



Highly Pathogenic Avian Influenza A(H5N1) Virus in Animals: Interim Recommendations for Prevention, Monitoring, and Public Health Investigations

WHAT TO KNOW

This guidance outlines CDC's recommendations for preventing exposures to highly pathogenic avian influenza (HPAI) A(H5N1) viruses and infection prevention and control measures, including the use of personal protective equipment, testing, antiviral treatment, patient investigations, monitoring of exposed persons, and antiviral chemoprophylaxis of exposed persons.

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Summary

The purpose of this guidance is to outline CDC's recommendations for preventing exposures to [highly pathogenic avian influenza \(HPAI\) A\(H5N1\)](#) viruses, infection prevention and control measures including the use of personal protective equipment, testing, antiviral treatment, patient investigations, monitoring of exposed persons, including persons exposed to sick or dead wild and domesticated animals and livestock with suspected or confirmed infection with highly pathogenic avian influenza (HPAI) A(H5N1) virus, and [antiviral chemoprophylaxis](#) of exposed persons. These recommendations are based on information available as of March 2024 and will be updated as needed when new information becomes available.

Background

Although human infections with HPAI A(H5N1) virus are rare, having [unprotected exposure](#) to any infected animal or to an environment in which infected birds or other animals are or have been present can pose a risk of infection. Therefore, people with work or recreational exposures to H5N1 virus-infected animals may be at increased risk of infection and should follow recommended precautions.

The [pandemic](#) of HPAI A(H5N1) viruses in wild birds has resulted in outbreaks among commercial poultry, backyard bird flocks, and spread to infect wild [terrestrial](#) and [marinemammals](#), as well as domesticated animals. Sporadic human infections with HPAI A(H5N1) virus have been reported in 23 countries since 1997 with a [case fatality proportion](#) of >50%, but only a small number of H5N1 cases have been reported in

humans since 2022. Most human infections with H5N1 virus have occurred after unprotected exposures to sick or dead infected poultry. There is no evidence of sustained human-to-human H5N1 virus transmission, and limited, non-sustained human-to-human H5N1 virus transmission has not been reported worldwide since 2007.

Influenza A viruses infect the [respiratory](#) and [gastrointestinal](#) tracts of birds causing birds to shed the virus in their saliva, mucous, and feces. Influenza A viruses can also infect the respiratory tract of mammals and cause [systemic](#) infection in other organ tissues. Human infections with [avian influenza A viruses](#) can happen when enough virus gets into a person's eyes, nose, or mouth or is inhaled. People with [close or prolonged unprotected contact](#) with infected birds or animals or their contaminated environments are at greater risk of infection. Illnesses in people from HPAI A(H5N1) virus infections have ranged from mild (e.g., upper respiratory symptoms) to severe illness (e.g., pneumonia, multi-organ failure) resulting in death.

Since 2022, many different wild bird species have been reported with HPAI A(H5N1) virus infection, including terrestrial, seabird, shorebird, and migratory species. In the United States, HPAI A(H5N1) virus detections in wild birds have been reported in 50 states or territories, and outbreaks in commercial poultry or backyard bird flocks associated with high mortality have been reported in 48 states since February 2022.

A wide range of terrestrial and marine mammals have been reported with HPAI A(H5N1) virus infection in multiple countries, typically resulting in neurologic signs of disease and death. HPAI A(H5N1) virus infection has been reported in wild mammals such as foxes, bears, seals, and sea lions, and in domesticated animals, including pets such as cats and dogs, farmed mink and foxes, and livestock such as goats and cows. In the United States, HPAI A(H5N1) virus detections in mammals have been reported in more than 20 states.

At this time, CDC considers the human health risk to the U.S. public from HPAI A(H5N1) viruses to be low; however, people with close or prolonged, unprotected exposures to infected birds or other animals, or to environments contaminated by infected birds or other animals, are at greater risk of infection. CDC considers HPAI A(H5N1) viruses to have the potential to cause severe disease in infected humans and recommends the following:

Recommendations for the Public

People should avoid unprotected (not using respiratory or eye protection) exposures to sick or dead animals including wild birds, poultry, other domesticated birds, and other wild or domesticated animals, as well as with animal feces, litter, or materials contaminated by birds or other animals with suspected or confirmed HPAI A(H5N1) virus infection.

