Public health resource pack for countries experiencing outbreaks of influenza in animals

World Health Organization

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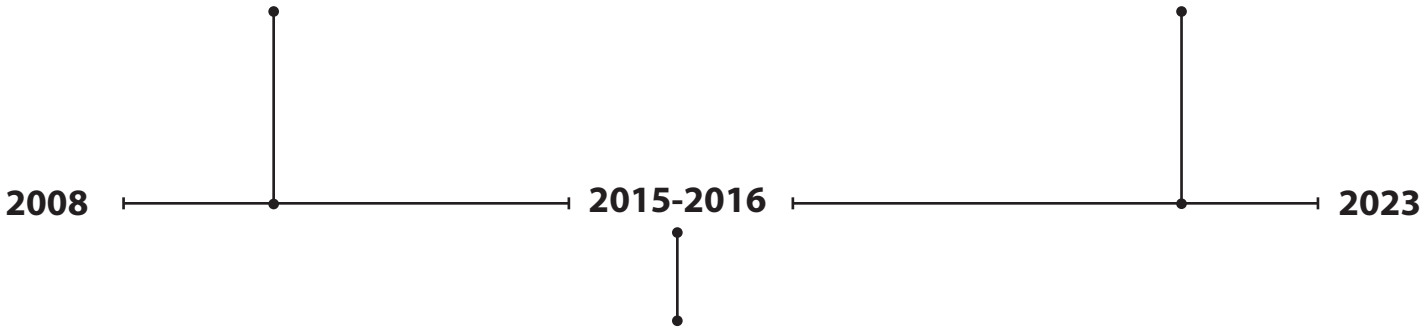
Design and layout revisions: Derek Ellis, Morfa Inc.

CONTENTS

DEVELOPMENT HISTORY

2008 – Each of the component chapters of this resource pack were originally compiled with the intention of distributing them to WHO representatives in countries affected by outbreaks of highly pathogenic avian influenza among animals.

2022 – The scope of the resource pack was broadened to address the risks to public health from all animal influenza viruses, not just avian influenza viruses. Links to existing resources were updated and new resources added.



2015–2016 – Following the re-emergence of highly pathogenic avian influenza viruses in animals in regions of the world that had not experienced outbreaks for several years, the original information pack was updated and published under the title Summary of Key Information Practical to Countries Experiencing Outbreaks of A(H5N1) and Other Subtypes of Avian Influenza.

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ABBREVIATIONS AND ACRONYMS

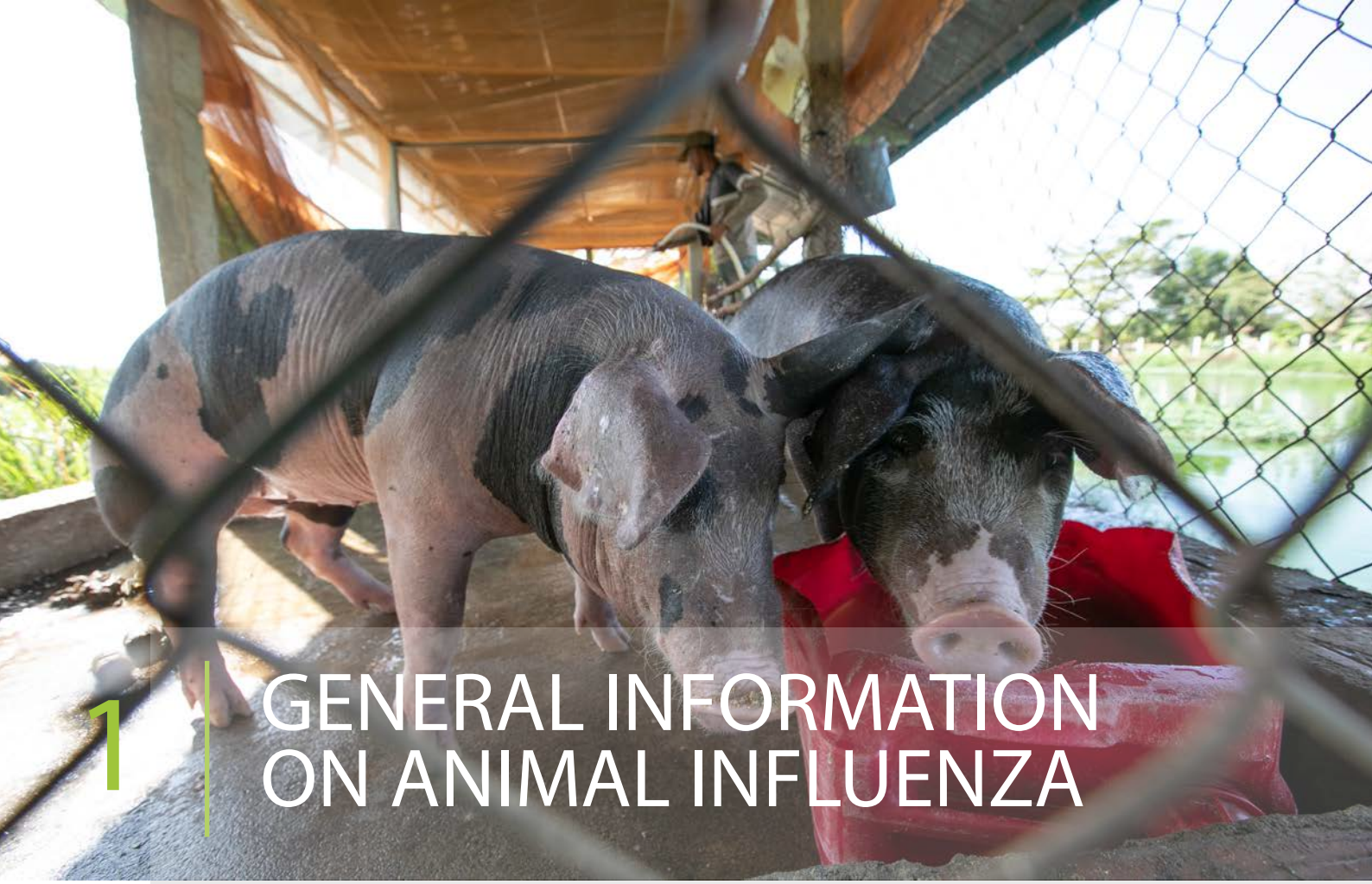
CCs	Collaborating Centres
CVV	Candidate vaccine viruses
ERC	Emergency risk communication
FAO	Food and Agriculture Organization of the United Nations
FFP	Filtering face piece
GISRS	Global Influenza Surveillance and Response System
IHR (2005)	International Health Regulations (2005)
IVPP	Influenza viruses with human pandemic potential
HA	Haemagglutinin
HPAI	High pathogenicity avian influenza
LPAI	Low pathogenicity avian influenza
NA	Neuraminidase
NIC	National influenza centre
OFFLU	Joint WOAH-FAO Scientific Network on Animal Influenza
PIP	Pandemic Influenza Preparedness
PPE	Personal protective equipment
RCCE	Risk communication and community engagement
SIVs	Swine influenza viruses
WHO	World Health Organization
WOAH	World Organisation for Animal Health

INTRODUCTION

This public health resource pack collates currently available information primarily from WHO, FAO and WOAH recommendations and guidelines on animal influenza, that might be relevant to a country experiencing outbreaks of influenza in animals or facing suspected cases of human infections with zoonotic influenza viruses.

The resource pack aims to provide WHO country offices and national institutions with an overview of the key information needed to advise their countries on issues of human health during influenza outbreaks or detections in animals. Areas covered in this resource pack include some elements of the five components for health emergency preparedness, response and resilience: collaborative surveillance, community protection, access to countermeasures, clinical care and emergency coordination.

As more information becomes available, the resource pack will be reviewed accordingly.



1 GENERAL INFORMATION ON ANIMAL INFLUENZA

KEY ISSUES

- Animal influenza viruses are distinct from human seasonal influenza viruses and are not easily transmitted between humans. However, zoonotic influenza viruses – animal influenza viruses that can occasionally infect humans through direct or indirect contact – can lead to disease outcomes in humans ranging from mild illness to death.
- Human infections with animal influenza viruses are rare and are typically acquired through direct contact with infected animals or contaminated environments. There is no evidence to suggest that currently circulating animal influenza viruses are easily transmitted from person to person.
- However, human infections with animal influenza viruses must be investigated and monitored closely. A thorough epidemiological investigation and immediate public health actions should include assessing exposure to animals and travel history, contact tracing and the early identification of any unusual respiratory events that could signal person-to-person transmission of the virus.

