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AVIAN INFLUENZA (BIRD FLU)

INTRODUCTION

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 that can rapidly reach epidemic proportions. The disease, which occurs worldwide, was first identified in Italy over 100 years ago in 1878 and was then known as “fowl plague”.

The disease in birds has two forms. The first causes mild illness, sometimes expressed only as ruffled feathers or reduced egg production. Of greater concern is the second form, known as “highly pathogenic avian influenza” (HPAI), which is characterized, by sudden severe illness and rapid death with a mortality that can approach 100%. When such infections occur, public health authorities need to monitor the situation closely because of concerns about the potential for more widespread infection in the human population.

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. As on December 6, 2005, 134 laboratory confirmed cases of H5N1 infection with 69 deaths (CFR 51.5%) were reported - 93 from Vietnam (42 of them fatal); 21 from Thailand (13 deaths); 4 from Cambodia (4 deaths); 13 from Indonesia (8 deaths) and 3 from China (2 deaths).

Avian Influenza in Birds

H5N1 outbreaks in poultry have been reported from Asian countries – Thailand, Vietnam,

Japan, Republic of Korea, Laos, Indonesia, Cambodia, China, Malaysia, Turkey, Romania, Western Siberia and Kazakhstan. There have also been reports of poultry deaths in Taiwan (H5N2) and Pakistan (H7) due to other strains.

EPIDEMIOLOGY

Avian influenza A viruses do not usually infect humans; however, several instances of human infections have been reported. H5N1 variant demonstrated a capacity to directly infect humans in Hong Kong (1997), and again in Vietnam (January 2004). As these viruses do not commonly infect humans, there is little or no immunity against them in the human exposure. Such an event, therefore, may mark the start of an influenza pandemic which can spread rapidly around the world. Influenza illness, commonly called “the flu”, manifests in mild to severe forms and may have life-threatening complications.

Recent avian influenza outbreaks in human populations

- **1997:** In Hong Kong, avian influenza A (H5N1) infected both chickens and humans. The first time an avian influenza virus had been found to transmit directly from birds to humans. During this outbreak, 18 people were hospitalised and 6 of them died. To control the outbreak, authorities killed about 1.5 million chickens to remove the source of the virus.
- **1999:** In Hong Kong, cases of avian influenza A (H9N2) were confirmed in 2 children. Both patients recovered, and no additional cases were confirmed. The evidence suggested that poultry was the source of infection and the main mode of transmission was from birds to human. However, the possibility of person-to-person transmission remained open.

- **2003:** Two cases of avian influenza A (H5N1) occurred among members of a Hong Kong family that had travelled to China. One person recovered, the other died. How and where these two were infected could not be determined. Another family member died of a respiratory illness in China, but no testing was done. No additional cases were reported.
- **2003:** Avian influenza A (H7N7) among poultry workers and their families was confirmed in the Netherlands during an outbreak of avian flu among poultry. More than 80 cases of H7N7 were reported (the symptoms were mostly confined to eye infections, with some respiratory symptoms), and one patient, a veterinarian who had visited an affected farm, died. There was evidence of some human-to-human transmission.
- **2003:** An H9N2 infection was confirmed in a child in Hong Kong, who was hospitalised but recovered.
- **2003-04:** H5N1 infections in humans have been reported in Vietnam and Thailand following outbreaks of highly pathogenic H5N1 infection among poultry.
- **2004-6th Dec. 2005:** There has been significant rise in the reported H5N1 infection in humans. Vietnam has reported 93 cases (42 deaths); Thailand 21 cases (13 deaths); Indonesia 13 cases (8 deaths); Cambodia 4 cases (4 deaths); China 3 cases (2 deaths).

The H5N1 strain isolated from fatal human cases in Vietnam has been partially sequenced. All the genes are of avian origin, indicating that the virus has not yet acquired genes from the human influenza virus. The acquisition of such genes increases the likelihood that a virus of avian origin can be readily transmitted from person to person.

