Surveillance and Control of Human Cases of Avian Influenza

Provisional Guidelines for Public Health Services in Georgia

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Ministry of Labor, Health, and Social Affairs of Georgia

Public Health Department

National Center for Disease Control and Medical Statistics

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Abstract

Outbreaks of highly pathogenic avian influenza are occurring in domestic fowl in many countries, posing a considerable human public health risk. The outbreaks are largely caused by a novel H5N1 strain of influenza A, against which people are not immune. The H5N1 viruses have been able to cross the species barrier and infect humans, causing severe disease with high mortality. The ability of these viruses to rapidly mutate and acquire genes from viruses affecting other species raises the concern that they will gain the ability to spread efficiently among humans and cause a global influenza pandemic.

The early detection of cases of H5N1 influenza in humans plays a critical role in combating a potential pandemic. The main benefits of having ascertained clear and fast recognition of transmission to human beings include:

- Prompt implementation of public health and medical interventions aimed at preventing, delaying, or containing human-to-human virus transmission.
- More effective medical care of infected individuals, resulting in reduced mortality.
- Reduced economic and social impact of a potential pandemic.

The guidelines outlined in this report are the first attempt to provide comprehensive recommendations to help Georgian health workers promptly identify, report, confirm, and classify potential cases of avian influenza in humans; analyze data; investigate and respond to cases and outbreaks; and improve other aspects of an early warning system for humans. They are most appropriate for the current stage of pandemic preparedness (phases 3 to 4 of the World Health Organization [WHO] Pandemic Alert Period) and designed primarily for health personnel working at rayon and regional public health centers. In addition to general recommendations for the human avian influenza surveillance system as a whole, the guidelines include specific sections devoted to communication with the public as well as infection control in health facilities.

Based on the latest WHO standards and recommendations, this document was developed by a multi-agency task force of experts under the leadership of the Georgian Ministry of Labor, Health, and Social Affairs and the National Center for Disease Control and Medical Statistics. Periodic revisions are expected as more evidence and feedback from users become available.

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Acronyms

ARI	Acute respiratory infection
CIF	Curatio International Foundation
CPH	Center of Public Health
EU	European Union
HPAI	Highly pathogenic avian influenza
IHC	Immuno-histochemical
ILI	Influenza-like illness
MoLHSA	Ministry of Labor, Health, and Social Affairs
NCDC	National Center for Disease Control and Medical Statistics
NIOSH	National Institute for Occupational Safety and Health
PATH	Program for Appropriate Technology in Health
PPE	Personal protective equipment
RT-PCR	Reverse transcriptase polymerase chain reaction
USAID	US Agency for International Development
VTM	Viral transport medium
WHO	World Health Organization

What Is Avian Influenza?

There are three types of influenza viruses: A, B, and C. Influenza type A viruses can infect humans, birds, pigs, horses, and other animals, but wild birds are the natural hosts for these viruses. Influenza B viruses are usually found only in humans and generally are associated with less severe epidemics than are influenza A viruses. Influenza type C viruses cause mild illness in humans and are not a significant concern for human health. Only influenza type A viruses can cause pandemics.

Avian influenza ("bird flu") is an infectious disease of birds caused by various subtypes of type A influenza virus.

Sixteen subtypes of type A influenza virus are known to infect birds. To date, all outbreaks of the highly pathogenic form have been caused by subtypes H5 and H7.[1]

1. Description of the Disease in Birds

Influenza infections occur naturally among birds worldwide.

Infection causes a spectrum of symptoms in birds, ranging from mild illness to a highly contagious and rapidly fatal disease that can cause severe epidemics. The latter is known as "highly pathogenic avian influenza," or HPAI. HPAI is characterized by sudden onset, severe illness, and rapid death, with a mortality that can approach 100 percent. Some birds, such as ducks, can get and spread the disease without showing signs of illness.

The current outbreaks of HPAI began in mid-2003. The causative agent, the H5N1 virus,[2] began to circulate widely in poultry in parts of Southeast Asia, spreading within months to affect eight countries in an outbreak that was unprecedented in its geographical extent. Never before have so many countries been simultaneously affected by HPAI; the outbreak has already resulted in the loss of more than 100 million birds. The disease remained confined to Southeast Asia until mid-2005, when the virus spread through parts of Central Asia to Europe, Africa, and the Middle East—affecting more than 60 countries in all.

Migratory waterfowl—most notably wild ducks and geese—are the natural reservoir of avian influenza viruses, and these birds are also the most resistant to infection. Direct or indirect contact of wild migratory waterfowl with domestic flocks (e.g., through droppings from infected wild birds) has been implicated as a frequent cause of bird epidemics.

The disease spreads from bird to bird when the virus is inhaled. Environmental spread is *theoretically* possible, too: contaminated vehicles, equipment, feed, cages, or clothing can carry the virus from farm to farm. Some species are more resistant to infection than others. Domestic poultry, including chickens and turkeys, are particularly susceptible to epidemics of rapidly fatal influenza.

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[1]The subtypes differ based upon proteins on the surface of the virus: the hemagglutinin (H) protein governs entry of virus into cells; immunity to the H subtype prevents infection. The neuraminidase (N) protein governs release of new virus into the body; immunity to the N subtype reduces severity of the disease.

[2]The H5N1 virus is also of particular concern for human health, as explained on page 8.

2. The Risk and Significance of Transmission to Humans

The current outbreaks of HPAI are closely monitored by experts around the globe because 1 of the 16 avian influenza virus subtypes, H5N1,[3] was able to cross the species barrier on a number of occasions and cause severe illness with high case fatality in humans (Table 1). This poses a theoretical risk of a new influenza pandemic—that is, a global epidemic affecting a large proportion of the population.

TABLE 1. Cumulative Number of Laboratory-Confirmed Human Cases of Avian Influenza A (H5N1) Reported to the World Health Organization (as of July 20, 2006)

COUNTRY	TOTAL CASES	TOTAL DEATHS
Azerbaijan	8	5
Cambodia	6	6
China	19	12
Djibouti	1	0
Egypt	14	6
Indonesia	54	42
Iraq	2	2
Thailand	22	14
Turkey	12	4
Vietnam	93	42
Total	**231**	**133**

Influenza pandemics have been documented since the 16th century and have occurred at intervals ranging from 10 to 50 years. During a pandemic, an estimated 25 to 30 percent of the world population may get ill, and up to 1 percent of the population may die.

All previous pandemics have been caused by H1, H2, or H3 viruses. The H5 virus has never circulated among humans, so it meets the requirement of a novel virus.

Pandemic influenza viruses in the 20th century

1918–19	H1N1, “Spanish flu”	40 million deaths
1957–58	H2N2, “Asian flu”	2 million deaths
1968–69	H3N2, “Hong Kong flu”	1 million deaths

Three prerequisites are normally required for a pandemic to occur. H5N1 meets the first two criteria.

1. (+) A novel virus subtype must emerge.
2. (+) The virus must be able to replicate in humans and cause serious disease.
3. (–) The virus must be efficiently transmitted from one human to another.

[3]In addition to H5N1, two avian influenza strains—H9N2 and H7N7—have caused illness in humans, but the outbreaks were not as severe as those caused by the H5N1 strain.

It is thought that there are two mechanisms by which a bird influenza virus can evolve into a pandemic strain. In the 1918 pandemic, it is believed that an avian H1N1 virus mutated sufficiently over time to acquire the ability to be transmitted easily from person to person. In contrast, the 1957 and 1968 pandemics were caused by re-assortments, or mixing of genes, between human and avian viruses.

The spread of infection in birds increases the likelihood of human contact with infected birds. If more humans become infected over time, the likelihood increases that humans, if concurrently infected with human and avian influenza strains, could serve as the "mixing vessel" for a novel strain with sufficient human genes to be easily transmitted from person to person. Such an event would mark the start of an influenza pandemic because the human population has little or no immune protection against such virus subtypes. Moreover, existing vaccines, which are developed each year to match currently circulating strains and protect humans during seasonal epidemics, would be ineffective against a new virus.

The longer the current H5N1 strain circulates, the greater the possibility that people will be infected with H5N1—and the greater the risk of pandemic.

To date, human infections have not resulted in sustained human-to-human transmission.

However, reported family clusters of H5N1 disease highlight the concern that changes in the circulating avian H5N1 virus might transform it into a virus that can be transmitted efficiently from human to human.

3. How Human Infections Might Occur

Avian influenza viruses do not usually infect humans. Nevertheless, as mentioned above, several instances of human infections and outbreaks have been reported since 1997.

