning point of view. Based on this estimation between 100,000 and 200,000 people would require outpatient care, between 1,400 and 5,400 people would require hospitalization and between 400 and 1,400 people would die in Trinidad and Tobago during an influenza pandemic.

Due to the large number of patients who would require medical services during an influenza pandemic, communities and health care organizations must have guidelines in place that will address what will be done if health care organizations are overwhelmed. The use of non-traditional sites (NT sites) for the provision of medical care and the need for additional human resources, including volunteers and other health care or non-health care workers, must be considered as a strong possibility and planned for accordingly. Legislative, management and professional authorities will have to be clearly defined at the Regional level.

This document is divided into two main sections. The first section provides guidelines regarding the utilization and administration of NT sites, and the preparedness and operational activities that should take place with respect to NT sites during the interpandemic, pandemic and post-pandemic periods. The second section focuses on the need for and identification of additional human resources as part of pandemic planning, and also identifies activities by each pandemic period.

Section 1: Non-Traditional Sites

1.1 Definition of a Non-Traditional Site

The following is a definition of a non-traditional site (NT site) for the purposes of planning for an influenza pandemic.

A non-traditional site is a site that is:

- a) currently not an established health care site, or
- b) is an established health care site that usually offers a different type or level of care.

The functions of a non-traditional site will vary depending on the needs of the community but will focus on monitoring, care and support of influenza patients during an influenza pandemic.

1.2 Potential Roles of Non-Traditional Sites

The role of any NT site will depend on the needs of the community and the resources available. It is expected that NT sites will be used during a pandemic for three main purposes:

- .the care of patients who are not critically ill when hospitals are overloaded,
- as domiciliary care for individuals unable to care for themselves at home, and
- as a “step-down” unit for the care of stable patients that have been transferred from acute care hospitals.

Where possible care at non-traditional sites should be limited to supportive care or palliation for influenza patients. Critical care would likely not be possible within these sites and should remain in the acute care setting. Persons with immunosuppressive illness or communicable diseases other than influenza (e.g. tuberculosis) should not be admitted to these sites.

In communities with a high proportion of elderly or high risk persons, the role of the NT site may need to be expanded to include the provision of health care services specifically related to dealing with the exacerbation of co-morbidities (e.g. chronic heart or lung disease, diabetes) in these groups.

Depending on the impact of the pandemic and the health care resources available in the community, NT sites may serve several functions. They may be set-up as triage centres, mobile health units, sub-acute care providers, clinics, or emergency residential facilities for those that cannot care for themselves at home or for cases that usually live with a high-risk individual.

1.3 Administrative Options for Non-Traditional Sites

NT sites may be established as a “satellite site” of an acute care facility or other health care facility, or as a “free-standing site”. The “satellite site” model is advantageous since it does not require establishment of a separate administrative structure. Specifically,

linkage with an existing acute care facility or other health care facility would facilitate the following:

- prompt implementation of an administrative structure,
- ordering, tracking and maintenance of equipment and supplies,
- implementation of record keeping and patient tracking systems,
- implementation/establishment of nursing protocols and patient care guidelines,
- sharing of expertise and human resources between sites,
- access to services such as sterilization, laboratory services, pharmacy services, laundry, food services,
- referrals between the site and the affiliated health care facility, and
- extension of liability, workers compensation and other insurance programs to the satellite site.

The satellite site is the recommended administrative option, however, where it is not possible to set-up a “satellite site” the establishment of “free-standing sites” will be necessary. Planning for the administration of “free-standing sites”, including how the issues listed above will be dealt with at the site, will need to be completed during the inter-pandemic period. It is recommended that pandemic planning be incorporated into the existing emergency response plan.

Triage, transfer and transport agreements between the NT site and the affiliated health care facility or referral hospital need to be established.

Regardless of the administrative structure of the site, an individual or team needs to be designated to oversee the care provided in each NT site. This person/team should monitor patient flow, maintain a log of patient activity including patient outcome, and monitor availability of supplies. Delegation of these responsibilities to ensure ongoing and consistent administration of the site needs to be planned for in advance.

1.4 National Emergency Stockpile System (NESS)

There should be a coordinated system to stockpile material, primarily for use in crises such as natural disasters, earthquakes, or other emergencies in which there is a sudden need for supplies and equipment to deal with a large number of people with varying medical needs. The program involves the purchase, packaging, shipping and storing of supplies and equipment organized into “kits” designed to meet specific emergency medical needs. The components of the “kits” are packaged and stored in warehouses across Trinidad and Tobago to facilitate timely distribution. This system should not be

confused with provincial emergency stockpiles that may exist within each province or territory.

In the event of a pandemic, specific kits or units from the stockpile could potentially be used to facilitate reception, intake, triage and provision of medical and social services at a NT site. The following is a brief description of the types of kits/units available through the NESS.

Emergency Hospital - capable of providing support to the existing health care system by the provision of acute and short term medical care for up to -----200 patients. Also has the adaptability to support social services functions (i.e., evacuation centres, reception areas, shelters, etc).

Advanced Treatment Centre - capable of providing early medical and limited surgical procedures in a 'field' or operational environment; also used to support the movement of patients to other health care facilities. Can also support the movement of evacuees and the operations of shelters, evacuation centres, reception areas, etc.

Casualty Unit - capable of providing immediate first aid care and movement of patients to other health care facilities. Also can support the movement of evacuees and the operations of evacuation centres, shelters, reception areas, etc.

Reception Centre Kit - provides supplies, and registration and inquiry materials for the set-up and operation of reception functions for evacuation centres/shelters.

Mobile Feeding Unit - provides an emergency feeding capability in a 'field' environment, or where normal food services are not available (equipment and supplies, not food).

Trauma Kit - consists of first aid, intubation equipment, IV solutions and medical components to support first line response, patient triage and stabilization. Is useful in a patient staging facility (mini clinics, advanced treatment centres, etc).

Mini Clinic - intended to supplement existing medical care facilities in a disaster situation that overwhelms their system (e.g. a hospital emergency room). It would be located adjacent to these facilities to triage and treat the less seriously injured, so that the main facility remains clear to accept and treat the seriously injured.

The equipment supplied is older but well maintained. New equipment is being added to certain units and others are being reconfigured to be more effective. Transportation of these materials is dependent upon commercial or military vehicles and requires access by road. In the event of a local emergency that overwhelms available municipal resources, the protocol for accessing the NESS program is that the municipality contacts the local / regional emergency management authorities. Release of equipment or supplies must then be coordinated through the local/regional Health, or Social Services Division.

The NESS equipment and supplies are owned by the Ministry of Health, and are made available to the local/regional on a loan basis. The local/ regional bodies administers this Government program under guidelines established by the Pandemic Influenza Committee through 'Memoranda of Agreement' between the Minister of Health, Regional/Local bodies and other stakeholders. In a national emergency or large-scale disaster, the authority for the release and use of the stockpile equipment remains with the Ministry of Health. To obtain an Emergency Hospital or other unit, a Health Region must communicate with the Ministry of Health.

1.6 NT Site Planning During the Interpandemic Period

The following activities should take place during the interpandemic period. Further detail is provided below the list:

- Review emergency preparedness legislation
- Identify triggers for implementation
- Plan for the triage process
- Assess locations for potential NT sites
- Planning for critical equipment and supplies

1.6.1 Review Emergency Preparedness Legislation

Emergency preparedness legislation makes many provisions for management of a crisis including: obtaining and accessing materials and other resources, implementation of crisis plans and a crisis management structure. Pandemic planning should be integrated with the emergency plans of the jurisdictions in order to make best use of existing plans and resources.

The national support framework is not contingent upon declaration of a national emergency. The resource management and non-traditional sites working groups recommend all R/L planners review both National and R/L emergency legislation to determine how to integrate plans within the framework of emergency legislation. For example it is important to identify what provisions of legislation are particularly applicable to obtaining use of property and materials in a crisis. These provisions would include but likely not be limited to:

- the ability and responsibility of authorities to requisition property for use as NT sites,
- access to transportation, materials, administrative staff and other resources, and
- compensation for requisitioned property.

1.6.2 Identify Triggers for Implementation

Existing legislation and emergency plans at the government and institutional level already identify criteria that would trigger the implementation of specific plans. The Trinidad and Tobago Pandemic Influenza Plan and the pandemic phases will also describe general points of action. In co-ordination with existing legislation and plans, national, regional and local authorities, and institutions should identify key criteria and methodologies that would trigger the phased implementation of plans regarding NT sites in their jurisdiction. Local authorities, most likely the local County Medical Officer of Health, together with the local pandemic response team, will decide when to initiate the pandemic influenza plan for their jurisdiction, including recommendations regarding the establishment of NT sites.

Since it is likely that the pandemic will not start in Trinidad and Tobago, the first trigger for the consideration of establishment of NT sites may be reports of the severity and epidemiology of the pandemic from other countries. This will likely be the first indicator of what to expect when the pandemic reaches Trinidad and Tobago in terms of demand on traditional health care services. In each locality it will be important for the local

endemic response team to be monitoring the availability of resources in their local acute care facilities and projections regarding when capacity may be exceeded (especially if there will be “free-standing sites”). Therefore potential triggers include:

- The proportion of emergency room visits attributable to influenza.
- The proportion of influenza cases requiring hospitalisation.
- The capacity of the hospital to accommodate influenza cases.
- The proportion of cases who normally live with high-risk individuals or who have no support at home and cannot care for themselves.

Other triggers may include reports from sentinel physician or walk-in clinics that they cannot accommodate all of the patients requesting appointments for influenza-like-illness. Ambulance re-routing to other acute care setting due to full emergency rooms may serve as another trigger for further implementation of plans for NT sites. These triggers should be established during the interpandemic period.

1.6.3 Plan for the Triage Process

Definition of Triage:

A process whereby a group of casualties or patients is sorted according to the seriousness of their illness or injuries, so that treatment priorities can be allocated between them. In emergency situations it is designed to maximize the number of survivors.

In order to reduce demand on hospital emergency departments and potentially on family physicians and walk-in clinics, it may be necessary to perform triage at NT sites during the pandemic. The use of such a system will require a significant public awareness campaign since ill people will tend to seek services at their usual health care providers.

The Clinical Care Guidelines and Tools (Annex F) provide recommendations on the assessment and management of influenza and non-influenza patients during a pandemic, including algorithms on the triage of adults and children based on their clinical presentation and risk factors or co-morbidities. The guidelines on initial assessment and management assist healthcare staff, as well as volunteers with minimal expertise, to rapidly evaluate the needs of each individual and to sort patients efficiently in a crisis situation (i.e., to decide when patients can be treated as outpatients, or if they need to be redirected or admitted to a hospital). In larger communities, patients who required further assessment by a physician, X-rays and laboratory tests (secondary assessment) would likely be transferred to an acute care facility.

Some NT triage centres, however, may have the facilities to perform secondary assessment and treatment without moving the patients. Designation of NT sites as triage centres specifically for influenza-like-illness has the added advantage of potentially reducing the exposure of other patients to influenza, consistent application of current recommendations through the use of patient care protocols and control over the number and type of other services, such as laboratory testing and chest x-rays, that are being ordered. Non-traditional triage sites may be established at public health clinics/units, specifically identified walk-in clinics or triage centres adjacent to or associated with acute

care institutions. Triage sites will need to be organized to provide streamlined and efficient service. The following table is provided for planning purposes, and suggests how a site might be organized.

ZONE	SERVICE	TRAINING REQUIRED
Registration Zone	Register in-coming patients	Trained non-medical workers
Waiting Zone	Awaiting Primary Assessment	Medical professionals with trained non-medical workers
Primary Assessment Zone	Vital signs Trained non-medical Chest auscultation & assessment	Medical Professional (Physician or Nurse)
Secondary Assessment Zone	On-Site Lab Tests Secondary assessment Physician	Trained non-medical workers
Advanced First Aid & Transfer Zone	Service to patients who arrive in distress includes oxygen, suction, etc. while they await transfer to emergency department	Advanced First Aid
Education Zone	Education resources and advice	Trained non-medical workers
Discharge Zone	Follow up or transfer	

The Infection Control and Occupational Health Guidelines (Annex E) lists some guidelines for the set up of triage and preliminary treatment sites including:

- If possible, separate those with influenza like illness (ILI) and those without ILI by: minimizing time spent in waiting rooms; providing separate entrance/waiting areas for patients with ILI; placing patients with ILI directly into a single room; separate patients as quickly as possible by placing ILI patients in an area of the waiting room separated from non ILI patients by at least one metre.
- Remove magazines and toys from the waiting rooms.
- Clean equipment and environmental surfaces in examination/treatment rooms potentially contaminated by coughing patients as frequently as possible, preferably after each patient.
-

1.6.4 Assess Locations for Potential NT Sites

It is recommended that a multidisciplinary team approach be used to assess potential NT sites in a jurisdiction, to ensure suitability of a potential site. Ideally the assessment team should include:

- emergency personnel/police/fire,

- health care personnel, and,
- engineering/maintenance/public works staff.

This team should conduct a community-wide space and site inventory to determine the location and availability of potential sites for NT hospitals and vacant land for possible mobile hospital installations. This assessment should be repeated at regular intervals during the interpandemic period to ensure that identified sites remain suitable. Potential locations for NT sites include, but are not limited to:

- schools
- hotels
- community halls
- banquet facilities
- arenas
- churches
- closed hospitals or hospital wards
- day care centres

For each location the feasibility of its use as a NT site should be determined based on the information below and the intended use of the facility. Since a site at which inpatient care will be provided will have the most stringent and demanding requirements, it might be reasonable to assess each location for this type of service provision. Locations that are not found to be suitable for provision of inpatient care may be considered for another purpose such as triage or provision of education/counseling services.

Characteristics and Services Required for an Inpatient Care Setting

Each building under consideration should meet the National Building Code standards for its currently designated building type. Once the building code standards have been assessed, the following issues need to be considered:

- Adequacy of external facilities: public accessibility (including public transport, parking, directions) off-loading, traffic control, assistants for elderly, etc.
- Adequacy of internal space: washrooms and sinks: number m/f; amenities, functional kitchen: refrigeration, dishes, dishwashing capability, food preparation areas etc.
- secure space for administration/patient records: . space for reception, waiting, patient care, patient/family education, counselling/support, and any other services defined by the planning process . secure storage capacity for pharmacy and other supplies, mortuary space
- Adequacy of critical support systems required for the site to provide patient care: ventilation system (adequate air flow, air conditioning), . physical plant/ building engineering, . electricity - power for lighting, sterilizers, refrigeration, food services, natural gas supply – e.g., for heating or electricity or cooking water supply, sanitation (including number of toilets, showers or washing facilities)
- Arrangements to provide essential support services required for the provision of in-patient care:
 - security

- communications capability
- maintenance
- laundry
- environmental/cleaning services
- sterilization services – Sterilization of equipment should be provided by trained and experienced personnel using certified equipment. Appropriate arrangements for sterilization services, e.g., with a hospital, may be required
- pharmaceutical services
- medical waste disposal/storage
- mortuary/funeral services
- food services
- facilities for staff lodging and feeding

INFECTION CONTROL

When planning for a NT site it is important to establish whether the site will focus only on the care of influenza patients or whether other types of patients will be receiving services at these sites. Infection control issues will be greater if transmission of influenza to other patients is a possibility.

All patient beds should be separated by at least one metre; as is the norm for patients with any medical condition. If non-influenza patients will be seen at these sites separate waiting areas should be considered for potential influenza patients. For NT sites focused on influenza, there appears to be no infection control basis for segregating people at various stages of illness. In either situation health care workers and visitors to the site will need to be educated regarding appropriate infection control practices. Infection prevention and control issues are addressed in detail in Annex E of the Plan.

SECURITY AND SAFETY

The safety of buildings will be based on National Building Code. “Security” includes security of access, security of medications, and the security of patients. Security issues must be considered in choosing sites as well as when planning for staffing needs.

UPGRADE FACILITIES

Some facilities may need to be upgraded, in order to be used as a medical site. Local authorities may wish to upgrade designated facilities in order to ensure they are adequate. Upgrades such as improving power supplies and upgrading washing facilities may be considered as an investment in emergency preparedness and part of overall emergency planning for the community. As it is much less expensive to build in facilities at the time of construction then to add them later, emergency planners and pandemic co-coordinators may work with local authorities, school boards, etc. to add facilities to buildings that are under construction.

1.6.5 PLANNING FOR CRITICAL EQUIPMENT AND SUPPLIES

During the interpandemic period planners should identify critical equipment and supplies necessary for the establishment and operation of NT sites. Sources of supplies need to be identified; expected needs during an influenza pandemic and ability to meet those needs should be discussed with all possible suppliers. Potential access to the NATIONAL STOCKPILE should also be addressed.

A pandemic will likely result in shortages of medications, medical supplies and potentially operational supplies. Since multiple jurisdictions including other countries will potentially be affected by these shortages, the response plan should not rely heavily on outside assistance in terms of the provision of supplies and equipment. Some of the issues directly affecting Trinidad and Tobago supplies will be:

Interrupted transportation lines—Trinidad and Tobago supplies travel long distances since supplies are often obtained from the U.S. and other nations. Difficulties at port and border crossings may substantially affect supply lines. In addition, a loss of up to 30% of workers, drivers, and other transportation staff may affect the production and delivery of supplies.

Lack of inventory — In an effort to reduce costs, most health regions have moved to “just-in-time” inventory systems that keep minimal supplies on hand. Consideration should be given to the purchase of products made locally to avoid potential supply problems due to border crossing restrictions implemented at the time of the pandemic.

Embargoes — The majority of medical supplies are not produced in Trinidad and Tobago. The Ministry of Health will make all efforts to establish a network for the importation and distribution of influenza vaccine and some antibiotics. However, in many cases supplies are provided by only one or two manufacturers worldwide or the essential ingredients or components come from a single source. In past pandemics and health crises other nations have banned the export of critical vaccines, medications and supplies. Recommendations for the use of vaccine and antivirals during a limited supply situation are provided in other annexes.

Transportation and Supply Logistics-Transportation planning for NT sites should include consideration of the types of supplies and products (e.g., dangerous goods such as oxygen, biomedical waste, equipment for sterilization) that will need to be transported to and from NT sites, who will provide these services (i.e., will volunteers need to be trained) and whether the site has appropriate delivery access. The size and types of vehicles and other mechanisms of transport have been identified for each “kit” that is available through the National Stockpile System.

Stockpiling

Regional and local health authorities may wish to review the possibility of rotating stockpiles of critical supplies for NT sites within their own jurisdictions. Jurisdictions may specifically wish to keep some older equipment such beds, which need little maintenance and have no specific “shelf life”. Appropriate assessment should be made of

the maintenance and training required to ensure the safety and effectiveness of older equipment, training needed by staff to use unfamiliar equipment, etc.

After such a critical assessment, institutions and health authorities may consider maintaining certain critical pieces of older equipment such as ventilators. The stockpiling of antiviral drugs will be discussed at the national level, however, the need to and feasibility of stockpiling critical medications for the management of patients with influenza and secondary pneumonia, should be address at the regional and local levels. In addition, RHAs will have to discuss the need to stock larger quantities of medications and equipment to manage persons with co-morbidities, e.g. chronic cardiac and respiratory disease, diabetes, renal failure, that may be exacerbated by influenza infection. The Clinical Care Guidelines (Annex F) provide guidance on antibiotics for the treatment of secondary pneumonia. The antibiotics currently stockpiled at the national level will be reviewed to determine whether these can be utilized in a pandemic, in addition to, further discussions on the need for additional national stockpiles.

Equipment and Supplies

The issue of equipment and supplies has been addressed in other annexes. The Resource Management annex provides information on supplies and equipment issues for acute care facilities that can be extrapolated to identify needs for NT sites. In addition, the treatment protocols in the Clinical Care Guidelines (Annex F) can be used to plan for medical supply and equipment needs. The Infection Control annex will address the use of masks and gowns and other supplies in various settings.

The services offered by each NT site will obviously dictate equipment and supply needs. For example, it is unlikely that NT Sites will be able to provide the expertise and resources required to support intubated patients, however, equipment may be needed to support patients requiring ventilation while they are transported to another facility. Isolated communities may wish to review the possibilities for hand ventilators (Ambubags) for short-term assistance and other equipment that does not require the same expertise or support as for ventilated patients. The following is a preliminary list of medical equipment and supplies needed to provide medical care in each site:

- beds, bedding, lights
- intravenous equipment (e.g., needles, intravenous catheters, fluid and tubing, syringes, tape, tourniquet)
- sterilizers
- sphygmomanometer, stethoscopes, thermometers
- miscellaneous supplies (e.g., antiseptics, dressings, bandages, steristrips, gloves, alcohol based hand sanitizers, alcohol sponges, gauze sponges, arm boards, pulse oximeter, extra batteries for equipment needs, flashlights, scissors, tongue blades, portable lamps)
- emergency drugs (e.g., epinephrine, diazepam, salbutamol)
- airway supplies (e.g., bag-valve-mask, oxygen masks, oxygen tubing, oxygen tank, spacer device for aerosolized medication, motor-driven nebulizers, oral airways, suction machines and catheters)
- patient identification tools, . privacy screens

- communications (telephone, fax, cell, radio or alternatives for isolated communities), . computers and Internet access

Supplies will need to be carefully managed.

Local Production

During a crisis some items, which are usually ordered from foreign sources, may be produced locally. Procurement specialists may wish to review which supplies could be obtained or produced locally if prior arrangements are made. Possible suppliers and suppliers of alternative products should be contacted to explore this possibility.

1.7 NT SITE PLANNING DURING THE PANDEMIC PERIOD

The following activities, with respect to NT sites, should occur during the pandemic, when there are indications that NT sites will be needed, based on local resource availability and utilization, and projections of disease impact:

- Re-evaluate plans based on WHO and Ministry of Health epidemiological projections.
- Appoint site administrators/managers or teams
- Implement plans to prepare the site(s)
- Co-ordinate procurement of supplies

1.7.1 Re-evaluate Plans Based on WHO and TnT Epidemiological Projections

Based on expected attack rates and the demographic of the groups most affected, local planners may re-evaluate what sites and services may be required. For example, if it appears pregnant women will be seriously affected by influenza as they were in 1918, moving deliveries to birthing centres may not be appropriate.