Particularly alarming, in terms of risks for human health, is the detection of a highly pathogenic strain, “H5N1”, as the cause of most of these outbreaks. H5N1 has jumped the species barrier causing severe disease in humans on two occasions in the past and is now doing so again, in gradually growing numbers, in Vietnam, Thailand and other Asian Countries.

CAUSATIVE AGENT

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 3 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 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). It has now been well established in many other Asian countries. The virus is killed by heat (56°C for 3 hrs or 60°C for 30 minutes) and with common disinfectants, such as formalin and iodine compounds.

Survival of the influenza virus H5N1

	Temperature	Survival Time
Contaminated manure*	Cool	3 Months
Water	22° C	4 days
	0° C	30 days

* One gram of contaminated manure contains enough viruses to infect one million birds

People at risk of contracting avian influenza

- Workers handling poultry in farms, markets and involved in culling activity, veterinary workers and health workers are at higher risk of acquiring the infection. Even the family members of these workers are at higher risk.
- Any types of Influenza tends to be more serious in children, elderly persons above 65 years, and the chronically sick persons.

MODE OF TRANSMISSION

Certain water birds such as water fowls and migratory birds act as reservoir of influenza viruses by carrying the virus in their intestines and shedding it. Birds that survive infection excrete virus for at least 10 days, orally and in

faeces, thus facilitating further spread. The virus can spread from birds to humans through close contact with live infected poultry through inhalation. Feco-oral transmission is also common in birds. In fact, in mammals, influenza is primarily a respiratory tract infection while in avian species it can be an infection of both the respiratory tract and the large intestinal tract.

Human-to-human transmission

There is no definite evidence of human-to-human transmission in the current episode. A new virus adapted for efficient human-to-human transmission would spread very rapidly. In such an event, the health authorities would know very quickly that a completely new virus has emerged.

Spread within a country

The disease spreads easily from one poultry farm to another. Large amounts of virus are secreted in bird droppings, contaminating dust and soil. Airborne virus can spread the disease from bird to bird, causing infection when the virus is inhaled. Contaminated equipment, vehicles, feed, cages or clothing, especially shoes, can carry the virus from farm to farm. The virus can also be carried on the feet and bodies of animals, e.g. rodents, which act as “mechanical vectors” for spreading the disease. Limited evidence suggests that flies can also act as mechanical vectors.

Droppings from infected wild birds can introduce the virus into both commercial and backyard poultry flocks. The risk that infection will be transmitted from wild birds to domestic poultry is greatest where domestic birds roam freely, share water supply with wild birds, or use water supply that might become contaminated by droppings from infected wild-bird carriers.

So called “wet” markets, where live birds are sold under crowded and sometimes in insanitary conditions can be another source of spread.

Spread from one country to another

The disease can spread from country to country through international trade in live poultry. Migratory birds, including wild waterfowl, sea birds, and shore birds, can also carry the virus for long distances and have, in the past, been implicated in the international spread of highly pathogenic avian influenza. Migratory waterfowl – most notably wild ducks – are the natural

reservoir of bird flu viruses, and also the most resistant to infection. They can carry the virus over great distances, and excrete it in their droppings, yet develop only mild and short-lived illness.

CLINICAL SYMPTOMS

In birds - most influenza viruses cause no symptoms, or only mild ones in wild birds; however, the range of symptoms in birds vary greatly depending on the strain of virus and the type of bird. Clinical signs may include ruffled feathers, soft shelled eggs, depression and droopiness, sudden drop in egg production, loss of appetite, cyanosis, diarrhoea, edema 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 increased death losses in a flock.

In human beings - The reported symptoms of avian influenza in humans have ranged from typical influenza-like symptoms (like fever, cough and sore throat, muscle aches) to eye infections, pneumonia, acute respiratory distress and other severe and life threatening complications.

Case Definitions for Influenza A/H5

Case definition:

The current possible case definition, based on WHO recommendations for H5N1 infections is:

Suspect case of Influenza A (H5)

Person with acute respiratory illness, characterized by fever (temperature $>38^{\circ}\text{C}$), cough or sore throat with onset of symptoms within seven days of:

- a. contact with a confirmed case of influenza A(H5) during the infectious period OR
- b. recent (less than 1 week) visit to a poultry farm or other poultry contact in an area known to have outbreaks of influenza A(H5) OR having worked in a laboratory that is processing samples from persons or animals that are suspected to have influenza A(H5) infection. An infectious case of pandemic influenza is a confirmed or suspected case for which the infectious period has not expired.