Most cases of H5N1 infection in humans are the result of direct contact with poultry or with objects or surfaces contaminated with feces from infected poultry (with a few cases of suspected human-to-human transmission among persons with intimate contact). These observations suggest either a **respiratory or fecal-oral route of transmission from birds to humans.** Exposure risk is considered highest during slaughter, de-feathering, butchering, and preparation of poultry for cooking. Infections have not occurred when individuals have used personal protective equipment (PPE) in the culling process.

Food safety: There is no evidence that properly cooked poultry or poultry products, such as eggs, can be a source of infection. Normal cooking at temperatures above 70°C will inactivate the virus.

4. WHO Phases for Pandemic Influenza

The World Health Organization (WHO) has designed a six-phase system for informing the world of the seriousness of the threat of pandemic influenza and to facilitate pandemic planning (Table 2). As of July 2006, the world was in phase 3: a new influenza virus subtype causing disease in humans but not yet spreading efficiently and sustainably between humans.

TABLE 2. Summary of WHO Phases of Pandemic Influenza

PERIOD	PHASE	DESCRIPTION	PUBLIC HEALTH GOALS
Inter-pandemic	1	No new influenza virus subtypes in humans.	Strengthen influenza pandemic preparedness at all levels.
	2	No new influenza virus subtypes in humans. A circulating animal influenza virus subtype poses a substantial risk of human disease.	Minimize the risk of transmission to humans; detect and report such transmission rapidly if it occurs.
Pandemic Alert	3	Human infection with a new subtype but no human-to-human spread, or at most, rare instances of spread to a close contact.	Ensure rapid characterization of the new virus subtype and early detection, notification, and response to additional cases.
	4	Small cluster(s) with limited human-to-human transmission, but spread is highly localized, suggesting that the virus is not well adapted to humans.	Contain the virus within limited foci or delay spread to gain time to implement preparedness measures, including vaccine development.
	5	Large cluster(s), but human-to-human spread is still localized, suggesting the virus is better adapted to humans but may not yet be fully transmissible.	Maximize efforts to contain or delay spread, to possibly avert a pandemic and to gain time to implement pandemic response measures.
Pandemic	6	Efficient and sustained transmission in the general population.	Minimize the impact of pandemic.

Source: WHO, 2006.

5. Epidemiology of WHO-Confirmed Human Cases of Avian Influenza A (H5N1) Infection

Results from the first analysis of epidemiological data on all 205 laboratory-confirmed H5N1 cases officially reported to WHO (analyzed by onset date from December 2003 through April 2006) have allowed several preliminary[4,5] conclusions on the epidemiology of this infection:

- Cases have occurred year round. In each of the three years in which cases have occurred, however, the incidence of human cases peaked during the period roughly corresponding to winter and spring in the northern hemisphere.[6]
- Half of the cases occurred in people less than 20 years of age; 90 percent of cases occurred in people less than 40 years of age.
- The overall case-fatality rate was 56 percent. Case fatality was high in all age groups but highest in persons aged 10 to 39 years.
- The case-fatality profile by age group differs from that seen in seasonal influenza, where mortality is highest in the elderly.
- The overall case-fatality rate was highest in 2004 (73 percent), followed by 63 percent to date in 2006 and 43 percent in 2005.
- The median incubation period was 3 to 4 days. The median duration from onset of symptoms until hospitalization was 4 to 5 days across all years studied. The overall median number of days from onset of symptoms until death was 9 days.
- Assessment of mortality rates and the time intervals between symptom onset and hospitalization and between symptom onset and death suggests that the illness pattern has not changed substantially during the three years.

[4]Because of several limitations, the extent to which these cases are representative of all human infections with H5N1 cannot be inferred. Multiple selection biases may have occurred because some patients may have died before being tested or diagnosed, mildly symptomatic patients may not have sought medical care, and false-positive or false-negative test results may have occurred.

[5]Epidemiology of WHO-confirmed human cases of avian influenza A (H5N1) infection. *WHO Weekly Epidemiological Record.* 2006;81(26): 249–260.

[6]If this pattern continues, an upsurge in cases could be anticipated starting in late 2006 or early 2007.

6. Rationale for Human Surveillance in Georgia

Two major migratory bird flyways cross over Georgia, placing the country at significant risk for the spread of HPAI. As of July 20, 2006, 20 human cases caused by the H5N1 influenza strain had been reported in countries that border Georgia—12 cases with four fatalities in Turkey and 8 cases with five fatalities in Azerbaijan. While no human cases have been identified in Georgia to date,[7] the country confirmed the detection of H5N1 in two wild birds (swans) in February 2006. Officials responded by culling all domestic poultry (about 1,800 chickens) within a 3-kilometer zone around the site where the dead birds were found.

At the current stage, the overall objective of human pandemic influenza surveillance in Georgia is to detect and investigate unusual morbidity and mortality due to acute respiratory illness, promptly identify potential cases, monitor the spread of influenza viruses in human and animal populations to assess the trend of this disease and its associated public health risk, and trigger appropriate public health pandemic preparedness actions.

The early detection of cases of H5N1 influenza in humans plays a critical role in combating a potential pandemic. The main benefits of having ascertained clear and fast recognition of transmission to human beings will ultimately include:

- Prompt implementation of public health and medical interventions aimed at preventing, delaying, or containing human-to-human virus transmission.
- More effective medical care of the infected subjects, resulting in reduced mortality.
- Reduced economic and social impact of a potential pandemic.

[7] As of July 20, 2006.

7. Clinical Description of Human Cases of H5N1 Avian Influenza

The incubation period for influenza A (H5N1) infection in humans is usually 2 to 4 days (although it may be up to 7 days).

The reported symptoms of avian influenza in humans have ranged from typical influenza-like symptoms (e.g., fever, cough, sore throat, and muscle aches) to viral pneumonia and acute respiratory distress. Gastroenterological symptoms are sometimes reported as well (Table 3). Lower respiratory symptoms develop early in illness, and overall severity of the disease is high. Clinically apparent pneumonia with chest x-ray changes are seen in most patients, although the x-ray changes have been nonspecific.

Common laboratory findings have included lymphopenia ($<1 \times 10^9$/liter), thrombocytopenia, and slightly or moderately raised alanine aminotransferase and aspartate transaminase. In fatal cases, the illness rapidly progresses to respiratory distress and subsequent respiratory failure within one week of the onset of symptoms, despite ventilator support.

TABLE 3. Prevalence of Selected Clinical Symptoms and Findings Among 59 Patients With Confirmed Avian Influenza A (H5N1) in Hong Kong, Thailand, Vietnam, and Cambodia (1997–2005)

CLINICAL PRESENTATION	PREVALENCE (%)*
Fever ≥38°C†	98
Cough†	88
Shortness of breath†	62
Rhinorrhea	55
Sore throat†	52
Diarrhea	39
Headache	28
Myalgia	29
Abdominal pain	23
Vomiting	31
Pulmonary infiltrates	88
Lymphopenia	64
Increased aminotransferase levels	67
Thrombocytopenia	54

*On average, based on several studies. For more details, see Beigel JH, Farrar J, Han AM, et al. Avian influenza A (H5N1) infection in humans. *New England Journal of Medicine.* 2005;353:1374–1385.

†These most-prevalent symptoms have formed a basis for influenza A/H5N1 clinical (probable) case definition to increase its specificity. Chapter 8 provides additional details on this case definition.

8. Recommended Clinical (Probable) Influenza A/H5N1 Case Definition

Note: The case definition should be used in the current situation (WHO's pre-pandemic phase 3) for the purpose of undertaking surveillance of cases of influenza A/H5N1 infections in humans in Georgia.

Influenza A (H5N1) should be suspected in an individual with:

Clinical Presentation

Acute fever ≥38°C with at least one of the following symptoms:
cough, sore throat, or shortness of breath.
or
Death from an unexplained acute respiratory illness.

AND

Epidemiological Criteria

At least one of the following exposures within 7 days of onset of symptoms:

1. Human contact:	Has been in close contact with (within 1 meter of) a person reported as a laboratory-confirmed case of influenza A/H5N1.
2. Laboratory contact:	Has worked in a laboratory where there is potential exposure to influenza A/H5N1.
3. Contact with poultry or wild birds:	*The person resides in or has visited an area where influenza A/H5N1 is currently confirmed or where a mass bird die-off has occurred* and has been in close contact with sick or dead domestic poultry* or wild birds,† or has been in a home or at a farm where sick or dead domestic poultry have been reported in the past 6 weeks.