1.7.2 Appoint Site Administrators/Managers or Teams

Each NT site will require a site administrator/manager or a team of managers to locate the site, set up, manage adaptations, schedule staff, oversee movement of supplies, maintenance etc. and continue to operate the site. Depending on the size of the NT site, what services are offered and the community, this may require on-site management 24 hours a day 7 days a week for the duration of the epidemic wave. The nature of the task and the fact that any one may fall ill or be incapacitated requires that all such managers should have alternative people to whom to delegate authority.

1.7.3 Implement Plans to Prepare the Site(s)

The Ministry of Health in collaboration with the Office of Disaster Preparedness and Management (ODMP), has developed outlines for the planning and operation of Emergency Reception Centres and Shelters available through ODPM or the Regional/Local Health levels. Consider the following:

- Contact those currently responsible for the site (school board, civic authorities for community centres, etc.) . Conduct a “walk through” of the site to determine any problems or needed emergency upgrades.
- Ensure light/power/water/telephone is operational; . Ensure adequate furniture and position.

- Remove any obstructions, tripping hazards, impediments to flow, etc. Affix or erect any necessary directional signs, including route to washrooms if unclear. . Identify various rooms/areas for specific functions (e.g., rest, food service, etc.)
- Ensure adequate hand hygiene stations are available.
- Document and report any: . deficiencies in facilities; . failure of light//water/telephones.
- Arrange to move out and store any equipment that will not be needed (e.g. desks, chairs).
- Clean and disinfect the site.
- Contact any required transportation providers.
- Notify pre-determined media for public direction.
- Determine staff support - electrician/plumber/public health inspector/public health nurse/Occupational Health and Safety personnel.
- Determine regional and local support.
- Address financial implications to municipality. Ideally, using previously established accounts.
- Notify garbage removal contractor if required. . Notify recycling removal contractor if size or duration indicates.
- Notify staff, volunteer agencies, and specialty personnel (see Human Resource Section).

1.7.4 Coordinate Procurement of Supplies

- Contact stationery, office, and support equipment providers; arrange transportation if required.
- Contact identified food suppliers (may be a pre-alert to provide lead time). . Notify any required food transporters (vehicles). Arrange for dishes/eating utensils if not present at identified food serving locations.
- Order additional medical supplies.
- Establish alternate transportation/distribution arrangements if required.
- Establish local production of supplies where possible.
- Evaluate the need to access supplies from the National Stockpile System and request if necessary.

1.8 NT Site Planning During the Post-Pandemic Period

The possibility of subsequent waves of the pandemic, and the resources that would be required during those waves, should be considered before decommissioning NT sites. Activities at NT sites during the post-pandemic period will focus on the discharging or re-locating of patients, storage of medical records and the decommissioning of the NT site(s). Each site should be assessed for damage or necessary alterations to return it to its previous use. Supplies should be redistributed, stored or returned to stockpiles.

Section 2: Human Resources Issues

2.1 Introduction

During an influenza pandemic there will be an increased need for people with health care training to deal with the increased demands on the health care system. This may involve the re-locating of health care workers to different settings, including NT sites or to

different locations within the same traditional site to provide services that differ from their usual responsibilities. In addition, non-health care workers may need to be hired/contracted to provide supplementary services essential to the establishment and operation of NT sites or the expanded role of current health care sites. Volunteers will also be a potentially vital source of human resources to facilitate the management of health care services during a pandemic.

During an influenza pandemic the shortage of trained medical staff will be one of many barriers to the provision of adequate care. A significant proportion of the workforce may be unable to attend work for a period of time due to illness in themselves or family members. Communities and health care organizations will need to have specific guidelines in place to address what will be done if the health care system is overwhelmed and NT sites must be established or current service sites expanded. Human resource management in the acute care setting during a pandemic is addressed in the Resource Management Guidelines for Health Care Facilities During an Influenza Pandemic (Annex G). This section of the document will, therefore, focus on human resource issues outside of the traditional acute care settings.

2.2 Human Resource Planning During the Interpandemic Period

Planning during the interpandemic period for the optimal use of human resources at NT sites and other health care sites involves several steps. The following list of steps/activities is provided to assist with this part of the planning process, details are provided in the following sections.

- Appoint a human resource management team.
- Identification of human resource needs and a database to be used for staff and scheduling.
- Review emergency preparedness legislation.
- Recruitment of health care professionals.
- Plan for salaries or payments to staff not currently employed by the health care system.
- Identify and recruit volunteers.
- Provide training.
- Establish immunization recommendations.
- Supporting health care workers in NT sites.

2.2.1 Appoint a Human Resource Management Team

The work involved in identifying current health care workers who could be re-located to NT sites; recruiting additional health care workers, non-medical workers and volunteers; and managing the training, assignment and support of these workers, should be initiated during the interpandemic period. Establishment of a team or subcommittee that could take on these responsibilities in each jurisdiction is an important first step. A combination of professionals with expertise in human resource issues, pandemic planning, health care administration, and volunteer organizations would be desirable for this planning team/subcommittee.

2.2.2 Identify Human Resource Needs

One approach to identifying the human resource needs for NT and other health care sites is to consider each potential type of site and the services that would be provided at each. From this exercise the number and type of health care workers and non-health care workers that would be required per site could be estimated. The following is a list of where additional or new human resources will be needed during a pandemic (excluding acute care facilities):

- Triage Sites – community triage sites: at clinics, non-traditional sites, attached to an existing hospital
- Non-Traditional Sites – including emergency care centres, emergency hospitals, support hotels, nursing stations, etc.
- Vaccination Clinics – mobile clinics, clinics in acute care sites, etc.
- Home Care/Community Care – to reduce the pressure on other health care programs
- Long Term Care Facilities
- Telephone Information Services, 24-hour health lines
- Other – doctors’ offices, specialty health services (cancer or cardiac treatment centres), etc.

In order to make best use of the skills of various health care workers a pandemic will likely require that health care workers be reallocated from their usual roles and settings. For example, trained, health care professionals, will be required to supervise volunteers and other staff in clinics and non-traditional sites. Shortages of physicians and nurses will require extensive use of other health care professionals, trained non-medical workers and trained volunteers. Each jurisdiction needs to conduct an inventory of health care personnel and potential volunteers, and determine sources from which additional staff could be acquired, assuming that hospitals are using much, if not all, available staff for their own needs. The following list is for reference, and may be adapted and altered to meet various needs.

Health Care Workers (HCW)

Within facilities, consideration should be given to reassigning medical and nursing personnel with administrative, research and educational assignments to clinical duties.

Alternate sources of HCW would include, but are not limited to:

- retired physicians/nurses (need to be assurance that work during a pandemic would not affect their pension plans)
- physicians/nurses currently not working in clinical health care (i.e., working in education, administration, research, private industry)
- medical and nursing students
- registered nursing assistants, patient care assistants, emergency medical technicians
- veterinarians
- pharmacists
- therapists (respiratory/occupational/physio)
- technicians (laboratory, radiography)
- health care aides

Personal Care Services

Personal care services involve those people that provide health care and support services in the home. It is recognized that these organizations already function near capacity and may have limited ability to expand during a pandemic. These services include, but are not limited to:

- Home Health Agencies

Categories of Workers

In a pandemic, in addition to current health care workers, health care tasks may have to be undertaken by personnel who would not normally perform these tasks. For the purposes of assigning tasks, training, support and other issues human resource planners and managers must be aware of the following types of workers:

- Paid health care professionals
- Paid health care workers who are not licensed professionals
- Paid non-health care/non-medical staff (support, maintenance, etc.)
- Volunteer health care professionals
- Volunteers trained in medical tasks, but who are not licensed professionals.
- Volunteers not trained in medical tasks, but can provide other essential services to health care sites– e.g. electricians, who help set up the NT site.

For each site the essential functions and the skills required to complete each task should be identified and documented. It will be necessary to establish medical and nursing directives for each NT site (triage, influenza hospital, nursing station, community clinic or support hotel) and to access existing directives for sites that may need to be expanded during a pandemic. The next step is to list the type of workers/volunteers who already have the skills to carry out these tasks. (In existing institutions these roles are already defined, however they will need to be developed and adapted for use in the Non-Traditional Sites.) Any gaps in required skill sets should be addressed during this planning exercise. It may be necessary to investigate the local availability and access to other types of service providers in this type of emergency situation (e.g., mortuary services).

Checklist of Functions and Personnel at Non-Traditional Sites

This is a checklist of functions that may be required at a non-traditional site. It is an example of how the exercise described above might be documented. Depending on size, number of patients and function of the site, many tasks may be carried out by the same individual. Consider that these functions may be required 24 /7. Some services may be provided by a central hospital or community.

FUNCTIONS	SKILL SETS/PERSONNEL
A Administration	
Site Administration/Management	Management/administration
Co-ordination of Patient Care – staff scheduling and support, assessing service demands and supply	Medical training/knowledge (e.g. in-charge nurse), leadership and coordination skills

Medical Management	Physician or nurse with physician backup
On-site training and orientation of staff, volunteer and family members	Knowledge of basic patient care, patient triage, infection control, occupational health and safety
Spokesperson	Medical management. If no medical spokesperson refer to hospital or site administrator
Receptionist	Communication/language skills, public relations
Health Records Management	Clerical skills (including computer skills), confidentiality agreement
Information Technology/Resource	Knowledge of IT systems and problem solving skills
B Patient Care	
Medical triage	Medical training/nurse, ideally with ER training
Admissions/Discharge	Medical training/nurse, ideally with experience in discharge planning
Patient Care - medical	Instructed in nursing care: rehydration, feeding, ambulation, bathing, vital signs monitor, give meds
Physiotherapy	Trained in chest phyiotherapy and mobilization
Respiratory care	Trained in oxygen delivery, patient monitoring, equipment monitoring (oximeters) and inventory
Pharmacy Services	Pharmacist at hospital or in community
Discharge planning	(Refer to community care, self care)
C Infection Control	
Sterilization of Equipment	Trained in sterilization and infection control
Housekeeping	Basic infection control knowledge
D Food Services	Hospital or community based?
Patient nutrition/therapeutic diets	Dietician at hospital or in community (home care, meals on wheels)
Food preparation - workers' meals	Basic food safety training
E Social Services	

Social service/community care	Counselling, accessing community resources/Liaison Social Worker
Psychology/Pastoral Care/Grief Counselling	Social workers, religious leaders, psychologists, local service clubs/support groups
Care for children/family members of workers	Training or experience in child care, care for elderly, home care/criminal records check
F Morgue	
Transportation of corpses	Driver's license
Preparation and storage of corpses (see Annex on Mass Fatalities)	Body bagging, shelving corpses
G Transportation	
Patients, Staff	Driver's license
Dangerous goods (e.g. oxygen), medical waste	Appropriate licenses and liability insurance
Supplies, Lab tests	Drivers license, criminal records check
H Services	
Laboratory testing	Laboratory services at hospital or in community
Maintenance	plumbing, electrical, etc.
Laundry	local laundry business
Communication services and equipment support - phone, cells, cable, computer support	Local businesses
I Security (Staff ID will be necessary)	
Public order and personal safety	Crowd control, traffic control
Protection of site – fire safety, theft	Trained in building safety and security

Training for health care workers, volunteers, family members may be carried out at the time of a pandemic.

2.2.3 Review Emergency Legislation

Emergency legislation makes many provisions for the management of workers during a crisis. This includes the recruitment of professional and other paid staff as well as volunteers, managing human resources and protection of people who volunteer. Pandemic planning should be integrated with the emergency plans of the jurisdictions as much as possible, in order to make best use of existing plans and resources. Remember, it is unlikely that an Emergency will be “declared”. Therefore human resource planning should be based on existing plans without a declaration.

The following provisions of legislation are particularly applicable to human resource issues including:

- authority regarding licensing and scope of practice issues, and the ability of government to make unilateral changes during a crisis;
- safety and protection of workers, (one of the primary responsibilities);
- fair compensation;
- insurance, both site insurance, workers compensation and other forms of insurance;
- training;
- provision of clothing and equipment;
- protection of the jobs of workers who take leave to assist during the crisis.

Compelling Workers

Under emergency legislation Ministry of Health and RHA's may have the authority to designate "Essential Services" and workers and have the ability to compel people's time or property with due compensation *as a last resort*. This issue has been raised both because of the existing shortage of health care workers and concerns that health care workers and others may refuse to work during a pandemic due to changed job responsibilities, fear of infection, family responsibilities or other reasons. However, the extreme difficulty of enacting or enforcing such legislation and would strongly encourage the jurisdictions to review all other methods of obtaining essential human resources, in advance of a pandemic.

2.2.4 Recruitment of Health Care Professionals

While actual recruitment of health care professionals for the purpose of service provision will not be necessary until the pandemic arrives, it is important to establish an ongoing dialogue with these professionals in the interpandemic period. Communication must take place to inform health care professionals about influenza, influenza pandemic plans and their roles within those plans. It will be important to convey the potential impact of the pandemic on health care service provision and specifically the need for additional human resource and NT sites. Issues regarding licensing and scope of practice expansion during a crisis should be discussed with the goal of addressing any concerns during the interpandemic period rather than at the time of the pandemic. In addition, any potential impediments for recruited/volunteer health worker being able to return to their own workplace following the provision of services in the NT site, will need to be addressed in advance. Education regarding the identification and treatment of influenza and immunization programs should also be ongoing during the interpandemic period. In order to be able to call on health care professionals, for the purpose of pandemic training or the implementation of the pandemic response, planners should review the logistical and legal issues around developing databases of HCWs who have the training and skills needed during a pandemic. This may be achieved by arranging with the appropriate licensing bodies or associations for the establishment and maintenance of databases of members for

use during a crisis. There may be legal requirements that individuals agree to keep their names on a list of professionals available for work in a crisis.

2.2.5 Plan for Salaries or Payments to Staff Not Currently Employed by the Health Care System

Decisions around payment and expenditures will be based on current arrangements and labour agreements in each province, territory or local jurisdictions. Planning must be used on these contractual arrangements or assessment of current local salaries for similar work.

2.2.6 Identify and Recruit Volunteers

Definition of Pandemic Volunteer

The following is a definition of a volunteer for the purposes of pandemic planning and response.

A volunteer is a person registered with a government agency or government designated agency, who carries out unpaid activities, occasionally or regularly, to help support Trinidad and Tobago to prepare for and respond to an influenza pandemic. A volunteer is one who offers his/her service of his/her own free will, without promise of financial gain, and without economic or political pressure or coercion.

A volunteer may be a health care or other professional, or any other person who offers their services freely. Notwithstanding that while a volunteer may not expect financial gain, or remuneration for their time, the agency or government may provide supports such as: insurance protection, family support and job security to facilitate the recruitment of needed volunteers.

Interpandemic Tasks in Volunteer Management

There are several tasks/activities that should take place during the interpandemic period to optimise the use of volunteers in the pandemic response. These include:

- a. Communicate with the public and with volunteer organizations.
- b. Develop and maintain databases of volunteer organizations.
- c. Develop Job descriptions and skill lists for volunteer positions in conjunction with volunteer agencies. (See Checklist of Functions and Personnel)
- d. Develop recruitment, screening procedures.
- e. Develop training procedures.
- f. Monitor and track qualifications.
- g. Prepare to manage volunteers.

The time between the WHO declaration of an influenza pandemic, the first wave and analysis of the severity of the pandemic will be very short. There will be a need to recruit, screen, train and deploy volunteers as quickly as possible. Therefore procedures need to be in place in order to best place volunteers in as short a time as possible.

a. Communicate with volunteer agencies

Existing volunteer agencies will be the primary source of trained, screened volunteers in most jurisdictions. Developing ongoing communications and planning procedures with these agencies will be essential to the planning effort. Potential sources of volunteers include, but are not limited to:

- . Red Cross, St. John Ambulance
- . Salvation Army
- . Volunteer Fire Departments
- . Scouts, Sea/Army/Air Cadets, Guides
- . Big Brothers, Big Sisters
- . Community Service Agencies

Each jurisdiction needs to liaise with non-governmental organizations within their district to determine the approximate number of volunteers who would be available during a pandemic. During the interpandemic period, recruitment of volunteers, both those with health care skills and those without should take place primarily through existing agencies. These agencies already have recruitment, screening, training programs and management programs in place. It is important that health authorities and emergency planners establish communication with existing agencies to communicate community needs during a pandemic, in order that agencies may recruit and maintain a core group of volunteers with appropriate training. They may wish to add certain types of training to standard training programs in order to address issues regarding pandemic influenza.

Specifically, volunteers should be aware that unlike other emergencies such as earthquakes or floods, the duration of the “emergency” will be longer for an influenza pandemic and more than one pandemic wave will likely occur. Since people view the risk of disease differently than the risk of injury, and will be concerned about bringing this disease home to their families, it is important that these issues are addressed during training sessions.

b. Develop and maintain databases of volunteers

Because maintaining up-to-date databases of volunteers is time consuming, difficult and expensive, health authorities will likely have to depend on existing volunteer agencies.

Such agencies should be encouraged, where possible, to track trained and screened (those that had interviews, reference checks and criminal records checks) volunteers and track records of certificates or diplomas and maintain methods of communication.

Health authorities may wish to encourage these agencies to keep their databases current, and to expand the information on their volunteers’ skill sets or experiences, to include skill sets that would be required in a pandemic.

c. Develop job descriptions and skill lists for volunteers

Develop a list of jobs, job descriptions and skills based on the needs of the region or community and working in conjunction with volunteer agencies. (See Checklist of Functions and Personnel). This list can be used to determine which training programs are necessary and how best to recruit, train and assign volunteers in the interpandemic and pandemic periods.

d. Develop volunteer recruitment, and screening procedures.

Develop procedures that can be implemented quickly once a pandemic is declared. (See Pandemic Period – Recruitment, Screening and Deployment.)

e. Monitor and track qualifications and certification

Plan for methods to ensure health care workers, including volunteers are trained and certified for the tasks they are undertaking:

- Review the logistical and legal issues around developing databases of HCW's who have the training and skills to be deployed during a pandemic.
- Arrange with appropriate agencies to maintain databases of members for use during a crisis. There may be legal requirements that individuals agree to keep their names on a list of those available for work in a crisis.
- Plan for a "Quick Check" method of confirming certification or qualification.
- If a volunteer is trained at an NT site during a pandemic, plan for ways to test and record the level of skills.

f. Prepare to manage volunteers

During a major crisis many people come forward who wish to volunteer. In some cases managing the numbers of people who come forward to volunteer is a major logistical effort in itself.

During the interpandemic period:

- Review emergency plans for managing an influx of volunteers.
- Plan for a volunteer co-ordinator or team – identify agencies, positions or individuals – to take responsibility for directing the process of accepting, screening, training and placing volunteers.
- Ensure resource information is available to the volunteer co-coordinator/team.
- Plan for a location for volunteer recruitment/management that is separate from existing hospitals or clinics to reduce congestion and security issues.

2.2.7 Provide Training

Both health care professionals and other workers will need training for dealing with pandemic influenza. Professionals may need training or refresher courses in tasks they don't normally perform, including supervision and management. Due to the limited

number of health care professionals that will be available in the community, volunteers and other non-medically trained staff will likely be needed to perform direct patient care.

i) Train the Trainer

Health authorities and existing volunteer agencies, may establish programs to “train the trainers,” to maintain resources to call on during a pandemic. Plan for where and how training programs will be delivered, ideally during the interpandemic period, but also during the pandemic.

ii) Train for Self-Care

All health care workers should be trained in self-care as it pertains to pandemic influenza treatment and symptom control and the ability to communicate the principles of self-care to others. As professionals will likely be required for the provision of medical services, teaching self-care skills may become part of the volunteers’ role. A number of jurisdictions are currently developing “Self-Care” modules designed to improve the quality of home care. (See the Clinical Care annex for more information). Jurisdictions are encouraged to share such resources and to develop other health information services for the public, e.g. 24-hour telephone health information services. Ensure that all those training in self-care are using consistent, accurate and up-to-date information. Plan for methods to educate health care workers and the public in Self-Care. While some education will be done in advance, much of the education of patients and their families will take place in clinics, NT Sites, vaccination clinics during a pandemic.

iii) Train Health Care Professionals

A number of training programs exist which can be adapted for pandemic influenza. Health care professionals may need training for reassignment and training for supervision. The time for training once a pandemic is underway will be extremely short; therefore training should be incorporated into existing programs now. By incorporating the skills needed during a pandemic into existing training, we reduce costs, improve efficiency and enhance readiness. Training may include medical training essential to working in a pandemic situation including:

- Infection control procedures
- Use of respirators and care of patients on respirators
- Worker and volunteer supervision
- Working with grieving families

Develop a plan for training/retraining health care workers who have not been working in health care (retirees, etc.) at the time of a pandemic. (See Resource Management Guidelines in Acute Care Settings (Annex G) for lists of Health Care Professionals.)

iv) Train Volunteers

During the interpandemic period, volunteer training may be left as much as possible to existing agencies. In areas without well-developed volunteer systems and agencies,

planners may wish to review the need for developing, maintaining and funding core groups of volunteers trained for medical emergencies such as pandemic, and trained trainers. All volunteers should be trained for self-care and infection prevention and control (routine or universal precautions).

Based on the Checklist of Functions for your jurisdiction, volunteers working in direct patient care may also be trained in:

- Basic personal care (Bed baths, bed pans)
- Observation of condition (temp, pulse, resp, etc.)
- Case definition, identify the illness
- Giving medications (pills, eye and ear drops, liquids)
- Oxygen administration
- Pressure ulcer prevention – skin care
- Ambulation, mobilization
- Cleaning in health care facilities
- Records management
- Food preparation (Food Safety Courses)
- Workplace Hazardous Materials Information Systems (WHMIS) protocols
- Security staff trained in working with grief stricken people.

