Arab Republic of Egypt
Ministry Of Health And Population
Preventive Sector

Preparedness Plan For Pandemic Influenza

2018 - 2019

Influenza Pandemic Preparedness Plan

Ministry of Health and Population

Egypt

2018

Her Excellency Minister of Health and Population

Influenza is one of the most common and rapidly spreading infectious diseases worldwide. The annual incidence of seasonal influenza is 25-50 million, of which 3-5 million have severe respiratory symptoms and may cause death in high risk groups. The estimated number of deaths is 290-650 thousand per year worldwide.

Influenza viruses have the ability to mutate, particularly *Influenza* A virus, and to cause epidemics which sometimes reach the phase of the global pandemic, like that happened in 2009 A / H1N1 *influenza* virus, which is known as swine flu, Pandemic *influenza* virus 2009 had changed its features to become one of the seasonal *influenza* viruses in accordance with the published World Health Organization In August 2010.

Egypt is one of the early countries implementing the surveillance of *influenza*, where the disease had been included in the list of diseases that obligatory reported since February 1919. The Ministry of Health monitors acute respiratory diseases and particularly *influenza* disease through the National Surveillance System of *Influenza*, which includes a group of programs that are continuously supported and upgraded by MoHP.

Global *Influenza* Surveillance Centers have recorded the emergence of the A / H5N1 avian *influenza* virus and other virus species that spread in birds in many countries of the world in 2003, causing human infections in 16 countries and endemic in six countries including Egypt, where Egypt recorded its first human cases of the disease in March 2006.

In continuation of the concern of the Egyptian Ministry of Health to combat *influenza*, it was necessary to develop an updated preparedness plan for the pandemic *influenza*. This plan aims to raise awareness of health care workers. Training on all pillars of the plan will

be conducted at all levels to ensure rapid and effective response to the potential pandemic. I would like to offer my sincere thanks to all colleagues who participated in the preparation for their effective efforts and to ensure combating the pandemic of *influenza* in order to preserve the health of the Egyptian citizens.

Prof. Dr / Hala Zayed
The Minister of Health and Population

Under the supervision of:

The Preventive Sector - MoHP

Department of Epidemiology and Surveillance (DES) – Preventive Sector – prepared and reviewed the Influenza Pandemic Preparedness Plan with other relevant departments and in collaboration with WHO Representative Office in Egypt;

- **Central Administration for Preventive Affairs**
  - Communicable Disease Control Department
  - General Department of Quarantine
  - Infection Control Department
  - General Department of Fever Hospitals
- **Central Public Health Laboratories**
- **General Department of Chest Diseases**

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List of Abbreviations

AGMP	Airborne-generating medical procedure
ARDS	Acute respiratory distress syndrome
CDC	Center for Disease Control and Prevention
CMV	Controlled Mandatory Ventilation
CNS	Central nervous system
COPD	Chronic Obstructive Pulmonary Diseases
CPAP	Continuous Positive Airway Pressure
CPHL	Center Public Health Laboratory
DES	Department of Disease Epidemiology and Surveillance
ECDC	European Centre for Disease Prevention and Control
ETT	Endotracheal tube
GISRS	Global Influenza Surveillance and Response System
HAI	Hospital Acquired Infection
HCW	Health care worker
ICU	Intensive Care Unit
IHR	International Health Regulations
ILI	Influenza-like illness
IPC	Infection Prevention and Control
MoHP	Ministry of Health and Population
NAI	Neuraminidase inhibitors
NAMRU-3	U.S. Naval Medical Research Unit 3
NFP	National Focal Point
NIC	National Influenza Center
NORCB	National Organization of Research and Control of Biologicals
NPI	Non-pharmaceutical interventions
NSC	National Superior Committee
PCR	Polymerase Chain Reaction
PHC	Primary health care
PHEIC	Public Health Emergency of International Concern
PIP	Pandemic Influenza Preparedness
SARI	Severe Acute Respiratory Infection
SIMV	Synchronized Intermittent Mandatory Ventilation
SOPs	Standard Operating Procedures
TIPRA	Tool of Influenza Pandemic Risk Assessment
WHO	World Health Organization

Introduction and Objectives

Introduction

An influenza pandemic occurs when influenza A virus to which most humans have little or no existing immunity acquires the ability to cause sustained human-to-human transmission leading to community-wide outbreaks. Such a virus has the ability to spread rapidly worldwide, causing a pandemic.

During the 20th century, influenza pandemics caused millions of deaths resulting into social destabilization as well as major economic losses worldwide. The influenza A (H1N1) ***2009*** *pandemic* was the last pandemic in this century with an extremely mild impact. Yet, it is not possible to predict neither the timing nor the impact of future influenza pandemics. Advanced planning and preparedness for a prolonged and widespread health emergency of unpredictable impact is challenging but essential to mitigate such impact.
A preparedness plan for influenza pandemic provides a guide to prepare for and respond to an influenza pandemic. It aims at empowering all individuals, facilities, and institutions nationwide to handle the pandemic. Pandemic planning includes strengthening information and providing the necessary framework to properly carry out the relevant tasks and responsibilities in an organized manner.

Good preparation should lead to lower transmission rates of a pandemic virus; fewer cases, hospitalizations and deaths; and continuity of basic services while minimizing the social and economic consequences of the pandemic. Thus, it requires the collaborative and coordinated efforts of all partners in all sectors, authorities and concerned entities in the community (such as government representatives) and individuals from different backgrounds (such as policy-makers; legislators; practitioners of public health, curative health, and animal health; laboratory workers; and experts in communication and disaster management).

The first Egyptian Influenza Pandemic Plan was completed in 2007 by the Egyptian Ministry of Health and Population (MoHP). The 2009 Influenza **A** (H1N1) pandemic was a real test for Egypt's pandemic preparedness planning efforts. This document provides an updated plan reflecting new evidence and best practices. It is recommended that influenza pandemic plans be updated regularly to cope with the emergence of pandemic influenza strains and with any change in the Egyptian health system.

The goal of the Pandemic Influenza Preparedness Plan:

The overall goal is to reduce morbidity and mortality due to a pandemic influenza virus in Egypt through the optimum management of the Influenza pandemic.

The objectives of the Pandemic Influenza Preparedness Plan:

1. To identify different aspects to be considered on preparing the influenza preparedness plan.
2. To provide individuals, facilities, and institutions with a clear framework of the key components of the pandemic influenza preparedness plan to operate together to prepare for and respond to the pandemic.

Egypt's achievements in preparedness and response for pandemic influenza 2009

First: Crisis Management

• The establishment of the Supreme National Committee to follow up the pandemic epidemiological situation (including Ministry of Health, Ministry of agriculture, Ministry of Local Development, Ministry of Environment, Ministry of defenses, Ministry of foreign affairs, Ministry of General Information Authority, General Administration of Veterinary Affairs, Crisis Management Room at Council of Ministers, Ministry of Interior, Preventive and Endemic Affairs of Ministry of Health)

• The establishment of a crisis management committee - Ministry of Health, including all sectors concerned within the ministry (preventive sector, curative sector, health care and nursing sector, general authority for health insurance, general authority for hospitals and educational institutes, central administration of medical medicine, central administration of preventive affairs, The General Secretariat of Specialized Medical Centers - Central Administration of Pharmacy - General Directorate of Hospitals - General Department of Chest Diseases - General Department of Infectious Diseases - General Administration of Veterinary Affairs Mechanism - Epidemiology and Surveillance - The official spokesman of the Ministry of Health - a representative of the Supreme Council of Universities)

• Periodic meeting of the Crisis Management Committee to follow up the implementation of control measures and control of the disease

Second: Epidemiological and Laboratory Surveillance

• Epidemiological surveillance

- Gathering suspected and confirmed cases and deaths from hospitals and schools daily
- Establish databases for suspected and confirmed cases, daily and periodic reports, and update the epidemiological situation
- Activate influenza surveillance and pneumonia in all hospitals in all governorates on a daily basis to determine the epidemiological status of the activity of influenza and acute respiratory infection
- Follow-up of the global epidemiological situation and access to the recommendations

- of the World Health Organization in this regard, as well as the follow-up of genetic
- mutations at the global and regional levels on a regular basis.
- Updating, printing and distributing the definition of the case to all public and private health facilities

• Laboratory surveillance

- Collecting samples from all suspected cases for examination in regional laboratories in governorates and central laboratories at the Ministry of Health
- Follow up the results of the samples on a daily basis and coordinate with the governorates.
- Follow-up of genetic mutations at the global and regional levels on a regular basis
- Supporting central labs in the ministry and regional laboratories in the governorates with reagents and supplies to test for influenza viruses
- Training of laboratories workers at the level of the governorates on withdrawal, preservation and transfer of samples required
- Share samples with reference laboratories of the World Health Organization

Third: Treatment of cases and hospital management

• List intensive care units in hospitals (adult - children) and ventilators (adults - children)

• Identification of the referral system between hospitals and dissemination of this data to all health directorates and all hospitals

• Train all health care providers on case definition and protocol for the treatment of cases of acute respiratory infection

• Activation of central supervision and follow-up hospitals to measure performance of management of cases of acute respiratory symptoms in hospitals

• Assign specialists of chest diseases from university hospitals to follow up severe respiratory cases

• Provision of Tamiflu to treat cases

Fourth: Raising of heath awareness

- Raise capacity of the hot line team to respond to citizens' questions and deal with complaints about avian influenza and work 24/7
- Print and distribute posters about the disease and preventive measures and the advice to be followed to deal with patients in addition to broadcast television and radio

Fifth: Quarantine and entry points

- Distribute brochures to all quarantine workers, including case definition in quarantine units
- Follow-up of arrivals from abroad and refer suspected cases to fever hospitals for management in accordance to preventive and curative measures.

Considerations for Preparedness of Influenza Pandemic Planning

1. Understanding Pandemic Influenza

1.1 Epidemiological features of Influenza virus

- **Influenza virus characteristics:**

Influenza is a highly infectious viral illness caused by influenza virus. Influenza virus is a single-stranded, RNA virus of the Orthomyxovirus family. There are 3 antigen types A, B, and C.

Only influenza A and B viruses cause seasonal outbreaks in humans, and only influenza A viruses have been known to cause pandemics. Influenza A causes moderate to severe illness and affects all age groups. The virus infects humans and other animals. Influenza A virus can be found in numerous species such as humans, pigs, horses, water mammals and birds. Pigs are considered an intermediate host between birds and humans. The influenza B virus only infects humans while influenza C virus infects pigs and can infect humans.

Influenza B generally causes milder disease than type A and primarily affects children. Influenza B is more stable than influenza A, with less antigenic drift and con

sequent immunologic stability. It affects only humans. Influenza C is rarely reported as a cause of human illness, probably because most cases are subclinical. It has not been associated with epidemic disease.

Type A influenza has subtypes that are determined by the surface antigens hemagglutinin (H) and neuraminidase (N). Three types of hemagglutinin in humans (H1, H2, and H3) have a role in virus attachment to cells. Two types of neuraminidase (N1 and N2) have a role in virus penetration into cells.

Hemagglutinin and neuraminidase periodically change, apparently due to sequential evolution within immune or partially immune populations. These changes may take the form of antigenic drift or antigenic shift, the latter associated with pandemics.

Antigenic shift involves a major change in one or both surface antigens (H or N). Antigenic shifts are probably due to genetic recombination (an exchange of a gene segment) between influenza A viruses that affect humans and/or animals (avian or swine). An antigenic shift may result in a worldwide pandemic if the virus is efficiently transmitted from person to person.

Antigenic drift is a minor change in surface antigens that results from point mutations in a gene segment. The new variant of the virus is not recognized by the immunity system in the greater part of the population, thus a large number of the population are susceptible to the new strain. Antigenic drift may result in an epidemic.

It should be noted that the actual virulence, pathogenicity, shedding, incubation period and period of communicability of a specific strain cannot be determined until the pandemic has been declared and sufficient epidemiologic information has been obtained. Further characterization of the influenza pandemic strain will continue to be developed as the pandemic progresses and new information becomes available.

- **Source of infection and period of communicability:**

Infected sources with pandemic influenza strain are considered the main source of infection. The period of communicability starts as soon as influenza virus shedding takes place. Thus, infected individuals are infectious from the day before illness onset and can persist for 5 to 7 days. Transmission while asymptomatic is possible but it is more efficient when symptoms, such as coughing, are present and viral shedding is high (i.e. early in symptomatic period). Some persons may shed virus for longer periods, particularly young children and severely immunocompromised persons.

The amount of virus shed is greatest in the first 2-3 days of illness and appears to correlate with fever, with higher amounts of virus shed when temperatures are highest.

- **Mode of infection and disease transmission:**

Influenza viruses are transmitted from person to person through close contact. Although the relative contribution of each mode is uncertain, influenza virus can potentially be transmitted through:

- Droplet exposure of mucosal surfaces (e.g. nose, mouth, and eyes) by respiratory secretions from coughing or sneezing;
- Contact, usually of hands, with an infectious patient or fomite (a surface that is contaminated with secretions) followed by self-inoculation of virus onto mucosal surfaces such as those of the nose, mouth, and eyes; and
- Small particle aerosols in the vicinity of the infectious individual.

Transmission of influenza through the air over longer distances, such as from one patient room to another, is thought not to occur. All respiratory secretions and bodily fluids, including diarrheal stools, of influenza patients are considered to be potentially infectious.

- **Susceptibility and Host Factors:**

Susceptible hosts include all non-immune individuals. During an influenza pandemic caused by a novel influenza strain, the lack of immunity against the pandemic influenza viral strain may result in a greater number of susceptible hosts and thus potentially greater spread of disease.

- **Incubation Period:**

The incubation period for influenza is estimated to range from 1 to 4 days with an average of 2 days.

- **Clinical picture:**

Most confirmed influenza infections (up to 35%) are asymptomatic. Among symptomatizing cases, a wide clinical spectrum of disease ranging from non-febrile, mild upper respiratory tract illness, febrile influenza-like illness (ILI) to severe or even fatal complications, including rapidly progressive pneumonia has been described. The most commonly reported symptoms have included cough, fever, sore throat, muscle aches, malaise, and headache. Some patients have experienced gastrointestinal symptoms (nausea, vomiting, and/or diarrhoea). The symptoms of influenza, including 2009 H1N1 influenza, can include fever, cough, sore throat, runny or stuffy nose, body aches, headache, chills, fatigue, nausea, diarrhea, and vomiting. Depending on the case series, the proportion of persons who have laboratory confirmed 2009 H1N1 infection and do not have fever can range from about 10 to 50%.
The most common pulmonary complications are pneumonia due to the influenza virus and those due to a secondary bacterial infection. Other complications include myositis, myocarditis and encephalitis.

Approximately 10-30% of hospitalized patients in some countries have required admission to intensive care units (ICU). Critically ill patients include those who experienced rapidly progressive lower respiratory tract disease, respiratory failure, and acute respiratory distress syndrome (ARDS) with refractory hypoxemia. Other severe complications have included

secondary invasive bacterial infection, septic shock, renal failure, multiple organ dysfunction, myocarditis, encephalitis, and worsening of underlying chronic disease conditions such as asthma, chronic obstructive pulmonary disease (COPD), or congestive cardiac failure.

- **Laboratory diagnosis:**

Diagnosis can be made by collecting samples of the oropharyngeal and nasopharyngeal mucosa taken during the first four days of illness. This can be done using nasopharyngeal swab, throat swab, nasal and bronchial washings nasal aspirates and sputum. Samples can be processed for viral isolation, antigen detection, or nucleic acid amplification. The numerous diagnostic tests that can be used for the diagnosis of influenza are shown in table 1.

Table 1: Influenza Diagnostic Tests

Test	Virus Type	Specimen	Diagnosis Time
Virus culture	A & B	Nasopharyngeal and throat swab, nasal and bronchial washings, nasal aspirates and sputum	5-10 days
ELISA	A & B	Nasopharyngeal and throat specimen, nasal and bronchial washings	2 Hours
PCR	A & B	Nasopharyngeal and throat specimen, nasal and bronchial washings, nasal aspirates and sputum	< 12 Hours

1.2 Characteristics of influenza pandemic

Influenza pandemics or worldwide epidemics occur when influenza A virus to which most humans have little or no immunity acquires the ability to cause sustained human-to-human transmission leading to community-wide outbreaks. Such a virus has the potential to spread rapidly worldwide, causing a pandemic.

Influenza pandemics are unpredictable but recurring events.

It is not predicted when a pandemic will occur, where it will emerge, how it will spread (season, severity, speed of spread and waves of spread), what the characteristics of the pandemic virus (transmissibility, virulence and sensitivity to antivirals and to vaccines) will be, and what impact the pandemic will have on the population.

Since the 16th century, influenza pandemics have been described at intervals ranging between 10 and 50 years with varying severity and impact.

Characteristics of the past four pandemics are summarized in Table 2.

Table 2: Characteristics of the past four influenza pandemics

Pandemic year of emergence and common name	Area of origin	Influenza A virus subtype (type of animal genetic introduction/ recombination event)	Estimated case fatality	Estimated attributable excess mortality worldwide	Age groups most affected
1918 "Spanish flu"	Unclear	H1N1 (unknown)	2–3%	20–50 million	Young adults
1957–1958 "Asian flu"	Southern China	H2N2 (avian)	<0.2%	1–4 million	All age groups
1968–1969 "Hong Kong flu"	Southern China	H3N2 (avian)	<0.2%	1–4 million	All age groups
2009–2010 "influenza A(H1N1) 2009"	North America	H1N1 (swine)	0.02%	100000 – 400000	Children and young adults

In June 2009, WHO declared the first influenza pandemic of the 21st century after the emergence of the new influenza A (H1N1) virus subtype (Influenza A[H1N1]pdm09). In April 2009, the virus appeared and quickly spread across North America. By May 2009, the virus had spread to many areas of the world. Influenza morbidity caused by Influenza A[H1N1] pdm09 remained above seasonal baselines throughout spring and summer 2009 and was the cause of the first influenza pandemic since 1968. . WHO declared the end of the pandemic influenza in August 2010. Since then Influenza A[H1N1]pdm09 has been circulating in humans as seasonal influenza virus.

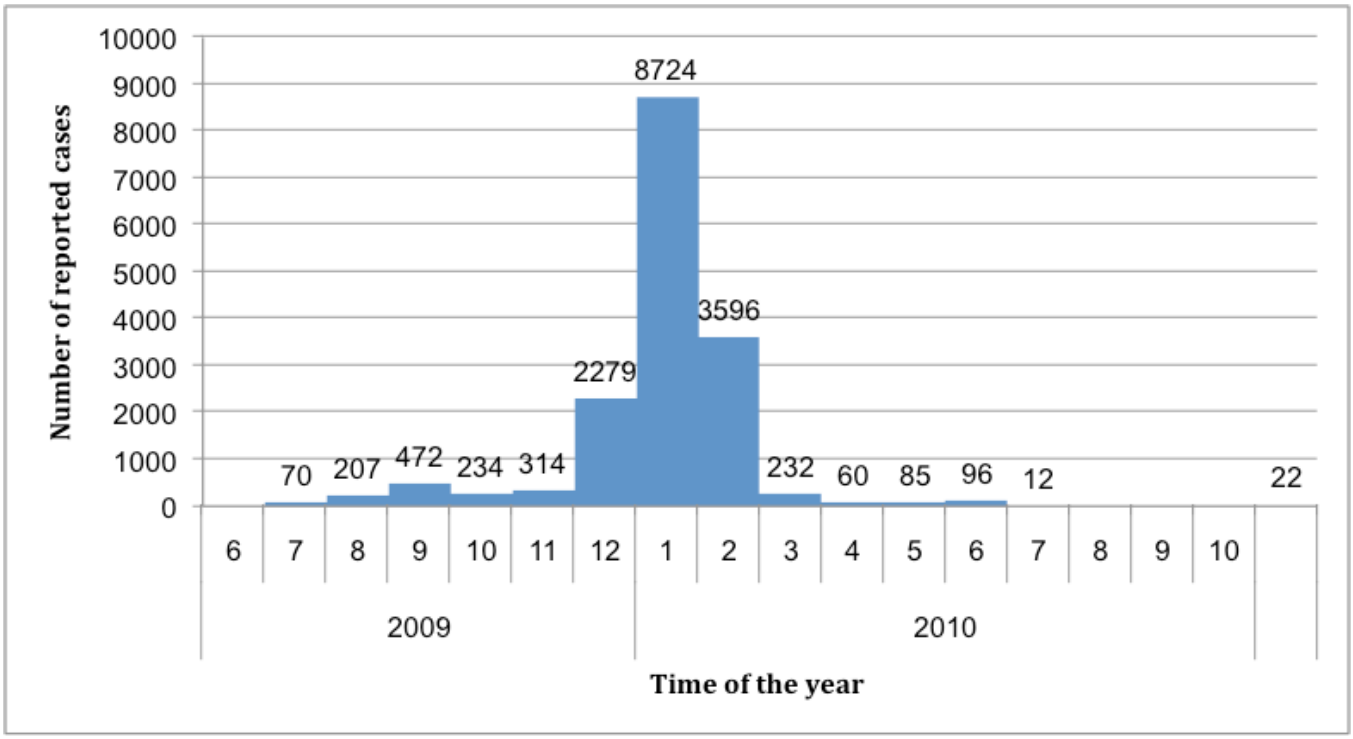
Every pandemic has its unique features, however there are some common characteristic of the pandemics:

- Pandemic influenza has a different pattern than seasonal influenza
- Can occur during any time of the year irrespective of the influenza season and has more than one wave
- During the pandemic the new pandemic virus replaces other circulating influenza strains. Afterwards, the pandemic strain becomes part of
- (and may dominate) the mix of seasonal influenza A viruses.
- Unlike seasonal influenza, pandemic influenza disease is characterized by higher

- morbidity and mortality among young adult and persons without underlying medical conditions.

1.3 Epidemiological features of the 2009 influenza pandemic in Egypt

Figure 1: Epidemic curve for H1N1 2009 Pandemic in Egypt



During the pandemic period, the majority of reported hospitalized cases were detected in Cairo (7717 cases, 47%), Giza (2493 cases, 15%) and Alexandria (1765 cases, 11%), while the remaining cases (4428 cases, 27%) were distributed all over the remaining 24 Egyptian governorates.

Age and sex distribution of the reported hospitalized laboratory confirmed cases and deaths are shown in table3.

Table 3: Age and sex distribution of the reported laboratory confirmed influenza cases during the 2009 influenza pandemic in Egypt

	Total cases		Cured cases		Deaths		
	N	%	N	%	N	%	Case Fatality (%)
Male	8735	53	8618	53	117	41	**1.3**
Female	7668	47	7503	47	165	59	2.2
Total	**16403**	**100**	**16121**	**100**	**282**	**100**	**1.7**
<5	1778	**11**	1763	11	15	5	**1**
5-<15	5705	35	5695	35	10	4	**0.2**
15-<35	5657	**34**	5533	34	**124**	44	2
35-<55	2472	**15**	2374	15	98	35	**4**
55-<65	560	**3**	538	3	22	8	**4**
>65	231	**1**	218	1	13	5	**6**
Total	**16403**	**100**	**16121**	**100**	**282**	**100**	**2**

The majority of reported deaths among the hospitalized patients due to pandemic influenza (124/282; 44%) were in the age group 15-35, however the age-specific case fatality rate for pandemic influenza patients was highest (6%) for the >65 age group.

2. Lessons learned from the 2009 influenza pandemic in Egypt

There were many important epidemiological observations from the 2009 Influenza pandemic to take into account in future planning and response to influenza pandemics. These include the speed with which cases and sporadic outbreaks appeared in Egypt. Although the symptoms were similar, age groups affected and risk conditions varied from seasonal influenza. Greater impact was seen in pregnant women and young children. The 2009 H1N1 pandemic in Egypt revealed the following:

- Having a clear pandemic preparedness and response plan is mandatory to manage the influenza pandemic. Thus, the existing plan that was created in 2007 need to be updated based on WHO recommendations and lessons learned from 2009 influenza pandemic.
- Existing strong surveillance system allowed to continue containment of the pandemic

- influenza spread for longer period than expected before the gradual shift into mitigation activities. However, the increased demand on the surveillance system during the pandemic necessitates the upgrade in the electronic peripheral surveillance system and the capacity of the epidemiologic analysis.
- Providing clear instant and timely communication of information to the public and to health care providers at all levels is mandatory to avoid fear and develop trust. Thus, it is mandatory to develop clear strategies to communicate risk and information.
- Shortage in the availability of stockpiles of antiviral. Thus, the Egyptian Government imported the antiviral medication in powder form with an extended shelf life to be manufactured whenever needed. In order to calculate the needed amount of the anti-viral drugs that need to be manufactured, estimates are done on worst pandemic scenario.
- Shortage in the availability of stockpiles of personal protective equipment (PPE) was one of the problems encountered during the 2009 H1N1 influenza pandemic. Thus, a PPE manufacturing industry was initiated in Egypt to meet the requirements of PPE during the 2009 H1N1 Influenza pandemic and thereafter.
- Despite the low number of available vaccine doses assigned for Egypt (5 million doses) during the 2009 H1N1 influenza pandemic, Egypt stopped the importation of vaccine after receiving 1,908,000 doses only, due to low demand of the Egyptian population on getting the vaccine. The total number of consumed vaccine doses was 1,377,810 and a total number of 530,190 doses remained unused, because people were afraid of the side effects of the vaccine. Thus, we need to have an effective marketing plan and adequate health education of the population about the vaccine safety to encourage target group to be vaccinated.
- Lack of coordination between public and private sectors during 2009 H1N1 influenza pandemic resulted in increased burden on the public sector. Thus, a ministerial decree was released mandating the adequate organization and collaboration between both sectors during the pandemic.

3. Ethical Framework

The ethical framework of the influenza pandemic preparedness plan is to help policy makers and planners take decisions in a fair, just and transparent way. During a pandemic, a number of issues are encountered where a balance between rights, interests and values has to be considered. Decisions have to be made according to legislations and laws, but within the context of the ethical framework.

Examples of important decisions include:

1) Limited resource allocations

2) Identification of priority groups for vaccination and antiviral medications

3) Public health measures that would limit individual freedom and create social distancing such as closure of schools, office building or other public places (i.e. non-pharmaceutical interventions [NPI])

4) Roles and obligations as well as legal protection of health care workers

5) Restricting or changing access to healthcare.

3.1 General Ethical Considerations

Ethical considerations taken into account in the development of health policy include:

- Identification of clear overall goals for pandemic planning.
- Commitment to transparency which should be based on individual and community respect.
- Engagement of the public to build public will and trust.
- Putting sound guidelines based on the best available scientific evidence.
- Balancing of individual liberty and community interests
- Having a fair process approach (Procedural Justice): there should be consistency in applying standards, decision makers should be neutral, treat others with respect and take adequately reasoned decisions based on accurate information.

3.2 Ethical Principles

The ethical principles of equity, utility/efficiency, liberty, reciprocity and solidarity are especially helpful in the context of influenza pandemic preparedness planning.

