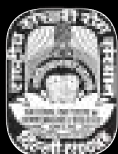
HEALTH CARE WORKERS MANUAL FOR AVIAN INFLUENZA



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World Health Organization
Country Office for India

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About the Manual

Purpose and scope

The purpose of this document is to provide infection control guidance to health care workers (HCWs) or those providing care to patients with suspected or confirmed avian influenza (AI) infection (including H5N1).

Health care workers include:

- Field workers involved in surveillance and related activities
- Nursing and paramedical staff involved in providing care to (suspected) Avian Influenza cases
- Laboratory workers involved in the collection of clinical samples from suspected cases of Avian Influenza.

These guidelines are intended for use only in situation of Human Avian Influenza infections where there is no evidence of sustained human-to-human transmission. Although this guidance may be modified as the epidemiology of AI evolves, health care facilities may use this guidance, in addition to the guidelines set in national/state pandemic influenza plans, to assist in pandemic influenza control.

Objectives

- Early detection of human cases and their management.
- Surveillance of avian influenza in affected areas.
- Containment of infection and prevention of its transmission.
- Generation of awareness about health care in the community and mobilizing community participation.

To achieve the objectives, the manual should preferably be translated in local languages to make it more understandable for health care workers.

Chapter 1

Introduction

Influenza is a respiratory illness caused by a virus that primarily attacks the upper respiratory tract, i.e. nose, throat and sometimes lungs. Infection usually lasts about one week. It is characterized by high fever, headache, malaise, cough and sore throat. It is estimated that influenza epidemics attack from 5 to 15 per cent of the population annually, causing approximately three to five million cases worldwide, including 250,000 to 500,000 deaths (mostly among the elderly).

Avian influenza, pandemic influenza and seasonal common cold are three different entities and need to be clearly understood by the health care worker. The broad differences can be seen in Table 1.

Avian influenza

Influenza A viruses affect birds and a few other mammals. Avian Influenza or "bird flu" is a contagious disease caused by viruses that normally infect only birds and, less commonly, pigs. While all bird species are thought to be susceptible to infection, domestic poultry flocks are especially vulnerable to the infection that can rapidly reach epidemic proportions. The disease, which occurs worldwide, was first identified in Italy in 1878 and was then known as "fowl plague".

Avian Influenza or "bird flu" is a contagious disease caused by viruses that normally infect only birds and, less commonly, pigs.

The disease in birds has two forms.

The first form is a mild illness, sometimes expressed only as ruffled feathers or reduced egg production. The second form of greater concern is known as "Highly Pathogenic Avian Influenza" (HPAI), and is characterized by sudden severe illness and rapid death with a mortality rate that can approach 100 per cent. When such infections occur, public health authorities need to monitor the situation closely because of concerns about the potential for spread of infection in the human population. HPA1 is the first indication

Table 1

Differences between pandemic influenza, avian influenza and seasonal common cold

Symptoms	Pandemic influenza	Avian influenza (AI)	Seasonal common cold (including seasonal influenza)
	Influenza pandemics are caused by new influenza viruses that adapt to human transmission by reassortment	Caused by Influenza 'A' virus, family Orthomyxoviridae. AI or bird flu is a contagious disease of animals, caused by a virus that normally infects birds and less commonly pigs and humans	Rhinovirus, adenovirus, influenza A & B and para influenza viruses are the pathogens most commonly associated with common cold. It is a viral illness that affects adults on an average 4 to 8 times a year
Fever	Usually high, lasts 3–4 days	Fever >38°C	Mild and self- limiting
Body ache	Severe, can last 2–3 weeks	Always present	Mild
Sore throat	Seen sometimes	Common	Common
Stuffy nose	Seen sometimes	Sometimes	Common
Cough	Yes	Yes	Unusual
Chest discomfort	Common	Common	Not common
Complications	Acute respiratory distress and other severe life-threatening complications	Bronchitis, pneumonia; in severe cases life-threatening complications	Sinus congestion, sometimes secondary bacterial infection

to public health authorities that human avian influenza cases might occur.

Avian Influenza virus characteristics

Avian influenza ("bird flu") viruses belong to influenza type A, which are part of the family Orthomyxoviridae. Influenza A viruses can be divided into subtypes on the basis of their surface proteins - hemagglutinin (HA) and neuraminidase (NA). There are 16 known H subtypes. While all subtypes can be found in birds, only three types of HA (H1, H2 & H3) and two subtypes of NA (N1 and N2) are known to have circulated widely in humans. Influenza A viruses are found in many different animals, including ducks,

chickens, pigs, whales, horses and seals. Of the 16 avian influenza virus subtypes, H5N1 is of particular concern for several reasons. H5N1 mutates rapidly and has a documented propensity to acquire genes from influenza viruses infecting other animal species. Its ability to cause severe disease in humans has been documented on two occasions (Hong Kong 1997, Hong Kong/China 2003) and has now been well established in many other Asian countries.

The danger from avian flu is that the virus could develop into a new strain that could be transmitted among humans. The virus might mutate or in a human already infected with the human flu virus it may mix or 'reassort' with that virus. Because humans would have little or no immune protection against this novel strain and since there are no existing vaccines, it could potentially cause a massive pandemic. For example, in 1918, the Spanish flu strain underwent such a process, becoming highly contagious among humans and causing 50 lakh to 100 lakh deaths.

A pandemic (global epidemic) is an outbreak of an infectious disease that affects people or animals over an extensive geographical area. During the 20th century, there were three influenza pandemics: 1918, 1957 and 1968 (Table 2). A pandemic strain is always a subtype that has not previously circulated in humans and it is presumed that it would have dangerous consequences since the vast majority of the population would have no immunity to it.

Once a fully transmissible human pandemic virus emerges, it is expected to encircle the globe within three months. Because H5N1 has become established within the poultry population in South-East Asia, and has proven its continued ability to cross the species barrier and infect mammals including humans, it is clear that H5N1 is a strain with pandemic potential. However, any other subtype not recognized as yet could also be responsible for the next pandemic.

The type of strain prevailing and the death toll (mortality) during the previous pandemics can be seen in Table 2. It is clear that during the past pandemics the death toll was very high and the strains were different during each pandemic. As per the information (not shown in table) available, the morbidity (number of cases) due to the pandemic strain was very high during each pandemic.

Table 2
Previous pandemics and their magnitude

Year	Designated influenza strain	Death toll
1918	H1N1 ('Spanish')	50 - 100 lakh
1957	H2N2 ('Asian')	1 - 4 lakh
1968	H3N2 ('Hong Kong')	1 - 4 lakh

The global scenario of avian influenza

I. Avian influenza in humans

Since mid-December 2003, human infections with Influenza A (H5N1) have attracted attention of public health professionals. Infections in humans have been reported in Vietnam and Thailand following outbreaks of highly pathogenic H5N1 infection among poultry.

- A total of 349 laboratory confirmed human cases of Avian Influenza H5N1 including 216 deaths (Case Fatality Ratio = 62%) have been reported to the World Health Organization (WHO) till the end of December 2007 from 14 countries. These include Azerbaijan (8 cases, 5 deaths), Cambodia (7 cases, 7 deaths), China (27 cases, 17 deaths), Djibouti (1 case, 0 death), Egypt (43 cases, 19 deaths), Indonesia (117 cases, 94 deaths), Iraq (3 cases, 2 deaths), Lao People's Democratic Republic (2 cases, 2 deaths), Myanmar (1 case, 0 death), Nigeria (1 case, 1 death), Pakistan (1 case, 1 death), Thailand (25 cases, 17 deaths), Turkey (12 cases, 4 deaths) Vietnam (101 cases, 47 deaths).

II. Avian influenza in poultry

- Globally, from December 2003 till end of December 2007, a total of 62 countries have reported Avian Influenza (type H5N1) in birds/animals to the World Organization for Animal Health (OIE). These include Republic of Korea, Vietnam, Japan, Thailand, Cambodia, Lao PDR, Indonesia, China, Malaysia, Russia, Kazakhstan, Mongolia, Turkey, Romania, Croatia, Ukraine, Iraq, Nigeria, Azerbaijan, Bulgaria, Greece, Italy, Slovenia, Iran, Austria, Germany, Egypt, India, France, Hungary, Slovakia, Bosnia-Herzegovina, Georgia, Niger, Sweden, Switzerland, Serbia-Montenegro, Poland, Albania, Cameroon, Myanmar, Denmark, Israel, Afghanistan, Pakistan, Jordan, Czech Republic, Burkina Faso, Palestinian Auton Territories, United Kingdom, Sudan, Cote d'Ivoire, Djibouti, Spain, Hong Kong (SARPRC), Philippines, Kuwait, Bangladesh, Saudi Arabia, Ghana, Togo and Benin.

The Indian scenario

These guidelines have been developed based on the investigation and containment of recent outbreaks of avian influenza (H5N1) in poultry in Nandurbar (Navapur block) and Jalgaon districts in Maharashtra; the Surat district (Uchhal block) in Gujarat and Burhanpur district (village Ichhapur) in Madhya Pradesh in 2006 and in Manipur in 2007. Fortunately, no human illness with AI has been detected.

Chapter 2

Epidemiology of Avian Influenza

Since 1997, when the first human infections with the H5N1 Avian Influenza virus were documented, the virus has undergone a number of changes. These changes have affected the patterns of virus transmission and spread among domestic and wild birds. Human infection remains a rare event. The virus presently does not spread easily from birds to humans or readily from person to person.

Reservoir

The incubation period (the median time between exposure and onset of illness) for classic human influenza virus infection is 2–3 days (range 1–7 days). The incubation period of influenza A (H5N1) is 3 days (range 2–4 days).

Migratory waterfowl – most notably wild ducks – are the natural reservoir of avian influenza viruses, and these birds are also the most resistant to infection. Domestic poultry, including chickens and turkeys, are particularly susceptible to epidemics of rapidly fatal influenza. Direct or indirect contact of domestic flocks with wild migratory waterfowl has been implicated as a frequent cause of epidemics. Live bird markets have also played an important role in the spread of epidemics.

Clinical presentation

The incubation period (the median time between exposure and onset of illness) for classic human influenza virus infection is 2–3 days (range 1–7 days). The incubation period of influenza A (H5N1) is 3 days (range 2–4 days).

In birds

- Infection with influenza viruses causes a wide spectrum of symptoms in birds, ranging from mild illness to a highly contagious and rapidly fatal disease resulting in severe epidemics. The latter is known as "Highly Pathogenic Avian Influenza" (HPAI). This form is characterized by sudden onset, severe illness, and rapid death, with a mortality that can approach 100 per cent. Infection by H5N1 influenza strain is an example of HPAI, which is dangerous and fatal among poultry.

- Clinical signs in poultry include ruffled feathers, soft shelled eggs, depression and droopiness, sudden drop in egg production, loss of appetite, cyanosis, diarrhoea, oedema and swelling of head, eyelids, etc., blood-tinged discharge from the nostrils, incoordination, including loss of ability to stand and walk, pin-point haemorrhages, respiratory distress and rapid and increased deaths in a flock.

In human beings

The reported symptoms of avian influenza in humans have ranged from typical influenza-like symptoms to pneumonia. The initial signs and symptoms include:

- high fever(>38°C)
- cough
- sore throat
- muscle aches
- eye infections
- watery diarrhoea

These may be followed by severe and life-threatening complications:

- Lower respiratory symptoms or signs including dyspnoea and auscultatory signs.
- Clinically apparent pneumonia with chest X-ray changes, which are non-specific and include diffused, multi-focal or patchy infiltrates, interstitial infiltrates, and segmental or lobular consolidation with air bronchogram.
- Respiratory distress and subsequent respiratory failure within one week of onset of symptoms. Most such cases have died despite antiviral treatment and ventilator support.

Mode of transmission (spread) of influenza virus (including human avian influenza)

Available evidence suggests that transmission of human influenza viruses occurs through:

- Multiple routes including large droplets, direct and indirect contact, and droplet nuclei (droplet >5 µm in diameter from the nose and throat of an infected person who is coughing and sneezing).
- Airborne (droplet nuclei) transmission may be more likely to occur in situations in which droplet nuclei particles are generated (i.e. aerosol-generating procedures in infected patients).
- Through faeco-oral transmission from the influenza patients having diarrhea

Droplet transmission

Coughing, sneezing, and talking can generate respiratory aerosols, which contain aerosol particles of varying size. Larger particles (>5 µm) typically remain suspended in the air for a limited period and settle within 1 metre (3 feet) of the source. The smallest particles (<5 µm) evaporate quickly and the dried residues that remain (droplet nuclei) settle from the air slowly. Droplets are generated primarily during coughing, sneezing, and talking. Droplet transmission occurs when larger particles (>5 µm) containing the infectious agent are propelled through the air and deposited on the host's conjunctivae, nasal mucosa, or mouth. Droplet transmission has been considered a major mode of transmission of influenza. Therefore, respiratory etiquette is of paramount importance in preventing the spread of human influenza viruses.