[Personal protective equipment \(PPE\)](#) should be worn when in direct or close contact (within about six feet) with sick or dead animals including poultry, wild birds, backyard bird flocks, or other animals, animal feces, litter, or materials potentially contaminated with HPAI A(H5N1) viruses. PPE includes a properly fitted unvented or indirectly vented safety goggles, disposable gloves, boots or boot covers, a NIOSH-Approved particulate respirator (e.g., N95[®] filtering facepiece respirator, ideally fit-tested), disposable fluid-resistant coveralls, and disposable head cover or hair cover.

Cook poultry, eggs, and beef to a safe internal temperature to kill bacteria and viruses. Refer to [CDC's safer foods table](#) for a complete list of safe internal temperatures. Choosing pasteurized milk and products made with pasteurized milk is the best way to keep you and your family safe. Unpasteurized (raw) milk and products made from raw milk, including soft cheese, ice cream, and yogurt, can be contaminated with germs that can cause serious illness, hospitalization, or death. Pasteurization kills bacteria and viruses, like avian influenza A viruses, in milk.

People exposed to HPAI A(H5N1)-virus infected birds or other animals (including people wearing recommended PPE) should monitor themselves for new respiratory illness symptoms, including [conjunctivitis](#) (eye redness), beginning after their first exposure and for 10 days after their last exposure. Influenza antiviral post-exposure prophylaxis may be considered to prevent infection, particularly in those who had unprotected exposure to HPAI A(H5N1)-virus infected birds or other animals (more information below). Persons who develop any illness symptoms after exposure to HPAI A(H5N1) virus infected birds or other animals should seek prompt medical evaluation for possible influenza testing and antiviral treatment by their clinician or public health department. Symptomatic persons should isolate away from others, including household members, except for seeking medical evaluation until it is determined that they do not have HPAI A(H5N1) virus infection.

Recommendations for Protecting Farmers and Poultry, Backyard Bird Flock, and Livestock Owners

To reduce the risk of HPAI A(H5N1) virus infection, poultry farmers and poultry workers, backyard bird flock owners, livestock farmers and workers, veterinarians and veterinary staff, and emergency responders should avoid unprotected direct physical contact or close exposure with the following animals and materials potentially infected or confirmed to be infected with HPAI A(H5N1) virus:

- Sick birds, livestock, or other animals
- Carcasses of birds, livestock, or other animals
- Feces or litter
- Raw milk
- Surfaces and water (e.g., ponds, waterers, buckets, pans, troughs) that might be contaminated with animal excretions.

Farmers, workers, and emergency responders should wear [appropriate PPE](#) when in direct or close physical contact with sick birds, livestock, or other animals; carcasses; feces; litter; raw milk; or surfaces and water that might be contaminated with animal excretions from potentially or confirmed infected birds, livestock, or other animals, and when going into not yet disinfected buildings where these animals or materials are or were. [Workers should receive training](#) ^{PDF} on and demonstrate an understanding of when to use PPE; what PPE is necessary; how to properly put on, use, take off, dispose of, and maintain PPE; and PPE limitations. Employers can help by [posting signage](#) ^{PDF} that reminds workers of recommended PPE and its proper usage including how to properly put it on and take it off. Employers subject to Occupational Safety and Health Administration (OSHA) regulations should comply with applicable standards as highlighted on the OSHA [Avian Influenza – Standards](#) ^{page}.

Recommendations for Clinicians

Clinicians should consider the possibility of HPAI A(H5N1) virus infection in persons showing signs or symptoms of [acute respiratory illness](#) who have relevant exposure history. More information is available at [Brief summary for Clinicians](#). This includes persons who have had contact with potentially infected sick or dead birds, livestock, or other animals within 10 days before symptom onset (e.g., handling, slaughtering, defeathering, butchering, culling, preparing for consumption or consuming uncooked or undercooked food or related uncooked food products, including unpasteurized (raw) milk or other unpasteurized dairy products), direct contact with water or surfaces contaminated with feces, unpasteurized (raw) milk or unpasteurized dairy products, or parts (carcasses, internal organs, etc.) of potentially infected animals; and persons who have had prolonged exposure to potentially infected birds or other animals in a confined space. Clinicians should contact the state public health department to arrange testing for influenza A(H5N1) virus, collect recommended respiratory specimens (more information below) using PPE, consider starting empiric antiviral treatment (more information below), and encourage the patient to isolate at home away from their household members and not go to work or school until it is determined they do not have avian influenza A virus infection. Testing for other potential causes of acute respiratory illness should also be considered depending upon the local epidemiology of circulating respiratory viruses, including SARS-CoV-2.