Review the Checklist of Functions for the training required in your jurisdiction. As far as possible, existing agencies should be encouraged to maintain skills in these tasks during the inter-pandemic period.

v) **Training Resources and Programs**

Curricula for the above listed skills are available through existing agencies. Training programs include, but are not limited to:

- on-line courses, including an Infection Prevention on-line course for infection control issues at www.igc.org/avsc/ip/index.html
- Association for Practitioners in Infection Control and Epidemiology training manual “*Influenza Prevention: A Community and Healthcare Worker Education Program*” < <http://www.apic.org/resc/>>
- Nursing colleges training programs (i.e. the basic care programs for health care aides)

2.2.8 Establish Immunization Recommendations

While no vaccine for the pandemic strain of influenza will likely be available in advance of the arrival of the pandemic in Trinidad and Tobago, health care workers should be up-to-date with the other recommended immunizations. Because immunizations require varying amounts of time and some require more than one dose for a person to develop immunity, it will likely be impossible to provide all of these once a pandemic is declared, or to provide them within an appropriate time frame given the lack of supplies and human resources.

Where possible volunteers already working with existing agencies or recruited in the interpandemic period should be encouraged or required to be up-to-date with respect to the recommended immunization schedule. In addition, depending on type of work they will be doing during the pandemic, it may be appropriate to recommend that volunteers receive the same immunizations that are recommended for health care workers (e.g., hepatitis B vaccine). Volunteer recruiters should also ask for immunization records, where possible, to facilitate identification of individuals who are not up-to-date with respect to the current recommended schedule.

2.2.9 Supporting Workers in NT Sites

Plans to extend support programs for health care workers (including trainees, volunteers and retirees) to all workers at NT sites should also be included in overall plan for the management of human resources. Support should include: provision of food and drink, grief counseling, support for families and job protection.

2.2.10 Insurance/Licensing

In addition to addressing any liability / insurance issues in relation to health care professionals and other non-professional health care workers, these issues must also be addressed for retired/trainee health care professionals and volunteers performing patient care and other non-medical tasks. There are a number of insurance issues which present major concerns, especially the insurance required for workers at NT sites including volunteers. The Non-Traditional Sites and Workers subgroup has noted that issues around personal liability and workers compensation (including compensation for acquired illness) may present a powerful barrier and disincentive to the recruitment of health care workers, especially volunteers, during a crisis. A recommendation has been put forth, that these issues be addressed on a national basis, and be reviewed to determine the legislative, administrative, licensing and other options within each RHA's. The scale of a pandemic may require significant changes to scopes of practice of professionals, and delegation of tasks to non-professional staff and volunteers. These raises many issues regarding insurance and licensing which must be reviewed with respect to existing insurance, licensing practices, cross jurisdictional licensing, labour agreements and Emergency Legislation. The types of insurance which must be reviewed include:

- Malpractice and personal liability
- Transfer of licensing between jurisdictions
- Workers compensation
- Accidental death and dismemberment.
- Directors and officers liability (depending on the administrative authority)

Malpractice/Liability Insurance of Workers and Volunteers

Review liability protection/malpractice insurance coverage to see how it will extend to cover workers in Non-Traditional Sites, professionals, those taking on tasks not usually part of their scope of practice and volunteers.

Transfer of Licensing Between Jurisdictions

Each province/territory must review with its professional licensing bodies (medical colleges, nurses associations) how pandemic workers with varying qualifications, or licensed in other jurisdictions, may deliver some services. Professional licensing bodies may be asked to liaise and extend privileges to out of province professionals, or foreign trained professionals based on their standing in another jurisdiction.

Workers' Compensation

Each region or local authority must make appropriate arrangements with their workers' compensation board if pandemic volunteers are to be covered by workers' compensation. A Memorandum of Understanding (MOU) between the Authorities and registered volunteers or persons compelled for emergency service work are protected by workers' compensation during emergency response, as long as they are registered. Some volunteer agencies have a liability policy for their volunteers. In some circumstances, volunteers who register with designated agencies may be covered by workers' compensation under certain Emergency Preparedness Legislation. However, there are a number of issues to be resolved with workers' compensation Boards at the national and regional level:

- . Definition of Health Care Workers for this purpose
- . Definition of volunteers for this purpose
- . Does the policy require a declaration of Emergency and at what level of government or would the insurance come into effect once the Minister of Health declares a Pandemic?
- . Compensation is usually based on loss of income, however, in some cases volunteers may be retired, homemakers, or self-employed. Would compensation cover costs of the person's other responsibilities, such as family care?
- . Would compensation be available if volunteers became ill rather than injured?

Accidental Death and Dismemberment

Usually a subset of workers' compensation. Ensure that this insurance is available.

Directors and Officers liability

If the health care site or service is a part of an existing institution, hospital, or health authority, determine whether existing insurance can be extended to those managing sites or services elsewhere or obtain this insurance elsewhere.

2.3 Human Resource Planning During the Pandemic Period

Once a pandemic is declared there will be a massive effort required to implement the programs and activities developed during the interpandemic period to manage the human resource issues. Activities will include:

- Activation of the Human Resource Management Team
- Implement Volunteer Management Team

- Provide Human Resource Management Team with lists and job descriptions of personnel required.
- Contact supporting organizations to request additional personnel with special skills, e.g. Translation Services, Churches/Counselling Services.

2.3.1 Contact Health Care Professionals

By the time Pandemic is declared most existing health care institutions and agencies will be aware that the WHO and Ministry of Health have been monitoring a growing situation.

Communications with professionals is vital at this stage as professionals will be required to take on additional or changed responsibilities and may be reassigned to other sites or activities.

2.3.2 Volunteer Recruiting, Screening, Training, Deployment

a. Communicate with volunteer agencies

Communicating with the Volunteer Agencies to co-ordinate the activities of voluntary efforts will be one of the first tasks of the Volunteer Management Team.

b. Call for volunteers

In emergencies often volunteers come forward. This potentially large and commendable response needs to be channelled so that those with needed skills can be placed where they are needed most and their skills can be optimized. However, not all volunteers will have the skills, ability or stability required for the jobs they want to do. Therefore, any calls for volunteers should identify the needed skill sets to streamline the recruitment process. Volunteer recruitment and screening needs to be considered, including:

- . position descriptions
- . advertising the need for volunteers
- . screening criteria
- . volunteer application forms
- . interview
- . reference checks
- . criminal record check.

c. Volunteer screening

Volunteers in a pandemic may be placed in positions of significant trust and authority, with vulnerable people. Volunteer positions will vary in nature, in the type of training, skills and abilities required, in the setting and in the level of risk to the volunteer. Volunteer screening must take all of these issues into consideration and provide for interviews, review of qualifications and appropriate assignment. In addition, it is important to ensure that volunteers do not have a personal history, which indicates they are incompatible with the safety and well being of vulnerable people.

Screening processes must review the stability of the individuals and may include criminal record checks. The most important part of volunteer recruitment and assignment is the

interview process. Reference checks are also a good screening tool. A criminal records check is usually required by law for volunteers who work with vulnerable people. However, during the pandemic, police services may not have the resources due to illness and/or have other high priority duties to provide this service. Therefore more emphasis may need to be placed on conducting a good interview and reference check process. It will be important to use trained volunteer recruiters, preferably identified and trained during the interpandemic period.

Due Diligence: The volunteer recruitment process should include a briefing meeting on risks and infection control (routine or universal precautions), and should require the individual to sign an agreement acknowledging they have been informed of the risks and protections, prior to being assigned to a placement.

2.3.3 Training During the Pandemic

Training programs developed or planned during the interpandemic period should be “geared up”. These will include those programs listed in the interpandemic section of this document.

Training for Families/Caregivers

Family members of patients may stay at the site to help care for a patient or may be asked to take a patient home. In either case, the family member will need some training, especially in the areas of re-hydration, infection control, observation and assessment, and self-care. In addition, families may require counselling to help them support those who are ill or to cope with fear and grief.

Training for Support Tasks

In addition to training for patient care there are needs for training for intake, housekeeping, maintenance and other tasks. There are standards set for training of all workers related to health care, including housekeeping and maintenance staff. In many cases Staff Associations set these standards. It is important to note that during a crisis it will not be possible to demand the same level of training for volunteers, which would normally be required of staff. Thus, it will be important to consider what are the minimum standards and basic information that must be communicated on certain issues.

2.3.4 Supporting Workers in NT Sites

Support provided to Workers at Non-Traditional Sites may include:

- Emotional support/grief counselling (aimed at permitting workers to continue to work and reduce loss of staff due to grief or traumatic stress).
- Family care (for children, seniors, sick family members who do not require hospitalization). This poses some questions around infection control if gathering children or others together for group care.
- Job protection for workers who move from other jobs during pandemic.
- Job protection for spouses who do family care to allow workers to work in health care.

2.3.5 Communicate Changes to Licensing and Insurance Provisions

Inform site managers and coordinators, as well as health care professionals in all sites and health care programs of changes in licensing and insurance and what it will mean for flexibility in staff deployment and additional staffing.

2.4 Human Resource Planning During the Post-Pandemic Period

Activities during this period will focus on the demobilization of staff and volunteers. Assessment of insurance claims or claims for assistance will also occur during this period.

Annex I

Guidelines for the Management of Mass Fatalities during an Influenza Pandemic Introduction

During a pandemic, local authorities will have to be prepared to manage additional deaths due to influenza, over and above the number of fatalities from all causes currently expected during the inter-pandemic period. Within any locality, the total number of fatalities (including influenza and all other causes) occurring during a 6- to 8-week pandemic wave is estimated to be similar to that which typically occurs over six months in the inter-pandemic period. This guideline aims to assist local planners and funeral directors in preparing to cope with large-scale fatalities due to an influenza pandemic. A number of issues have been identified, which should be reviewed with medical examiners, local authorities, funeral directors, and religious groups/authorities.

1.0 Planning for Mass Fatalities

In order to identify planning needs for the management of mass fatalities during a pandemic, it is important to examine each step in the management of a corpse under normal circumstances and then to identify what the limiting factors will be when the number of corpses increase over a short period of time. The following table identifies the usual steps. Possible solutions or planning requirements are discussed in further detail in the sections that follow this table.

Usual Process for Corpse Management

Steps	Requirements	Limiting Factors	Planning for Possible Solutions/Expediting
Death pronounced	Person legally authorized to perform this task	If death occurs in the home then one of these people will need to be contacted Availability of people able to do this task	Provide public education re. how to access an authorized person Consider planning an on call system 24/7 specifically for this task
Death certified	Person legally authorized to perform this task	Legally, may not necessarily be the same person that pronounced the death	Consider “collecting” corpses and having one authorized person perform this task en masse to improve efficiency
Body wrapped	Person(s) trained to perform this task Body bags	Supply of human and physical (body bags) resources If death occurs in the home: the availability of these requirements	Consider developing a rotating 6 month inventory of body bags, given their shelf life Consider training or expanding the role of current staff to include this task Provide this service in the home in conjunction with pronouncement and transportation to morgue
Transportation to the morgue	In hospital: trained staff (orderly?) and stretcher	Availability of human and physical resources	In hospital: consider training additional staff

	Outside hospital: informed person(s), stretcher and vehicle suitable for this purpose		working within the facility Consider keeping old stretchers in storage instead of discarding Look for alternate suppliers of equipment that could be used as stretchers in an emergency e.g., trolley manufacturers Outside hospital: provide public education or specific instructions through by phone to public Health Offices where to take corpses if the family must transport
Morgue storage	A suitable facility that can be maintained at 4 to 8 degrees Celsius	Capacity of such facilities	Identify and plan for possible temporary morgue sites
Autopsy if required/ requested	Person qualified to perform autopsy and suitable facility with equipment	May be required in some circumstances Availability of human and physical resources	Ensure that physicians and families are aware that an autopsy is not required for confirmation of influenza as cause of death
1) Cremation*	Suitable vehicle of transportation from morgue to crematorium Availability of cremation service A cremation certificate	Capacity of crematorium/speed of process Availability of coroner or equivalent official to issue certificate	Identify alternate vehicles that could be used for mass transport Examine the capacity and surge capacity of crematoriums within the jurisdiction Discuss and plan appropriate storage options if the crematoriums become backlogged Discuss and plan expedited cremation certificate completion processes
2) Embalming**	Suitable vehicle for transportation from morgue Trained person	Availability of human and physical resources	Consult with service provided regarding the availability of supplies and potential need to stockpile or develop a rotating 6 month

	Embalming equipment Suitable location	Capacity of facility and speed of process	inventory of essential equipment/supplies Discuss capacity and potential alternate sources of human resources to perform this task e.g. retired workers or students in training programs Consider “recruiting” workers that would be willing to provide this service in an emergency
Funeral service funeral director	Appropriate location(s), casket (if not cremated), director	Availability of caskets Availability of location for service and visitation	Contact suppliers to determine lead time for casket manufacturing and discuss possibilities for rotating 6 month inventory Consult with the Funerary Services to determine surge capacity and possibly the need for additional sites (e.g., use of churches etc. for visitation)
2a) Transportation to temporary vault or burial site	Suitable vehicle and driver	Availability of human and physical resources	Identify alternate vehicles that could be used for this purpose Consider use of volunteer drivers
2b) Temporary vault storage	Access to and space in a temporary vault	Temporary vault capacity and accessibility	Expand capacity by increasing temporary vault sites
2c) Burial	Grave digger, space at cemetery	Availability of grave diggers and cemetery space	Identify sources of supplementary workers

* cremated bodies are not usually embalmed; families may choose to have a funeral service followed by cremation or to have the body cremated first and a memorial service later.

** bodies to be buried may be embalmed and may need to be stored in a temporary vault prior to burial.

1.1 General Planning Considerations

In order to develop guidelines or adjust existing plans to suit the pandemic situation, local pandemic planners should ensure that the following persons are involved in mass fatality planning:

- *the Coroner Office/Branch,
- *the Medical Officer of Health,
- *the Emergency Response Team,
- *representatives of the Funeral Services or the local funeral director,
- *representatives from local health care facilities, and

*representatives of local religious and ethnic groups.

Existing disaster plans may include provisions for mass fatalities but should be reviewed and tested regularly, to determine if these plans are appropriate for the relatively long period of increased demand which may occur in a pandemic, as compared to the shorter response period required for most disaster plans. There are currently no plans to recommend mass burials or mass cremations. This would only be considered in the most extreme circumstances.

Since it is expected that most fatal influenza cases will seek medical services prior to death, hospitals, nursing homes and other institutions (including non-traditional sites) must plan for more rapid processing of corpses. These institutions should work with the pandemic planners and the Funeral Services or the local funeral director and coroner office to ensure that they have access to the additional supplies (e.g., body bags) and can expedite the steps, including the completion of required documents, necessary for efficient corpse management during a pandemic.

In order to deal with the increase in fatalities, some municipalities will find it necessary to establish temporary morgues. Plans should be based on the capacity of existing facilities compared to the projected demand, for each region. Local planners should make note of all facilities available, including those owned by religious organizations. Some religious groups maintain facilities including small morgues, crematoria and other facilities that are generally operated by volunteers. Access to these resources should be discussed with these groups as part of the planning process during the interpandemic period.

In the event that local funeral directors are unable to handle the increased numbers of corpses and funerals, it will be the responsibility of municipalities to make appropriate arrangements. Individual regions should work with local funeral directors to plan for alternate arrangements. Planning should also include a review of death documentation requirements and regulatory requirements that may affect the timely management of corpses.

1.2 Role of the Funeral Service

It is recommended that all funeral directors contact their Medical Officer of Health to become involved in their disaster and pandemic planning activities with respect to the management of mass fatalities at the local level. The Task Force Committee of pandemic influenza planning has recommended that funeral directors consider it a part of their professional standards to make contingency plans for what would happen if they were incapacitated or overwhelmed. Each container would be a fully organized temporary morgue with all necessary equipment. These are intended for use in such disaster scenarios as major fire, flood or aircraft crash but might be useful as adjuncts to large auxiliary hospitals in a pandemic.

1.3 Autopsies

Many deaths in a pandemic would not require autopsies since autopsies are not indicated for the confirmation of influenza as the cause of death. However, for the purpose of

public health surveillance (e.g., confirmation of the first cases at the start of the pandemic), respiratory tract specimens or lung tissue for culture or direct antigen testing could be collected post-mortem. Serological testing is not optimal but could be performed if 8-10 ml of blood can be collected from a subclavian puncture post-mortem. Permission will be required from next-of-kin for this purpose.

Any changes to regular practices pertaining to the management of corpses and autopsy requirements during pandemic situations, would require the authorization of the Chief Medical Examiner or Coroner. If a physician requires that an autopsy be performed, normal protocols will be followed, including permission from the next-of-kin. In cases where the death is reportable to a Medical Examiner or Coroner, the usual protocols prevail based on national legislation.

1.4 Preparations for Funeral Homes and Crematoria

In a pandemic, each individual funeral home could expect to have to handle about six months work within a 6- to 8-week period. That may not be a problem in some communities, but funeral homes in larger cities may not be able to cope with the increased demand.

Individual funeral homes should be encouraged to make specific plans during the interpandemic period regarding the need for additional human resources during a pandemic situation. For example, volunteers from local service clubs or churches may be able to take on tasks such as digging graves, under the direction of current staff.

Crematoriums will also need to look at the surge capacity within their facilities. Most crematoriums can handle about one body every four hours and could probably run 24 hours to cope with increased demand. Cremations have fewer resource requirements than burials and, where acceptable, this may be an expedient and efficient way of managing large numbers of corpses during a pandemic.

1.5 Planning for Temporary Morgues

Additional temporary cold storage facilities may be required during a pandemic, for the storage of corpses prior to their transfer to funeral homes. A temporary morgue must be maintained at 4-8o C. However, corpses will begin to decompose in a few days when stored at this temperature. If the body is not going to be cremated, plans to expedite the embalming process should be developed since in the case of a pandemic, bodies may have to be stored for an extended period of time. In jurisdictions where a timely burial is not possible due lack of facilities, corpses may need to be stored for the duration of the pandemic wave (6 to 8 weeks).

Each Region should make pre-arrangements for temporary morgues based on local availability and requirements. The resource needs (e.g. body bags) and supply management for temporary morgues should also be addressed. The types of temporary cold storage to be considered may include refrigerated trucks, cold storage lockers.

Refrigerated trucks can generally hold 25-30 bodies without additional shelving. To increase storage capacity, temporary wooden shelves can be constructed of sufficient strength to hold the bodies. Shelves should be constructed in such a way that allows for safe movement and removal of bodies (i.e., storage of bodies above waist height is not recommended). To reduce any liability for business losses, regions should avoid using trucks with markings of a supermarket chain or other companies, as the use of such trucks for the storage of corpses may result in negative implications for business.

Using local businesses for the storage of human remains is not recommended and should only be considered as a last resort. The post-pandemic implications of storing human remains at these sites can be very serious, and may result in negative impacts on business with ensuing liabilities.

1.6 Capacity of and Access to Vaults

A vault is a non-insulated storage facility for remains that have already been embalmed, put into caskets and are awaiting burial.

In preparation for a pandemic each community should identify the capacity of existing vaults and address access issues for temporary storage. In addition, the need for the creation of new temporary vaults, to meet the increased demand during a pandemic should be addressed. This temporary vault should be non-insulated, have some security features such as covered windows and locks on doors.

2.0 Other Technical Considerations

2.1 Death Registration

Death registration is a Regions/Counties responsibility and administrative practices to register a death. Moreover, only physicians may certify death.

In the pandemic situation, with the increased number of deaths, each jurisdiction must have a body collection plan in place to ensure that there is no unnecessary delay in moving a body to the (temporary) morgue. If the person's death does not meet any of the criteria for needing to be reported to a coroner, then the person could be moved to a holding area soon after being pronounced dead. Then, presumably on a daily basis, a physician could be designated to complete the death certificate.

Funeral directors generally have standing administrative policies that prohibit them from collecting a body from the community or an institution until there is a completed certificate of death. In the event of a pandemic with many bodies, it seems likely that funeral directors could work out a more flexible practice if directed to do so by some central authority (e.g. registrar of vital statistics). These special arrangements must be planned in advance of the pandemic and should include consideration of the regional differences in resources, geography, and population.

2.2 Infection Control

The Infection Control and Occupational Health Guidelines provide general recommendations on infection control for health care facilities and non-traditional sites during a pandemic. However, special infection control measures are not required for the handling of persons who died from influenza, as the body is not “contagious” after death.

Funeral homes should take special precautions with deaths from influenza. Training in the routine infection control practice and additional precautions must be recommended

Visitations/wakes could be a concern in terms of influenza transmission amongst attendees, particularly in smaller communities. It is the responsibility of the Medical Officers of Health to place restrictions on the type and size of public gatherings if this seems necessary to reduce the spread of disease. This may apply to funerals and religious services. Medical Officers of Health should plan in advance for how such restrictions would be enacted, and enforced, and for consistency and equitability of the application of any bans. Families requesting cremation of their deceased relative are much less likely to request a visitation, thus reducing the risk of spreading influenza through public gatherings.

2.3 Transportation

No special vehicle or driver licence is needed for transportation of a corpse. Therefore, there are no restrictions on families transporting bodies of family members if they have a death certificate.

2.4 Supply Management

Funeral directors do not order excessive amounts of supplies such as embalming fluids, body bags, etc., but that they have enough on hand in a rotating inventory to handle the first wave of the pandemic (that is enough for six months of normal operation). Fluids can be stored for years, but body bags and other supplies have a limited shelf life.

Cremations generally require fewer supplies since embalming is not required.

Families having multiple deaths are unlikely to be able to afford multiple higher-end products or arrangements. Funeral homes could quickly run out of lower-cost items (e.g. inexpensive caskets such as cloth and some wooden caskets) and should be prepared to provide alternatives.