Avian Influenza A (H5N1) transmission

Avian-to-human

- By direct contact with sick or dead poultry
- Contact with infected poultry products, feathers and droppings of poultry
- Contact with dead or sick migratory birds
- Ingestion of poultry (not a common route of infection)

Human-to-human

- So far no or limited human-to-human transmission has been reported. In the event of human-to-human spread it would be similar to seasonal influenza, with high morbidity and mortality. The disease will spread by direct contact with patient's secretions (nasal and eye secretion) or droplet airborne infection.
- In the current AI outbreaks, investigation of human AI (H5N1) cases suggests that human-to-human transmission may have occurred in household clusters and in one case of apparent child-to-mother transmission. Thus, so far all secondary cases appear to have had close contact with cases without the use of necessary precautions and human-to-human transmission via the airborne route has not been identified.
- Since diarrhea has been frequently noted in AI (H5N1) infected patients and the virus has been isolated from the faeces of a human case, faeces may also prove to be a source of infection.
- Disease transmission and severity may also be related to viral load, viral strain, and host immune response.

Control measures

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

Chapter 3

Health Care Workers – Activities related to Surveillance and Response

A surveillance system for animal health can detect infection in poultry quickly which can be followed by rapid containment measures by safe culling of infected and exposed poultry as per the contingency plan for avian influenza.

"Surveillance is the continuing scrutiny of all aspects of occurrence and spread of a disease that are pertinent for its effective control." In simpler language, it means keeping a close watch on the disease.

The need for influenza surveillance - Surveillance activities by health care workers

Poultry surveillance

Main responsibility : - Animal Husbandry

A surveillance system for animal health can detect infection in poultry quickly which can be followed by rapid containment measures by safe culling of infected and exposed poultry as per the contingency plan for avian influenza. Health care workers should also be alert to recognize early warning signals like high mortality in poultry (both commercial and backyard) in the community.

Community surveillance

Health care workers need to undertake surveillance of the community, cullers, veterinary personnel involved directly or indirectly with the infected poultry; and those taking care of any suspected human case of avian influenza. The following activities are suggested:

- House-to-house surveillance on a daily/regular basis.
- Daily monitoring of any suspected or confirmed case of avian influenza or seasonal influenza.
- Reporting of suspect case(s) to civil surgeons/Chief Medical Officer (CMO)/Primary Health Centre (PHC) Medical Officer on a daily basis by the fastest mode.

- Any suspected case of avian influenza, if observed (as per case definition in annexure-I) should be sent to the nearest hospital/health facility for further action.
- The containment measures are to be followed as per the guidelines.
- Prophylactic treatment is to be given as and when required, as per the guidelines.

Laboratory surveillance

Although transmission of Avian influenza A (including H5N1) among humans is very limited at present, there is an absolute need to expand the current laboratory based influenza surveillance system for continued monitoring to identify any change in the virus characteristics.

The surveillance mechanism

- The Department of Animal Husbandry would activate its action plan on receipt of any preliminary report (from any source) regarding unusual sickness or above average mortality in poultry or wild/migratory birds.
- The health care worker should inform the Medical Officer of the PHC/District Animal Husbandry Officer (DAHO) immediately, who accompanied by a District CMO and DAHO shall visit the site without any delay and personally ascertain the circumstances and facts of the event. This will help in liaison between the two departments.
- The health professionals and health care workers should actively search for influenza-like illness in humans exposed (or likely to be exposed) to the AI infection in the 0–3 km infection zone around the central area affected by avian influenza.
- Clustering of cases of unexplained moderate to severe acute respiratory illness in humans or cases dying of an unexplained acute respiratory febrile illness in areas affected by avian influenza (H5N1) may be an early warning signal for efficient human-to-human transmission and calls for heightened surveillance. The HCW should report such cases to his concerned medical officer immediately.
- This should trigger immediate epidemiological investigation to find out potential exposure to the avian influenza virus. The information about such early warning signals must be conveyed immediately to the local district human and animal health authorities.
- HCW would assist the rapid response teams (RRT) for early investigation and containment of the outbreak as many respiratory diseases produce symptoms similar to avian influenza.
- Diagnosing sporadic cases in humans is not an easy task, especially in areas where poultry death or sickness is not occurring or has not been reported so far.
- In the area where the outbreak is occurring in the poultry, active search should be undertaken for sporadic as well as for clusters of suspected and probable cases in at risk population. Health care workers employed for this purpose must follow universal precautions.

Surveillance needs to be in place to identify cases in:

a. the areas where antiviral prophylaxis and non-pharmaceutical measures are being implemented;
b. adjacent areas; and
c. other areas that may be at increased risk due to the usual pattern and mode of transportation and travel of cases.

Surveillance strategies

During containment, a parallel surveillance system should not be established; rather the existing surveillance under Integrated Disease Surveillance Project (IDSP) should be strengthened to include avian influenza. Enhanced surveillance strategies initiated during initial rapid response and investigation in health care and community-based settings should be continued including:

1. Active surveillance in hospitals, particularly targeting patients having flu-like illness attending OPD and emergency departments
2. Expansion of surveillance to other sources such as traditional healers, private practitioners and private laboratories
3. Supplemental measures such as telephone hotlines, rumor tracking and verification and ham/community radio or other emergency networks for reporting suspected cases in the community
4. Active surveillance of the groups that may be at a higher occupational risk of exposure viz. poultry workers, health care workers, cullers and their family members etc.

During the containment process other approaches may be utilized e.g. active case finding using house-to-house searches and visits to densely populated settings which may be at increased risk of human-to-human transmission such as residential facilities, military barracks, dormitories, camps, etc.

Containment measures for avian influenza

Containment is a resource-intensive measure which requires strong coordination between animal and human health sectors and also with other stakeholders in public and private sectors including international agencies like the World Health Organization (WHO), World Organization for Animal Health (OIE), and Food and Agriculture Organization (FAO). Important containment measures are:

- Elimination of source of infection (total culling of poultry and safe disposal of carcasses, excreta and poultry products in the infection zone, biosafety in the farms, etc.)
- Enhanced surveillance to detect additional cases in 0-3 km, i.e. infection zone
- Management of cases in isolation ward
- Active contact tracing, monitoring and management through public health measures (chemoprophylaxis, voluntary home quarantine and non-pharmaceutical health measures)
- Strict infection control practices in health care settings
- Risk communication
- Exceptional measures like area quarantine, social distancing like

closure of schools, cinema halls and places of mass gatherings, and mass antiviral chemoprophylaxis in a defined geographical area.

Define at-risk population: During the outbreak of avian influenza in poultry/birds, the following at-risk populations should be kept under active surveillance for 10 days after the last day of culling operation of poultry to detect suspected/probable cases of avian influenza. They include:

- Persons working in affected/unaffected commercial poultry farms in infection zone;
- Persons exposed to dead/dying/diseased backyard poultry;
- Cullers (persons involved in culling of poultry);
- Labourers used to help the cullers or to dispose off potentially infected material;
- Workers in live animal market, persons working with live or recently killed birds, dealers in pet birds;
- Close contact of human cases of avian influenza (for example, household, neighborhood, workplace, school and social contacts);
- Laboratory personnel who handle suspected clinical material or the virus;
- Health care workers working in the affected area;
- Population in the affected village/town;
- Population in 0–3 km area (infection zone) — first priority;
- Population in 3–10 km area (surveillance zone) — second priority;
- All persons with flu-like symptoms coming to the OPD of health care facilities in the avian influenza outbreak-affected areas;
- All other persons who had or are likely to come in contact with dead, recently dead or dying birds/animals, infected poultry products and waste material.

Quarantine

Quarantine refers to separation and restriction of movement of persons or animals who, when not yet ill, have been exposed (or are considered to be at high risk of exposure) to a case of communicable disease during its period of communicability.

The quarantine measures will depend on the disease pattern in the country. Three situations have been identified along with measures for quarantine that need to be followed:

i. Where avian influenza is suspected in birds/poultry (described below);
ii. Where one or more human cases of avian influenza (as per standard case definition) have been reported;
iii. Where human-to-human transmission has been established in a small cluster.

Quarantine where avian influenza is suspected in birds/poultry

i. The following quarantine measures are recommended for human beings: Quarantine of the affected village and all villages within a radius of 0–3 km, whichever is more. This will apply to exposed individuals (poultry workers, community members, etc.) within the

above-specified area. No one from the affected area will be allowed to move out of the infected zone, nor will outsiders be allowed to enter the affected area. Medical care, food supply, social support, communication and psychological assistance for the people in the community under quarantine should be ensured. Schools, colleges, cinemas, weekly markets should be closed and social gatherings should be avoided as far as possible.

ii. Those engaged in culling activities will be quarantined for a period of 10 days after the last culling.

iii. The health care providers working in the field and visiting the affected area, would take necessary chemoprophylaxis before the visit. The team members would be quarantined in the defined geographical area.

iv. Extensive IEC activities should be undertaken for proper enforcement of the above recommendations.

Health monitoring in the community during quarantine period

Those at risk of occupational exposure should

1. Beware of the early clinical signs of H5N1 infection but also understand that many other common diseases of far less health concern will show similar early symptoms.

   Most patients infected with the H5N1 virus show initial symptoms of fever (38ºC or higher) followed by influenza-like respiratory symptoms, including cough, running nose, sore throat and (less frequently) shortness of breath.

   Watery diarrhea is often present in the early stages of illness, and may precede respiratory symptoms by up to one week. Gastrointestinal symptoms (abdominal pain, vomiting) may occur and headache has also been reported.
2. Check for these signs (especially fever) each day (morning and evening) during potential exposure and for 10 days after the last exposure.
3. Communicate development of any symptoms to a designated local physician and provide background information on exposure history.

Management of suspected cases

1. Place suspected cases in isolation and manage according to recommended procedures for infection control.
2. Collect sample from suspected cases according to national guidelines and submit samples to regional or national laboratories for investigations.
3. Samples and virus isolates may be sent to designated regional laboratories for diagnosis and virus characterization in accordance with national guidelines.
4. If possible (for research aimed at identifying risk factors for infection), collect paired serum samples and epidemiological data from persons who have been exposed. (Serological studies should be done using micro-neutralization tests only).

Advice about contact with poultry in an area with HPAI

i. Avoid handling (live or dead) chickens, ducks or any other poultry while visiting friends, family or others, even if the birds are thought to be healthy. Children should not be allowed to have contact with poultry or any other affected birds (live or dead).

ii. Avoid contact with chicken farms, duck farms or any farm where birds have been sick, killed or are thought to have bird flu.

iii. If a person comes into contact with an environment that has had sick/ dead chicken, ducks and other poultry products, he/she must wash hands properly. Monitor his/her temperature for four days regularly. If he/she develops a high temperature, consult a doctor immediately.

iv. If a person has had contact with any dead birds that have died from avian flu or had contact with the droppings of these birds, consult a doctor to know whether treatment is needed.

Sample Collection Guidelines

Specimen collection/transport/handling within health care facilities

General biosafety measures for avian influenza sample collection and transport:

- Preferably, trained health care personnel should collect clinical samples.
- Collect all clinical samples under special care (refer to universal work precautions).
- Use N95 masks while collecting samples. In case N95 masks are not available, triple layer well-fitted surgical face masks may be used.
- Use latex disposable gloves while collecting samples.
- Wear laboratory coat/disposable apron.
- Cover hair with head cover.
- Use protective eyewear (goggles)/face shields if procedure is likely to generate aerosols, or splashes of secretions.
- Waste generated while collecting samples should be segregated using special precautions. The disposable waste should be placed in an appropriate colour coded bag (autoclavable) and autoclaved before disposal. Contaminated non-disposable waste should be treated chemically. (Refer waste management guidelines - Annexure 5).
- The clinical samples should be processed only in a designated laboratory having the appropriate containment facilities.

Use N95 masks while collecting samples. The clinical samples should be processed only in a designated laboratory having the appropriate containment facilities.

Samples that need to be collected

Specimens for the laboratory diagnosis of avian influenza A should be collected in the following order of priority:

- Throat swab
- Nasal swab
- Acute phase blood sample
- Convalescent blood sample

(Serum should not be separated)

A variety of other specimens may be taken if patient is in hospital.

- Nasopharyngeal aspirate
- Sputum
- Rectal swab (if patient is having diarrhoea)
- Blood in EDTA for PCR test

In addition, the following samples using invasive procedures can also be collected:

- Transtracheal aspirate
- Bronchoalveolar Lavage (BAL)
- Lung biopsy
- Postmortem lung or tracheal tissue
- CSF (in case of accompanying meningitis)

Samples should be collected by

- Doctor in the PHC/district hospital/ OPD
- Occasionally HCW in the hospital setting under supervision of clinician

For Sample Collection Kit

The containers for sample collection will be provided by the laboratories. The district laboratory should always have a stock of these materials which will be supplied to them by a state-designated laboratory or you could request state RRT (microbiologist).

Material required for sample collection: Refer to Annexure 2

Collect and transport respiratory specimens in viral transport media. A number of media that is satisfactory for the recovery of a wide variety of viruses are commercially available.

Labeling of sample vials

- In a diagnostic investigation, collect all information contained in the case investigation form along with the specimen.
- Assign a unique identification number to each patient. Make sure that this unique identification number and the patient name is present on all specimens, epidemiological data forms, and the laboratory transmittal forms.
- Use preprinted labels whenever possible. Permanently affix label to the specimen container. Enter the following information:

Patient name: ....