*Dead domestic poultry does not include poultry meat commercially available in shops and supermarkets.
†This does not include seemingly well birds that have been killed, for example by hunting.

Note: Whereas a theoretical possibility of contracting influenza type A/H5N1 through the consumption of raw/undercooked bird meat or eggs exists but has not been confirmed, this is not included in the definition to achieve its optimal specificity.

9. Definition of a Laboratory-Confirmed Case

Definition

An individual, irrespective of the clinical and epidemiological picture, with a positive test for influenza A/H5 or A/H5N1 performed by the National Center for Disease Control and Medical Statistics (NCDC) laboratory.

Laboratory Criteria for Diagnosis

Influenza A/H5 or A/H5N1 can be demonstrated by one of the following lab tests:

- Positive reverse transcriptase polymerase chain reaction (RT-PCR) for influenza A/H5 or A/H5N1.
- Positive immunofluorescence antibody test using influenza A/H5 monoclonal antibodies.
- Four-fold rise in influenza H5-specific antibody titer in paired serum samples.
- Positive viral culture for influenza A/H5N1 confirmed by a WHO reference laboratory.

10. Probable A/H5N1 Case Notification Procedures

Any clinical (probable) human case of avian influenza A/H5N1 identified by providers requires immediate notification of the rayon Center of Public Health (CPH), without any delay, by any existing means of communication (telephone, fax, email, or standard notification card #58/1).

In turn, the rayon CPH must notify the following institutions within 1 hour:

- The NCDC and the regional CPH (to inform them that further investigation is required).
- The rayon veterinary service and the rayon administration (to alert them that response measures may be required upon case investigation).
- The regional/rayon hospital (to enable the chief doctor to arrange admission of the patient to the hospital if needed). Transportation should be provided by an ambulance operating in the rayon.

General case notification and reporting requirements are outlined in more detail in *Surveillance and Control of Communicable Diseases: Guidelines for Public Health Services in Georgia.*

11. Procedures to Strengthen the Early Warning System for Humans

An early warning system for humans aims at detecting unusual or unexplained events of acute respiratory illness (ARI) that should trigger appropriate public health and laboratory investigations.

Routine Seasonal Influenza and ARI Surveillance

All institutions rendering health services are required to strictly adhere to the national notification reporting and investigation requirements summarized in Table 4.

TABLE 4. National Notification Reporting and Investigation Requirements

DISEASE/CONDITION	REPORTING BY ALL PROVIDERS AND LABS		REPORTING BY CPH		INVESTIGATION BY CPH	
	URGENT	MONTHLY	URGENT	MONTHLY	THRESHOLD	PERIOD
Acute respiratory infection	No	Yes	No	Yes	No	No
Influenza	No	Yes	No	Yes		
Hospitalized case of influenza-like illness (ICD codes: 06.9, 22, 10, 10.1, 11, 11.1, 12, 12.1, 12.2, 12.8, 18)	Within 24 hours	No	No	Yes	1 case	1–48 hours
Fatal case of acute infectious disease	Within 24 hours	No	Yes	Yes	1 case	1–48 hours
Influenza caused by a new viral subtype	Within 1 hour	No	Within 1 hour	No	1 case	1–24 hours

The institution should follow standard investigation procedures specified in the national communicable disease guidelines and check each case for potential exposure to the H5N1 virus in the 7 days prior to onset of symptoms using the *Probable Human Case of Avian Influenza A/H5N1 Investigation Card* (Figure 1).

If the case turns out to be a probable human case of avian influenza, the institution should follow the investigation and response procedures specified in this manual (Chapters 12 through 15).

FIGURE 1. Probable Human Case of Avian Influenza A/H5N1 Investigation Card

Facility # and date: _____ Registration # in the NCDC: _____ Autonomous rep/region: _____ Rayon: _____

Case identification	Full name of patient:	
	Date of birth:	Day/ / Month/ / Year/ /
	Address:	
	Occupation/place of study:	
Case detection and notification history	Date and facility at which the patient presented for the first time:	Day/ / Month/ / Year/ / Health facility name:
	Date case was reported to CPH:	Day/ / Month/ / Year/ /
	Date case investigation started:	Day/ / Month/ / Year/ /
Hospitalization	Date and place:	Day/ / Month/ / Year/ / Hospital name:
Current health status	Date of disease onset:	Day/ / Month/ / Year/ /
	Symptoms:	Fever ≥38°C? ○ Yes ○ No ○ Unknown Shortness of breath? ○ Yes ○ No ○ Unknown Cough? ○ Yes ○ No ○ Unknown Sore throat? ○ Yes ○ No ○ Unknown Rhinitis? ○ Yes ○ No ○ Unknown General weakness? ○ Yes ○ No ○ Unknown Conjuctivitis? ○ Yes ○ No ○ Unknown Muscle/joint aches? ○ Yes ○ No ○ Unknown Diarrhea? ○ Yes ○ No ○ Unknown
	Outcome:	○ Alive ○ Dead ○ Unknown If dead, date of death: Day/ / Month/ / Year/ /
Prophylaxis against influenza	Patient vaccinated against seasonal influenza in the last 6 months?	○ Yes ○ No ○ Unknown
	Was the patient taking any antiviral medications during 7 days prior to symptom onset?	○ Yes ○ No ○ Unknown If yes, name of antiviral: _____ Received at facility: _____ Start date: Day/ / Month/ / Year/ /

Exposure history: During the 7 days prior to the onset of symptoms, has the patient:	Been in close contact with a confirmed case of avian influenza A/H5N1?	○ Yes ○ No ○ Unknown If yes, give details:				
	Been in close contact with a person with an unexplained acute respiratory illness that later resulted in death?	○ Yes ○ No ○ Unknown If yes, give details:				
	Been working in a laboratory where there is potential exposure to influenza A/H5N1 viruses?	○ Yes ○ No ○ Unknown If yes, give details (location, type, frequency, duration of exposure):				
	Been in close contact (within 1m) with sick or dead poultry or birds?	Domestic poultry? ○ Yes ○ No ○ Unknown Specify type_____ Wild birds? ○ Yes ○ No ○ Unknown Specify type_____	If yes, location:	Date:	Duration (hours, days):	Sick or dead:
	Been on premises where sick or dead domestic poultry have been reported in the previous 6 weeks?	○ Yes ○ No ○ Unknown				
	If exposed, was he/she wearing PPE?	○ Yes ○ No ○ Unknown Specify: ○ Respirator ○ Mask ○ Gloves ○ Gown ○ Eyewear				
Lab testing	Date of sample collection:	Day/ / Month/ / Year/ / ○ Nasopharyngeal swab ○ Oropharyngeal swab ○ Serum ○ Nasopharyngeal wash/aspirate ○ Other_____				
Classification	Final case classification:	○ Probable ○ Laboratory-confirmed				

This form should be sent to the reginal CPH and to the NCDC by the 5th day and the 7th day of the next month, respectively.

Responsible person: _____ Signature: _____

Monitoring High-Risk Occupational Groups for Early Signs of Influenza-Like Infection

The head of each rayon CPH must assume personal responsibility for the development and timely CPH update of a rayon-specific list of occupational groups that are at high risk of contracting A/H5N1 infection. The rayon CPH head should also assume control over monitoring the health status of these individuals using the register suggested in Figure 2.

At a minimum, these groups should include:

- People involved in the culling of infected or potentially infected birds.
- Health care workers caring for patients with probable or confirmed A/H5N1 infection.
- Laboratory workers handling clinical specimens from patients with probable or confirmed A/H5N1 infection.
- Mortuary room workers dealing with bodies of probable or confirmed A/H5N1 cases.

Each of the professionals in the register should be informed about clinical symptoms of influenza-like illnesses and provided with the contact details of a designated health official or health care facility (contactable 24 hours a day, 7 days a week). They should be instructed to:

- Check their temperature twice daily for 7 days following their last contact with potentially infected animals or humans.
- Not self-medicate if a fever develops. Instead, they should limit interactions with others and immediately seek assistance from the designated health official/health care facility.

While self-reporting is encouraged, CPH personnel are advised to actively contact identified individuals and/or cooperate with their employers to verify the absence of influenza-like illness during the entire monitoring period.

If a probable A/H5N1 infection is suspected, a prompt investigation and response should be initiated as specified in these guidelines.

