Avian Influenza

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Key facts

To better understand public health terms included in this Disease Tool (e.g. What is a case definition? or What is an infectious agent?), consult our page on Key concepts in epidemiology.

Importance

Avian influenza is caused by influenza A viruses, which are classified based on the hemagglutinin (HA) and neuraminidase (NA) surface proteins. Notable subtypes affecting birds and humans include H5N1, H7N9, and H5N8. The virus primarily affects avian species, particularly domestic poultry such as chickens, ducks, and turkeys, but can also affect other wild and domestic animals. Wild birds, especially waterfowl, are natural reservoirs of the virus. Avian influenza viruses are classified into two categories based on their pathogenicity in birds: low pathogenic avian influenza (LPAI) and highly pathogenic avian influenza (HPAI).

Certain HPAI strains have zoonotic potential, meaning they can infect humans and cause severe respiratory illness. H5N1 and H7N9 can cause severe disease in birds, and are the most concerning due to their high case fatality rates in humans. These subtypes have been responsible for human outbreaks and deaths in Africa, Asia, Europe, the Middle East, and the Americas.

Case definition

A **case definition** is a set of uniform criteria used to define a disease for public health surveillance. It enables public health officials to classify and count cases consistently.

*The following are standard case definitions to allow national health authorities to interpret data in an international context. However, during an outbreak case definitions may be adapted to the local context and the Red Cross Red Crescent should use those agreed/established by national health authorities. NB: Consider that during community-based surveillance, **volunteers** should use broad (simplified) case definitions (referred to as community case definitions) to recognize most or all possible cases, provide relevant risk communication*

*and appropriate actions and encourage them to seek care. Other actors such as **healthcare workers or investigators** studying the cause of a disease, on the other hand, can use more specific case definitions that may require laboratory confirmation.*

Suspected case: A case that is compatible with the clinical description and has an epidemiological link to confirmed or suspected animal cases or contaminated animal products.

Probable case: A suspected case that has evidence of an acute pneumonia on chest radiograph plus evidence of respiratory failure (hypoxemia, severe tachypnea).

Confirmed case: A suspected case that is laboratory-confirmed.

WHO case definition source of information:
https://iris.who.int/bitstream/handle/10665/205388/B0634.pdf

Alert / epidemic threshold

An **alert threshold** is the pre-defined number of alerts that suggest the beginning of a possible disease outbreak and therefore warrant immediate notification.
Epidemic thresholds are the minimum number of cases indicating the beginning of a particular disease's outbreak.

Single case

Risk factors

- Children playing with infected poultry, particularly asymptomatic infected ducks.
- Workers handling infected poultry or livestock including on farms and backyard flocks
- Poultry handlers in live animal markets / wet markets
- Cullers without proper PPE
- Persons hunting, plucking, butchering, and preparing infected wild birds and wild mammals.
- Consumption of undercooked poultry products
- Hospital staff managing human cases of avian influenza without proper PPE

Attack rate (AR)

The **attack rate** is the risk of getting a disease during a specific time period (such as during an outbreak).

Attack rates will vary from one outbreak to another. In case of an outbreak, consult the latest information provided by health authorities.

- Generally low and depends on the type of exposure.

Groups at increased risk of severe illness (most vulnerable)

- People with weakened immune systems.
- People living with other respiratory issues such as pneumonia
- Immunosuppressed persons such as those receiving chemotherapy, transplant recipients or HIV carriers.
- People with chronic diseases such as renal disease, cancer, chronic lung or liver disease and diabetes.

Infectious agent

Infectious agents are bacteria, viruses, fungi, prions and parasites. A disease caused by an infectious agent or its toxic products is defined as an infectious disease.

It is a complex disease is caused by a group of Influenza viruses divided into multiple subtypes (i.e. H5N1, H7N9, H5N3, H5N8 etc.) whose genetic characteristics rapidly evolve.

Reservoir / host

A **reservoir of infection** is a living organism or material in or on which an infectious agent lives and/or usually multiplies. Reservoirs include humans, animals and the environment.

A **susceptible host** is a person at risk of being infected. The level of susceptibility depends on age, sex, ethnicity and genetic factors, specific immunity also depends on other factors that affect an individual's ability to resist infection or to limit its ability to cause infection.

A **zoonotic disease** or **zoonosis** is an infectious disease that has jumped from a non-human animal to humans.

Zoonotic disease: mostly found in domesticated poultry birds and wild migratory birds. While avian influenza primarily infects birds, it can also infect mammals, particularly those who consume birds or are exposed to heavily contaminated environments.

How disease is spread (modes of transmission)

Categorisation of **modes of transmission** varies from one agency to another. In addition, some infectious agents can be transmitted by more than one mode. A list of modes of transmission can be found in the key

concepts to serve as guidance to better understand the diseases included in this website.

