

Avian Diseases Transmissible to Humans¹

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Introduction

Anyone who keeps birds, whether as pets or as production animals, should be aware that certain avian diseases are *zoonotic*, that is, they can be transmitted to humans. People rarely catch avian diseases and should not be discouraged from keeping birds because avian diseases do not pose a serious threat to most people. Bird owners should be aware of zoonotic diseases, however, and should certainly seek medical assistance if they suspect they may have contracted a disease from a bird.

Diseases that infect both animals and humans are called *zoonoses*. The infectious agents can be bacterial, fungal, protozoal, or viral. The seriousness of the disease in humans varies with human hosts' age, overall health, and immune status (immunodeficient or immunosuppressed people experience more severe disease). The severity of the disease in humans is also affected by the virulence of the organism, the infective dose, and the route of infection. The effect of these diseases on the commercial poultry industry in Florida is minimal, but because there are many small flock owners within the state, these owners should be aware of these zoonoses.

Chlamydiosis, salmonellosis, avian influenza, eastern equine encephalitis (EEE), and avian tuberculosis infections may be serious or life-threatening.



Figure 1.
Credits: UF/IFAS

Avian Influenza (Bird Flu)

Avian Influenza (AI) receives a lot of attention in the media because of its virulence in birds. The main strain of concern in humans continues to be Highly Pathogenic Avian Influenza (HPAI) H5N1. More than 700 infections have been reported to the World Health Organization (WHO) since November 2003 (<http://www.cdc.gov/flu/avianflu/h5n1-people.htm>). These infections have occurred in Asia, Africa, the Pacific, Europe, and the Near East. The first reported case of human infection with HPAI H5N1 in the Americas was in 2014 and occurred in a traveler who had recently returned from China. There have been no reported cases that originated in the United States. In cases where evidence is present, humans who have contracted

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avian influenza have been in areas where there is constant close contact between birds and humans or in cases where the humans were exposed to infected bird secretions. It is important to note that poultry that originate from areas of the world where the virus is common are not allowed to enter the United States legally. All commercial poultry that enter Florida from other states are required to have an entry permit and come from influenza-free flocks.

The incubation period for H5N1 in humans is believed to be from 3 to 7 days followed by a rapid onset of viral pneumonia. Other typical flu-like symptoms include fever, sore throat, muscle aches, cough, chest pain, lethargy, vomiting, and diarrhea. The rate of death in humans with this virus is over 40%; however, the disease is extremely rare in humans, and this strain is not present in the United States.

Chlamydiosis

Chlamydomphila psittaci is a bacterial organism that occurs worldwide and affects more than 100 avian species. The disease is also referred to as parrot fever when it occurs in psittacine birds (psittacine refers to parrot-like birds). It is referred to as ornithosis in other birds.

Chlamydiosis is primarily transmitted by the inhalation of contaminated fecal dust and is spread by carrier birds that act as the main reservoir for the disease. The organism is secreted in both the feces and nasal secretions. The carrier state can persist for years. *C. psittaci* can survive drying, which allows it to be transmitted on contaminated clothing and equipment. It can also be transmitted from bird to bird, from feces to bird, and from bird to human. Human-to-human transmission can occur as well, mainly by exposure to infected saliva. Infection in humans is extremely rare and is often misdiagnosed.

Treatment for *C. psittaci* usually consists of tetracycline or macrolides in both humans and birds, although the treatment span may be different. Tetracycline is not recommended for children or pregnant women. In Florida, chlamydiosis is a reportable zoonotic disease for both health and livestock officials. This means that if a case of the disease is confirmed then this information must be reported to the Florida Department of Agriculture and Consumer Services.