Information Sources

Information Source Title	Link
WHO – Influenza (avian and other zoonotic) fact sheet	https://www.who.int/news-room/fact-sheets/detail/influenza-(avian-and-other-zoonotic)
WHO –Global Influenza Programme – human-animal interface	https://www.who.int/teams/global-influenza-programme/avian-influenza
WHO – Influenza virus infections in humans	https://www.who.int/publications/m/item/influenza-virus-infections-in-humans_2018

Information Source Title	Link
WHO – Managing epidemics: key facts about major deadly diseases	https://apps.who.int/iris/handle/10665/272442
WHO – Avian influenza A(H7N9) virus	https://www.who.int/teams/global-influenza-programme/avian-influenza/avian-influenza-a-(h7n9)-virus
WOAH – Avian influenza	http://www.woah.org/en/disease/avian-influenza/
WOAH – Terrestrial Manual; Chapter 3.3.4: avian influenza	https://www.woah.org/fileadmin/Home/eng/Health_standards/tahm/3.03.04_AI.pdf
WOAH – Swine influenza	https://www.woah.org/en/disease/swine-influenza/

There are four types of influenza viruses – A, B, C and D. Influenza A and B viruses circulate and cause seasonal epidemics of disease in humans. Influenza A viruses also infect many different animals and are established in many animal host species. When animal influenza viruses infect their host species, they are named according to the host – as in avian influenza viruses, swine influenza viruses, equine influenza viruses, canine influenza viruses, etc.

Influenza A viruses are classified according to the two glycoproteins on their surface, namely haemagglutinin (HA) and neuraminidase (NA). The subtype of any given influenza virus denotes the combination of the different HA and NA types exhibited by the virus (for example, H1N1, H5N1, H7N9, etc.).

Avian influenza

Avian influenza refers to an infectious disease of birds caused by infection with avian influenza viruses. Such infections can be asymptomatic or may cause illness (ranging from mild to severe) and/or rapid death. The clinical signs may vary depending on the organ system affected (for example, respiratory, gastrointestinal or neurological).

Wild aquatic birds are the reservoir for avian influenza viruses. Transmission of the virus occurs from wild aquatic birds to terrestrial or domestic birds via close contact through the faecal-oral route.

Given the wide circulation of avian influenza viruses in domestic birds in certain areas of the world, virus transmission can also occur back into wild birds from domestic birds.

Avian influenza viruses are classified as being of either low or high pathogenicity depending on the clinical signs and disease severity in experimentally infected poultry, and on the molecular signature of the cleavage site on the HA protein, and the classification is not related to clinical signs in infected humans. High pathogenicity avian influenza (HPAI) viruses may emerge from the spontaneous mutation of low pathogenicity avian influenza (LPAI) viruses in domestic birds or through the genetic reassortment of avian influenza viruses during co-infection of a host. To date, only subtypes of H5 and H7 avian influenza viruses have been characterized as HPAI viruses. High pathogenicity viruses of the A(H5N1) subtype have become established in wild bird populations, including migratory birds, and have spread across Eurasia, Africa, North and Central America and parts of South America resulting in spillback to poultry.

The degree of disease caused by HPAI viruses can be variable and depends on the species, age and type of bird, their susceptibility to infection, specific characteristics of the infecting virus and environmental factors. Traditionally, HPAI viruses have primarily affected domestic birds (particularly gallinaceous birds such as chickens, turkeys, guinea fowl and quails). In chickens and turkeys, the clinical course of HPAI may be acute and severe, wiping out an entire flock. In domestic or wild waterfowl (such as duck, geese and swans), HPAI is traditionally subclinical or asymptomatic. However, in other wild bird species (for example, shore birds, scavengers, raptors, pelicans and cranes), HPAI can result in significant illness and death. LPAI viruses are usually associated with limited clinical signs. However, such viruses may also cause morbidity or mortality in poultry, and/or production losses such as a drop in egg production.

Generally, high pathogenicity avian influenza outbreaks in poultry have immediate and severe consequences for the agricultural sector and may pose a risk to food security. Such outbreaks result in the culling of affected and in-contact flocks. In addition, recent epizootics have also demonstrated the severe impact of HPAI viruses once introduced into wild bird populations, which may result in mass mortalities and jeopardize the survival of critically endangered species.

In regions where avian influenza viruses are endemic – or areas where the prevalence of the virus is high in wild bird populations – the transmission of these viruses to mammalian species (including, but not limited to, humans, pigs, mink, dogs, cats, foxes, skunks, racoons, bobcats, coyotes, bears and marine mammals) has been sporadically reported. "Spill-over" events with A(H5) high pathogenicity avian influenza viruses can originate from the predation of sick or dead birds or exposure to high levels of environmental contamination.

Swine influenza

Swine influenza is a respiratory disease of pigs caused by influenza A viruses and is not a notifiable disease to WOAH. Swine influenza viruses (SIVs) exhibiting H1 or H3 HA – particularly A(H1N1), A(H1N2) and A(H3N2) subtypes – are enzootic in swine populations around the world. An A(H2) virus was last identified in pigs in 2006 in the United States of America. Given the significant genetic diversity of SIVs, several lineages and clades have been designated based on their phylogenetic characteristics. SIVs circulating in North America and Europe are genetically different from each other, while viruses detected in Asia exhibit genes originating from both these regions.

Once introduced into pig herds, SIVs may cause high morbidity – though mortality is often low, with recovery from infection taking around 7–10 days. Clinical signs observed in pigs are generally mild and include fever, depression, coughing, discharge from the nose or eyes, sneezing, breathing difficulties, eye redness or inflammation, and changes in appetite. Certain SIVs may also circulate silently in herds causing asymptomatic or subclinical infections. Although mortality is often low in infected herds, high levels of morbidity may lead to delays in weight gain or abortion and thus to production losses for pig owners.

Pigs are often called "mixing vessels" due to their susceptibility to both avian and human influenza viruses. They are not the only animal species in which this can occur but this mixing provides opportunities for genetic reassortment between influenza viruses of different species and the potential emergence of viruses with zoonotic or pandemic potential. Beyond pig (and pig-related) species, SIVs have also been detected in humans and in several bird species.

In humans

Animal influenza viruses – most commonly avian and swine influenza viruses – can occasionally infect humans, resulting in zoonotic infections. Zoonotic diseases are those transmitted from animals to humans. Reverse zoonosis refers to transmission from humans to animals. Current influenza viruses that cause zoonotic infections have not demonstrated sustained person-to-person transmission. WHO regularly assesses the risk posed by zoonotic influenza viruses to human health, including the risk of sustained person-to-person transmission.

Avian influenza viruses – including, but not limited to, influenza A(H5N1), A(H7N9) and A(H9N2) viruses – have sporadically caused disease in humans following infection. Direct contact with infected birds or by-products (through handling, culling, slaughtering or processing) or indirect contact (through environments contaminated with bodily fluids from infected birds) represent a risk for human infection. Although rare, human cases of infection with avian influenza viruses following contact with an intermediate species have also been reported. Exposure to avian influenza viruses can lead to infection and disease in humans – ranging from conjunctivitis or mild, flu-like symptoms to severe, acute respiratory disease – and/or death. Disease severity will depend upon the virus causing the infection and the characteristics of the infected individual. Rarely, gastrointestinal and neurological symptoms have been reported. To date, only subtypes of H3, H5, H6, H7, H9 and H10 avian influenza viruses are known to have caused human infections. Serological studies suggest some undetected human infections occur in occupationally exposed groups.

Cases of human infection with SIVs have also been reported. When an SIV infects a human, it is labelled as a variant (v) virus (for example, H1N1v, H1N2v or H3N2v viruses). Close proximity to infected pigs or visiting locations where pigs are kept has been reported as a factor in most human cases. Human infections with variant viruses have generally been mild, with symptoms similar to those of human seasonal influenza – though some cases have been associated with other symptoms and/or hospitalization with more severe disease.

Prevention

Influenza prevention and control measures in animals will minimize the circulation of animal influenza viruses, thus reducing the risk of zoonotic human infections and disease. Such measures should be developed and implemented in an integrated way, with the public health and animal health sectors working hand in hand at both administrative and technical levels, and applying a One Health approach. The local FAO office can provide more information on the prevention measures being implemented in the animal sector.

Measures to reduce human exposure to animal influenza viruses and to prevent human disease should focus on the interface between humans, animals and the environment (see modules 4 and 5 of this resource pack on reducing human exposure). Preventive measures should target occupational risk groups (for example, veterinarians, farmers or farmworkers in contact with poultry, swine or mink, and backyard bird and pig keepers) and anyone in contact with potentially infected animals (for example, live animal market workers and visitors, slaughterhouse workers, meat processors, or households practising home slaughtering of animals). In addition, surveillance to detect possible human cases should be intensified, and protocols for the initial rapid response to the first detection of a human case in an area should be in place and should be reviewed as required.