FIGURE 2. Form for Monitoring Contacts Potentially Exposed to Influenza A/H5N1 Infection (Monitoring Until 7 Days After Last Exposure)

Rayon: _____ Patient's name or suspected animal source/place of exposure: _____

Facility name and telephone (for monitoring of contacts among occupational groups): _____

N	First and Last Name	Address and Telephone	Sex	Age	Occupation	Character and Duration of Exposure (e.g., Relationship With Case*)	Last Contact	Fever (≥38°C) After Last Exposure? (Y/N) Day							Cough? Sore Throat? Dyspnea?	If the Contact Falls Ill During the Observation Period
								1	2	3	4	5	6	7	Date Started	Referral Date and Place
1							___/___/___								___/___/___	Place: ___/___/___
2							___/___/___								___/___/___	Place: ___/___/___
3							___/___/___								___/___/___	Place: ___/___/___
4							___/___/___								___/___/___	Place: ___/___/___
5							___/___/___								___/___/___	Place: ___/___/___
6							___/___/___								___/___/___	Place: ___/___/___
7							___/___/___								___/___/___	Place: ___/___/___
8							___/___/___								___/___/___	Place: ___/___/___
9							___/___/___								___/___/___	Place: ___/___/___
10							___/___/___								___/___/___	Place: ___/___/___
11							___/___/___								___/___/___	Place: ___/___/___

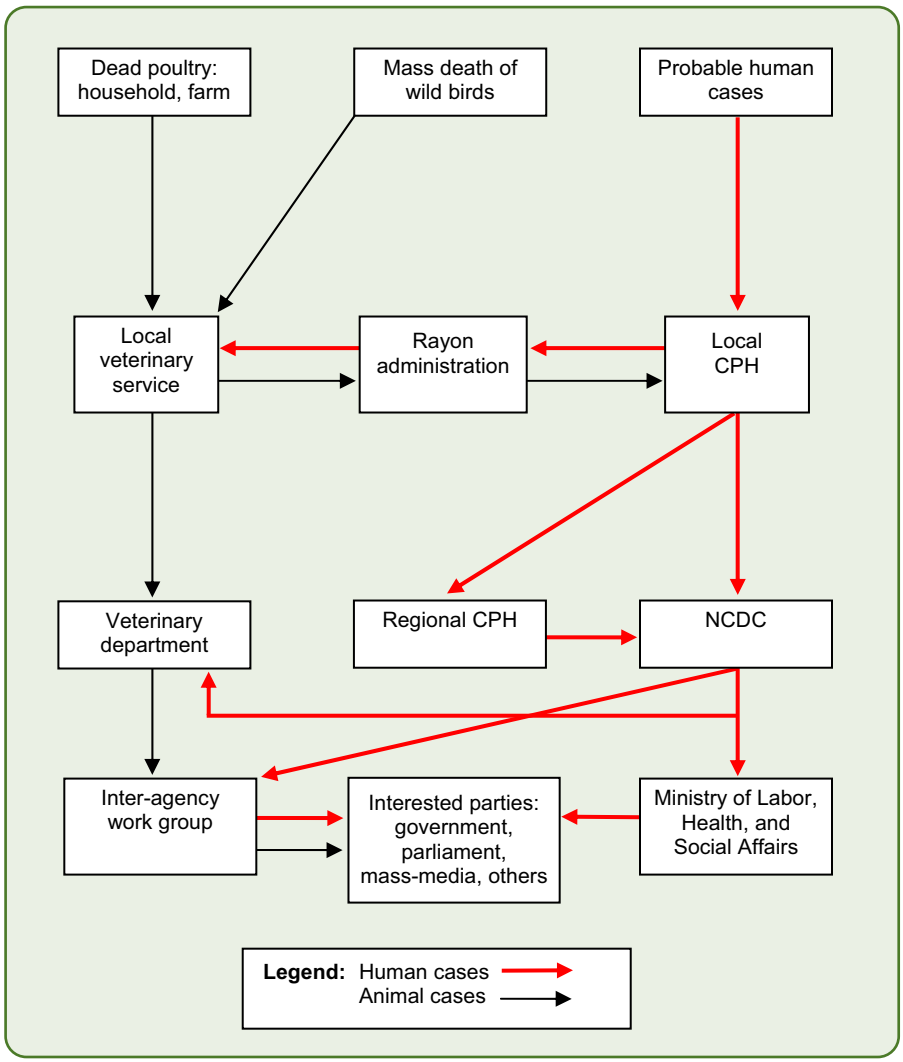
*Houshold member (H), friend (F), working mate (W), other(O) (specify).

Active Search for Human Respiratory Infections in Cases of Unexplained or Unusual Mortality or Confirmed Cases of A/H5N1 in Birds or Animals

Unexplained or unusual mortality in poultry, wild birds, or animals may indicate an outbreak of HPAI A/H5N1.

As shown in Figure 3, the rayon veterinary office will normally be the first to be notified about such an event. They will promptly notify the rayon CPH and veterinary department and convene the rayon avian influenza response commission.

FIGURE 3. Reporting Channels for Suspected Cases of Avian Influenza



This notification may be followed by testing of deceased birds/animals, and in the case of a positive result, measures to control the animal infection, such as culling.

In the absence of a laboratory confirmation of A/H5N1 in birds, the rayon avian influenza response commission, in consultation with the NCDC, should make a decision to initiate an active search for human infections.

Active surveillance is carried out to detect and investigate probable human cases as early as possible and implement containment measures to prevent further spread.

The importance of active surveillance will increase as the virus becomes better adapted to humans.

A two- or three-person surveillance team should be composed of CPH personnel and rayon health facility health workers. During the case search, the team members should wear PPE and be equipped with mobile telephones, flashlights, thermometers, and sufficient supplies of case investigation and contact monitoring forms.

The first step is to determine target population groups. Depending on the scope of the problem, these groups may include:

- People living in villages with suspected H5N1 outbreaks in poultry or wild bird die-offs.
- Persons involved in H5N1 poultry investigations and response and health care workers.
- Workers/buyers/vendors in live animal markets (especially bird markets).
- Poultry cullers.
- Poultry or swine farm workers.
- Veterinarians.
- Hunters.
- Dealers or traders in wild/exotic birds.
- Zoo workers.

During active house-to-house visits, the surveillance team should interview the target population to verify the presence of *both* clinical symptoms and epidemiological contact with a potential source of infection using the standard case definition. For example:

Close contact with sick or dead domestic poultry, wild birds, or their droppings **and** Evidence of fever ≥38°C with signs or symptoms of ARI (such as cough, sore throat, shortness of breath)

For each case, the team actions should be as follows:

IF THERE ARE:		THEN:
NO clinical signs and NO contact with suspected source of infection	➔	Deliver appropriate health education messages on infection prevention and health care seeking behavior (see annex).
ONLY clinical signs of respiratory infection	➔	Refer patient to health facility. Deliver appropriate health education messages on infection prevention (see annex).
ONLY contact with sick or dead poultry, wild birds, animals, or a human source of infection	➔	Include patient on the list of contacts for close observation (Figure 2) and begin monitoring for signs of infection for 7 days. Advise patient not to self-medicate if fever develops but to limit interactions with others and *immediately seek assistance from the designated health official/health care facility* that can be contacted 24 hours a day, 7 days a week.
BOTH clinical signs and contact with a potential source within 7 days of symptom onset	➔	This is a probable human case of avian influenza. Investigate on the spot using the case investigation form (Figure 1). Initiate control measures as recommended in Chapters 14 and 15.

12. Investigation of Human Cases/Outbreaks of Avian Influenza A/H5N1

Every reported clinical (probable) human case of avian influenza A/H5N1 has to be investigated by a rayon CPH epidemiologist in cooperation with the NCDC, regional CPH experts, and facility health workers within 1 business day of notification.

The following steps are required in an investigation:

1. Collect data according to the *Probable Human Case of Avian Influenza A/H5N1 Investigation Card* (Figure 1) by reviewing medical records and interviewing health personnel and the patient as needed.

The collected data should be verified against the information found in the health facility's infectious disease register 60/A and the CPH register 60/B. All newly identified cases resulting from the investigation should be recorded in these registers as well. Facilities should continue filling out the investigation cards for all clinical (probable) cases identified.

2. Verify that all cases meet the probable A/H5N1 case definition.

If a case does not meet the definition, the investigation team should discuss the case with the physician(s). A case that is incompatible with the clinical and epidemiological description and is not confirmed by specific laboratory tests will be eliminated from epidemiological surveillance reporting.

3. Identify the potential source of infection by analyzing exposure history of the case 7 days prior to the onset of symptoms.