Recommendations for State Health Departments

State health department officials should investigate potential human cases of HPAI A(H5N1) virus infection as described below and should notify CDC within 24 hours of identifying a [case under investigation](#). Rapid detection and characterization of [novel influenza A viruses](#) in humans remain critical components of national efforts to prevent further cases, to allow for evaluation of clinical illness associated with them, and to assess the ability of these viruses to spread from human to human. State Health Department officials, including the State Public Health Veterinarian, should collaborate with State Department of Agriculture and State Wildlife officials using a One Health approach when relevant to investigate suspected HPAI A(H5N1) infections in people linked with animals.

Recommendations for Surveillance and Testing

People exposed to HPAI A(H5N1)-infected birds or other animals (including people wearing recommended PPE) should be monitored for signs and symptoms of acute respiratory illness beginning after their first exposure and for 10 days after their last exposure. Patients who meet Epidemiologic criteria AND either Clinical OR Public Health Response criteria below should be [tested for HPAI A\(H5N1\) virus infection](#) by reverse-transcription polymerase chain reaction (RT-PCR) assay using H5-specific primers and probes at your state or local public health department.

Epidemiological Criteria

Persons with recent exposure (within 10 days) to HPAI A(H5N1) virus through one of the following:

- Exposure to HPAI A(H5N1) virus infected birds or other animals defined as follows:

- Close exposure (within six feet) to birds or other animals, with confirmed avian influenza A(H5N1) virus infection. Bird or other animal exposures can include, but are not limited to handling, slaughtering, defeathering, butchering, culling, or preparing birds or other animals for consumption, or consuming uncooked or undercooked food or related uncooked food products, including unpasteurized (raw) milk, OR
- [Direct contact](#) with surfaces contaminated with feces, unpasteurized (raw) milk or other unpasteurized dairy products, or bird or animal parts (e.g., carcasses, internal organs) from infected birds or other animals, OR
- Visiting a live bird market with confirmed bird infections or associated with a case of human infection with HPAI A(H5N1) virus.
- Exposure to an infected person – Close (within six feet) unprotected (without use of respiratory and eye protection) exposure to a person who is a confirmed, probable, or symptomatic suspected case of human infection with HPAI A(H5N1) virus (e.g., in a household or healthcare facility).
- Laboratory exposure (unprotected exposure to HPAI A(H5N1) virus in a laboratory)

Clinical Criteria

Persons with signs and symptoms consistent with acute upper or lower respiratory tract infection, or complications of acute respiratory illness without an identified cause. In addition, gastrointestinal symptoms such as diarrhea are often reported with HPAI A(H5N1) virus infection. Examples include but are not limited to:

- Mild illness (e.g., cough, sore throat, eye redness or eye discharge such as conjunctivitis, fever or feeling feverish, rhinorrhea, fatigue, myalgia, arthralgia, headache)
- Moderate to severe illness: (e.g., shortness of breath or difficulty breathing, altered mental status, seizures)
- Complications: pneumonia, respiratory failure, acute respiratory distress syndrome, multi-organ failure (respiratory and kidney failure), sepsis, meningoencephalitis

Public Health Response Criteria

Testing of asymptomatic persons for HPAI A(H5N1) virus infection is not routinely recommended. As part of public health investigations, asymptomatic persons, such as close contacts of a confirmed case of HPAI A(H5N1) virus infection, might be tested after consultation with CDC.