2 ROLE OF THE ANIMAL HEALTH SECTOR

KEY ISSUES

- Be aware of the roles and responsibilities of, and establish transparent communications with, partners within the animal, human and environmental health sectors.
- Understand the importance of coordination and information exchange between the animal health, environmental health and public health sectors regarding animal disease outbreaks, surveillance in animals, and the response to zoonotic influenza cases (One Health approach).

Information Sources

Information Source Title	Link
World Organisation for Animal Health	http://www.woah.org/en/home/
WOAH – Terrestrial Animal Health Code; Chapter 10.4: Infection with high pathogenicity avian influenza viruses	https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/?id=169&L=1&htmfile=chapitre_avian_influenza_viruses.htm
FAO – Animal health	https://www.fao.org/animal-health/en/
FAO – Global avian influenza viruses with zoonotic potential situation update	https://www.fao.org/animal-health/situation-updates/global-aiv-with-zoonotic-potential/en
FAO – Avian Influenza A(H7N9) virus situation update	https://www.fao.org/animal-health/situation-updates/avian-influenza-A(H7N9)-virus/en
FAO – Sub-Saharan Africa HPAI situation update	https://www.fao.org/animal-health/situation-updates/sub-saharan-africa-hpai/

Information Source Title	Link
Joint WOAH-FAO Scientific Network on Animal Influenza (OFFLU)	www.offlu.org
OFFLU – Collection of specimens from swine for the detection of influenza A virus by molecular assays or virus Isolation	https://www.offlu.org/wp-content/uploads/2021/01/OFFLU-_Collection_of_Specimens_for_Detection_of_Influenza__December2017.pdf
WHO – Tripartite zoonoses guide: operational tools and approaches for zoonotic diseases	https://www.who.int/initiatives/tripartite-zoonosis-guide

The animal health sector is in charge of preventing and controlling outbreaks of disease in animals. Reporting new and ongoing influenza detections and outbreaks in animals is important for focusing human health activities in the affected areas and raising awareness among professionals working with potentially infected animals, as well as with the public. The sharing of information on human cases with the animal health sector is equally important in ensuring that response activities are targeted. The following section lists the different agencies and their responsibilities in animal health.

The Food and Agriculture Organization (FAO) of the United Nations

Mandate: To promote food security and good nutrition by providing access to knowledge, policy advice and technical assistance to member countries. FAO publishes information and guidance on avian influenza and provides direct technical assistance to countries through its headquarters, regional and country offices, including expert missions, capacity-building and laboratory support. FAO further promotes collaboration, communication and coordination between countries and regions. FAO works primarily through direct collaboration with national ministries in charge of agriculture, livestock, the environment (including forestry and wildlife services) and fisheries, as well as with other stakeholders such as international and regional organizations, farmer or poultry associations and veterinary professional associations, or through public–private partnerships.

The World Organisation for Animal Health (WOAH)

Mandate: To improve animal health and welfare worldwide. This standard-setting organisation of reference for the World Trade Organization sets international standards for animal health and zoonosis prevention and response through the Terrestrial and Aquatic Animal Health Codes and the Manual of Diagnostic Tests and Vaccines for Animals. WOAH is responsible for collecting and disseminating official animal disease information from its member countries. It also collaborates with national veterinary services, as well as with FAO at national, regional and global levels, to provide technical assistance such as laboratory support to countries. As specified in the

Terrestrial Code, WOAH member countries are required to report the detection of HPAI viruses in poultry and non-poultry (including wild birds) to WOAH, as well as the infection of domestic and captive wild birds with LPAI viruses with proven natural transmission to humans associated with severe consequences. Swine influenza is not notifiable to WOAH.

The Joint WOAH-FAO Scientific Network on Animal Influenza (OFFLU)

OFFLU was established jointly in 2005 as a global network of expertise on animal influenza, and works to reduce the negative impacts of avian, swine and equine influenza viruses by promoting effective collaboration between animal health experts and the human health sector in detecting and controlling important influenzas in animals. One of the objectives of OFFLU is to collaborate with WHO on issues related to the animal–human interface, including pandemic preparedness for the early production of human vaccines.

National veterinary services

Official veterinary services are normally located within the Ministry of Agriculture (or a similar ministry) and are responsible for the implementation of national avian influenza prevention measures to prevent or control the spread of the disease in poultry. In some countries, other governmental bodies (for example, food safety, trade and environment agencies) are also responsible for aspects of avian influenza control. Other organizations, such as wildlife organizations and international donor and technical assistance organizations, contribute to national surveillance, prevention and control activities.

Influenza A in swine is not listed as a notifiable disease in the WOAH Terrestrial Code. There are also few national swine influenza prevention and control programmes in place, with the exception of certain countries and a number of surveillance activities carried out by private companies or research programmes.

3 RISK COMMUNICATION, COMMUNITY ENGAGEMENT, INFODEMIC MANAGEMENT AND SCIENCE AND KNOWLEDGE TRANSLATION

KEY ISSUES

- Before an outbreak occurs, develop strategies for communication and infodemic management, map stakeholders, conduct landscape assessments and identify key community concerns and risk perceptions.
- Ensure that structures are in place to support a "One Voice" approach in which trained and designated spokespersons from different sectors can communicate consistently and accurately aligned communications.
- Launch response activities as soon as possible– even if the facts are not yet clear or complete, involving all stakeholders and partners.
- Cocreate and share credible, accessible information and prevention messages, materials and health guidance with affected communities and stakeholders and work with them to translate the latest science and guidance to their constituency and amplify reach of guidance.
- Consider having social-behavioural feedback mechanisms in place and issue social listening and infodemic insights reports and recommendations on the outbreak.

Information Sources

Information Source Title	Link
WOAH – Communication handbook: veterinary services	https://www.who.int/publications/i/item/communication-handbook-veterinary-services
WHO – Communicating risk in public health emergencies: a WHO guideline for emergency risk communication (ERC) policy and practice	https://apps.who.int/iris/handle/10665/259807
OpenWHO – Risk communication essentials	https://openwho.org/courses/risk-communication
OpenWHO – Risk communication for influenza events	https://openwho.org/courses/risk-communication-influenza
OpenWHO – Infodemic management channel	https://openwho.org/channels/infodemic-management
WHO/UNICEF 6 steps to generate an infodemic insights report	https://apps.who.int/iris/handle/10665/370317
WHO competency framework: Building a response workforce to manage infodemics	https://apps.who.int/iris/rest/bitstreams/1370589/retrieve

Outbreaks of animal influenza often create widespread concern and can disrupt social and economic life. In an emergency, stakeholders and communities must have targeted, practical, actionable and understandable information delivered quickly in order to effectively respond. Risk communication, science knowledge and translation, infodemic management, social listening and infodemic insights analysis are key components of the response.

Risk communication and community engagement (RCCE)

Risk communication is the real-time exchange of information, advice and opinions between experts or officials and people who face a threat to their health, economic or social well-being. Risk communication helps people at risk make informed decisions to protect themselves and their communities and lets them know what to do if concerned. Community engagement is the process of developing relationships and structures that engage communities as equal partners in the creation of acceptable and workable response solutions. Risk communication is a core capacity of the International Health Regulations (IHR, 2005)[1] and one of five strategies within the Pandemic Influenza Preparedness (PIP) Framework[2]. A One Health approach to risk communication must reflect the considerations of diverse stakeholders, including human health agencies, veterinary services, agriculture and environment interests and communities and embrace the possibility of joint communication strategies targeting the same audiences.

Science and knowledge translation

Science and knowledge translation in health emergencies can be defined as the synthesis, dissemination, exchange and application of scientific knowledge with and by communities, policy- and decision-makers, media, and other stakeholders in a way that is accessible, understandable and meaningful to everyone, in order to strengthen evidence-informed policies and decisions to protect lives and promote health during health emergencies.

[1] International Health Regulations, 3rd edition, World Health Organization, 2016 (https://apps.who.int/iris/rest/bitstreams/1031116/retrieve, accessed 8 March 2023).
[2] Pandemic influenza preparedness framework for the sharing of influenza viruses and access to vaccines and other benefits, 2nd edition, World Health Organization, 2021 (https://apps.who.int/iris/rest/bitstreams/1351857/retrieve, accessed 8 March 2023).

Infodemic management

Outbreaks and other acute health events are accompanied by infodemics, where too much information including false or misleading information in digital and physical environments surges in communities, potentially causing cause confusion and risk-taking behaviours that can harm health, lead to mistrust in health authorities and undermine the public health response. Infodemic insights can identify high-risk narratives that may promote perceptions and behavior that are not supportive of adhering to public health guidance and inform improvements to response strategies to build resilience to health misinformation and promote digital and information literacy.

Social listening and infodemic insights analysis

Social listening is the collection, analysis and interpretation of contextual, behavioural and social data. This can inform the circulating questions, concerns, information voids, and narratives, including misinformation in the public and in vulnerable populations. Social listening insights can be triangulated with other data sources to generate rapid insights which can also lead to strategies and actions. Insights can be translated into strategies and actions for RCCE and other aspects of the response.