Probable Cases of Influenza A/H5

Possible case

AND

Limited laboratory evidence for influenza A/H5 (H5 specific antibody detected in a single serum specimen)

OR

No evidence for another cause of disease

Confirmed influenza A/H5 case

Suspect or a probable case as given above with Positive viral culture for Influenza A/H5

OR

Positive PCR for Influenza A (H5),

OR

Positive IFA test using influenza A/H5 monoclonal antibodies

OR

A 4-fold rise in H-5 specific antibody titers in paired serum samples.

Contact definition

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

LABORATORY DIAGNOSIS

Number of tests can help in confirming the diagnosis of influenza. During an outbreak of respiratory illness, however, testing can be very helpful in determining if influenza is the cause of the outbreak. Laboratory tests that can be carried out are:

➤ Detection of antigen in nasal secretions by:

- Rapid Test
- Immunofluorescence test
- Antigen capture ELISA with monoclonal antibody to the nucleoprotein
- Polymerase Chain Reaction (PCR)

➤ Virus isolation in:

- Cell line Madin-Darby Canine Kidney cells (MDCK)
- Egg inoculation

➤ Serological test in paired serum samples

In India, the facilities for laboratory diagnosis for avian influenza in humans are available at National Institute of Virology (NIV), Pune, and NICD, Delhi. For diagnosis in animals, the facilities are available at High Security

Animal Disease Laboratory (HSADL) at Bhopal and other Regional Laboratories of Department of Animal Husbandry and Dairying.

For the purpose of global surveillance, all laboratory confirmed cases of influenza A/H5 should be reported to WHO.

WHO recommends that for countries and territories where influenza A/H5 viruses have not been identified as a cause of illness in human or animal populations since 1 October 2003, the decision whether to test for influenza A/H5 viruses should be based on risk assessment that considers both geographical proximity to countries/territories where HPAI outbreaks are reported in animal populations and following case-based factors:

- clinical presentation, including death due to unexplained acute respiratory illness
- occupational exposure
- living in an area in which there are rumours of deaths of domestic fowl
- history of travel, during 7 days before the onset of symptoms, to a country or territory with reported HPAI outbreaks due to influenza A (H5N1) in the animal populations and one or more of the following:
 - contact (within 1 metre) with live or dead domestic fowl, wild birds, or swine in any setting
 - exposure to settings in which domestic fowl or swine were or had been confined in the previous 6 weeks
 - contact (within touching or speaking distance) with a confirmed human case of influenza A/H5 infection
 - contact (within touching or speaking distance) with a person with an unexplained acute respiratory illness that later resulted in death
 - positive laboratory result for influenza A.

Guidelines for Collection and Transportation of Specimen from Human Cases of Avian Influenza

The following clinical samples need to be collected preferably within **72 hours** of illness and sent to the laboratory within **24 hours** of collection:

➤ Nasopharyngeal wash/aspirate

Have the patient sit with the head tilted slightly backward. Instill 1-1.5 ml of Viral Transport Medium (VTM)/sterile normal

saline into one nostril. Flush a plastic catheter or tubing with 2-3 ml of VTM/sterile normal saline. Insert the tubing into the nostril parallel to the palate and aspirate nasopharyngeal secretions. Repeat this procedure with the other nostril. Collect 1-2 ml of nasopharyngeal wash/aspirate in a sterile vial; transport in cold chain at 2-8°C.

➤ **Nasopharyngeal (NP) swab/ Oropharyngeal (OP) swab/ Throat swab (TS)**

Collect one NP and one OP/throat swab using cotton swabs on a non-wooden shaft.

➤ **Collection of nasopharyngeal swab**

Insert the swab into nostril parallel to the palate and leave in place for a few seconds to absorb secretions. Swab both the nostrils.