Preferred Clinical Specimens

For persons with suspected HPAI A(H5N1) virus infection, [the following specimens](#) should be collected as soon as possible after illness onset or when deemed necessary: a nasopharyngeal swab and a nasal swab combined with an oropharyngeal swab (e.g., two swabs combined into one viral transport media vial). The nasopharyngeal swab and the combined nasal-throat swabs should be tested separately. If these specimens cannot be collected, a single nasal or oropharyngeal swab is acceptable. **If the person has conjunctivitis (with or without respiratory symptoms), both a conjunctival swab and nasopharyngeal swab should be collected.** Patients with severe respiratory disease also should have lower respiratory tract specimens (e.g., an endotracheal aspirate or bronchoalveolar lavage fluid) collected, if possible. For severely ill persons, multiple respiratory tract specimens from different sites should be obtained to increase the potential for HPAI A(H5N1) virus detection.

Recommendations for Infection Prevention and Control

Standard, contact, and airborne precautions are recommended for patients presenting for medical care or evaluation who have illness consistent with influenza and recent exposure to birds or other animals potentially infected with HPAI A(H5N1) virus. For additional guidance on infection prevention and control precautions for patients who might be infected with HPAI A(H5N1) virus, please refer to [guidance for infections with novel influenza A viruses associated with severe disease](#).

Recommendations for Influenza Antiviral Treatment and Chemoprophylaxis

Treating Symptomatic Persons with Bird or Other Animal Exposures

Outpatients meeting epidemiologic exposure criteria who develop signs and symptoms compatible with influenza should be referred for prompt medical evaluation, testing, and empiric initiation of antiviral treatment with oseltamivir as soon as possible. Clinical benefit is greatest when

antiviral treatment is administered early, especially within 48 hours of illness onset.

Hospitalized patients who are confirmed, probable, or [suspected cases](#) of human infection with HPAI A(H5N1) virus, regardless of time since illness onset are recommended to initiate antiviral treatment with oral or enterically administered [oseltamivir](#) as soon as possible. Antiviral treatment should not be delayed while waiting for laboratory testing results.

Detailed guidance on dosing and treatment duration is available at [Interim Guidance of the Use of Antiviral Medications for the Treatment of Human Infection with Novel Influenza A Viruses Associated with Severe Human Disease](#).

Chemoprophylaxis of Persons with [Exposure to HPAI A\(H5N1\) Virus](#): Chemoprophylaxis with influenza antiviral medications can be considered for any person meeting epidemiologic exposure criteria. Decisions to initiate post-exposure antiviral chemoprophylaxis should be based on clinical judgment, with consideration given to the type of exposure, duration of exposure, time since exposure, and known infection status of the birds or animals the person was exposed to.

Antiviral chemoprophylaxis is not routinely recommended for personnel who used proper PPE and experienced no breaches while handling sick or potentially infected birds or other animals or decontaminating infected environments (including animal disposal).

If antiviral chemoprophylaxis is initiated, oseltamivir treatment dosing (one dose twice daily) is recommended instead of the antiviral chemoprophylaxis regimen for seasonal influenza. Specific dosage recommendations for treatment by age group is available at [Influenza Antiviral Medications: Summary for Clinicians](#). Physicians should consult the manufacturer's package insert for dosing, limitations of populations studied, contraindications, and adverse effects. If exposure was time-limited and not ongoing, five days of medication (one dose twice daily) from the last known exposure is recommended.

Monitoring and Antiviral Chemoprophylaxis of Close Contacts of Persons with HPAI A(H5N1) virus infection: Recommendations for monitoring and chemoprophylaxis of close contacts of infected persons are different than those that apply to persons who meet bird or other animal exposure criteria. Post-exposure prophylaxis of close contacts of a person with HPAI A(H5N1) virus infection is recommended with oseltamivir twice daily (treatment dosing) instead of the once daily pre-exposure prophylaxis dosing. Detailed guidance is available at [Interim Guidance on Follow-up of Close Contacts of Persons Infected with Novel Influenza A Viruses and Use of Antiviral Medications for Chemoprophylaxis](#).

Vaccination

No human vaccines for prevention of HPAI A(H5N1) virus infection are currently available in the United States. Seasonal influenza vaccines do not provide any protection against human infection with HPAI A(H5N1) viruses.

Attribution Statement

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Appendix: Risk by Exposure Table

Categories of individual risk for influenza A(H5N1) virus infection by setting and exposure, including exposure to infected dairy cows, contaminated raw cow's milk, and other potentially infected peridomestic animals.