Preparedness activities

- Develop, test and review strategies for communication and infodemic management, identify roles and responsibilities for implementation and develop SOPs and templates.
- Map, set up partnerships and build trust among stakeholders and partners, networks and communities that are geographically and non-geographically bound, to lay the foundations for response activities.
- Conduct landscape assessments to identify sources of information to use for analysis of questions, concerns, information voids, and circulating narratives, including mis- and disinformation, across all relevant sectors and use these findings to determine the necessary risk communication and community engagement response measures.
- Ensure that structures are in place to support a "One Voice" approach in which trained and designated spokespersons from different sectors can communicate consistently and accurately aligned communications.
- Ensure that digital channels of all stakeholders provide basic credible and accurate influenza information that is easily accessible and shareable, search engine optimized, and addresses all relevant audiences.

Response activities

- Launch response activities in alignment with the risk communication and community engagement plan as soon as possible– even if the facts are not yet clear or complete. Use language such as: *The situation is uncertain, and we share your concerns. We are seeking answers and will keep you updated as new information becomes available*. Involve all stakeholders and partners in response activities.
- Cocreate and share influenza prevention messages, materials and health guidance with affected communities and stakeholders, translating the latest science and guidance. Key messages should raise awareness on knowing how to stay safe and knowing whom to report concerns about animals or humans to. Use images and videos to explain complex concepts.
- Consider having social-behavioural feedback mechanisms in place and issue social listening and infodemic insights reports and recommendations on the outbreak and use these findings to improve the accuracy, quality and accessibility of health information.

4 REDUCE HUMAN EXPOSURE TO ANIMAL INFLUENZA: BASIC MESSAGES FOR THE GENERAL PUBLIC AND AT-RISK GROUPS

KEY ISSUES

- Minimize exposure of the public to potentially infected animals and other sources of contamination.
- People with exposure to potentially infected animals should practice proper personal hygiene, especially frequent hand washing, and promptly seek medical help if illness develops.
- Work with the animal health sector (and others) to reduce the risk of transmission of animal influenza viruses to humans in ways that are acceptable to the public, producers and traders.

Information Sources

Information Source Title	Link
WHO – Global Influenza Programme: human-animal interface	https://www.who.int/teams/global-influenza-programme/avian-influenza
WHO –Disease Outbreak News	https://www.who.int/emergencies/disease-outbreak-news
FAO – Preparing for highly pathogenic avian influenza	https://www.fao.org/documents/card/en/c/02d20256-dc22-5822-995b-d4d2a414eb51
OFFLU – Collection of specimens from swine for the detection of influenza A virus by molecular assays or virus isolation	https://www.offlu.org/wp-content/uploads/2021/01/OFFLU-_Collection_of_Specimens_for_Detection_of_Influenza__December2017.pdf
WOAH – Avian influenza and wildlife: risk management for people working with wild birds	https://www.woah.org/en/document/avian-influenza-and-wildlife-risk-management-for-people-working-with-wild-birds-2/

When influenza viruses are circulating in animal populations, ministries of health, in collaboration with ministries of agriculture, ministries of wildlife and other governmental bodies and actors, should identify at-risk groups, assess the risk of infection in such groups and in the general public, develop a risk-mitigation plan (including an integrated communications plan) and implement biosecurity and other measures to reduce exposure among at-risk groups and the general public.

Identify at-risk groups

When avian influenza viruses circulate in an area, all those who are exposed to infected birds or their environments are at risk, especially those who:

- keep live poultry in their backyards or homes, or purchase live poultry or birds at markets;
- slaughter, de-feather or butcher poultry;
- handle and prepare raw poultry for further cooking and consumption;
- transport or sell live poultry or carcasses, or who are involved in culling/depopulating/disposing of poultry (see Chapter 5 of this resource pack on specific messages for poultry cullers for more information on this topic);
- work in the poultry industry, including farmers and veterinarians;
- have contact with poultry by-products (such as viscera, manure and feathers) or with water contaminated with such by-products (such as wastewater from a live bird market or slaughtering facility);
- consume raw poultry products; and
- participate or engage in outdoor activities (for example, shooting, hunting, animal watching or animal conservation/recuperation) that may involve exposure to wild birds.

When swine influenza viruses circulate in an area, all those who are exposed to infected swine are at risk, especially those who:

- work in the swine industry, including farmers and veterinarians;
- visit swine exhibitions or farms;
- slaughter or butcher swine;
- keep swine species as domestic animals; and
- participate in outdoor activities (for example, shooting, hunting or animal watching) that may involve exposure to wild swine species.

Minimize exposure

The general public should minimize contact with animals in areas known to be affected by animal influenza viruses, including farms and settings where live animals may be sold or slaughtered. For example, contact with chickens, ducks or other birds should be minimized if possible and areas where poultry are housed, slaughtered or prepared avoided. In those areas known to be affected by animal influenza viruses, children should be kept away from birds and their waste, including feathers and manure. Also, children, older people, pregnant and postpartum women (up to 6 weeks) or people with suppressed immune systems should neither collect eggs nor assist with slaughtering or raw product manipulation. Contact with any surfaces that appear to be contaminated with animal faeces should be avoided.

Given the observed extent and frequency of avian influenza cases in wild birds and some wild mammals, the public should avoid contact with animals that are sick or dead from unknown causes, including wild animals, and should report dead wild birds and mammals or request their removal by contacting local wildlife or veterinary authorities.

Practice good hygiene

Everyone should perform hand hygiene, preferably washing their hands either with soap and running water (especially if there is visible soiling of hands) or using alcohol hand rubs, and in all cases as frequently, thoroughly and often as possible – but especially before and after contact with animals and their environments.

Everyone should use adequate personal protection (which are exclusively dedicated to this activity) when touching animals or animal faeces from areas where animals may be infected with influenza viruses; walking on soil contaminated with animal faeces; or cleaning animal housing areas (for example, cages). If gloves are not available, plastic bags can be used to protect hands. Hands should be washed immediately afterwards with soap and water, and shoes and outer clothing should be cleaned.

People who sell live animals or are involved in the slaughtering and processing of animals at traditional markets should ideally wear light coloured protective clothing, clean aprons, gloves and rubber boots. Washing hands thoroughly and changing into clean clothes before returning home is also recommended. If this is not feasible, hands should be washed with soap and water immediately after handling animals or their by-products.

There remain gaps in the knowledge on the efficacy of face masks against laboratory-confirmed influenza especially in different environmental conditions[3]. However, certain face mask types are generally acceptable options for use by the general public for prevention and control in the context of COVID-19[4]. Eye protection could also be considered for those individuals in contact with contaminated environments or involved in the slaughtering and processing of animals.

Meat and meat products should be cooked thoroughly. Chapter 6 of this resource pack on food safety provides further information on this topic.

Seek assistance

The general public and at-risk individuals should report sick or unexpectedly dead animals to the veterinary authorities immediately, and should comply with all official measures put in place (for example, animal movement restrictions). Animals showing signs of disease or that have unexpectedly died should not be slaughtered and/or consumed.

Any at-risk individuals or members of the general public that may have been exposed to potentially infected animals should promptly seek health care if they feel unwell and should inform their health care provider of their possible exposure (for example, the activities mentioned above under the at-risk groups).

[3] Non-pharmaceutical public health measures for mitigating the risk and impact of epidemic and pandemic influenza. World Health Organization, 2019. (https://apps.who.int/iris/rest/bitstreams/1257621/retrieve, accessed 22 March 2023)

[4] Infection prevention and control in the context of coronavirus disease (COVID-19): A living guideline. World Health Organization, 2023. (https://app.magicapp.org/#/guideline/Lr2a8L/rec/ERl661, accessed 22 March 2023)

5 REDUCE HUMAN EXPOSURE TO AVIAN INFLUENZA: SPECIFIC MESSAGES FOR POULTRY CULLING ACTIVITIES

KEY ISSUES

- Supervisors should provide appropriate personal protective equipment (PPE) and training to employees involved in poultry culling and cleaning activities.
- Supervisors should keep records of employees who are exposed to infected poultry and monitor their health status during and for a minimum of 7 days after exposure to possibly infected birds and contaminated environments. The period of monitoring may be adjusted based on evolving science and understanding around the outbreak investigation.

Information Sources

Information Source Title	Link
WOAH – Terrestrial Animal Health Code; Chapter 7.6: Killing of animals for disease control purposes	https://www.woah.org/fileadmin/Home/eng/Health_standards/tahc/current/chapitre_aw_killing.pdf

When avian influenza viruses are circulating in an area, some people will be involved in specific high-risk tasks such as sampling sick birds, culling and disposing of infected birds, and cleaning of contaminated premises. All individuals with occupational risks of exposure should be taught how to maximally protect themselves and be provided with appropriate PPE and training on how to use it properly.