The scope of response measures will depend on whether animal-to-human or human-to-human transmission is suspected. For example, if the initial investigation suggests a relationship in time and place with unusual deaths in poultry or other animals, the rayon veterinary authorities and rayon avian influenza response commission should initiate immediate investigations to search for the possible source and collect appropriate animal samples for laboratory evaluation. If, however, the initial investigation suggests human-to-human transmission, exceptional control measures—such as social distancing, voluntary home quarantine, and antiviral prophylaxis—should be carefully considered. (Chapter 14 provides additional detail.)

4. Collect specimens for laboratory investigation.

Laboratory testing is currently mandated for confirmation of every probable case of A/H5N1. Samples should be collected by specially trained professionals—members of a CPH/NCDC case investigation/rapid response team.

All manipulations should be carried out following standard bio-safety guidelines, in particular, using full PPE, including a respirator mask (e.g., fit-tested National Institute for Occupational Safety and Health [NIOSH]-certified N95, European Union [EU] FFP2, or equivalent), gown, gloves, and eye protection.

Chapter 16 provides instructions for specimen collection, storage, and transportation.

5. Assess potential for transmission and identify contacts.

The potential for transmission is usually determined by the number of susceptible contacts. At the present time, the risk to humans is believed to be generally low because avian influenza viruses usually do not cross the species barrier and infect humans. If the epidemiological situation progresses unfavorably, sporadic cases and clusters of human-to-human transmission will be registered, indicating that the virus is adapting to humans and signaling the need to intensify pandemic-preparedness measures, including improving capacity to contain cases.

The investigation team should identify all close contacts of the probable human A/H5N1 cases during their infectious period (7 days after the resolution of fever for people older than 12 years and 21 days after illness onset for children less than 12 years) and follow up with them to promptly detect potential human-to-human transmission of influenza viruses in Georgia. (Chapters 13 and 14 provide additional detail.)

Close contact with a human case is defined as:

- Having intimate contact (within 1 meter).
- Living in the same household.
- Providing care.
- Having direct contact with respiratory secretions, body fluids, or excretions.

Within 7 days of symptom onset.

6. Search for additional cases.

An active search should be conducted to determine if additional cases exist. This can be accomplished by identifying areas and populations of likely risk (people exposed to/closely associated in time and place with the same animal or human source of infection) and visiting those places to find out if anyone else near the potential source of infection has developed signs or symptoms that meet the case definition. (Chapters 11 and 14 provide additional information on the search for additional cases.)

7. Analyze outbreak data in the case of a cluster of probable or confirmed human cases.

Following detection of a cluster of probable or confirmed cases, epidemiological data should be analyzed to characterize patients by person, place, and time. More specifically, the analysis should include a description of the illness in terms of clinical presentation, demographic information, and occupational data; the proportion of cases requiring hospitalization; clinical outcomes and case-fatality ratio; estimated incubation period; and a description of disease transmission patterns and mechanisms.

8. Implement control and prevention measures in partnership with the rayon avian influenza response commission and rayon veterinary authorities. (See Chapters 14 and 15 and the annex.)

9. Write a report and send two copies to the regional CPH. (The regional CPH will forward one copy to the NCDC.) The report should include:

- The *Probable Human Case of Avian influenza A/H5N1 Investigation Card* (Figure 1) completed for each case.
- An analysis of epidemiological data and a description of control and preventive measures taken and their effectiveness.

10. Keep other stakeholders—such as the local health administration and local veterinary authorities—informed about the case/outbreak and measures undertaken. This can be done verbally (e.g., by telephone, at various meetings) or in writing (e.g., through reports/updates).

13. Preparedness and Organization of Response at the Rayon Level

The avian influenza response commission undertakes planning and coordination of response activities at the rayon level. The recommended composition of the commission is as follows:

- Head of local administration.
- Head of local self-administration.
- CPH (director, epidemiologist).
- Health administration.
- Rayon veterinary service and agricultural department.
- Rayon hospital and polyclinic ambulatory unit.
- Rayon center for educational resources.
- Nongovernmental organizations and private-sector entities.
- Representatives of other agencies. (Such representatives—such as police, those who provide assistance to internally displaced persons and refugees, and others—should be invited on an as-needed basis.)

Representatives of the commission should meet as needed to do the following:

- Review the latest human and animal avian influenza surveillance data and the latest pandemic preparedness directives and materials.
- Review the functioning of the early warning system for humans and identify deficiencies and measures to correct them.
- Review and update the inventory of supplies needed for disease response (including antiviral and other medicines, PPE) based on the burden assessment. Ensure they are ready for use.
- Review other resources (e.g., personnel, transport, communications) and identify material and training needs.
- Determine concrete roles and responsibilities of different services/agencies for response actions. Assign clear responsibilities to individuals and units for specific response activities.

In the event of a probable or confirmed case(s) of A/H5N1 in humans or animals, the commission representatives should start planning and implementing response measures. Based on the scope of the problem, central- and/or regional-level involvement should be considered. Financial resources at a certain minimum level should be secured at all times to support investigation and control activities as well as to ensure that there is a safe minimum stock of medicines and supplies.

14. Initial Human Case of Avian Influenza A/H5N1 Control/Response Measures

Control measures are aimed at reducing opportunities for further transmission. They should be initiated immediately upon the case investigation and should not await laboratory confirmation of the causative agent.

1. If an animal source is confirmed, quickly and safely control infection in birds.

As needed, cooperate with the veterinary service, which will ensure immediate destruction of all infected or exposed poultry, quarantining and rigorously disinfecting farms to limit avian influenza spread and to reduce opportunities for human exposure.

2. Ensure isolation of all probable human cases in respiratory (negative pressure) rooms or single rooms. Moderate to severe cases must be hospitalized.

3. Ensure that personnel transporting and providing care to probable or confirmed patients as well as people dealing with infected or exposed poultry wear—and are instructed and trained in how to wear—the following PPE:

- A particulate respirator that fits well (e.g., fit-tested NIOSH-certified N95, EU FFP2, or equivalent). If a sufficient number of particulate respirators is not available, a tightly fitting surgical mask should be used.
  - Wear masks once and then discard them.
  - Change masks when they become moist.
  - Do not leave masks dangling around the neck.
  - Wash hands after touching or discarding a used mask.
- Clean gloves, if direct contact with the patient or infected poultry is anticipated.
- A long-sleeved (preferably fluid-resistant) gown, if direct contact with the patient or infected poultry is anticipated. If a water-resistant gown is not available, a waterproof apron should be worn over the gown, particularly if splashing of potentially infectious material is anticipated.
- Protective eyewear (face shield or goggles), if close contact (less than 1 meter) with the patient or infected poultry is anticipated. Clean and disinfect reusable equipment after each use.

PPE placement procedures

1. Collect all equipment needed.
2. Wash hands with an alcohol-based hand rub (preferably) or soap and water.
3. Put on PPE in the following order:
   - Fluid-resistant gown.
   - Disposable particulate respirator (or mask). Perform user seal-check of particulate respirator.
   - Hair cover (if used, for example during an aerosol generating procedure).
   - Face shield or goggles.
   - Gloves. (Make sure gloves cover cuff of gown sleeves.)

PPE removal procedures

1. Remove PPE, preferably in a separate room, making sure that neither the environment nor other persons can become contaminated.
   - Remove protective eyewear and discard in rubbish bin. If a reusable face shield is used, place the shield in the container for decontamination.
   - If worn, remove hair cover and discard in rubbish bin.
   - Remove gown and discard in rubbish bin.

- Remove gloves and discard in rubbish bin. (Gloves may be peeled from hands when gown is removed.)
- Wash hands with an alcohol-based hand rub (preferably) or soap and water.
- Remove particulate respirator by grasping elastic bands; do not touch front of particulate respirator (front of particulate respirator may be contaminated). Discard in rubbish bin.

2. Single-use items must be put in rubbish bin. Reusable items must be placed in a container for decontamination.
3. Wash hands with an alcohol-based hand rub (preferably) or soap and water.

4. Minimize those exposed. Separate people from known or potential sources of avian influenza virus in animals or humans.

First, advise health professionals dealing with A/H5N1-infected patients on **infection-control measures to minimize the risk of nosocomial transmission.** Chapter 15 provides detailed instructions.

Next, conduct public awareness campaigns and deliver appropriate **health education messages to the public.** Detailed instructions and examples of messages are included in the annex.

Carry out **domestic cleaning and disinfection,** using household disinfection products, to reduce transmission from infectious respiratory secretions on surfaces and via objects such as clothing, towels, bed linens, and utensils that possibly harbor the virus and are capable of transmitting it. **Clean and disinfect areas where infected poultry are kept.** (Chapter 15 and the annex provide more details.)

