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Avian Salmonellosis

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What is Avian Salmonellosis?

Avian salmonellosis (sal-moh-neh-loh-sis) refers to the infection of birds with a bacterium called *Salmonella typhimurium*, which is a specific type of *Salmonella* of which there are more than 2,500 types. These bacteria are typically found in the intestines of a variety of vertebrates. The bacteria are transmitted to birds either from direct contact with other infected birds, through exposure to contaminated surfaces (e.g. bird feeder platforms contaminated with feces; Figure 1) or ingestion of contaminated food or water. In wild birds, outbreaks can kill many birds, especially during winter. When a free-ranging bird is infected with *Salmonella*, it can either become a carrier, appearing healthy but spreading the pathogen in the environment, or it can become sick and die. Sick birds appear lethargic, fluffed, and emaciated (Figure 2). They may or may not have diarrhea and are often unaware of human presence and can be picked up by people or predated by cats with ease.

Figure 1. Platform-type bird feeders are easily contaminated by sick birds. Credit: Photo by Nancy Jackson 2009.

When, where and what types of birds become sick or die from Salmonellosis?

The distribution of avian salmonellosis is worldwide. Many birds become infected, do not develop symptoms and eventually clear the infection. Young or elderly birds and individuals with weakened

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immune systems are particularly susceptible and may die from the infection. Even adult, otherwise healthy birds can become infected and once they develop symptoms do not typically recover. Outbreaks with high mortalities are typically documented in songbirds which congregate in large numbers at agricultural fields [e.g. Brown-headed Cowbird (*Molothrus ater*)] or backyard feeders [e.g. Pine Siskins (*Carduelis pinus*), and American Goldfinch (*Carduelis tristis*)]. The other type of bird typically affected by this bacterium are juveniles of colony-nesting birds, such as Cattle Egret (*Bubulcus ibis*) or birds foraging in highly contaminated sites (e.g. gulls feeding at waste dumps).

Figure 2. A White-throated Sparrow and a Northern Cardinal infected with *Salmonella* appear lethargic, fluffed and indifferent to human presence. Credit: Photo by Nancy Jackson 2009.

I think there are sick birds in my backyard—what do I do?

There are many types of diseases that can make birds sick and result in symptoms similar to avian salmonellosis. To confirm whether a bird has died from a *Salmonella* infection, a full necropsy and tissue cultures are required. However, the location of the bird, the species and appearance can provide important clues. By law, only veterinarians or wildlife rehabilitators with appropriate state and federal licenses are able to provide treatment for sick birds.

If you are in Georgia, and you find a bird that you suspect is infected with *Salmonella*, you can call the Southeastern Cooperative Wildlife Disease Study [(706) 542 1741; http://www.scwds.org] or your local Department of Natural Resources office [in GA (404) 656 3500; http://www.gadnr.org/]. Otherwise, please notify your agricultural extension agent or U.S. Department of Agriculture Veterinary Services office [http://www.aphis.usda.gov/animal_health/]. Dead or sick birds may be tested at no charge to you. Reporting cases and collecting as much detail as possible is important to ensure the health of wild birds. Reporting new cases helps wildlife professionals understand the dynamics of this disease which could lead to an improvement of its management and prevention of future outbreaks.

What does salmonella look like?

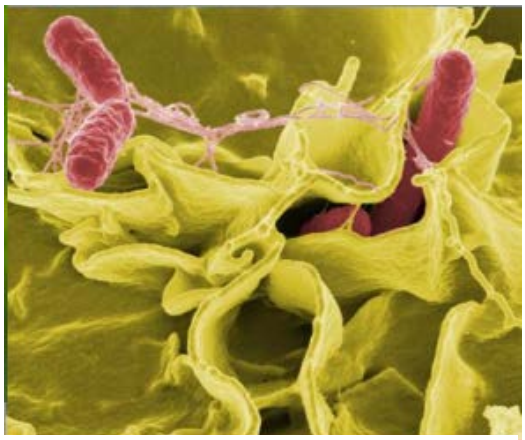

Figure 3. Colored microphotograph of *Salmonella* bacteria. Credit: Rocky Mountain Laboratories, NIAID, NIH.

Salmonella are long, rod-shaped microorganisms that cannot be seen by the naked eye (Figure 3). The bacterium can be visualized by scanning a contaminated sample (meat, feces, milk) under the microscope or by growing it (culture) in a laboratory.