Personal protective equipment

PPE includes waterproof protective clothing that covers the entire surface of the head, body and extremities; particulate respirators (single-use FFP2, N95 equivalent or higher quality); eye protection; gloves (heavy duty rubber work gloves depending on the task); and rubber or polyurethane boots or impermeable foot covers. PPE must be correctly removed immediately after the task is completed and disposed of safely. If necessary, the use of reprocessed PPE (that is, previously worn PPE that has been appropriately decontaminated) can be considered.

Training should be provided on how to put on and take off PPE correctly, including training on fit testing of particulate respirators, and on PPE management (for example, disposal or disinfection).

Personal hygiene

Everyone involved in these tasks should perform hand hygiene preferably washing their hands either with soap and running water (especially if there is visible soiling of hands) or using alcohol hand rubs, and in all cases as frequently, thoroughly and often as possible – and at a minimum after completion of each task.

Monitoring of individuals

All those involved in high-risk tasks should be registered and monitored closely by local health authorities for 7 days following the last day of contact with infected poultry or their environments. Anyone involved in high-risk activities who develops symptoms should be considered a suspect case and appropriate clinical case management should be implemented. This includes triage and clinical assessment for disease severity classification, assessment of risk factors for severe disease, and isolation and treatment (for example, antiviral use and supportive care). Testing of asymptomatic exposed individuals could also be considered on a case-by-case basis, depending on available resources and objectives (for example, as part of an outbreak investigation or special study to assess asymptomatic transmission). In this context, the testing of respiratory samples for viable and replicating virus should be paired with serological testing of acute and convalescent serum samples.

Preventive measures

A risk assessment of the degree of exposure should be performed initially and updated periodically. If a person has a high risk of exposure, post-exposure antiviral chemoprophylaxis can be considered on a case-by-case basis (see Chapter 10 of this resource pack on the clinical management of suspected and confirmed patients with zoonotic influenza infections for more information).

Individuals at increased risk of developing severe disease could consider requesting temporary reassignment to lower-risk tasks to avoid direct exposure.

Consideration should be given to immunizing individuals with a high likelihood of exposure to avian influenza viruses with the seasonal influenza vaccine. This is to protect them against seasonal influenza viruses thus facilitating detection of an avian influenza virus infection, and to minimize the risk of reassortment of the two viruses in a co-infected individual. Administration of the seasonal influenza vaccine will not reduce the risk of avian influenza infection in such individuals. Chapter 11 of this resource pack on vaccinations for humans provides more information on this topic.

6 FOOD SAFETY

KEY ISSUES

- Promote thorough cooking of poultry and poultry products.
- Inform the public about ways to promote safe food preparation and consumption.
- Traditional food market hygiene and biosecurity should be assessed and improved where possible.
- National food safety authorities and poultry producers should adopt good animal production practices to reduce the risk of the emergence and spread of avian influenza viruses.

Information Sources

Information Source Title	Link
WHO – Five keys to safer food manual	https://apps.who.int/iris/handle/10665/43546
FAO – Code of hygienic practice for meat	https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B58-2005%252FCXP_058e.pdf
WHO – Five keys for safer traditional food markets	https://apps.who.int/iris/rest/bitstreams/1500252/retrieve
FAO – Food safety is everyone's business in traditional food markets	https://www.fao.org/documents/card/en/c/cc0040en
WHO – Reducing public health risks associated with the sale of live wild animals of mammalian species in traditional food markets: interim guidance, 12 April 2021	https://apps.who.int/iris/handle/10665/340719

Information Sources

Information Source Title	Link
WHO – Safe and healthy food in traditional food markets in the WHO European Region, March 2021	https://apps.who.int/iris/handle/10665/340954
FAO – Biosecurity guide for live poultry markets	www.fao.org/documents/card/en/c/5a3c4d30-efd1-47f2-a805-589676cacfef/

Food safety measures require a "farm-to-fork" approach and are a joint responsibility of consumer, retailer, producer and governmental actors. Eggs, poultry meat and other poultry food products can be safely consumed provided such items are properly cooked and properly handled during food preparation.

Separate raw meat from cooked or ready-to-eat foods

To avoid cross-contamination, the surfaces, chopping boards, knives and other utensils used for preparing raw meat should never be used for cooked or ready-to-eat foods before they are thoroughly cleaned. Hand hygiene should also be practised in between handling raw and cooked foods. Cooked meat should not be placed back onto the same plate or surface it was on before it was cooked.

Keep clean and wash hands

Before and after handling raw poultry or eggs, hands and all surfaces and utensils should be thoroughly washed with soap and running water. Chapter 4 of this resource pack on reducing human exposure to animal influenza viruses provides more information on this topic.

Cook food thoroughly

All foods obtained from poultry, including eggs and poultry blood, should be cooked thoroughly. Cooked egg yolks should not be runny or liquid. Because influenza viruses are destroyed by heat, the cooking temperature for poultry meat should reach 70 °C (158 °F) in all parts so that no pink meat remains. Raw or soft-boiled eggs should not be used in foods that will not be cooked.

Handle and store meat properly

People can be exposed to the influenza virus through the handling and slaughtering of live infected poultry.

Good hygiene practices are essential during slaughtering, de-feathering and handling after slaughter to prevent direct exposure or cross-contamination from poultry to other foods, food preparation surfaces or equipment (see Chapter 4 of this resource pack for more information). Some influenza A viruses, if present in poultry meat, are not killed by refrigeration or freezing. Properly dispose of meat by-products and food waste.

Biosecurity at traditional food markets

Traditional food markets where live animals may be present can create opportunities for the spread of influenza viruses between animals and from animals to humans. The following market management best practices can improve hygiene and biosecurity to minimize the risk of virus transmission in these settings:

- Animal trade activities should be segregated from food market activities and involve trade in healthy animals as relevant according to the context and official directions from animal health authorities.
- Good practices regarding animal health and the hygienic manipulation of animals, their carcasses and related products should be promoted.
- Apply market zoning and avoid mixing animal species in the same area or mixing live animals with food products or slaughtering areas.

- Define specific and (when applicable) external slaughtering areas for animals. The primary processing of animals (especially poultry) should be centralized in slaughterhouses authorized by the competent authority and by the market supervisors. Ensure safe and hygienic slaughter conditions in market settings and properly dispose of by-products (see Chapter 4 for more information).
- Separate the areas used for selling and slaughtering live animals from the areas open to the general public.
- Minimize the contact between customers and live animals. Customers should avoid touching animals and then touching their own eyes, nose or mouth.
- Markets should be cleaned daily with proper waste disposal. A rest day can be organized at least twice a month to allow for thorough cleaning and disinfection of all market areas, equipment and utensils. Animals should not stay in the market on rest days.
- Market staff should be trained in good hygiene practices, including the need for regular hand washing with soap and running water after touching animals and animal products.

Hazard management for producers

Good animal production practices need to be in place, including specific measures to reduce the risk of emergence and spread of avian influenza viruses.

7 DRINKING-WATER AND THE ENVIRONMENT

KEY ISSUES

- Carefully treat drinking-water supplied from open surface water to minimize any potential risks to human and animals.
- Be aware that properly treated wastewater seems to pose only a small risk for humans.
- Be aware that in some cases, recreational water might be contaminated.
- Consider that faeces from infected animals can be infectious.
- Bury dead animals appropriately.

Information Sources

Information Source Title	Link
WHO – Review of latest available evidence on potential transmission of avian influenza (H5N1) through water and sewage and ways to reduce the risks to human health	https://apps.who.int/iris/handle/10665/204275
WHO – Guidelines for drinking-water quality. Fourth edition incorporating the first and second addenda	https://apps.who.int/iris/rest/bitstreams/1414381/retrieve
FAO – Carcass management guidelines. Effective disposal of animal carcasses and contaminated materials on small to medium-sized farms	https://www.fao.org/publications/card/en/c/CB2464EN/

Surface water can potentially be contaminated in areas where animal influenza viruses are circulating. Viable influenza viruses are able to persist for extended periods of time in water and wet surfaces. All potential water reservoirs, particularly those in areas with high density animal production areas, should be identified and registered.

Consider the following steps to minimize/eliminate the risk from drinking-water and the environment.

Water treatment

Appropriate water treatment is strongly recommended if open water reservoirs are to be used for drinking-water supplies (see above WHO Guidelines for drinking-water quality).

If there is no community drinking-water treatment system, consider advising the public to treat drinking-water with available and acceptable household-level interventions (boiling or chlorination).

Wastewater

Generally, virus concentrations are reduced when going through wastewater treatment but are not completely eliminated. Virus concentrations may be increased in certain treated or separated waste fractions (such as waste solids) by sedimentation and solid-liquid separation processes.