Identification No.: ....

Specimen type: ....

Date of collection: ....

Time: ....

Blood collection for influenza diagnosis

Since the samples are collected by clinicians or under their supervision, the methodology for collection of samples is to be followed as per the contingency plan.

Specimen storage

Specimens in viral transport medium for viral isolation should be kept at 4°C and transported to the laboratory promptly. If specimens are transported to the laboratory within two days, they may be kept at 4°C; otherwise they should be frozen at or below –70°C until they can be transported to the

laboratory. Whole blood sample should NOT be frozen.

Blood/sera may be stored at 4°C for approximately one week, but thereafter only sera should be frozen at –20°C. Specimens for influenza should not be stored or transported in dry ice (solid carbon dioxide) unless they are sealed in glass or sealed, taped and double plastic-bagged. Carbon dioxide can rapidly inactivate influenza viruses if it gains access to the specimens through shrinkage of tubes during freezing.

Packaging of samples

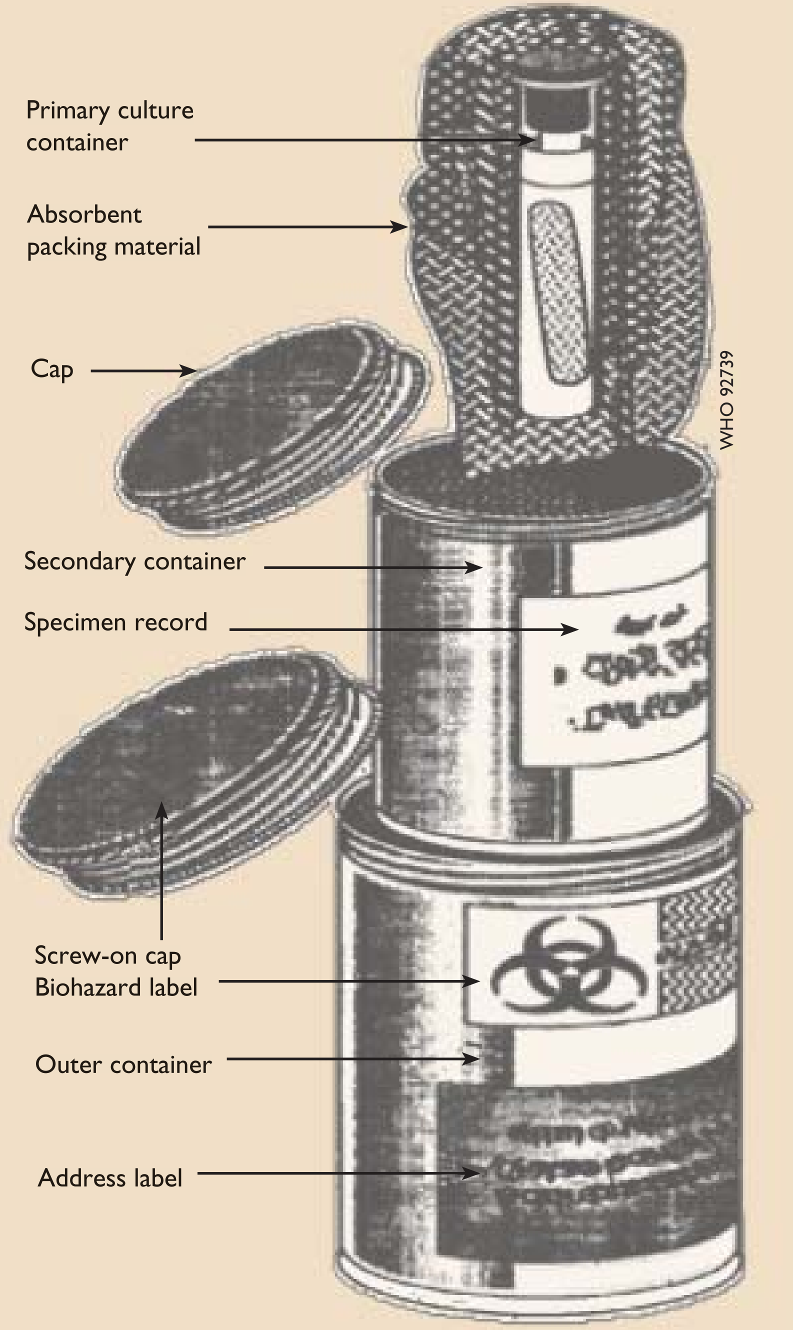
WHO approved basic triple-packaging system

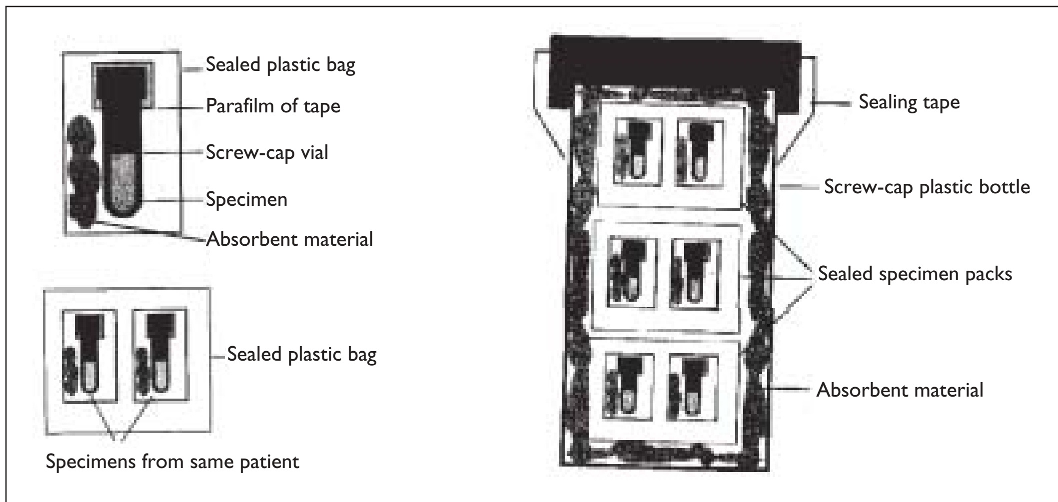
- Place the specimen in the primary container with ID number that must be leak-proof unbreakable and airtight. After tightening the cap, apply sealing tape over the cap and top of the specimen container and wrap in absorbent material (e.g. cotton wool) to absorb accidental leakage. If cotton wool is not available, tissue paper/old newspaper can be used.
- The sealed specimen container with a small amount of absorbent material must be placed in a suitably sized plastic bag. The bag must be sealed. Two or more sealed specimens from the same patient may be placed in a larger plastic bag and sealed. Specimens from different patients should never be sealed in the same bag.
- Place the sealed bags containing the specimens inside secondary plastic containers with screw-capped lids. Specimens from several patients may be packed inside the same secondary plastic container. Place additional absorbent material inside the secondary container to cushion multiple primary receptacles and absorb any leakage that may occur. Tape the laboratory request form sealed in a plastic bag to the outside of this secondary container.
- The outer package or tertiary container protects the contents from physical damage and water while in transit. It should have a resistant, high-density external cover (e.g. metal, wood, or fiberboard), shock-absorbent padding on the inside, and a tight-fitting lid. The outer package must be leak proof and well insulated, and can contain ice, cold packs or dry ice, whatever is available.
- It is the duty of the CMO to arrange to send the sample to a designated laboratory following all precautions.
- The HCW who is carrying the sample should follow biosafety precautions.

Transport of specimens - precautions

- All samples are to be transported at a temperature of 4–8°C and should reach the laboratory within 24–48 hours.
- Before transport, inform the receiving laboratory about all shipping and specimen details in advance of specimen arrival.
- If international transport is necessary, the laboratory should organize appropriate authorization for the same.
- While arranging for transportation, provision should also be made for

WHO-approved triple packaging system should be followed as indicated below





information to the sender on receipt or non-receipt of the specimens.

Surface transport/courier service

- Securely fasten transport boxes in the transport vehicle.
- To meet any accidental leakage/spillage in the vehicle keep a spill kit containing absorbent material, chlorine disinfectant, heavy-duty reusable gloves, face masks, aprons, goggles, and leak proof waste disposal container.
- Arrange for an adequate amount of refrigerant at regular intervals in case of delays in the travel schedule so that the cold chain is maintained.
- Avoid extensive vibration of samples that can happen when traveling for long periods over roads as this can haemolyse blood samples, rendering them useless.

Air transport/postal service

- Diagnostic specimens may be sent by mail in conformity with all relevant international, national, and commercial carrier requirements.
- Contact with the postal authorities should be established prior to the collection of samples to ensure their ability to transport the materials and to verify understanding of the shipping requirements.

Arrangements to be made to send samples through:

- HCW directly to NIV, Pune/NICD, Delhi or any other designated laboratory in the state.
- Indian Airlines or any other earliest flight from the nearest airport. Airway bill along with information should be faxed to designated laboratory so that the sample box is collected well in time.

Infection Control Guidelines

Universal work precautions, respiratory hygiene/cough etiquette and proper use of appropriate Personal Protective Equipment minimize human infection with AI virus.

Universal work precautions

(a) Hand washing:

- Before and after patient contact.
- After removing gloves or any other Personal Protective Equipment (PPE).

  Routine hand washing should be performed either by using an alcohol-based hand rub (preferably) or by washing hands with soap and water, or if nothing is available, using fresh ash and water. After washing, hands should be dried with a towel or tissue paper or if nothing is available, even newspaper can be used. Tissue paper or any other paper once used should be discarded as infected waste. If towel is used, it should be washed.

(b) Use appropriate PPE to avoid contact with blood, body fluids, excretions, and secretions.

(c) Appropriate handling of patient care equipment and soiled linen.

(d) Prevent needle stick/sharp injuries (in case of any needle stick injury squeeze to ooze blood, wash hands thoroughly with soap and water and inform the concerned authorities).

(e) Appropriate environmental cleaning and spills-management.

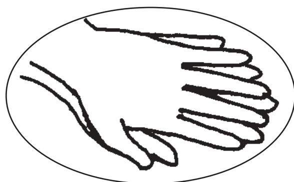
(f) Appropriate handling and disposal of waste.

Respiratory hygiene/cough etiquette for all (including health care facilities)

(a) Persons with respiratory illness should be educated to:

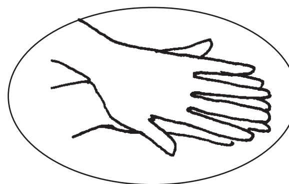
- Cover their mouth and nose with a tissue paper when coughing and dispose of used tissue paper in waste containers;
- Use a mask if coughing, if it can be tolerated;
- Perform hand hygiene (use an alcohol-based hand rub or wash hands with soap and water or fresh ash) after contact with respiratory secretions; and

Steps of good hand washing



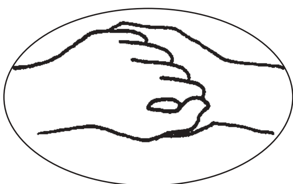
Step 1

Wash palms and fingers



Step 2

Wash back of hands

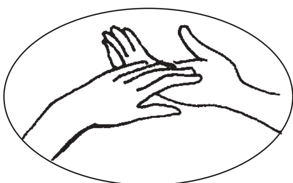


Step 3

Wash fingers and knuckles

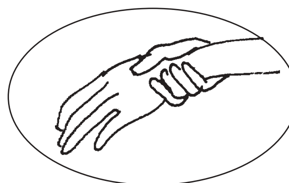
Step 4

Wash thumbs



Step 5

Wash fingertips



Step 6

Wash wrists

- Stand or sit at least 1 meter (3 feet) away from other persons.

(b) Health care facilities should promote respiratory hygiene/cough etiquette by:

- Educating HCWs, patients, family members and visitors on the importance of minimizing respiratory aerosols and secretions that help in preventing the transmission of influenza and other respiratory viruses.
- Making available masks, tissue paper and alcohol-based hand rubs so that control measures at the source of infection can be implemented in common areas and areas used for the evaluation of patients with respiratory illness.

Personal Protective Equipments for Avian Influenza

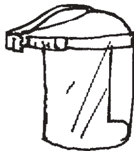
PPE reduces the risk of infection if used correctly. It includes:

Gloves

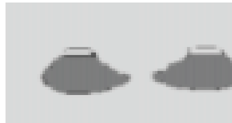
N95 mask (high-efficiency mask)

Long-sleeved cuffed gown

Protective eyewear (goggles/visors/face shields)

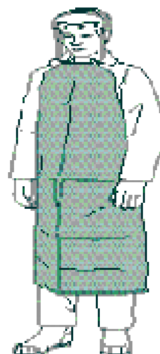


Shoe cover



Triple layer mask

Head cover (may be used in high risk situation where there may be increased aerosols)



Plastic apron (if splashing of blood, body fluids, excretions and secretions is anticipated)

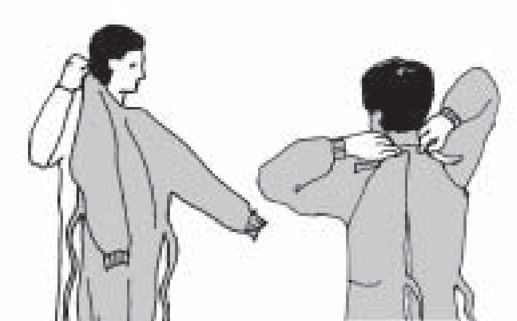
Correct order/procedure of wearing PPE

- First wear shoe covers with trousers tucked inside
- Thorough hand wash
- Wear the overall/apron/gown
- Wear head cover to cover hair completely
- Wear face masks
- Wear goggles/eye shield
- Wear gloves
- PPE must be changed after every 6–8 hours.
- Used PPE should be disposed of properly.