- **Equity:** Providing care in an equitable manner, recognizing special needs, cultural values and religious beliefs of different members of the community.
- **Utility/efficiency:** The principle of utility requires that one acts so as to maximize aggregate welfare. This implies an additional principle of efficiency, i.e. the idea that benefits should be obtained using the fewest resources necessary.
- **Individual liberty:** Ensuring that the rights of the individual are upheld as much as possible
- **Reciprocity:** Ensuring that when individuals are asked to take measures or perform duties for the benefit of society as a whole, their acts are appropriately recognized and legitimate need associated with these acts are met where posble.The principle of reciprocity is based on the concept of mutual exchange. Therefore, if people are asked to take increased risks, or face increased bur dens, during a pandemic, they should be supported in doing so, and the risks and burdens should be minimized as far as possible. Some people, in cluding health and social care staff, may face very heavy burdens in trying to help others through a pandemic; it is important to think about how to minimize those burdens.

4. Legal Framework

International laws as well as local Egyptian legislations will be relied upon during the preparedness and response phases of a pandemic.

4.1 International Requirements

- **International Health Regulations (IHR) 2005:**

The IHR (2005) provide a global legal framework to prevent, control or respond to Public Health Emergency of International Concern (PHEIC). PHEIC is defined in the IHR (2005) as "an extraordinary event which is determined to constitute a public health risk to other States through the international spread of disease and to potentially require a coordinated international response". The IHR (2005) Annex 2 includes "human influenza caused by a new subtype" among the specified diseases for which a case is necessarily considered "unusual or unexpected and may have serious public health impact", and thus shall be notified in all circumstances to WHO.

The aim of the IHR (2005) is to prevent the international spread of disease while limiting interference with international traffic and trade. The IHR is available at: *http://www.who.int/ihr/9789241596664/en/.*

The IHR (2005) established an effective and transparent process for WHO and its Member States (including Egypt) who are States Parties to the Regulations, to follow when determining and responding to a PHEIC. Thus, the IHR (2005) included the following obligations for its States Parties:

- develope core capacity for surveillance and response;
- establish a national focal point (NFP) as the contact point for WHO on all IHR matters; and Notify WHO of all potential PHEIC within specified time frames.

In order for Egypt to meet the IHR (2005) obligations, all levels of government must collaborate. In Egypt, Health Directorates use established protocols to report influenza infections of international concern to the Egyptian MoHP, which is Egypt's NFP. After an initial assessment if notification is required, MoHP communicates with the WHO. Reportable influenza-related events include cases of human influenza caused by a new subtype as well as cases having potential international public health implications that meet the notification criteria established under Annex 2 of the IHR (2005). WHO then re-assesses the event to determine whether the event constitutes an actual PHEIC.
The first PHEIC declared by the WHO under the IHR (2005) was the influenza A (H1N1) pandemic in 2009.

Declaration of a pandemic:

During the period of spread of human influenza caused by a new subtype, and appropriate to the situation, the WHO Director-General may make a declaration of a pandemic.
While the determination of a PHEIC and/or declaration of a pandemic may trigger certain regulatory actions by WHO and Member States, actions at national level should be based on national/local risk assessments and be commensurate with risk.

- **Pandemic Influenza Preparedness Framework**

The Pandemic Influenza Preparedness Framework (PIP Framework) for the sharing of influenza viruses and access to vaccines and other benefits was adopted by the World Health Assembly in 2011. The PIP Framework aims to improve the sharing of influenza viruses with pandemic potential and to achieve more predictable, efficient and equitable access for countries in need of life-saving vaccines and medicines during future pandemics. The PIP Framework is available at: http://www.who.int/influenza/ pip/en/.
Under the Framework, Member States, including Egypt, are responsible for:

- ensuring the timely sharing of influenza viruses with human pandemic potential with the Global Influenza Surveillance and Response System (GISRS);
- contributing to the pandemic influenza benefit-sharing system; and continuing to support the GISRS.

4.2 Local Legislations

Egypt has put in place legislation and communication mechanisms to ensure smooth responses under IHR 2005.

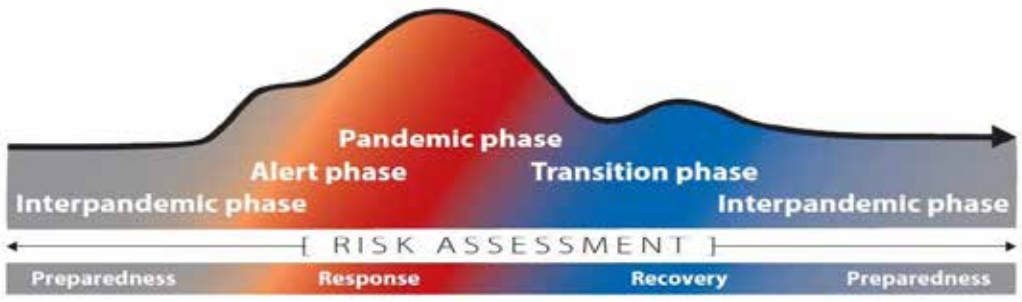
The Egyptian government has comprehensive emergency plans concerning the preparation for, response to and recovery from emergencies and disasters, including those with potential impact on critical infrastructure.

5.WHO Pandemic Phases

In 2013, WHO issued interim guidance on risk management of pandemic influenza. This guidance included new pandemic phases to describe the spread of a new influenza subtype. The pandemic influenza phases reflect WHO's risk assessment of the global situation regarding each influenza virus with pandemic potential that is infecting humans. The global phases – inter-pandemic, alert, pandemic and transition – describe the spread of the new influenza subtype, taking account of the disease it causes, around the world. As pandemic viruses emerge, countries and regions face different risks at different times. For that reason, countries are strongly advised to develop their own national risk assessments based on local circumstances, taking into consideration the information provided by the global assessments produced by WHO.

The risk-based approach to pandemic influenza phases is represented in **Figure 2** as a continuum, which also shows the phases in the context of preparedness, response and recovery, as part of an all-hazards approach to emergency risk management.

Figure 2: The continuum of pandemic phases[a]



[a] This continuum is according to a "global average" of cases, over time, based on continued risk assessment and consistent with the broader emergency risk management continuum.

The new phases are as follows:

- **Interpandemic phase:**

This is the period between influenza pandemics.

- **Alert phase:**

This is the phase when influenza caused by a new subtype has been identified in humans. Increased vigilance and careful risk assessment, at local, national and global levels, are characteristic of this phase. If the risk assessments indicate that the new virus is not developing into a pandemic strain, a de-escalation of activities towards those in the interpandemic phase may occur.

- **Pandemic phase:**

This is the period of global spread of human influenza caused by a new subtype. Movement between the interpandemic, alert and pandemic phases may occur quickly or gradually as indicated by the global risk assessment, principally based on virological, epidemiological and clinical data.

- **Transition phase:**

As the assessed global risk reduces, de-escalation of global actions may occur, and reduction in response activities or movement towards recovery actions by countries may be appropriate, according to their own risk assessments.

The global phases and their application in risk management are distinct from:

(1) the determination of a PHEIC under the IHR (2005) and

(2) the declaration of a pandemic.

These are based upon specific assessments and can be used for communication of the need for collective global action, or by regulatory bodies and/or for legal or contractual agreements, should they be based on a determination of a PHEIC or on a pandemic declaration.

Determination of a PHEIC:

The responsibility of determining a PHEIC lies with the WHO Director-General under Article 12 of the IHR (2005). The determination leads to the communication of temporary recommendations.

Declaration of a pandemic:

During the period of spread of human influenza caused by a new subtype, and appropriate to the situation, the WHO Director-General may make a declaration of a pandemic.
While the determination of a PHEIC and/or declaration of a pandemic may trigger certain regulatory actions by WHO and Member States, actions at national level should be based on national/local risk assessments. As pandemic viruses emerge, countries face different risks at different times and should therefore rely on their own risk assessments, informed by the global phases, to guide their actions. The uncoupling of national actions from global phases is necessary since the global risk assessment, by definition, will not represent the situation in each country, thus national risk assessment should be done on regular continuous basis to identify the pandemic phase of the country.

6. Actions taken during the different pandemic phases

Pandemic phase	Actions taken	Objectives
Inter-pandemic	**Preparedness** (to face future pandemic)	The aim is to establish arrangements and update capacities to improve responses to the next emergence of a novel influenza virus infecting humans: This is done by: - Monitoring and evaluation of the existing activities e.g. surveillance system, laboratory investigation, stockpiling… - Identification of weaknesses of the existing activities - Evaluation of the existing Pandemic Influenza Preparedness and Response plan - Thorough studying of the lessons learned during 2009 pandemic - Updating the existing Pandemic Influenza Preparedness and Response plan - Regular risk assessment
Alert	**Response** (to stop or limit the pandemic disease (spread in Egypt	- **If cases are detected outside Egypt:** Prevent the introduction of the disease into Egypt by doing strict travel and border-related measures. - **If sporadic cases or small clusters are detected in Egypt**: strict measures are taken to prevent the spread i.e. doing containment of disease spread. This is mainly achieved by contact tracing (Contact tracing is the process of identification of people who have possibly been infected after exposure to cases with infectious diseases for the purpose of containing the spread of the disease). Following contact tracing, phone surveillance or segregation may be necessary for persons (contacts) who are well and adequate management of cases who start to suffer from the infection.

Pandemic phase	Actions taken	Objectives
Pandemic	**Response** (to minimize the impact of the pandem-(ic in Egypt	- **If cases are detected outside Egypt:** Prevent the introduction of the disease into Egypt by doing strict travel and border-related measures. - **If sporadic cases or small clusters are detected in Egypt:** strict measures are taken to prevent the spread i.e. doing containment of disease spread. - **If the disease is spreading widely in Egypt:**When transmission is occurring quickly, the practicalities of implementing containment strategy may outweigh its potential benefits. Thus, shift the activities towards mitigation activities. This requires an overall activation of the influenza pandemic response plan.
Transition	**Recovery**	De-escalation of actions, and reduction in response activities to reach the regular baseline activities Review and revise situation monitoring and assessment tools for potential subsequent waves of disease (which might be larger and more severe than the first), the next pandemic and other public health emergencies. In addition, resume seasonal influenza surveillance programs incorporating the pandemic virus subtype as part of routine surveillance, while considering that this recovery might in fact be a short break before a second wave potentially larger and more severe than the first wave

Transfer from one phase and action to another is mainly dependent on a regular continuous risk assessment.

7. Risk assessment and triggers for different actions

Risk assessment is a systematic process for gathering, assessing and documenting information to assign a level of risk. Risk assessment aims to determine the likelihood and consequences of events that impact public health at global, national, subnational and local levels. It provides the basis for taking action to manage and reduce the negative consequences of risks to public health.

Use of risk assessment promotes an understanding of the risks and attendant uncertainties of pandemic influenza and their potential influence on sustained health and other development objectives. It also facilitates the communication of risks and uncertainties. Risk assessment allows the provision of evidence-based information for policy-makers.

- **Method of Influenza Pandemic Risk Assessment**

Risk assessment will rely on the "Tool of Influenza Pandemic Risk Assessment" (TIPRA), which was developed for conducting influenza A virus risk assessment at global and national level with the following objectives:

1) To give a timely and updatable risk assessment on novel influenza viruses that emerged in the human population;
2) To assist countries in influenza pandemic preparedness planning and prvide information needed for policy making;
3) To transparently document the features of the virus that might pose a threat to humans and facilitate information sharing; and To identify knowledge gaps and prompt investigations.

- **Elements considered in the TIPRA:**

Risk assessment includes three components- hazard, exposure, and context assessments. The outcome of these three assessments is used to characterize the overall level of risk. For purpose of this document, nine risk elements are identified to present the characteristic of the viruses and their impacts on the human population. These risk elements include:

A. Properties of the virus

1- Infections in animals
2- Geographic distribution (in animals)
3- Receptor binding
4- Genomic characteristics
5- Transmission in animal models
6- Susceptibility to antiviral drugs

B. Attributes of the human population

7- Human infection
8- Disease severity
9- Population immunity

- **Steps for conducting risk assessment:**

1. Assembling the risk assessment team

A group of experts with different experience and background should be assembled to

conduct the risk assessment. This group of expert included the following:

Category	Risk Elements	Expertise
Public Health	Human infections	Public Health Epidemiologists
	Disease severity	Public Health Epidemiologists
	Population immunity	Public Health Epidemiologists, Immunologists
	Antigenic relatedness to vaccine candidates	Public Health Epidemiologists, Immunologists
Animal Health	Global distribution in animals	Epidemiologists/Veterinarians
	Infections in animals	Epidemiologists/Ecologists/Virologists
		Veterinarians
Virology	Receptor binding	Virologists
	Transmission in laboratory animals	Virologists/Veterinarians
	Sensitivity to antiviral treatment	Virologists/Pharmacologists
	Genomic characteristics	Molecular Virologists/Phylogeny Scientists

2. Formulating risk Questions

i. Which virus will be assessed?

The assessment process will be implemented on one virus at a time for two components, likelihood and impact. Meanwhile we can still compare the final results of the likelihood and impact of more than one virus and present them in one chart for comparison

ii. Which risk question will assess the risk?

Four risk questions have been identified as the most critical ones, two for public health threats and two for an animal virus to cause more human infec tions. Each question is concerned with one component and should be indepen dently evaluated:

- To assess public health threats, two components, likelihood and impact of the infection on the public health, must be independently evaluated:
    1) What is the likelihood that a virus has the potential for sustained human-to-human transmission?
    2) What is the potential impact to the human population if this virus acquired sustained human-to-human transmissibility?
- To assess the risk of an animal virus to cause more human cases, another two risk

components shall be evaluated:

3) What is the likelihood of an animal virus to cause more human infection?

4) What is the potential impact on the human population if this animal virus caused more human infections?

3. Collecting information/ Performing literature search

Collect detailed information on the event, preferably from those responsible for investigating the event at local and national level.

Get all the available data "published data and shared unpublished data" for each risk element (including outbreak reports, surveillance data and disease fact sheets).

Where gaps in knowledge are identified and further information is required, seek advice from key experts to provide the supplementary information to the virus profile.

4. Undertaking risk assessment to characterize the overall level of risk

Once the risk assessment team has carried out the risk assessments, risk characterization is done by assigning the level of risk. This is done by a risk matrix (Appendix 1) where estimates of the likelihood are combined with estimates of the consequences.

The risk matrix also helps to assess and document changes in risk before and after control measures are implemented.

5. Risk communication and Control measures:

There is two-way communication between the risk management team and stakeholders.

The outcome of a risk assessment is communicated to the policy-makers to help in the informed decision-making process since it will guide them to direct proportionate control measures that reflect the risk.

6. Monitoring and evaluation

Risk assessment should be conducted along the continuum of pandemic phases. It should be repeated as new information becomes available. It may also be repeated on a regular timetable or as requested by stakeholders.

- **Triggers to initiate Alert/Pandemic Response action:**

Egypt's response to the novel/pandemic virus will relate to its presence and activity levels in this country based on the national risk assessment, while considering the WHO Global phases. Thus, triggers to initiate the response actions of the Alert or Pandemic phases include:

1. International triggers:

Declaration of global Influenza pandemic by WHO triggers the start of response actions of the alert or pandemic phase of the influenza pandemic in Egypt.

2. National triggers:

Examples of specific respiratory triggers include the following:

- Abrupt, unexpected changes in the trend of respiratory disease observed in routine surveillance systems
- Clusters of severe respiratory disease or pneumonia in families, work places, or social networks
- An unexpected pattern of respiratory disease or pneumonia such as an increase in apparent mortality, a shift in the age group associated with severe influenza, or a change in the pattern of clinical presentation of influenza-associated disease
- Persistent changes noted in treatment response or outcome of severe lower respiratory illness
- Severe, unexplained lower respiratory illness occurring in healthcare workers who care for patients with respiratory disease
- Unusually high levels of sales of pharmaceuticals used for respiratory disease treatment
- Respiratory disease in humans that is associated with illness in animals
- Human cases of infection with an unsubtypeable respiratory sample or any influenza virus not currently circulating in human populations

Risk assessment committee should be meeting regularly and assessing the situation in Egypt. Results are communicated to higher authorities (Crisis Management committee and National Pandemic Inter-ministerial Committee) for informed decisions about the pandemic disease condition in Egypt. Also, results communicated to WHO to inform about the updated situation on the national level.

- **Triggers to initiate Recovery Response action during the Transition Phase:**

Continuous risk assessment is conducted by the Risk assessment committee, thus the end of the pandemic phase will be detected as soon as decline in the number of cases is confirmed. Laboratory-confirmed novel influenza H1N1 cases are occurring sporadically approaching pre-pandemic levels. An influenza pandemic is declared ended when enough data shows that

the influenza virus, worldwide, is similar to a seasonal influenza virus in how it spreads and the severity of the illness it can cause. Thus, the committee announces the start of the transition phase and accordingly de-escalation of response activities will be conducted.

8. Pandemic Severity Index

Declaration of influenza pandemic in Egypt triggers the initiation of a number of response actions to manage the pandemic and minimize its effect on the Egyptian community. However, different response actions will depend on the severity of the pandemic. Thus, a Pandemic Severity Index (PSI) was created. The PSI is a proposed classification scale for reporting the severity of pandemic influenza. According to the PSI a set of appropriate actions are implemented at the level of the individual and the communities. The goal of the index is to provide guidance as to what measures various organizations can take that will slow down the progression of a pandemic and reduce the burden on the health system.

Identification of the PSI depends on a number of factors:

1. Increase in the number of pandemic influenza cases: the speed of spread of the pandemic influenza virus is a reflection of the pandemic severity.

2. Percentage of influenza patients suffering from severe influenza infection. Severe infection is considered if the patient's respiratory rate is >30/minute, and/or the patient has pneumonia.

3. Case fatality rate

According to these criteria, the PSI is categorized into:

1- Category 1 ➔ mild,

2- Category 2 ➔ moderate,

3- Category 3 ➔ alarming,

4- Category 4 ➔ severe.

Table 4 shows the characteristics of each category of the pandemic severity.

Table 4: Characteristics of the different categories of the PSI

	Pandemic Severity Index			
	Category 1	**Category 2**	**Category 3**	**Category 4**
Number of pandemic influenza patients	Limited increase in the number of cases	Number cases are doubled within a month	Number cases are doubled within 2 weeks	Number cases are doubled within one week
Percentage of patients with severe disease	<1%	1 - <5%	5 - 10%	>10%
Case fatality rate	<0.5%	0.5 - <1%	1 – 2%	>2%

The results of PSI assessments help national and local decision makers determine whether to implement certain mitigation actions, including those that can be very disruptive and might have a more serious economic and societal impact on individual persons and communities.

Plan Pillars

Command & control

Surveillance

- Influenza surveillance system in Egypt

Laboratory measures

Preventative measures

- Vaccination
- Infection prevention and control
- Travel and border-related measures
- Managing deaths

Therapeutic measures

- Protocol of case management
- Antiviruses drugs

Health care services

- Hospital plan
- Primary healthcare units plan
- Private sector plan

Non Pharmaceutical Interventions

- Communication and public education
- Social distancing
- Measures taken in closed communities
- Individual and household level intervention

Training and Evaluation

Research

Command and Control

Disaster Management and Command Control

- **Declaration of a pandemic**

During the period of spread of human influenza caused by a new subtype, and appropriate to the situation, the WHO Director-General may make a declaration of a pandemic at the global level.

At the national level, information on the declaration of phases by the WHO and on the corresponding levels of alert in the country will be given by the Health Minister.

The communication to the nation of the declaration of a pandemic on the part of the WHO will be given by the Prime Minister following advice from the Health Minister.

- **Command and control to cope with the emergency health crisis**

In Egypt, decision-making and rapid response during health emergencies such as pandemic influenza is primarily considered the responsibility of the MoHP. However, given the national framework for coordinating whole-of-government planning and response during a national crisis that has national significance and impact, a National Superior Committee is formed during emergency health crisis. It includes all ministries for coordinating the cross-government response in order to ensure the preparedness of all authorities and sectors to work under the supervision of the MoHP to respond to epidemics and emerging diseases. On declaration of an influenza pandemic, a Ministerial Committee for Crisis Management at the MoHP will coordinate between all sectors of the MoHP in order to raise the degree of preparedness and follow-up of the epidemiological situation and conduct all preventive and curative measures to control the spread of the pandemic. A National Pandemic Inter-Ministerial Committee is formed at the MoHP and will take the role of the Incident Command group which will coordinate between the different ministries to manage the pandemic (Figures 3-6).

- **Composition of National Superior Committee (NSC)**

The NSC chairmanship rotates annually on the ministers who are members of the committee:

- The Minister of Health
- The Minister of Local Development
- The Minister of Agriculture and Land Reclamation.

- The Minister of Environment
- The Governors
- Chief of State Information Service
- Chief of Crisis Management Room at the Cabinet of Ministers
- Chief of veterinary services at the Ministry of Defense
- A representative of the Ministry of the Interior (water surfaces police)
- A representative of the Ministry of Foreign Affairs
- Chief of the General Authority for Veterinary Services
- Representatives of Preventive and Endemic Affairs Sector

○ Roles and responsibilities of NSC:

- NSC will consolidate information and coordinate information exchange and advice to ministers
- Ensure preparedness of all authorities and sectors to work according to the prepared strategy under the supervision of the MoHP to respond to epidemics and emerging diseases
- Approval of the activation of response level needed to cope with emerging
- health crisis according to the current epidemiological situation
- Ensure the availability of health care needed for the cases
- Ensure the availability of all needs and resources and ensure their re-distribu tion according to priorities as well as the provision of required funding and allocation of an exceptional funding if necessary
- Ensure coordination between all ministries and sectors
- Ensure coordination with international organizations specially WHO, as well as coordination with ministries of health of neighboring countries
- Decision- making related to the request of international assistance if necessary
- Information management and communication with the media and social mobilization

○ Composition of Crisis Management Committee at the MoHP:

The Health Minister issues a ministerial decision to form the Crisis management committee and selects its chairperson.

Members of the committee include:

- First undersecretary of Preventive Affairs and Endemic Diseases Sector

- First undersecretary of Curative Care Sector
- First undersecretary of the Primary Health Care & Nursing Sector
- Chief of the General Authority for Health Insurance
- General Secretary of the General Authority for Educational Hospitals and Institutes
- Chief of the Central Directorate for Curative Medicine
- Chief of the Central Directorate for Preventive Affairs
- Chief of the Central Directorate for Emergency Critical Care
- Chief of the Central Directorate for Pharmacy
- Chief of the Central Directorate for General Secretariat
- General Director of the Department of Epidemiology and Surveillance
- General Director of the Communicable Diseases Department
- General Director of the Quarantine Department
- General Director of Hospitals
- General Director of the Fever Hospitals Department
- General Director of the Chest Diseases Department
- General Director of the Financial Affairs Department
- Official speaker for the MoHP
- Representative of the Supreme Council of Universities
- Chief of the Secretariat of Medical Specialty centers
- Chief of the Central Directorate for Endemic diseases

- **The roles and responsibilities of the Crisis Management Committee at the MoHP:**

- Constantly follow up of the epidemiological situation 24 hour/day
- Implement all preventive and curative measures to cope with the disease
- Ensure the preparedness of emergency teams 24 hour/day
- Ensure reception and follow up of all reports regarding diseases over the day through the hotline and Crisis Management Center
- Follow up of the application of specific disease management protocols
- Ensure the provision of medicines and medical supplies to cope with the disease
- Follow-up of the intensive care units supplies needed for the reception of cases
- The Committee meets regularly and continuously