If A/H5N1 infection is confirmed in humans or animals, it may be prudent to restrict local movement of people in and out of the affected area, both to reduce the number of people exposed and to lower the risk of extending infection among animals.

5. Obtain and follow NCDC instructions regarding the need to recommend targeted prophylaxis of close contacts with antiviral medications. (The NCDC instructions will depend on the epidemiological stage/priorities and supplies availability.)

6. Actively search for and establish monitoring of symptom onset in people potentially exposed to A/H5N1 infection for 7 days after the last contact (Figure 2). These people include:

- Persons who have had close contact with a human case.
- Persons who could potentially have been exposed to the same source of infection as the patient (e.g., infected poultry or their droppings).

If the number of contacts/potentially exposed people is large, mobile brigades consisting of two or three health workers should be mobilized as needed. Follow-up should be prioritized based on:

- Increased probability of infection, such as contact with a laboratory-confirmed case.
- Duration and closeness of contact.
- A high-risk (e.g., unprotected) exposure.

Contacts/potentially exposed people should be informed of the signs and symptoms of the illness and the need to immediately report the onset of fever and other symptoms to the health facility. Symptomatic persons should not self-medicate but should limit their social interactions and remain at home until free of fever for at least 24 hours, unless a diagnosis of influenza has been excluded.

A member of the CPH team should visit or telephone contacts/potentially exposed people daily to ascertain their clinical status and appropriately refer contacts who show symptoms.

7. Recommend targeted vaccination with normal seasonal influenza vaccine for:

- All health care workers who are expected to have contact with the influenza A (H5N1) virus or an H5N1 patient.
- All persons who are expected to be in contact with poultry or poultry farms potentially affected by HPAI, especially cullers involved in destruction of poultry and people living and working on poultry farms where HPAI has been reported or is suspected or where culling takes place.

These persons should be vaccinated with the current WHO-recommended influenza vaccine as soon as possible. This will not protect against influenza A (H5N1), but it will help to avoid simultaneous infection by human influenza and avian influenza and minimize the possibility of re-assortment of the virus genes, which will reduce the risk of the emergence of a new pandemic virus.

Additional Exceptional Response Measures if Sustained Human-to-Human Transmission Is Highly Probable or Confirmed

8. Recommend voluntary home quarantine of persons who have had close contact with a case for 7 days after the last contact. Persons in home quarantine may need to be provided with food, access to communications, psychological support, and supplies of their usual medications, especially for any acute or chronic conditions.

9. Implement "social distancing" measures as needed.

- Close schools and workplaces.
- Cancel mass gatherings and public transportation.
- Establish border controls.

These measures are socially disruptive and may cause considerable discomfort in the affected population.

10. Follow the NCDC instructions regarding the need for mass antiviral prophylaxis.

15. A/H5N1 Infection-Control Recommendations for Health Facilities

The recommended infection-control precautions should be implemented during the time the patient is infectious: **for 7 days after the resolution of fever for people older than 12 years and for 21 days after illness onset for children less than 12 years.** (Young children can shed seasonal influenza virus at high titers longer than older children or adults.)

Standard Precautions

- Wash hands with soap and water (using a single-use towel for drying hands) or an alcohol-based hand rub before and after patient contact, after removing PPE, and after using the restroom.
- Use PPE based on risk assessment. Avoid contact with blood, body fluids, excretions, and secretions.
- Prevent needlestick/sharp injuries.

Respiratory Etiquette

Persons with respiratory illness should be educated to:

- Cover the mouth and nose with a tissue when coughing and dispose of used tissue in waste containers.
- Use a mask when coughing (when a mask can be tolerated).
- Wash hands with soap and water after contact with respiratory secretions.
- Stand or sit at least 1 meter from other persons, if possible.

Isolation Precautions

Barrier precautions

All individuals providing care for patients with probable or confirmed avian influenza infection should use PPE as specified in Chapter 14.

Patient placement

- Place the patient in a negative pressure room (if available) or a single room and keep doors closed when not being used for entry/exit. Isolation rooms should have their own hand-washing sink, toilet, and bath facilities when possible.
- If single rooms are not available, patients infected with the same organism can share rooms. However, laboratory-confirmed cases should not be mixed with probable cases.

Room preparation

- Ensure appropriate signage on the door.
- Place a recording sheet at the entrance. All health care workers and visitors should provide their names so that follow-up/contact tracing is possible if necessary.
- Use only essential furniture that is easy to clean.
- Stock linens as needed outside the isolation room.
- Place appropriate waste bags in a foot-operated bin.
- Place a puncture-proof container for sharps inside the isolation room.
- Dedicate non-critical patient equipment (e.g., stethoscope, thermometer, sphygmomanometer) to the patient. Any patient care equipment that is required for use by other patients should be thoroughly cleaned and disinfected prior to use.
- Set up a trolley outside the door to hold PPE.

- Place an appropriate container with a lid outside the door for equipment that requires disinfection and sterilization.
- Keep adequate equipment required for cleaning and disinfection inside the patient's room and ensure scrupulous daily cleaning of the isolation room.
- Recommend setting up a telephone (e.g., mobile telephone) in the patient's room to enable the patient or family member/visitor to communicate with health care workers to minimize the necessity for health care workers to enter the room.

Family Member/Visitor Recommendations

- Visitors should be strictly limited to those needed for the patient's well-being and care. They should be advised about the possible risk of avian influenza transmission.
- Visitors should be provided PPE and instructed in their use and hand-washing practices prior to entering the patient's room.

Patient Transport Within the Health Care Facility

- Limit the patient's movement from the isolation room for essential purposes only and notify the receiving area as soon as possible prior to the patient's arrival, informing him or her of the diagnosis and precautions.
- Ensure that the patient wears a surgical mask (if tolerated) during transport.
- If there is patient contact with surfaces, clean and disinfect these surfaces afterward.

Pre-Hospital Care and Transport Outside Health Facilities

- Place a surgical mask on the patient (if tolerated) or have the patient cover his or her mouth and nose with a tissue when coughing.
- Health care workers should use full barrier precautions as indicated above.
- When possible, use vehicles that have separate driver and patient compartments. Optimize the vehicle's ventilation to increase the volume of air exchange during transport.
- Notify the receiving facility as soon as possible prior to arrival, informing them of the suspected diagnosis and precautions.
- Follow recommended procedures for disposing of waste and disinfecting the vehicle and reusable patient care equipment.

Waste Disposal

Use standard precautions when working with solid waste outside of the isolation room that may be contaminated with avian influenza virus.

Clinical (infectious) waste includes waste directly associated with blood, body fluids, secretions, and excretions; laboratory waste that is directly associated with specimen processing, human tissue, blood, animal tissue, or carcasses; and discarded sharps.

- All generated waste should be removed from the isolation room in bags or containers that do not allow for spillage or leakage of contents. Later, the waste should be treated as infectious waste.
- When transporting waste, use gloves followed by hand washing.
- Liquid waste—such as urine or feces—can be flushed into the sewage system if there is an adequate sewage system in place. Close toilet cover when flushing feces.

Dishes and Eating Utensils

- Recommend the use of disposable dishes and eating utensils.

- Wash reusable items in a dishwasher with detergent at the recommended water temperature. If dishwashers are not available, detergent and hot water should be used. Rubber gloves should be used when washing items by hand.
- If family members are caring for the patient, they should designate dishes and eating utensils for the patient's use only.
- Disposable items should be discarded with other general waste.

Linens and Laundry

- Place soiled linens directly into a laundry bag in the isolation room. Heavily soiled linens should be folded to contain the heaviest soil in the center of the bundle.
- Large amounts of solid material (e.g., feces) should be removed from the linens with a gloved hand and toilet tissue and then placed into the toilet for disposal before the linens are placed into the laundry bag.
- When transporting solid linens, use gloves followed by hand washing.
- Wash and dry linens according to routine facility standards and procedures.

Environmental Cleaning and Disinfection

- Cleaning must precede disinfection.
- The avian influenza virus is inactivated by phenolic disinfectants, household bleach, alcohol, and other registered/licensed disinfectants. Follow the manufacturer's recommendations for use, contact time, and handling.
- Patient rooms should be cleaned at least daily and terminally cleaned upon discharge.

Patient Care Equipment

- If possible, place contaminated patient care equipment in suitable bags before removing it from the isolation room. Heavily soiled equipment should be cleaned and disinfected before containment and removal from the isolation room.
- When transporting contaminated equipment, use gloves followed by hand washing.