Gown

Before wearing a gown, first select the right size for yourself. The gown should open in the back (front closing); secure the gown at the neck and waist. If the gown is too small to fully cover your abdomen, use two gowns. Put on the first gown with the opening in front and the second gown over the first with the opening in the back.

The proper sequence for wearing a gown.



Face masks

- Some masks are fastened with ties, others with elastic. Unfold the pleats of the masks and make sure they are facing down. If the mask has ties, place the mask over your mouth, nose and chin.
- Fit the flexible nose piece to the bridge of your nose; tie the upper set at the back of your head above the ears and the lower set at the base of your neck.

The proper fit for a face mask with ties.

- If a mask has elastic headbands (e.g. in the case of N95 masks) separate the two bands.
- Place and hold the mask over your nose, mouth and chin, then stretch the bands over your head and secure them comfortably as shown; one band at the back of your head above the ears, the other below the ears at the base of the neck.
- Adjust the mask to fit.
- Remember, you don't need to touch it during use, so take the few seconds needed to make sure it is secure on your head and fits snugly around your face and make sure there are no gaps.

The technique for wearing a particulate respirator, such as an N95, is similar to putting on a pre-formed mask with elastic head bands.

The key differences are:

- The need to first select a respirator for which you have been fit-tested.
- Fit checking the device, as you have been instructed, before entering an area where there may be risk of getting airborne infectious disease.

Select a fit–tested N95 mask

- Select a fit-tested N95 mask.
- Place over nose, mouth and chin.
- Stretch the bottom band over the head and position below the ear.
- Stretch and position the top band high on the back of the head.
- Press the masks firmly against face with the nose piece to the shape of your nose.
- Test the fit of the masks by exhaling vigorously and checking for any leakage.

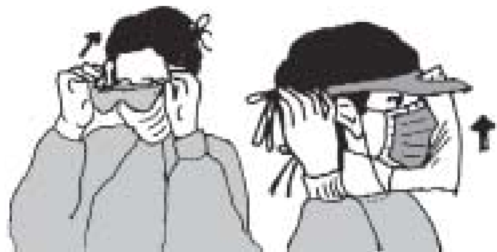
The correct technique for fitting a (N95) mask.

Be sure to follow the manufacturer's instructions for wearing the device. In some instances, the manufacturer's instructions may differ slightly from those presented here.

Eye wear/face shield

- Either goggles or a face shield should be worn.
- Position either device over the face and/or eyes and secure to head using the attached earpieces or headband.
- Adjust to fit comfortably.
- Goggles should feel snug but not tight.
- Position face shield over face and secure on brow with headband; adjust to fit comfortably.
- Position goggles over eyes and secure to the head using the earpieces or headband.
- Goggles can be worn over spectacles.

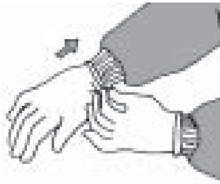
The proper placement of goggles and a face shield.



Gloves

- The last item of PPE to be worn is a pair of gloves.
- Be sure to select the type of glove needed for the task in the size that best fits you.
- Insert each hand into the appropriate glove (right or left side) and adjust as needed for comfort and dexterity.
- If you are wearing an isolation gown, tuck the gown cuffs securely under each glove. This provides a continuous barrier protection for your skin.

Adjusting gown cuffs securely under the gloves.



In addition to wearing PPE, you should also follow safe work practices.

- Avoid contaminating yourself by keeping your hands away from your face and not touching PPE.
- Remove your gloves if they become torn and perform hand hygiene before putting on a new pair of gloves.
- Avoid spreading contamination by limiting contact with surfaces and items (which have been touched with contaminated gloves).
- Change mask if it becomes wet or after 6 to 8 hours of use.

Removing PPE

- To remove PPE safely, you must first be able to identify which sites of PPE are considered 'clean' and which areas are 'contaminated.'
- In general, the outside front and sleeves of the isolation gown and outside front of the goggles, mask, respirator, and face shield are considered 'contaminated,' regardless of whether there is visible soiling. The outside surfaces of the gloves are contaminated.
- The areas that are considered 'clean' are the parts that will be touched when removing PPE. These include the inside surfaces of the gloves; the gown ties and the inside and back of the gown; and the ties, elastics, or earpieces of the mask, goggles, and face shield.

The sequence for removing PPE is intended to limit opportunities for self-contamination.

Remove PPE in the following order:

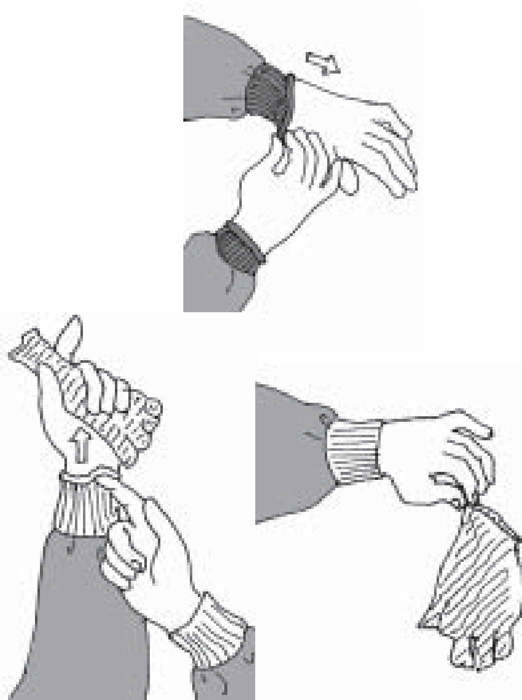
- Remove gloves (peel from hand and discard into rubbish bin).
- Remove goggles or face shield.
- Remove gown (discard into rubbish bin).
- Use alcohol-based hand-rub or wash hands with soap and water.
- Remove mask – **by grasping elastic behind ears – do not touch front of mask**
- Remove cap.
- Remove shoe covers.
- Use alcohol-based hand-rub or wash hands with soap and water.
- Leave the room.
- Once outside room, use alcohol hand-rub again or wash hands with soap and water.

To remove gloves

- Using one gloved hand, grasp the outside of the opposite glove near the wrist.
- Pull and peel the glove away from the hand.
- The glove should now be turned inside out, with the contaminated side now on the inside.
- Hold the removed glove in the opposite gloved hand.
- Slide one or two fingers of the ungloved hand under the wrist of the remaining glove.

- Peel glove off from the inside, creating a bag for both gloves.
- Discard in waste container.

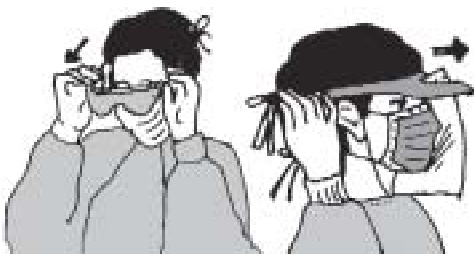
Removing gloves.



To remove goggles and shields

Using ungloved hands grasp the 'clean' ear or headpieces and lift away from face.

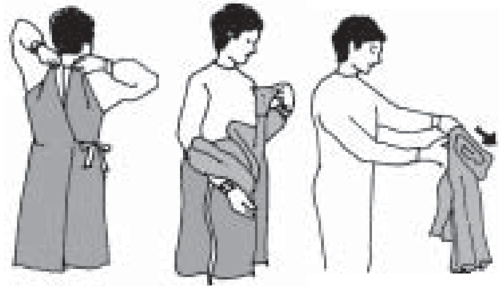
Removing goggles and shields.



To remove gown

- Unfasten the gown ties with the ungloved hands.
- Slip your hands underneath the gown at the neck and shoulder, and peel it away from the shoulders.
- Slip the fingers of one hand under the cuff of the opposite arm.
- Pull the hand into the sleeve, grasping the gown from inside.
- Reach across your body and push the sleeve off the opposite arm.
- Fold the gown toward the inside and roll into a bundle. (Only the 'clean' part of the gown should be visible.) Discard into a waste or linen container, as appropriate.

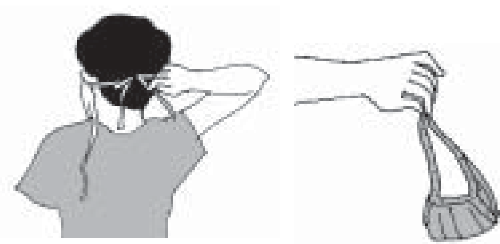
Removing gown.



To remove mask

- The front of the mask is considered contaminated and should not be touched.
- Remove your mask by handling only the ties or elastic bands, starting with the bottom tie/elastic followed with the top tie or band.
- Lift the mask or respirator away from the face and discard it into the designated waste receptacle.

Removing masks with ties.



- If the mask has elastic bands, lift the bottom elastic over the head first, then remove the top elastic. This must be done slowly to prevent the respirator from "snapping" off the face.

Removing a mask with elastic bands.

Personal protective equipment (PPE) recommendations for HCWs providing care to AI-infected patients

- The use of PPE is mandatory if direct close contact with the patient is anticipated and when entering the room where aerosol-producing procedures in avian influenza-infected patients are being performed.
- Use face masks that are at least as protective as the USA NIOSH-certified N95, or equivalent.
- Appropriate procedures should be used to select a particulate respirator that fits well and a user seal check should be performed each time a disposable particulate respirator is worn.
- Disposable particulate respirators, although similar in appearance to surgical masks, differ significantly from surgical masks because they are specifically designed to protect the wearer from exposure to airborne infectious diseases by sealing tightly to the face and filtering infectious particles from the air.
- If a particulate respirator N95 mask is not available, a tight-fitting triple-layered surgical or procedure mask should be used.
- Surgical and procedure masks do not provide protection against small-particle aerosols (droplet nuclei) and aerosol-generating procedures.
- Use eye protection (face shield, visor or goggles), if close contact with the patient is anticipated and for all aerosol-generating procedures.
- Wear clean, non-sterile, ambidextrous gloves, which should cover the cuffs of the gown.
- Wear clean, non-sterile long-sleeved gowns (fluid-resistant, if available).
- If cloth gowns are used, a waterproof apron should also be used if splashing of blood, body fluids, excretions, or secretions is anticipated.
- PPE is an integral part of routine infection control practice and is an important component of prevention and control activities that are intended to reduce the risk of health care-associated infections,

(including avian influenza) in health care facilities. However, use of PPE on its own does not prevent acquisition of any pathogen associated with the process of care.

- HCWs should receive training on the use of recommended infection control precautions as well as the underlying concepts that form the basis for these recommendations.
- **Hand washing is an important component of infection control precautions.**
- HCWs must also be trained to use PPE correctly. Incorrect use of PPE may fail to protect HCWs against the acquisition of health care-associated infections and may also lead to self-contamination and inoculation with infectious agents.
- PPE placement should be carefully done before entering the isolation room or area. Careful removal of PPE is critical to avoid self-contamination.
- Following recommended procedures for PPE placement and removal, infection control precautions and use of PPE are just some of the components of an overall programme of infection prevention and control in health care facilities. There should be an infection control programme at the national/ state level to support these activities in health care facilities.

Prioritizing the use of PPE when supplies are limited

Provision of necessary supplies should be an institutional priority.

- Reuse of disposable PPE items should be avoided. Data on reuse of disposable PPE items for influenza are not available and reuse may increase the potential for contamination;
- If a sufficient supply of PPE items is not available, health care facilities may consider reuse of some disposable items only as an urgent, temporary solution and only if the item has not been obviously soiled or damaged (e.g. creased or torn).
- To avoid wastage, critically evaluate in which situations PPE is indicated.

Respiratory protection

If AI-infected patients are situated in a common area or in several rooms on a nursing unit, and multiple patients will be visited over a short time, it may be practical to wear one particulate respirator for the duration of the activity.

Surgical and procedure masks

If a particulate respirator is not available, a tightly fitting surgical or procedure mask should be worn.

- Wear mask once and then discard.
- Change mask when it becomes moist.
- Do not leave mask dangling around the neck.
- After touching or discarding an used mask, perform hand hygiene.

Gloves

- If supplies of gloves are limited, reserve gloves for situations where there is a likelihood of contact with blood or body fluids, including during aerosol-generating procedures.

- Use other barriers (e.g. disposable paper towels, paper napkins) when there is no direct contact with patient's respiratory secretions (e.g. to touch equipment linked to the patient). Scrupulous hand hygiene is critical in this situation.

Gowns

- If supplies of gowns are limited, gown use should be prioritized for aerosol-generating procedures and for activities that involve holding the patient close (e.g. in pediatric settings), or when other extensive body surface-to-body surface contact is anticipated.
- If there is a shortage, gowns may also be worn in the care of more than one patient in a common area if there is no direct contact between the gown and the patients.