Figure 3: Command and Control Scheme to cope with emergency health crisis

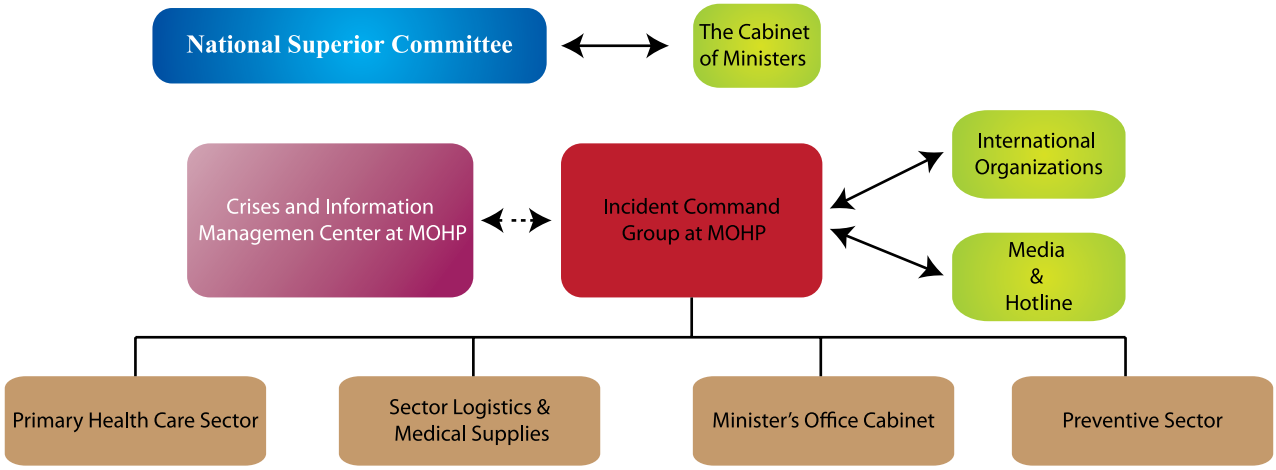


Figure 4: Flow of Pandemic Alert

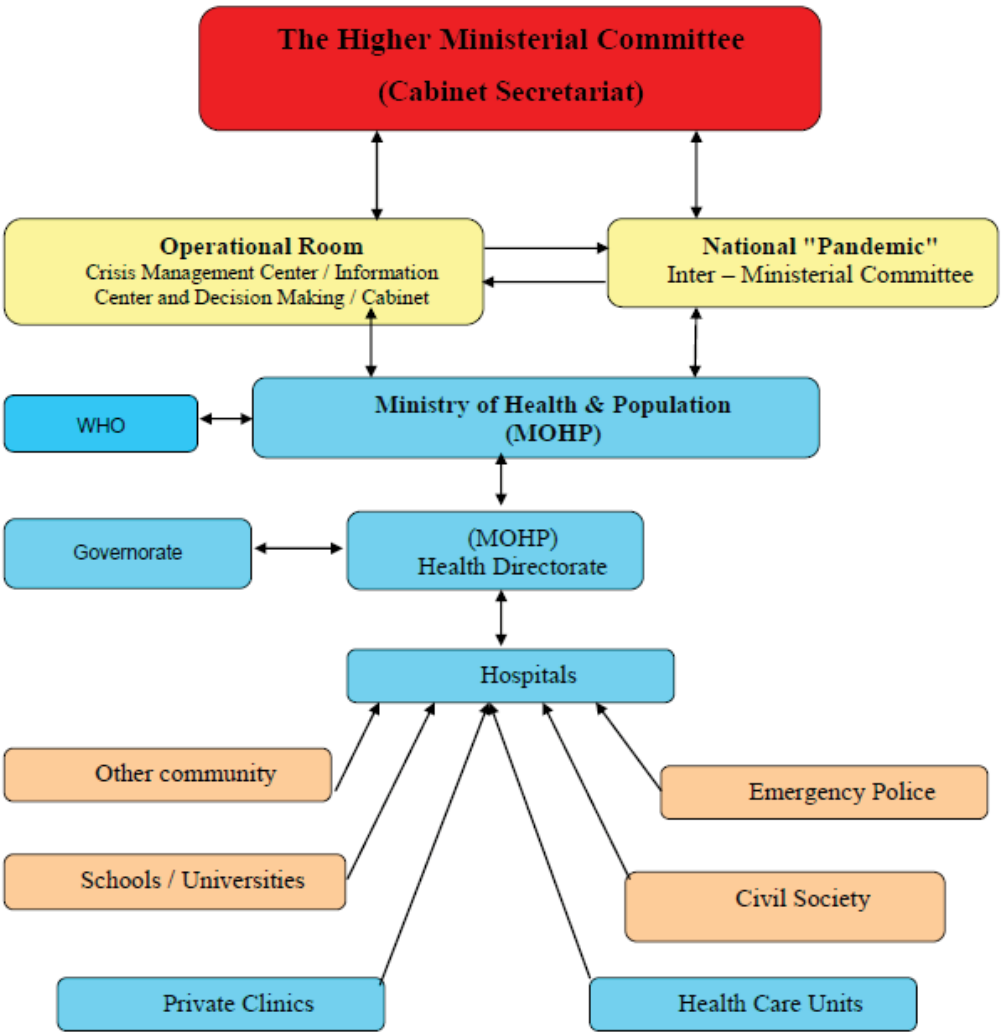


Figure 5: Notification Flow during Pandemic Phase

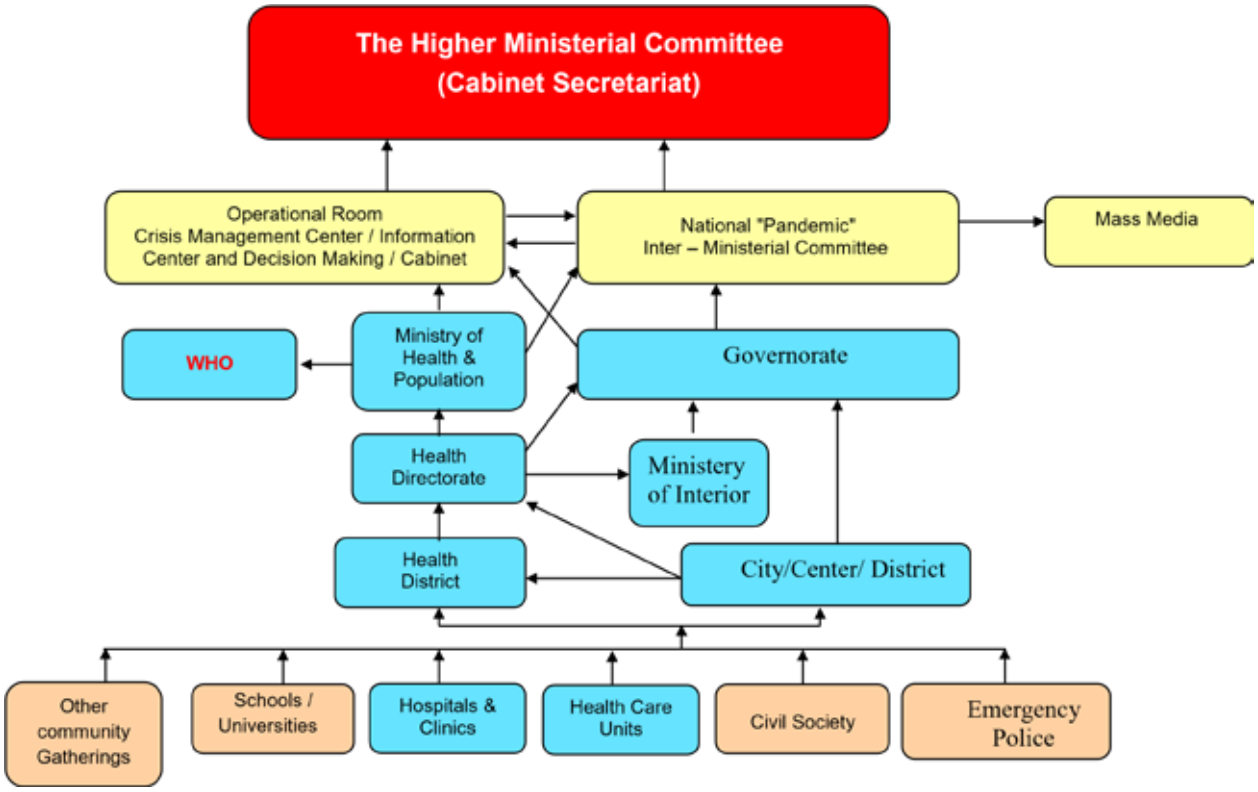
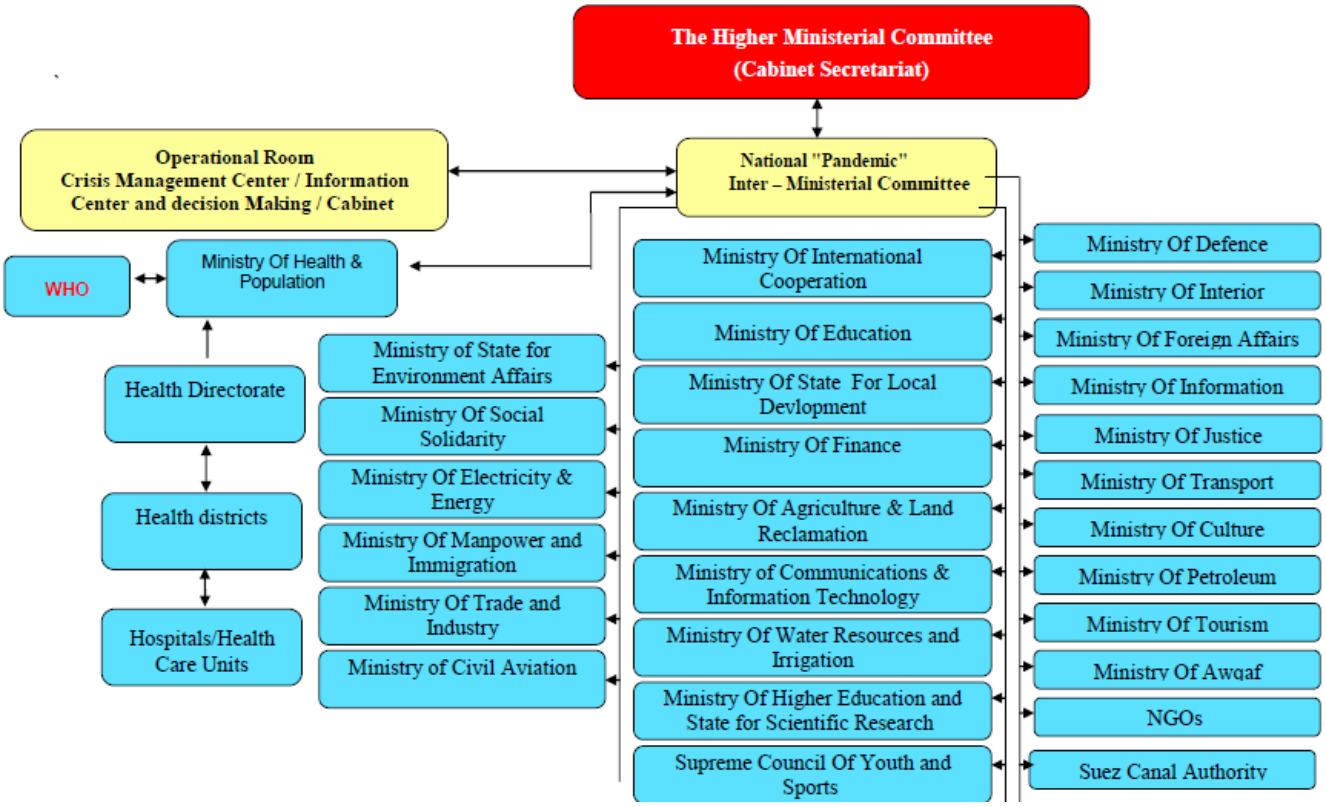


Figure 6: Pandemic Response Chain of Command (National level)



Whole-of-society approach

An influenza pandemic will test the resilience of nations, businesses, and communities, depending on their capacity to respond. No single agency or organization can prepare for a pandemic on its own. Inadequate or uncoordinated preparedness of interdependent public and private organizations will reduce the ability of the health sector to respond during a pandemic. A comprehensive approach to pandemic risk management is required.
The whole-of-society approach encompasses three major groups in society: governments, business and civil society – at the global, national, subnational, local and community levels.

Role of Government (whole-of-government approach)

In national pandemic influenza risk management, the government is the natural leader for overall pandemic coordination and communication efforts. All ministries should work with the MoHP within the national coordination system to ensure a consistent approach to preparedness and business continuity planning.

Role of MoHP

The MoHP is responsible for the preparation of the Influenza pandemic preparedness plan. The first Influenza pandemic plan was completed in 2007. The 2009 Influenza A (H1N1) pandemic was a real test for Egypt's pandemic preparedness planning efforts. It is recommended that influenza pandemic plans be updated regularly to cope with the emergence of pandemic influenza strains and with any change in the Egyptian health system.
All sectors of the MoHP are collaborating and play vital role in pandemic influenza planning.

- **Preventive Sector:**
  - Assistance for other sectors in establishing a preparedness plan for pandemic influenza.
  - Cooperation and coordination among the highest levels of Ministry leadership.
  - Leadership and coordination with Preventive Medicine Departments at the Health Directorate level.
  - Supervision of the Health Directorate's pandemic plan with other sectors.
  - Development and implementation of training on various preventive activities.

- Surveillance operation evaluation and monitoring.
- Establishment and management of Prevention Central Operations Room.
- Evaluation and support of health units with respect to manpower, medical equipments, essential medications and supplies.
- The set-up of a hotline at the central level and the provision of technically trained personnel.
- Guide preparation of and following-up infection control procedure implementation in health facilities.
- Laboratory services guide preparation, laboratory services plan establishment and provision of all equipment and reagents for laboratory diagnosis.
- Increasing laboratory capacity at all levels.
- Enhancement of communication with international reference laboratories
- Establishment of a quarantine procedure plan as part of the pandemic preparedness plan that applies mandates of the International Health Regulations in accordance with the procedures promulgated by WHO.
- Establishment of the necessary health measures at all international ports of entry into Egypt (air, sea, land)
- Cooperation with organizations in other countries through International Health Regulations
- Preparation of publications and booklets on the pandemic for travelers and people arriving at international ports of entry
- Provision of a strategic stockpile of antivirals and PPE in cooperation with the other involved sectors
- Cooperation and coordination with WHO

• Curative sector

- Assistance for other sectors in establishing a preparedness plan for pandemic influenza
- Cooperation and coordination among the highest levels of Ministry leadership
- Leadership and coordination with the Curative Departments at the Health Directorate level
- Supervision of the Health Directorate's pandemic plan with other Sectors Development and implementation of training activities
- Evaluation and support of hospitals with respect to manpower, medical equip-

ments, essential medications and supplies
- The establishment and management of the Centre for Crisis Management
- Assurance of complete equipment of hospital intensive care units.
- Preparation of clinical care guidelines for influenza patients
- Fulfillment of field hospital requirements in additional non-traditional sites providing health services to cope with the surge of cases seeking medical care during the pandemic phase
- Equipment of ambulance cars and training of ambulance health teams
- Establishment of emergency service policies and procedures
- Provision of ambulance services to patients (transfer and first aid)

- **Health Insurance sector**
  - Monitoring absenteeism and health status in schools, groups of workers and persons that hold health insurance. During periods of
  - higher than usual absenteeism rates, submission of daily reports to the Central Prevention Emergency Room
  - Cooperation with the highest levels of Ministry leadership
  - Leadership and coordination with the health insurance branches
  - Supervision of the Health Insurance Authority branches in their planning for a pandemic
  - Development and implementation of training activities
  - Evaluation and support of health insurance hospitals and clinics with respect to manpower, medical equipment, essential medications and supplies
  - Fulfillment of needs for equipment in intensive care units in health insurance hospitals.
  - Application of guidelines for case management and follow-up

- **Pharmaceutical Sector:**
  - Preparation of regulations and systems necessary to decrease the need for imported medicines and medical supplies, but also to assure their provision “before and during the pandemic”
  - Leadership and coordination with the Departments of Pharmacy at the Health Directorate levels.
  - Supplying all levels in Egypt with all necessary medications and medical equipment

- Monitoring use of medications used for influenza-like illness in hospitals and sales from pharmacies
- Provision of strategic stocks of medications and supplies to maintain continuity in health service
- Provision of strategic stocks of the available seasonal influenza vaccines to maintain continuity in health services
- Supervision of storage of raw materials for the drug Oseltamivir
- Supervision of manufacture of the drug Oseltamivir
- Supervision of storage and distribution of the two drugs, Oseltamivir and Amantadine
- Supervise and follow up the storage of medicines, vaccines, and set up the regulating policies and procedures

• Headquarters' Affairs Sector

- Establishment of a dedicated web site for influenza pandemic planning and the provision of electronic epidemiological updates in collaboration with the other sectors.
- Establishment of an information network to link all affiliated hospitals to the ministry, directorates and districts
- Provision of technical and financial support for training activities and all pandemic planning activities required by other sectors
- Regulation of procedures for calling up retirees and organizing volunteers to share in the provision of health services during the pandemic
- Assistance in and completing the purchase of medications and medical equipment needed for pandemic preparedness
- Organization of contact with media in collaboration with the Prevention Sector. This is achieved by Participation with involved parties in preparation of daily press statement Holding press conferences Issuing information bulletins Preparation and production of informational materials "Posters, leaflets, manuals" Preparation of programs and television and radio spots Coordination with the Ministry of Foreign Affairs to provide information on the pandemic through contact with the Egyptian embassies and consulates abroad
- Contact with international organizations to assist in pandemic preparedness

- **Health Directorate Level:**
  - Pandemic preparedness plan at Health Directorate level.
  - Cooperation and coordination between Health Directorate and the various bodies within the governorate *(e.g. university hospitals, security forces, electric utilities, drinking water and sanitation utilities, irrigation facilities, communication, lo cal media, environmental organizations, educational organizations, cultural organizations, non-governmental organizations)*
  - Supervision of task and responsibility implementations at all levels *(i.e. directorates, districts, and health care facilities)*
  - Ensuring the implementation of procedures for social distance and transmission reduction *(e.g., workplace, cinema, theatre, sports venue, school and university closure and/or restrictions)*
  - Preparation and equipping mobile field hospitals and non-traditional sites providing health services to cope with the surge of cases seeking medical care during the pandemic.
  - Collecting and analyzing all data about the pandemic.
  - Establishment of an Emergency and Operations Room at the Directorate level.
  - Leadership and coordination in providing services.
  - Monitoring hospitals and the system for case referral.
  - Preparation and implementation of training activities.
  - Evaluation and follow-up of surveillance activities.
  - Evaluation and support of health facilities with respect to manpower, medical equipments, essential medications, supplies, detergents and disinfectants.
  - The set-up of a hotline at the Governorate level and the provision of trained technical personnel.
  - Preparation of infection control guidelines and monitoring infection control procedure implementation in health facilities.
  - Supplies and reagent provision for laboratory diagnosis.
  - Implementation of laboratory guidelines.
  - Quarantine procedure application at ports and International Health Regulation application in accordance with WHO.
  - Implementation of health measures at ports of entry (air, sea, land).
  - Distribution of publications and booklets with information about the influenza pandemic to travelers coming through the quarantine units.

- Distribution of Oseltamivir, Amantadine and protective clothing in accordance with the instructions.
- Assure the presence of necessary ICU equipment in hospitals.
- Application of case management guidelines.
- Equipment of ambulance cars and training ambulance teams.
- Implementation of necessary policies and procedures to provide help services.
- Provision of emergency services to patients (transfer, first aid).
- Monitoring and providing all drug supplies and medical equipment at all Governorate levels.
- Control provision and sales of medications used in ILI in Governorate hospitals and pharmacies.
- Provision of strategic stocks of medications and supplies to maintain continuity of health services.
- Supervision of storage and distribution of Oseltamivir and Amantadine.
- Supervision and monitoring of medication and vaccine supplies and implementing their distribution plans.
- Supervision of safe waste disposal procedures.

• Health Insurance branches in the Governorates

- Monitoring absenteeism rates and the health status of student and workers groups covered by the health insurance.
- During periods of higher than usual absenteeism rates, submission of daily reports to Health Affairs Emergency Room and the General Authority for Health Insurance.
- Cooperation and coordination with the Health Directorate.
- Implementation of training activities.
- Evaluation and support of health insurance hospitals and clinics with respect to manpower, medical equipments, essential medications, supplies, detergents and disinfectants.
- Monitor the presence of essential equipment in insurance hospital intensive care units.
- Application of guidelines for case management .
- Supervision of safe waste disposal procedures.

Role of other Ministries

During the 2009 pandemic, MoHP contacted other ministries through the Higher Ministerial Committee to put clear plan with their integrated roles and responsibilities during the pandemic. Accordingly each ministry has to establish its own executive plan for pandemic preparedness. This section covers the agreed upon functions and roles of the different ministries in supporting and implementing the influenza pandemic preparedness plan in the healthcare field.

- **Ministry of Interior:**

  - Support and provision of security services for health facilities.
  - Securing the main and auxiliary warehouses for medications and medical equipment.
  - Ensuring implementation of the special quarantine procedures.
  - Regulation of conversion procedures of public venues to health services facilities i.e. development of non-traditional sites providing health services to cope with the surge of cases seeking medical care during the pandemic.
  - Implementation of the social distancing procedures.
  - Secure transport and distribution of medications, vaccines and PPE at all levels (i.e. Central, Governorates, districts and health care facilities).
  - Securing mass burial procedures if needed.
  - Meeting the needs of the MoHP with regard to crisis management.

- **Ministry of Education**

  - Take the necessary steps in order to increase awareness of human pandemic influenza and ways of preventing it among workers, teachers and students.
  - Preparation of a list of each Governorate's schools, their condition and size; this will be used when a pandemic occurs to determine which should be converted to health care facilities i.e. non-traditional sites providing health services to cope with the surge of cases seeking medical care during the pandemic..
  - When absenteeism of students and teachers exceeds the normal rate; monitoring and reporting the numbers.
  - School closure when necessary.
  - Providing and coordinating volunteers when needed.

- **Ministry of Agriculture**

  - Continuing to take appropriate action to control avian influenza (i.e., surveillance, bird vaccination, disposal of dead birds)
  - Constantly exchanging information with the MoHP.
  - Raising awareness about avian influenza among the public.

- **Ministry of Transport**

  - Preparation of a plan to provide the manpower needed in case of high worker absenteeism in one of the transportation sectors (e.g. trains, underground, buses)
  - Assistance in the provision of health team transportation when needed.
  - Coordination in supplying ambulance centers with drivers if an ambulance drivers shortage occurs.

- **Ministry of Social Solidarity**

  - Provision of strategic stocks of basic foodstuffs for hospitals and healthcare facilities.
  - Coordination with non-governmental organizations to provide volunteers, assistance subsidies and special equipment to hospitals and health education to citizens.
  - Coordination with the Red Crescent to provide medical services, subsidies and field hospitals.

- **Ministry of Communications and Information Technology**

  - Provision of telephone equipment for central and Governorate level hotlines (50 central lines and 300 lines for Governorates).
  - Ensuring continuously operating phones in all health care facilities, Health Districts, Health Directorates, Ambulance Directorates and emergency facilities.

- **Ministry of Housing, Utilities and Urban Development**

  Ensure continuous clean water access for healthcare facilities, health districts, health directorates, and ambulance and emergency facilities.

- **Ministry of Electricity and Energy**

Ensure continuous access to electricity for all healthcare facilities, health districts, health directorates, and ambulance and emergency facilities.

- **Ministry of Information**

- Preparation of an integrated media plan (i.e., health programs, television and radio spots, leaflets, posters).
- Implementation of the MoHP media plan to raise the public awareness.
- Participation in Nile information centers in Governorates' awareness programs and in rumor mitigation.

- **Ministry of Culture**

- Preparation of special leaflets and posters for the public awareness.
- Enacting social distance programs such as; closing museums, theatres, cinemas

- **Ministry of Foreign Affairs**

- Provision of information on the pandemic through contact with Egyptian embassies and consulates abroad.
- Working with international organizations to assist in pandemic planning and control.

- **Ministry of Investment and International Cooperation**

Work with international organizations to assist in confronting the pandemic planning and control.

- **Ministry of Petroleum**

Provision of fuel and petroleum products necessary for the operation of all healthcare facilities, health districts, health directorates, and ambulance facilities.

- **Ministry of Finance**

Being a member of the Crisis Management Committee, Ministry of Finance will provide the necessary financial resources to implement the pandemic preparedness plan according to pre-set budget released during health threats and emergencies.

- **Ministry of Local Development**

Establishing a detailed executive plan at the Governorates level of the pandemic preparedness plan.

- **Ministry of Environmental Affairs:**

Establishing Plan for Eradication and safe disposal of hospitals hazardous wastes

Role of Business

Businesses should work closely with the government and civil society to sustain essential infrastructure and mitigate impacts of pandemic influenza on health, the economy and the functioning of society.

On one hand; businesses have an obligation to protect their employees during any health emergency e.g. by the provision of accurate and timely communication messages developed by the national communication plan, provision of PPE when necessary, and referral to a health care facility whenever needed. On the other hand; it is essential to develop business continuity plans for high and possibly fluctuating levels of workers' absenteeism throughout the pandemic. Business continuity plans should include the following actions:

- Identify the critical functions that need to be sustained such as electricity and transportation.
- Identify the personnel, supplies and equipment vital to maintain critical functions.
- Consider how to deal with staff absenteeism to minimize its impact on critical functions.
- Provide clear command structures, delegations of authority and orders of succession.
- Assess the need to stockpile strategic reserves of supplies, material and equipment.
- Identify units, departments or services that could be downsized or closed.
- Assign and train alternative staff for critical posts.
- Establish guidelines for priority of access to essential services.
- Train staff in workplace infection prevention and control and communicate essential safety messages.
- Consider and test ways of reducing social mixing (e.g. telecommuting or working from home and reducing the number of physical meetings and travel).
- Consider the need for family and childcare support for essential workers.
- Consider the need for psychosocial support services to help workers to remain effective.
- Consider and plan for the recovery phase.

Role of Civil Society

- Civil society and community-based organizations have a key role in providing some community-based services to meet the needs of vulnerable populations. It is therefore critical that these organizations have plans how to maintain or expand their essential services during a preparedness and response actions of the pandemic.
- They may be involved in the decision making about the criteria to be used in allocating scarce resources e.g. vaccines, antiviral drugs, hospital beds; so that decisions are made in an open, transparent and inclusive manner. An open, trusted process will strengthen solidarity and enhance the whole-of-society approach to pandemic management.
- Community-based non-governmental organizations may participate in activities that promote health such as health education and social mobilization. For example, they may contribute to the planning and implementation of public education campaigns. They may also have appropriately trained and accredited community health workers and trained volunteers who are especially important when there is shortage in the work force participating in the preparedness and response actions during the pandemic phases.

Surveillance

Introduction:

Surveillance is one of the main tools used to control influenza as it provides baseline information about incidence and severity of seasonal influenza during the inter-pandemic period, which may lead to early detection of a pandemic. Identifying new virus strains circulating in animals during this period may be important to make early identification of possible pandemic or panzootic strains. Analyzing the efficiency of control procedures helps ensure the optimum use of resources.

The influenza surveillance during the influenza inter-pandemic and pandemic phases will contribute to:

- Ongoing risk assessment for pandemic influenza,
- Rapid detection of the novel pandemic influenza virus as soon as it arrives in Egypt,
- Description of the epidemiologic characteristics of the pandemic influenza infection e.g. geographic distribution, patient characteristic,
- Identification and monitoring of the severity of the pandemic e.g. complicated disease conditions, hospitalizations, deaths,
- Description of virological characteristics e.g. genetic structure and antiviral sensitivity.
- Implementation and discontinuation of the non-pharmaceutical interventions (refer to point number 3.10)
- Identification of areas in need of special studies and further research

Influenza surveillance system in Egypt (Figure 7)

- Egypt has multiple activities for influenza within their surveillance system. The Department of Disease Epidemiology and Surveillance (DES) under the Preventive Sector, MoHP is coordinating all influenza-related activities.

DES performs the following influenza surveillance activities:

- **Indicator based surveillance:**

The nationwide hospital-based surveillance for pandemic influenza:

General influenza surveillance takes place in all government hospitals (450 General, fever , chest hospitals and Teaching hospitals) and more than 5,000 outpatient clinics

- **The sentinel surveillance system for ILI and severe acute respiratory infections (SARI):**

There are 13 sentinel influenza surveillance sites (3 for both ILI and SARI, 5 for ILI

only and 5 for SARI only) in selected fever and chest hospitals:

- Fever hospitals: Alexandria, Damietta, Mahalla, Abbaseia, Imbaba, Zagazig, Menia, Aswan and Helwan.
- Chest hospitals: Damietta, Shebin Elkom and Abbaseia
- Sentinel surveillance for ILI was established in 1999 in eight outpatient clinics of selected fever and chest hospitals. Sentinel surveillance for SARI began in 2009 and occurs in eight inpatient wards of selected hospitals.

o The nationwide hospital-based surveillance for avian influenza started in early 2006.

o The MoHP has upgraded its national surveillance guidelines for, and case definitions of priority communicable diseases including influenza.

o The MoHP is updating, printing and distributing the reporting forms to all surveillance sites (Appendix 2).

o A web-based electronic reporting system, National Egyptian Disease Surveillance System (NEDSS-online) is operational in 27 governorates, 270 health districts and all fever and chest hospitals.

o Extensive training of surveillance teams at all levels on different surveillance protocols and guidelines to improve capacity of early detection, immediate reporting, rapid response to sporadic cases and disease outbreaks, surveillance data management and analysis.

o Influenza data from hospitals throughout 27 governorate surveillance units is collated and then submitted electronically to the DES, MoHP.

o A weekly report is generated from surveillance data for pneumonia and avian influenza, and from sentinel SARI and ILI surveillance data to be distributed to designated persons within the MoHP and to regional epidemiologists.

- **Laboratory surveillance:**

  Laboratory surveillance is an integral part to monitor influenza activity. Definite diagnosis of influenza virus infection can only be achieved by lab testing, because influenza disease manifestations are caused by other respiratory pathogen. According to surveillance guidelines and protocols, samples collected from suspected influenza cases (according to case definition) are sent to designated labs (details mentioned in “Laboratory investigation” section). Suspected Influenza cases are considered laboratory confirmed cases if the tested sample is positive by polymerase chain reaction (PCR) or if the virus is isolated from nasopharyngeal swabs.