3.0 Social/Religious Considerations

A number of religious groups have specific directives about how bodies are managed after death, and such needs must be considered as a part of pandemic planning. Hindus and Muslims, have specific directives for the treatment of bodies and for funerals. The wishes of the family will provide guidance, however, if no family is available local religious communities can be contacted for information. Religious leaders should be involved in planning for funeral management, bereavement counselling, and communications.

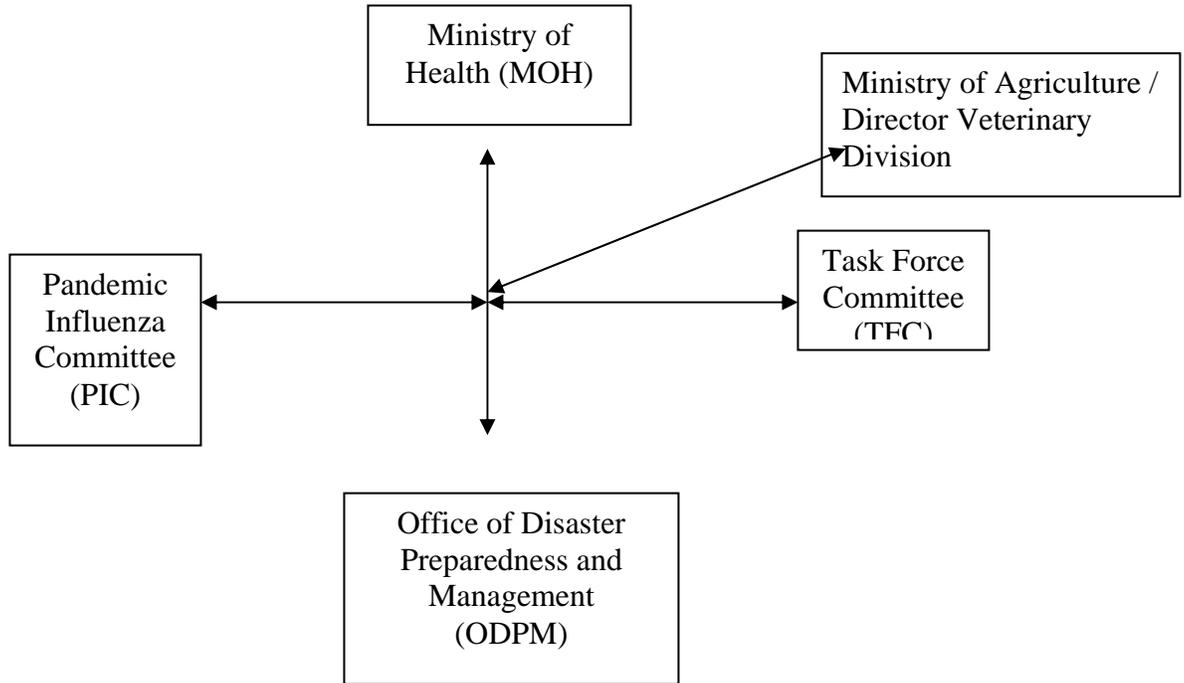
Annex J Communications

Pandemic Influenza A (H5N1) Task Force Committee

NAMES	ORGANIZATION	TELEPHONE/E-MAIL
Dr. Krishna Sundararaneedi	Medical Director Health Programmes	627-0042
Dr. Rohit Doon	Chief Medical Officer	625-0066
Mr. Gerald Peters	Epidemiologist, National Surveillance Unit	681-9336 624-7998
Dr. Dadilia Garces	UNV Medical Epidemiologist, NSU	788-8332 dadiliag@yahoo.es
Dr. B. P Yadav	UNV Medical Epidemiologist, NSU	744-6046 bpyadav66@hotmail.com
Dr. Avril Siung Chang	Environmental Health Advisor PAHO/WHO	624-7524
Dr. Saed Rahaman	Director, Veterinary Public Health	683-4277 625-3825
Mr. Kamesh Sharma	Epidemiologist, Ministry of Health	627-0012
Ms. Bhabie Roopchand	Legal Advisor, Ministry of Health	627-0012
Ms. Lynette John	Principle Pharmacist	627-0012
Dr. Aiuvha Rajnarinesingh	CMOH, Victoria	653-5811
Dr. Ian Popplewell	CMOH, St. Andrew/St. David	668-2053 countystad@yahoo.com
Dr. Anton Cumberbatch	CMOH, St. George East	667-3693
Dr. Mohammed Rahaman	CMOH, St George Central	675-5253
Dr. Randolph Phillip	CMOH, St George West	625-4151 nwrha8@cablenett.net
Dr. Menton Melville	CMOH, Tobago	339-2295
Dr. Olalikan Fagbola	MOH, Nariva/Mayaro	644-2314
Dr. Ingrid PoonKing	CMOH, Caroni	636-3606
Dr. Jay Manohar	SMO, Occupational Health	625-2885
Ms. Marilyn Entwistle	Advisor, Health Services Administration	627-0012
Ms. Onelia Granger	Regional Nursing Office SWRHA	652-3581
Mr. Luthman	Director, Health Education	625-2885
Ns. Patricia Thorne	EPI Coordinator, Ministry of Health	786-1524 tamu2810@hotmail.com
Ms. Joanne Persad	Office of Disaster Preparedness & Management	640-1285 / 8905

Flowchart

Intersectoral Collaboration for Pandemic Influenza Preparedness and Response Plan





**MINISTRY OF HEALTH
Health Alert Notice for
PANDEMIC INFLUENZA**

IF You Have Visited Any Foreign Countries Including The Following Within The Last Seven (7) Days:

Countries to be identified: (Indonesia, Vietnam, Cambodia, Thailand)

And or develop the following symptoms within seven (7) days:

High Fever (>38° C)

And one or more Respiratory Symptoms including:

Cough

Shortness of Breath

Difficulty Breathing

Report URGENTLY to nearest health Facility or the Emergency Department at any Hospital listed below:

Port of Spain General Hospital

San Fernando General Hospital

Eric Williams Medical Sciences Complex

Scarborough Hospital- Tobago

PANDEMIC INFLUENZA HEALTH

DECLARATION

DATE:
TIME OF ARRIVAL COUNTRY OF
ORIGIN_____

REG. NO_____

FLIGHT NO_____

NO. OF PASSENGERS & CREW_____

NO. IN TRANSIT_____

NO. OF INFLUENZA FORMS_____

NO. FROM AFFECTED AREAS_____

NO. WITH SYMPTOMS_____

NO. WITH CONTACT HISTORY_____

PANDEMIC INFLUENZA HEALTH

DECLARATION

DATE:
TIME OF ARRIVAL COUNTRY OF
ORIGIN_____

REG. NO_____

FLIGHT NO_____

NO. OF PASSENGERS & CREW_____

NO. IN TRANSIT_____

NO. OF INFLUENZA FORMS_____

NO. FROM AFFECTED AREAS_____

NO. WITH SYMPTOMS_____

NO. WITH CONTACT HISTORY_____

PANDEMIC INFLUENZA HEALTH

DECLARATION

DATE:
TIME OF ARRIVAL COUNTRY OF
ORIGIN_____

REG. NO_____

FLIGHT NO_____

NO. OF PASSENGERS & CREW_____

NO. IN TRANSIT_____

NO. OF INFLUENZA FORMS_____

NO. FROM AFFECTED AREAS_____

NO. WITH SYMPTOMS_____

NO. WITH CONTACT HISTORY_____

PANDEMIC INFLUENZA HEALTH

DECLARATION

DATE:
TIME OF ARRIVAL COUNTRY OF
ORIGIN_____

REG. NO_____

FLIGHT NO_____

NO. OF PASSENGERS & CREW_____

NO. IN TRANSIT_____

NO. OF INFLUENZA FORMS_____

NO. FROM AFFECTED AREAS_____

NO. WITH SYMPTOMS_____

NO. WITH CONTACT HISTORY_____



GOVERNMENT OF THE REPUBLIC OF TRINIDAD AND TOBAGO
MINISTRY OF HEALTH AIRPORTS/SEAPORTS
AUTHORITY

PANDEMIC INFLUENZA

DECLARATION FORM

{For Arriving Passengers}

Date..... Flight/Vessel..... Seat Occupied.....
Name..... Sex..... Age
(Last Name) *(First Name)*

PERMANENT ADDRESS

COUNTRIES VISITED WITHIN THE LAST SEVEN (7) DAYS

HAVE YOU BEEN IN CONTACT WITH ANY ONE OF THE FOLLOWING WITHIN THE LAST SEVEN (7) DAYS:

- (a) A person who is a suspected or probable case of PANDEMIC INFLUENZA Yes No
(b) A person who has been quarantined for PANDEMIC INFLUENZA Yes No
(c) Have you visited a farm within the last seven days? Yes No
(d) **INTENDED ADDRESS IN TRINIDAD AND TOBAGO**

CITY/TOWN/VILLAGE STREET.

HOUSE NO./L.P. No HOST TEL.No

ONWARD JOURNEY-NEXT STOP

ARE YOU SUFFERING FROM THE FOLLOWING:

- (a) High Fever Yes No
(b) Cough and/or other respiratory symptoms Yes No
(c) Shortness of breath, difficulty in breathing Yes No

(d) Muscle aches

Yes

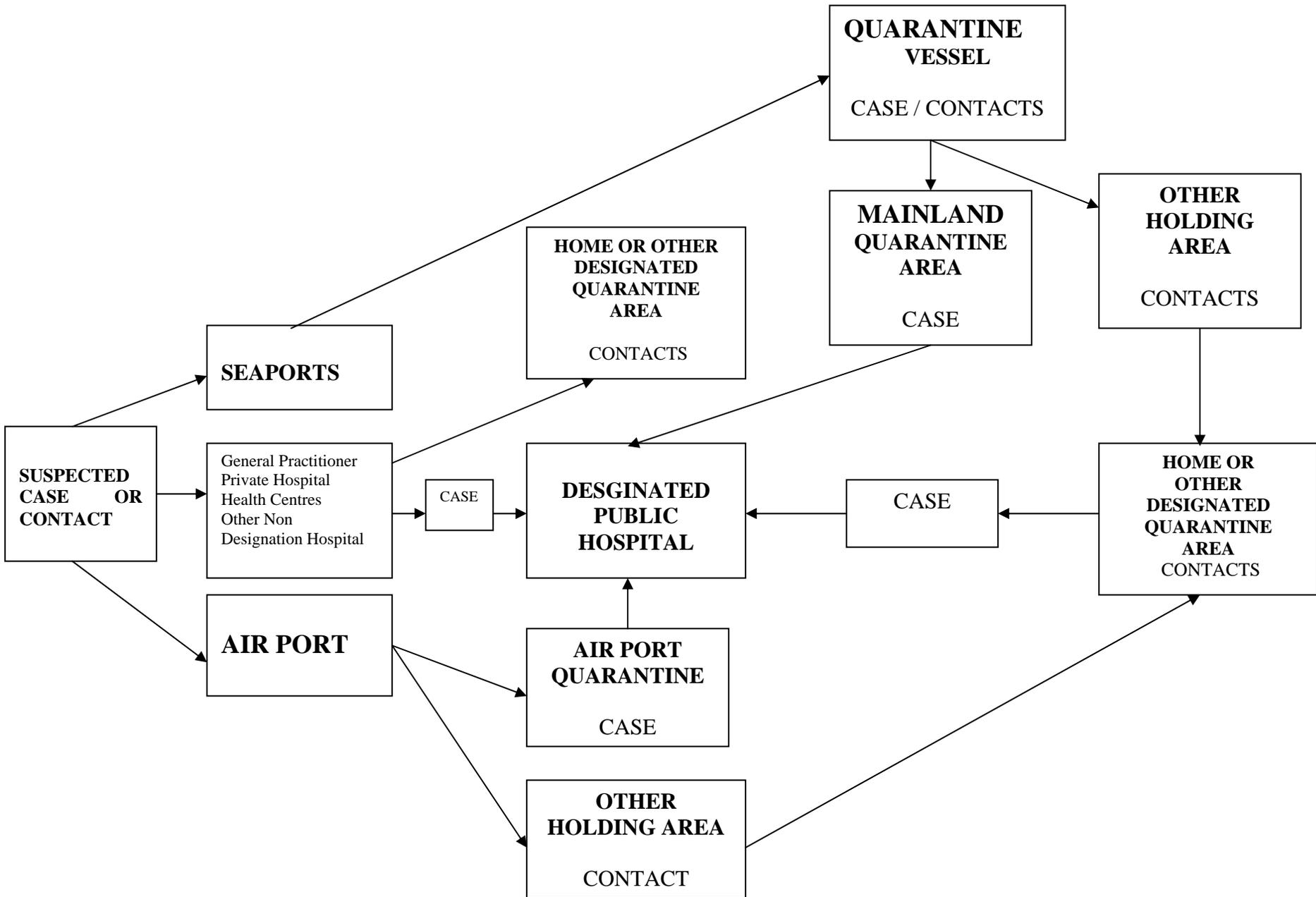
No

Please contact the nearest Health Facility or any of the major hospitals listed below if you develop any of the above symptoms:

Port-of-Spain General Hospital
San Fernando General Hospital

Scarborough Hospital - Tobago
Eric Williams Medical Sciences

**TRINIDAD AND TOBAGO
MINISTRY OF HEALTH
PROVISION OF CARE FLOWCHART
INFLUENZA PANDEMIC**





MINISTRY OF HEALTH REQUEST FOR SHIP INSPECTION

All agencies are to provide transport for the Port Health Officer and Port health Inspector to and from vessels for inspection and a representative/Boarding Clerk must be with the Officer/Inspector during the voyage

INSPECTION REQUEST MUST BE MADE AT Least 24 HOURS IN ADVANCE

The vessel is presently at (please underline)

1. CoastGuard,Chaguaramas	17 Humming Bird Marine	33. National Petroleum, Sea Lots
2Cari Dock, Chaguanamas	18. Tardieu marine, Chaguaramas	34. Bains Docks, Sea Lots
3.BPH- Exron, Chaguaramas	19. Coral Cove Marine,Chaguaramas	35. Point Lisas
4.IMS - Yacht Services, Bariod, Chaguaramas	20. Ecn Marine, Chaguarmas	36. ISPAT, Point Lisas
6Salt Dock, Chaguaramas	21. Crews Inn, Chaguaramas	37. Hydro Agri, Point Lisas
7Mariners Haven, Chaguaramas	22. Harts Cut, Chaguaramas	38. Claxton Bay Cement jetty
8Eric Miller, Chaguaramas	23. Yachting Association, Chaguaramas	39. Claxton Bay Trin. Contractors
9British Gas, Chaguaramas	24. Alcoa Carenage	40. Point-a-Pierre
10C.L Financial Dock	25. Yacht Club, Carenage	41. King's Wharf, San Fernando
11Inter Isle, Cha	26. National Flour Mills	42. Brighton, La Brea
12Peakes, Cha	27. King's Wgarft, Port of Spain	43. Sobo, La Brea
13Power Boats, Ch	28. Slipway Jetty, Port of Spain	44. Guapo, Point Fortin
14Formula Marine, Chaguaramas	29. Tourist Terminal, Port of Spain	45. Point Fortin
15Budget Marine ,Cha	30. Tobago jetty	46. Fishing Depot
16.Calypso Marine, Ch	31. Queen's Wharft, Port of Spain	47. Fishing Depot, Icos
	32. National Fisheries, Sae Lots	48. Point Galeota

ANY OTHER PORT: _____

Name of Vessel: _____

Net Tonnage: _____

Last Port of Call: _____

Date of Arrival: _____ Date of Departure _____

Name of Captain: _____

Appointment Date for Inspection: _____ Time: _____

Type of Inspection: _____

Name of Agency: _____ Tel. No. _____

Address: _____

For Agency



**TRINIDAD AND TOBAGO
MINISTRY OF HEALTH INFLUENZA PANDEMIC ADVISORY**

**TO THE PUBLIC AND ALL STAKEHOLDERS IN THE
SHIPPING INDUSTRY**

1. Information on **All Ports** visited by vessel within the last 10 days must be directed to Port Health Department by Immigration/Shipping Agents at least 24 hours prior to arrival of vessel.
2. Prior information on Health Status/Declaration on all persons on board must be submitted to the Port Health Department by Immigration/Shipping Agent at least 24 hours prior to arrival of vessel.
3. Pilots/Immigration Personnel/Customs Personnel/Shipping Agents/Port Health Personnel/Plant Quarantine Personnel and Tide Surveyor Personnel must wear Personal Protective Equipment before boarding vessels i.e **N95 or Similar Masks and Surgical Gloves** before boarding vessels.
4. If any suspected case is detected, all personnel on board at the time must remain on board the vessel. The vessel will be placed in Quarantine as per Quarantine Act Chapter 28:05.
5. **On Shore Workers and Personnel** must exercise the same precautions as previously stated at 3 above if boarding any vessel under Quarantine.
6. **Workers** handling waste must exercise the same precautions as stated at 3 above and all infected waste must be secured and stored in bio hazard containers and or incinerated or buried.
7. Proper personal hygiene i.e. washing of hands and face must be practiced by all personnel disembarking from vessels including all port workers.

**MINISTRY OF HEALTH
LIST OF TELEPHONE NUMBERS**

	TELEPHONE NUMBERS	
PERMANENT SECRETARY Mr. Reynold Copper	623-9119	
CHIEF MEDICAL OFFICER Dr. Rohit Doon	625-0066	681-9334
PRINCIPAL MEDICAL OFFICERS		
Dr. Balkaran Shivnauth (E)	625-0110	680-7983
MEDICAL DIRECTOR HEALTH PROGRAMME Dr. Krishna Sundararaneedi	6240042 678-0608	
NATIONAL SURVEILLANCE UNIT		
Mr. Gerald Peters – Non Epidemiologist	622-5311	681-9336
TRINIDAD PUBLIC HEALTH LABORATORY		
Ms. Leslie Carrington - Director	622-5311 622-0951	761-8783
REGIONAL HEALTH AUTHORITIES		
North West Regional Health Authority (CEO)	662-5579	
Eastern Regional Health Authority (CEO)	668-1105	
South West Regional Health Authority (CEO)	653-8383	653-8078
Tobago Regional Health Authority	639-3908	
COUNTY MEDICAL OFFICERS		
Dr. Harry Singh – St. George Central	675-5281/5272 674-4363	
Dr. A. Cumberbatch – St. George East	667-3693/ 3479/ 4515	
Dr. Ingrid Poon-King – Caroni	636-3960/3961	
Dr. Selwyn Mohan – St. Patrick	649-1227	
Dr. Carl Ferdinand – Nariva/Mayaro	644-2320	
Dr. Ajodha Rajnarinesingh – St. Andrew/David	668-2053/55	
Dr. Mentor Melville – Tobago	639-2295	
HOSPITALS		
Arima District Hospital	667-4714	
Caura	662-2211	
EWMSC	645-4673 OR 645-2640	
Mayaro District Hospital	630-1258	
Port of Spain General Hospital	623-2951	
Princes Town District Hospital	655-2255	
St. Ann’s Hospital	624-1151	
St. James Medical Complex	622-1977	
San Fernando General Hospital	652-3581	
Sangre Grande County Hospital	668-2273	
Tobago County Hospital	639-2551	

HEALTH CENTRES	NUMBERS
Arima	667-4715
Aranguez	638-2120
Arouca	642-1065
Barataria	638-2124
Biche	668-9053
Blanchisseuse	669-4118
Brothers Road	656-2547
Carenage	632-1860
Caroni	645-2897
Cedros	690-1440
Chaguanas	665-4423
Couva	636-2300
Cumana	670-8250
Cunupia	665-0183
Debe	647-6247
Diego Martin	637-9308
El Socorro	638-5218
Freeport	673-0021
Fyzabad	677-2034
George Street	623-5155
Gran Couva	679-9134
Gran Rivierre	670-8264
Chatham	690-2183
Guapo	648-2208
Guayaguayare	630-3093
Icacos	690-3724
Indian Walk	655-2478
La Brea	648-7562
La Horquetta	643-0911
La Romaine	657-1673
Macoya	663-4617
Maloney	642-1330
Manzanilla	668-2063
Maracas	663-1064
Maraval	629-2043
Monte Grande	663-4616
Morvant	627-7607
Moruga	656-7022
Nariva Mayaro	644-2320
Oxford Street	623-6741
Petit Valley	637-3284
Point Fortin	648-2329
Rio Claro	644-2236

HEALTH CENTRE CONT'D	
St. James	622-1142
St. Joseph	662-2443
San Fernando Palms Club	652-2016
San Juan	638-3618
Sangre Grande	668-2509
Santa Cruz	676-7400
Siparia	649-2484
Success Village	623-6434
Tabaquite	636-2989
Tacarigua Extended Care	662-4617
Talparo	643-7309
Toco	670-8277
Tunapuna El Dorado	663-4617
Upper Laventille	624-4438
Williamsville	655-1751
▪ TOBAGO HEALTH CENTRES	
Bethel	639-8580
Canaan/Bon Accord	639-8829
Les Coteaux	660-0069
Mt. St. George	660-2119
Moriah	660-0092
Plymouth	639-2982
Roxborough	660-5155
Scarborough	639-2423/3855
Speyside	660-4044

DRAFT

Legal Notice No:

Republic of Trinidad and Tobago

**By His Excellency,
George Maxwell Richards, President and
Commander-in Chief of
The Republic of Trinidad and Tobago
George Maxwell Richards
President**

A PROCLAMATION

Whereas it is provided by Section 103 of the Public Health Ordinance Ch. 12, No. 4, the Governor may be proclamation declare any disease (in addition to the diseases (listed in section 2) to be an infectious disease or a dangerous infectious disease.

And whereas by recent World Health Organization (WHO) Advisory, Trinidad and Tobago has been advised of the existence of Influenza Pandemic, a new highly infectious and dangerous disease which is currently appearing in numerous locations around the world.