- **Direct contact:** Individuals may be infected when they touch infected birds or other infected animals or when they are in close contact (within one metre) with a person (e.g. caring for, speaking with or touching) who is a suspected, probable or confirmed case.
- **Environmental exposure**: Humans can also get infected when they are in environments contaminated by their faeces in an area where infections in birds or humans have been suspected or confirmed in the last month.
- **Vehicle-borne transmission:** Birds may become infected by eating contaminated feedstuff. Humans may be infected by eating raw or poorly cooked poultry products from environments where the disease has been confirmed.

Incubation period

This time from when infection occurs to the onset of symptoms is called the **incubation period**. It is a range of days and it can be different for each disease.

Incubation period is usually 2-8 days after exposure to the causative virus from sick or dying wild or domestic birds or other mammals.

Period of infectiousness

Period of infectiousness is the time interval during which an infected person can transmit the infection to other susceptible persons.

Human to human transmission cases have been recorded but rarely happen.

https://www.cdc.gov/bird-flu/virus-transmission/avian-in-humans.html&nb...;

Clinical signs and symptoms

Onset similar to seasonal influenza;

- Fever >38.0C Cough
- Difficulty in breathing after 5-7 days of onset
- Conjunctivitis / eye inflammation
- Sore throat, muscle aches, runny nose
- Diarrhoea

- Severe cases may progress to:
- Primary viral pneumonia
- Rapid deterioration to acute respiratory distress syndrome (ARDS) and multi-organ failure

Infrequent features:

- Vomiting
- Abdominal pain
- Chest pain
- Bleeding from nose and/or gums
- Encephalopathy (rare)

Other diseases with similar clinical signs and symptoms

Community-Acquired Pneumonia (CAP), H1N1 Influenza (Swine Flu), Influenza, Middle East Respiratory Syndrome (MERS), Pneumococcal Infections (Streptococcus pneumoniae), Severe Acute Respiratory Syndrome (SARS)

Diagnosis

- Isolation of an H5N1 virus (or other known HPAI subtype)
- Positive H5 PCR results from tests using two different PCR targets, e.g. primers specific for influenza A and H5 HA;
- A fourfold or greater rise in neutralisation antibody titer for H5N1 (or other HPAI subtype) based on testing of an acute serum specimen (collected 7 days or less after symptom onset) and a convalescent serum specimen. The convalescent neutralising antibody titer must also be 1:80 or higher.
- A micro-neutralization antibody titer for H5N1 (or other HPAI subtype) of 1:80 or greater in a single serum specimen collected on Day 14 or later after symptom onset and a positive result using a different serological assay, for example, a horse red blood cell hemagglutination inhibition titer of 1:160 or greater or an H5-specific western blot positive result.

Vaccine or treatment

Please refer to the appropriate local or international guidelines for clinical management. All clinical management including the administration of a treatment or vaccine should be conducted by a health professional.

- Avian Influenza cannot be treated with antibiotics. However, secondary bacterial infections that may arise can be treated with antibiotics.
- An antiviral (Oseltamivir) is the primary drug of choice for avian influenza.

Immunity

There are two types of immunity:
- **Active immunity** results when exposure to an agent triggers the immune system to produce antibodies to that disease.
- **Passive immunity** is provided when a person is given antibodies to a disease rather than producing them through his or her own immune system.

Previous infections grant some level of immunity

Which interventions are most effective for prevention and control?

The following is a list of activities considered for Red Cross Red Crescent volunteers to take part in. It is not an exhaustive list of all prevention and control activities for the specific disease.

- Communicate risks about the disease or epidemic, not only to share information on prevention and mitigation measures, but also to encourage informed decision-making, positive behaviour change and maintenance of trust in the Red Cross Red Crescent response. This includes the identification of rumours and misinformation around disease—frequent during health emergencies—to manage them appropriately. Volunteers should use the most context-appropriate communication techniques (ranging from social media to face-to-face interactions).
- Community education and engagement activities to encourage the adoption of protective behaviours including:
  - Reduce overcrowding and improve ventilation in living shelters, workplaces, and schools if possible
  - Promote good hand hygiene (handwashing with soap)
  - Promote respiratory hygiene and coughing etiquette (cover your cough or sneeze using your sleeve or a tissue, wash hands after coughing or sneezing, do not spit onto the ground or in public)
  - Use personal protection (for example, face mask)
- Social mobilization to support poultry vaccination in endemic areas, where possible. This includes extensive Information, Education and Communication (IEC) activities on the benefits of the vaccines, vaccination schedules and where/when to get the vaccines for livestock.

Epidemic characteristics and RCRC

indicators and targets

The first table below includes data that should be gathered from health authorities and relevant non-governmental actors to understand the progress and characteristics of the epidemic in the specific country and area of intervention. The second table includes a list of suggested indicators that can be used for monitoring and evaluating Red Cross Red Crescent activities; wording of indicators may be adapted to specific contexts. Target values for a specific indicator can vary widely from one context to another and therefore managers should define them based on the specific population, area of intervention and programmatic capacity. Exceptionally, some indicators in this website may include target values when these are globally agreed as a standard; e.g. 80 per cent of individuals who slept under an insecticide-treated net (ITN) the previous night—the normative World Health Organization benchmark for universal coverage with ITNs.