- **School Surveillance:**

  If more than 10% of students in a school in one governorate are absent as a result of ILI in one week, the public health officials are notified. In this situation, clinical samples should be collected from at least two suspected cases and sent to the Central Public Health Laboratory (CPHL) for influenza testing.

- **Work place surveillance:**

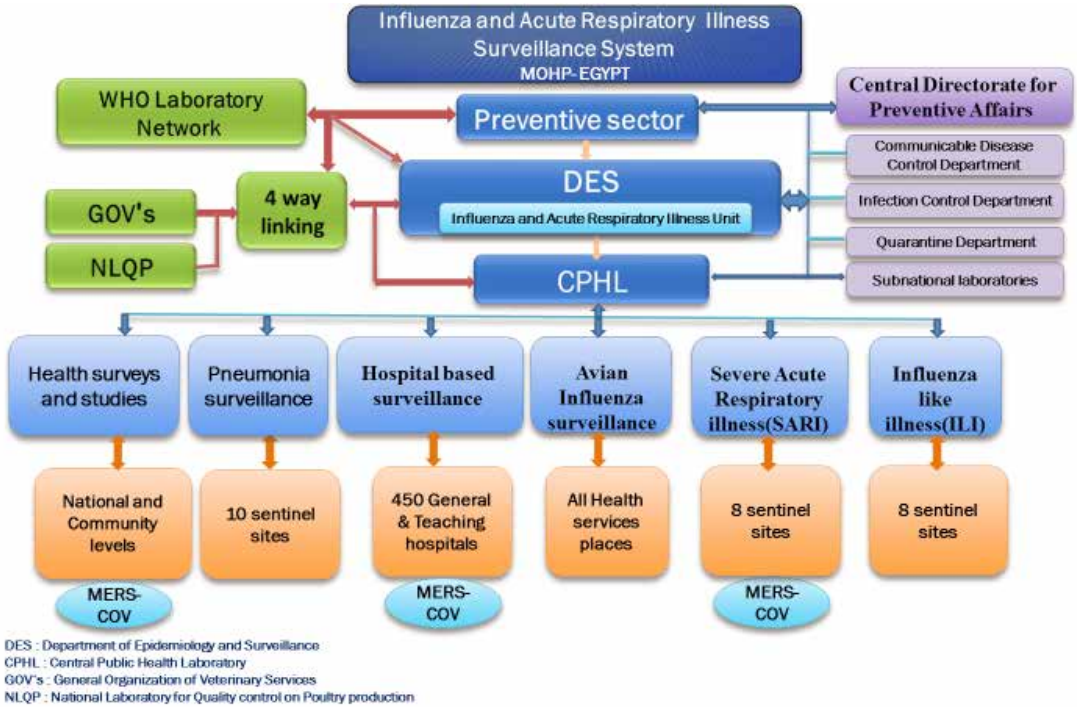
  If more than 10% of workers in a work place in one governorate are absent as a result of ILI, the public health officials are notified. In this situation, clinical samples should be collected from at least two suspected cases and sent to the Central Public Health Laboratory (CPHL) for influenza testing.

- **Surveillance of closed communities**

  e.g. prisons, students' dormitories, nursing homes for elderly or disabled, long-term care facilities or any other closed settings.

  DES-MoHP performs continuous follow up of infectious disease situations in the region and globally, via WHO, Center for Disease Control and Prevention (CDC), European Center for Disease Control and Prevention (ECDC) and various sources, to identify external health risks and threats.

Figure 7: Influenza surveillance system in Egypt



Data generated from the different influenza surveillance activities on as-needed basis in relation to identified events with pandemic potential are regularly reported by the DES to Health Minister, who in turn will report to the National Pandemic Inter-Ministerial Committee and the Higher Ministerial Committee (Figures 4, 5, 6). This will aid in the:

- Policy adjustment: prompt dynamic adjustments of policies and tactics are essential to prevent additional burden caused by the pandemic on the health system by lowering the disease morbidity and mortality. The 2009 pandemic experience revealed that these adjustments should be applied on all managerial levels which needed to be forwarded from higher to lower level and to the public urgently by many approaches (direct communication, reports, training, meeting, circulars and media)
- Modelling of pandemic wave and consequently inform the evolution of response to the pandemic
- Escalation and de-escalation of response according to different triggers

- **Event Based Surveillance (EBS):**

- It is the systematic and rapid access to information about events that pose potential public health risks. This information can be rumors or other reports transmitted through official channels (routine reporting systems) or
  informal channels (media, health workers and NGO reports)
- This information includes events related to human illness such as pandemic influenza related clusters or symptoms or unusual patterns of disease, unexpected death as defined by health workers as well as events resulting from human exposure such as exposure to disease-related events and deaths in animals, food products Contaminated water, contaminated water and environmental hazards.
- Unlike indicator-based surveillance, event-based surveillance does not rely on routine data collection but relies on information on events affecting public health regardless of the source of this information, particularly information and data outside the health sector.
- Information received through event-based surveillance should be assessed rapidly, especially those that pose a serious risk to public health. This information is subject to the screening and assessment of the reported / discovered events followed by the verification process, which is an essential step, that includes verifying the validity of the signal, its credibility, its compatibility with the reality and its characteristics, by requesting additional information by contacting the relevant health authorities or the

original source of the event.

Preparedness Activities of the DES during the inter-pandemic period:

- Regular surveillance activities are performed.
- Continuous monitoring and evaluation of existing influenza surveillance activities.
- Putting guidelines for the enhanced surveillance activities to be implemented during pandemic Influenza.
- Planning for and conducting extensive training of surveillance teams from all levels (central, governorate and district) on routine surveillance activities, infection prevention and control guidelines, and on the preparedness guidelines outlined in Egypt's national preparedness pandemic plan.
- Collaboration with teams from virology laboratories in the MoHP and Veterinary Sector to perform regular risk assessment at the national level.
- Co-ordination through the 4-way linking framework activities (collaborative activities between Public health epidemiology and laboratory with the corresponding partners in the Veterinary side) in collaboration with WHO, Food and Agriculture Organization (FAO).
- Planning for doing rapid laboratory testing methods for diagnosis in the field (if possible) to reduce burden on the CPHL and minimize the risks of transporting and handling specimens during the pandemic.
- **School surveillance**: Egyptian standards of practice (SOPs) for school surveillance of pandemic influenza cases are ready to be distributed to and activated in all schools in Egypt during an influenza pandemic, to aid them to deal with influenza cases appearing at the school and to have clear guidelines about indications of school closures in case of pandemics.

Response Activities of the DES during the alert and pandemic influenza phases:

During these phases, the aim of the surveillance is to assess the impact of the pandemic and describe its characteristics to direct control measures and evaluate efficiency. Therefore, it is important that epidemiological as well as laboratory surveillance be both maintained at their maximum capacities.

1- Response activities when pandemic is declared in other countries:

When cases of influenza due to a pandemic strain are identified in other countries, Egypt's response activities will be initiated. The main aim of the response activities is to prevent

the introduction of the pandemic influenza into Egypt and to contain the spread from any sporadic cases or small outbreaks. Thus, influenza surveillance activities will be enhanced and strengthened, and all surveillance data regarding the spread and severity of the pandemic will be provided to public health officials.

In this case, the DES will perform the following activities:

- Call for an urgent meeting for the members of the National Pandemic Inter-Ministerial Committee who will assess the surveillance data and send their findings to the appropriate authorities.
- Update surveillance protocols according to the characteristics of the novel/pandemic influenza virus.
- Provide cascade training to healthcare facilities and provide updated information to physicians and other healthcare providers on the epidemiology and surveillance of
- pandemic, including case definition, changes in transmission pattern and changes in disease severity, and current WHO recommendations regarding case management.
- Running regular surveillance activities with close monitoring and supervision to ensure strict application of surveillance guideline e.g. identification of suspected cases, regular adequate and timely reporting of cases, safe sampling procedures, safe and efficient transport and processing of clinical specimens, case management guidelines.
- Implement available rapid laboratory testing methods for diagnosis in the field (if possible) to reduce burden on the CPHL and minimize the risks of transporting and handling specimens during the pandemic.
- Provide information to the public regarding the influenza pandemic.
- Surveillance at international entry points: Follow up of the arrivals (Egyptians and non-Egyptians) from countries that announced the influenza pandemic (see details in the travel and border-related measures).
- Influenza disease containment: Tracing and meticulous investigations for contacts of sporadic cases is carried out to contain disease spread as much as possible.
- Monitor problems that may develop in performing disease surveillance
- Vaccinate surveillance staff whenever the vaccine is available (Follow recommendations to specific groups according WHO guidelines at this time)
- Regularly report confirmed cases to WHO
- School and work surveillance: to identify influenza cases and monitor school and work absenteeism.
- Surveillance of closed communities e.g. prisons, students dormitories, nursing homes for elderly or disabled, long-term care facilities or any other closed settings.

2- Response activities of the DES when pandemic is declared in Egypt

The main objective of the enhanced surveillance activities when the pandemic starts in Egypt is to obtain a comprehensive and timely epidemiological picture of the pandemic in order to provide decision-makers with the timely information they need for an effective response proportional to the situation. The surveillance will monitor parameters such as:

- The geographic spread of the virus across Egypt,
- The trend of disease occurrence as it rises and falls across the country to draw the epidemic curve,
- The intensity and impact of the pandemic by monitoring: clinical cases, hospitalization, complications and associated risk groups, deaths and associated risk groups, demand on the health system,
- Changes in the antigenicity and antiviral sensitivity of the virus, Effect of vaccination (when the vaccine becomes available).

In addition to the routine surveillance activities, the following activities will be strengthened and enhanced:

- Health care workers' surveillance: which is routinely conducted by the infection control teams in different hospitals
- Hospital acquired infection (HAI) surveillance for pandemic influenza: which is routinely conducted by the infection control teams in different hospitals
- Schools and universities surveillance system: conducted routinely by School Health Insurance, which in turn reports to District Surveillance Units.
- Surveillance in institutes, organizations, work places and any other closed communities such as prisons, students' dormitories, nursing homes for elderly and disabled, long-term care facilities and businesses: through the established Event-based surveillance units.
- Surveillance at international entry points: conducted by the Quarantine Department

Surveillance data analysis during pandemic:

Descriptive and analytical analysis with the following objectives:

- Identification of the Properties of the virus
  - Infections in animals or known host if present
  - Geographic distribution (spread)
  - Genomic characteristics
  - Susceptibility to antiviral drugs

- Identification of attributes of the human population
  - **Human infection:**
    - Characteristics of cases: by age (compared to the unified age grouping used in last pandemic in CDC, and WHO), gender, comorbidities, treatment, influenza vaccinations)
    - Risk factors for complications and deaths
    - Special consideration regarding cases among medical and paramedical personnel.
  - **Disease severity and Influenza burden estimates:**
    - Complications specially respiratory complications
    - Outcome (cured or death), case fatality (total, specific by age, comorbidities, gender)
    - Comorbidities
    - Admission to ICUs
    - Respiratory support (Oxygen mask and mechanical ventilations)
  - Population immunity: e.g. by vaccination coverage
  - Contacts e.g. number of cases caused by community transmission
  - Data analysis of schools, universities cases and any other closed communities.

Analysis of the surveillance data is used for monitoring the public health impact of the influenza pandemic:

- Monitoring hospitalizations and deaths:

  Appendix 2 shows the four forms that will be completed for each Health Directorate, Health Districts, and/or Hospital on a daily basis to monitor the hospitalized influenza patients and the outcome of infection.
- Monitoring of sickness absence and societal disruptions:

  Sickness absence is routinely monitored in schools during inter-pandemic periods and during pandemics, but it is monitored only during pandemics in different work places and closed communities.

Laboratory Services

Introduction:

The MoHP's Central Public Health Laboratory (CPHL) serves as the National Influenza Center (NIC). NICs are national institutions designated by national Ministries of Health and recognized by WHO. They form the backbone of the WHO's Global Influenza Surveillance and Response System (GISRS). There are 114 WHO NICs in 85 countries. These NICs implement global programs to survey influenza in cooperation with WHO. In addition, there are four reference laboratories in Atlanta, United States; Tokyo, Japan, London, United Kingdom, and Melbourne, Australia. These labs are Network hubs that monitor world-wide influenza activity and are important in the early identification of new influenza virus strains. Sharing information through GISRS and strengthening capacity within the laboratory system during the inter-pandemic period will support a timely and effective pandemic response. The CPHL provides laboratory support to the DES for surveillance activities related to human influenza in Egypt, in addition to 8 subnational laboratories that can do molecular testing for influenza virus.

1- Laboratory activities during the inter-pandemic period (Preparedness actions):

- **Laboratory surveillance:**

Laboratory surveillance is an integral part to monitor influenza activity to detect laboratory confirmed cases of Influenza. CPHL has the capacity to detect and subtype seasonal, H5N1, and the A[H1N1]pdm09 influenza viruses using both molecular and culture-based techniques. Isolated influenza viruses are sent twice a year for analysis at the U.S. CDC, one of WHO reference labs, to be genetically classified and placed among the viruses considered for use in a seasonal influenza vaccine. If a new Influenza virus subtype is identified, immediate reporting to WHO is done and a specimen of the virus is sent to one of the WHO reference laboratories.

- Adequate training of all CPHL workers and capacity building of the CPHL to ensure that the lab can accept, test and report the increased number of samples during the pandemic in a timely manner.
- CPHL routinely provides training to laboratory staff members and offers technical support to subnational laboratories.
- Regular monitoring and evaluation of all laboratory activities starting from sample collection in the health clinics until the release of lab testing results.

- Ensure high-quality specimen collection and safe transport from sites of sample collection to the CPHL by adequate training and availability of related manuals with recommendations and best practices for specimen collection detailed instructions.
- Ensure the availability of enough stockpiles of supplies needed for sample collection, transfer and testing.

2- Laboratory activities during the Alert and Pandemic phases (Response action):

Rapid laboratory identification of a novel influenza virus and timely tracking of virus activity throughout the duration of the pandemic are critical to the success of a pandemic response.

- **When the pandemic is declared outside Egypt:**
  - CPHL has to maximize its influenza laboratory surveillance activities to identify the first cases of novel/pandemic influenza strains in Egypt
  - Update laboratory protocols for virus detection, identification, shipping and sharing with WHO Collaborating Centers for Influenza as the diagnostics for the novel/pandemic strain become available.
  - Collect specimens for testing and virological characterization of the novel/pandemic virus using protocols and procedures developed in collaboration with WHO.
  - Adequate training on sample collection, handling, transfer to CPHL and testing procedures for the novel/pandemic strain should be done.
  - Identify the first cases of novel/pandemic influenza strains in Egypt.
  - Communicate the results to relevant decision makers and to WHO.
- **When Pandemic starts in Egypt:**
  - Support Epidemiological surveillance efforts to track the spread and trend and impact of the pandemic, e.g. shift laboratory testing priorities from testing all suspected specimens to testing samples from any newly affected area to monitor disease spread.
  - Facilitate clinical treatment by distinguishing patients infected with the pandemic influenza virus from those with other respiratory diseases until the pandemic strain proves to be the predominant virus in the community.
  - Maintain adequate virological surveillance to detect antigenic and genetic changes of the pandemic strain.

- Maintain adequate virological surveillance to detect antiviral susceptibility and pathogenicity of the pandemic strain.
- Assess the vaccine effectiveness.
- Ensure the minimum standards of Quality Assurance

3- During the Transition phase of the pandemic (Recovery actions):

Return to regular baseline activities, and incorporating the pandemic virus subtype as part of routine laboratory surveillance.

Appendix 3: shows guidelines for sampling techniques and transfer

Appendix 4: shows the submission form for clinical specimens delivered to CPHL for in fluenza virus testing.

Preventive Measures

Vaccination

Pandemic influenza vaccination, if available, is the most important and effective preventive measure to prevent the spread of pandemic influenza infection. In fact, production of the pandemic vaccine takes 4 to 6 months after the emergence of the new pandemic strain of influenza virus, which makes other Influenza preventive measures more important at initial pandemic stages. Presence of an effective vaccine will significantly decrease morbidity, mortality and societal disruption due to the spread of influenza pandemic. Thus, a Pandemic Vaccine Program has to be in place with following objectives:

- To make effective safe vaccine available.
- To administer the vaccine as rapidly as possible to all Egyptians at risk of the pandemic influenza infection. Risk of influenza infection is high since there is no prior exposure to the newly emerged pandemic strain of influenza virus.
- To monitor safety and effectiveness of the vaccine

During the inter-pandemic phase, available influenza vaccines are as follows:

- Type of the available vaccines:

  Vaccine is made annually in accordance with surveillance data collected from the WHO NICs and reference laboratories. There are three types of vaccines:

  - Inactivated vaccine
  - Live-attenuated vaccine
  - Recombinant vaccine
- The most commonly used vaccine is the trivalent inactivated vaccine: it protects against two influenza A viruses (H1N1 and H3N2) and an influenza B virus. The vaccine composition differs according to the circulating virus strain
- The trivalent inactivated vaccine is used in Egypt because it is the vaccine registered in Egypt, it has the TGA licensure. The type of vaccine may be changed to the quadrivalent vaccine according to the availability and effectiveness.
- Vaccines transportation and storage: The vaccines are transported and stored in cold chain equipments at a temperature ranging between 2-8°C.
- Routes of administration:
  - Intramuscular Flu shots.
  - Intradermal Flu shots.

- Contraindication of flu shots:
  - Infants below 6 months.
  - People who have sensitivity against egg.
  - People who have severe sensitivity against the vaccine or any of its ingredients.
  - People who suffer from fever, the vaccination will be postponed till recovery.
  - People who suffer from Guillian Barre syndrome should consult their physician
- Effectiveness of influenza vaccine:
  - The effectiveness of the influenza vaccine depends on the match between the strains of virus that are being transmitted during the influenza season and those strains from which the vaccine is prepared. Health status and age of the vaccine recipient also play an important role in determining vaccine effectiveness. Studies have shown that if there is a good match, vaccine effectiveness ranges from 70 - 90% for healthy adults < 65 years old. The vaccine is more effective in healthy persons aged 2 – 65 years old, whereas the vaccine is less effective in children below 2 years old and immune-deficient persons above 65 years old.
  - Maintaining the cold-chain during vaccine transferring, distribution and storage is essential to maintain the effectiveness of the vaccine.
- Side effects of the flu shots:
  - Soreness, redness, or swelling at injection site
  - Fever (low grade)
  - Body Aches

Vaccination activities during inter-pandemic period (Preparedness actions):

- Identification/enlisting of vaccine manufacturers.
- It is essential to increase seasonal influenza vaccine (which includes influenza A[H1N1]pdm09) coverage levels among high risk groups such as:
  - HCW
  - Pilgrims and Umrah seekers
  - Patients with pre-existing chronic disease(s)
- Put plan for target priority groups to receive the pandemic influenza vaccine once it is available during influenza pandemic:
  It takes four to six months to develop and produce pandemic vaccine, so it is not likely to be available by the time the pandemic reaches Egypt. For this reason,

other preventive measures such as infection control measures and contact precautions is more important at initial stages.

The vaccine will become available in batches, so the entire population cannot be immunized simultaneously. There would be a need to prioritize specific groups of people to receive the vaccine before others. Priority lists for immunization at the time of the pandemic will be selected according to ethical and legal considerations.

Priority groups include:

- First: HCW (doctors and nurses at fever and chest hospitals, Intensive care units and neonatal units in general and central hospitals, as well as any hospital staff in contact with patients with acute respiratory infections).
- Second: Pilgrims and Umrah seekers.
- Third: Country leaders and officials.
- Fourth: Personnel at different essential governmental sectors; police, army, transportation workers, people working for essential services, media personnel.
- Fifth: Population at risk of developing complications:
    - Children with severe respiratory illness.
    - Children with vascular diseases.
    - Children and adults who are more susceptible to infection:
        - Elderly > 65 years old.
        - Infants and pregnant women.
- Sixth: People who are susceptible to infection:
    - Close contacts to patients.
    - Personnel and students at different nurseries, schools and universities
    - Workers who deal with the public (Banks, Post offices, Grand stores …)
    - Workers at crowded places.

Vaccination activities during the Alert phase (response action):

1- Identification of the vaccine against the pandemic virus strain during this season.

2- Communicating with the Immunization Advisory Committee, the Cabinet and the Ministry of Finance to arrange funding for vaccine purchasing.

3- Determining the purchase channels. The vaccine purchase is achieved through a restricted practice by inviting registered companies in Egypt and selecting the vaccine according to the availability, specifications and price.

4- The vaccine should be registered and approved by the pharmacy sector and the National Organization for Research and Control of Biologicals (NORCB), but in case of emergency, there is a rapid track registration system.

5- Ensuring the availability of suitable stockrooms and the required cold-chain for transferring, storage and distributing the vaccines.

6- Ensuring the availability of adequate stockpiles of supplies and equipment needed for vaccination campaigns e.g. safety boxes for syringe disposal, gloves, ...

7- Preparing vaccines distribution plan:

- Vaccine distribution to different health directorates, hospitals, health districts (according to needs of each directorate / hospital / district).
- Determination of vaccine administrators: these are qualified nurses who work in the field of vaccination or well-trained nurses working at the health insurance sector. The number of vaccine administrators is calculated according to the target number of vaccine recipients.
- Training program for vaccine administration teams about methods of vaccine administration, target groups for the vaccine, safe injection practices, contraindications of the vaccine and vaccine cold-chain.
- Training program for central supervisors for following up the proper implementation of the vaccination process.
- Training program for hotline staff of the preventive emergency room on the frequently asked questions and their answers (what is the vaccine, contraindications, route of administration, target groups, side effects).
- Marketing plan to raise awareness about the importance of the vaccine: preparation of health messages to be ready for distribution through television/ radio/ newspaper/ internet, preparation of posters/ leaflets and flyers to be ready for printing and distribution as soon as the vaccine is available.

Vaccination activities during the pandemic phase (Response actions):

1- Provision of vaccine stockpiles: Based on available data about the virus causing the pandemic (disease severity – morbidity and mortality rates – transmissibility – spread speed), the needed stockpile would be as follows:

Plan A: If the vaccine supply is provided according to the country's needs:

About 15 million doses of the vaccine will be needed to cover the following target groups:

150,000 doses	HCW
150,000 doses	Pilgrims and Umrah seekers
50,000 doses	State leaders
650,000 doses	Workers in some sectors: workers in Armed Forces and Police, transportation workers, utilities and public services workers (e.g., telecommunications, electricity, water), mass media personnel
4 million doses	Individuals at risk of severe complications
10 million doses	Individuals at risk of infection

Plan B: If the vaccine supply is limited:

About 2 million doses of the vaccine will be needed to cover the following target groups:

150,000 doses	HCW
150,000 doses	Pilgrims and Umrah seekers
50,000 doses	State leaders
1,650,000 doses	Other target groups (priority will be for old ages with chronic illnesses and people working at crowded places).

2- Communication with the General Directorate of Pharmacy to get vaccine samples to send them to the NORCB to test the samples, then the General Directorate of Pharmacy take the decision of licensing the vaccines. It is not enough for the vaccine to be approved by FDA, EMEA or TGA in Egypt, it should be approved by the NORCB.

3- Determination of the means of vaccine transportation, stockrooms, syringes and vaccine administration supplies depending on the number of purchased doses.

4- Continue training activities for vaccine administrators, central supervisors and hotline staff.

5- Vaccine marketing to raise health awareness about the importance of the vaccination campaign by:
   - Videotapes for TV broadcasting; the following items to be included (what is the vaccine, route of administration, vaccination centers, contraindications)
   - Printing posters, leaflets and flyers to be distributed.
   - Training of physicians on target groups.
   - Publishing health education messages on the website of the MoHP *www.MoHP.gov.eg* about the crucial role of vaccination and the clarification of circulating rumors. These messages would be distributed on social networks to reach most of the population.

6- Vaccine distribution to different health directorates, each health directorate distribute the vaccines to different health administrations and hospitals (according to needs of each health facility.

7- Communication and coordination with the ministries of education and higher education to facilitate the campaign activities.

8- Initiating the vaccination campaign (defining vaccination sites – preparation of maps – selecting vaccination teams – preparation of teams' requirements - setting a timetable – monitoring and evaluation of the campaign activities - observation of the vaccine cold chain – observing weaknesses and limitations to improve the campaign).

9- Monitoring the vaccine and reporting of possible side effects:
   Some side effects only appear after vaccination of a diverse group of the population with various age groups and health status. Side effects are reported immediately.
   The communicable diseases control department is responsible for observation of the side effects through the side effects report system in collaboration with other sectors of the MoHP and through receiving complaints through either the preventive emergency room, the hotline of the MoHP or its website. In addition, observation and correction of circulating rumors and assuring people to encourage them to be vaccinated.

10- Collection of lists of vaccinated individuals on weekly basis in each governorate, stock reviewing and analysis to determine the additional needs.

Vaccination activities during the transition phase (recovery action):

1- Identification of the reported vaccination side effects with calculation of its rate of occurrence among total number of vaccinated people, analyzing the available data and doing a descriptive study.

2- Quality and stability monitoring:
The NORCB is responsible for vaccine quality monitoring and post-marketing surveillance.

3- Calculation of the total vaccinated people:
Calculation of total vaccinated people and the proportion of vaccinated people from each target group.

4- Calculation of the number of unused vaccination doses. These will be used for pilgrims or unvaccinated HCW.

5- Performance evaluation:
Vaccine administration teams are evaluated regularly and at the end of the campaign to improve performance.

6- Final assessment of the vaccine cold-chain.

7- Identification of the weaknesses and recommendations to improve response actions in future emergencies or pandemics.

Tasks and responsibilities of the different sectors as regards the provision and availability of the pandemic influenza vaccine:

	Sectors	Roles
1	Cabinet of Ministries	• Facilitate approvals to obtain the vaccine. • Facilitate financial resources to obtain the vaccine
2	The Higher Advisory Committee on Immunization	• Take the decision of purchasing the pandemic vaccine. • Agree on funding resources. • Make recommendations about vaccine licensing and speedy analysis of samples of the vaccine to be licensed.
3	The Crisis Committee	• Coordination between the various MoHP sectors and between the various stakeholders. • Discuss the implementation of the national plan to confront the pandemic and face the challenges and implement the recommendations.