Last updated: June 20, 2024

This table^A provides a framework for epidemiologic assessment of individual risk for influenza A(H5N1) virus infection amidst the ongoing U.S. outbreak of A(H5N1) viruses in dairy cows. CDC considers the current risk to the U.S. public from A(H5N1) viruses to be low; however, persons with exposure to infected animals, or contaminated materials, including raw cow's milk, are at higher risk for A(H5N1) virus infection and should take recommended precautions, including using [recommended personal protective equipment](#). This table is intended for use by public health practitioners to help determine how best to prioritize monitoring and investigation efforts among higher risk persons when resources are limited. In summary, among groups exposed to A(H5N1) viruses, the highest risk for A(H5N1) virus infection is from close, direct, unprotected contact with animals with confirmed or suspected A(H5N1) virus infection or their environments and exposure to contaminated raw cow's milk from infected cows or other products made from contaminated raw cow's milk.

While data are still being gathered on the current outbreak, current risk assessments are based on expert opinion and supported by historical case examples from the literature. The exposures included in the table primarily focus on dairy cows and contaminated raw cow's milk; the table will be updated to include poultry, backyard flocks, and wild bird related exposures. Furthermore, as additional data are gathered from the response, these assessments will be refined, and the risk category associated with some exposures may change.

Setting	Examples of behaviors/activities	Relative risk for A(H5N1) virus infection among groups listed	Human A(H5) case data supporting risk assessments
<p>Working^B on farms with cows infected with A(H5N1) virus or sick cows exposed to those infected with A(H5N1) virus; known close animal contact</p>	<p>Working with cows with known or suspected A(H5N1) virus infection in any capacity without appropriate personal protective equipment (PPE)</p> <ul style="list-style-type: none"> • Milking cows • Getting splashed in face or eyes with raw milk from cows • Feeding or watering cows • Handling carcasses of dead cows <p>Providing veterinary care for cows with known or suspected A(H5N1) virus infection (including veterinarians, veterinarian staff, farm owners or workers, animal health responders)</p> <ul style="list-style-type: none"> • Medicating cows (e.g., instilling electrolyte solution down cow's throat) • Handling, examining, taking specimens for testing (respiratory, blood, etc.) • Vaccinating cows <p>Experiencing a breach in PPE, wearing inadequate PPE, or removing PPE incorrectly while handling or working with cows with known or suspected A(H5N1) virus infection or their environments</p> <p>Working in environments with cows with known or suspected A(H5N1) virus infection</p> <ul style="list-style-type: none"> • Cleaning cow pens (e.g., shoveling or cleaning waste) 	<p>HIGHEST</p>	<p>Examples of direct/close contact with sick/dead animals presumed or documented with A(H5N1) virus infection.</p> <ul style="list-style-type: none"> • TX and MI cases from the current (2024) response fall into this category [1-3] • Direct contact with sick/dead poultry [4] • Preparing sick/dead poultry for consumption; having sick/dead poultry in the household [5] • Visiting a live poultry market [6] <p>NEJM Review: Update on avian influenza A(H5N1) virus infection in humans [7]:</p> <p>Direct avian-to-human A(H5N1) virus transmission is the predominant means of human infection, although the exact mode and sites of influenza A (H5N1) virus acquisition in the respiratory tract are incompletely understood. Handling of sick or dead poultry during the week before the onset of illness is the most common risk factor. Most patients have acquired A(H5N1) virus infection from poultry raised inside or outside their houses. Slaughtering, defeathering, or preparing sick poultry for cooking; playing with or holding diseased or dead poultry; handling fighting cocks or ducks that appear to be well; consuming raw or undercooked poultry or poultry products, and visiting a live poultry market have all been implicated as potential risk factors. The defeathering of dead wild swans was implicated in one human case cluster.</p>