And whereas there is presently no known cure of Influenza Pandemic by the World Health Organization.

And whereas the World Health Organization has recommended that persons suspected of having and confirmed as having contracted the Influenza infection, be isolated from the general population.

And whereas the Minister of Health believes that due to the speed and ease of international travel, this can result in a rapid spread around the world of the Influenza Pandemic and ultimately the arrival in Trinidad and Tobago of Influenza Pandemic with a devastating effect on the Public Health of Trinidad and Tobago.

And whereas by Sections 3 (1) of Existing Laws Amendment Order No. 8 of 1962, any reference on any existing law to the Governor shall be read and construed as reference to the Governor General.

And whereas by Section 5(5) (b) of the Legislation of the Republic of Trinidad and Tobago Ch. 1.01, any reference on any existing law to the Governor General shall be read and construed as if it were a reference to the President.

Now, therefore, I George Maxwell Richards, President, do hereby declare Influenza Pandemic to be a dangerous infectious disease.

Given under my Hand and Seal
Of the President of the Republic of
Trinidad and Tobago at the
Office of the President, St. Anns'
This..... day of2005

Annex K

C.D.C. Guideline for Handwashing and Hospital Environmental Control

Julia S. Garner; Matin S. Favero, Hospital Infections Program Center for Infectious Diseases, Centers for Disease Control and Prevention

Publication date: 01/01/1985

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RANKING SCHEME FOR RECOMMENDATIONS

CATEGORY I

Measures in Category I are strongly supported by well-designed and controlled clinical studies that show their effectiveness in reducing the risk of nosocomial infections, or are viewed as effective by a majority of expert reviewers. Measures in this category are viewed as applicable for most hospitals -- regardless of size, patient population, or endemic nosocomial infection rates.

CATEGORY II

Measures in Category II are supported by highly suggestive clinical studies in general hospitals or by definitive studies in specialty hospitals that might not be representative of general hospitals. Measures that have not been adequately studied but have a logical or strong theoretical rationale indicating probable effectiveness are included in this category. Category II recommendations are viewed as practical to implement in most hospitals.

CATEGORY III

Measures in Category III have been proposed by some investigators, authorities, or organizations, but, to date, lack supporting data, a strong theoretical rationale, or an indication that the benefits expected from them are cost effective. Thus, they are considered important issues to be studied. They might be considered by some hospitals for implementation, especially if the hospitals have specific nosocomial infection problems, but they are not generally recommended for widespread adoption.

PREFACE

In 1980, the Centers for Disease Control (CDC) began developing a series of guidelines entitled Guidelines for the Prevention and Control of Nosocomial Infections. The purpose of the Guidelines was twofold: 1) to disseminate advice on how to prevent or control specific nosocomial infection problems and 2) to cover the questions most frequently asked of the Hospital Infections Program staff on different aspects of the hospital's inanimate environment (1). One of the first Guidelines to be published was the Guideline for Hospital Environmental Control. It was written by Bryan P. Simmons, M.D. in consultation with Thomas M. Hooton, M.D., and George F. Mallison, M.P.H., and in collaboration with a working group consisting of Edward J. Bertz; Mary K. Bruch; Sue Crow, R.N., M.S.N.; William E. Scheckler, M.D.; Harold Laufman, M.D., Ph.D.; Janet K. Schultz, R.N., M.S.N.; Earle H. Spaulding, Ph.D.; and Richard P. Wenzel, M.D.

In February 1981, CDC mailed to each U.S. acute-care hospital Part I of the Guideline for Hospital Environmental Control, which contained sections entitled "Antiseptics, Handwashing, and Handwashing Facilities," "Cleaning, Disinfection, and Sterilization of Hospital Equipment," and "Microbiologic Surveillance of the Environment and of Personnel in the Hospital." In October 1981, Part II of the Guideline for Hospital Environmental Control, which contained the sections "Housekeeping Services and Waste Disposal," "Laundry Services," "Intensive Care Units," and "Pharmacy," was published. In July 1982, the section on "Cleaning, Disinfection, and Sterilization of Hospital

Equipment" was revised. In November 1982, the two parts of the Guideline were combined into a single document entitled Guideline for Hospital Environmental Control, and copies were mailed to all U.S. acute-care hospitals.

In October 1983, CDC issued a statement entitled "Clarification of Guideline Recommendations on Generic Antiseptic, Disinfectant, and Other Products," which was mailed to all U.S. acute-care hospitals. The statement emphasized that CDC recommendations are not intended to endorse any particular commercial product or to exclude the use of other commercial products containing generic ingredients not mentioned in the Guideline for Hospital Environmental Control.

In November 1983, a follow-up statement requested that users delete the portion of the Guideline for Hospital Environmental Control that recommended specific generic antimicrobial ingredients for use in health care personnel hand washes and announced that the entire Guideline would be comprehensively revised. In June 1984, a draft of the proposed revision was mailed to 150 scientists and infection control professionals for review and comment. Rather than using an expert working group to finalize the content of this Guideline, we used the written comments and suggestions which we received from the reviewers to determine the final content of the Guideline and the ranking of the recommendations.

This Guideline incorporates the above revisions, as well as newly available information; the title has been changed to Guideline for Handwashing and Hospital Environmental Control. It replaces all previous handwashing and environmental control statements issued or published by the Hospital Infections Program, Center for Infectious Diseases, CDC.

Major Changes In The Guideline

Since this Guideline contains many important changes from the original Guideline for Hospital Environmental Control, it is important that users read the entire Guideline carefully. The major changes in the titles and content of sections are listed below:

1. The section "Handwashing," which replaces the old section entitled "Antiseptics, Handwashing, and Handwashing Facilities," contains updated recommendations for handwashing with plain soaps or detergents and with antimicrobial-containing products. Rather than recommending specific generic ingredients for handwashing with antimicrobial containing products, the Guideline indicates that hospitals may choose from appropriate products in categories defined by the U.S. Food and Drug Administration (FDA), since preparations used to inhibit or kill microorganisms on skin are categorized by an FDA advisory review panel for nonprescription (over-the-counter {OTC}) antimicrobial-drug products (2). Manufacturers of antimicrobial containing products voluntarily submit data to the review panel, which categorizes the products according to their intended use, i.e., antimicrobial soaps, health-care personnel hand washes, patient preoperative skin preparations, skin antiseptics, skin wound cleansers, skin wound protectants, and surgical hand scrubs. Generic antimicrobials for each use category are further divided: Category I (safe and efficacious); Category II (not safe and/or efficacious); and Category III (insufficient data to categorize). Consequently, chemical germicides formulated as antiseptics are categorized by the FDA into groupings by use and efficacy, but they are not regulated or registered in the same fashion as chemical germicides are by the U.S. Environmental Protection Agency (EPA). Persons responsible for selecting commercially marketed health-care-personnel hand washes can obtain information about categorization of products from the Center for Drugs and

2. The section "Cleaning, Disinfecting, and Sterilizing of Patient-Care Equipment" has been rewritten. Medical devices, equipment, and materials are divided into three categories (critical, semicritical, and noncritical) based on the risk of infection involved in their use. Revised recommendations for sterilizing and disinfecting items in these categories are included in this section. Rather than listing specific chemical germicides, the Guideline indicates that hospitals may choose from sterilant and disinfectant formulations registered with the EPA, since chemical germicides are regulated and registered by the EPA (3). Manufacturers of chemical germicides formulated as general disinfectants, hospital disinfectants, and disinfectants used in other environments, such as the food industry, are required by EPA to test their formulations using specific protocols for microbicidal efficiency, stability, and toxicity to humans. In past years, the EPA has reserved the right to test and verify formulations of chemical germicides for their specified efficacy; however, in practice only those formulations to be registered as sterilants or sporicides were actually tested. In 1982, the EPA discontinued this testing. Currently, formulations of chemical germicides are registered by the EPA based on data obtained from the manufacturer. Persons responsible for selecting chemical germicides should keep in mind that the field is highly competitive, and exaggerated claims are often made about the germicidal efficiency of specific formulations. When questions regarding specific claims or use arise, the Disinfectants Branch Registration Division, Office of Pesticides, EPA, 401 M Street, S.W., Washington, D.C. 20460, can be consulted. As with handwashing products, information in the scientific literature, presented at scientific meetings, documented by manufacturers, and obtained from other sources deemed important may be considered. The recommendation against reprocessing and reusing single-use items has been removed. Since there is lack of evidence indicating increased risk of nosocomial infections associated with the reuse of all single-use items, a categorical recommendation against all types of reuse was not considered justifiable. Rather than recommending for or against reprocessing and reusing single-use items, the Guideline indicates that items or devices that cannot be cleaned and sterilized or disinfected without altering their physical integrity and function should not be reprocessed. In addition, reprocessing procedures that result in residual toxicity or compromise the overall safety or effectiveness of the items or devices should be avoided. Arguments for and against reprocessing and reusing single-use items have been summarized in a report from the International Conference on the Reuse of Disposable Medical Devices in the 1980's (4).
3. The section "Microbiologic Sampling" replaces the old section entitled "Microbiologic Surveillance of the Environment and of Personnel in the Hospital. The recommendation for microbiologic sampling of infant formulas prepared in the hospital has been removed, since there is no epidemiologic evidence to show that such sampling reduces the infection rate in hospitals. Information and recommendations for microbiologic surveillance of personnel have been deleted, since this topic is addressed in the Guideline for Infection Control in Hospital Personnel (5).
4. A new section, "Infective Waste," has been added. It contains information about identifying infective waste and recommendations for its handling and disposal.
5. The section "Housekeeping" replaces the old section "Housekeeping Services and Waste Disposal." Recommendations against use of carpets in patient care areas have been removed, since there is no epidemiologic evidence to show that carpets

influence the nosocomial infection rate in hospitals (6); whether to use carpets, therefore, is not considered an infection control issue.

6. The section "Laundry" contains a discussion of and recommendations for both hot-water and reduced temperature washing.
7. The section "Intensive Care Units" has been deleted, since it primarily dealt with information and recommendations that are covered elsewhere in this Guideline and in the Guideline for Isolation Precautions in Hospitals (7).
8. The section "Pharmacy" has been deleted from this Guideline, since it primarily dealt with recommendations for admixture of parenteral fluids that are contained in the Guideline for Prevention of Intravascular Infections.

The recommendations presented in this Guideline were chosen primarily for their acknowledged importance to infection control, but other factors, such as the feasibility of implementing them and their potential costs to hospitals, were also considered. Many recommendations are intended to reduce or eliminate expensive practices that are not likely to prevent infections. Some of the recommendations are based on well-documented epidemiologic studies; others are based on a reasonable theoretical rationale, since for many of these practices little or no scientifically valid evidence is available to permit evaluation of their effect on the incidence of infection. Because new studies are constantly revealing pertinent information in this field, users of this Guideline should keep informed of other sources. The recommendations presented in this Guideline may be modified as necessary for an individual hospital and are not meant to restrict a hospital from developing recommendations that may be more appropriate to its own unique needs. The recommendations have no force of law or regulation.

References

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SECTION 1: HANDWASHING

Introduction

Handwashing is the single most important procedure for preventing nosocomial infections. Handwashing is defined as a vigorous, brief rubbing together of all surfaces of lathered hands, followed by rinsing under a stream of water. Although various products are

available, handwashing can be classified simply by whether plain soap or detergents or antimicrobial-containing products are used (1). Handwashing with plain soaps or detergents (in bar, granule, leaflet, or liquid form) suspends microorganisms and allows them to be rinsed off; this process is often referred to as mechanical removal of microorganisms. In addition, handwashing with antimicrobial-containing products kills or inhibits the growth of microorganisms; this process is often referred to as chemical removal of microorganisms. Routine handwashing is discussed in this Guideline; the surgical hand scrub is discussed in the Guideline for Prevention of Surgical Wound Infections.

Epidemiology

The microbial flora of the skin consists of resident and transient microorganisms; the resident microorganisms survive and multiply on the skin and can be repeatedly cultured, while the transient microbial flora represent recent contaminants that can survive only a limited period of time. Most resident microorganisms are found in superficial skin layers, but about 10%-20% can inhabit deep epidermal layers (2,3). Hand washing with plain soaps and detergents is effective in removing many transient microbial flora (4-6). Resident microorganisms in the deep layers may not be removed by handwashing with plain soaps and detergents, but usually can be killed or inhibited by handwashing with products that contain antimicrobial ingredients.

Many resident skin microorganisms are not highly virulent and are not implicated in infections other than skin infections. However, some of these microorganisms can cause infections in patients when surgery or other invasive procedures allow them to enter deep tissues or when a patient is severely immunocompromised or has an implanted device, such as a heart valve. In contrast, the transient microorganisms often found on the hands of hospital personnel can be pathogens acquired from colonized or infected patients and may cause nosocomial infections. Several recent studies have shown that transient and resident hand carriage of aerobic gram-negative microorganisms by hospital personnel may be more frequent than previously thought (7-10). More study on the bacteriology of hands is needed to fully understand the factors that contribute to persistent hand carriage of such microorganisms (11).

Control Measures

The absolute indications for and the ideal frequency of handwashing are generally not known because of the lack of well-controlled studies. Listing all circumstances that may require handwashing would be a lengthy and arbitrary task. The indications for handwashing probably depend on the type, intensity, duration, and sequence of activity. Generally, superficial contact with a source not suspected of being contaminated, such as touching an object not visibly soiled or taking a blood pressure, does not require handwashing. In contrast, prolonged and intense contact with any patient should probably be followed by handwashing. In addition, handwashing is indicated before performing invasive procedures, before taking care of particularly susceptible patients, such as those who are severely immunocompromised or newborn infants, and before and after touching wounds. Moreover, handwashing is indicated, even when gloves are used, after situations during which microbial contamination of the hands is likely to occur, especially those involving contact with mucous membranes, blood and body fluids, and secretions or excretions, and after touching inanimate sources that are likely to be contaminated, such as urine-measuring devices. In addition, handwashing is an important component of the personal hygiene of all hospital personnel, and hand washing should be encouraged when personnel are in doubt about the necessity for doing so.

The circumstances that require handwashing are frequently found in high-risk units, because patients in these units are often infected or colonized with virulent or multiply-resistant microorganisms, and are highly susceptible to infection because of wounds, invasive procedures, or diminished immune function. Handwashing in these units is indicated between direct contact with different patients and often is indicated more than once in the care of one patient, for example, after touching excretions or secretions, before going on to another care activity for the same patient.

The recommended handwashing technique depends on the purpose of the handwashing. The ideal duration of handwashing is not known, but washing times of 15 seconds (6) or less (5) have been reported as effective in removing most transient contaminants from the skin. Therefore, for most activities, a vigorous, brief (at least 10 seconds) rubbing together of all surfaces of lathered hands followed by rinsing under a stream of water is recommended. If hands are visibly soiled, more time may be required for handwashing.

The absolute indications for handwashing with plain soaps and detergents versus handwashing with antimicrobial-containing products are not known because of the lack of well-controlled studies comparing infection rates when such products are used. For most routine activities, handwashing with plain soap appears to be sufficient, since soap will allow most transient microorganisms to be washed off (4-6).

Handwashing products for use in hospitals are available in several forms. It is important, however, that the product selected for use be acceptable to the personnel who will use it (6). When plain soap is selected for handwashing, the bar, liquid, granule, or soap-impregnated tissue form may be used. It is preferable that bar soaps be placed on racks that allow water to drain. Since liquid-soap containers can become contaminated and might serve as reservoirs of microorganisms, reusable liquid containers need to be cleaned when empty and refilled with fresh soap. Completely disposable containers obviate the need to empty and clean dispensers but may be more expensive. Most antimicrobial-containing handwashing products are available as liquids. Antimicrobial-containing foams and rinses are also available for use in areas without easy access to sinks.

In addition to handwashing, personnel may often wear gloves as an extra margin of safety. As with handwashing, the absolute indications for wearing gloves are not known. There is general agreement that wearing sterile gloves is indicated when certain invasive procedures are performed or when open wounds are touched. Nonsterile gloves can be worn when hands are likely to become contaminated with potentially infective material such as blood, body fluids, or secretions, since it is often not known which patients' blood, body fluids, or secretions contain hepatitis B virus or other pathogens. Further, gloves can be worn to prevent gross microbial contamination of hands, such as when objects soiled with feces are handled. When gloves are worn, handwashing is also recommended because gloves may become perforated during use and because bacteria can multiply rapidly on gloved hands.

The convenient placement of sinks, handwashing products, and paper towels is often suggested as a means of encouraging frequent and appropriate handwashing. Sinks with faucets that can be turned off by means other than the hands (e.g., foot pedals) and sinks that minimize splash can help personnel avoid immediate recontamination of washed hands.

Although handwashing is considered the most important single procedure for preventing nosocomial infections, two reports showed poor compliance with handwashing protocols by personnel in medical intensive care units, especially by physicians (12) and personnel

taking care of patients on isolation precautions (13). Failure to wash hands is a complex problem that may be caused by lack of motivation or lack of knowledge about the importance of handwashing. It may also be caused by obstacles such as under staffing, inconveniently located sinks, absence of paper towels, an unacceptable handwashing product, or the presence of dermatitis caused by previous handwashing. More study is needed to identify which of these factors, alone or in combination, contribute significantly to the problem of poor compliance with handwashing recommendations.

Recommendations

1. Handwashing Indications

1. In the absence of a true emergency, personnel should always wash their hands
 1. before performing invasive procedures; Category I
 2. before taking care of particularly susceptible patients, such as those who are severely immunocompromised and newborns; Category I
 3. before and after touching wounds, whether surgical, traumatic, or associated with an invasive device; Category I
 4. after situations during which microbial contamination of hands is likely to occur, especially those involving contact with mucous membranes, blood or body fluids, secretions, or excretions; Category I
 5. after touching inanimate sources that are likely to be contaminated with virulent or epidemiologically important microorganisms; these sources include urine-measuring devices or secretion collection apparatuses; Category I
 6. after taking care of an infected patient or one who is likely to be colonized with microorganisms of special clinical or epidemiologic significance. for example, multiply-resistant bacteria; Category I
 7. between contacts with different patients in high-risk units. Category I
2. Most routine, brief patient-care activities involving direct patient contact other than that discussed in 1.a. above, e.g., taking a blood pressure, do not require handwashing. Category II.
3. Most routine hospital activities involving indirect patient contact, e.g., handing a patient medications, food, or other objects, do not require handwashing. Category I.

2. Handwashing

Technique

For routine handwashing, a vigorous rubbing together of all surfaces of lathered hands for at least 10 seconds, followed by thorough rinsing under a stream of water is recommended. Category I

3. Handwashing with Plain Soap

1. Plain soap should be used for handwashing unless otherwise indicated. Category II
2. If bar soap is used, it should be kept on racks that allow drainage of water. Category II
3. If liquid soap is used, the dispenser should be replaced or cleaned and filled with fresh product when empty; liquids should not be added to a partially full dispenser. Category II

4. Handwashing with Antimicrobial-Containing Products (Health-Care Personnel Handwashes)

1. Antimicrobial handwashing products should be used for handwashing before personnel care for newborns and when otherwise indicated during

their care, between patients in high-risk units, and before personnel take care of severely immunocompromised patients. Category III Hospitals may choose from products in the product category defined by the FDA as health-care personnel handwashes. Persons responsible for selecting commercially marketed antimicrobial health-care personnel handwashes can obtain information about categorization of products from the Center for Drugs and Biologics, Division of OTC Drug Evaluation, FDA, 5600 Fishers Lane, Rockville, MD 20857. In addition, information published in the scientific literature, presented at scientific meetings, documented by manufacturers, and obtained from other sources deemed important may be considered).

2. Antimicrobial-containing products that do not require water for use, such as foams or rinses, can be used in areas where no sinks are available. Category III
5. Handwashing Facilities
 1. Handwashing facilities should be conveniently located throughout the hospital. Category I
 2. A sink should be located in or just outside every patient room. More than one sink per room may be necessary if a large room is used for several patients. Category II
 3. Handwashing facilities should be located in or adjacent to rooms where diagnostic or invasive procedures that require handwashing are performed (e.g., cardiac catheterization, bronchoscopy, sigmoidoscopy, etc.). Category I

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SECTION 2: CLEANING, DISINFECTING, AND STERILIZING PATIENT-CARE EQUIPMENT

Introduction

Cleaning, the physical removal of organic material or soil from objects, is usually done by using water with or without detergents. Generally, cleaning is designed to remove rather than to kill microorganisms. Sterilization, on the other hand, is the destruction of all forms of microbial life; it is carried out in the hospital with steam under pressure, liquid or gaseous chemicals, or dry heat. Disinfection, defined as the intermediate measures between physical cleaning and sterilization, is carried out with pasteurization or chemical germicides.

Chemical germicides can be classified by several systems. We have used the system originally proposed by Spaulding (1) in which three levels of disinfection are defined: high, intermediate, and low ([Table 1](#)). In contrast, EPA uses a system that classifies chemical germicides as sporicides, general disinfectants, hospital disinfectants, sanitizers, and others. Formulations registered by the EPA as sporicides are considered sterilants if the contact time is long enough to destroy all forms of microbial life, or high-level disinfectants if contact times are shorter. Chemical germicides registered by the EPA as sanitizers probably fall into the category of low-level disinfectants. Numerous formulations of chemical germicides can be classified as either low- or intermediate-level disinfectants, depending on the specific label claims. For example, some chemical germicide formulations are claimed to be efficacious against *Mycobacterium tuberculosis*; by Spaulding's system, these formulations would be classified at least as intermediate-level disinfectants. However, chemical germicide formulations with specific label claims for effectiveness against *Salmonella choleraesuis*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa* (the challenge microorganisms required for EPA classification as a "hospital disinfectant") could fall into intermediate- or low-level disinfectant categories.

The rationale for cleaning, disinfecting, or sterilizing patient-care equipment can be understood more readily if medical devices, equipment, and surgical materials are divided into three general categories (critical items, semicritical items, and noncritical items) based on the potential risk of infection involved in their use. This categorization of medical devices also is based on the original suggestions by Spaulding (1).