	Sectors	Roles
4	Communicable Diseases Prevention and Control Department	• Coordination to assess risk at the local level and communication with the WHO to monitor the global situation of the pandemic. • Identify the vaccine that targets the virus strain causing the pandemic. • Calculation of the necessary vaccine doses according to the needs identified by each governorate within the framework of the target groups for vaccination. • Identification of the administrative channels to get the vaccine. • Weekly collection of data from the governorates to identify the number of vaccinated individuals and to assess the needs for additional doses. • Monitor the side effects of vaccine • Having an emergency room responsible for: - Responding to queries from citizens about the vaccine safety, side effects, availability, contraindications, and places to obtain the vaccine. - Monitoring the complaints of citizens, members of the health team, vaccinators and hospitals concerning the side effects of vaccination and related conditions.
5	General Directorate of Pharmacy	• Issuance of approvals to import the vaccine • Sampling of the vaccine and sending the samples to the NORCB to ensure that the imported vaccine is meeting the specified standards. • Release the imported vaccine from the customs
6	NORCB	• Analysis of samples from the vaccine to ensure that the vaccine is meeting the specified standards. • Evaluation of the quality and effectiveness of the vaccine. • Surveillance of the vaccine side effect by coordinating with the Communicable Diseases Prevention and Control Department
7	Health Directorates	• Receiving the vaccine doses from central stores in a timely manner to be transported safely to the stores of the Health Directorate. • Distribution of the vaccine to various health departments and hospitals of the governorates according to population density and distribution of the target groups for vaccination. • Supervision of the various vaccination teams in the different health departments and hospitals. • Weekly data collection from health departments to identify the total number of vaccinated individuals in various departments and hospitals. Data are sent to the Vaccination committee at the Communicable Diseases Prevention and Control Department

	Sectors	Roles
8	Health administrations	• Receiving the vaccine from the Directorate stores. • Distribution of vaccine to the health units and medical centers that will provide vaccination services to the population (according to the population needs of the geographical area of each unit / center). • Number of vaccinated individuals are sent weekly the Health Directorate.
9	Hospitals/ PHC centers and units/ Health Bureaus	• Vaccination of target groups • Surveillance of vaccine side effects. • Training of immunization teams to go to schools and other places for vaccination campaigns
10	Ministry of Finance	• Providing the necessary financial resources to make the vaccine available in a timely manner
11	Ministry of Information	• Raise awareness of the Egyptian population about the importance of getting the vaccine to be protected from pandemic influenza infection
12	Ministries of Education and Higher Education	• Cooperation with the MoHP to facilitate vaccination of school children: provide a place for the immunization campaign, notify the school children about the time and importance of the vaccine, • Immediate reporting of any vaccination side effects affecting any of the vaccinated school children

Possible Limitations of the pandemic influenza vaccine:

1- Late identification of virus strain causing the pandemic, which results in delayed vaccine production.
Vaccine production usually takes 4 to 6 months; thus it is mandatory to implement other preventive measures such as strict infection control procedures and improvement of personal hygiene and contact precautions.

2- Delayed licensing of the imported influenza vaccine by the Egyptian general directorate of pharmacy. This can be overcome through exemption of this vaccine from the long process of approvals from different sectors and going through the rapid track registration system.

3- Possible circulating rumors about vaccine and campaign:
This can be overcome through good vaccine marketing and good response to such rumors.

4- Insufficient human resources: This can be overcome by training nurses from other sectors e.g. insurance hospitals to participate in the vaccine administrations teams.

5- Health care staff rejection to be vaccinated: This can be overcome through raising their health awareness about the importance of the vaccine.

Infection Prevention and Control

Well-functioning Infection Prevention and Control (IPC) programs should prevent, limit or control the acquisition of health care associated infections for everyone in the health care setting, including patients, HCWs and visitors.

Key components for Pandemic Influenza IPC procedures are:

1. Hand hygiene:

Hand hygiene should be done using an alcohol-based hand rub (if hands are not visibly soiled), or by washing hands with soap and water, and drying them using a single-use towel. Perform hand hygiene:

- before and after any direct contact with patients;
- immediately after removal of gloves;
- before handling an invasive device not requiring a surgical procedure, including central intravascular catheters, urinary catheters or peripheral vascular catheters;
- after touching blood, body fluids, secretions, excretions, non-intact skin or contaminated items, even if gloves are worn;
- when moving from a contaminated to a clean body site on the same patient;
- after contact with inanimate objects in the immediate vicinity of the patient;
- and after using the lavatory.

2. Appropriate use of PPE:

PPE include gowns, gloves, masks, respirators, face shields or other eye protection.
Selection of suitable PPE on dealing with patients depends on the assessment of the risk of exposure to body substances or contaminated surfaces before any anticipated health-care activity:

- Mask and face or eye protection: when the HCW will be working within two meters of an influenza patient (or someone with ILI symptoms).
- Respirator and face or eye protection: when HCWs will be working within two meters of an influenza patient (or someone with ILI symptoms) and the patient is coughing forcefully or an aerosol generating procedure (AGP) is being performed on a patient with symptoms compatible with the pandemic influenza strain.
- Gloves: whenever contact with blood, body fluids, secretions, excretions, mucous membranes or non-intact skin is anticipated.

- Gowns: Gowns are not recommended for the routine care of patients with influenza or symptoms of ILI, unless contact with clothing or skin of the patient or contact with the patient's immediate (i.e. within two metres) environment is anticipated.
- Method for putting on and removing PPE is shown in Appendix 5.

3. Environmental sanitation including:

- Cleaning and disinfection: This can be done by using standard hospital disinfectants.
- Cleaning the pandemic influenza patient care environment; patient care equipment; dishes and eating utensils; linen and laundry and waste management from patients with influenza symptoms: no special handling is needed, follow routine standards and procedures of the health-care facility.

IPC during the Inter-pandemic period (Preparedness action):

The aim is to ensure that the risk of transmission of the pandemic influenza strain is as low as possible in case an Influenza pandemic is declared. This achieved by:

- Revision of existing IPC protocol guidelines concerning influenza IPC and doing updates when necessary
- Evaluate the state of readiness of the IPC program in the health care facilities to face the influenza pandemic.
- Evaluate the effectiveness of the Hospital Acquired Infection (HAI) surveillance program to identify and track trends and outbreaks of influenza infection within the organization.
- Ensure adequate stockpiling of PPE to maintain the availability of supplies essential to implement IPC program during the influenza pandemic.
- Planning and providing pandemic influenza IPC education and skills training for HCW: This should include:
  - A detailed review of the Influenza Pandemic Preparedness plan
  - Information about the pandemic influenza virus characteristics, modes of transmission, at risk groups, expected clinical presentation, and possible complications
  - Measures for protection against pandemic influenza infection: appropriate selection and use of PPE, hand hygiene, immunization for the pandemic strain, prophylactic use of anti-virals.

- Plan for education of people attending the hospital about respiratory etiquette (cover nose and mouth when coughing or sneezing, use tissue to contain respiratory discharges, immediately dispose of tissues into rubbish bins, wash and dry hands after contact with respiratory secretions). Preparation of posters to be put on the walls in waiting areas and other places inside the health facility.
- Plan a safe flow of patients, to help prevent transmission of infection. For example, provide health services targeting uninfected populations (e.g. prenatal care, injury care, well-child visits and treatment of non-infectious diseases), particularly those who are at high risk of a complicated influenza infection (e.g. the immunocompromised and the elderly), in an area separate from patients known or suspected to have the influenza infection.
- Planning for accommodation and cohorting of patients:
- Plan for appropriate spatial separation (i.e. two-meter separation or use of partitions) between influenza patients and non-influenza patients in clinical and waiting areas.
- Plan to establish inpatient units to cohort/isolate influenza patients separately from non-influenza patients.
- Planning for transfer of suspected or confirmed pandemic influenza patients within and between health care facilities: plan to limit the movement of influenza patient, if it is necessary to move the patient, the patient should wear a mask and the transfer personnel should put on appropriate PPE and the receiving department or facility should be made aware of the patient's medical condition.
- Planning for visitors:
- Plan the health facility's visitor policies during the pandemic:
- Instruct visitors not to visit influenza patients if they are high risk group,
- Ensure visitors put on PPE on visiting influenza patients,
- Ensure visitors perform hand hygiene on entrance to and exit from patient's room,
- Visitors with ILI manifestation should not be allowed to visit patients in the health facility.
- Ensure the availability of updated IPC guidelines for collection, transport and handling of specimens from ILI patients and for handling corpse of influenza patients.
- Ensure the presence of occupational health program which includes:
- Immunization of HCW with the available influenza vaccine
- ILI surveillance program for health-care workers

- Fitness-for-work policies: these include measures to identify:
    - HCWs with respiratory infections and determine their ability to work: the aim is to prevent an infected HCW from exposing patients and other HCWs to the influenza virus in the healthcare setting.
    - HCWs at high risk of severe complications from influenza infection: consider administration of prophylactic antiviral drugs
    - Adequate management of infected HCW

During the Alert and Pandemic phases (Response action)

IPC response actions aim at prevention and control of pandemic influenza virus spread from infected patients to other uninfected patients, HCW or visitors.

- Access up to date information about the IPC recommendations for novel pandemic influenza virus.
- Providing intensified pandemic influenza IPC education and skills training for HCW.
- Implementation of pandemic influenza IPC plan.
- IPC measures for triage, flow, placement and transfer of patients:
    - On arrival to the health facility, there must be a separate triage area for people presenting with ILI.
    - Separate waiting areas and assessment places are assigned for patients with ILI and those without ILI with a physical barrier in between or spatial separation of 2 meters distance.
    - Admission and placement process: Place patients in single rooms, or cohort those with the same etiological diagnosis. A physical barrier or spatial separation of at least 2 meters should separate patients with suspected or confirmed pandemic influenza patients from non-influenza patients.
    - Transfer of suspected or confirmed pandemic influenza patients within and between health care facilities should be limited. If patient movement is necessary, the patient should wear a mask and the transfer personnel should put on appropriate PPE and the receiving department or facility should be made aware of the patient's medical condition.
- Follow strict regulations for visitors.
- HCW surveillance for ILI.
- HAI surveillance for ILI among hospitalized patients.
- Apply regular IPC practices on specimen taking, transfer and handling of specimens

from suspected or confirmed pandemic influenza patients.

- Apply regular IPC practices on handling corpse of suspected or confirmed pandemic influenza patients.
- Apply IPC in ambulance:
  - Ambulance staff should put on PPE on dealing with suspected or confirmed pandemic influenza patients.
  - Suspected or confirmed pandemic influenza patients should wear a mask if possible (e.g. when it would further compromise the patient's respiratory status or it is difficult for the patient to wear a mask)
  - Routine cleaning and disinfection procedures of the ambulance after transporting suspected or confirmed pandemic influenza patients.

Travel and border-related measures

Border measures include a range of measures that can be taken at International Entry Points into the country e.g. airports and seaports, to delay the entry or minimize the spread of illness to or from affected countries as much as possible. However, given the long incubation period for flu compared with a typical aero plane journey, the chances of slowing entry of the virus are close to zero.

There are 35 International Entry Points in Egypt (airports, seaports and ground crossing). At every point of entry, there is a Quarantine unit, which works under the supervision of the General Quarantine Directorate in the MoHP.

The working team at the Quarantine units at International Entry Points consist of: physicians, nurses, health inspectors and other employees.

During the inter-pandemic period (Preparedness action):

- Public health measures related to communicable diseases of concern are in place at Egypt's borders every day. When an Influenza pandemic starts outside Egypt these measures are strengthened.
- Preparation of a Pandemic Response Plan with detailed SOPs to be applied at the entry point as soon as a pandemic is announced outside Egypt.
- Routine daily follow up on the WHO and CDC announcements about global situation of influenza.
- Ensure that the recommended surveillance measures and infrastructure are in place
- Training workers at the Quarantine units
- Training workers at the International Entry Points e.g. crew members about how to

identify and deal with influenza suspected cases.

- Preparation of health education materials to be distributed to the passengers whenever a pandemic is declared
- The Health Directorate supplies the different International Entry points with the necessary resources e.g. stockpiles of PPE, thermal scanners, ambulance at the International Entry point.

During the Alert and Pandemic phases (Response action):

When Pandemic influenza is declared outside Egypt, (even if cases were not yet detected inside Egypt):

Measures taken at the borders and Egypt entry points are the first line of defense against possible introduction of pandemic cases into Egypt.

- Training of the workers at the Quarantine units as well as personnel working at the International Entry Points to identify and deal with suspected cases. The aim is to minimize the spread of infection from the case to the surrounding contacts.
- Daily checking of WHO and CDC websites to identify the areas with geographic spread of the pandemic influenza virus.
- Identification of suspected influenza cases by screening of all passengers arriving at the entry points from geographic areas known to have started the Pandemic Influenza. This could be done by:
  - Crew of international conveyances (i.e. airplanes, ships) report the presence of passengers with influenza disease manifestations on board before landing
  - Thermal scanners
  - Screening of incoming passengers by quarantine nurse at the entry point
  - Self-reporting: all passengers and the crew of the international conveyances (i.e. airplanes, ships) are asked to fill out “Passenger / Crew Health Declaration Form” where they self-report the presence of any symptoms of ILI (Appendix 8)
- Collecting contact Information of all arriving passengers: Arriving passengers fill out a “Contact Information Form” with their contact information during the first seven days of their stay in Egypt to enable the quarantine team to contact them whenever necessary (Appendix 9).
- Managing suspected cases:
- The Quarantine team identifies acutely sick travelers with suspected influenza disease manifestations. They should follow strict infection prevention and control procedures on dealing with these cases. Cases receive immediate medical care at the

border according to case management guidelines. This may include transportation by a dedicated ambulance service to a nearby medical facility with the oversight and advice by the quarantine team.

- Voluntary isolation of influenza cases not requiring hospitalization
- Contact tracing on the same flight or ship Contact tracing will be initiated for those arriving on international conveyances (i.e. airplanes, ships) with a confirmed case. Passengers could be directly contacted using the contact information collected from the flight manifest or from the contact information form.
- Health education of travelers:
- Disseminating public health messages to travelers by various methods e.g. posters, TV monitors, large video screens at ports of entry Printed health education materials are distributed to incoming and outgoing travelers to raise awareness about the disease.

Managing Deaths

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.

During the inter-pandemic period (preparedness action):

Put a clear plan to cope with the surge in deaths due to an influenza pandemic. An estimation of the expected number of deaths has been made at the Governorate level to help define the necessary measures.

During the alert and pandemic period (response action):

1. Preservation of corpses:

Preservation of corpses may be needed if huge numbers of deaths occur in hospitals:

- The number of chambers in refrigerators of all governorates has been calculated (1800 chamber).
- Corpses should be preserved in refrigerated chambers. In case the number of such storage spaces is inadequate, it is possible to inject corpses with chemicals such as formalin in order to preserve them for 72 hours.
- Local authorities must develop special plans for burial services including an estimate of the number of burials that will likely be required and the provision of vehicles and drillers to complete the transfer and burial of the deceased.

1. IPC procedures for people handling with corpses

People handling corpses should take precautions by using protective clothing and PPE.

2. Death certificates

The health inspector should obtain death certificates according to the area of jurisdiction and according to the recommendations of the National "pandemic" inter-Ministerial Committee.

3. Religious legitimacy of mass burial:

The Egyptian MUFTI Department has declared that there is no religious rule preventing mass burial in the event of an epidemic or other settings where there is a lack of burial space, provided that females and males are separated. Washing and shrouding should be completed and rapid burial is recommended unless public interests dictate otherwise. In that case, there is no legitimate objection to keeping the body unburied for a certain period.

4. Places of mass burial:

It is preferred that mass burials take place in deserts outside of cities and other urbanized areas. In the absence of such settings, as in the central Delta governorates surface burial procedures are applied.

Therapeutic Measures

Protocol of case management

During the inter-pandemic period (preparedness actions):

- Development of clear clinical care guidelines for the proper management of suspected or confirmed influenza patients.
- Distribute clinical care guidelines to all health care service providers
- Plan and conduct training of the HCW on available clinical care guidelines.
- Plan for adequate stockpiling of antiviral drugs, other medications e.g. antipyretics, antibiotics, IV fluids, …
- Plan for adequate stockpiling of equipment e.g. ventilators, cardiac monitors, pulse oximeters.

During the alert and pandemic period (response action):

- Update clinical care guidelines according to the novel pandemic influenza virus strain.
- Conduct extensive training on the updated clinical care guidelines.
- Ensure adequate stockpiling of supplies (of antiviral drugs, other medications e.g. antipyretics, antibiotics, IV fluids, …) and equipment (e.g ventilator).
- Monitoring and evaluation of the implementation of approved clinical guidelines approved and distributed by the MoHP.

Clinical care of influenza patients

Clinical care involves the assessment and treatment of persons with suspected or confirmed pandemic influenza. A wide clinical spectrum of disease ranging from non-febrile, mild upper respiratory tract illness, febrile ILI to severe or even fatal complications, including rapidly progressive pneumonia has been described.

Diagnosis of influenza patients:

- **Uncomplicated influenza:**
  - ILI symptoms include: fever, cough, sore throat, rhinorrhea, headache, muscle pain, and malaise, but no dyspnoea. Patients may present with some or all of these symptoms.
  - Gastrointestinal illness may also be present, such as diarrhoea and/or vomiting, especially in children, but without evidence of dehydration

- **Complicated or severe influenza:**

  - Clinical and/or laboratory evidence of sustained virus replication or invasive secondary bacterial infection (e.g. persistent high fever and other symptoms beyond 3 days),
  - Clinical (e.g. dyspnoea, tachypnea, hypoxia or cyanosis) and/or radiological signs of lower respiratory tract disease (e.g. pneumonia) which may be further complicated by respiratory failure and acute respiratory distress syndrome (ARDS) with refractory hypoxemia.
  - Central nervous system (CNS) involvement (e.g. encephalopathy, encephalitis),
  - Severe dehydration,
  - Secondary complications, such as renal failure, multi-organ failure, and septic shock.
  - Exacerbation of underlying chronic disease, including asthma, COPD, chronic hepatic or renal failure, diabetes, or other cardiovascular condition,
  - Any other condition or clinical presentation requiring hospital admission for clinical management.
  - Pregnant women, especially those with co-morbidities, are at increased risk for complications from influenza virus infection. Influenza in pregnancy is associated with an increased risk of adverse pregnancy outcomes, such as spontaneous abortion, preterm birth, and fetal distress.
  - Newborns and young children often present with less typical ILI symptoms, such as apnoea, low grade fever, fast breathing, cyanosis, excessive sleeping, lethargy, feeding poorly, and dehydration. Such symptoms are non-specific and diagnosis cannot be made based on these signs alone. Clinicians should exercise a high index of suspicion during circulation of the pandemic influenza virus and should be aware of occurrence of ILI in contacts of the child to assist clinical diagnosis and to avoid delay in antiviral treatment.

- **Laboratory diagnosis:**

Virological diagnosis is done by PCR (or some other similar molecular diagnostic method) or isolation of the virus from respiratory samples (nasopharyngeal and/or throat swabs). All hospital have access to validated PCR assays. Whenever needed samples are sent to assigned labs under strict precautions and the results are received within 24-48 hours.

- **Radiological diagnosis:**

Chest x-ray may be abnormal in only about 10% of cases.

When influenza viruses are known to be circulating in a community, patients presenting with features of uncomplicated influenza can be diagnosed on clinical and epidemiological grounds. Diagnostic testing, when available, should be prioritized for patients in whom confirmation of influenza virus infection may affect clinical management, including patients considered at-risk and/or those with complicated, severe, or progressive respiratory illness. In addition, results of diagnostic testing may also be valuable in guiding management of a patient's close contacts.

Under no circumstances should influenza diagnostic testing delay initiation of infection control practices or antiviral treatment, if pandemic influenza disease is suspected clinically and epidemiologically.

Patients may have co-infection with bacterial pathogens or other respiratory viruses; therefore, investigations and/or empiric therapy for other pathogens should also be considered.

Treatment of influenza patients:

- **General treatment considerations:**

  - Patients presenting with uncomplicated illness, should be instructed to go home and to return for follow-up, should they develop any signs or symptoms of complicated or severe influenza or fail to improve within 72 hours of the onset of symptoms.
  - Antipyretics (e.g. paracetamol or acetaminophen) for fever or pain. Salicylates (such as aspirin and aspirin-containing products) should not be used in children and young adults (aged <18 years) because of the risk of Reye's syndrome. Non-steroidal anti-inflammatory drugs including aspirin are contraindicated in pregnancy.
  - Symptomatic treatment: e.g. adequate fluids to avoid dehydration, fluids for rehydration, drugs to relieve associated symptoms such as pharyngitis, cough and nasal congestion.

- **Antiviral therapy:**

Influenza A[H1N1]pdm09 virus is currently susceptible to the NAIs Oseltamivir and Zanamivir, but resistant to the M2 inhibitors Amantadine or Rimantadine.

Early initiation of treatment with Oseltamivir or Zanamivir, is recommended for all patients

including pregnant women and young children < 2 years. Earlier treatment is associated with better outcomes. Therefore, antiviral treatment should be initiated immediately and without waiting for laboratory confirmation of diagnosis.
Extended oseltamivir treatment (at least 10 days) and higher doses (up to 150 mg twice daily in adults) should be considered in severe cases. Patients who are suffering from oseltamivir-resistant infection, might be sensitive to Zanamivir. During the 2009 H1N1 pandemic, there was limited availability of Zanamivir, yet future emergency plans are made to make it available for possible health emergencies.

- Oseltamivir :

Oseltamivir is indicated for treatment of patients one year of age and older. For adolescents (13 to 17 years of age) and adults the recommended oral dose (based on data from studies in typical uncomplicated influenza) is 75mg oseltamivir twice daily for 5 days.
For infants less than 1 year of age recommended doses are as follows:

> 3 months to 12 months	3 mg/kg twice daily
> 1 month to 3 months	2.5 mg/kg twice daily
0 to 1 month	2 mg/kg twice daily

For children 1-12 years of age recommended doses are as follows:

15 kg or less	30 mg orally twice daily for 5 days
15-23 kg	45 mg orally twice daily for 5 days
24-40 kg	60 mg orally twice daily for 5 days
> 40 kg	75 mg orally twice daily for 5 days

- Zanamivir :

Zanamivir is indicated for treatment of influenza in adults and children (>5 years). The recommended dose for treatment of adults and children from the age of 5 years is two inhalations (2 x 5mg) twice daily for 5 days.

- **Oxygen therapy**

At presentation or triage and routinely during subsequent care in hospitalized patients, oxygen saturation should be monitored. Supplemental oxygen should be provided to correct hypoxaemia. Monitor oxygen saturation and maintain SaO_2 over 90% (92-95% for pregnant

women) with nasal cannulae or face mask. High flow oxygen may be required in severe cases.

- **Antibiotics**

Empirical antibiotic therapy is given for suspected bacterial co-infection in patients with influenza. Antibiotic sensitivity testing should then be done to guide proper antibiotic usage. In the absence of clinical and/or microbiological indication of bacterial infection, discontinuation of antibiotics may be considered in patients with laboratory confirmed pandemic (H1N1) viral pneumonia.

- **Specific measures for severely ill patients:**

A number of severely ill patients with pandemic influenza disease will develop ARDS requiring mechanical ventilation and intensive care support.

Treatment of ARDS associated with the new influenza A (H1N1) virus infection should be based upon published, evidence-based guidelines for sepsis-associated ARDS.

Treatment of pneumonia caused by influenza infection:

- The triage of persons with pneumonia should be done using the CURB-65 system where the presence of confusion, a Blood Urea Nitrogen (BUN) level > 7mmol/L, a respiratory rate > 30 breaths/min, low blood pressure (systolic BP < 90 mmHg and/or diastolic BP < 60 mmHg), and age ≥ 65 years are used to calculate a score which corresponds to a risk of death and, consequently, the need for hospitalization or intensive care:
- (Community Assessment Tools (CATs) could provide a framework for triage decisions for hospital referral and admission. CATs have been developed based on evidence that supports the recognition of severe influenza and pneumonia in the community for adults, children and infants, and serious feverish illness in children. CATs use six objective criteria and one subjective criterion, any one or more of which should prompt urgent referral and admission to hospital. These criteria are:
- CATs were developed to help non-specialist front-line staff identify which sick children and adults are most likely to benefit from interventions and levels of care only available in hospitals when resources are limited. CATs use six objective and one subjective criteria based on simple clinical assessment. Meeting any CATs criterion warrants referral and admission to hospital. Criteria are:

A. Severe respiratory distress,
B. Increased respiratory rate,
C. Oxygen saturation ≤ 92% on pulse oximetry breathing air, or on oxygen,
D. Respiratory exhaustion,
E. Severe dehydration or shock,
F. Altered consciousness level and
G. Causing other clinical concern.)

Treatment of pneumonia using the CURB_65 scoring system	
Each answer is equivalent to one point:	
· Mental confusion	
· Blood Urea Nitrogen > 7mmol/L	
· Respiratory rate > 30/minute	
· Low blood pressure: Systolic ≤ 90 mmHg or diastolic ≤ 60 mmHg	
· Age > 65 years	
Result	**Recommended steps**
0 or 1	Treatment at home
2 or 3	May be transferred to hospital
4 or 5	Urgent transfer to Intensive Care Unit (ICU) in a hospital

However, hospitalization for patients with severe primary viral pneumonia may be considered, regardless of the CURB-65 score.

Indications for ICU admission:

- CURB-65 score is four or five points
- Hypoxemia (PaO2 Partial Pressure of Oxygen < 8 Kpa or < 60 mmHg OR O2 saturation < 90%) despite oxygen administration via mask or nasal cannula.
- Increasing hypercapnia (PaCO2 Partial Pressure of Carbon Dioxide > 60 mmHg)
- Acidosis (arterial pH < 7.26)
- Septic shock

Indications for mechanical ventilation:

Mechanical Ventilation is used to partially or completely assist a patient's breathing using a ventilator. It is used when the patient is unable to breath adequately to maintain oxygen and carbon dioxide exchange required for tissue metabolism (Details about mechanical ventilation is shown in Appendix 6).

Types of mechanical ventilation:

A. Therapeutic mechanical ventilation.
B. Compulsory mechanical ventilation.

Indications for therapeutic mechanical ventilation

- Loss of consciousness.
- Post-cardiopulmonary resuscitation.
- Apnea (cessation of breaths).
- Asystole (cessation of heart beats).
- Diaphragmatic paralysis due to neuromuscular disease.
- Injury of the central nervous system (brain or spinal cord) that affects the respiratory center or its communication with the respiratory system.
- Cases of pulmonary diseases that lead to low arterial oxygen content (hypoxemia) such as Chronic Obstructive Pulmonary Diseases (COPD) or profound congestive heart failure (pulmonary edema) Acute Respiratory Distress Syndrome (ARDS).
- Cases of heart disease, e.g., cardiogenic shock.

Indications for compulsory mechanical ventilation

- As part of post-operative care including open-heart and other operations requiring prolonged anaesthesia
- Cases of head injuries because of possible injury to the brain's
- Respiratory center

Indications for intubation and ventilation:

- Respiratory rate > 35 breaths/minute.
- Inadequate ventilation caused by a tidal volume < 5 ml/kg (bodyweight)(normal: 5-7 ml/kg)
- PaO2 < 60 torr (partial pressure)
- PaCO2 > 60 torr (partial pressure)(normal: 35-40 torr)
- Other indications may include: cyanosis, diaphoresis, agitation or shallow, ineffective, unassisted breaths

Different methods of mechanical ventilation

There are many ways to use mechanical ventilation systems, but three are the most widely used:

1- Controlled Mandatory Ventilation (CMV)

In this mode, the ventilator delivers a specified number and volume of breaths to the patient. The patient does not breathe spontaneously or initiate breaths, but completely depends on the device.