Recreational water

Open water can be contaminated with waterfowl faeces. The risk of bathing or swimming in contaminated water is not clear. The relevant authorities should advise the public of the potential risk and, where necessary, restrict human access to potentially contaminated sites.

Animal faeces

Infected birds can shed large amounts of influenza virus in their faeces. People should reduce their contact with animal faeces and/or take the precautions described in Chapter 4 of this resource pack on reducing human exposure to animal influenza. Influenza viruses can survive up to 4 weeks in faeces, with the survival period dependent on pH, temperature and other environmental factors.

Burial of dead animals and solid waste

Dead infected animals and potentially contaminated solid waste should be disposed of in an appropriate manner and carried out by trained personnel according to local regulations.

8 SURVEILLANCE AND INVESTIGATION OF ZOONOTIC INFLUENZA CASES

KEY ISSUES

- Monitor the health of people exposed to animals with influenza or to other people with zoonotic influenza.
- Increase surveillance for, and awareness of, zoonotic influenza.
- Understand the importance of coordination and information exchange between the animal health and public health sectors during the response to cases of zoonotic influenza (One Health approach).
- Know the triggers for investigating zoonotic influenza cases.
- Investigate all suspected cases of zoonotic influenza and include testing for animal influenza viruses in investigation and laboratory protocols.
- Report all cases of zoonotic influenza to WHO under the International Health Regulations (IHR, 2005).

Information Sources

Information Source Title	Link
WHO – Protocol to investigate non-seasonal influenza and other emerging acute respiratory diseases	https://apps.who.int/iris/handle/10665/275657
WHO – Zoonotic influenza A virus outbreak toolkit. Updated September 2022	https://www.who.int/emergencies/outbreak-toolkit/disease-outbreak-toolboxes/zoonotic-influenza-a-virus-outbreak-toolbox
International Health Regulations (2005)	https://www.who.int/health-topics/international-health-regulations
FAO-WHO-WOAH – Tripartite zoonoses guide: operational tools and approaches for zoonotic diseases	https://www.who.int/initiatives/tripartite-zoonosis-guide

Animal influenza viruses are currently not easily transmitted from infected animals to humans and there has been no sustained human-to-human transmission to date. However, any suspected human cases must be investigated in order to:

- provide appropriate treatment;
- identify other potential human contacts of the case and monitor them for the onset of illness; and
- determine if human-to-human transmission of the virus is occurring.

Case investigation

The most important goal when investigating potential cases of zoonotic influenza is to assess the extent of potential human-to-human transmission, especially in clusters of human cases and contacts of confirmed cases.

Staff at health care facilities, including private clinics, should be informed about the possible signs and symptoms of infection with a zoonotic influenza virus, how to explore patients' exposure and travel histories, and about how and to whom they should report any suspected cases.

If a person is suspected of having zoonotic influenza, the health authorities should be notified and appropriate clinical case management provided, including testing, triage, clinical assessment for disease severity classification, assessment of risk factors for severe disease, and isolation and treatment (for example, with antivirals and supportive care). Public health authorities should report any laboratory-confirmed case should to WHO under the International Health Regulations (IHR, 2005) and initiate other important response activities such as contact tracing and risk assessment.

Public health and animal health authorities should work together and share information during investigations of human cases of zoonotic influenza. Investigations by animal health authorities should involve assessing the role of local animals as sources of exposure and understanding if any illnesses or deaths have occurred in the local animal population, and whether animal influenza viruses are circulating in the local animal population (see Chapter 2 of this resource pack on the role of the animal health sector for more information). Genetic information on viruses circulating in animals and those detected in human are important for risk assessment.

Enhanced surveillance

When there has been human exposure to a known outbreak of an influenza A virus in domestic poultry, wild birds or other animals – or when there has been an identified human case of infection with such a virus – enhanced surveillance in potentially exposed human populations becomes necessary.

Enhanced surveillance should consider the health care seeking behaviour of the population, and could include a range of active and passive health care and/or community-based approaches, including:

- active screening in hospitals – particularly targeting inpatient and emergency departments for patients suspected of having zoonotic influenza (for example, after asking about exposure history);
- inclusion of other sources such as traditional healers, private practitioners and private diagnostic laboratories; and
- active surveillance of groups that may be at higher occupational risk of exposure, such as health workers and people exposed to live or dead birds or other animals (done in conjunction with the animal health sector where appropriate).

Monitoring of individuals

All individuals exposed to animal influenza viruses, and all contacts of confirmed human cases, should monitor their health for the duration of the known exposure period plus an additional 7 days at a minimum. All those exposed to known infected poultry, wild birds or other animals, or to farms under suspicion, should be registered and placed under close monitoring by local health authorities. This will facilitate the early detection of illness and timely clinical case management. If a person is suspected of having zoonotic influenza, the health authorities must be notified and appropriate clinical case management provided (see "Case investigation" above). Testing of asymptomatic exposed individuals could also be considered on a case-by-case basis, depending on available resources and based on an exposure risk assessment and testing objectives (for example, as part of an outbreak investigation or special study to assess asymptomatic transmission). In this context, the testing of respiratory samples for viable and replicating viruses should be paired with serological testing of acute and convalescent serum samples.

9 COLLECTING DIAGNOSTIC SAMPLES FROM HUMANS

KEY ISSUES

- Ensure that specimen collection materials are available and that specimens are collected safely, correctly and in a timely manner.
- Ensure the safe packaging and transport of specimens – the latest international regulations on the transport of infectious substances can be found in the WHO Laboratory biosafety manual (see "Information sources").
- Ensure that samples are sent to laboratories that are capable of confirming zoonotic influenza infections.
- Promote virus/sample sharing with WHO laboratories according to the WHO Operational guidance on sharing influenza viruses with human pandemic potential (IVPP) under the Pandemic Influenza Preparedness (PIP) Framework (see "Information sources").

Information Sources

Information Source Title	Link
WHO – Manual for the laboratory diagnosis and virological surveillance of influenza	https://apps.who.int/iris/handle/10665/44518
WHO –WHO information for molecular diagnosis of influenza virus	https://www.who.int/teams/global-influenza-programme/laboratory-network/quality-assurance/eqa-project/information-for-molecular-diagnosis-of-influenza-virus
WHO – Laboratory biosafety manual. Fourth edition	https://apps.who.int/iris/rest/bitstreams/1323419/retrieve
WHO – Operational guidance on sharing influenza viruses with human pandemic potential (IVPP) under the Pandemic Influenza Preparedness (PIP) Framework	https://apps.who.int/iris/rest/bitstreams/1091180/retrieve
WHO – Clinical care for severe acute respiratory infection. Toolkit: Update 2022	https://apps.who.int/iris/rest/bitstreams/1416473/retrieve

The collection of appropriate specimens from suspected human cases for virus identification, typing and subytping by a qualified laboratory – together with rapid and precise characterization of the virus and/or its isolate at specialized reference laboratories – is essential for the early detection of cases, proper management of patients, public health risk assessment and developing proper response measures. In addition, appropriate specimen collection is also vital for monitoring resistance to antivirals, producing effective vaccines and evaluating laboratory methods.

Specimen collection

Before collecting specimens, ensure that the relevant diagnostic laboratories have been informed in advance, that specimens can be taken safely (using the appropriate PPE) and that the specimens can be transported and stored correctly.

The following specimens are preferred:

- Upper respiratory tract – for detailed guidance, please refer to the WHO Manual for the laboratory diagnosis and virological surveillance of influenza.
- Lower respiratory tract – if the patient is intubated, collect a bronchoalveolar lavage sample or take a tracheal aspirate.
- Blood for serum collection (both acute and convalescent if possible).

Laboratory testing

Ensure that the laboratory selected is capable of processing and confirming human infections with an animal influenza virus. If not, an appropriate reference laboratory should be contacted (see next section).

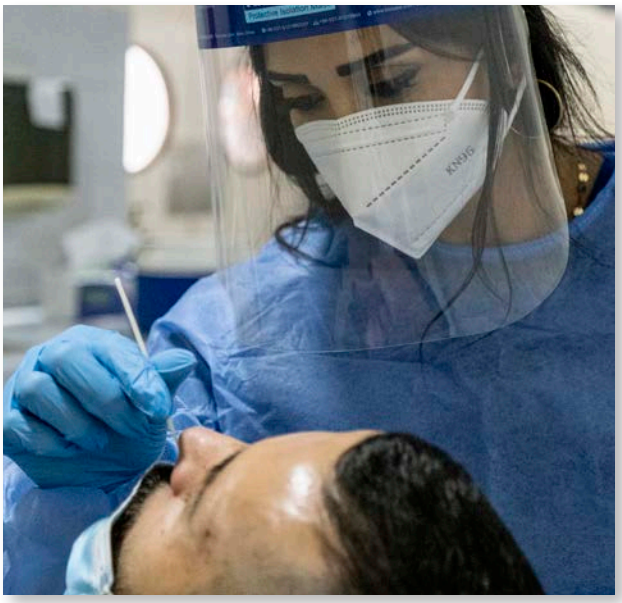
Virus sharing

To monitor the evolution of the virus and inform timely updates of diagnostics and vaccines, it is vital to share clinical specimens and/or virus isolates (if available) with WHO Collaborating Centres/H5 Reference Laboratories. Timely sharing is also critical for the purpose of risk assessment.