Critical items are instruments or objects that are introduced directly into the bloodstream or into other normally sterile areas of the body. Examples of critical items are surgical instruments, cardiac catheters, implants, pertinent components of the heart-lung oxygenator, and the blood compartment of a hemodialyzer. Sterility at the time of use is required for these items; consequently, one of several accepted sterilization procedures is generally recommended.

Items in the second category are classified as semicritical in terms of the degree of risk of infection. Examples are noninvasive flexible and rigid fiber optic endoscopes, endotracheal tubes, anesthesia breathing circuits, and cystoscopes. Although these items come in contact with intact mucous membranes, they do not ordinarily penetrate body surfaces. If steam sterilization can be used, it is often cheaper to sterilize many of these items, but sterilization is not absolutely essential; at a minimum, a high-level disinfection procedure that can be expected to destroy vegetative microorganisms, most fungal spores, tubercle bacilli, and small nonlipid viruses is recommended. In most cases, meticulous physical cleaning followed by an appropriate high-level disinfection treatment gives the user a reasonable degree of assurance that the items are free of pathogens.

Noncritical items are those that either do not ordinarily touch the patient or touch only intact skin. Such items include crutches, bed boards, blood pressure cuffs, and a variety of other medical accessories. These items rarely, if ever, transmit disease. Consequently, depending on the particular piece of equipment or item, washing with a detergent may be sufficient.

The level of disinfection achieved depends on several factors, principally contact time, temperature, type and concentration of the active ingredients of the chemical germicide, and the nature of the microbial contamination. Some disinfection procedures are capable of producing sterility if the contact times used are sufficiently long; when these procedures are continued long enough to kill all but resistant bacterial spores, the result is high-level disinfection. Other disinfection procedures that can kill many types of viruses and most vegetative microorganisms (but cannot be relied upon to kill resistant microorganisms such as tubercle bacilli, bacterial spores, or certain viruses) are considered to be intermediate- or low-level disinfection ([Table 1](#)).

The tubercle bacillus, lipid and nonlipid viruses, and other groups of microorganisms in [Table 1](#) are used in the context of indicator microorganisms that have varying degrees of resistance to chemical germicides and not necessarily because of their importance in causing nosocomial infections. For example, cells of *M. tuberculosis* or *M. bovis*, which are used in routine efficacy tests are among the most resistant vegetative microorganisms known and, after bacterial endospores, constitute the most severe challenge to a chemical germicide. Thus, a tuberculocidal chemical germicide may be used as a high or intermediate-level disinfectant targeted to many types of nosocomial pathogens but not specifically to control respiratory tuberculosis.

Control Measures

Since it is neither necessary nor possible to sterilize all patient-care items, hospital policies can identify whether cleaning, disinfecting, or sterilizing of an item is indicated to decrease the risk of infection. The process indicated for an item will depend on its intended use. Any microorganism, including bacterial spores that come in contact with normally sterile tissue can cause infection. Thus, it is important that all items that will touch normally sterile tissues be sterilized. It is less important that objects touching mucous membranes be sterile. Intact mucous membranes are generally resistant to infection by common bacterial spores but are not resistant to many other microorganisms, such as viruses and tubercle bacilli; therefore, items that touch mucous membranes require a disinfection process that kills all but resistant bacterial spores. In general, intact skin acts as an effective barrier to most microorganisms; thus, items that touch only intact skin need only be clean.

Items must be thoroughly cleaned before processing, because organic material (e.g., blood and proteins) may contain high concentrations of microorganisms. Also, such organic material may inactivate chemical germicides and protect microorganisms from the disinfection or sterilization process. For many noncritical items, such as blood pressure cuffs or crutches, cleaning can consist only of 1) washing with a detergent or a disinfectant-detergent, 2) rinsing, and 3) thorough drying.

Steam sterilization is the most inexpensive and effective method for sterilization. Steam sterilization is unsuitable, however, for processing plastics with low melting points, powders, or anhydrous oils. Items that are to be sterilized but not used immediately need to be wrapped for storage. Sterility can be maintained in storage for various lengths of time, depending on the type of wrapping material, the conditions of storage, and the integrity of the package.

Several methods have been developed to monitor steam sterilization processes. One method is to check the highest temperature that is reached during sterilization and the length of time that this temperature is maintained. In addition, heat- and steam-sensitive chemical indicators can be used on the outside of each pack. These indicators do not reliably document sterility, but they do show that an item has not accidentally bypassed a sterilization process. As an additional precaution, a large pack might have a chemical indicator both on the outside and the inside to verify that steam has penetrated the pack.

Microbiological monitoring of steam sterilizers is recommended at least once a week with commercial preparations or spores of *Bacillus stearothermophilus* (a microorganism having spores that are particularly resistant to moist heat, thus assuring a wide margin of safety). If a sterilizer is working properly and used appropriately, the spores are usually killed. One positive spore test (spores not killed) does not necessarily indicate that items processed in the sterilizer are not sterile, but it does suggest that the sterilizer should be rechecked for proper temperature, length of cycle, loading, and use and that the test be repeated. Spore testing of steam sterilization is just one of several methods for assuring adequate processing of patient-care items ([Table 2](#)).

Implantable items, such as orthopedic devices, require special handling before and during sterilization thus, packs containing implantable objects need to be clearly labeled so they will be appropriately processed. To guarantee a wide margin of safety, it is recommended that each load of such items be tested with a spore test and that the sterilized item not be released for use until the spore test is negative at 48 hours. If it is not possible to process an implantable object with a confirmed 48-hour spore test before use, it is recommended that the unwrapped object receive the equivalent of full-cycle steam sterilization and not flash sterilization. Flash sterilization {270 degrees F (132 degrees C) for 3 minutes in a gravity displacement steam sterilizer} is not recommended for implantable items because spore tests cannot be used reliably and the margin of safety is lower.

Because ethylene oxide gas sterilization is a more complex and expensive process than steam sterilization, it is usually restricted to objects that might be damaged by heat or excessive moisture. Before sterilization, objects also need to be cleaned thoroughly and wrapped in a material that allows the gas to penetrate. Chemical indicators need to be used with each package to show that it has been exposed to the gas sterilization process. Moreover, it is recommended that gas sterilizers be checked at least once a week with commercial preparations of spores, usually *Bacillus subtilis* var. *niger*. Because ethylene oxide gas is toxic, precautions (e.g., local exhaust ventilation) should be taken to protect personnel (2). All objects processed by gas sterilization also need special aeration according to manufacturer's recommendations before use to remove toxic residues of ethylene oxide.

Powders and anhydrous oils can be sterilized by dry heat. Microbiological monitoring of dry heat sterilizers and following manufacturers' recommendations for their use and maintenance usually provides a wide margin of safety for dry heat sterilization.

Liquid chemicals can be used for sterilization and disinfection when steam, gas, or dry heat sterilization is not indicated or available. With some formulations, high-level disinfection can be accomplished in 10-30 minutes, and sterilization can be achieved if exposure is for significantly longer times. Nevertheless, not all formulations are equally applicable to all items that need to be sterilized or disinfected. No formulation can be considered as an "all purpose" chemical germicide. In each case, more detailed information can be obtained from the EPA, descriptive brochures from the manufacturers, peer-review journal articles, and books. The most appropriate chemical germicide for a

particular situation can be selected by responsible personnel in each hospital based on the object to be disinfected, the level of disinfection needed, and the scope of services, physical facilities, and personnel available in the hospital. It is also important that the manufacturer's instructions for use be consulted.

Gloves may be indicated to prevent skin reactions when some chemical disinfectants are used. Items subjected to high-level disinfection with liquid chemicals need to be rinsed in sterile water to remove toxic or irritating residues and then thoroughly dried. Subsequently, the objects need to be handled aseptically with sterile gloves and towels and stored in protective wrappers to prevent recontamination.

Hot-water disinfection (pasteurization) is a high-level, nontoxic disinfection process that can be used for certain items, e.g., respiratory therapy breathing circuits.

In recent years, some hospitals have considered reusing medical devices labeled disposable or single use only. In general, the primary, if not the sole, motivation for such reuse is to save money. For example, the disposable hollow-fiber hemodialyzer has been reprocessed and reused on the same patient in hemodialysis centers since the early 1970s. By 1984, 51% of the 1,200 U.S. dialysis centers were using dialyzer reprocessing programs. It has been estimated that this practice saves more than 100 million dollars per year (3). When standard protocols for cleaning and disinfecting hemodialyzers are used, there does not appear to be any significant infection risk to dialysis patients (4). Moreover, the safety and efficacy of dialyzer reuse programs are supported by several major studies (5-7). Few, if any, other medical devices that might be considered candidates for reprocessing have been evaluated in this manner.

Arguments for and against reprocessing and reusing single-use items in the 1980's have been summarized (4). Since there is lack of evidence indicating increased risk of nosocomial infections associated with reusing all single-use items, a categorical recommendation against all types of reuse is not considered justifiable. Rather than recommending for or against reprocessing and reuse of all single-use items, it appears more prudent to recommend that hospitals consider the safety and efficacy of the reprocessing procedure of each item or device separately and the likelihood that the device will function as intended after reprocessing. In many instances it may be difficult if not impossible to document that the device can be reprocessed without residual toxicity and still function safely and effectively. Few, if any, manufacturers of disposable or single-use medical devices provide reprocessing information on the product label.

Hydrotherapy pools and immersion tanks present unique disinfection problems in hospitals. It is generally not economically feasible to drain large hydrotherapy pools that contain thousands of gallons of water after each patient use. Typically, these pools are used by a large number of patients and are drained and cleaned every one to two weeks. The water temperature is typically maintained near 37 degrees C. Between cleanings, water can be contaminated by organic material from patients, and high levels of microbial contamination are possible. One method to maintain safe pool water is to install a water filter of sufficient size to filter all the water at least three times per day and to chlorinate the water so that a free chlorine residual of approximately 0.5 mg/l is maintained at a pH of 7.2 to 7.6. Local public health authorities can provide consultation regarding chlorination, alternate halogen disinfectants, and hydrotherapy pool sanitation.

Hubbard and immersion tanks present entirely different problems than large pools, since they are drained after each patient use. All inside surfaces need to be cleaned with a disinfectant-detergent, then rinsed with tap water. After the last patient each day, an

additional disinfection step is performed. One general procedure is to circulate a chlorine solution (200-300 mg/l) through the agitator of the tank for 15 minutes and then rinse it out. It is also recommended that the tank be thoroughly cleaned with a disinfectant-detergent, rinsed, wiped dry with clean cloths, and not filled until ready for use.

An alternative approach to control of contamination in hydrotherapy tanks is to use plastic liners and create the "whirlpool effect" without agitators. Such liners make it possible to minimize contact of contaminated water with the interior surface of the tank and also obviate the need for agitators that may be very difficult to clean and decontaminate.

Recommendations

1. Cleaning

All objects to be disinfected or sterilized should first be thoroughly cleaned to remove all organic matter (blood and tissue) and other residue. Category I

2. Indications for Sterilization and High-Level Disinfection

1. Critical medical devices or patient-care equipment that enter normally sterile tissue or the vascular system or through which blood flows should be subjected to a sterilization procedure before each use. Category I
2. Laparoscopes, arthroscopes, and other scopes that enter normally sterile tissue should be subjected to a sterilization procedure before each use; if this is not feasible, they should receive at least high-level disinfection. Category I
3. Equipment that touches mucous membranes, e.g., endoscopes, endotracheal tubes, anesthesia breathing circuits, and respiratory therapy equipment, should receive high-level disinfection. Category I

3. Methods of Sterilization

1. Whenever sterilization is indicated, a steam sterilizer should be used unless the object to be sterilized will be damaged by heat, pressure, or moisture or is otherwise inappropriate for steam sterilization. In this case, another acceptable method of sterilization should be used. Category II
2. Flash sterilization {270 degrees F (132 degrees C) for 3 minutes in a gravity displacement steam sterilizer} is not recommended for implantable items. Category II

4. Biological Monitoring of Sterilizers

1. All sterilizers should be monitored at least once a week with commercial preparations of spores intended specifically for that type of sterilizer (i.e., *Bacillus stearothermophilus* for steam sterilizers and *Bacillus subtilis* for ethylene oxide and dry heat sterilizers). Category II
2. Every load that contains implantable objects should be monitored. These implantable objects should not be used until the spore test is found to be negative at 48 hours. Category II
3. If spores are not killed in routine spore tests, the sterilizer should immediately be checked for proper use and function and the spore test repeated. Objects, other than implantable objects, do not need to be recalled because of a single positive spore test unless the sterilizer or the sterilization procedure is defective. Category II
4. If spore tests remain positive, use of the sterilizer should be discontinued until it is serviced. Category I

5. Use and Preventive Maintenance
Manufacturers' instructions should be followed for use and maintenance of sterilizers. Category II

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| 6. | Chemical | Indicators |
| | Chemical indicators that will show a package has been through a sterilization cycle should be visible on the outside of each package sterilized. Category II | |
| 7. | Use of Sterile | Items |
| | An item should not be used if its sterility is questionable, e.g., its package is punctured, torn, or wet. Category I | |
| 8. | Reprocessing Single-Use or Disposable Items | |
| | 1. Items or devices that cannot be cleaned and sterilized or disinfected without altering their physical integrity and function should not be reprocessed. Category I | |
| | 2. Reprocessing procedures that result in residual toxicity or compromise the overall safety or effectiveness of the items or devices should be avoided. Category I | |

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SECTION 3: MICROBIOLOGIC SAMPLING

Introduction

Before 1970, regularly scheduled culturing of the air and environmental surfaces such as floors, walls, and table tops was widely practiced in U.S. hospitals. By 1970, CDC and the American Hospital Association were advocating that hospitals discontinue routine environmental culturing, since rates of nosocomial infection had not been related to levels of general microbial contamination of air or environmental surfaces, and meaningful standards for permissible levels of microbial contamination of environmental surfaces did not exist (1,2). Between 1970 and 1975, 25% of U.S. hospitals reduced the extent of such routine environmental culturing (3), and this trend has continued.

In the last several years, there has also been a trend toward reducing routine microbiologic sampling for quality control purposes. In 1982, CDC recommended that the disinfection process for respiratory therapy equipment should not be monitored by routine microbiologic sampling (4). Moreover, the recommendation for microbiologic sampling of

infant formulas prepared in the hospital has been removed from this Guideline, since there is no epidemiologic evidence to show that such quality control testing influences the infection rate in hospitals.

Control Measures

The only routine or periodic microbiologic sampling that is recommended is of the water and dialysis fluids used with artificial kidney machines in hospital-based or free standing chronic hemodialysis centers. Microbiologic sampling of dialysis fluids and water used to prepare dialysis fluids is recommended because gram-negative bacteria are able to grow rapidly in water and other fluids associated with the hemodialysis system; high levels of these microorganisms place dialysis patients at risk of pyrogenic reactions, bacteremia, or both (5). It is suggested that the water that is used to prepare dialysis fluid also be sampled periodically, because high levels of bacteria in water often become amplified downstream in a hemodialysis system and are sometimes predictive of bacterial contamination in dialysis fluids. Although it is difficult to determine the exact frequency of such a sampling program in the absence of pyrogenic reactions and bacteremia, sampling water and dialysis fluid monthly appears to be reasonable.

Routine microbiologic sampling of patient-care items purchased as sterile is not recommended because of the difficulty and expense of performing adequate sterility testing with low-frequency contamination.

Microbiologic sampling is indicated during investigation of infection problems if environmental reservoirs are implicated epidemiologically in disease transmission. It is important, however, that such culturing be based on epidemiologic data and follow a written plan that specifies the objects to be sampled and the actions to be taken based on culture results.

Recommendations

1. **Routine Environmental Culturing of Air and Environmental Surfaces**
Routine microbiologic sampling of the air and environmental surfaces should not be done. Category I
2. **Microbiologic Sampling of Dialysis Fluids**
Water used to prepare dialysis fluid should be sampled once a month; it should not contain a total viable microbial count greater than 200 colony-forming units (CFU)/ml. The dialysis fluid should be sampled once a month at the end of a dialysis treatment and should contain less than 2,000 CFU/ml. Category II
3. **Microbiologic Sampling for Specific Problems**
Microbiologic sampling, when indicated, should be an integral part of an epidemiologic investigation. Category I
4. **Sampling for Manufacturer-Associated Contamination**
 1. Routine microbiologic sampling of patient-care objects purchased as sterile is not recommended. Category I
 2. If contamination of a commercial product sold as sterile is suspected, infection control personnel should be notified, suspect lot numbers should be recorded, and items from suspected lots should be segregated and quarantined. Appropriate microbiologic assays may be considered; however, the nearest district office of the FDA, local and state health departments, and CDC should be notified promptly. Category I

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SECTION 4: INFECTIVE WASTE

Introduction

There is no epidemiologic evidence to suggest that most hospital waste is any more infective than residential. Moreover, there is no epidemiologic evidence that hospital waste disposal practices have caused disease in the community. Therefore, identifying wastes for which special precautions are indicated is largely a matter of judgment about the relative risk of disease transmission. Aesthetic and emotional considerations may override the actual risk of disease transmission, particularly for pathology wastes.

Since a precise definition of infective waste that is based on the quantity and type of etiologic agents present is virtually impossible, the most practical approach to infective waste management is to identify those wastes that represent a sufficient potential risk of causing infection during handling and disposal and for which some special precautions appear prudent. Hospital wastes for which special precautions appear prudent include microbiology laboratory waste, pathology waste, and blood specimens or blood products. Moreover, the risk of either injury or infection from certain sharp items (e.g., needles and scalpel blades) contaminated with blood also needs to be considered when such items are disposed of. While any item that has had contact with blood, exudates, or secretions may be potentially infective, it is not normally considered practical or necessary to treat all such waste as infective. CDC has published general recommendations for handling infective waste from patients on isolation precautions (1). Additional special precautions may be necessary for certain rare diseases or conditions such as Lassa fever (2). The EPA has published a draft manual (Environmental Protection Agency. Office of Solid Waste and Emergency Response. Draft Manual for Infectious Waste Management, SW-957, 1982. Washington: 1982) that identifies and categorizes other specific types of waste that may be generated in some research-oriented hospitals. In addition to the above guidelines, local and state environmental regulations may also exist.

Control Measures

Solid waste from the microbiology laboratory can be placed in steam-sterilizable bags or pans and steam-sterilized in the laboratory. Alternatively, it can be transported in sealed, impervious plastic bags to be burned in a hospital incinerator. A single bag is probably adequate if the bag is sturdy (not easily penetrated) and if the waste can be put in the bag without contaminating the outside of the bag; otherwise, double-bagging is indicated. All slides or tubes with small amounts of blood can be packed in sealed, impervious containers and sent for incineration or steam sterilization in the hospital. Exposure for up to 90 minutes at 250 degrees F (121 degrees C) in a steam sterilizer, depending on the size of the

load and type container, may necessary to assure an adequate sterilization cycle (3,4). After steam sterilization, the residue can be safely handled and discarded with all other nonhazardous hospital solid waste. All containers with more than a few milliliters of blood remaining after laboratory procedures and/or bulk blood may be steam sterilized, or the contents may be carefully poured down a utility sink drain or toilet.

Waste from the pathology laboratory is customarily incinerated at the hospital. Although no national data are available, in one state 96% of the hospitals surveyed reported that they incinerate pathology waste (5). Any hospital incinerator should be capable of burning, within applicable air pollution regulations, the actual waste materials to be destroyed. Improper incineration of waste with high moisture and low energy content, such as pathology waste, can lead to emission problems.

Disposables that can cause injury, such as scalpel blades and syringes with needles, should be placed in puncture-resistant containers. Ideally, such containers are located where these items are used. Syringes and needles can be placed intact directly into the rigid containers for safe storage until terminal treatment. To prevent needle-stick injuries, needles should not be recapped, purposely bent, or broken by hand. When some needle cutting devices are used, blood may be aerosolized or spattered onto environmental surfaces; however, currently no data are available from controlled studies examining the effect, if any, of the use of these devices on the incidence of needle-transmissible infections.

It is often necessary to transport or store infective waste within the hospital prior to terminal treatment. This can be done safely if proper and common-sense procedures are used. The EPA draft manual mentioned above contains guidelines for the storage and transport, both on-site and off-site, of infective waste. For unique and specialized problems, this manual can be consulted.

Recommendations

1. Identification of Infective Waste
 1. Microbiology laboratory wastes, blood and blood products, pathology waste, and sharp items (especially needles) should be considered as potentially infective and handled and disposed of with special precautions. Category II
 2. Infective waste from patients on isolation precautions should be handled and disposed of according to the current edition of the Guideline for Isolation Precautions in Hospitals. (This recommendation is not categorized since the recommendations for isolation precautions are not categorized.)
2. Handling, Transport, and Storage of Infective Waste
 1. Personnel involved in the handling and disposal of infective waste should be informed of the potential health and safety hazards and trained in the appropriate handling and disposal methods. Category II
 2. If processing and/or disposal facilities are not available at the site of infective waste generation (i.e., laboratory, etc.) the waste may be safely transported in sealed impervious containers to another hospital area for appropriate treatment. Category II
 3. To minimize the potential risk for accidental transmission of disease or injury, infective waste awaiting terminal processing should be stored in an area accessible only to personnel involved in the disposal process. Category III
3. Processing and Disposal of Infective Waste

1. Infective waste, in general, should either be incinerated or should be autoclaved prior to disposal in a sanitary landfill. Category III
2. Disposable syringes with needles, scalpel blades, and other sharp items capable of causing injury should be placed intact into puncture-resistant containers located as close to the area in which they were used as is practical. To prevent needle-stick injuries, needles should not be recapped, purposely bent, broken, or otherwise manipulated by hand. Category I
3. Bulk blood, suctioned fluids, excretions, and secretions may be carefully poured down a drain connected to a sanitary sewer. Sanitary sewers may also be used for the disposal of other infectious wastes capable of being ground and flushed into the sewer. Category II (Special precautions may be necessary for certain rare diseases or conditions such as Lassa fever (2).)