Eye protection

Reusable eye protective equipment poses a potential risk for cross-infection. Such items must be cleaned and disinfected after each use when leaving an isolation room/area, using any effective disinfectants against influenza (preferably those recommended by the manufacturer). Cleaning must precede disinfection. Hand hygiene must be performed after disposal or cleaning of eye protective equipment.

Waste disposal

Use standard precautions when working with solid waste that may be contaminated with AI virus outside of the isolation room/area. Clinical (infectious) waste includes waste directly associated with blood, body fluids, secretions and excretions; laboratory waste directly associated with specimen processing, human tissues, including material or solutions containing free-flowing blood, and animal tissue or carcasses used for research; and also includes discarded sharps.

- All waste generated in the isolation room/area should be removed from the room/area in suitable containers or bags that do not allow for spillage or leakage of contents.
- Waste should be classified as per the national laws or regulations. If waste from AI-infected patients is classified as infectious, then all waste from an isolation room/area should be treated as clinical waste and should be disposed off as per institute policy and in accordance with national regulations pertaining to such waste.
- One waste disposal bag is usually adequate, provided waste can be placed in the bag without contaminating the outside of the bag. If the outside of the bag is contaminated, two bags should be used (double bagging). If additional bags are not available, clean and disinfect the outside of the bag before removing it from the room/area.
- When transporting waste outside the isolation room/area, use gloves followed by hand hygiene.

Although the possibility of transmission of AI infection via human faeces is unknown, faeces of AI-infected patients should be handled with caution and possible aerosolization of

faeces should be avoided (e.g. removal of faeces from bedpan, commode, clothing, or reusable incontinence pads by spraying with water).

Liquid waste such as urine or faeces can be flushed into the sewer system if there is an adequate sewage system in place. Close toilet cover when flushing faeces.

- Health care workers should be trained in infection control guidelines and waste handling and they in turn should train the community.
- Beware. If infection control guidelines are not followed, you can fall sick quickly.
- Hence follow these guidelines to protect yourself and your family.
- Frequent hand washing can protect you from getting infected.

Case Handling

Case definition (suspected, probable or confirmed) of any patient should be as per WHO guidelines (Annexure I)

Correct classification of sick individuals using the WHO case definitions for human Avian Influenza A (H5N1) infection followed by strict adherence to case management protocols will aid in favourable outcomes for infected individuals.

Transportation of any suspected case from field to the district/designated hospital

- Notify receiving facility as soon as possible prior to arrival that a patient with suspected AI infection is being transported to the facility and of the precautions that are indicated.
- During transport optimize the vehicle's ventilation to increase the volume of air exchange.
- HCW should use PPE if pre-hospital care is being provided for a suspected or confirmed AI-infected patient or during transport of the patient in a vehicle.
- Follow recommended procedures for disposal of waste and cleaning and disinfecting the emergency vehicle and reusable patient-care equipment after pre-hospital care or transport has been provided. Use a gown and gloves followed by hand hygiene for these procedures.

Patient transport within health care facilities

- Limit the movement and transport of patients from the isolation room/area for essential purposes only. Inform the receiving area as soon as possible but prior to the patient's arrival, about the diagnosis and the precautions that are indicated.
- If transport outside the isolation room/area is required, the patient should wear triple layer surgical mask. Perform hand hygiene after contact with patient or his/her respiratory secretions.
- If patient cannot tolerate a mask (e.g., due to the patient's age or deteriorating respiratory status) instruct patient (or parent of paediatric patient) to cover nose and mouth with tissue while coughing/sneezing. If possible, instruct the patient to perform hand hygiene after coughing and sneezing or coming in contact with respiratory secretions.

- Surgical masks are appropriate for use by AI-infected patients to contain respiratory droplets and should be worn by suspected or confirmed AI-infected patients.
- If the patient has contact with any surface, it should be cleaned and disinfected after patient has left. Use sodium hypochlorite 0.1% for cleaning and disinfecting of surfaces.
- HCWs transporting AI-infected patients should use PPE as per standard precautions.
- Use gloves for direct patient contact followed by hand hygiene. Follow recommended procedures for disposal of waste and cleaning and disinfecting the emergency vehicle.

Preparation of the isolation room: Recommendation for hospital health care worker

- Ensure additional precautions through appropriate signage on the door. Place a recording sheet at the entrance of the isolation room/area. All health care workers or visitors entering the isolation area should be encouraged to enter their relevant details on the recording sheet so that if follow-up/ contact tracing is required, details are available.
- Remove all non-essential furniture. The furniture present in isolation area should be easy to clean and should not conceal or retain dirt or moisture, either within or around it.
- Collect linen as needed.
- Stock the hand basin with suitable supplies for hand washing. If basin is not available, place a bucket with lower tap for water and collect waste in another bucket.
- Place appropriate waste bags in the room on a foot-operated bin.
- Place a puncture-proof container for sharps in the room.
- Keep the patient's personal belongings to a minimum.
- Keep water pitcher and cup, tissue wipes, and other items necessary for attending to personal hygiene within the patient's reach.
- The patient should be allocated his/her own non-critical items of patient care equipments, e.g. stethoscope, thermometer and sphygmomanometer. Any patient care equipment required for other patients should be thoroughly cleaned and disinfected prior to use.
- Set up a trolley outside the door to hold personal protective equipments. A checklist may be useful to ensure that all equipments are available.
- Place an appropriate container with a lid outside the door for equipment that requires disinfection and sterilization. Once equipment has been appropriately cleaned, it can be sent to the sterilizing service department.
- Keep adequate equipments (required for cleaning and disinfection) inside the patient's room. Scrupulous daily cleaning of the isolation unit is important for the prevention of cross-infection.
- Cutlery and crockery should be cleaned in hot soapy water.

Safe handling of dead body

- Mortuary staff should be informed in advance that the deceased had AI.
- If mortuary staff is handling an AI-infected patient who died at home, full barrier PPE should be used while at home.
- In the mortuary, mortuary staff and the burial team should use standard precautions when caring for the body. This includes appropriate use of PPE and performance of hand hygiene to avoid unprotected contact with blood, body fluids, secretions, or excretions.
- Hygienic preparation of the deceased (e.g. cleaning, tidying of hair, trimming of nails, and shaving) may also be conducted.
- The body in the body bag can be safely removed for storage in the mortuary, sent to the crematorium, or placed in a coffin for burial.
- If autopsy is being considered, the body may be held under refrigeration in the mortuary.
- Standard infection control precautions should be followed; there is no further risk of airborne or droplet spread of AI.
- If family members want to kiss the dead body (hands, face), these body parts should be disinfected, using a common antiseptic (e.g. 70% alcohol).
- If the family wants only to view the body and the face of the deceased, but not touch it, they may be allowed to do so. If the patient died in the infectious period, the family should wear gloves and gowns and perform hand hygiene.

Case management

- Take respiratory and blood specimens for laboratory testing for influenza and other infections as clinically indicated (clinician to decide on this).
- Start treatment with a neuraminidase inhibitor such as Oseltamivir (75 mg orally, twice daily for five days) as early in the clinical course as possible. The HCW should be aware that treatment of suspected case needs to be started as early as possible, preferably within 24–48 hours. Therefore, he/she should ensure that the suspected case is sent to hospital or appropriate health care facility at the earliest. The HCW should not administer anything except as advised by clinician.
- If clinically indicated, hospitalize patients under appropriate infection control precautions as described. If a case does not require hospitalization, educate the patient and his/her family on personal hygiene and infection-control measures to be followed at home.
- Instruct the patient to seek prompt medical care if the condition worsens.

Discharge policy – at the discretion of attending doctor

- Until further evidence is available, presently, as per WHO guidelines it is recommended that infection-control precautions for adult patients remain in place for 7 days after resolution of fever.
- Previous human influenza studies have indicated that children younger than 12 years can shed virus for 21 days after onset of illness. Therefore, infection-

control measures for children should ideally remain in place for this period.

- Wherever this is not feasible (because of lack of local resources), the family should be educated on personal hygiene and infection-control measures (e.g. hand washing and use of a paper or surgical mask by a child who is still coughing). Children should not attend school during this period. The HCW should be aware of these recommendations and monitor them regularly.

Home treatment in those cases which are not serious

Community care

- In case of a pandemic, there may be scarcity of hospital beds but most exposed cases could be taken care of at home.
- People with respiratory (infection) symptoms should practice the following:
  - Respiratory etiquette
  - Social distancing.

Home care

The patients should be instructed as follows:

- Take extra rest. Bed rest can help you feel better. It will also help you avoid spreading the virus to others.
- Elevate your head at night with an extra pillow if coughing keeps you awake.

Call your doctor or HCW if

- Your symptoms improve but seem to get worse again.
- You develop signs of a bacterial infection, such as a new or worse cough that produces yellow, green, rust-coloured, or bloody mucous; persistent fever, ear pain, sore throat, sinus pain, or nasal drainage that changes from clear to coloured after 7-10 days.

Handling the dead patient

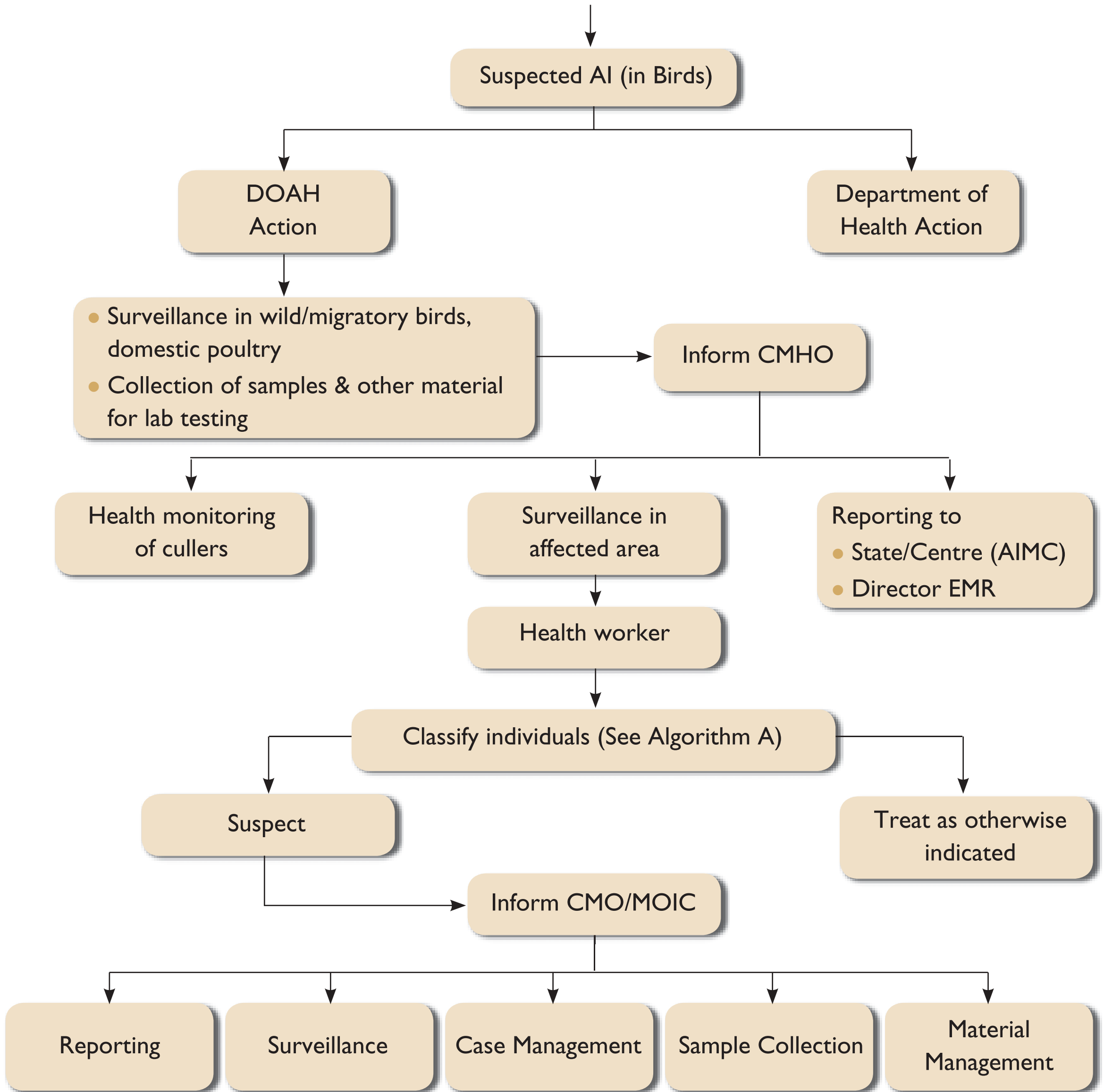
Removal of the body from the isolation room/area

- PPE should be used by the HCWs.
- The body should be fully sealed in an impermeable body bag prior to removal from the isolation room/area on prior to transfer to pathology or to the mortuary.
- No leaking of body fluids should occur and the outside bag should be kept clean.
- After removing PPE, do hand washing.
- If the family of the patient wishes to touch the body, they may be allowed to do so. But if the patient died in the infectious period, the family should wear gloves and gowns and follow with hand hygiene.
- Transfer to pathology or to mortuary should occur as soon as possible after death.
- Cultural sensitivity should be practiced when an AI patient dies.