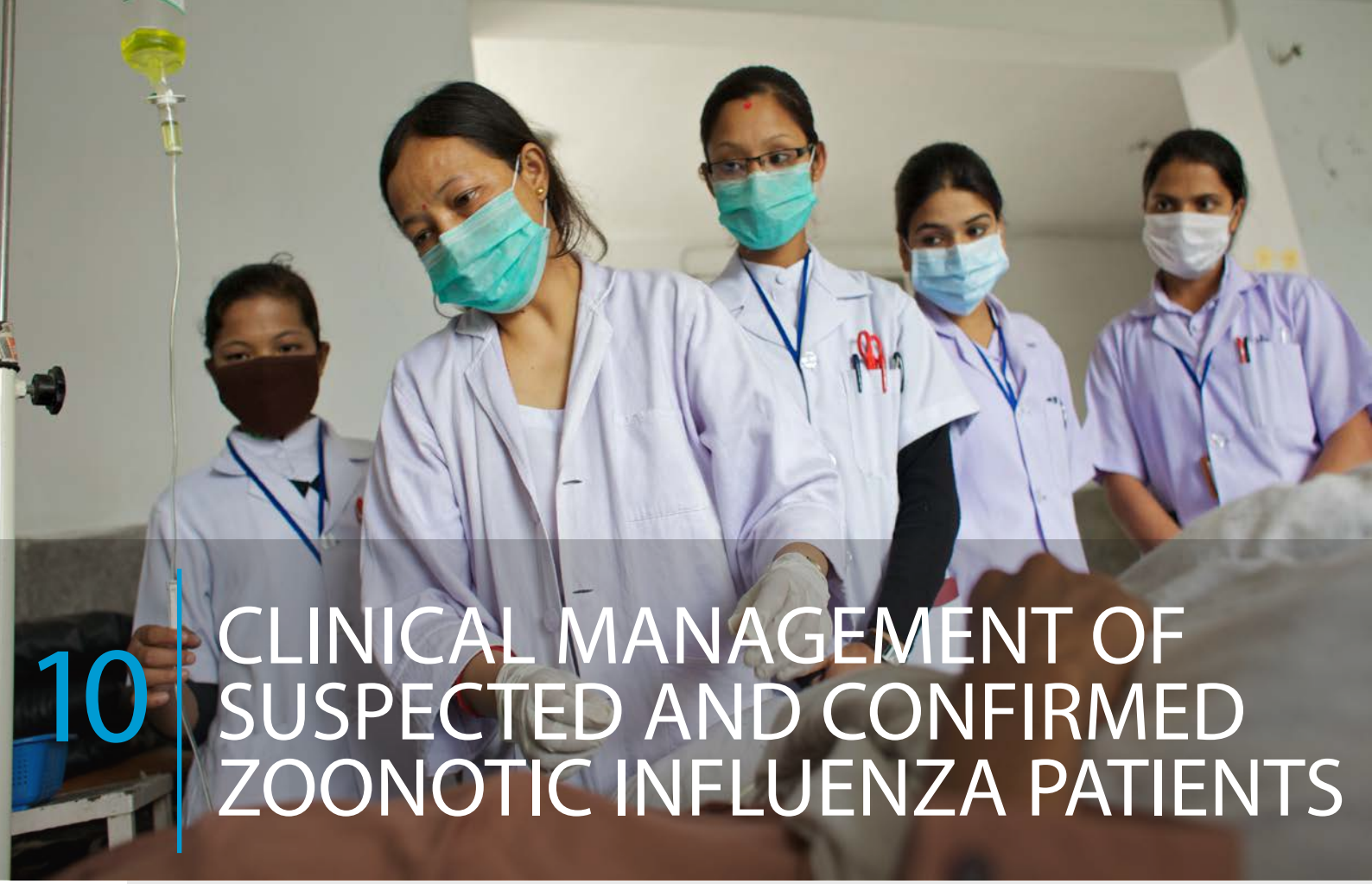
In the context of both laboratory testing and virus sharing, WHO can assist with the shipping of samples to its reference laboratories – for more details on such assistance please see the WHO Operational guidance on sharing influenza viruses with human pandemic potential (IVPP) under the PIP Framework.

It is also important to share the genetic sequence data of viruses in a publicly accessible database (for example, GISAID or GenBank) where the capacity for such sequencing exists in the laboratory.

Occasionally, national influenza centres (NICs) may receive influenza viruses that do not fall in the categories of human seasonal viruses or PIP biological materials; for example, viruses from animal or environmental specimens. Such material should preferably be handled in facilities away from those where human specimens and viruses are investigated. NICs share virus samples with WHO Collaborating Centres (CCs) of the Global Influenza Surveillance and Response System (GISRS) of their choice to support GISRS risk assessment following national and international rules and regulations. It is the responsibility of the NICs to ensure that appropriate permits and other national/international documents and approvals are in place to facilitate virus-sharing.[5]



[5] Terms of Reference for National Influenza Centers of the Global Influenza Surveillance and Response System, World Health Organization, 2017 (https://cdn.who.int/media/docs/default-source/influenza/national-influenza-centers-files/nic_tor_en.pdf?sfvrsn=93513e78_30, accessed 8 March 2023).



10 CLINICAL MANAGEMENT OF SUSPECTED AND CONFIRMED ZOONOTIC INFLUENZA PATIENTS

KEY ISSUES

- Prevent the nosocomial spread of zoonotic influenza viruses.
- Properly treat and manage zoonotic influenza cases.
- Report cases to WHO under the International Health Regulations (IHR, 2005).

Information Sources

Information Source Title	Link
WHO – Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care	https://apps.who.int/iris/handle/10665/112656
WHO – Clinical care for severe acute respiratory infections. Toolkit: Update 2022	https://apps.who.int/iris/rest/bitstreams/1416473/retrieve
WHO – Guidelines for the clinical management of severe illness from influenza virus infections	https://apps.who.int/iris/handle/10665/352453
WHO guidelines on hand hygiene in health care	https://apps.who.int/iris/rest/bitstreams/52455/retrieve
WHO – Standard precautions for the prevention and control of infections. Aide-memoire	https://apps.who.int/iris/rest/bitstreams/1436791/retrieve
WHO – Transmission-based precautions for the prevention and control of infections. Aide-memoire	https://apps.who.int/iris/rest/bitstreams/1436784/retrieve
International Health Regulations (2005)	https://www.who.int/health-topics/international-health-regulations

Health care facilities need to be ready to manage patients with zoonotic influenza. Such management will include the measures detailed below.

Infection control and prevention

Implement early infection control and prevention measures to prevent the nosocomial spread of the disease (that is, spread originating in a hospital). Raise awareness among health care workers regarding suspected cases. Implement a screening and triaging (patient categorization) system in hospitals. Implement standard and droplet precautions, and airborne precautions (N95/FFP2/FFP3), when aerosol-generating procedures are being carried out on suspected cases. Monitor health care workers for fever and influenza-like illness. Provide personal protective equipment and appropriate training in its use.

Case management

See Chapter 9 of this resource pack on collecting diagnostic samples from humans for more details on specimen collection and laboratory testing.

Manage influenza patients properly to prevent severe illness and death. For more details, see the updated WHO Guidelines for the clinical management of severe illness from influenza virus infections listed in "Information sources". For patients with laboratory-confirmed influenza virus infection with progressive, complicated or severe illness – or those with asymptomatic or mild disease but at increased risk of severe disease – treat with oseltamivir as soon as possible. If influenza virus infection is suspected but laboratory test results are delayed by more than 24 hours, empiric treatment with oseltamivir is recommended and can be modified once the test results have been received. Corticosteroids should not be used routinely but can be considered in cases of septic shock with suspected adrenal insufficiency , or if there is co-infection with SARS CoV 2 and the patient is hypoxemic.

Do not use antibiotic chemoprophylaxis unless there is a suspicion of bacterial co-infection, such as bacterial community-acquired pneumonia or bacterial sepsis. If empiric antibiotics are started in the initial treatment regimen, their discontinuation should be prompted by negative microbiological findings.

The early recognition and provision of optimized supportive care is essential when treating patients with progressive or severe influenza virus infection. This includes implementation of triage and clinical assessments, monitoring of oxygen saturation and provision of supplemental oxygen to correct hypoxemia.