References

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SECTION 5: HOUSEKEEPING

Introduction

Although microorganisms are a normal contaminant of walls, floors, and other surfaces, these environmental surfaces rarely are associated with transmission of infections to patients or personnel. Therefore, extraordinary attempts to disinfect or sterilize these environmental surfaces are rarely indicated. However, routine cleaning and removal of soil are recommended. Recommendations for cleaning in the rooms of patients on isolation precautions have been published (1).

Control Measures

Cleaning schedules and methods vary according to the area of the hospital, type of surface to be cleaned, and the amount and type of soil present. Horizontal surfaces (for example, bedside tables and hard-surfaced flooring) in patient-care areas are usually cleaned on a regular basis, when soiling or spills occur, and when a patient is discharged. Cleaning of walls, blinds, and curtains is recommended only if they are visibly soiled. Disinfectant fogging is an unsatisfactory method of decontaminating air and surfaces and is not recommended.

Recommendations against use of carpets in patient-care areas have been removed from this Guideline, since there is no epidemiologic evidence to show that carpets influence the nosocomial infection rate in hospitals (2). Carpets, however, may contain much higher

levels of microbial contamination than hard-surfaced flooring and can be difficult to keep clean in areas of heavy soiling or spillage; therefore, appropriate cleaning and maintenance procedures are indicated.

Disinfectant-detergent formulations registered by the EPA can be used for environmental surface cleaning, but the actual physical removal of microorganisms by scrubbing is probably as important, if not more so, than any antimicrobial effect of the cleaning agent used. Therefore, cost, safety, and acceptability by housekeepers can be the main criteria for selecting any such registered agent. The manufacturers' instructions for appropriate use should be followed.

Special precautions for cleaning incubators, mattresses, and other nursery surfaces with which neonates have contact have been recommended (3), since inadequately diluted solutions of phenolics used for such cleaning and poor ventilation have been associated with hyperbilirubinemia in newborns (4).

Recommendations

1. Choice of Cleaning Agent for Environmental Surfaces in Patient-Care Areas
Any hospital-grade disinfectant-detergent registered by the EPA may be used for cleaning environmental surfaces. Manufacturers' instructions for use of such products should be followed. Category II
2. Cleaning of Horizontal Surfaces in Patient-care Areas
 1. Uncarpeted floors and other horizontal surfaces, e.g., bedside tables, should be cleaned regularly and if spills occur. Category II
 2. Carpeting should be vacuumed regularly with units designed to efficiently filter discharged air, cleaned if spills occur, and shampooed whenever a thorough cleaning is indicated. Category II
3. Cleaning Walls, Blinds, and Curtains
Terminal cleaning of walls, blinds, and curtains is not recommended unless they are visibly soiled. Category II
4. Disinfectant fogging
Disinfectant fogging should not be done. Category I

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SECTION 6: LAUNDRY

Introduction

Although soiled linen has been identified as a source of large numbers of pathogenic microorganisms, the risk of actual disease transmission appears negligible. Rather than rigid rules and regulations, hygienic and common sense storage and processing of clean and soiled linen are recommended. Guidelines for laundry construction and operation for health care facilities have been published (1,2).

Control Measures

Soiled linen can be transported in the hospital by cart or chute. Bagging linen is indicated if chutes are used, since improperly designed chutes can be a means of spreading microorganisms throughout the hospital (3). Recommendations for handling soiled linen from patients on isolation precautions have been published (4).

Soiled linen may or may not be sorted in the laundry before being loaded into washer/extractor units. Sorting before washing protects both machinery and linen from the effects of objects in the linen and reduces the potential for recontamination of clean linen that sorting after washing requires. Sorting after washing minimizes the direct exposure of laundry personnel to infective material in the soiled linen and reduces airborne microbial contamination in the laundry (5). Protective apparel and appropriate ventilation (2) can minimize these exposures.

The microbicidal action of the normal laundering process is affected by several physical and chemical factors (5). Although dilution is not a microbicidal mechanism, it is responsible for the removal of significant quantities of microorganisms. Soaps or detergents loosen soil and also have some microbicidal properties. Hot water provides an effective means of destroying microorganisms, and a temperature of at least 71 degrees C (160 degrees F) for a minimum of 25 minutes is commonly recommended for hot-water washing. Chlorine bleach provides an extra margin of safety. A total available chlorine residual of 50-150 ppm is usually achieved during the bleach cycle. The last action performed during the washing process is the addition of a mild acid to neutralize any alkalinity in the water supply, soap, or detergent. The rapid shift in pH from approximately 12 to 5 also may tend to inactivate some microorganisms.

Recent studies have shown that a satisfactory reduction of microbial contamination can be achieved at lower water temperatures of 22-50 degrees C when the cycling of the washer, the wash formula, and the amount of chlorine bleach are carefully monitored and controlled (6,7). Instead of the microbicidal action of hot water, low temperature laundry cycles rely heavily on the presence of bleach to reduce levels of microbial contamination. Regardless of whether hot or cold water is used for washing, the temperatures reached in drying and especially during ironing provide additional significant microbicidal action.

Recommendations

1. Routine Handling of Soiled Linen

1. Soiled linen should be handled as little as possible and with minimum agitation to prevent gross microbial contamination of the air and of persons handling the linen. Category II
2. 1) All soiled linen should be bagged or put into carts at the location where it was used; it should not be sorted or prerinsed in patient-care areas. Category II
 1. Linen soiled with blood or body fluids should be deposited and transported in bags that prevent leakage. Category II

3. If laundry chutes are used, linen should be bagged, and chutes should be properly designed. Category II
2. Hot-Water Washing
If hot water is used, linen should be washed with a detergent in water at least 71 degrees C (160 degrees F) for 25 minutes. Category II
3. Low-Temperature Water Washing
If low temperature (less than or equal to 70 degrees C) laundry cycles are used, chemicals suitable for low-temperature washing at proper use concentration should be used. Category II
4. Transportation of Clean Linen
Clean linen should be transported and stored by methods that will ensure its cleanliness. Category II

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Annex L

Part II. Recommendations for Isolation Precautions in Hospitals

Hospital Infection Control Practices Advisory Committee

RATIONALE FOR ISOLATION PRECAUTIONS IN HOSPITALS

Transmission of infection within a hospital requires three elements: a source of infecting microorganisms, a susceptible host, and a means of transmission for the microorganism.

Source

Human sources of the infecting microorganisms in hospitals may be patients, personnel, or, on occasion, visitors, and may include persons with acute disease, persons in the incubation period of a disease, persons who are colonized by an infectious agent but have no apparent disease, or persons who are chronic carriers of an infectious agent. Other sources of infecting microorganisms can be the patient's own endogenous flora, which may be difficult to control, and inanimate environmental objects that have become contaminated, including equipment and medications.

Host

Resistance among persons to pathogenic microorganisms varies greatly. Some persons may be immune to infection or may be able to resist colonization by an infectious agent; others exposed to the same agent may establish a commensal relationship with the infecting microorganism and become asymptomatic carriers; still others may develop clinical disease. Host factors such as age; underlying diseases; certain treatments with antimicrobials, corticosteroids, or other immunosuppressive agents; irradiation; and breaks in the first line of defense mechanisms caused by such factors as surgical operations, anesthesia, and indwelling catheters may render patients more susceptible to infection.

Transmission

Microorganisms are transmitted in hospitals by several routes, and the same microorganism may be transmitted by more than one route. There are five main routes of transmission: contact, droplet, airborne, common vehicle, and vectorborne. For the purpose of this guideline, common vehicle and vectorborne transmission will be discussed only briefly, because neither play a significant role in typical nosocomial infections.

- (1) *Contact transmission*, the most important and frequent mode of transmission of nosocomial infections, is divided into two subgroups: direct-contact transmission and indirect-contact transmission.
 - (a) Direct-contact transmission involves a direct body surface-to-body surface

contact and physical transfer of microorganisms between a susceptible host and an infected or colonized person, such as occurs when a person turns a patient, gives a patient a bath, or performs other patient-care activities that require direct personal contact. Direct-contact transmission also can occur between two patients, with one serving as the source of the infectious microorganisms and the other as a susceptible host.

- (b) Indirect-contact transmission involves contact of a susceptible host with a contaminated intermediate object, usually inanimate, such as contaminated instruments, needles, or dressings, or contaminated hands that are not washed and gloves that are not changed between patients.
- (2) *Droplet transmission*, theoretically, is a form of contact transmission. However, the mechanism of transfer of the pathogen to the host is quite distinct from either direct- or indirect-contact transmission. Therefore, droplet transmission will be considered a separate route of transmission in this guideline. Droplets are generated from the source person primarily during coughing, sneezing, and talking, and during the performance of certain procedures such as suctioning and bronchoscopy. Transmission occurs when droplets containing microorganisms generated from the infected person are propelled a short distance through the air and deposited on the host's conjunctivae, nasal mucosa, or mouth. Because droplets do not remain suspended in the air, special air handling and ventilation are not required to prevent droplet transmission; that is, droplet transmission *must not* be confused with airborne transmission.
- (3) *Airborne transmission* occurs by dissemination of either airborne droplet nuclei (small-particle residue [5 µm or smaller in size] of evaporated droplets containing microorganisms that remain suspended in the air for long periods of time) or dust particles containing the infectious agent. Microorganisms carried in this manner can be dispersed widely by air currents and may become inhaled by a susceptible host within the same room or over a longer distance from the source patient, depending on environmental factors; therefore, special air handling and ventilation are required to prevent airborne transmission. Microorganisms transmitted by airborne transmission include *Mycobacterium tuberculosis* and the rubeola and varicella viruses.
- (4) *Common vehicle transmission* applies to microorganisms transmitted by contaminated items such as food, water, medications, devices, and equipment.
- (5) *Vectorborne transmission* occurs when vectors such as mosquitoes, flies, rats, and other vermin transmit microorganisms; this route of transmission is of less significance in hospitals in the United States than in other regions of the world.

Isolation precautions are designed to prevent transmission of microorganisms by these routes in hospitals. Because agent and host factors are more difficult to control, interruption of transfer of microorganisms is directed primarily at transmission. The recommendations presented in this guideline are based on this concept.

Placing a patient on isolation precautions, however, often presents certain disadvantages to the hospital, patients, personnel, and visitors. Isolation precautions may require specialized equipment and environmental modifications that add to the cost of hospitalization. Isolation precautions may make frequent visits by nurses, physicians, and other personnel inconvenient, and they may make it more difficult for personnel to give the prompt and frequent care that sometimes is required. The use of

a multi-patient room for one patient uses valuable space that otherwise might accommodate several patients. Moreover, forced solitude deprives the patient of normal social relationships and may be psychologically harmful, especially to children. These disadvantages, however, must be weighed against the hospital's mission to prevent the spread of serious and epidemiologically important microorganisms in the hospital.

FUNDAMENTALS OF ISOLATION PRECAUTIONS

A variety of infection control measures are used for decreasing the risk of transmission of microorganisms in hospitals. These measures make up the fundamentals of isolation precautions.

Handwashing and Gloving

Handwashing frequently is called the single most important measure to reduce the risks of transmitting organisms from one person to another or from one site to another on the same patient. The scientific rationale, indications, methods, and products for handwashing have been delineated in other publications.(64-72)

Washing hands as promptly and thoroughly as possible between patient contacts and after contact with blood, body fluids, secretions, excretions, and equipment or articles contaminated by them is an important component of infection control and isolation precautions. In addition to handwashing, gloves play an important role in reducing the risks of transmission of microorganisms.

Gloves are worn for three important reasons in hospitals. First, gloves are worn to provide a protective barrier and to prevent gross contamination of the hands when touching blood, body fluids, secretions, excretions, mucous membranes, and nonintact skin (27-29); the wearing of gloves in specified circumstances to reduce the risk of exposures to bloodborne pathogens is mandated by the OSHA bloodborne pathogens final rule.(51) Second, gloves are worn to reduce the likelihood that microorganisms present on the hands of personnel will be transmitted to patients during invasive or other patient-care procedures that involve touching a patient's mucous membranes and nonintact skin. Third, gloves are worn to reduce the likelihood that hands of personnel contaminated with microorganisms from a patient or a fomite can transmit these microorganisms to another patient. In this situation, gloves must be changed between patient contacts and hands washed after gloves are removed.

Wearing gloves does not replace the need for handwashing, because gloves may have small, inapparent defects or may be torn during use, and hands can become contaminated during removal of gloves.(14,15,39,72-76) Failure to change gloves between patient contacts is an infection control hazard.(32)

Patient Placement

Appropriate patient placement is a significant component of isolation precautions. A private room is important to prevent direct- or indirect-contact transmission when the source patient has poor hygienic habits, contaminates the environment, or cannot be expected to assist in maintaining infection control precautions to limit transmission of

microorganisms (i.e., infants, children, and patients with altered mental status). When possible, a patient with highly transmissible or epidemiologically important microorganisms is placed in a private room with handwashing and toilet facilities, to reduce opportunities for transmission of microorganisms.

When a private room is not available, an infected patient is placed with an appropriate roommate. Patients infected by the same microorganism usually can share a room, provided they are not infected with other potentially transmissible microorganisms and the likelihood of reinfection with the same organism is minimal. Such sharing of rooms, also referred to as cohorting patients, is useful especially during outbreaks or when there is a shortage of private rooms. When a private room is not available and cohorting is not achievable or recommended,(23) it is very important to consider the epidemiology and mode of transmission of the infecting pathogen and the patient population being served in determining patient placement. Under these circumstances, consultation with infection control professionals is advised before patient placement. Moreover, when an infected patient shares a room with a noninfected patient, it also is important that patients, personnel, and visitors take precautions to prevent the spread of infection and that roommates are selected carefully.

Guidelines for construction, equipment, air handling, and ventilation for isolation rooms have been delineated in other publications.(77-79) A private room with appropriate air handling and ventilation is particularly important for reducing the risk of transmission of microorganisms from a source patient to susceptible patients and other persons in hospitals when the microorganism is spread by airborne transmission. Some hospitals use an isolation room with an anteroom as an extra measure of precaution to prevent airborne transmission. Adequate data regarding the need for an anteroom, however, is not available. Ventilation recommendations for isolation rooms housing patients with pulmonary tuberculosis have been delineated in other CDC guidelines.(23)

Transport of Infected Patients

Limiting the movement and transport of patients infected with virulent or epidemiologically important microorganisms and ensuring that such patients leave their rooms only for essential purposes reduces opportunities for transmission of microorganisms in hospitals. When patient transport is necessary, it is important that 1) appropriate barriers (e.g., masks, impervious dressings) are worn or used by the patient to reduce the opportunity for transmission of pertinent microorganisms to other patients, personnel, and visitors and to reduce contamination of the environment; 2) personnel in the area to which the patient is to be taken are notified of the impending arrival of the patient and of the precautions to be used to reduce the risk of transmission of infectious microorganisms; and 3) patients are informed of ways by which they can assist in preventing the transmission of their infectious microorganisms to others.

Masks, Respiratory Protection, Eye Protection, Face Shields

Various types of masks, goggles, and face shields are worn alone or in combination to provide barrier protection. A mask that covers both the nose and the mouth, and goggles or a face shield are worn by hospital personnel during procedures and patient-

care activities that are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions to provide protection of the mucous membranes of the eyes, nose, and mouth from contact transmission of pathogens. The wearing of masks, eye protection, and face shields in specified circumstances to reduce the risk of exposures to bloodborne pathogens is mandated by the OSHA bloodborne pathogens final rule.(51) A surgical mask generally is worn by hospital personnel to provide protection against spread of infectious large-particle droplets that are transmitted by close contact and generally travel only short distances (up to 3 ft) from infected patients who are coughing or sneezing.

An area of major concern and controversy over the last several years has been the role and selection of respiratory protection equipment and the implications of a respiratory protection program for prevention of transmission of tuberculosis in hospitals. Traditionally, although the efficacy was not proven, a surgical mask was worn for isolation precautions in hospitals when patients were known or suspected to be infected with pathogens spread by the airborne route of transmission. In 1990, however, the CDC tuberculosis guidelines (18) stated that surgical masks may not be effective in preventing the inhalation of droplet nuclei and recommended the use of disposable particulate respirators, despite the fact that the efficacy of particulate respirators in protecting persons from the inhalation of *M tuberculosis* had not been demonstrated. By definition, particulate respirators included dust-mist (DM), dust-fume-mist (DFM), or high-efficiency particulate air (HEPA) filter respirators certified by the CDC National Institute for Occupational Safety and Health (NIOSH); because the generic term "particulate respirator" was used in the 1990 guidelines, the implication was that any of these respirators provided sufficient protection.(80)

In 1993, a draft revision of the CDC tuberculosis guidelines (22) outlined performance criteria for respirators and stated that some DM or DFM respirators might not meet these criteria. After review of public comments, the guidelines were finalized in October 1994,(23) with the draft respirator criteria unchanged. At that time, the only class of respirators that were known to consistently meet or exceed the performance criteria outlined in the 1994 tuberculosis guidelines and that were certified by NIOSH (as required by OSHA) were HEPA filter respirators. Subsequently, NIOSH revised the testing and certification requirements for all types of air-purifying respirators, including those used for tuberculosis control.(81) The new rule, effective in July 1995, provides a broader range of certified respirators that meet the performance criteria recommended by CDC in the 1994 tuberculosis guidelines. NIOSH has indicated that the N95 (N category at 95% efficiency) meets the CDC performance criteria for a tuberculosis respirator. The new respirators are likely to be available in late 1995. Additional information on the evolution of respirator recommendations, regulations to protect hospital personnel, and the role of various federal agencies in respiratory protection for hospital personnel has been published.(80)

Gowns and Protective Apparel

Various types of gowns and protective apparel are worn to provide barrier protection and to reduce opportunities for transmission of microorganisms in hospitals. Gowns are worn to prevent contamination of clothing and to protect the skin of personnel from blood and body fluid exposures. Gowns especially treated to make them

impermeable to liquids, leg coverings, boots, or shoe covers provide greater protection to the skin when splashes or large quantities of infective material are present or anticipated. The wearing of gowns and protective apparel under specified circumstances to reduce the risk of exposures to bloodborne pathogens is mandated by the OSHA bloodborne pathogens final rule.(51)

Gowns are also worn by personnel during the care of patients infected with epidemiologically important microorganisms to reduce the opportunity for transmission of pathogens from patients or items in their environment to other patients or environments; when gowns are worn for this purpose, they are removed before leaving the patient's environment and hands are washed. Adequate data regarding the efficacy of gowns for this purpose, however, is not available.

Patient-Care Equipment and Articles

Many factors determine whether special handling and disposal of used patient-care equipment and articles are prudent or required, including the likelihood of contamination with infective material; the ability to cut, stick, or otherwise cause injury (needles, scalpels, and other sharp instruments [sharps]); the severity of the associated disease; and the environmental stability of the pathogens involved.(27,51,82-84) Some used articles are enclosed in containers or bags to prevent inadvertent exposures to patients, personnel, and visitors and to prevent contamination of the environment. Used sharps are placed in puncture-resistant containers; other articles are placed in a bag. One bag is adequate if the bag is sturdy and the article can be placed in the bag without contaminating the outside of the bag (85); otherwise, two bags are used.

The scientific rationale, indications, methods, products, and equipment for reprocessing patient-care equipment have been delineated in other publications.(68,84,86-91) Contaminated, reusable critical medical devices or patient-care equipment (i.e., equipment that enters normally sterile tissue or through which blood flows) or semicritical medical devices or patient-care equipment (i.e., equipment that touches mucous membranes) are sterilized or disinfected (reprocessed) after use to reduce the risk of transmission of microorganisms to other patients; the type of reprocessing is determined by the article and its intended use, the manufacturer's recommendations, hospital policy, and any applicable guidelines and regulations.

Noncritical equipment (i.e., equipment that touches intact skin) contaminated with blood, body fluids, secretions, or excretions is cleaned and disinfected after use, according to hospital policy. Contaminated disposable (single-use) patient-care equipment is handled and transported in a manner that reduces the risk of transmission of microorganisms and decreases environmental contamination in the hospital; the equipment is disposed of according to hospital policy and applicable regulations.

Linen and Laundry

Although soiled linen may be contaminated with pathogenic microorganisms, the risk of disease transmission is negligible if it is handled, transported, and laundered in a

manner that avoids transfer of microorganisms to patients, personnel, and environments. Rather than rigid rules and regulations, hygienic and common sense storage and processing of clean and soiled linen are recommended.(27,83,92,93) The methods for handling, transporting, and laundering of soiled linen are determined by hospital policy and any applicable regulations.

Dishes, Glasses, Cups, and Eating Utensils

No special precautions are needed for dishes, glasses, cups, or eating utensils. Either disposable or reusable dishes and utensils can be used for patients on isolation precautions. The combination of hot water and detergents used in hospital dishwashers is sufficient to decontaminate dishes, glasses, cups, and eating utensils.

Routine and Terminal Cleaning

The room, or cubicle, and bedside equipment of patients on Transmission-Based Precautions are cleaned using the same procedures used for patients on Standard Precautions, unless the infecting microorganism(s) and the amount of environmental contamination indicates special cleaning. In addition to thorough cleaning, adequate disinfection of bedside equipment and environmental surfaces (e.g., bedrails, bedside tables, carts, commodes, doorknobs, faucet handles) is indicated for certain pathogens, especially enterococci, which can survive in the inanimate environment for prolonged periods of time.(94) Patients admitted to hospital rooms that previously were occupied by patients infected or colonized with such pathogens are at increased risk of infection from contaminated environmental surfaces and bedside equipment if they have not been cleaned and disinfected adequately. The methods, thoroughness, and frequency of cleaning and the products used are determined by hospital policy.