➤ **Collection of oropharyngeal swab/ throat swab**

- Swab both the posterior pharynx and the tonsils areas avoiding the tongue.
- Place one NP swab and one OP/TS into the sterile vials containing 2 ml of VTM. Transport under cold chain at 2-8°C.

➤ **Serum: (Paired samples one in acute and the other in convalescent phase at 15 days interval)**

Collect 2-3 ml of serum in a clean sterile screw capped vial. Transport under cold chain at 2-8°C.

Guidelines for Waste Disposal

- All the waste has to be treated as infectious waste
- Articles like swabs/gauges etc. are to be discarded in the yellow coloured autoclavable biosafety bags. After use, the bags are to be autoclaved followed by incineration of the contents of the bag.
- Waste like gloves, face-masks and disposable syringes etc after use are to be discarded in blue/white autoclavable biosafety bags which should be autoclaved/ microwaved before disposal.
- All hospitals and laboratory personnel should follow the standard guidelines (Biomedical waste management and handling rules, 1998) for waste management.

General biosafety measures for collection of specimens from suspected cases of avian influenza

- Clinical samples should be collected by trained hospital staff and not by the laboratory staff.
- All clinical samples should be collected under special care.
- Use N95 masks while taking samples. If not available, triple layer well fitted surgical facemasks can be used.

- Use latex disposable gloves.
- Wear laboratory coat/disposable apron.
- Cover hairs with head cover.
- Use protective eyewear (goggles)/face shields if procedure is likely to generate aerosols, or splashes of secretions.
- Handle waste while collecting specimen with special precautions. The waste should be placed in an appropriate leak proof and autoclavable biohazard bag and autoclaved before disposal. Contaminated non-disposable waste should be treated properly.
- The clinical samples should be processed only in designated laboratory having the appropriate containment facilities.

TREATMENT

The mainstays of treatment will include:

- general support including oxygenation, intensive care where required, antipyretics (not aspirin in children), intravenous or oral fluids, nutrition, bed rest. These will vary depending on whether the patients are adult or paediatric, and the severity of the illness. The level of general support will vary depending on the type of facility to which the case has been admitted e.g. regional or local hospitals, 'influenza' hospitals, nursing homes
- antibiotics for bacterial complications of influenza
- antiviral therapy, if presentation has been within 48 hours of disease onset (and depending on their availability within the context of pandemic requirements)
- Management of contacts may include antiviral prophylaxis and advice about relevant vaccination (e.g. pandemic strain vaccine if available, usual influenza vaccination, pneumococcal vaccination).

'Technical Committee on Drugs' has recommended that following drugs can be used for treatment and chemoprophylaxis of avian flu:

- Tamiflu (Oseltamivir)
- Rolenza (Zanamivir)

Never give aspirin to children and teenagers to prevent occurrence of Reye syndrome.

PREVENTION & CONTROL STRATEGIES

Several measures can help minimize the public health risk of HPAI like:

1. Systematic surveillance of avian influenza in poultry has to be carried out. Clinical

outbreaks in domestic poultry including pigs, horses as well as pet animals, wild animals and exotic animals need to be investigated with help of diagnostic laboratories. Committees may be constituted at the State and District levels comprising of experts from Health, Animal Husbandry and other related sectors for close monitoring of the situation both in humans and poultry.

2. Stringent sanitary measures and appropriate bio-security practices should be applied, including the control of human traffic.
3. Sharing of information on the extent of influenza infection in animals as well as humans and on circulating influenza viruses.
4. WHO has recommended that travellers to areas abroad experiencing outbreaks should avoid contact with live animals in poultry farms and markets.

Control measures in birds

1. Where large outbreaks of avian influenza occur in birds, an immediate priority would be to halt further spread of the epidemic in poultry populations by quarantining infected farms. Feeding stuffs, contaminated equipment and manure must be destroyed or treated to inactivate the virus. The most important control measures are rapid destruction (“culling” or “stamping out”) of all infected or exposed birds, proper disposal of carcasses, and the quarantining and rigorous disinfections of farms.
2. Restrictions on the movement of live poultry, both within and between countries, are another important control measure.