Setting	Examples of behaviors/activities	Relative risk for A(H5N1) virus infection among groups listed	Human A(H5) case data supporting risk assessments
	<p>including urine/feces, using high pressure sprayer to clean pens, cleaning or replacing cow bedding)</p> <ul style="list-style-type: none"> • Contact with contaminated fomites, feed or water • Performing activities in milking parlors (e.g., cleaning milking parlor or milk tanks, conducting bulk tank testing, collecting milk samples, dumping milk, pumping milk into bulk tanks) <p>Working with calves (feeding non-heat-treated colostrum, bottle feeding raw milk, watering or medicating calves, cleaning calf pens)</p> <p>Working in maternity pens (calving, providing post-partum care, handling aborted fetuses)</p> <p>Handling other sick or dead animals (e.g., cats, wild birds, poultry) on premises with confirmed A(H5N1) virus in dairy cattle without appropriate PPE</p> <ul style="list-style-type: none"> • Providing veterinary care • Feeding or watering animals • Handling carcasses <p>Non-workers living on dairy farm premises</p>		
<p>Drinking, consuming or exposure to potentially contaminated raw cow's milk from cows infected with A(H5N1) virus or other products made from contaminated raw cow's milk</p>	<p>In settings where raw milk is obtained from cows infected with A(H5N1) virus or sick cows exposed to those infected with A(H5N1) virus</p> <ul style="list-style-type: none"> • Drinking raw milk obtained directly from bulk tanks on farms • Drinking raw milk purchased at stores, restaurants, farmers markets 	<p>Currently, level of risk to humans is unknown but high level of concern based on available animal data</p>	<p>Researchers orally inoculated mice with A(H5N1) positive milk and found that animals showed signs of illness starting on Day 1. High virus titers were detected in respiratory organs, with medium titers in other organs suggesting systemic infection. Heat inactivation reduced H5 virus titers [8].</p> <p>On dairy farms in Texas, deaths occurred in domestic cats fed raw colostrum and milk from cows infected with A(H5N1) virus. Clinical signs in sick cats included depressed mental status, ataxia, blindness and ocular and nasal discharge [9].</p>

Setting	Examples of behaviors/activities	Relative risk for A(H5N1) virus infection among groups listed	Human A(H5) case data supporting risk assessments
	<ul style="list-style-type: none"> • Eating or drinking other products made from contaminated raw cow's milk purchased at farms, stores, restaurants, farmers markets <p>Handling raw milk without appropriate PPE or biosecurity measures</p> <ul style="list-style-type: none"> • Milking cows • Getting splashed in face or eyes with raw milk • Feeding calves non-heat-treated colostrum or raw milk • Performing activities in milking parlors (e.g., cleaning milking parlor or milk tanks, conducting bulk tank testing, collecting milk samples, dumping milk, pumping milk into bulk tanks) • Working in milk or food testing laboratories • Hauling or transporting milk 		

Setting	Examples of behaviors/activities	Relative risk for A(H5N1) virus infection among groups listed	Human A(H5) case data supporting risk assessments
Slaughter house exposures to cows infected with A(H5N1) virus or sick cows exposed to those infected with A(H5N1) virus; known close animal contact	<p>Working in slaughter houses directly with cows with known or suspected A(H5N1) virus infection without appropriate PPE</p> <ul style="list-style-type: none"> • Unloading or handling live lactating dairy cows for slaughter • Working in holding pens • Performing antemortem inspections • Performing post-mortem inspections • Handling and transporting viscera • Removing and transporting udders for further processing or rendering 	HIGHEST	
Household members of a person with confirmed, probable, or suspected A(H5N1) virus infection; known close human contact	Prolonged unprotected contact with a household member with known or suspected A(H5N1) virus infection	HIGH to MEDIUM	<ul style="list-style-type: none"> • Unprotected prolonged bedside care in a hospital with exposure to respiratory secretions (kissing, wiping secretions) from a symptomatic family member in Thailand [10] • Unprotected, prolonged, close exposure including bedside care to a symptomatic blood-related family member in China and North Sumatra [11, 12] • Unprotected, prolonged, close exposure in households to a symptomatic blood-related family member in Pakistan and North Sumatra. [12, 13] • Generally, spread of avian influenza from one infected person to a close contact has occurred only rarely
Working* on a farm with cows infected with A(H5N1) virus or sick cows exposed to those infected with A(H5N1) virus; no close animal contact	<p>Working on a farm with cows with known or suspected A(H5N1) virus infection but with no known direct contact</p> <ul style="list-style-type: none"> • Possible contact with cows of unknown infection status, asymptomatic or pre-symptomatic infection 	HIGH to MEDIUM	Few A(H5N1) cases globally fall into a category of “no known poultry exposure” following investigation of exposures and epidemiologic links.