Epidemic characteristics and progression
Suspected cases per week (disaggregate by age, sex)
Confirmed cases per week (disaggregate by age, sex)
Case fatality rate
Indicators for Red Cross Red Crescent activities
Number of volunteers trained on a specific topic (e.g. Epidemic Control for Volunteers (ECV); Community-based surveillance (CBS); WASH training; CBHFA training, etc.) ***Numerator*:** Number of volunteers trained Source of information: Training attendance sheets
Suspect cases detected by volunteers who were encouraged to seek healthcare and who arrived at a health facility ***Numerator**:* Avian Influenza suspect cases detected by volunteers in a determined period preceding this survey (e.g. two weeks) for whom advice or treatment was sought from a health facility ***Denominator**:* Total number of people who are avian influenza suspect cases in the same period preceding the survey Source of information: Survey
Percentage of people recognizing at least one transmission route and at least one measure for preventing it ***Numerator*:** Total number of people who recognized at least one transmission route and at least one measure for preventing it during the survey ***Denominator*:** Total number of people surveyed Source of information: Survey

Indicators for Red Cross Red Crescent activities
Percentage of people who know the cause, symptoms, treatment or preventive measures ***Numerator*:** Number of people who cite the cause, symptoms, treatment or preventive measures ***Denominator*:** Number of people surveyed

See also:

- For Community Engagement and Accountability (CEA) indicators for activities accompanying ECV actions, please refer to: IFRC *CEA toolkit (Tool 7.1: Template CEA logframe, activities and indicators).* Available at: https://www.ifrc.org/document/cea-toolkit

- For community-based surveillance guidance please see: IFRC, Norwegian Red Cross, Croix-Rouge de Belgique (2022), *Community Based Surveillance Resources*. Available at: www.cbsrc.org/resources.

Impact on other sectors

Sector	Link to the disease
WASH	The main WASH activities concern farm biosecurity and environmental hygiene before, during and after exposure to suspected infected birds.
Food security	Through sharing poultry facilities that have been contaminated with the virus, other farms can become infected leading to massive loss of poultry birds and eggs.
Nutrition	Malnutrition increases the risk of avian influenza.
Shelter and settlements (including household items)	Essential sanitation facilities like hand wash basins in endemic areas or areas close to poultry farms with a history of avian influenza are important in decreasing transmission risk.
Psychosocial support and Mental health	Isolation and contact tracing in communities are highly stressful situations for concerned communities and psychosocial support may be needed for people.

Sector	Link to the disease
Sex and Gender	In many countries, women manage backyard poultry and local markets but are often excluded from trainings on avian influenza prevention, increasing their risk and reducing early outbreak detection. Men face different risks through roles in large-scale production, slaughter, and transport. Gender-sensitive training and response efforts are essential to reduce exposure and strengthen disease control for all.
Education	Schools can offer an important space for them to engage and raise awareness around Avian Influenza. Young people can be effective advocates for the adoption of preventive measures during an epidemic .
Livelihoods	Livelihoods based on poultry farming or sale of poultry products can be significantly affected during avian influenza outbreaks leading to massive losses.

Resources

- Centers for Disease Control and Prevention (CDC); Prevention and Antiviral Treatment of Avian Influenza A Viruses in People (2024)
- Centers for Disease Control and Prevention (CDC); Avian Influenza in Birds: Causes and How It Spreads (2024)
- European Centers for Disease Control and Prevention (ECDC); Proposed interim case definition and case finding algorithm for reporting patients infected by the avian influenza A(H7N9) virus in EU/EEA Member States (2013)
- World Health Organization (WHO); Interim Guidelines for Avian Influenza Case Management (2007)
- World Health Organization (WHO); Influenza: Avian (2024)
- https://www.emro.who.int/health-topics/avian-influenza/index.html
- https://www.who.int/westernpacific/wpro-emergencies/surveillance/avian-...
- World Organisation for Animal Health (WOAH): Avian Influenza (n.d.)
- World Organisation for Animal Health (WOAH): Avian Influenza (2009)
- WHO - Regional Office for South-East Asia; Asia-Pacific workshop on surveillance, prevention and control of zoonotic influenza: Paro, Bhutan, 29–31 August 2016. https://iris.who.int/handle/10665/364301; 2022
- WHO. WHO public health research agenda for influenza: minimizing the impact of pandemic, zoonotic, and seasonal epidemic influenza, 2017 update; 2017
- WHO. WHO public health research agenda for influenza: limiting the spread of pandemic, zoonotic and seasonal epidemic influenza, 2017 update. https://iris.who.int/handle/10665/259892; 2017
- World Health Organization. (2023). Public health resource pack for countries experiencing outbreaks of influenza in animals. World Health Organization. https://iris.who.int/handle/10665/372248