General Biosafety Measures for Poultry Farm Workers

1. Proper clothing and equipment to protect workers involved in the culling of poultry flocks. These workers should wear protective clothings, preferably coveralls, aprons or surgical gowns and gumboots.
2. Use of N-95 respirator masks is preferred. In the absence of N-95 masks, standard well-fitted surgical masks should be used.
3. A person exposed to infected chickens or poultry farms should be closely monitored.
4. All the clinically suspected human cases should be treated in isolation with universal precautions to prevent spread of infection.

Disposal of Carcasses

1. Carcasses of suspected and confirmed

poultry case of influenza should preferably be incinerated or buried deep using lime and soil in the ratio of 1:3.

2. The site where animals died is to be disinfected with 5% formaldehyde or 2% gluteraldehyde, after disposal of the carcasses.

Actions taken by the Government of India in response to threat of Avian Influenza

- The Hon’ble Union Minister for Health and Family Welfare is regularly reviewing the situation and he took a National Consultation Meeting on Pandemic Preparedness on 1st August, 2005 with all stakeholders and discussed the draft pandemic preparedness and Response Plan.
- Secretary (Health) wrote to the Chief Secretary of all States/Union Territories and Secretary, Department of Animal Husbandry to keep a close watch on fatality among bird population, especially poultry and appearance of severe respiratory illness in the exposed human population and to inform any such occurrence to the Department of Health.
- The Government of India has established a **Joint Monitoring Group** on 27th January 2004 under the chairmanship of the Director General of Health Services consisting of officials from the Ministry of Health & F.W., Indian Council of Medical Research, National Institute of Communicable Diseases, Delhi, World Health Organization and the representatives of Department of Animal Husbandry to monitor the situation and advise appropriate actions. The Joint Monitoring Group is meeting regularly. Technical guidelines on clinical management, laboratory and public health measures have been drawn up and the group is jointly monitoring for evidence of H5N1 in birds.
- The Ministry of Home Affairs was requested to keep vigil on the movement of poultry/related articles through the security agencies in the borders.
- Similarly, other concerned Ministries like Shipping (movement of poultry/related articles through our Ports), Environment and Forests (unusual deaths of birds in the sanctuaries etc.) were alerted.
- The National Institute of Communicable Diseases, Delhi has been identified as the

nodal agency to investigate any suspected cases/ outbreak among human population and the laboratories of Indian Council of Medical Research (National Institute of Virology, Pune) and National Institute of Communicable Diseases, Delhi were identified for laboratory diagnosis of human influenza. NICD has established An Avian influenza Monitoring cell. The control room numbers are : **(Tel. No.,23921401, Fax No. 23913028)**

- A special issue of 'CD Alert', a monthly newsletter of NICD, on Avian Influenza (Bird Flu) has been published and widely circulated to all States and Union Territories.
- A World Bank funded programme, called the Integrated Disease Surveillance Programme (IDSP), is to cover all the 601 districts in the country in three phases by 2009 at a total cost of Rs. 403 crores. It plans to establish disease surveillance units at the central, state and district levels, use information technology for communication and data analysis. This infrastructure will also be utilized for disease surveillance of Avian Influenza.
- Under the aegis of ICMR, an initiative to study the strains of Human Influenza, age group affected and seasonality in India through surveillance has been launched. Five centers have been identified for this project; (i) AIIMS, (ii) Entero Viral Unit, Kolkata (iii) RMRC, Dibrugarh (iv) King Institute, Chennai and NIV, Pune. Initial training has been completed. The laboratory of NICD has also been strengthened to take up such activities.
- A Task Force has been constituted under the chairmanship of Secretary (H&FW) vide order dated 22.10.2005 to ensure availability of drugs and vaccines for management of Avian influenza in the country. This task force met on 26.10.2005, decided to import one lakh courses of Oseltamivir/ Zanamivir. 20,000 capsules have been provided by WHO. Govt. of India is procuring one million doses Oseltamivir.
- A scheme for operationalising the important components of the National Plan such as hospital strengthening, Influenza Surveillance Network, Laboratory strengthening in terms of bio-safety labs, Stockpiling of drugs and Vaccines, IEC and

Research has been prepared at an estimated cost of Rs.1530 crores and the same is to be operationalized in a phased manner.