Setting	Examples of behaviors/activities	Relative risk for A(H5N1) virus infection among groups listed	Human A(H5) case data supporting risk assessments
	<ul style="list-style-type: none"> • Possible contact with contaminated environment • Possible contact with contaminated fomites • Possible contact with contaminated waste (feces, urine) • Possible contact with contaminated feed or water 		
<p>Non-farm <u>occupational</u> exposures to <u>potentially infected</u> cows or contaminated animal products (including raw milk); exposure unclear</p>	<p>These types of exposures could occur when a worker comes into contact with a cow (or raw milk) that is not known to be infected with A(H5N1) virus infection, but comes from a farm known to have other cows or animals with A(H5N1) virus infection (or other contaminated raw milk)</p> <ul style="list-style-type: none"> • Transport-hauling milk • Working in milk processing or pasteurization plants • Working in milk or food testing laboratories • Transport-hauling cattle • Working with animals in veterinary clinics • Slaughter houses • Unloading or handling live lactating dairy cows for slaughter • Working in holding pens • Performing antemortem inspections • Performing post-mortem inspections • Handling and transporting viscera • Removing and transporting udders for further processing 	MEDIUM	

Setting	Examples of behaviors/activities	Relative risk for A(H5N1) virus infection among groups listed	Human A(H5) case data supporting risk assessments
	or rendering		
Non-farm <u>recreational</u> exposures to <u>potentially infected</u> cows or contaminated animal products (including raw milk); known close animal contact	<ul style="list-style-type: none"> • Fairs • Live animal markets • Livestock shows/auctions • Petting Zoos • Backyard flock owners • Agritourism (activities carried out on a farm or ranch that allow members of the general public to visit for recreational, entertainment, or educational purposes, including farming, milking cows, ranching, and harvesting, among other activities. 	MEDIUM to LOW	H5 in live bird markets [14] Variant influenza A virus infections (non-avian) acquired after exposure to pigs at fairs in the United States [15]
Time-limited visit to farm with cows infected with A(H5N1) virus or sick cows exposed to those infected with A(H5N1) virus; no close animal contact	<p>Visitors to farm</p> <ul style="list-style-type: none"> • Delivery staff (feed, other farm-related materials) • Animal health responders • Public health responders • Nutritionists • Feed specialists 	MEDIUM to LOW	
Health care workers exposed to person with confirmed or suspected A(H5N1) virus infection; known close human contact	Risk would depend on extent of exposure to infected case, including amount of time that a healthcare worker is in close proximity to the infected case and types of interactions (e.g., performing aerosol-generating procedures) as well as use of appropriate PPE	MEDIUM to LOW	Serologic evidence of patient-to-health care worker transmission in Hong Kong in 1997 [16] One case of severe illness was reported in a nurse exposed to an infected patient in Vietnam [17]
Working on farms <u>without</u> cows infected with A(H5N1) virus or sick cows exposed to those infected with	Workers or visitors to farm could be at increased risk if cows or other animals appear healthy but have asymptomatic or pre-symptomatic A(H5N1) infection.	LOW	

Setting	Examples of behaviors/activities	Relative risk for A(H5N1) virus infection among groups listed	Human A(H5) case data supporting risk assessments
A(H5N1) virus; no known exposure	<p>Examples of activities that would typically only occur on farms without active outbreaks of A(H5N1) virus infection include:</p> <ul style="list-style-type: none"> Breeding cows or performing artificial insemination procedures Trimming cow hooves 		

^AThese risk assessments are based on historical data and limited data from the current outbreak; information in the table will be updated as additional data become available.

^BTypes of workers may include those who work only one farm as well as those who work or travel between multiple farms: farmers, farm workers, deadstock haulers, milk haulers, other contract haulers, feed deliverers, hoof trimmers, transport vehicles, veterinarians and veterinary staff, nutritionists, feed consultants, animal health responders, public health responders

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