This method is indicated:

- For head injury patients with respiratory compromise and/or increasing intracerebral pressure.
- During surgery while a patient is paralyzed.

2- Synchronized Intermittent Mandatory Ventilation (SIMV)

SIMV allows the ventilator to sense a patient's own breathing and will allow spontaneous breaths between mechanical ventilations while ensuring mandatory breaths should the patient's own breathing rate fall below a set level. This mode provides the patient with a specified number of breaths and/or a specified volume of air. It may be used as a method to separate ("wean") the patient from mechanical ventilation, as the patient breathes with the device assuring the total rate and/or volume.

3- Continuous Positive Airway Pressure (CPAP)

This mode provides the patient with air under specified pressure during breathing. This continuous pressure holds open small and medium airways and alveoli to decrease the amount of energy to re-open these units. This mode may help gas exchange and increase the efficiency of the lungs especially in ARDS. There are non-invasive CPAP units that can accomplish this same condition after the patient is taken off the mechanical ventilator.

Nursing role before patient placed on mechanical ventilation:

- Prepare the patient
- Assure that the gas line connections, electrical power outlets, and ventilator are in working order
- Connect the ventilator to an appropriate electrical power outlet and an oxygen source Prepare an endotracheal tube, suction catheters, sterile water, tape, gauze Nursing

Nursing role during and after patient placed on artificial breathing:

Monitor the patient's vital signs and watch for any change in pulse rate or cardiac rhythm.

- Monitor the patient for cyanosis
- Set the ventilator for the following:
  - Tidal volume (the amount of air delivered with each breath). Normal: 5-7 ml /kg of patient's bodyweight.
  - Ventilatory rate (the number of breaths per minute). Normal: 16-24 breaths / min.
  - Inspiratory and expiratory airway pressures, normally 10 to 20 cm of water. [Note: These airway pressures are indicators of lung efficiency and flexibility. Increased airway pressure can indicate problems such as accumulation of secretions within the patient's airways, the patient "fighting" the ventilator or back pressure from tubing of the ventilator itself.]
- Monitor movement of the patient's chest to ensure symmetric movement which implies equal distribution of air to each lung due to proper placement of the endotracheal tube (ETT). If the tube is placed in one main bronchus, the other lung will not be ventilated. The right main bronchus is more common to be selectively intubated because it is more proximal and vertical than the left main bronchus. This right main bronchus position facilitates the entry of any foreign body including an ETT that is placed too far down the trachea.
- Monitor the humidifier to maintain water level stays at the specified level and temperature (34°C)Monitor drainage from the ETT, mouth and nose and suction as needed.
- Routine care for the ETT.
- Reposition the patient in bed as tolerated in order to facilitate drainage of the secretions inside the patient's chest and avoid bed ulcers.
- Assist the patient with regular physical exercises for the chest and extremities
- Patient hygiene.
- Use the nasogastric tube to feed the patient as specified by the doctor

Weaning Consider weaning a patient from a mechanical ventilator when the:

- Need for mechanical ventilation decreases, i.e., cardiovascular parameters are stable, blood gases are improved, and the patient is conscious.

- Patient needs a fractional inspired Oxygen concentration (FI O2) < 50% and the positive inspiratory pressure (PIP) is < 25 cm/water.
- Respiratory rate is normal for age.

To accomplish this weaning, the patient is first placed on SIMV to determine if the patient is ready for weaning. If this is done successfully, the patient is placed on CPAP. If this done without problem, the ETT can be removed. The patient should be fasting several hours before and after the removal of the ETT. Following extubation, the patient is placed on oxygen by nasal cannula or mask and blood gases should be monitored. If intubation has been prolonged and there is little progress towards weaning, intravenous steroids may be considered.

Antivirals

- Anti-viral drugs for influenza are used as prophylactic and symptomatic treatment. The main drugs that have an effect on the influenza virus are Neuraminidase inhibitors (NAIs). Influenza A[H1N1] pdm09 virus was resistant to M2 inhibitors (Adamantines). **Neuraminidase inhibitors (NAIs):** Zanamivir (Relenza) and Oseltamivir (Tamiflu): Effective as prophylactic and symptomatic treatment of influenza A and B viruses. Influenza A[H1N1]pdm09 virus is susceptible to NAIs. They have rare side effects. If used within the first 48 hours of onset of symptoms, they reduce the disease severity and complications of influenza. Oseltamivir can be taken by pregnant and breast-feeding women if the benefits are felt to be greater than the risks. Oseltamivir is effective in treating children < 1 year of age, but is not recommended as prophylaxis in this age group. Treatment of children < 1 year old must also consider the benefits and risks of treatment. In general, NAIs are expensive.

- **Indications for antivirals:**
  - Antivirals for treatment of cases
  - Antivirals for post-exposure prophylaxis for contacts and at risk groups
  - Antivirals for pre-exposure prophylaxis for healthcare workers

- **Doses of anti-viral drugs:**
  - **Zanamivir (Relenza):** for treatment of cases: 20 mg/day inhaled (10 mg in 2 inhalations every 12 hrs.) for five days.
  - **Oseltamivir (Tamiflu):** for treatment of cases: 150 mg/day orally (75 mg capsule every 12 hrs.) for 5-7 days. For prophylaxis: 75 mg/day (1 capsule) during the exposure period for a maximum of 6 weeks.

- Treatment should begin within 48 hours of illness onset. WHO recommends using Zanamivir and Oseltamivir as treatment because of minimal side effects, less viral resistance, lower rates of pulmonary complications, and lower rates of antibiotic use and hospitalizations. The effectiveness of initiating antiviral treatment more than 48 hours after illness onset has not been established.

Anti-viral drugs during the inter-pandemic period (Preparedness actions):

- Antiviral drugs are used for treatment of seasonal influenza
- Regular monitoring of anti-viral sensitivity as part of the virological surveillance
- Stockpiling of antiviral drugs:

Adequate national stockpiles of antiviral drugs help ensure that there is equitable access across Egypt to a secure, government-controlled supply of antivirals for pandemic influenza. Without such stockpiling, it is unlikely that there would be any antiviral drugs available at the time of a pandemic.

- Amount:

  Egyptian government has a strategic stockpile of Oseltamivir of 1.2 million packs. In addition, there is a stockpile of its raw materials to manufacture 1.4 million more packs (total packs 2.6 million) whenever indicated. A strategic stock of 250,000 packs of Amantadine is also available.

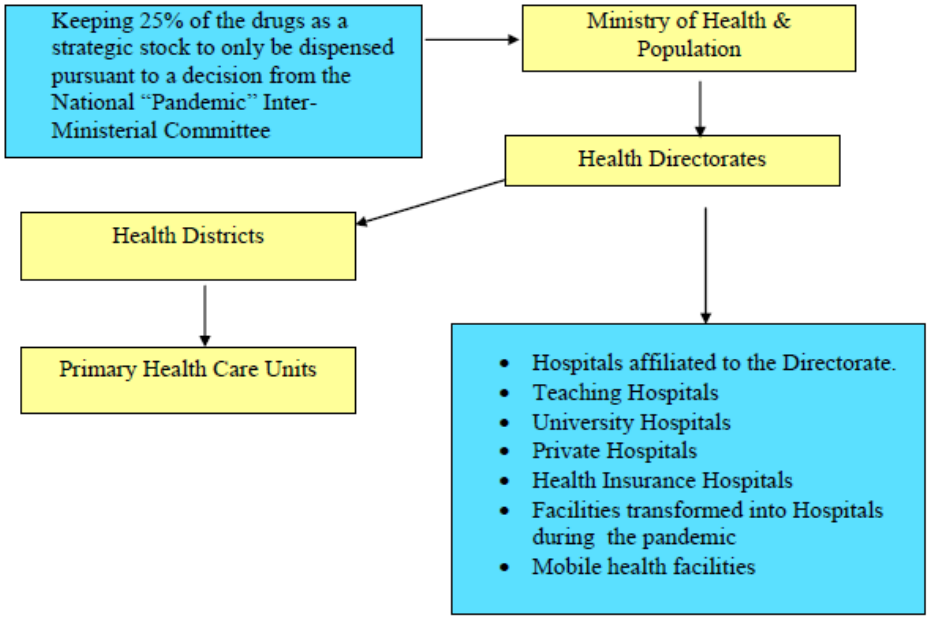
- Stockpile management:

  Careful consideration of storage conditions with ongoing regular testing for the stability and potency of the stockpiled antivirals. All antivirals require storage in a dry place at room temperature (15° to 30° c).

- Trigger for release of antivirals:

  Whenever a pandemic is declared globally, release from central depot is done to be distributed to the Health Directorates in a proportionate manner according to the estimated number of cases. About 25% shall be retained as strategic backup stock (Figure 8).

Figure 8: Distribution of antiviral stockpiles



Anti-viral drugs during the Alert phases (Response action):

- The aim of using of antivirals during the Alert phase is to apply the containment strategy to minimize the disease transmission. This is achieved by giving antiviral therapy to cases, and antiviral prophylaxis to their close contacts to restrict the spread of the disease.
- Ensure adequate stockpiling of anti-virals.

Anti-viral drugs during the Pandemic phase (Response action):

- Influenza antivirals are effective for both the prevention (prophylaxis) and early treatment if administered within 48 hours following the onset of illness. Antiviral prophylaxis can be considered for health care workers or individuals with suspected poor outcome (serious complication or death) if they get the infection.
- The aim of using antivirals during the pandemic phase is:
  - reducing the severity and duration of illness: their use can reduce the duration of symptoms and the likelihood of complications requiring hospitalization and the likelihood of death)
  - mitigating societal disruption by reducing the impact of absenteeism due to illness in the critical infrastructure sectors;
  - reducing the level and duration of viral shedding, thereby possibly reducing transmission
- Virological surveillance for regular monitoring of anti-viral sensitivity of the novel/pandemic influenza virus should be done to and modify clinical care guidelines accordingly.

Clinical Care Services

Preparedness of health care facilities providing health care services to the Egyptian population is considered an essential part of general emergency preparedness plan such as influenza pandemic plan. During an influenza pandemic, it is anticipated that the number of patients seeking medical care because of influenza infection will rise substantially. Influenza attack rates will likely range between 20-40% and case fatality rates may be 1% or higher. At least 10% of infected individuals may require hospitalization. There will be a need to manage large numbers of ill patients requiring various levels of health care, and to contain the spread of the pandemic influenza virus associated with heath care. Thus, health care facilities (whether hospitals or primary health care facilities) affiliated to both the public and the private sector should be involved in the influenza preparedness and response plans.

The capacity of various health care facilities to respond efficiently to pandemic threats at any given moment is highly dependent on existing standards of practice. The implementation of additional measures during a pandemic is challenging, and the lack of good baseline standards may hamper efforts to respond to the surge of patients needing health care during the pandemic. Preparedness of influenza pandemic requires continuous strengthening of early detection systems and safe care practices in the health-care facility.

Pre-pandemic planning by healthcare facilities is therefore essential to provide quality, uninterrupted care to ill persons and to prevent further spread of infection.

Hospitals' Plan

Goals of the Plan:

- Prevention of pandemic influenza risk
- Reduce morbidity and mortality due to influenza pandemic
- Improve the level of preparedness and response to the pandemic

Objectives of hospital plan:

- Support the effective epidemiological surveillance system for influenza, including investigation systems in communities and within the work environment, educational institutions and all health service delivery units as well as the development of laboratories to support surveillance systems at the level of the Republic
- Good preparedness of all agencies and ministries for the effective management of disasters during the influenza pandemic
- Create and manage strategic stocks from:

• Antiviral drugs
• Personal protective equipment
• Other medical supplies

- Equipment of health facilities and preparedness for the treatment of cases in the event of a pandemic

Tasks of the Emergency Plan Committee

- Prepare a detailed plan of action for the hospital to respond to the pandemic and identify the roles and the operators and identify alternatives and ways of communication and all necessary in terms of supplies, equipment, food, water, electricity and telecommunications
- Periodic follow up on what has been put in place to implement the plan
- Develop a personnel training plan
- Develop a plan to conduct two major tests each year in which the plan is put into practical operation and to ensure the readiness of the hospital and staff and is characterized by the element of surprise
- Review the results after a practical test and knowledge of limitations and research causes and plans for treatment of deficiencies
- Updating the plan monthly at a meeting of the hospital leaders and the plan committee with the manpower modernization
- Meeting the working groups of the plan at least once a month (eg doctors group - registration group - workers group - nursing group - ....)

Objectives

- Secure the transfer of patients
- Ensure the reception and treatment of patients
- Death and body-keeping insurance
- Insurance of supplies and medicines
- Ensure the continuity of medical services
- Ensure the protection of employees and ensure that they continue to activate the plan
- Good management of the pandemic

Phases of work plan

- **During the inter-pandemic period (preparedness actions):**

1. Data collection about all available health facilities and their human and physical resources (Appendix 7 shows the forms used for the Health Facility Data Models)
2. Ensure that each hospital has its own influenza preparedness and response plan with clear standard operating procedures (SOPs) for the workflow in the hospital: A selected committee from the curative care sector and the hospital directors develops the SOPs for the flow of work and the management of influenza pandemics at hospitals. These will include all roles and tasks of all hospital employees, in addition to all required supplies, equipment, food, water, electricity, line & wireless communication methods, ….
3. All health care workers should be fully committed to implement the SOPs.
4. Plan for the maintenance of the usual health care services provided by the hospital. The hospital continues to provide its basic health service (treatment of emergency cases, essential surgeries, childhood vaccination and treatment of chronic illnesses). Each hospital has developed criteria for temporarily canceling elective surgical procedures, determining what and where emergency procedures will be performed during a pandemic, reduction of the usual use of imaging, laboratory testing, and other ancillary service. Other services may be stopped such as family planning and mother and childcare.
5. Prepare a plan for conducting a simulation exercise for influenza pandemic plan implementation twice a year to assure that the hospital and its personnel are ready and prepared to cope with the pandemic. The exercise should be conducted suddenly and without previous notification. After each exercise, to review the course of events, especially gaps in efficiency or knowledge, examine their causes and establish a plan for making the necessary changes.
6. Ensure the availability of clinical care guidelines with clear triage protocols and clinical evaluation criteria for standardized management of patients with acute respiratory infections.
7. Plan for education and training of all hospital staff (administrators, physicians, nurses and pharmacists) about pandemic influenza.
8. Plan for education and training of patients and visitors about pandemic influenza.
9. Surveillance: monitoring and evaluation of the existing routine influenza surveil-

lance system.

10. Plan for increased hospital beds capacity to cope with the patient surge during the pandemic (while taking into account the need to provide staff and medical equipment and supplies to care for the patient of each additional hospital bed): some measures include:
    i. reducing elective admissions and surgeries to maximize medical bed capacity, and to maximize critical care beds;
    ii. shorten length of hospital stay: revise criteria of patient discharge;
    iii. Identify areas of the facility that could be vacated for use in cohorting influenza patients.
11. Plan for the establishment of non-traditional sites (i.e. sites that are not an established health care facility) as a "satellite site" of the hospital to provide health care services to cope with the surge of influenza cases seeking medical advice. Potential location for such sites include schools, community halls, hotels or any other suitable space. Selected places should be having adequate space with proper ventilation, water supply, electricity, proper sanitation. Strict IPC procedures should be followed on establishing these facilities.
12. Plan for patient prioritization:

    With the ethical considerations and goal of the pandemic response in mind, each hospital will need to make its own decisions on prioritization, depending on the availability of resources and stage of the pandemic in the served community.
13. Plan for adequate stockpiling of equipment and supplies needed during the pandemic:
    - Evaluate existing systems for tracking available medical supplies and equipment and to detect rapid consumption of goods.
    - Repair and maintenance and quality assessment of available respiratory care equipment to ensure its efficiency.
    - Estimate the need for respiratory care equipment, and develop a strategy for acquiring additional equipment if needed. Equipment needed during influenza pandemic include:
        - Ventilators and their requirements e.g. filters, circuits, oxygen, .
        - Cardiac monitors
        - Pulse oximeter
    - Assess anticipated needs for consumable resources, and determine a trigger

point for ordering extra resources.

- Consider stockpiling enough consumable resources to cover about 3 months:
    i. Antiviral drugs
    ii. Other medications: e.g. antipyretics, antibiotics
    iii. PPE
    iv. Vaccine (as soon as the pandemic influenza vaccine is available)
    v. Laboratory chemical and supplies
    vi. X-ray films and equipment
    vii. Disinfectants and cleaning supplies

14. Plan for optimum use of available human resources:

During influenza pandemic, hospital staff absenteeism may exceed 30% due to self-illness, illness of family, child care duties if schools and day care centers close, disruption in transportation, and/or other reasons including fear and anxiety about becoming ill in the workplace. Thus, adequate plans should be put to overcome the possible shortage of HCW. There are a number of available decrees and laws that organize and facilitate the involvement of different health work force categories to respond to the surge of patients needing health care during the pandemic. The health work force is increased by:

- Re-locating of HCWs to different settings within the hospital.
- Call retired HCW
- Trainees or students from professional schools (e.g., medical, nursing, pharmacy) can be trained to aid in the provision of some health care
- Volunteers are hired to facilitate the management of health care services e.g. organization of patient flow, health education of the public, spokesperson, health record management, housekeeping, social services, communication services, drivers for ambulances, security workers, ..

15. Plan for an occupational health program for hospital staff:

Hospitals must be prepared to:

- protect the hospital staff from exposure to infection by implementing clear IPC guidelines and provision of adequate PPE.
- evaluate and manage symptomatic and ill healthcare personnel
- distribute prophylactic anti-viral drugs if indicated
- vaccination of all hospital staff as soon as the vaccine is available
- protect hospital staff at high risk for complications of influenza (e.g., preg-

nant women, immunocompromised persons) by reassigning them to low-risk duties (e.g. non-influenza patient care, administrative duties that do not involve patient care)

16. Plan for clear organized guidelines for the referral system: i.e. which patients are referred to which health facility. If the patients' needs a special service e.g. ventilator which is not available in the current hospital.
17. Planning for effective external and intra-facility communication:
    - External communication: Each hospital should assign responsibility for external communication about pandemic influenza.
    - Intra-facility communication: how to keep administrators, HCW, patients, and visitors informed of the ongoing impact of pandemic influenza on the facility and on the community.
    - Effective communication necessitates the availability of:
    - readily updated directory for phone numbers:
        a. Hospital phone and fax numbers.
        b. Police phone numbers.
        c. Firefighting phone numbers
        d. Phone numbers of other public services.
        e. Phone numbers of the Health Directorate's Emergency Room.
        f. Phone numbers of the MoHP Emergency Room (preventive).
        g. Phone numbers of the MoHP Emergency Room (curative emergency).
    - contact information of all hospital employees:
        a. Hospital management staff.
        b. Physician according to their specialties.
        c. Pharmacists.
        d. Nurses.
        e. Administrators.
        f. Support service personnel.
        g. Security personnel.
        h. Maintenance personnel.
        i. Other staff.
18. Plan for management of deceased and preservation of the corpses in case of mass fatalities:

- Assess current capacity for refrigeration of deceased persons,
- Determine the scope and volume of supplies (e.g., body bags) needed to handle an increased number of deceased persons).

- **During the Alert and pandemic phases (response action):**

The increase in patients requiring hospitalization and critical care may result in shortages of multiple resources including beds, personnel and equipment.

1. Activate the influenza pandemic hospital plan.
2. Provide the hospital directors with updated information about the novel pandemic influenza virus and its clinical care guidelines.
3. Conduct extensive education and training of all hospital staff (administrators, physicians, nurses and pharmacists) about the novel pandemic influenza virus, the updated clinical care guidelines and measures for prevention and control of disease spread.
4. HCW should stick to the updated Influenza clinical care guidelines including the triage protocols and clinical evaluation criteria.
5. Ensure availability of adequate stockpiles equipment (ventilators, monitors, pulse oximeters) and supplies (PPE, antivirals, antibiotics, antipyretics, ..).
6. Implement the enhanced influenza surveillance activities.
7. Surveillance for influenza infection among HCW.
8. Surveillance for HAI with pandemic influenza.
9. Monitoring employees' absenteeism.
10. Ensure proper complete registration of the cases attending the hospital with daily reporting of all data to the affiliated health directorate.
11. During the peak of the pandemic, hospital emergency department will be overwhelmed with patients seeking care. Implementation of the triage protocol and clinical evaluation criteria is mandatory in order to:
    a. identify persons who might have pandemic influenza,
    b. separate them from others to reduce the risk of disease
    c. identify the type of care they require (i.e., home care or hospitalizations)
12. Strict implementation of IPC guidelines and procedures with continuous monitoring and evaluation of the IPC program. This includes use of PPE, examination, placement and isolation of influenza patients, intra-facility and

inter-facility patient movements, …

13. Prevention and control of influenza outbreaks within the hospital by:
    d. Routine IPC procedures.
    e. Early detection and proper management of influenza cases among the non-influenza hospitalized patients and HCW.
    f. Isolation of infectious influenza patients in private rooms or cohort unit.
    g. Immunization of all HCW and at risk patients as soon as the pandemic influenza vaccine is available.
    h. Health education of hospital staff, patients and visitors.
    i. Strict visitation rules.
14. Implementation of the occupational health program for the prevention and control of influenza infection among the hospital staff.
15. Having adequate hospital security services
16. Implementation of strict visitors' rules and guidelines.

- **During the transition phase (recovery action):**

1. Full documentation of the pandemic management.
2. Reassessment and review of plans.
3. Plan modification.
4. New training plans.

- **Dealing with deaths:**

- The estimated number of deaths at the governorate level is calculated to calculate the requirements to accommodate this number
- The acting health inspector / health clerk must perform procedures to extract the death certificate after confirming the deceased's data
- Counting the number of refrigerators in all governorates
- There is no legal impediment to keeping the body for a certain period, when necessary if it is for the public interest
- Make a line list of deaths

- **Burial place**

The Directorate shall determine the places of mass burial in cooperation with the localities in accordance with the severity of the pandemic and the preparation of death:

- Application of procedures in case of mass deaths

- Coordination with other stakeholders
- Coordination with local authorities and various relevant bodies
- The local authorities shall prepare a plan of action for the burial services and
- plan to provide all necessary services

- **Infection control procedures in dealing with deaths**
  - Emphasize the need to follow infection control procedures for corpse patients
  - Taking precautionary measures from workers when dealing with bodies with the need to use protective clothing.

Primary Health Care Plan

In Egypt, Primary health care (PHC) services are provided through about 4500 PHC centers and units distributed all over the country. The aim of engaging the PHC sector in the management of the influenza pandemic is to provide as many treatment facilities as possible to minimize the need for people to travel to seek medical treatment, rapidly identify patients who are sick or at high risk for early hospital care, thus mitigating the spread of the disease, and also to cope with the surge in demand on healthcare services.

A detailed subnational Influenza Preparedness and Response Plan is available for PHC sector at the level of each district and the primary health care facilities.

The aim of this section is to provide an overview on the role of PHC during the inter-pandemic, alert and pandemic influenza phases.

- **During the Inter-pandemic period (preparedness action):**

1. Preparation of the PHC Influenza management plan at the level of each PHC facility. The plan should include:
   - Working teams during the pandemics: physicians, nurses, health officers, volunteer workers
   - Modified work and patient flow inside the PHC center/unit: Influenza patients should be effectively segregated from non-influenza patients to prevent disease spread. Thus, separate waiting areas and separate examination rooms for influenza and non-influenza patients should be assigned.
   - Area Mapping
     - It is important to have a clear updated map of the catchment area of the PHC center/unit.

- The health inspector at the PHC center/unit draws a map for the catchment area. The map shows the locations of residential areas, schools, mosques, churches, pharmacies, markets, bridges, water canals, private clinics, private hospitals, …
- The health inspector divides the map into squares.
- A team will be responsible for follow up of the residents in each square. Coordinator of each square should be living in the same square so he/she can easily recognize the area and its residents

2. Clear plan for the referral system:

   A clear plan for referring patients should be available i.e. which patients will be referred to which health facility. This plan will be applied to patients attending the PHC suffering from influenza and need a higher level of care (e.g ventilator, ICU, ..).

3. Surveillance

   Adequate training on the updated regular surveillance activities.

4. Preparation of health education modules

   - Preparation of health education messages e.g. disease symptoms and signs, how it is transmitted, hand and respiratory hygiene measures, what to do, who to approach and where to go if symptoms are present,
   - Identification and training of the community health educators: e.g. nurses, social community workers, pharmacists, religious leaders, community leaders, volunteers such as school teachers, university students, employees…
   - Preparation of the tools and methods used for health education e.g. posters, flip charts, presentations …

5. Training:

   - Training of the surveillance team on updated surveillance activities
   - Training of the health care providers on the management of influenza cases using the “Guidelines for Management of Influenza Patients” prepared by the MoHP.
   - Training of the PHC workers on IPC guidelines.
   - Training of field coordinators on disease surveillance.

- **During the alert and pandemic phases (response actions):**

1. Provide the PHC directors with the updated clinical care guidelines according to the characteristics of the novel pandemic influenza virus.
2. Modification of the work and patient flow according to the pre-set PHC center/unit preparedness plan.
3. Extensive education and training of the HCW on the updated information about the novel pandemic influenza virus, modes of transmission, clinical presentation, diagnosis and clinical care guidelines.
4. Recruiting and training volunteers to facilitate the management of health care services during a pandemic e.g. organization of patient flow, health education of the public, health record management, housekeeping, social services, communication services, security workers, use of PPE.
5. Surveillance:
   - Enhanced surveillance activities in PHC center/unit.
   - Surveillance of health care providers for influenza infection
6. Outreach program: The teams assigned for each square according to the pre-designed map will be responsible for:
   - Screening of residents for ILI: Suspected or confirmed cases are imme diately referred to the PHC center/unit for further assessment by the health care providers.
   - Follow up of confirmed influenza cases to identify complicated cases or influenza-associated mortality.
   - Follow up of contacts of confirmed cases for early case finding and management.
   - Daily reporting of suspected cases, confirmed cases, complicated cases and mortalities due to Influenza infection.
   - Health education of the community
7. Health services provided at the PHC:
   - The PHC facility continues to provide its basic health service (treatment of emergency cases, vaccination, and treatment of chronic illnesses). Other services may be stopped such as family planning and mother and childcare.
   - PHC service providers strictly follow the “Guidelines for Management of Pandemic Influenza” prepared by the MoHP when dealing with sus-

pected or confirmed Influenza patients.

- Strict IPC procedures have to be applied.