Patient Discharge

- Perform terminal cleaning of the patient's room.
- If the patient is discharged while possibly still infectious, educate family members about personal hygiene, infection-control measures, and how to self-monitor their health status (see next chapter).

Care of the Deceased

- Use recommended PPE and standard precautions for routine care of the body and hygienic preparation of the deceased.
- The body should be fully sealed in an impregnable body bag prior to removal from the isolation room. No leaking should occur, and the outside of the bag should be kept clean.
- If required, transfer of the body to pathology or the mortuary should occur as soon as possible after death. If an autopsy is considered, the body should be held under refrigeration in the mortuary.
- The body can be safely removed from the body bag for storage in the mortuary or placed in a coffin for burial.
- If the patient's family wishes to touch the body, they may be allowed to do so. If the patient died during the infectious period, the family should wear gloves and gowns and follow contact with hand washing.
- If family members want to kiss the dead body (e.g., the hands or face), these body parts should be disinfected using a common antiseptic (e.g., 70 percent alcohol). If the family wants only to view the body, there is no need to wear any kind of PPE.

16. Guidelines for Collecting, Storing, and Transporting Specimens for Influenza Diagnostics

Collection of Respiratory Specimens

Eight types of respiratory specimens may be collected for viral and/or bacterial diagnostics:

1. Nasopharyngeal wash/aspirates.
2. Nasal or nasopharyngeal swabs.
3. Oropharyngeal swabs.
4. Broncheoalveolar lavage.
5. Tracheal aspirate.
6. Pleural fluid tap.
7. Sputum.
8. Autopsy specimens.

Nasal, nasopharyngeal, and oropharyngeal swabs are the preferred specimen types. Wash/aspirates are the specimens of choice for children less than 2 years of age.

Respiratory specimens for detection of most respiratory pathogens (and influenza in particular) are optimally collected within the first 3 days of the onset of illness.

1. Nasopharyngeal wash/aspirate.

- Have the patient sit with head tilted slightly backward.
- Place 1 to 1.5 ml of nonbacteriostatic saline (pH 7.0) into one nostril. Flush a plastic catheter or tubing with 2 to 3 ml of saline. Insert the tubing into the nostril parallel to the palate. Aspirate nasopharyngeal secretions. Repeat this procedure for the other nostril.
- Collect the specimens in sterile vials. Label each specimen container with the patient's identification number and the collection date.

2–3. Nasal/nasopharyngeal or oropharyngeal swabs.

- Use only sterile dacron or rayon swabs with plastic shafts. (Do not use calcium alginate swabs or swabs with wooden sticks, as they may contain substances that inactivate some viruses and inhibit RT-PCR testing.)
- To obtain a nasopharyngeal swab, insert a swab into the nostril parallel to the palate. Leave the swab in place for a few seconds to absorb secretions. Swab both nostrils.
- To obtain a nasal swab, insert the swab into the nostril, parallel to the palate, and leave it in place for a few seconds. Then slowly withdraw it with a rotating motion. Repeat this procedure for the other nostril. Obtain specimens from both nostrils with the same swab.
- To obtain an oropharyngeal swab, swab the posterior pharynx and tonsillar areas, avoiding the tongue.
- Immediately place the swabs into sterile vials containing 1 to 2 ml of viral transport media. Break off the applicator sticks near the tip to permit tightening of the cap. Label each specimen container with the patient's identification number and the date the sample was collected.

4–6. Broncheoalveolar lavage, tracheal aspirate, or pleural fluid tap.

- During bronchoalveolar lavage or tracheal aspirate, use a double-tube system to maximize shielding from oropharyngeal secretions.
- Centrifuge half of the specimen and fix the cell pellet in formalin. Place the remaining unspun fluid in sterile vials with external caps and internal o-ring seals. If there is no internal o-ring seal, tightly seal the vial with the available cap and secure with Parafilm®. Label each specimen container with the patient's identification number and the date the sample was collected.

7. Sputum

- Educate the patient about the difference between sputum and oral secretions.
- Have the patient rinse the mouth with water and then expectorate deep-cough sputum directly into a sterile screw-cap sputum-collection cup or sterile dry container.

8. Autopsy specimens

Immuno-histochemical (IHC) staining for influenza A (H5N1) viruses can be performed on autopsy specimens. Larger airways (particularly primary and segmental bronchi) have the highest yield for detection of influenza viruses by IHC staining.

If influenza is suspected, a minimum total of eight blocks of fixed-tissue specimens representing samples from each of the following sites should be obtained and submitted for evaluation:

- Central (hilar) lung with segmental bronchi.
- Right and left primary bronchi.
- Trachea (proximal and distal).
- Representative pulmonary parenchyma from right and left lung.

In addition, representative tissues from major organs should be submitted for evaluation. In particular, for patients with suspected myocarditis or encephalitis, specimens should include myocardium from the right and left ventricles and the central nervous system (cerebral cortex, basal ganglia, pons, medulla, and cerebellum). Specimens should be included from any other organ showing significant gross or microscopic pathology.

- Specimens may be submitted as:
  - Fixed, unprocessed tissue in 10 percent neutral buffered formalin, or
  - Tissue blocks containing formalin-fixed, paraffin-embedded specimens, or
  - Unstained sections cut at 3 microns placed on charged glass slides (10 slides per specimen).
- Specimens should be sent at room temperature (not frozen).
- Fresh-frozen unfixed tissue specimens may be submitted for RT-PCR.

In the event that NCDC pathologists require further information, include a copy of the autopsy report (preliminary or final, if available) and a cover letter outlining a brief clinical history and the submitter's full name, title, complete mailing address, and telephone and fax numbers.

Collection of Blood Specimens

Both acute and convalescent serum specimens should be collected for antibody testing. Collect convalescent serum specimens 2 to 4 weeks after the onset of illness. To collect serum for antibody testing:

- Collect 5 to 10 ml of whole blood in a serum separator tube. Allow the blood to clot, centrifuge it briefly, and collect all resulting sera in vials with external caps and internal o-ring seals. If there is no internal o-ring seal, then seal the tube tightly with the available cap and secure with Parafilm®.
- The minimum amount of serum preferred for each test is 200 microliters, which can easily be obtained from 5 ml of whole blood. A minimum of 1 cc of whole blood is needed for testing of pediatric patients. If possible, collect 1 cc in an ethylenediamine tetraacetic acid tube and 1 cc in a clotting tube. If only 1 cc can be obtained, use a clotting tube.
- Label each specimen container with the patient's identification number and the date the specimen was collected.

Specimen Storage

The viral transport medium (VTM) should be stored at -20°C for no more than 3 months prior to specimen collection. In case of thawing, the VTM should be stored at 4°C for no more than 10 to 14 days.

The specimens should be kept in the VTM for viral isolation at 4°C and transported to the laboratory promptly. If specimens are transported to the laboratory within 2 days, they may be kept at 4°C; otherwise, they should be frozen at or below -70°C or in liquid nitrogen until they can be transported to the laboratory. Avoid repeated freezing and thawing to prevent loss of infectivity.

Sera may be stored at 4°C for approximately one week, but thereafter should be frozen at -20°C.

Specimen Transport

Specimens should be collected and transported in a suitable transport medium on ice or in liquid nitrogen. Specimens for influenza should not be stored or shipped 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. The receiving laboratory should be notified before the specimens are shipped.

All specimens to be transported must be packaged in packaging consisting of three layers. Packaging should be strong enough to withstand the shocks and loads normally encountered during transport. Packaging should be constructed and closed so as to prevent any loss of contents that might be caused under normal conditions of transport (e.g., by vibration or by changes in temperature, humidity, or pressure).

Primary receptacles should be packed in secondary packaging in such a way that, under normal conditions of transport, they cannot break, be punctured, or leak their contents into the secondary packaging. Secondary packaging should be placed in a final outer package with suitable cushioning material. Any leakage of the contents should not substantially impair the protective properties of the cushioning material or of the outer packaging.

The primary receptacle(s) should be leak-proof. Absorbent material should be placed between the primary receptacle and the secondary packaging; if several fragile primary receptacles are placed in a single secondary packaging, they should be either individually wrapped or separated so as to prevent contact between them. There should be enough absorbent material to absorb the entire contents of the primary receptacle(s), and there should be a secondary packaging that is leak-proof.

Annex. Social Mobilization: Delivering Community Education Messages

Social mobilization involves planned actions and processes to reach, influence, and involve all relevant segments of society across all sectors, particularly at the community level.