HICPAC ISOLATION PRECAUTIONS

There are two tiers of HICPAC isolation precautions. In the first, and most important, tier are those precautions designed for the care of all patients in hospitals, regardless of their diagnosis or presumed infection status. Implementation of these "Standard Precautions" is the primary strategy for successful nosocomial infection control. In the second tier are precautions designed only for the care of specified patients. These additional "Transmission-Based Precautions" are for patients known or suspected to be infected by epidemiologically important pathogens spread by airborne or droplet transmission or by contact with dry skin or contaminated surfaces.

Standard Precautions

Standard Precautions synthesize the major features of UP (Blood and Body Fluid Precautions) (27,28) (designed to reduce the risk of transmission of bloodborne pathogens) and BSI (29,30) (designed to reduce the risk of transmission of pathogens from moist body substances) and applies them to all patients receiving care in hospitals, regardless of their diagnosis or presumed infection status. Standard Precautions apply to 1) blood; 2) all body fluids, secretions, and excretions *except sweat*, regardless of whether or not they contain visible blood; 3) nonintact skin; and 4) mucous membranes. Standard Precautions are designed to reduce the risk of

transmission of microorganisms from both recognized and unrecognized sources of infection in hospitals.

Transmission-Based Precautions

Transmission-Based Precautions are designed for patients documented or suspected to be infected with highly transmissible or epidemiologically important pathogens for which additional precautions beyond Standard Precautions are needed to interrupt transmission in hospitals. There are three types of Transmission-Based Precautions: Airborne Precautions, Droplet Precautions, and Contact Precautions. They may be combined for diseases that have multiple routes of transmission. When used either singularly or in combination, they are to be used in addition to Standard Precautions.

Airborne Precautions are designed to reduce the risk of airborne transmission of infectious agents. Airborne transmission occurs by dissemination of either airborne droplet nuclei (small-particle residue [5 μm or smaller in size] of evaporated droplets that may remain suspended in the air for long periods of time) or dust particles containing the infectious agent. Microorganisms carried in this manner can be dispersed widely by air currents and may become inhaled by or deposited on a susceptible host within the same room or over a longer distance from the source patient, depending on environmental factors; therefore, special air handling and ventilation are required to prevent airborne transmission. Airborne Precautions apply to patients known or suspected to be infected with epidemiologically important pathogens that can be transmitted by the airborne route.

Droplet Precautions are designed to reduce the risk of droplet transmission of infectious agents. Droplet transmission involves contact of the conjunctivae or the mucous membranes of the nose or mouth of a susceptible person with large-particle droplets (larger than 5 μm in size) containing microorganisms generated from a person who has a clinical disease or who is a carrier of the microorganism. Droplets are generated from the source person primarily during coughing, sneezing, or talking and during the performance of certain procedures such as suctioning and bronchoscopy. Transmission via large-particle droplets requires close contact between source and recipient persons, because droplets do not remain suspended in the air and generally travel only short distances, usually 3 ft or less, through the air. Because droplets do not remain suspended in the air, special air handling and ventilation are not required to prevent droplet transmission. Droplet Precautions apply to any patient known or suspected to be infected with epidemiologically important pathogens that can be transmitted by infectious droplets.

Contact Precautions are designed to reduce the risk of transmission of epidemiologically important microorganisms by direct or indirect contact. Direct-contact transmission involves skin-to-skin contact and physical transfer of microorganisms to a susceptible host from an infected or colonized person, such as occurs when personnel turn patients, bathe patients, or perform other patient-care activities that require physical contact. Direct-contact transmission also can occur between two patients (e.g., by hand contact), with one serving as the source of infectious microorganisms and the other as a susceptible host. Indirect-contact transmission involves contact of a susceptible host with a contaminated intermediate object, usually inanimate, in the patient's environment. Contact Precautions apply to

specified patients known or suspected to be infected or colonized (presence of microorganism in or on patient but without clinical signs and symptoms of infection) with epidemiologically important microorganisms than can be transmitted by direct or indirect contact.

A synopsis of the types of precautions and the patients requiring the precautions is listed in [Table 1](#).

EMPIRIC USE OF AIRBORNE, DROPLET, OR CONTACT PRECAUTIONS

In many instances, the risk of nosocomial transmission of infection may be highest before a definitive diagnosis can be made and before precautions based on that diagnosis can be implemented. The routine use of Standard Precautions for all patients should reduce greatly this risk for conditions other than those requiring Airborne, Droplet, or Contact Precautions. While it is not possible to prospectively identify all patients needing these enhanced precautions, certain clinical syndromes and conditions carry a sufficiently high risk to warrant the empiric addition of enhanced precautions while a more definitive diagnosis is pursued. A listing of such conditions and the recommended precautions beyond Standard Precautions is presented in [Table 2](#).

The organisms listed under the column "Potential Pathogens" are not intended to represent the complete or even most likely diagnoses, but rather possible etiologic agents that require additional precautions beyond Standard Precautions until they can be ruled out. Infection control professionals are encouraged to modify or adapt this table according to local conditions. To ensure that appropriate empiric precautions are implemented always, hospitals must have systems in place to evaluate patients routinely, according to these criteria as part of their preadmission and admission care.

IMMUNOCOMPROMISED PATIENTS

Immunocompromised patients vary in their susceptibility to nosocomial infections, depending on the severity and duration of immunosuppression. They generally are at increased risk for bacterial, fungal, parasitic, and viral infections from both endogenous and exogenous sources. The use of Standard Precautions for all patients and Transmission-Based Precautions for specified patients, as recommended in this guideline, should reduce the acquisition by these patients of institutionally acquired bacteria from other patients and environments.

It is beyond the scope of this guideline to address the various measures that may be used for immunocompromised patients to delay or prevent acquisition of potential pathogens during temporary periods of neutropenia. Rather, the primary objective of this guideline is to prevent transmission of pathogens from infected or colonized patients in hospitals. Users of this guideline, however, are referred to the "Guideline for Prevention of Nosocomial Pneumonia" (95,96) for the HICPAC recommendations for prevention of nosocomial aspergillosis and Legionnaires' disease in immunocompromised patients.

ANNEX M

Management of the Child with a Serious Infection or Severe Malnutrition CHAPTER 1. EMERGENCY TRIAGE ASSESSMENT AND TREATMENT

Emergency triage assessment and treatment

Deaths in hospital often occur within 24 hours of admission. Many of these deaths could be prevented if very sick children are identified soon after their arrival and treatment is started immediately. This chapter outlines a process of rapid triage to determine whether any emergency or priority signs are present. It then describes emergency treatment.

Triage is the process of rapidly screening sick children when they first arrive in hospital and of placing them in one of the following groups:

- those with *emergency signs*, who require immediate emergency treatment;
- those with *priority signs*, who should be given priority while waiting in the queue so that they can be assessed and treated without delay;
- *non-urgent cases*, who have neither emergency nor priority signs.

Emergency signs include:

- obstructed breathing
- severe respiratory distress
- central cyanosis
- signs of shock (capillary refill longer than 3 seconds; and weak, fast pulse)
- coma
- convulsions
- signs suggesting severe dehydration in a child with diarrhoea (any two of the following: lethargy, sunken eyes, very slow return after pinching the skin)

Children with emergency signs require *immediate* treatment to avert death.

The priority signs (see below, [section 1.2](#)) identify children who are at a higher risk of dying. These children should be *assessed without delay*.

Organization of triage and emergency treatment

Triage should be carried out in the place where the sick child presents at the hospital - before any administrative procedures such as registration. This may require reorganizing the sequence usually followed by patients who arrive in the clinic, e.g. children should be triaged even before their mothers sit in the waiting area. This calls for a nurse to carry out a rapid assessment of each child before weighing and registration.

It is important to carry out rapid triage of children who arrive in the outpatient clinic, especially when the room for emergency treatment is in a separate location. If sick children are brought directly to the paediatric ward, the nurse there must carry out triage and be prepared to move any child with emergency signs rapidly to where help is available and where treatment can be started.

All clinical staff involved in the initial assessment and care of sick children should be trained to carry out triage and, if possible, to give initial emergency treatment. This treatment is based on the use of a limited number of drugs and procedures which can be given safely by nurses and medical assistants after brief training.

The most experienced doctor or health worker should direct the emergency treatment. As the top priority is to give emergency treatment without delay, any trained member of the staff may have to start the emergency treatment while the most experienced person available is called.

After the emergency treatment, the child should be assessed promptly to establish the diagnosis, and given further appropriate treatment.

1.1 Summary of steps in emergency triage assessment and treatment

The emergency triage assessment and treatment process is summarized in the Charts following.

*First, check for **emergency signs**. If these signs are found, immediately give the appropriate **emergency treatment**. Ask and look for any head/neck trauma before positioning the child or moving the head/neck.*

Check for emergency signs in two steps:

- Step 1. Check for any airway or breathing problem. If a problem is found, start immediate treatment to restore breathing.
- Step 2. Quickly determine if the child is in shock or unconscious or convulsing, or has diarrhoea with severe dehydration. These assessments can be done very quickly and almost simultaneously. Immediately give emergency treatment if there are positive signs.

Most children will not require emergency treatment.

Take careful note if the child is severely malnourished, because this will affect the treatment of shock and dehydration

If emergency signs are found:

- Call an experienced health professional and others to help, but do not delay starting the treatment. The team needs to stay calm and work together efficiently. The person in charge should assign tasks so that assessment can continue and treatment can be initiated quickly. Other health workers may be required to give the treatment, because a very

sick child may need several treatments at once. The experienced health professional should continue assessing the child, to identify all underlying problems and develop a treatment plan.

- Carry out emergency investigations (blood glucose, blood smear, haemoglobin). Send blood for typing and cross-matching if the child is in shock, or appears to be severely anaemic, or is bleeding significantly.
- After giving emergency treatment, proceed immediately to assessing, diagnosing and treating the underlying problem.

If no emergency signs are found:

- Check for priority signs that indicate the child needs immediate assessment and treatment. These signs are:
 - visible severe wasting
 - oedema of both feet
 - severe palmar pallor
 - any sick young infant (<2 months old)
 - lethargy, drowsiness, unconsciousness
 - continually irritable and restless
 - major burns
 - any respiratory distress
 - child with urgent referral note from another facility.

These children need prompt assessment to determine what further treatment is needed. They should not be asked to wait in the queue. If a child has trauma or other surgical problems, get surgical help.

If no emergency or priority signs are found:

- Assess and treat the child who will follow the regular queue of non-urgent patients.

1.2 Assessment for emergency and priority signs

▪ Assess airway and breathing

Does the child's breathing appear obstructed? Look and listen to determine if there is poor air movement. Obstructed breathing can be due to blockage of the airway by the tongue, a foreign body or severe croup.

Is there respiratory distress? Is the child having trouble getting breath so that it is difficult to talk, eat or breastfeed?

Is there severe respiratory distress? Does the child's breathing appear very laboured? Is the child tiring?

Is there central cyanosis? This is indicated by a bluish/purplish discoloration of the tongue and the inside of the mouth.

- **Assess circulation (for shock)**

Is the child's hand cold? If so, check the capillary refill. Is it 3 seconds or longer? Apply pressure to whiten the nail of the thumb or the big toe for 3 seconds. Determine the capillary refill time from the moment of release until total recovery of the pink colour.

If capillary refill is longer than 3 seconds, check the pulse. Is the pulse weak and fast? If the radial pulse is strong and not obviously fast, the child is not in shock. If you cannot feel a radial pulse of an infant (less than 1 year old), feel the brachial pulse or, if the infant is lying down, the femoral pulse. If you cannot feel the radial pulse of a child, feel the carotid. If the room is very cold, rely on the pulse to determine whether the child may be in shock.

- **Assess for coma or convulsions (or other abnormal mental status)**

Is the child in coma? The level of consciousness can be assessed rapidly by the **AVPU** scale: **A** - the child is awake and Alert, or **V** - responds to Voice, or **P** - responds to Pain (e.g. pinching or pulling frontal hair), or **U** - Unconscious. If there is no response, ask the mother if the child has been abnormally sleepy or difficult to wake. If she confirms this, the child is in coma (unconscious) and needs emergency treatment.

Is the child convulsing? Are there spasmodic repeated movements in an unresponsive child?

Is the child lethargic? Does the child appear drowsy and show no interest in what is happening?

Is the child continually irritable or restless? A child who is continually irritable or restless cannot be calmed.

- **Assess for severe dehydration if the child has diarrhoea**

Does the child have sunken eyes? Do the eyes appear unusually sunken in their sockets? Ask the mother if the child's eyes are more sunken than usual.

Does a skin pinch go back very slowly (longer than 2 seconds)? Pinch the skin of the abdomen halfway between the umbilicus and the side. Pinch for 1 second, then release and observe.

- **Rapidly assess for severe malnutrition**

Does the child have visible severe wasting? Such children appear very thin and have no fat. Look for severe wasting of the muscles of the shoulders, arms, buttocks and thighs or visible rib outlines.

Does the child have oedema of both feet? Press with the thumb for a few seconds on the top of each foot. The child has oedema if an impression remains in the foot when you lift your thumb.

- **Assess for severe anaemia**

Look for severe palmar pallor. Look at the palms. Hold the child's palm open by grasping it gently from the side. Do not stretch the fingers backward as this could cause pallor by blocking the blood supply. Compare the colour of the child's palm with your own palm or the palm of the mother. If the skin of the palm is very pale or so pale that it looks white, the child has severe palmar pallor and may have severe anaemia.

- **Identify all sick young infants (<2 months old)**
- **Assess for a major burn**
- **Identify all children urgently referred from another facility**

1.3 Give emergency treatment

The charts that follow comprise a triage chart which presents a summary of the triage process, followed by charts which give detailed guidelines for emergency treatments named in the treatment boxes of the triage chart.

- Triage of sick children
 - How to manage the choking child
 - How to manage the airway in a child with obstructed breathing or who has just stopped breathing
- How to give oxygen
- How to position the unconscious child
- How to give IV fluids rapidly for shock (child not severely malnourished)
 - How to give IV fluids for shock in a child with severe malnutrition
- How to give diazepam or paraldehyde rectally for convulsions
- How to give IV glucose
- How to treat severe dehydration in an emergency setting

After giving these emergency treatments to *children with emergency signs*, proceed immediately to assessing, diagnosing and treating the underlying problem. Give the next highest priority for assessment and treatment to children with priority signs. Children with neither emergency nor priority signs can wait in the regular queue.

1.3.1 How to manage the airway

The treatment differs depending on whether there is a foreign body causing respiratory obstruction or some other cause for the obstruction or respiratory distress .

If a foreign body is causing the obstruction, the treatment depends on the age of the child.

For infants:

- Lay the infant on one arm or on the thigh in a head-down position.
- Give five blows to the infants back with the heel of the hand.
- If the obstruction persists, turn the infant over and give five chest thrusts with two fingers, 1 fingers breadth below the nipple level in the midline.
- If the obstruction persists, check the infants mouth for any obstruction which can be removed.
- If necessary, repeat this sequence with back slaps again.

For older children:

- While the child is sitting, kneeling or lying, give five blows to the childs back with the heel of the hand.
- If the obstruction persists, go behind the child and pass your arms around the childs body; form a fist with one hand immediately below the sternum; place the other hand over the fist and thrust sharply upwards into the abdomen. Repeat this up to five times.
- If the obstruction persists, check the childs mouth for any obstruction which can be removed.
- If necessary, repeat the sequence with back slaps again.

If respiratory obstruction is not caused by a foreign body, then manage the airway as in and assess the child fully to identify the cause of the obstruction. describes action which will open the childs airway and prevent the tongue from falling back to obstruct the pharynx.

The best head positions are "neutral" in the infant and "sniffing" in the child, as shown in . Once this has been done, it is important to check the patency of the airway by:

- looking for chest movements
- listening for breath sounds, and
- feeling for breath.

If neck trauma is suspected, the head-tilt/chin-lift manoeuvre may make the cervical spine injury worse. The safest airway intervention is the jaw thrust without head tilt. Ideally a second health worker should be made responsible for maintaining stabilization of the neck. This can also be achieved as described in by securing the child's head to a firm board after the breathing obstruction has been relieved.

1.3.2 Other emergency treatment

Details of other emergency treatments are given in Charts 5 to 11 and in appropriate sections of other chapters in this manual.

1.4 Give emergency treatment to the child with severe malnutrition

During the triage process, all children with severe malnutrition will be identified as having *priority signs*, which means that they require prompt assessment and treatment. The case-fatality rate in these children can be high, so it is important that they are assessed promptly by an experienced senior health worker and treatment started as *soon as possible*. Presents guidelines for the management of severely malnourished children.

A few children with severe malnutrition will be found during triage assessment to have *emergency signs*.

- Those with emergency signs for "*airway and breathing*" and "*coma or convulsions*" should receive emergency treatment (see charts following).
- Those with signs of *severe dehydration* but not shock should not be rehydrated with IV fluids. This is because the diagnosis of severe dehydration is difficult in severe malnutrition and is often misdiagnosed. Giving IV fluids puts these children at risk of overhydration and death from heart failure. Therefore, these children should be rehydrated *orally* using the special rehydration solution for severe malnutrition (ReSoMal).
- Those with signs of *shock* are assessed for further signs (*lethargic or unconscious*). This is because in severe malnutrition the usual emergency signs for shock may be present even when there is no shock.
 - If the child is *lethargic or unconscious*, keep warm and give 10% glucose 5 ml/kg IV, and then IV fluids
 - If the child is *alert*, keep warm and give 10% glucose (10 ml/kg) by mouth or nasogastric tube, and proceed to immediate full assessment and treatment.

Note: When giving IV fluids, treatment for shock differs from that for a well-nourished child. This is because shock from dehydration and sepsis are likely to coexist and these are difficult to differentiate on clinical grounds alone. Children with dehydration respond to IV fluids (breathing and pulse rates fall, faster capillary refill). Those with septic shock and no dehydration will not respond. The amount of fluid given should be guided by the child's response. Avoid overhydration. Monitor the pulse and breathing at the start and every 5-10 minutes to check if improving or not. Note that the type of IV fluid also differs in severe malnutrition, and the infusion rate is slower.

All severely malnourished children require prompt assessment and treatment to deal with serious problems such as hypoglycaemia, hypothermia, severe infection, severe anaemia and potentially blinding eye problems. It is equally important to take prompt action to prevent some of these problems, if they were not present at the time of admission to hospital.

Annex N

Animal Emergency Preparedness Plan

As part of an effort to control an outbreak of a transboundary disease, the Ministry of Agriculture, Land and Marine resources has developed an Animal Emergency Preparedness Plan, which has been tested at a “tabletop simulation” some two years ago. Although the plan is generic in nature and does not refer specifically to Avian Influenza, the Ministry of Agriculture can use the model in the event of such an outbreak.

The target of such a plan is to eliminate progressively and finally eradicate a transboundary animal disease (and prove that national or zonal freedom has been regained) if epidemiological and other circumstances are favorable. The alternative approach of simply 'living with the disease' through the institution of routine vaccination campaigns and/or other disease control measures will in the end prove far more costly and will be a permanent constraint to efficient livestock production systems. Furthermore, the continuing presence of TAD in a country, even if effective disease control programs minimize losses, will inhibit the opening of export trade opportunities for livestock and livestock products. Eradication of the disease and provision of scientific proof of freedom from the disease to a level of international acceptability will remove this constraint to international trade.

Contingency planning and other preparedness programs for animal disease emergencies are regarded as providing the key to mounting early effective action in the face of an emergency. In fact these should be recognized as some of the more important core functions of national animal health services.

The Republic of Trinidad and Tobago has been fortunate in not having the major diseases of economic importance endemic in its livestock population. The threat of highly infectious and contagious diseases being introduced into Trinidad and Tobago is highly probable because of the increased airline transport and recent trade agreements. Previously, we successfully excluded exotic and foreign diseases by zero tolerance. However with the signing of the Government of Trinidad and Tobago Agreement, we are bound by international law, to trade with new partners and disease restrictions are now being arbitrated by the OIE. It is therefore vitally important to have an effective emergency plan in place, as well as properly trained staff in risk analysis, emergency disease management and epidemiology to deal effectively with these changes.

With this in mind we envisage that the Animal Emergency Preparedness Plan will be of great importance to Public Health if ever there is an outbreak of Avian Influenza in our country. The plan has as its basis the Animal (Diseases and Importation) Act, CHAPTER 67:02, which gives power to the Minister of Agriculture and the Chief Veterinary Officer to Quarantine, Detain and Destroy as necessary any products or animals that may be of a treat to animal and/or human health.

Through the plan there is the setting up of a National Emergency Animal Disease Committee with representation from Ministries of Agriculture, Health, Finance and Trade and Commerce as well as agencies such as the Protective Services as well as NGO's. The function of the committee is to Promulgation of policies and coordination of the input of various Ministries of Government to prevent, control and eradicate any foreign animal disease. The Director of Animal Production and Health sits as Chairman of the committee. The committee has under it's umbrella a National Task Force, headed by the Chief Veterinary Officer, with responsibility for all actions taken on the ground.

The Plan is very comprehensive with Sections II dealing with Airport and Seaport surveillance (Part B), Proper Handling and Disposal of International Garbage (Part C), Sections III concentrating on Control/Eradiation and Containment, which comprises the majority of the plan. There are subsections dealing with everything from command and control to military involvement in quarantine as well as subsections on evaluation of losses for compensatory purpose. The annexes in the Plan also contain all necessary forms and notices that would be required for such an event.

The Ministry of Health is represented both at the level of the National Emergency Animal Disease Committee as well as having inputs at the field level through its Public Health Inspectorate and the Veterinary Public Health Department.

With respect to Avian Influenza and the impending threat of an Influenza Pandemic, the Animal Emergency Preparedness Plan serves as an adjunct to National Disaster Preparedness and will work in synchrony with our Influenza Pandemic Preparedness Plan.

Since Avian Influenza has the ability to infect humans, with a high fatality rate, the presence of this disease in the Country would require special precautions for persons handling birds; wild, domestic, dead or alive.