Additional information about the disease can be found at: <http://www.cdc.gov/pneumonia/atypical/psittacosis.html>

Salmonellosis

To date, more than 2500 different serotypes of *Salmonella* have been recognized. *Salmonella* bacteria are widespread in the environment and are associated with animals including birds, reptiles, mammals, and amphibians (typically in the gastrointestinal tract). Although *Salmonella* bacteria are very common, actual disease is rare because most strains are not pathogenic. Fewer than 15 serotypes are responsible for the majority of human infections. Common clinical symptoms in all species include diarrhea, vomiting, and a low-grade fever. Other symptoms include dehydration, weakness, septicemia, and headaches. The incubation period for salmonellosis varies between 6 and 72 hours, although most cases have an incubation period of 12 to 36 hours. *Salmonella* bacteria are typically transmitted via the fecal-oral route, usually via improperly cooked food that has been contaminated with feces.

Most cases of salmonellosis are mild and do not require the administration of antibiotics or other drugs. Resting and drinking plenty of water will usually clear the infection within a few days. In cases where a pathogenic strain of *Salmonella* has infected a human and is causing clinical disease, antibiotics can be administered. Some strains of *Salmonella* have developed resistance to some antibiotics.

Additional information on *Salmonella* and serotypes of the organism can be found at <http://www.cdc.gov/salmonella/> and <http://www.cdc.gov/salmonella/reportspubs/salmonella-atlas/serotyping-importance.html>

Colibacillosis

Colibacillosis is caused by an *Escherichia coli* infection. Like *Salmonella*, *E. coli* are found in the intestinal tract and on the skin of animals and are part of the normal bacterial flora. *E. coli* strains vary considerably in their ability to cause disease. Many strains are not pathogenic, but some can cause disease. Eating food that has been contaminated with a virulent strain can result in severe illness. In poultry, most *E. coli* infections are a result of complications and the *E. coli* are considered opportunistic agents. In poultry, *E. coli* may cause septicemia, chronic respiratory disease, synovitis, pericarditis, infectious cellulitis, and salpingitis. Humans with *E. coli* infection usually present with diarrhea and a possible fever. Complications for less common types of *E. coli* infection include dysentery, shock, and purpura (purple rash).

The incubation period is 12 hours to 5 days, although most cases will develop within 12 to 72 hours. Treatment of most cases of *E. coli* involves treating the diarrhea and dehydration that can occur. More severe cases may require the use of antibiotics or other drugs and hospitalization. Antibiotic resistance is a major problem when treating *E. coli* infections.

Additional information about colibacillosis in poultry can be found at: http://www.merckvetmanual.com/mvm/poultry/colibacillosis/overview_of_colibacillosis_in_poultry.html

Encephalitis Viruses

Viruses that cause encephalitis, such as Eastern Equine Encephalitis, St. Louis Encephalitis, or West Nile, are all present in wild bird populations within Florida. These viruses are mosquito-borne, with passerine birds (song birds such as swallows, starlings, jays, and finches) serving as the most common reservoir. They are transmitted to humans and other animals via mosquitos that have previously taken a blood meal from an infected animal. These types of viruses are not transmitted from person to person or from the consumption of chicken meat or eggs.

Many people may be bitten each year by a mosquito that is carrying encephalitis virus, but not everyone who is bitten will become sick. These viruses typically cause clinical disease only in vulnerable people—usually children younger than 15 years of age and adults over 50 years of age. Most epidemics of encephalitis viruses occur between late August and the first frost of the season, but in areas with a year-round mosquito season, cases may occur at any time of the year. Symptoms of encephalitis viruses include high fever, headache, vomiting, lethargy, joint stiffness (especially of the neck), convulsions, tremors, and coma.

The Florida Department of Health and many other mosquito-control districts around the state use adult chickens to monitor for these viruses. These “sentinel chickens” are housed in coops that are very similar to those that would be used by owners of backyard flocks. When bitten by a carrier mosquito, the chickens do not develop the disease, but they will produce antibodies to the virus. By routinely testing for the presence of antibodies, health officials can determine the significance of the virus in an area. The encephalitis viruses are all considered reportable animal diseases to the Florida Department of Agriculture and Consumer Services.