This section presents community education messages that should be delivered by public health workers and medical professionals to help the population know:

1. How to recognize avian influenza in animals and humans.
2. How to prevent its transmission.
3. When to seek treatment.

It should also help the population prevent a panic in the case of a confirmed animal or human infection in the area in which they live.

These messages should be delivered by appropriate communication methods such as:

- Newspapers.
- Television.
- Presentations at schools.
- Meetings with health personnel and trusted and respected religious and political leaders.
- Individual consultation of residents seeking advice or recommendation.

Relevant printed education materials (such as leaflets and brochures) should be disseminated during meetings and presentations for future reference.

Several sample questions and answers are presented below. Public health workers and medical professionals should be prepared to adapt these materials to address beliefs about the disease and the needs of specific populations.

Q: What is bird flu? Will it cause the next influenza pandemic?

A: Avian influenza ("bird flu") is a disease of wild and farm birds caused by avian influenza viruses. Bird flu viruses do not usually infect humans, but since 1997, there have been a number of confirmed cases of human infection from bird flu viruses. Most of these resulted from direct or close contact with infected birds. The spread of bird flu viruses from an infected person to another person has been very rarely reported; it has not been reported to continue beyond one person. A worldwide pandemic could occur if a bird flu virus were to change so that it could be easily passed from person to person. Experts around the world are watching for changes in bird flu viruses that could lead to an influenza pandemic.

Q: What types of birds can be infected with bird viruses?

A: Avian influenza viruses can infect chickens, turkeys, pheasants, quail, ducks, and geese, as well as a wide variety of other birds, including migratory waterfowl.

Each year, there is a flu season for birds just as there is for humans, and as with people, some forms of the flu are worse than others, depending on how strong the virus is. A weak virus may cause only mild illness in infected poultry and birds, but a strong virus could cause severe and extremely contagious illness—and even death—among infected poultry and birds.

Q: Is it safe to eat poultry?

A: Yes, it is safe to eat properly cooked poultry. Cooking destroys germs, including bird flu viruses. Be sure to:

- Cook thoroughly: Ensure that poultry meat reaches 70°C or that the meat is not pink; egg yolks should not be runny.
- Separate raw meat from cooked or ready-to-eat foods; do not use the same knife or the same chopping board; do not use raw or soft-boiled eggs in food preparations that will not be heat-treated/cooked.
- Keep clean and wash your hands after handling frozen or soft raw chicken or eggs; thoroughly wash surfaces and utensils that have been in contact with raw meat.

Q: What else can I do to reduce my risk of becoming ill?

A: **1. Avoid contact with chickens, ducks, and other poultry unless absolutely necessary,** particularly on any farm where animals have been ill, slaughtered, or thought to harbor avian influenza. Do not let poultry into your house. Discourage children from playing with birds or keeping them as pets.

Note that birds that are infected can spread the disease before they show signs of illness. Some birds, such as ducks, can get and spread the disease and never show signs of illness.

If there is contact with poultry: Do not rub your eyes or eat, drink, or smoke before washing your hands with soap and water.

2. Avoid close contact with people who are sick. When you are sick, stay home and/or keep your distance from others; cover your nose and mouth with a tissue when you cough or sneeze to protect others from catching a virus.

3. Wash hands with soap and water often, especially

- After going to the toilet.
- After changing a child's diaper.
- Before preparing or eating food or feeding a child/infant.
- After handling raw foods.
- After blowing your nose, coughing, or sneezing.
- After handling garbage.
- Before and after treating a cut or wound.
- After handling animals or animal waste.
- After visiting markets.

4. Regularly clean the areas where poultry are kept. Clean or sweep feces and unconsumed feed from the yard every day. Burn or bury feathers and other waste away from the farm. Bury the waste deep and with lime so that scavengers do not dig it up.

5. Take precautions in preparing and consuming poultry meat or eggs as specified above.

6. Take precautions if you are visiting a farm or other area where poultry are kept. After leaving the area, wash your hands with soap and water, brush and disinfect your clothing, shoes, and the wheels of bicycles, motorcycles, or other vehicles.

Home slaughtering

- Sick birds (or birds from flocks in which one or more birds are sick) should never be slaughtered for consumption. Eggs for human or animal consumption should never be marketed.
- The slaughter should take place in a confined area away from birds. Children and animals should be kept away.
- The person performing the slaughter should wear personal protective equipment and observe strict hygiene. After slaughter, they should clean and disinfect the area and safely dispose of feathers and animal remains.

Buying poultry or eggs

- Purchase only poultry and poultry products from shops with evident high food-hygiene standards.
- Avoid buying live poultry, as bird flu can spread through close contact with infected live poultry.
- Select fresh poultry with no signs of illness (such as unusually dark color, hemorrhage, etc.).
- Select fresh eggs without feces stains on the shells. Avoid buying eggs with cracked shells.
- Remember that canned poultry products can be safely consumed, as all processed foods undergo a heat treatment process that effectively destroys viruses.

Q: What additional measures should I take if there is avian influenza in poultry in the area?

A:

1. **Do not bring in contamination from other farms or markets.**
    - Brush or wash off your shoes and the wheels of your bicycle/motorcycle or other vehicle and change clothing immediately after returning from farms or live-bird markets (so you do not carry the virus home on your clothing, shoes, or equipment).
    - Clean or disinfect anything coming into the farm that may have contacted poultry or poultry droppings outside the farm. This includes clothing, tools, and equipment such as cages and bicycle or vehicle tires.
    - Do not borrow equipment or vehicles from other farms.
    - Do not transport live or dead chickens, ducks, or other poultry from one place to another—even if you think your birds are healthy.
    - Do not bring other animals, such as chicks, ducklings, or piglets, from another farm.
    - Do not buy or accept animals, eggs, or manure from other farms.

2. **Separate your poultry from wild birds and any domestic birds that roam free.**
    - Keep poultry brought to the farm/homestead from another location separate from your flock for at least 14 days.
    - Keep all your poultry fenced or caged away from other animals and wild birds and any source of water that could have been contaminated by wild birds.

3. **If recommended by authorities, bring your birds to be vaccinated.**

4. **Remember that hunting is prohibited** in the 10-km zone surrounding any place where H5N1 virus has been found.

If you have had contact with the carcass of any chicken that has died from avian influenza, the feces of the chicken, or an environment that has had sick or dead chickens in it:

- Wash your hands thoroughly.
- Report any sick or dead bird(s) to the rayon veterinary office immediately.
- Monitor your temperature for 7 days. If you develop a high fever (≥38°C), respiratory complaints, or an eye infection, immediately consult your doctor.

If poultry have died in your back yard, decontaminate the yard and immediately report the case to the rayon veterinary office.

- Wear personal protective equipment. At a minimum, cover your face and wear gloves or plastic bags over your hands.
- If authorities cannot come promptly, bury the dead poultry at a depth of at least 2.5 meters. This must be away from water supplies.
- Clean the area of all chicken droppings. Scrape or use a rake and bury the chicken droppings.
- Clean the chicken shed or area where the droppings have been with soap (or bleach) and water.

Note: Avian flu looks like other poultry diseases, especially Newcastle disease. Even if you think you know what is making your birds sick or die, still tell authorities, just to be safe.

Note: If your poultry or your neighbor's poultry are sick or have died from avian influenza, it is important to protect your community by culling any surviving birds and disinfecting your farm. Do not kill birds yourself—wait for the people sent by the government, who will do it properly. After your birds have been culled, follow the government authority's instructions about obtaining compensation and about disinfecting your farm.

Q: What should I do if I think someone else has avian influenza?

A:

- Take the person to a health care provider immediately.
- Until you bring the person to the health care provider, take specific protective actions: wash your hands frequently, wear a mask or cover your mouth and nose with a cloth, have the person who is ill wear a mask or cover their mouth and nose with a cloth, and limit the number of people who come within a meter of the sick person.
- Contact the nearest rayon hospital or ambulatory facility for additional guidance.

Q: Will the seasonal flu shot protect me against pandemic influenza?

A: No, it will not. But flu shots can help you avoid seasonal flu.

Q: Is there a special vaccine to protect me against pandemic influenza?

A: No, currently there is no vaccine to protect humans against avian viruses. Even though vaccine-development efforts are under way, there are a number of constraints to development and mass production. Because viruses change over time, a specific pandemic influenza vaccine cannot be produced until a pandemic influenza virus emerges and is identified. If a pandemic influenza virus is identified, it will likely take an additional 4 to 6 months to develop, test, and begin producing a vaccine.