For patients that develop acute respiratory distress, management with advanced non-invasive respiratory support interventions and invasive mechanical ventilation should adhere to lung-protective mechanical ventilation strategies. More information on these can be found in WHO COVID-19 clinical guidelines and in the WHO Clinical care for severe acute respiratory infections toolkit listed in "Information sources".

Report cases

All laboratory-confirmed cases of zoonotic influenza need to be reported to WHO under the IHR (2005) through the IHR national focal point.

11 VACCINATIONS FOR HUMANS

KEY ISSUES

- Twice a year, WHO updates its recommendations on the need for additional candidate vaccine viruses (CVVs) for pandemic preparedness purposes.
- Zoonotic influenza vaccines are not widely available and the decision to use them would depend on the risk of infection and the decision of the national authority.
- WHO has no stockpile of zoonotic influenza vaccines.

Information Sources

Information Source Title	Link
WHO – Global Influenza Programme. Vaccines	https://www.who.int/teams/global-influenza-programme/vaccines
SAGE Working Group on Influenza Vaccines and Immunizations. Influenza A(H5N1) vaccine stockpile and inter-pandemic vaccine use. Background document	https://terrance.who.int/mediacentre/data/sage/SAGE_Docs_Ppt_Nov2013/6_session_influenza/Nov2013_session6_h5n1_vaccine_stockpile.pdf

Seasonal influenza vaccine

WHO recommends the targeted administration of seasonal influenza vaccine to health care workers in all countries in order to protect their patients from seasonal influenza. In addition, vaccination against seasonal influenza infection for selected groups at increased risk of exposure to animal influenza viruses could be considered as a way of reducing the probability of human co-infections with both animal and human influenza viruses. Fewer such infections will reduce the opportunities for viral reassortment and the emergence of influenza viruses with pandemic potential. It should be borne in mind that current seasonal influenza vaccines derived from circulating human influenza viruses provide no protection against human infection with animal influenza A viruses.

Zoonotic influenza vaccines

Vaccines against zoonotic A(H5N1) and other animal influenza viruses for human use have been developed based on the WHO-recommended CVVs and have been licensed for use in several countries. Such vaccines are not widely available and the decision to use them would depend on the risk of infection. Some countries stockpile these vaccines as part of their pandemic preparedness measures. WHO does not itself have a stockpile of A(H5N1) or other influenza vaccines against potentially zoonotic viruses.

Pandemic vaccines

Influenza viruses with pandemic potential continue to be identified and evolve both genetically and antigenically. Twice a year, WHO consults with experts from WHO Collaborating Centres, Essential Regulatory Laboratories and other partners to review data generated by the Global Influenza Surveillance and Response System (GISRS) on influenza viruses with pandemic potential. Following these consultations, WHO makes recommendations on the need for additional CVVs for pandemic preparedness purposes.

There is no way of knowing which influenza virus subtype will cause the next pandemic. Therefore, the production of any required pandemic influenza vaccine can only begin once the precise pandemic influenza virus strain has been identified. Based on the current commonly used influenza vaccine manufacturing technologies, the first doses of a pandemic vaccine would only become available 4–6 months after the pandemic influenza virus strain has been identified.

SUMMARY OF INFORMATION SOURCES

1. General information on animal influenza	▪ https://www.who.int/news-room/fact-sheets/detail/influenza-(avian-and-other-zoonotic) ▪ https://www.who.int/teams/global-influenza-programme/avian-influenza ▪ https://www.who.int/publications/m/item/influenza-virus-infections-in-humans_2018https://apps.who.int/iris/handle/10665/272442 ▪ https://www.who.int/teams/global-influenza-programme/avian-influenza/avian-influenza-a-(h7n9)-virus ▪ http://www.woah.org/en/disease/avian-influenza/ ▪ https://www.woah.org/fileadmin/Home/eng/Health_standards/tahm/3.03.04_AI.pdf ▪ https://www.woah.org/en/disease/swine-influenza/
2. Role of the animal health sector	▪ http://www.woah.org/en/home/ ▪ https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/?id=169&L=1&htmfile=chapitre_avian_influenza_viruses.htm ▪ https://www.fao.org/animal-health/situation-updates/global-aiv-with-zoonotic-potential/en ▪ https://www.fao.org/animal-health/situation-updates/avian-influenza-A(H7N9)-virus/en ▪ https://www.fao.org/animal-health/situation-updates/sub-saharan-africa-hpai/ ▪ www.offlu.org ▪ https://www.offlu.org/wp-content/uploads/2021/01/OFFLU-_Collection_of_Specimens_for_Detection_of_Influenza__December2017.pdf ▪ https://www.who.int/initiatives/tripartite-zoonosis-guide
3. Risk communication and community engagement	▪ https://www.who.int/publications/i/item/communication-handbook-veterinary-services ▪ https://apps.who.int/iris/handle/10665/259807 ▪ https://openwho.org/courses/risk-communication ▪ https://openwho.org/courses/risk-communication-influenza ▪ https://openwho.org/channels/infodemic-management ▪ https://apps.who.int/iris/handle/10665/370317 ▪ https://apps.who.int/iris/rest/bitstreams/1370589/retrieve
4. Reduce human exposure to animal influenza: basic messages for the general public and at-risk groups	▪ https://www.who.int/teams/global-influenza-programme/avian-influenza ▪ https://www.who.int/emergencies/disease-outbreak-news ▪ https://www.fao.org/documents/card/en/c/02d20256-dc22-5822-995b-d4d2a414eb51 ▪ https://www.offlu.org/wp-content/uploads/2021/01/OFFLU-_Collection_of_Specimens_for_Detection_of_Influenza__December2017.pdf ▪ https://www.woah.org/app/uploads/2022/08/avian-influenza-and-wildlife-risk-management-for-people-working-with-wild-birds.pdf
5. Reduce human exposure to avian influenza: specific messages for poultry culling activities	▪ https://www.woah.org/fileadmin/Home/eng/Health_standards/tahc/current/chapitre_aw_killing.pdf

SUMMARY OF INFORMATION SOURCES

6. Food safety	▪ https://apps.who.int/iris/handle/10665/43546 ▪ https://www.fao.org/fao-who-codexalimentarius/sh-proxy/en/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FStandards%252FCXC%2B58-2005%252FCXP_058e.pdf ▪ https://apps.who.int/iris/rest/bitstreams/1500252/retrieve ▪ https://www.fao.org/documents/card/en/c/cc0040en ▪ https://apps.who.int/iris/handle/10665/340719 ▪ https://apps.who.int/iris/handle/10665/340954 ▪ www.fao.org/documents/card/en/c/5a3c4d30-efd1-47f2-a805-589676cacfef/
7. Drinking-water and the environment	▪ https://apps.who.int/iris/handle/10665/204275 ▪ https://apps.who.int/iris/rest/bitstreams/1414381/retrieve ▪ https://www.fao.org/publications/card/en/c/CB2464EN/
8. Surveillance and investigation of zoonotic influenza cases	▪ https://apps.who.int/iris/handle/10665/44518 ▪ https://www.who.int/emergencies/outbreak-toolkit/disease-outbreak-toolboxes/zoonotic-influenza-a-virus-outbreak-toolbox ▪ https://www.who.int/health-topics/international-health-regulations ▪ https://www.who.int/initiatives/tripartite-zoonosis-guide
9. Collecting diagnostic samples from humans	▪ https://apps.who.int/iris/handle/10665/44518 ▪ https://www.who.int/teams/global-influenza-programme/laboratory-network/quality-assurance/eqa-project/information-for-molecular-diagnosis-of-influenza-virus ▪ https://apps.who.int/iris/rest/bitstreams/1323419/retrieve ▪ https://apps.who.int/iris/rest/bitstreams/1091180/retrieve ▪ https://apps.who.int/iris/rest/bitstreams/1416473/retrieve
10. Clinical management of suspected and confirmed zoonotic influenza patients	▪ https://apps.who.int/iris/handle/10665/112656 ▪ https://apps.who.int/iris/rest/bitstreams/1416473/retrieve ▪ https://apps.who.int/iris/handle/10665/352453 ▪ https://apps.who.int/iris/rest/bitstreams/52455/retrieve ▪ https://apps.who.int/iris/rest/bitstreams/1436791/retrieve ▪ https://apps.who.int/iris/rest/bitstreams/1436784/retrieve ▪ https://www.who.int/health-topics/international-health-regulations
11. Vaccinations for humans	▪ https://www.who.int/teams/global-influenza-programme/vaccines ▪ https://terrance.who.int/mediacentre/data/sage/SAGE_Docs_Ppt_Nov2013/6_session_influenza/Nov2013_session6_h5n1_vaccine_stockpile.pdf

Contacts:

Global Influenza Programme: WHOinfluenza@who.int
Outbreak: outbreak@who.int
IHR: ihrinfo@who.int

World Health Organization
Avenue Appia 20
1211 Geneva 27
Switzerland

9789240076884