Additional information about encephalitis viruses can be found at: Eastern Equine Encephalitis: <http://www.cdc.gov/EasternEquineEncephalitis/>, St. Louis Encephalitis: <http://www.cdc.gov/sle/>, and West Nile Virus: <http://www.cdc.gov/westnile/>

Avian Tuberculosis

Avian tuberculosis is caused by the bacterium *Mycobacterium avium*. This bacterium is closely related to the bacteria that cause human and bovine tuberculosis. In bird species, *M. avium* causes a chronic debilitating disease with tubercular nodes. In humans, infection with *M. avium* will typically cause local wound infections with swelling of lymph nodes in the region of the infection. Infection with this bacterium is extremely rare and is of most risk in severely immunocompromised individuals.

Infection in humans is caused by ingestion of food or water that has been contaminated with feces from infected birds (called “shedders”). Most *Mycobacterium* infections are treatable with antibiotics, but *Mycobacterium avium*, highly resistant to antibiotics, is the exception. Surgical excision of infected lymph nodes is often necessary to eliminate the infection. Poultry flocks with this disease must be euthanized because no treatment is available. Fortunately, *M. avium* is not found in the commercial poultry industry today, but rare cases are found in small flocks where birds are held for several years.

Additional information about avian tuberculosis in humans can be found at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1830337/>

Newcastle Disease

Newcastle Disease is a serious respiratory disease in poultry that is caused by a paramyxovirus. In poultry, the disease is highly contagious, and the highly pathogenic form, termed velogenic, can kill entire flocks of wild and domesticated birds. The velogenic form is not found in the poultry industry in the United States, but it is common in many other countries. This paramyxovirus can also infect humans, although the disease presentation is very different in humans as compared to poultry. In humans, after initial exposure the paramyxovirus causes a mild and localized infection in the eye called conjunctivitis. The conjunctivitis tends to last from 5 to 10 days and resolves completely without treatment. Typical symptoms include slight discomfort because of the localized swelling, and a “bloodshot” look in the eyes. Conjunctivitis caused by this paramyxovirus is so mild that people infected with it may

not even realize that they have the condition. Topical eye drops and ointments are available to reduce any discomfort and inflammation.

People are most at risk of contracting this disease when

- administering live-virus vaccines to birds,
- performing post-mortem examinations on actively infected birds, and
- working in a lab to isolate and concentrate the virus for study.

Additional information about Newcastle Disease can be found at: <http://www.inspection.gc.ca/animals/terrestrial-animals/diseases/reportable/nd/fact-sheet/eng/1330202454619/1330202602677>

Cryptosporidiosis

Cryptosporidiosis is caused by a protozoan of the genus *Cryptosporidium*. In poultry such as chickens and turkeys, the disease may cause respiratory illness, but it can also result in gastroenteritis and diarrhea. Cryptosporidiosis in humans is associated with abdominal pain, nausea, and watery diarrhea that will typically persist for 3 to 4 days. In immunocompromised individuals, the disease can cause persistent, severe diarrhea with associated malabsorption of nutrients and weight loss.

The disease is spread by the ingestion of protozoal oocysts, typically by the fecal-oral route. There is an incubation period that lasts from 3 to 7 days. This protozoan is related to other protozoal species that cause coccidiosis; however, anticoccidial drugs are not effective against *Cryptosporidium*.

Additional information about *Cryptosporidium* can be found at: <https://www.merckvetmanual.com/poultry/cryptosporidiosis/cryptosporidiosis-in-poultry>

Conclusion

People who keep poultry or other birds should be aware that some avian diseases can be passed to humans. Although it does not happen often and the probability of catching an avian disease is low, people who keep birds and especially people who have underdeveloped immune systems or whose immune systems are weakened by illness or age should take common-sense precautions when handling or managing birds. The following practices will

help to reduce the probability of contracting disease from birds:

- Practice biosecurity for your flock.
 - Additional information on biosecurity can be found at: <http://healthybirds.aphis.usda.gov/>
- If you suspect that one of your birds is ill, make sure to get it checked by a veterinarian.
- Avoid contact with the feces or fluids of birds unless you are wearing the proper protective gear.
- Wash your hands thoroughly with soap and water after handling any bird.
 - If soap and water are not available, use hand sanitizer or alcohol-based wipes.
 - Do not allow children to nuzzle or kiss poultry—including baby chicks.