8. Stockpiles:

- In each facility, an assigned person is responsible to keep and follow on the availability of the supplies. Each facility should have at least 3 months stock of the following supplies:
    a. Medications: antipyretics, antibiotics for adults and children, antitussive drugs, bronchodilators.
    b. PPE: gowns, gloves, masks, respirators, eye goggles.
    c. Printings: surveillance forms, lab transfer sheets, logbooks, health education posters and booklets
    d. Disinfectants and cleaning supplies

9. Referral system:

Patients attending the PHC suffering from influenza and need a higher level of care (e.g ventilator, ICU, ..). should be immediately referred to certain hospitals. While keeping strict IPC procedures, the patient will be transferred with a well-equipped ambulance to the hospital. The patient should wear a mask, the transfer personnel should put on appropriate PPE, and the receiving health facility should be made aware of the patient's medical condition.

10. Community health education:

- Messages:
    - Definition of the disease and its symptoms
    - Methods of disease spread
    - How to deal with cases, when to seek medical advice
    - What contacts of cases should do to avoid getting the infection
    - Basic public health and personal hygiene (hand washing)
    - Vaccination as soon as the vaccine is available
- Educators:

  Educators may include any of the following:
    - Health team members at health facilities: physicians, nurses, pharmacists, laboratory workers, social workers,
    - Volunteered teachers, university and school students, and public service employees.

- Religious leaders, advocates, and community leaders.
- Coordinators and teams responsible for the different geographic squares of the PHC catchment area

• Method:

- Posters have to be glued in frequently visited places such as mosques, churches, market places, pharmacies, health establishments, and means of transportation.
- Brochures should be available at the health facilities and with all the health educators.
- Home visits and direct person-to-person contact.
- Lectures and seminars.

11. Handling the corpses:

- Health officer will process the paper work required for issuing death certificates after reviewing the data of the deceased.
- An empty space outside the community is to be allocated as a graveyard (it is preferable to be in the desert areas near to the villages/towns).
- In case of mass deaths of community members occur, the health officer will alert the city council to prepare for burial operations.
- Infection control procedures have to be followed when dealing with mortality cases.

Private Health Care Facilities' Plan

During the inter-pandemic period (preparedness action):

The pandemic influenza preparedness plan will be distributed to all private health care facilities. According to a ministerial decree private health care facilities should be collaborating with the MoHP in dealing with influenza patients during the pandemic

During the alert and pandemic phases (response action):

The private sector should be collaborating closely with the MoHP and should be ready to receive and manage referred influenza patients from the public sector.
Private health care facilities should plan and conduct a training of its HCW on the implementation of all the components of the influenza plan as soon as an influenza pandemic is declared.

Non-pharmaceutical interventions (NPI)

Introduction:

NPIs can be taken by individuals and communities to help prevent, control or mitigate pandemic influenza. These range from public communication and health education to actions taken by individuals (e.g., hand hygiene, self-isolation) to actions taken in community settings and workplaces (e.g., increased cleaning of common surfaces) to those that require extensive community preparation such as social distancing (e.g. school closures).

The aim of implementing the NPIs is to:

- Delay the onset and spread of the pandemic
- Decrease the number of cases and the number of complications and deaths
- Decrease overall health impact
- Reduce the peak burden on hospitals and infrastructure.

Examples of NPIs:

- Communication and Public education
- Social distancing

Communication and Public education

Communication and public education plays a key role in the actions taken by individuals and community, as well as the acceptability and response to extensive community measures. Effective and efficient communication is critical throughout the management of the pandemic influenza phases. It include information dissemination within the health sector, between health and other sectors and, crucially, with the public.

In risk communication, national and local government authorities provide information to the public in an understandable, timely, transparent and coordinated manner before, during and after a health emergency. In Egypt, MoHP is responsible for national communications to the public. The objectives of such risk communications are to develop and maintain public trust in local and national health systems and to convey realistic expectations about capacities for health emergency risk management.

A comprehensive communications strategy, implemented across all stages of the pandemic, is thus a key component of a successful response to an influenza pandemic. The communication strategy involves processes to:

- collect information in a timely manner
- use information to develop messages
- distribute information in a timely manner
- ensure formats are appropriate to the target audiences.

The communication strategy should take into account behavioral aspects of how people react to and act on advice and information they receive, not only from authorities but also from sources such as mass and social media. Public understanding of hazards and risks is complex, context-dependent and culturally mediated, thus communications strategy development may benefit from community participation. Communication with the public, through the media and other sources, will shape the public perception of risk and the way in which the public is engaged in measures to address the pandemic.

Key principles across the communication process:

- Openness and transparency: build public confidence by keeping people informed of the current situation; what is being done to address it; and what individuals can do to minimize their risk and to prepare themselves for the potential societal impacts.
- consistent, clear messages
- regular, timely provision of tailored information
- use of a wide range of communication methods to reach a broad audience

The aim of communication and public education:

- Gain public trust and build public confidence
- Encourage behaviors and attitudes that will contribute positively to reducing the spread of disease and minimize the psychological, social and economic impacts.

- **During the inter-pandemic phase (preparedness action):**

1. Develop effective strategies to inform, educate and communicate with individuals and families to improve their ability to take appropriate actions before, during and after a pandemic.
2. Gather information and develop clear comprehensive messages.
3. Identify appropriate spokespeople.
4. For the sake of community health education, the following health educators could be considered:

- Health team members at health facilities.
- Volunteered teachers, university and school students, and public service employees.
- Religious leaders, advocates, and community leaders.
- Private sector pharmacists.

- Health team members at the private sector's health facilities.

5. Identify communication channels and assess their ability to reach all target population groups. Develop protocols and provide training to spokespeople for each communication channel.
6. Plans for a pandemic influenza hotline and/or website for public inquiries.
7. Pre-test messages through each medium, including social media, and test communications procedures through exercises.
8. Build effective relations with key journalists and familiarize them with influenza and pandemic related issues.
9. Develop communication strategies to support the implementation of NPIs including restrictions on mass gatherings and school closures.

- **During the alert and pandemic phases (Response actions):**

1. Provide regular briefing updates to all spokespeople to ensure that the information conveyed is consistent and up-to-date.
2. Conduct frequent and pre-announced public briefings through popular media outlets such as the web, television, social media and radio to counter panic and dispel rumours.
3. Activate mechanisms to ensure the widest possible dissemination of information.
4. Activate a pandemic influenza hotline and/or website for public inquiries
5. Topics likely to require updating and regular communication include :

- What is known and not known about the virus, the state of the outbreak, use and effectiveness of measures and likely next steps.
- What is known and not known about the pandemic disease, including transmission patterns, clinical severity, treatment and prophylaxis options including vaccination against the pandemic influenza.
- The importance of compliance with recommended measures to stop further spread of the disease.
- Societal concerns, such as the disruption to travel, border closures, school closures and the impact on the economy or society in general.
- Sources of emergency medical care, resources for dealing with urgent non-pandemic health-care needs, and resources for self-care of medical conditions.
- Any changes to the status of the pandemic.

- The ongoing need for vigilance and disease-prevention efforts to prevent any upswing in disease levels.
- Advice for travellers.

6. Ensure effective communication of public health measures to reduce the spread of pandemic influenza, e.g. hand and respiratory hygiene, reduction of unnecessary travel and overcrowding of mass transport systems, self-isolation for sick individuals, except their nominated caregiver, and minimization of contact with others.
7. Development and distribution of public information materials such as posters and brochures. Posters have to be glued in frequently visited places such as mosques, churches, market places, pharmacies, health establishments, and means of transportation. As for the brochures, they should be available at the health facilities and coordinators of community square.
8. Gather feedback from the general public, vulnerable populations and at-risk groups on attitudes towards the recommended measures and barriers affecting their willingness or ability to comply.
9. Update communications strategies as feedback from the general public and stakeholder organizations is collected and analyzed.

- **During the transition phase (recovery actions):**

Publicly acknowledge the contributions of all communities and sectors to the pandemic effort. Review the lessons learnt about communications and revise in readiness for the next major public health event.

Stakeholders

Departments of the Ministry of Health, other ministries or international organizations that are particularly relevant to this event.

List of stakeholders:

Within the Ministry of Health

Central Department of Preventive Affairs
General Department of Epidemiology and Surveillance
General Department of Communicable Diseases control
Preventive Emergency Room
Hot line (105)
International Health Regulations Coordinator
General Department of Quarantine

General Directorate of Infection Control
Central Department of Environmental Affairs
General Directorate of Environmental Health
General Directorate for Food Control
Central Laboratories of the Ministry of Health
Other partners within the Ministry of Health
Media Center
Pharmacy Management (Supply)
Drug vigilance

Outside the Ministry of Health

Egyptian Council of Ministers, Information and Decision Support Center (IDSC)
Veterinary Services, Ministry of Agriculture
Ministry of Civil Aviation
Ministry of Interior
Ministry of Communications and Information Technology
Ministry of Transportation
The Ministry of Environment
Ministry of Local Development
The Ministry of Education
Ministry of Higher Education and Scientific Research

International Organizations

World Health Organization
FAO
CDC
ECDC

Social distancing

Social distancing is a community level intervention to reduce normal physical and social population mixing in order to slow the spread of a pandemic throughout society.

Social distancing measures may complement measures applied to individuals to decrease the likelihood of spread of pandemic influenza. The PSI will provide guidance as to what measures various organizations can take that will slow down the progression of a pandemic and reduce the burden on the health system.

The role of health sector experts and decision makers would be to develop and forward recommendations to the Crisis Management Committee, for consideration and action.

Examples of social distancing procedures:

- Isolation at home
- School closure;
- Workplace closure;
- Cancellation of mass gatherings e.g cinemas, theatre, concerts, sports events, festivals, religious observances, camps, conferences, fairs.
- Internal Domestic travel
- Postpone or cancel pilgrimage

Table 5 shows the triggers to initiate different social distancing activities based on the PSI. Duration of applying the different social distancing activities will depend on the PSI.

Table 5: Social distancing procedures according to the PSI score

	Pandemic Severity Index			
	1	2	3	4
Voluntary isolation of ill at home (adults and children)	Not recommended*	Recommend**	Recommend	Recommend
Voluntary quarantine of household members in homes with ill persons (adults and children)	Not recommended	Consider***	Recommend	Recommend
Closure of schools and universities	Not recommended	Consider	Recommend	Recommend
Work place: decrease number of social contacts and meetings	Not recommended	consider	Recommend	Recommend

	Pandemic Severity Index			
	1	2	3	4
Increase distance between persons (e.g., reduce density in public transit, workplace)	Not recommended	Not recommended	Consider	Recommend
Social gatherings: modify, postpone, or cancel selected public gatherings to promote social distance (e.g., stadium events, theater performances)	Not recommended	Not recommended	Consider	Recommend
Postpone pilgrimage	Not recommended	Not recommended	Consider	Recommend

***Not Recommended** = unless there is a compelling rationale for specific populations, measures are generally not recommended for entire populations as the consequences may outweigh the benefits.

****Recommended** = generally recommended as an important component of the planning strategy.

*****Consider** = Important to consider these alternatives as part of a prudent planning strategy, considering characteristics of the pandemic, such as age-specific illness rate, geographic distribution, and the magnitude of adverse consequences. These factors may vary globally, nationally, and locally.

School closure:

- Policies and Purpose:
- Egyptian Standards of practice (SOPs) for school surveillance of pandemic influenza cases are updated and distributed to all schools in Egypt, to aid them to deal with influenza cases appearing at the school and to have clear guidelines about indications of school closures in case of pandemics.
- Children are known to be efficient transmitters of influenza; closing schools and may reduce transmission or delay spread of the disease in this age group and in younger siblings, parents and close contacts of school attendees.
- Trigger for school closure:
- This measure would be most effective if the pandemic was causing high attack rates in school-age children, or the PSI is 2-4.

- Duration:
  The duration of school closure will depend on the severity of the pandemic, School closure is recommended as long as the PSI is 2-4.
- Disadvantages of school closure:
  This measure may make parents, including healthcare workers; need to take unplanned leave from work. This will cause workplace and economic disruption. Some children may be left without supervision. The benefits of school closure would be reduced if children continue to have contact with others during the school closure period. In addition, there will be disruption of school curricula and delays of exams.

Cancellation of mass gatherings:

- Policies and Purpose:
  Public health officials will have to consider modifying, postponing, or cancelling mass gatherings. The objective of cancelling mass gatherings is to reduce transmission of influenza by limiting the number of potentially ill contacts that an individual is exposed to. Certain types of mass gatherings may be particularly associated with magnified risk of transmission of influenza, with key factors being event duration, degree of crowding, type of venue, and event timing in relation to the epidemic peak. Mass gatherings may include cinemas, theatres, concerts, sports events, festivals, religious observances, camps, conferences and fairs
- Trigger and implementation:
  According to PSI, cancellation of mass gatherings is recommended when PSI is 4. However, throughout the pandemic, the public should be encouraged to avoid mass gatherings during the pandemic.
- Duration:
  This will depend according to PSI. Cancellation of mass gatherings is recommended as long as the PSI is 4.
- Disadvantages:
  The direct costs of cancelling a mass event could be substantial. Any decision to cancel an event over a period of time would be controversial because staging events is very expensive and public opinion may be divided on the need for its cancellation. Event organisers, hosts, sponsors and attendees would be directly affected. In addition, cancellation of such gatherings may increase the public panic and thus contribute to societal disruption.

Measures taken in closed communities

Closed communities include any closed residential institutions such as long-term care facilities, care homes, students' dormitories, nursing homes for elderly or disabled personnel, prisons, or any other closed settings. Influenza outbreaks may develop in such settings much easier than the rest of the community, because:

- They contain large numbers of people in close proximity for extended periods of time, leading to a high risk of spread.
- Some of these settings also serve people who are at high risk of flu complications.
- Some of these institutions may not always be able to ask people to recover at home, so may need to isolate sick people within the institution

During the inter-pandemic phase (preparedness action):

- Preparation of health education for residents and working staff of the institution about respiratory etiquette, hand hygiene, using PPE and reporting in case of fever or ILI manifestation.
- Ensure access to PPE
- Planning for isolation and cohorting of patients:
  - Plan for appropriate spatial separation (i.e. two-meter separation or use of partitions) between influenza patients and other residents.
  - Plan to establish special rooms or units to cohort/isolate influenza patients separately from other residents and staff.
- Planning for the presence of health care workers to provide necessary health care services during the Influenza pandemic.
- Plan for clear organized guidelines for the referral system: i.e. which patients are referred to which health facility. If the patients' needs a special service e.g. ventilator which is not available in the residential institution.
- Planning for transfer of pandemic influenza patients who need special health services to nearby health care facilities. The patient should wear a mask and the transfer personnel should put on appropriate PPE and the receiving facility should be made aware of the patient's medical condition.
- Planning for visitors:
  Plan the institutions' visitor policies during the pandemic:
  - Instruct visitors not to visit influenza patients if they are high risk group,
  - Ensure visitors put on PPE on visiting influenza patients,

- Ensure visitors perform hand hygiene on entrance to and exit from patient's room,
- Visitors with ILI manifestation should not be allowed to visit patients in the health facility.

During the Alert and Pandemic phases (Response action)

Influenza can be introduced into such closed communities by newly admitted residents, working staff and by visitors. Spread of influenza can occur between and among residents, workers, and visitors. The aim is to prevent an outbreak of pandemic Influenza in the closed community. An influenza outbreak in a closed community is considered if two or more cases of ILI are detected within a seven-day period, including at least one laboratory confirmed case.

To prevent the occurrence of Influenza outbreak the following general preventive measures should be followed:

- Continuous monitoring and surveillance of ILI and influenza cases inside the facilities.
- Instruct staff and residents to report symptoms of ILI to the facility health care professional at the first sign of illness.
- Education of residents and staff in the facility about respiratory etiquette (cover nose and mouth when coughing or sneezing, use tissue to contain respiratory discharges, immediately dispose of tissues into rubbish bins, wash and dry hands after contact with respiratory secretions). Preparation of posters to be put on the walls in the facility.
- Make the means for appropriate hand cleansing readily available within the facility, including entries and exits, visitation rooms, common areas, and staff-restricted areas, in addition to lavatories and food preparation and dining areas. The means for hand cleansing are ideally running water, soap, and hand drying machines or paper towels and waste baskets; alternatively, except in lavatories and food preparation areas, alcohol-based hand sanitizers may be used.
- Clean all common areas within the facility routinely and immediately, when visibly soiled, with the cleaning agents normally used in these areas. Eating utensils should be washed with water and soap. Cups and utensils should not be shared until after washing.
- Monitor working staff absenteeism due to respiratory symptoms and exclude those with influenza-like symptoms from work until at least 24 hours after they no longer have a fever.
- Vaccination of staff and residents in the facility as soon as the vaccine becomes available.

- Implementation of visitors' rules.

Handling of outbreaks:

- Isolation of patients with ILI or influenza in single rooms if possible or establish a designated area of the facility/institution specifically for sick persons. Testing of persons with ILI should be done to determine what viruses are circulating at the institution.
- Testing of persons with ILI should be done to determine what viruses are circulating at the institution.
- Apply strict IPC procedures when dealing with ILI or influenza patients.
- Adequate management of patients according to Clinical Care guidelines.
- Restrict movement of patients within the facility and if it is necessary to move the patient, the patient should wear a mask and the transfer personnel should put on appropriate PPE.
- Designate staff to care for the sick individuals only. Limit movement of designated staff between different parts of the institution to decrease the risk of staff spreading influenza to other parts of the facility.
- Cancel internal group gatherings and provide more personal space between individuals if possible.
- Avoid new admissions or transfers to wards with symptomatic residents.
- Restrict personnel movement from areas of the facility suffering from the outbreak to areas unaffected areas.

Individual and household level interventions

Individual and household level interventions include the following measures:

1. Strengthen recommendations to stay home from public events and locations (i.e. Self-Isolate) if the person has fever and new onset of respiratory disease.

- **Advantage:** Potential to decrease the number of people exposed to an ill person and therefore decrease (or delay) the spread of disease
- **Disadvantage:** May result in unnecessary absenteeism among essential workers because, based on the nonspecific symptoms, individuals ill due to other causes will end up staying home.

2. Use masks by well individuals:

- **Advantage:** May decrease exposure to large droplets containing virus
    - Psychologically reassures people that they are taking measures to prevent infection

- **Disadvantage:**
    - There are no available funds to provide the public with masks. Thus not all members of the public can afford to purchase mask.
    - May cause panic if the availability of masks is limited
    - Public purchase of masks may limit the availability of masks in health care settings where they are required.
    - It is not feasible to wear masks constantly for the duration of pandemic wave.
    - Use of masks, apart from other infection control practices, is of limited effectiveness and may provide a false sense of security.

3. Implement hand sanitizing stations in public settings (soap and water, alcohol;-based hand rub):

- **Advantage:**
    - May increase hand hygiene thus reduce the spread of the disease.
    - Reinforces key messages about hand hygiene
- **Disadvantage:**
    - There are no available human and financial resources to provide all public places with hand sanitizing stations.
    - Effectiveness depends on public compliance
    - Will not be effective against droplet spread via coughs and sneezes
    - May give people a false sense of security

Training and Evaluation

Training is conducted by highly qualified dedicated MoHP professionals.

- Train the workers at healthcare facilities at all governmental levels (directorates, districts and health facilities) on the methods of collecting data
- Train all central MoHP sections on the national influenza preparedness plan
- Conduct training on setting a pandemic plan to staff members on all levels (central, directorates, districts, health facilities)
- Develop and introduce all elements of the pandemic preparedness plan including therapeutic manuals, lab manuals, infection control procedures, and isolation/quarantines procedures
- Conducting relevant training to the hotline team members

Follow up and evaluation: This is done by the relevant Departments at the MoHP:

- Identifying the officials at the central level.
- Identifying the officials at the Health Directorate level.
- Identifying the officials at the health district level.
- Identifying the officials at the health facility level.
- Holding regular meetings to give updates based on ongoing daily data analysis, evaluation of the implementation of the pandemic control plan and seeking the avoidance of faults and negativism at all levels.

Research

The main goal of research is to fill out the gaps in knowledge in order to develop and upgrade influenza countermeasures such as vaccines, therapies and diagnostic tools. Much of this research can be carried out during the inter-pandemic periods, but some can only be conducted during a pandemic.

Key components of a successful pandemic influenza research strategy include:

- Identification of research needs: research needs are periodically updated. Important research topics include influenza disease burden, influenza vaccine efficacy and side effects, cost-effectiveness of influenza vaccine, antiviral drugs efficacy and side effects, cost-effectiveness of anti-viral drugs, molecular and genetic epidemiological features of influenza virus
- Development and ongoing support of partnerships and research networks: MoHP workgroup collaborate actively with the academia and research institutes nationally and internationally.
- Identification of sustained funding sources: MoHP provides some funding for the conduction of research. External (national and international) funding opportunities are also available.
- Rapid ethics review processes for pandemic research: the MOH research ethics committee reviews and approves proposed research protocols in a timely manner.
- Rapid research response: Special research studies, such as seroprevalence studies, will be needed to inform pandemic decision-making.
- Knowledge translation: Assigned persons at the MoHP are responsible for compiling research findings from the 2009 pandemic and maintaining up-to-date literature reviews in key areas, such as the effectiveness of public health measures, relevant vaccine studies, and antiviral treatment and resistance. This would help decision-makers understand and make optimal use of evidence and research.

Appendices

Appendix 1: Risk assessment matrix

A risk matrix showing clearly delimited boundaries between categories

	Almost Certain					
	Highly Likely					
	Likely					
	Unlikely					
	Very Unlikely					
		Minimal	Minor	Moderate	Major	Severe
Consequences						

How to read the risk matrix figure:

	Level of overall risk	Actions
	Low risk	Corresponds to inter-pandemic phase; Preparedness actions are taken
	Moderate risk	May indicate the start of the “Alert phase”; Response actions are taken
	High risk	May indicate the start of the “Pandemic phase”; Response actions are taken
	Very high risk	May indicate the start of the “Pandemic phase”; Response actions are taken

Reduction of risk e.g. from high to moderate may indicate the start of the “Transition phase”. Thus, recovery actions are taken.

Form (1)
Influenza Pandemic Logbook

Health Directorate:.....

Health District:.....

Health Facility:.....

Daily Record of Cases in Hospital
Day:..... Date:.../.../.....

Name	File Number	Address	Age Year/ month	Gender		Age group by years				Admission	Discharge		
				Male	Female	< 5	5-15	>15-45	> 45		Recovery	Death	Referral
Total													

Form (2)
Hospital Notification Form

Health Directorate:.....

Health District:.....

Health Facility:.....

Statement Date ...../...../200

% of nursing staff absence					
% of doctor absence					
No. of empty morgue chambers					
No. of empty ventilator					
No. of empty ICU beds					
No. of empty beds					
Patients' Movement	Referral				
	Discharge	Death	> 45 y		
			>15 - 45 y		
			5 - 15 y		
			< 5y		
			Total		
		Recovery	> 45 y		
			>15 - 45 y		
			5 - 15 y		
			< 5y		
			Total		
	Admission		> 45y		
			>15- 45y		
			5-15y		
			< 5y		
			Total		

This form should be filled and sent daily from health facility to the district

Form (3)
District Notification Form

Health Directorate: .....

Health District: .....

Statement Date ...../...../..... /200

Patients' Movement				Name of The Hospital						
Admission	Total									
	< 5y									
	5-15y									
	>15- 45y									
	> 45y									
Discharge	Recovery	Total								
		< 5y								
		5 - 15 y								
		>15 - 45 y								
		> 45 y								
	Death	Total								
		< 5y								
		5 - 15 y								
		>15 - 45 y								
		> 45 y								
Referral										
No. of empty beds										
No. of empty ICU beds										
No. of empty ventilator										
No. of empty morgue chambers										
% of doctor absence					-	-	-	-		-
% of nursing staff absence					-	-	-	-		-

*This form should be filled & sent daily the district to the directorate.

Form (4)
Directorate Notification Form

Health Directorate: .....

Statement Date ..... /..... /200

Patients› Movement				Name of The Hospital					
Admission	> 45y								
	>15- 45y								
	5-15y								
	< 5y								
	Total								
Discharge	Recovery	> 45 y							
		>15 - 45 y							
		5 - 15 y							
		< 5y							
		Total							
	Death	> 45 y							
		>15 - 45 y							
		5 - 15 y							
		< 5y							
		Total							
Referral									
No. of empty beds									
No. of empty ICU beds									
No. of empty ventilator									
No. of empty morgue chambers									
% of doctor absence				-	-	-	-	-	
% of nursing staff absence				-	-	-	-	-	

This form should be filled and sent daily from the Directorate to central MOHP

Appendix 3: Sample collection and transfer

Collecting and sending clinical samples to labs

Sample type:

Two throat swabs and one serum sample.

Materials required for specimen collection

1. Throat swabs:
   Sterilized swabs made of polystyrene with breakable wooden or plastic hand. Cotton swabs should not be used as they absorb the traced specimen.
2. Virus transfer media:
   These media, which must be packed in sterilized and tightly sealed plastic tubes, will be provided by CPHL of MoHP or some other Governorate level labs. Each tube contains 1.5 ml media substance. No other materials are to be used.

Method for preserving throat swabs and their media:

1. Make sure that the throat swabs containers are completely sealed to assure sterilization and they will be kept in room temperature.
2. Tubes containing virus transfer media should be stored in the freezer until used. When there is a need to use these media, only the required number of tubes are taken out of the freezer and kept in the room temperature until the media substance become liquid. In all cases the liquid should be kept cool.

Technique for collecting a throat swab:

1. Sample is taken by sterilized throat swab from the back wall of the throat. Once the sample is taken, it should be inserted immediately in the tube which is filled with virus transfer media substance. The extra part of the handle is broken then, the tube is tightly closed.
2. Samples are placed vertically in the tube holder .
3. Samples are immediately stored in a refrigerator or an icebox. The tube holder is placed vertically and surrounded by ice bags. Samples are sent to the central lab within 24 hours.
4. Samples are submitted to the sample room at the CPHL along with their data form. The sample is recorded and given a serial number for avian flu samples.
5. Sample analysis results are reported to concerned authorities by fax or via direct telephone calls.

Appendix 4: Submission form for clinical specimens delivered to CPHL for influenza virus testing

Health Directorate: .....

Health District: .....

Name of Health Facility: .....

Submission form for clinical specimens delivered to CPHL for influenza virus testing

Patient name		
Age		
Gender		
Profession		
Address		
Onset date of symptoms		
Specimen date		
Symptoms	**Yes**	**No**
Fever		
Cough		
Shortness of breath		
Muscle pain		
Headache		
Runny nose		
Others		
Medical History	**Yes**	**No**
Seasonal flu vaccination		
Do you suffer from other illnesses and/ or complications?		
Is there any one in the house or work has the same symptoms?		
Type of specimen collected	**Test Result**	
Throat swab		
Nasal swab		
Nasopharyngeal swab		
Other		

Name of Physician::…… Signature:…… ……..... Date:……..

Appendix 5: Putting on and removing personal protective equipment (WHO guidelines)

B. Taking off PPE

- Avoid contamination of self, others and the environment.
- Remove the most heavily contaminated items first.

Remove gloves and gown:
- Peel off gown and gloves and roll inside, out;
- Dispose of gloves and gown safely.