- Cabinet Secretary took a meeting on 21.10.2005 on Bird Flu and emphasized on strengthening surveillance and prepare action plans for vaccine production, and to prepare a contingency plan in case the migratory birds bring in the disease to India, affecting the poultry and subsequent potential human transmission.
- Hon'ble HFM reviewed the scheme for pandemic preparedness on 26.10.2005 and agreed for expenditure of about Rs. 70 crores on items required to combat Avian influenza such as ventilators, personal protective equipments, case management protocols, strengthening of influenza surveillance network, strengthening of laboratories, stockpiling of drugs and IEC activities.
- A contingency plan to tackle human cases of avian influenza has been prepared.
- A technical committee for vaccine under DG, ICMR; technical committee group on laboratory improvement under Director, NICD; and a technical committee on drugs have been constituted.
- Secretary (H&FW) has written to Law Ministry to advise on geographical quarantine on public health emergency act or other prevailing law.

Action taken by Dept. of Animal Husbandry Dairying and Fisheries

- **Surveillance in wild/migratory birds**
Ministry of Environment & Forests, Bombay Natural History Society, Wetland International and similar interested groups have been alerted to do a physical surveillance and monitor the migratory and other wild birds for any unusual sickness or mortality.
The wild life personnel and representative of various other bird watching groups are being trained by DADF to collect suitable material for surveillance through laboratory examination.
- **Collection of material**
Droppings and other clinical or suspected material of migratory/wild birds to be collected and sent to designated laboratory for the purpose of surveillance.

In the event of unusual death in migratory/wild birds, written instruction has been given to staff by M/o Environment & Forests to transport appropriate material to the identified laboratory for diagnosis.

• **Domestic Poultry**

Random sample surveillance in domestic poultry is being carried out for the last four years which has so far proved that the country is free from H5 & H7 types of avian influenza.

Surveillance has also been intensified in poultry farms located near or around water bodies/sanctuaries identified by the M/o of Environment & Forests with the visit of migratory/wild birds for their winter nesting. Laboratory identified for the purpose of diagnosis and also surveillance is the High Security Animal Disease Laboratory (HSADL) located at Bhopal with Indian Council of Agricultural Research (ICAR).

Surveillance of poultry with non-infectious antigens is also being taken up with five Regional Disease Diagnostic laboratories under the Deptt. of Animal Husbandry, Dairying & Fisheries, Govt. of India.

All the birds (GP stock of poultry), etc. imported from HPAI free countries are subjected to quarantine and screening against possibility of introduction of the disease through these birds.

There is a total ban in place against import of poultry or poultry products and other identified related products from countries which are continuing with HPAI or had exposure in recent times.

A contingency preparedness plan in the event of suspicion of bird flu in poultry or other birds or in the event of its detection in the country, has been prepared by the Deptt. of Animal Husbandry, Dairying & Fisheries. Birds within 3 Kms. of radius would be culled once a suspected case of Avian Influenza

is detected. All movements with 10 Km. radius would be limited and if a vaccine is available, birds within such area would be vaccinated.

The State Animal Husbandry Departments have been given alert notices. The States have already activated the State Animal Disease Emergency Committees (SADEC) for any eventuality due to bird flu.

The public should report any mass deaths in poultry to the local veterinary hospital and to the State Veterinary Department immediately. In the event of detection of infection in the flock, marketing of birds, eggs, etc., should be stopped completely till advised by the concerned authorities.

Do's and Don'ts for Community

These guidelines are for contacts of patients, family members

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 for surface 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 3 meter) or while in a confined space.
- Always wash hands after having contact with respiratory secretions, with detergent or soap.
- Ask patient to use tissue paper/handkerchief to cover nose and mouth while coughing and sneezing.
- 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.

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 throwaway the tissue paper/mask handkerchief after use.

...about CDAlert

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