Postmortem examination

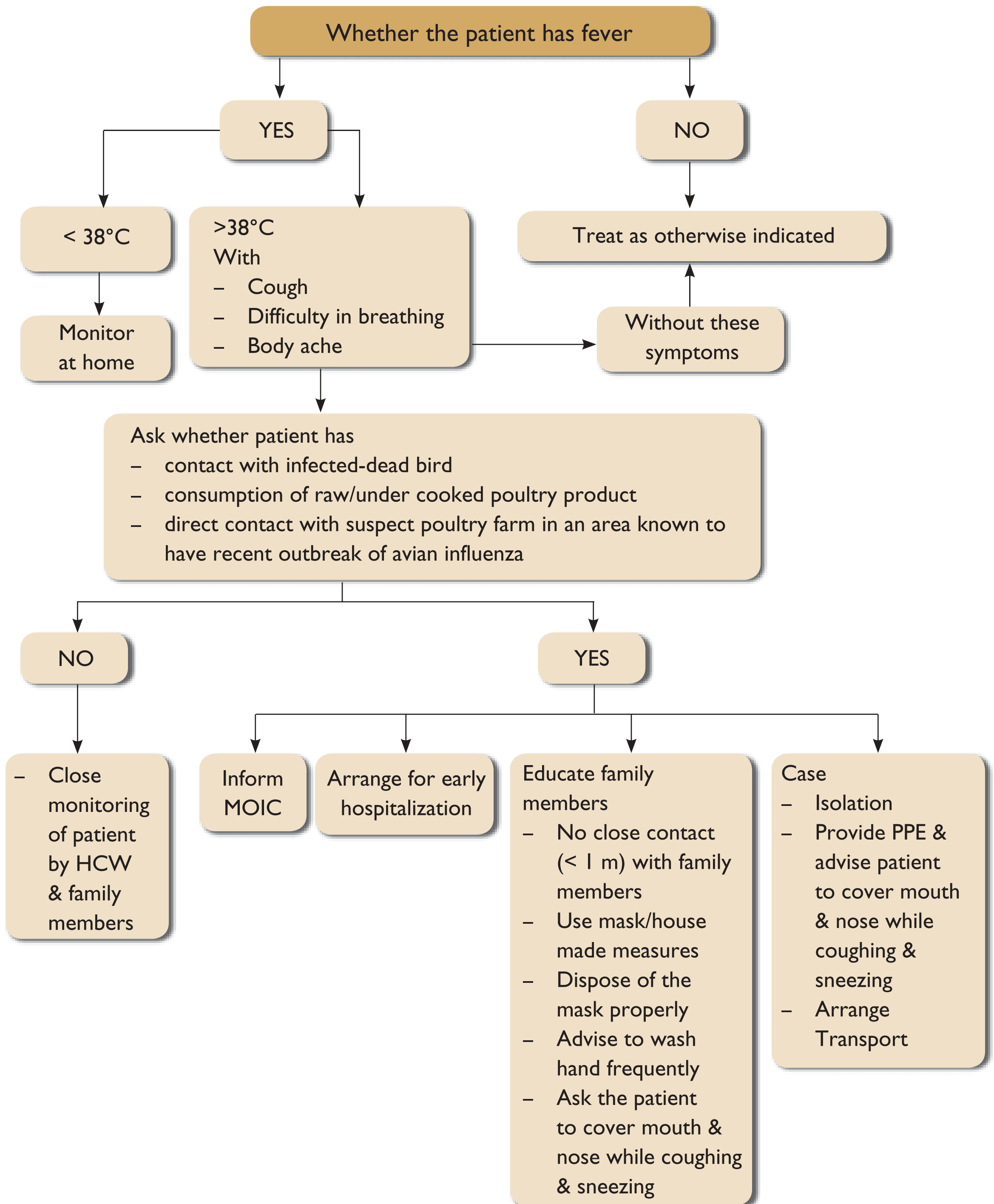
- If postmortem examination is needed, obtain family consent.
- Family should not be allowed to observe the postmortem procedure.

Sequence of Actions by Health Personnel in an AI Outbreak



DOAH - Director of Animal Husbandry
CMO - Chief Medical Officer
EMR - Emergency Medical Relief
CMHO - Chief Medical Health Officer
MOIC - Medical Officer In-charge
AIMC - Avian Influenza Monitoring Cell

Algorithm A - Classification of Sick Individuals by Health Care Workers (HCWs)



Infection control and prevention of nosocomial spread of influenza A (H5N1)

- Isolate the patient to a single room with the door closed.
- If a single room is not available, cohort patients separately in designated multi-bed rooms or wards; beds should be placed more than one meter apart and preferably be separated by a physical barrier (e.g. curtain, partition).
- Reinforce standard precautions with droplet and contact precautions. See Annexure 3.
- Appropriate personal protective equipment (PPE) for all those entering patients' rooms consists of mask (high efficiency mask if available or surgical mask), gown, face shield or goggles and gloves.
- Limit the number of HCWs who have direct contact with the patient(s); these HCWs should not look after other patients.
- The number of other hospital employees (e.g. cleaners, laboratory personnel) with access to the environment of these patients should also be limited.
- Designated HCWs should all be properly trained in infection-control precautions.
- Restrict the number of visitors and provide them with appropriate PPE and instruct them in its use.
- Ask HCWs with direct patient contact to monitor their own temperature twice daily and report to hospital authorities any febrile event.
- An HCW who has fever (>38°C) and who has had direct patient contact should be treated immediately.
- Offer post-exposure prophylaxis (for example, Oseltamivir 75 mg daily orally for 7 days) to any HCW who has had potential contact with droplets from a patient without having had adequate PPE.
- HCWs who are unwell should not be involved in direct patient care since they are more vulnerable and may be more likely to develop severe illness when exposed to influenza A (H5N1) viruses.
- Dispose of waste properly by placing it in sealed, impermeable bags which should be clearly labeled 'Biohazard' and incinerated.
- Linen and reusable materials that have been in contact with patients should be handled separately and disinfected.

Chapter 7

Frequently Asked Questions (FAQs)

1. What is avian influenza?

Avian influenza, or 'bird flu', is a contagious disease of animals caused by viruses that normally infect only birds and, less commonly, other mammals. Avian influenza viruses are highly species-specific, but have, on rare occasions, crossed the species barrier to infect humans.

In domestic poultry, infection with avian influenza viruses causes two main forms of disease, distinguished by low and high extremes of virulence. The so-called 'low pathogenic' form commonly causes only mild symptoms (ruffled feathers, a drop in egg production) and may easily go undetected. The highly pathogenic form is far more dramatic. It spreads very rapidly through poultry flocks, causes disease affecting multiple internal organs, and has a mortality rate that can approach 100% often within 48 hours.

2. How is avian influenza spread?

Pandemic influenza spreads from person to person mainly through 'respiratory secretions,' like seasonal influenza viruses and other common respiratory infections. Respiratory secretions are virus-containing droplets (such as nasal secretions or sputum) that are spread when infected persons cough or sneeze. These droplets can then land on the surface of the mouth, nose and throat of persons who are near (i.e. within three feet of) the ill person. The virus may also be spread through contact with the infectious respiratory secretions on the hands of an infected person and other objects and surfaces.

Adults and children can spread influenza virus one day before symptoms appear. While children can spread virus infection up to 10 days after the onset of illness, adults can spread virus infection up to five to seven days after the onset of illness.

3. Will the regular (seasonal) flu shot provide any protection against the pandemic influenza virus?

No. But the regular flu shot will protect you against the influenza viruses that are circulating right now. However, in India there is currently no policy for vaccination against seasonal influenza.

4. Do migratory birds spread highly pathogenic avian influenza viruses?

The role of migratory birds in the spread of highly pathogenic avian influenza is not fully understood. Wild waterfowl are considered the natural reservoir of all influenza A viruses. They have probably carried influenza viruses, with no apparent harm, for centuries. They are known to carry viruses of the H5 and H7 subtypes, but usually in low pathogenic form. Considerable circumstantial evidence suggests that migratory birds can introduce low pathogenic H5 and H7 viruses to poultry flocks, which then mutate to the highly pathogenic form.

In the past, highly pathogenic viruses have been isolated from migratory birds on very rare occasions involving a few birds, usually found dead within the flight range of a poultry outbreak. This finding long suggested that wild waterfowl are not agents for the onward transmission of these viruses.

Recent events make it likely that some migratory birds are now directly spreading the H5N1 virus in its highly pathogenic form. Further spread to new areas is expected.

5. Does the virus spread easily from birds to humans?

No. Though about 350 cases have occurred in the current outbreak, this is a small number compared with the huge number of birds affected and the numerous associated opportunities for human exposure, especially in areas where backyard flocks are common. It is not presently understood why some people, and not others, become infected following similar exposures.

6. How do people become infected?

Direct contact with infected poultry, or surfaces and objects contaminated by their faeces, is presently considered the main route of human infection. To-date, most human cases have occurred in rural or periurban areas where many households keep small poultry flocks, which often roam freely, sometimes entering homes or sharing outdoor areas where children play. As infected birds shed large quantities of virus in their faeces, opportunities for exposure to infected droppings or to environments contaminated by the virus are abundant under such conditions. Moreover, because many households in Asia depend on poultry for income and food, many families sell or slaughter and consume birds when signs of illness appear in a flock, and this practice has proved difficult to change. Exposure is considered most likely during slaughter, defeathering, butchering, and preparation of poultry for cooking.

7. Where have human cases occurred?

In the current outbreak, laboratory-confirmed human cases have been reported in 14 countries: Cambodia, Indonesia, Thailand, Vietnam, Egypt, Turkey, Azerbaijan, Laos, Nigeria, Iraq, Djibouti, China, Myanmar and Pakistan.

8. What changes are needed for H5N1 to become a pandemic virus?

The virus can improve its transmissibility among humans via two principal mechanisms. The first is a 'reassortment' event, in which genetic material is exchanged between human and avian viruses during co-infection of a human or pig. The second mechanism is a more gradual process of adaptive mutation, whereby the capability of the virus to bind to human cells increases during subsequent infections of humans.

9. How serious is the current pandemic risk?

The risk of pandemic influenza is serious. With the H5N1 virus now firmly entrenched in large parts of Asia, the risk that more human cases will occur will persist. Each additional human case gives the virus an opportunity to improve its transmissibility in humans, and thus develop into a pandemic strain. While neither the timing nor the severity of the next pandemic can be predicted, the probability that a pandemic will occur has increased.

10. What is special about the current outbreaks in poultry?

The current outbreaks of highly pathogenic avian influenza, which began in South-East Asia in mid-2003, are the largest and most severe on record. Never before in the history of this disease have so many countries been simultaneously affected, resulting in the loss of so many birds.

The causative agent, the H5N1 virus, has proved to be especially tenacious. Despite the death or destruction of an estimated 150 million birds, the virus is now considered endemic in many parts of Indonesia and Vietnam and in some parts of Cambodia, China, Thailand, and possibly also the Lao People's Democratic Republic. Control of the disease in poultry is expected to take several years.

The H5N1 virus is also of particular concern for human health as it may evolve as a pandemic strain.

11. What are the most important warning signals that a pandemic is about to start?

The most important warning signal comes when clusters of patients with clinical symptoms of influenza, closely related in time and place, are detected, as this suggests that human-to-human transmission is taking place. For similar reasons, the detection of cases in health workers caring for H5N1 patients would suggest human-

to-human transmission. Detection of such events should be followed by immediate field investigation of every possible case to confirm the diagnosis, identify the source and determine whether human-to-human transmission is occurring.

12. Can a pandemic be prevented?

No one knows with certainty. The best way to prevent a pandemic would be to eliminate the virus from birds, but it has become increasingly doubtful if this can be achieved in the near future.

Following a donation by industry, WHO will have a stockpile of antiviral medications, sufficient for three million treatment courses or more. Recent studies, based on mathematical modelling, suggest that these drugs could be used prophylactically near the start of a pandemic to reduce the risk that a fully transmissible virus will emerge or at least to delay its international spread, thus gaining time to augment vaccine supplies.

The success of this strategy, which has never been tested, depends on several assumptions about the early behaviour of a pandemic virus, which cannot be known in advance. Success also depends on excellent surveillance and logistics capacity in the initially affected areas, combined with an ability to enforce movement restrictions in and out of the affected area. To increase the likelihood that early intervention using the WHO rapid-intervention stockpile of antiviral drugs will be successful, surveillance in affected countries needs to improve, particularly concerning the capacity to detect clusters of cases closely related in time and place.

13. What is the significance of limited human-to-human transmission?

Though rare, instances of limited human-to-human transmission of H5N1 and other avian influenza viruses have occurred in association with outbreaks in poultry and should not be a cause for alarm. In no instance has the virus spread beyond a first generation of close contacts or caused illness in the general community. Data from these incidents suggest that transmission requires very close contact with an ill person. There have been a number of instances of avian influenza infection occurring among close family members. It is often impossible to determine if human-to-human transmission has occurred since the family members are exposed to the same animal and environmental sources as well as to one another.