Perform hand hygiene.

- Remove cap (if worn).
- Remove goggies from behind.
- put goggies in a separate container for reprocessing.

- Remove respirator from behind.

Perform hand hygiene.

Appendix 6: Mechanical ventilation

Mechanical Ventilation is used to partially or completely assist a patient's breathing using a ventilator. It is used when the patient is unable to breath adequately to maintain oxygen and carbon dioxide exchange required for tissue metabolism.

Types of mechanical ventilation:

A. Therapeutic mechanical ventilation.
B. Compulsory mechanical ventilation.

Indications for therapeutic mechanical ventilation:

- Loss of consciousness.
- Post-cardiopulmonary resuscitation.
- Apnea (cessation of breaths).
- Asystole (cessation of heart beats).
- Diaphragmatic paralysis due to neuromuscular disease.
- Injury of the central nervous system (brain or spinal cord) that affects the respiratory center or its communication with the respiratory system.
- Cases of pulmonary diseases that lead to hypoxia such as COPD or profound congestive heart failure (pulmonary edema) Acute Respiratory Distress Syndrome (ARDS).
- Cases of heart disease, e.g., cardiogenic shock.

Indications for compulsory mechanical ventilation

- As part of post-operative care including open-heart and other operations requiring prolonged anesthesia.
- Cases of head injuries because of possible injury to the brain's respiratory center.

Indications for intubation and ventilation:

- Respiratory rate > 35 breaths/minute.
- Inadequate ventilation caused by a tidal volume < 5 ml/kg (bodyweight)(normal: 5-7 ml/kg)
- PaO2 < 60 mmHg (partial pressure)
- PaCO2 > 60 mmHg (partial pressure)(normal: 35-40 mmHg)
- Other indications may include: cyanosis, diaphoresis, agitation or shallow, ineffective, unassisted breaths

Different methods of mechanical ventilation

- There are many ways to use mechanical ventilation systems, but three are the most widely used:

- Controlled Mandatory Ventilation (CMV):

  In this mode, the ventilator delivers a specified number and volume of breaths to the patient. The patient does not breathe spontaneously or initiate breaths, but completely depends on the device.

This method is indicated:

- For head injury patients with respiratory compromise and/or increasing intracerebral pressure.
- During surgery while a patient is paralyzed.

- Synchronized Intermittent Mandatory Ventilation (SIMV):

  This method allows the ventilator to sense a patient's own breathing and will allow spontaneous breaths between mechanical ventilations while ensuring mandatory breaths should the patient's own breathing rate fall below a set level. This mode provides the patient with a specified number of breaths and/or a specified volume of air. It may be used as a method to separate ("wean") the patient from mechanical ventilation, as the patient breathes with the device assuring the total rate and/or volume.

- Continuous Positive Airway Pressure (CPAP)

  This mode provides the patient with air under specified pressure during breathing. This continuous pressure holds open small and medium airways and alveoli to decrease the amount of energy to re-open these units. This mode may help gas exchange and increase the efficiency of the lungs especially in ARDS. There are noninvasive CPAP units that can accomplish this same condition after the patient is taken off the mechanical ventilator.

Nursing role before patient placed on mechanical ventilation:

- Prepare the patient
- Assure that the gas line connections, electrical power outlets, and ventilator are in working order
- Connect the ventilator to an appropriate electrical power outlet and an oxygen source

- Prepare an endotracheal tube, suction catheters, sterile water, tape, gauze pads, a nasogastric tube and PPE

Nursing role during and after patient placed on artificial breathing

- Monitor the patient's vital signs and watch for any change in pulse rate or cardiac rhythm.
- Monitor the patient for cyanosis
- Set the ventilator for the following:
  - Tidal volume (the amount of air delivered with each breath): Normal: 5-7 ml/kg of patient's bodyweight.
  - Ventilatory rate (the number of breaths per minute). Normal: 1624 breaths/min.
  - Inspiratory and expiratory airway pressures, normally 10 to 20 cm of water. [Note: These airway pressures are indicators of lung efficiency and flexibility. Increased airway pressure can indicate problems such as accumulation of secretions within the patient's airways, the patient "fighting" the ventilator or back pressure from tubing of the ventilator itself.]
- Monitor movement of the patient's chest to ensure symmetric movement which implies equal distribution of air to each lung due to proper placement of the endotracheal tube (ETT). If the tube is placed in one main bronchus, the other lung will not be ventilated. The right main bronchus is more common to be selectively intubated because it is more proximal and vertical than the left main bronchus. This right main bronchus position facilitates the entry of any foreign body including an ETT that is placed too far down the trachea.
- Monitor the humidifier to maintain water level stays at the specified level and temperature (34°C)
- Monitor drainage from the ETT, mouth and nose and suction as needed.
- Routine care for the ETT.
- Reposition the patient in bed as tolerated in order to facilitate drainage of the secretions inside the patient's chest and avoid bed ulcers.
- Assist the patient with regular physical exercises for the chest and extremities
- Patient hygiene.
- Use the nasogastric tube to feed the patient as specified by the doctor

Weaning

Consider weaning a patient from a mechanical ventilator when the:

- Need for mechanical ventilation decreases, i.e., cardiovascular parameters are stable, blood gases are improved, and the patient is conscious.
- Patient needs a fractional inspired Oxygen concentration (FI O2) < 50% and the positive inspiratory pressure (PIP) is < 25 cm/water.
- Respiratory rate is normal for age.
- To accomplish this weaning, the patient is first placed on SIMV to determine if the patient is ready for weaning. If this is done successfully, the patient is placed on CPAP. If this done without problem, the ETT can be removed. The patient should be fasting several hours before and after the removal of the ETT. Following extubation, the patient is placed on oxygen by nasal cannula or mask and blood gases should be monitored. If intubation has been prolonged and there is little progress towards weaning, intravenous steroids may be considered.

Appendix 7: Health Facility Data Model

Model (1)

Model of Hospitals' Statistics

Ministry of Health and Population

Health Directorate: .....

Health District: .....

A- General Data

Hospital Name: ..... Type of Hospita[1]: .....

Hospital Phone: ..... Fax : .....

Item	Name		Phone		
			Mobile		Home
Hospital's Director					
Hospital's Deput-Director					
Hospital's Assistant Director					
Infection Control Officer					
Administrative Director(2)					
Pandemic Plan Information Officer(3)					
Number of Physicians		Number of nurses		Number of other categories(4)	
Number of beds in the Hospital			Number of beds in intensive care(5)		
Number of doctors for Intensive care			Number of nurses in intensive care		
Are there areas in the hospital to be used as an extra area for additional beds in case of pandemic?				Yes	No
The approximate surface in square meters					
Are there areas in the courtyard of the hospital to be used as an extra area for additional beds in case of an influenza pandemic ?				Yes	No
The approximate surface in square meters					

B- List of names of the supervisors and physicians of the intensive care unit

Serial no.	Name	Ability to deal with ventilator		Phone	
		Yes	No	Mobile	Home
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

C- Number of special units in the hospital

Neonatal care unit (number of units)		Dialysis unit (number of machines)	
Burn unit (number of beds)		Operations theaters [6] (number of tables)	

D- Number of devices ready to be used in the hospital

Device	No.	Device	No.	Device	No.	Device	No.
Cardiac Monitor		blood oximeter		Device for intravenous injection		Gas net	
Defibrillator		blood gas analyzer		Device for sodium and potassium analysis		Oxygen Cylinders	
Mechanical ventilator		Cardic pacemaker		Computed tomography		Breathing device	
Electro-cadiograph		Ultrasound device		Radiography			
Stress electro-cardiogram device		Echocardiog ram device		Portable Radiography			

E- Spporting services

Morgue Refrigerator (number of chamber)		Incinerator	
Water source[7]		Generator	
Alternative Water source (tanks) (8)		Service car (mention the number if any)	

F- Ambulance Posts

Inside hospital	Yes	No	No. of cars if any	Typical	IC
Name of the nearset ambulance point outside the hospital				Distance from the hospital (km)	

G- Number of physicians and beds according to the specialty

Specialty	No. of Doctors	No. of Beds	Specialty	No. of Doctors	No. of Beds	Specialty	No. of Doctors	No. of Beds	Specialty	No. of Doctors

H- List of the supporting categories

Category	No.	Category	No.	Category	No.
High nurse		Food specialist		Worker	
Nurse staff (Secondary)		Engineering technician		Security	
Radiography technician		Mediacl devices technician		Driver	
Laboratory technician		Administrator		Other	

Hospital's Director

Name: .....

Signature: .....

Model (2)

Model of Governmental Polyclinics' Statistics [11]

Ministry of Health and Population

Health Directorate:

Health District:

A- General Data

Facility Name: ..... Type of Facilty: .....

Phone: ..... Fax : .....

Item	Name	Phone	
		Mobile	Home
Facilty Director			
Deputy Director			
Infection Control officer			
Administrative Officer			
No. of doctors	No. of nurses	other categories	

Electricity: □ Governmental □ Generator

Water source: □ Pipe pumps □ Tanks

B- List of human resources

Item	No.	Item	No.	Item	No.
General practitioner		Laboratory Technician		Social specialist	
Pharmacist		Dental Technician		Female community educator	
Dentist		Radiography technician		Worker	
Nurses		Statisties Technician		Driver	
Sanitarian		Clerk/ Administrator		Other (to mention)	

C- Devices ready to be used

Item	No.		Item	No.	Item	No.	Item	No.
Operation Theater		Devices of developed laboratory	Microscope		X-Ray		Phone	
Respiratory device			spectro photometer		Ultrasound		Fax	
Autoclave			Centrifuge		Patient Beds		Computer	
Hot air oven			Water distillator		Oxygen cylinder		Car	

Director of the Facility

Name: .....

Signature: .....

Model (3)

Model of Statistics for the Primary Health Care Units

Ministry of Health and Population

Health Directorate:

Health Facility:

A- General Data

Facility Name: ..... Type of Facilty: .....

Phone: ..... Fax : .....

Item	Name	Phone		
		Office	Mobile	Home
Facilty Director				
Deputy Director				
Sanitarian				

Population Number: .....

Number of villages: .....

No. of satelite: .....

Electricity: ☐ Governmental ☐ Generator

Water source: ☐ Pipe ☐ pumps ☐ Tanks

B- List of human resources

Item	No.	Item	No.	Item	No.
General Physician		Laboratory Technician		Social specialist	
Pharmacist		Dental Technician		Female community educator	
Dentist		Radiography technician		Worker	
Nurses		Statisties Technician		Driver	
Sanitarian		Clerk/ Administrator		Other (to mention)	

C- Devices ready to be used

Item	No.		Item	No.	Item	No.	Item	No.
Operation Theater		Devices of developed laboratory	Microscope		X-Ray		Phone	
Respiratory device			spectro photometer		Ultrasound		Fax	
Autoclave			Centrifuge		Patient Beds		Computer	
Hot air oven			Water distillator		Oxygen cylinder		Car	

D- Data about schools/No. of classroom in the specified area

School Name	No. of classrooms	School Name	No. of classrooms	School Name	No. of classrooms

E- Other institutions inside the specified area

Item	No.	Item	No.
Youth Center		Local Unit	
Mosque		Church	

Medical Center, Center for Maternity & Childhood Care, Rural Unit, Health Group, Health Office and district clinic.

Facility Director

Name: .....

Signature: .....

District Director

Name: .....

Signature: .....

Model (4)

List of Liaison Coordinators from District to Primary Health Units

Ministry of Health and Population

Health Directorate:

Health District: ....

Serial No.	Name of the Health facilty	Liaison Coordinators	Position	Phone		
				Office	Mobile	Home
Total						

The Liaison Coordinator is responsible for 5-10 Health facilities.

Preventive Director

Name: .....

Signature: .....

District Director

Name: .....

Signature: .....

Model (5)

Number of the Human Resources Working at the Health District

Ministry of Health and Population

Health Directorate: .....

Health District: .....

Director of District: ..... Phone Office: ..... Mobile: .....

Assistant Director of District: ..... Phone Office: ..... Mobile: .....

Serial No.	Category	Curative	Preventive	Primary Care	Family Planning	Private Care	Pharmacy	Dentistry	Endemic	Laboratories & Blood Banks	Information Center	Training	Technical Support Office	Cars	Stores	Other	Total
	Physician																
	Dentist																
	Pharmacist																
	Nurse																
	Sanitarian																
	Statistician																
	Administrative																
	Driver																
	Worker																
	Other																

Human Resource Director

Name: .....

Signature: .....

District Director

Name: .....

Signature: .....

Model (6)

Health Facilities in District

Ministry of Health and Population

Health Directorate: .....

Health District: .....

Name of the District	
General	
Central	
Integrated	
Chest	
Ophthalmic	
Fever	
Dermatology	
Specialized Medical Centers	
Foundation Health Facilities	
Teaching Hospitals	
Health Insurance	
Agencies or Company's Hospitals	
Private Hospitals	
Others (10)	
Total Number of Hospitals	
Governmental Polyclinics (11)	
Medical Center	
Maternity & Childhood Care	
Rural Unit	
Health Group Unit	
Health Office	
District Clinic	
Total Primary care Units	

Health District Director

Name: .....

Signature: .....

Model (7)

List of Names of the Liaison Coordinators of the Directorate for its Health Districts

Ministry of Health and Population

Health Directorate:.....

Serial No.	Name of the Health district	Number of residents in the district	Number of Health Facilities in each district	Liaison Coordinator of the district	Position	Phone		
						Work	Home	Mobile
Total								

* Only one Liaison Coordinator for the Governorate Capital.

* The Liaison Coordinator is responsible for 3-5 health district.

Preventive Director:

Name: .....

Signature: .....

Directorate Director:

Name: .....

Signature: .....

Model (8)

Number of Human Resources Working at the Health Directorate

Ministry of Health and Population

Health Directorate: .....

Health District: .....

Director of Directorate: ..... Phone Office: ..... Mobile: .....

Assistant Director of Directorate: ..... Phone Office: ..... Mobile: .....

Serial No.	Category	Curative	Preventive	Primary care	Family Planning	Private Care	Pharmacy	Dentistry	Endemic	Laboratories & Blood Banks	Information Center	Training	Technical Support Office	Cars	Stores	Other	Total
	Physician																
	Dentist																
	Pharmacist																
	Nurse																
	Sanitarian																
	Statistician																
	Administrative																
	Driver																
	Worker																
	Other																

Human Resource Director Directorate Director

Name: ..... Signature: ..... Name: ..... Signature: .....

Model (9)

List of Names of the Liaison Coordinators of the Directorate for its Health Districts

Ministry of health and population

Health Directorate:

Name of the Health district	Number of Hospitals according to the category																Primary Care units						
	General	Central	Integrated	Chest	Ophthalmic	Psychiatry	Fever	Dermatology	Specialized Medical Centers	Foundation health facilities	teaching Hospitals	Health Insurance	Agencies or Company's Hospitals[9]	Private hospitals	Others[10]	Total Number of Hospitals	Governmental Polyclinics	Medical Center	Maternity & Childhood Care	Rural Unit	Health Group Unit	Health Office	District Clinic	Total Number of Basic Care Units
Total																								

Primary Care Director Curative Director Directorate Director

Name:..... Name: ..... Name: .....

Signature:..... Signature: ..... Signature: .....

Guide for Model Completion (1,2,6, and 9)

1	Type of Hospital	- General - Central - Integrated - Specialized Medical Centers - Health Foundation - Teaching Hospitals - Health Insurance - Private Hospital - & other. - All hospitals are to be registered except hospitals of the Ministries of Defense and Interior.
2	Administration director	- A leadrship administrative position - Responsible for management of all hospital personnel except doctors and nurses. - Responsible for work system in the store rooms, kitchen, and autopsy room.
3	Liaison coordinator for the pandemic preparedness	- A leadership administrative position - Responsible for management of all hospital personnel except doctors and nurses. - Responsible for work system in the store rooms, Kitchen, and autopsy room.
4	Other categories	All people working in the hospital except for doctors and nursing personnel.
5	Number of beds in the intensive care	In case there is more than one intensive care (general - heart - chest - surgery) to specify the number of beds.
6	Number of beds in operating theater	Number of operating tables on service, not including the recovery beds
7	Water source	Governmental water outlet (available or not)
8	Alternative water sourse	No. of tanks
9	Hospitals affiliated with certain agencies and companies	Hospitals affiliated with a governmental agency or company (ministry of electricity and petroleum hospitals, railway hospital, others).
10	Other hospitals	All other unlisted hospitals except for the hospitals affiliated with the ministries of Defense and Interior.
11	Governmental polyclinics	Clinics and dispensaries located outside the hospital including health insurance clinics and respiratory diseases dispensaries, and others.

Appendix 8: Passenger / Crew Health Declaration Form

Passenger / Crew Health Declaration Form

Please Mark (✓) if you have or more symptoms written below:

- high fever and chills ( )
- Cough ( )
- Shortness of breath ( )
- Headache ( )
- Muscle aches ( )
- Sore throat ( )

In the last seven days have you had close contract with someone who had a severe respiratory illness? Yes ( ) No ( )

Appendix 9: Contact Information Form

Address and telephone information for the passenger for the next 7 days:

Name: .....
Surname: .....
Date of birth: .....
Nationality: .....
Arriving form: .....
Flight number: .....
Seat Number: .....
Address in Egypt (if different from above) .....
Contact phone number in Egypt (if different from above) .....
Mobile phone: .....

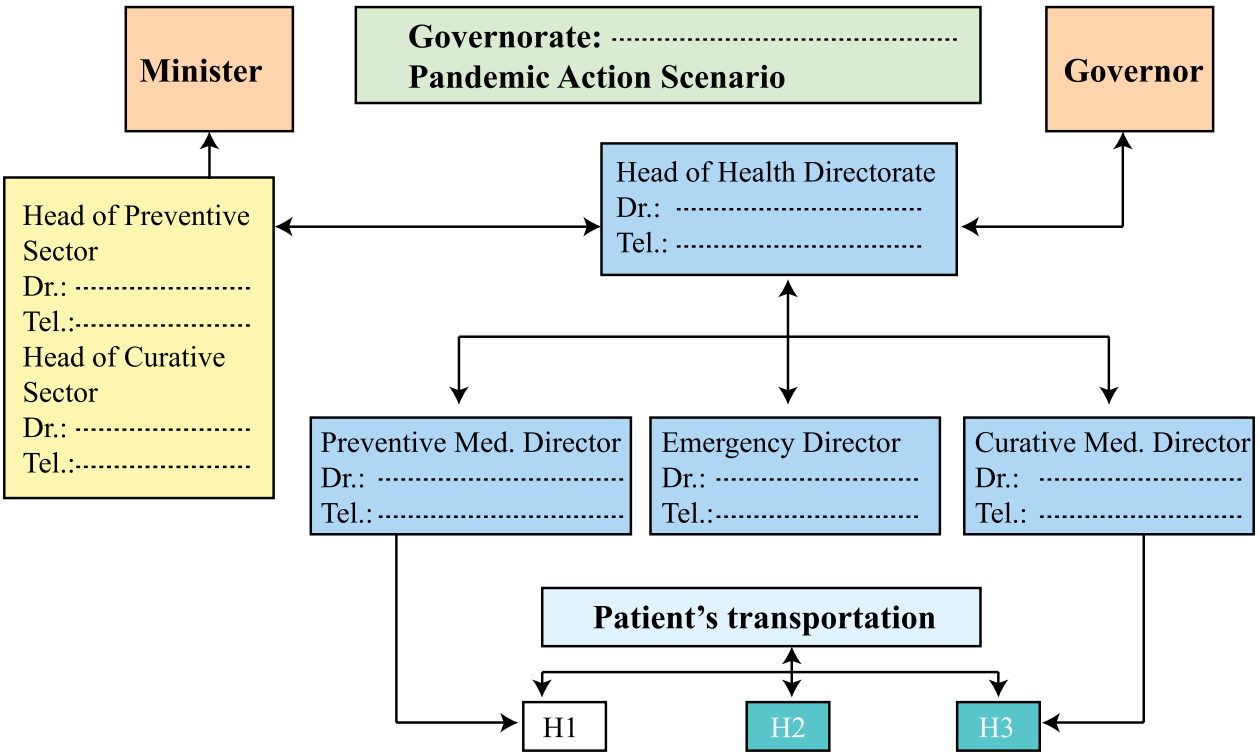
Appendix 10: Pandemic announcement (notification scenario)

The first notification is received from the Head of MOHP Directorate in the governorate.

Dr.: …… **Tel: ……**

Mobile: ……..

The Head of the Directorate issues his/her instructions to the Director of Preventive Medicine, Director of Emergency Aid, and Director of Curative Medicine to deal with the pandemic related cases according to the set plan, which is known to all parties, according to the assigned role of each of them and their supporting teams.



Head of Health Directorate, in coordination with Emergency, Preventive Medicine, and Curative medicine Directors, is responsible for work management at the time of pandemic.

- Immediate contact is to be made with the Heads of Preventive Medicine Sector and Curative Medicine Sector if there is a need for medical support, medications, supplies, transferring central rapid response team or air ambulance to transfer critical cases. All required actions are to be taken and the Minister and other concerned authorities are to be formally notified.
- Incident reports are to be sent to (Pandemic MOHP Emergency Room) Tel.:……..
  Tel.: …….. **Fax:……..**

Methods of work:

- Pandemic cases are recorded first in a special logbook in the reception. This will include patient's name, file number, address, age (year/month), gender, age group, admission date and time, and discharge condition.
- The group is to be organized in 2-3 work teams along with doctors and nurses assigned for cases triage.
- Bracelets are used by the medical registration team and it will include patient's data and unrepeated name. In case name of the patient is difficult to identify, a code number is written along with a special descriptive sign of the case.
- Recording is done in pre-prepared list forms which will be available at the reception office along with the wristlets and signs.
- Data are to be completed later and the patient track inside the hospital is be monitored. Each member of the group will be responsible for a certain number of lists.
- List forms are collected by the reception clerk who will transfer their data to the record book according to time of arrival.
- Copy of the list forms are sent to the department management office, which will prepare a collective data sheet and prepare a report including; number of cases, statistics, and periodical update of the situation in the department.
- In the event the Admissions Department is unable to obtain bracelets, white adhesive tape will be used for recording sequential numbers and the name (if possible) and will be affixed on the wrist or ankle.

Triage (determining disease severity):

- **Personnel in charge:**
  - The reception doctor on-duty according to the shift schedule.
  - Doctors whose specialties are not directly related to the pandemic (e.g., Gynecologists, Dermatologists, or Ophthalmologists etc …).
  - 2-3 reception nurses according to the shift schedule.
  - Medical registration/recoding team members.
- **Method of work:**
  - The doctor conducts an initial examination of the patient and classifies the case.
  - The nurse or the doctor marks the patient according to his/her classification. The doctor also identifies the first medical specialization that should deal with the case and record that on the colored card.
  - Patient data and classification is recorded.
  - Staff responsible for patient transfer is to be notified with the place where the

patient has to go for treatment.

- **Triage classification cards:**

Signs have to be in the form of cards. These cards will be in three colors; each refers to patient's case and priority according to his/her condition (triple code).

- **Red:** for those who are suffering from death causing injuries.
- **Yellow:** for those who suffer from life threatening injuries and in need for intervention and good observation/follow up.
- **Green:** for stabilized cases (simple injuries or broken bones).
- **Black or white cards** will be placed on cases who died before reaching the hospital or who have died while being admitted.

- **Cards locations:**

- Reception office along with the identification bracelets and special lists.
- The ambulances which transfer the cases.
- If it is difficult to get cards, paper or plaster is used and marked by marker pen for colors. These colors are located at the secretary office of the emergency department.

- **Dealing with cases:**

- Cases of influenza will be received in predetermined areas within the hospital
- Triage team will receive and examine each case and perform triage based on the initial examination as described above.
- Distribution of cases:
  - Green card-holders will be placed in observation rooms in the admission department and treated by the minor cases team. Alternatively, persons may be cared for in the hallways of the admission department.
  - Yellow card-holders are placed in the main hospital units. Alternatively, hallways in front of main hospital units may be used.
  - Red card-holders should be placed in critical care units. Alternatively, care may be given in the internal hallways in front of critical care units.
  - Stable patients requiring hospitalization or higher levels of care will be transferred to higher levels when possible.

Patient transportation (ground and air ambulance):

The Governorate Ambulance Director organizes and manages this part of the plan which includes:

- Transporting patients to specified hospitals according to the severity of their illness.
- Practicing infection control within ambulance.
- Determining the number and type of cars needed to transport the ill, as well as designating doctors to accompany critical cases.
- Ensuring case information for all persons (including the hour of service, identifying patient data, patient's condition and the hospital to which the patient has been transported) is entered into a special register.
- Notifying the Emergency Control Unit of The Directorate and the Ministry about the situation immediately after providing service.

List of Governorate ambulance staff

Serial no.	Position	Name	phone	
			Mobile	Home
1	Ambulance's Director General			
2	Deputy Ambulance Director			

Ambulances and staff (hospital plan should include information about the vehicles existing in the main ambulance center which serve the hospital area including the ambulances located inside the hospital or in near-by locations).

Serial no.	Vehicle Number or Code	Driver's Name	Mobile phone	Paramedic Name	Mobile phone	Doctor's Name	Mobile phone
1							
2							
3							
4							
5							
6							

Staff call and distribution of responsibilities (call and code):

When pandemic is announced in the area where the hospital is located, call and code system has to be activated to call all staff to work station for top emergency needs as follows:

Authority for issuing call order:

1. Hospital's General Director.
2. Emergency Director (in case of Director General absence).
3. On-duty Hospital's Deputy Director (in case of Emergency Director absence).
4. Deputy Administrative Director (in case of On-duty Deputy Director absence).

Serial no.	Position	Name	phone	
			Mobile	Home
1	Hospital's Director General			
2	Emergency Director			
3	On-duty Hospital's Deputy Director			
4	Deputy Administrative Director			
5	Deputy Administrative Director			

Staff responsible for making calls:

1. Operator (1): internal calls.
2. Operator (2): external calls.
3. Operator (3): stand-by.

Serial no.	Position	Name	phone	
			Mobile	Home
1	Operator (1)			
2	Operator (2)			
3	Operator (3)			

Call and code:

First: Personnel inside the hospital

" Code one … all hospital staff… code one … emergency department " This call is repeated until the arrival of the appropriate number of staff to the Emergency Department.

In case of one of the plan's key players is absent, he/she has to be called by name and position.

Second: Staff outside the hospital

- Doctors are called.
- Nursing staff and supervisors are called.
- Admin staff, workers, and basic service personnel are called.
- A list of all doctors is to be prepared which includes; name, specialty, mobile and home phone numbers. A copy of this list has to be at the operator's desk to be used as needed.
- List of the nursing staff and supervisors is prepared including; name, department of work, mobile and home phone numbers.
- A list of administrative staff has to be prepared including; name, department of work, mobile and home phone numbers especially, for those who are working at the reception, storage, pharmacy, financial affairs, kitchen and other critical positions.

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