14. What drugs are available for treatment?

Two drugs (in the neuraminidase inhibitors class), Oseltamivir (commercially known as Tamiflu) and Zanamivir (commercially known as Relenza) can reduce the severity and duration of illness caused by seasonal influenza. The efficacy of the neuraminidase inhibitors depends, among others, on their early administration (within 48 hours after symptom onset). For cases of human infection with H5N1, the drugs may improve prospects of survival, if administered early, but clinical data are limited.

An older class of antiviral drugs, the M2 inhibitors amantadine and rimantadine, could potentially be used against pandemic influenza, but resistance to these drugs can develop rapidly and this could significantly limit their effectiveness against pandemic influenza.

15. What are the implications for human health?

The widespread persistence of H5N1 in poultry populations poses two main risks for human health.

The first is the risk of direct infection when the virus passes from poultry to humans, resulting in very severe disease. Of the few avian influenza viruses that have crossed the species barrier to infect humans, H5N1 has caused the largest number of cases of severe disease and death in humans. Unlike normal seasonal influenza, where infection causes only mild respiratory symptoms in most people, the disease caused by H5N1 follows an unusually aggressive clinical course, with rapid deterioration and high fatality. Primary viral pneumonia and multi-organ failure are common. In the present outbreak, more than half of those infected with the virus have died. Most cases have occurred in previously healthy children and young adults.

A second risk, of even greater concern, is that the virus – if given enough opportunities – will change into a form that is highly infectious for humans and spread easily from person to person. Such a change could mark the start of a global outbreak (a pandemic).

16. Is it safe to eat poultry and poultry products?

Yes, though certain precautions should be followed in countries currently experiencing outbreaks. In areas free of the disease, poultry and poultry products can be prepared and consumed as usual, with no fear of acquiring infection with the H5N1 virus.

In areas experiencing outbreaks, poultry and poultry products can also be safely consumed provided these items are properly cooked and properly handled during food preparation. The H5N1 virus is sensitive to heat. Normal temperatures used for cooking (70°C in all parts of the food) will kill the virus. Consumers need to be sure that all parts of the poultry are fully cooked (no 'pink' parts) and that eggs, too, are properly cooked (no 'runny' yolks).

Consumers should also be aware of the risk of cross-contamination. Juices from raw poultry and poultry products should never be allowed, during food preparation, to touch or mix with items eaten raw. When handling raw poultry or raw poultry products, persons involved in food preparation should wash their hands thoroughly and clean and disinfect surfaces in contact with the poultry products. Soap and hot water are sufficient for this purpose.

In areas experiencing outbreaks in poultry, raw eggs should not be used in foods that will not be further heat-treated as, for example by cooking or baking.

Avian influenza is not transmitted through cooked food. To date, no evidence indicates that anyone has become infected following the consumption of properly cooked poultry or poultry products, even when these foods were contaminated with the H5N1 virus.

Message for public

DO's

- Minimize close contact with infectious cases.
- Use separate living, dining, bathing, laundry and toilet facilities for the infectious case.
- Minimize use or handling of items in home that might be used/touched by infectious case.
- Wear masks if available or cover the nose and mouth with tissue paper or handkerchief while in close contact with infectious case (less than three metres) or while in a confined space.
- Always wash hands after having contact with respiratory secretions, with detergent or soap.
- Ask patient to throw the tissue paper, etc. always in a bin closed with a lid after its use.
- In the event of any case, quarantine of a case helps the health authority to investigate the case and prevent the spread of the disease.
- These guidelines are for contact with patient, family members, visitors and members of community.

DON'Ts

- Do not handle secretions or paper, clothes used by patients with respiratory illness.
- Ask people to avoid contact with individual at risk.
- Avoid visiting the poultry area where cases of avian flu has been detected.
- Do not throw away the tissue paper/mask/handkerchief everywhere indiscriminately after use.

WHO Case Definitions for Human Infections with Avian Influenza A (H5N1) Virus

Background

Prompt and accurate reporting of H5N1 influenza cases to WHO is the cornerstone for monitoring both the situation evolution of this disease and the corresponding risk that a pandemic virus might emerge. WHO has developed standardized case definitions to facilitate:

1. Reporting and classification of human cases of H5N1 infection by health authorities.
2. Comparability of data across time and geographical areas.

Case definitions

Person under investigation

A person whom public health authorities have decided to investigate for possible H5N1 infection.

Suspected case definition

A person presenting with unexplained acute lower respiratory illness with

- fever (>38°C) and
- cough.
- shortness of breath or difficulty in breathing.

AND

One or more of the following exposures in the seven days prior to symptom onset:

a. Close contact (within 1 metre) with a person (e.g. caring for, speaking with, or touching) who is a suspected, probable, or confirmed H5N1 case;

b. Exposure (e.g. handling, slaughtering, defeathering, butchering, preparation for consumption) to poultry or wild birds or their remains or to environments contaminated by their faeces in an area where H5N1 infections in animals or humans have been suspected or confirmed in the last month;
c. Consumption of raw or undercooked poultry products in an area where H5N1 infections in animals or humans have been suspected or confirmed in the last month;
d. Close contact with a confirmed H5N1 infected animal other than poultry or wild birds (e.g. cat or pig);
e. Handling samples (animal or human) suspected of containing H5N1 virus in a laboratory or other setting.

Probable case

Probable definition 1:

A person meeting the criteria for a suspected case

AND

One of the following additional criteria:

a. infiltrates or evidence of an acute pneumonia on chest radiograph plus evidence of respiratory failure (hypoxemia, severe tachypnea)

OR

b. positive laboratory confirmation of an influenza A infection but insufficient laboratory evidence for H5N1 infection.

Probable definition 2:

A person dying of an unexplained acute respiratory illness who is considered to be epidemiologically linked by time, place, and exposure to a probable or confirmed H5N1 case.

Confirmed case

A person meeting the criteria for a suspected or probable case

AND

One of the following positive results conducted in a national, regional or international influenza laboratory whose H5N1 test results are accepted by WHO as confirmatory:

Isolation of an H5N1 virus;

1. Positive H5 PCR results from tests using two different PCR targets, e.g. primers specific for influenza A and H5 HA;
2. A fourfold or greater rise in neutralization antibody titer for H5N1 based on testing of an acute serum specimen (collected seven days or less after symptom onset) and a convalescent serum specimen (collected at least 14 days after symptoms onset). The convalescent neutralizing antibody titer must also be 1:80 or higher;
3. A microneutralization antibody titer for H5N1 of 1:80 or greater in a single serum specimen collected on day 14 or later after symptom onset and a positive result using a different serological assay, for example, a horse red blood cell haemagglutination inhibition titer of 1:160 or greater or an H5-specific western blot positive result.

Annexure 2

Material Required for Sample Collection

• Disposable vials (5 ml)	• Rubber bands
• Disposable sample collection vials, sterile, crew caps	• Labels (self-adhesive)
• Sterile individually packed Dacron-coated swab stick (throat swab)	• Glass marking pen
• Personal Protective Equipment kit	• Adhesive tape
• Puncture-proof discarding bags (disposable)	• Vacutainer (plain and EDTA) 5 ml
• Spirit swabs/alcohol swabs	• Syringes and needles disposable (5 ml)
• Band-aids	• Tourniquet
• Vaccine carrier with frozen ice-packs	• Gloves
• Test tube rack	• N95 Mask, Masks (triple layer surgical mask)
• Viral transport medium (VTM)	• Sodium hypochlorite concentrates (4%)
• Sterile plastic catheter (Tubing)	• Hand disinfectant
• Tongue Depressor/Ice cream spoon (sterile)	• Torch with spare batteries/rechargeable batteries
• Sterile individually packed Dacron-coated flexible nasopharyngeal swabs with VTM	• Reporting formats
• Sterile disposable screw - capped container of 5-10 ml capacity	• Ziploc Bags
• Sterile Sample collection vials for RT – PCR (RNAs/ DNAs free)	• Tissue paper

Annexure 3

Respiratory Protection for Aerosol-generating Procedures

During aerosol-generating procedures, there must be minimal particulate respirator face-seal leakage to fully protect HCWs from exposure to small-particle respiratory aerosols. The following respiratory protection options should be considered:

- A particulate respirator at least as protective as a NIOSH-certified N95 is the minimum level of respiratory protection required for HCWs performing aerosol-generating procedures.
- Appropriate procedures should be used to select a particulate respirator that fits well and a user seal check should be performed each time a disposable particulate respirator is worn, before entering the isolation room/area.

Selection of respiratory protection equipment

A. Particulate respirators

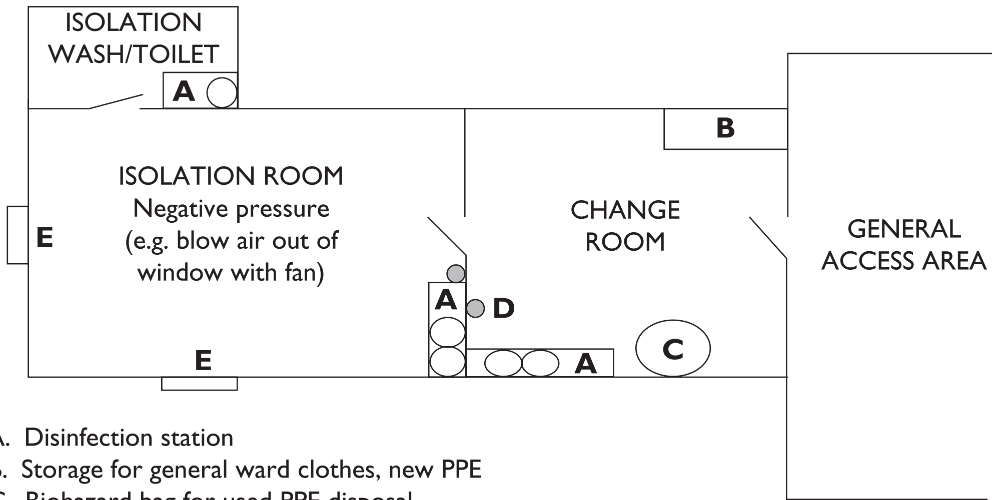
- HCWs working with AI-infected patients should select the highest level of respiratory protection equipment available, preferably a particulate respirator (N95 mask).
- The fit and seal of the mask is critical for effective function. If possible, it is recommended that fit testing be performed prior to the first use of a disposable triple layered mask/N95 determine if an acceptable fit and seal can be achieved.
- HCWs with facial hair should not use a disposable layered mask/N95 because a good seal cannot be obtained. HCWs with facial structure abnormalities may also be unable to obtain a good seal.
- Some factors to consider when choosing a layered mask/N95 in this setting include affordability, availability, impact on mobility, impact on patient care, potential for exposure to higher levels of aerosolized respiratory secretions, and potential for reusable particulate respirators to serve as fomites for transmission.

B. Surgical and procedure masks (triple-layered masks)

- Surgical or procedure masks are indicated when providing care for patients infected by droplet transmitted diseases and/or as part of facial protection during patient-care activities that are likely to generate splashes or sprays of blood, body fluids, secretions and excretions.
- Surgical and procedure masks do not offer appropriate respiratory protection against small particle aerosols (droplet nuclei) and should not be used unless particulate respirators are not available when dealing with airborne transmitted diseases. If a particulate respirator is not available, use a tightly fitting mask.
- Surgical and procedure masks are not designed for fit and thus do not prevent leakage around the edge of the mask when the user inhales, which is a major limitation for protection against droplet nuclei.
- Surgical masks come in two basic types: one type is affixed to the head with two ties, conforms to the face with the aid of a flexible adjustment for the nose bridge, and may be flat/pleated or duck-billed in shape; the second type is pre-moulded, adheres to the head with a single elastic band and has a flexible adjustment for the nose bridge.
- Procedure masks are flat/ pleated and affix to the head with ear loops. All masks have some degree of fluid resistance, but those approved as surgical masks must meet specified standards for protection from penetration of blood and body fluids.

Typical Isolation Facility Appropriate for Patients with Influenza A (H5N1)

General Principles of isolation unit



A. Disinfection station
B. Storage for general ward clothes, new PPE
C. Biohazard bag for used PPE disposal
D. Wall-mounted alcohol hand-wash dispensers
E. Windows - external only. Keep clear of public.

Suggested checklist for isolation room/area trolley/ table

The following items should be kept on the trolley at all times so that personal protective equipment is always available for health care workers.

Equipment Stock present

- Face shield/visor/goggles
- Single-use gloves for clinical use (sizes: small, medium and large)
- Gloves (reusable for environmental cleaning)
- Hair covers (optional for high-risk procedures, but should be available)

- Particulate respirators (N95, FFP2, or equivalent)
- Surgical or procedure masks
- Single-use long-sleeved fluid-resistant gowns
- Single-use plastic aprons (optional if splashing is anticipated)
- Alcohol-based hand rub or alternative method for washing hands in clean water
- Plain soap (liquid if possible)
- Disinfectant
- Clean single-use towels
- Appropriate disinfectant for environmental cleaning
- Large plastic bags
- Appropriate clinical waste bags
- Linen bags
- Collection container for used equipment

Waste Disposal and Disinfection Guidelines

DISINFECTANTS

Alcohol and bleach

Health care facilities with limited resources may not have access to standard hospital disinfectants. Alcohol and bleach are acceptable alternatives when used as directed below.

Alcohol

Alcohol is effective against the influenza virus. Ethyl alcohol (70%) is a powerful broad spectrum germicide and can be used as a good hand rub. It is generally considered superior to isopropyl alcohol. Alcohol is often used to disinfect small surfaces and occasionally external surfaces of equipment (e.g. stethoscopes and ventilators). Because alcohol is flammable, its use as surface disinfectant should be limited to small surface areas and it should be used in well-ventilated spaces only. Alcohol may also cause discoloration, swelling, hardening, and cracking of rubber and certain plastics after prolonged and repeated use.

Sodium hypochlorite (bleach)

Bleach is a strong and effective disinfectant, but it is readily inactivated in the presence of organic material. Its active ingredient, sodium hypochlorite, is effective in killing bacteria, fungi, and viruses, including influenza virus. Diluted household bleach works at variable contact times (from 10 to 60 min), is widely available at a low cost, and can be recommended for disinfection in health care facilities. Improper use of bleach may reduce its effectiveness for disinfection and can also result in health care worker injury.

Procedures for preparing/using diluted bleach

- Use mask, rubber gloves, and a waterproof apron. Goggles are also recommended to protect the eyes from splashes.
- Mix and use bleach solutions in well-ventilated areas.
- Mix bleach with cold water because hot water decomposes the sodium hypochlorite and renders it ineffective.
- Bleach containing five per cent sodium hypochlorite should be diluted as recommended in the table below:

Recommended dilutions of chlorine-releasing compounds

	Clean Conditions[A]	Dirty Conditions[B]
Available chlorine required	0.1% (1 g/l)	0.5% (5 g/l)
Sodium hypochlorite solution (5% available chlorine)	20 ml/l	100 ml/l
Calcium hypochlorite (70% available chlorine)	1.4 g/ l	7.0 g/l
Sodium dichloroisocyanurate powder (60% available chlorine)	1.7 g/l	8.5 g/l
Sodium dichloroisocyanurate tablets (1.5 g available chlorine per tablet)	1 tablet per litre	4 tablets per litre
Chloramine (25% available chlorine)	20 g/l	20 g/l

A. After removal of bulk material.

B. For flooding, e.g. on blood or before removal of bulk material.

Sodium Hypochlorite solution preparation

Dilution sodium hypochlorite solutions (part of stock solution: parts of water)

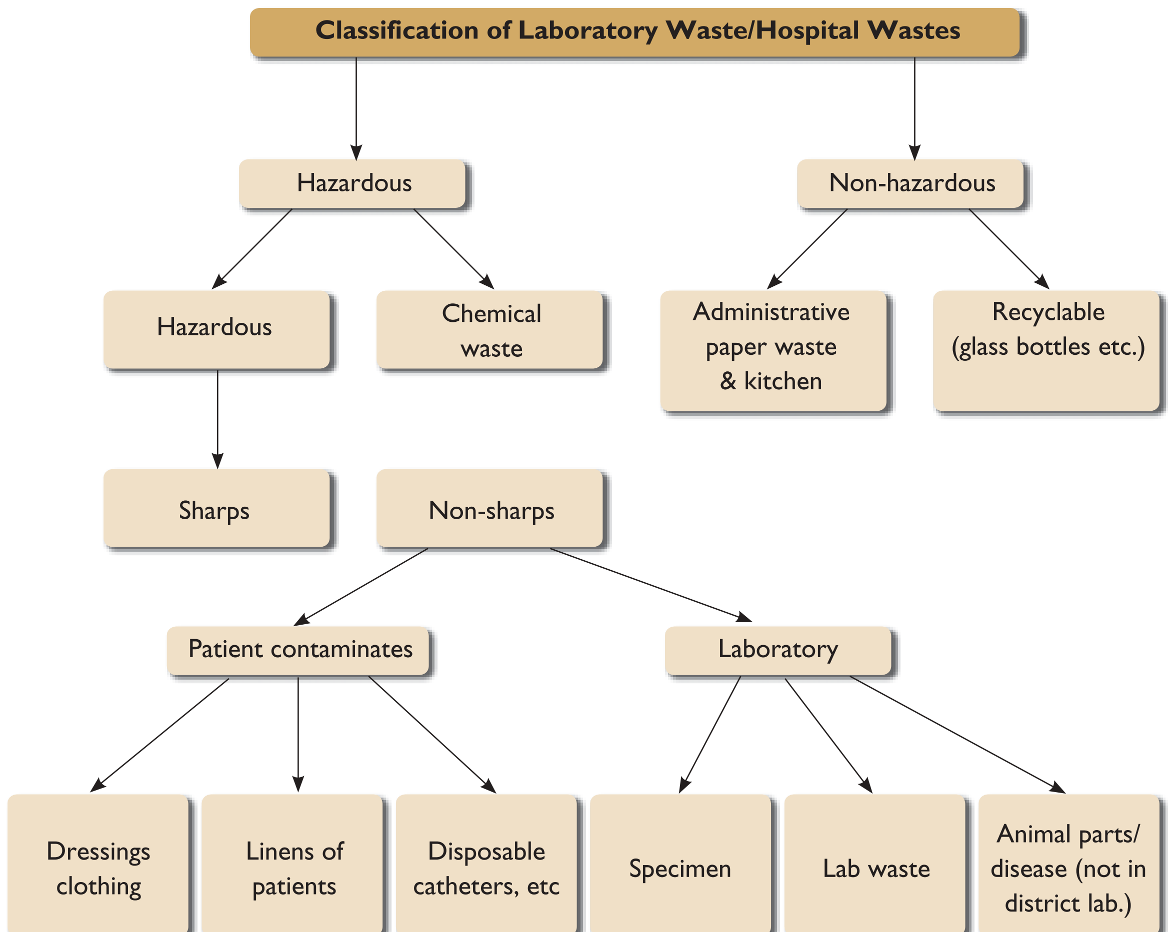
Required Strength	4% stock solution	5% stock solution	10% stock solution	15% stock solution
0.1% (1g/L-1000 ppm)	1:40	1:50	1:100	1:150
0.5% (5g/L-5000 ppm)	1:20	1:25	1:50	1:75
0.1% (10g/L-10000 ppm)	1:4	1:5	1:10	1:15

Procedure to clean up all spills

- Pour 1% freshly prepared Sodium hypochlorite solution over spills in sufficient quantity.
- Cover the spills with paper towel or absorbent materials.
- Leave for 10 minutes.
- Clean it.
- Wipe the whole spill with fresh absorbent material using gloved hands and discard it in a contaminated waste container.
- Wipe the surface with soap and water.

Laboratory waste

Anything that has to be discarded is called waste. The laboratory waste requires appropriate handling. The most common documented transmission of infection from waste to health care worker is through contaminated metallic waste. Hospital waste is a potential reservoir of pathogenic microorganisms. Decontamination of waste and its ultimate disposal are closely interrelated. Laboratory wastes are of different categories and can be classified.

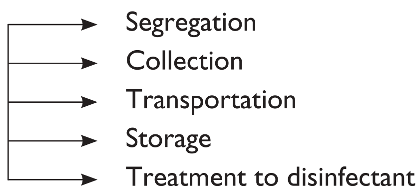


Hospital/laboratory waste management

Material required

1. Waste disposal colour-coded bags with a biohazard symbol: Blue, Red, Black and Yellow.
2. Trolley Baskets for holding the bags.
3. Autoclave for decontamination of waste on site.
4. Disinfectant solution (Sodium hypochlorite solution).
5. Incinerator if possible (optional).
6. Soap for hand washing.
7. Gloves.
8. Puncture-proof containers plastic/metal with a biohazard symbol.

Follow management at every step from the site of generation



Final disposal

- Segregation of waste into the prescribed categories at the point of generation.
- Colour-coded bags as per international norms.

Methodology

In the district laboratory, the laboratory waste handling is an essential job which needs to be under supervision of the biosafety officer. The broad guidelines to be followed are:

- Segregate the different categories of waste at the point of generation.
- Discard infectious wastes if possible in disinfectant solution/ autoclaving.
- Discard sharp waste, i.e. needles, blades, etc in puncture-proof containers. After the container is two-third filled it should be autoclaved/shredded and land-filled for decontamination.
- If you have nothing for decontamination, deep bury in a secure area.

Categories

a. Non-contaminated waste which can be reused or recycled, disposed of as general household waste.
b. Contaminated sharps disposed of in puncture-proof containers fitted with cover, labeled as infectious.
c. Contaminated materials for decontamination by autoclave, thereafter washing and reuse/ recycle.
d. Contaminated material for autoclaving and disposal.
e. Contaminated material for direct incineration.

Quality control

- Check that proper quality bags are purchased.
- Autoclave monitoring and maintenance.
- Disinfectant quality check.
- It is the responsibility of the district CMO to provide quality products to the HCW.

Contaminated infectious materials for autoclaving and reuse

- No pre-cleaning to be done.
- Transfer material to autoclave.

- Autoclave 121°C/15 lbs pressure for 45 minutes.
- If cleaning is required, do washing before hand.
- Reuse.

Contaminated infectious waste for disposal

Disposable waste in AI patient/ During respiratory infection	
• PPE	Dispose
• Tissue paper	Dispose
• Sample collection material, syringes, needles etc.	Dispose
• Drugs discarded	Dispose
• Linen	Reusable
• Towel	Reusable
• Hospital equipment	Reusable

- Autoclave in leak-proof containers, i.e. autoclavable colour-coded plastic bags.
- Place material in transfer containers/ trolleys with bags.
- Transport to incinerator.
- If reusable transfer containers are used they should be disinfected and cleaned before they are returned to laboratories.
- Discarding jars preferably unbreakable should be used and they should have a suitable disinfectant (Sodium hypochlorite 1%) freshly prepared each day.

In the field condition: One must follow proper waste handling

- Disposal as deep burial is best. If you can autoclave waste it is preferred before it is sent out.
- In the hospital discard them by incineration.

Container and colour-coding for disposal of bio-medical laboratory wastes

Waste category	Waste class	Type of containers	Colour-coding	Treatment of waste disposal
1.	Microbiology & Biochemical lab	Plastic holding bags with biohazard sign	Yellow	Autoclaving/Microwave & shredding
2.	Waste sharps	Reusable plastic/metal containers	Blue	Shredding & deep buried
3.	Discarded chemical, reagents, kits	Reusable plastic/metal containers	Blue	Shredding & deep buried
4.	Soiled wastes (lab coats, etc.)	Plastic bags with biohazard sign	Yellow/Black	Disinfection/Autoclave then machine wash
5.	Chemical wastes	Sturdy containers or plastic holding bags	Yellow/Black	
6.	Disposables other than sharps	Reusable sturdy containers/plastic bags	Yellow/Black	Disinfection/Autoclaving shredding & deep buried

Annexure 6

Antiviral Prophylaxis after AI Exposure

Always to be given under direct observation/supervision of doctors.

Antiviral drugs have demonstrated efficacy in the treatment and prevention of seasonal influenza A and human avian influenza of AI.

Neuraminidase inhibitors

The neuraminidase inhibitors, zanamivir and oseltamivir, are chemically related drugs that have activity against both influenza A and B viruses.

Oseltamivir is approved for chemoprophylaxis of influenza. Oseltamivir is effective against all subtypes of influenza viruses A (including H5N1) indicated for both therapeutic and prophylactic use but is only advocated for persons one year and above.

For prophylaxis purpose the dosage is:

Close contact	75 mg once daily for at least seven days (aged 13 years and above)
1 to 12 years	<15 kgs: 30 mg once a day
	15–<23 kg: 45 mg once a day
	23–<40 kg: 60 mg once a day
	>or= 40 kg: 75 mg once a day
	Community contact: 75 mg once daily

Protection lasts only during the period of chemoprophylaxis. Duration of prophylaxis depends on epidemiologic setting. Post-exposure use is typically for 7–10 days but can be continued to a maximum of six weeks. The only contraindication is in persons with known hypersensitivity to any of the components of the product.

Adverse reactions to oseltamivir

- The most frequent side-effects in adults are nausea and vomiting. These are transient and generally occur with the first dose.
- In children, the most frequently reported side-effect is vomiting.
- Other reported events include abdominal pain, epistaxis, ear disorder and conjunctivitis.
- These events do not require discontinuation of treatment in a majority of cases.
- Should be used during pregnancy or lactation only if the potential benefit justifies the potential risk to the fetus or breast-fed baby.

Antiviral prophylaxis for potentially exposed HCWs

- Although the efficacy of neuraminidase inhibitors as prophylaxis for Avian Influenza A (H5N1) is unknown, prophylaxis is suggested for exposed HCWs because of the high mortality of the disease.
- When used for potentially exposed HCWs, the HCW should take 75 mg Oseltamivir phosphate each day for at least seven days beginning immediately or as soon as possible after unprotected exposure (<48 hours) to Avian Influenza A (H5N1) infected patient. When used, prophylaxis should continue until one week after the last unprotected exposure.

Annexure 7

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