How long can *Salmonella* live in the environment? How do I get rid of it?

No one knows exactly where birds acquire this bacterium; however, contact with sewage, manure and other contaminated environments increases the probability of infection. Once infected, birds can excrete bacteria in their feces for weeks or months. *Salmonella* thrives in wet environments in shady areas, and can survive for several months (up to nine months, with the right conditions) in soil and waste feed around bird feeders or in a breeding colony. Certain types of bird feeders can help to transmit this type of bacteria. Those that allow the contamination of feed with feces (e.g. platform feeders) are particularly harmful.

When several birds appear sick or dead in the same area, even if there is not a laboratory confirmation of salmonellosis, it is recommended to remove bird feeders for 2-4 weeks to discourage birds from concentrating in areas where transmission of *Salmonella* can be facilitated. It also is important during that time to properly dispose of waste seed and bird droppings below feeders or water baths because they can be contaminated. Regular cleaning (once or twice per month) of bird feeders or bird baths with warm, soapy water will prevent contamination (Figure 4). Make sure to first remove organic debris, followed by disinfection with a solution of nine parts water to one part bleach. Other commercially available disinfectants such as iodines, quaternary ammoniums, or phenols are also effective but are more difficult to obtain. Feeders should be rinsed and allowed to dry thoroughly prior to replacing them outdoors. Bird feeders made of plastic and metal are more easily cleaned and disinfected than those made of wood. In addition, discard hulls and old seeds when refilling feeders. Because rodents and flies can play a role in transmitting *Salmonella*, bird food should be secured in containers that are not accessible to these pests.

Figure 4. Washing bird feeders before refilling them can reduce the transmission of bacteria among birds. Credit: Photo by Viviana Gonzalez, 2012

Can people become infected with *Salmonella* from wild birds?

Yes. Worldwide, *Salmonella* is the leading cause of diarrheal disease in people. According to the Centers for Disease Control and Prevention (CDC), in the USA alone, it causes 30,000 laboratory confirmed human cases per year. Many other cases probably go undiagnosed. Most human cases of salmonellosis occur through ingestion of contaminated food (e.g. meat or eggs that have not been proroperly cooked). The second most important way people are reported to become sick with *Salmonella* is through handling and accidentally ingesting the bacteria shed by pet reptiles. This has become an issue of major concern, particularly for small children, for which infection with *Salmonella* can be extremely serious [see http://www.cdc.gov/salmonella/]. A less likely method of infection occurs when people handle sick or dead birds or contaminated feeders. Routine hygiene measures (e.g. hand washing with soap and water) can prevent infection. It is advised to wear gloves when handling sick or dead birds and when cleaning feeders or baths. In some cases, people have become infected by handling domestic animals (e.g. cats) that ingested sick or dead birds that were infected with *Salmonella.*

What are the symptoms of salmonellosis in humans?

Onset of symptoms typically start 12-36 hrs after infection, and are consistent with gastroenteritis, but can include headache, diarrhea, fever, nausea, abdominal pain, and dehydration, all of which can lead to severe disease. If you suspect you are infected with *Salmonella*, you should seek medical attention. If you have handled a sick or dead bird and become sick, provide these details to your doctor.

Do other diseases cause similar symptoms in people?

Yes. There are other parasitic, viral and bacterial diseases that can cause similar symptoms to salmonellosis [see http://www.cdc.gov/outbreaknet/].

How is salmonellosis diagnosed in humans?

Your doctor might be able to diagnose salmonellosis simply from your symptoms and history (which is why it is important to mention if you have been exposed to sick birds). However, because many other pathogens can cause similar symptoms, to definitively confirm *Salmonella*, a stool sample is typically collected for culture.

How is salmonellosis in humans treated?

People are typically treated with supportive care, including measures to prevent dehydration or decrease nausea and diarrhea, but antibiotics may be recommended, especially if the infection becomes blood-borne. Fluoroquinolones (i.e. ciprofloxacin, levofloxacin, norfloxacin) are the most widely used group of antibiotics for the treatment of salmonellosis in adults, because they are relatively well tolerated, inexpensive, have a good absorption if taken orally and are generally more effective than earlier drugs. In children with severe *Salmonella* infection, other groups of antibiotics are preferred, such as third-generation cephalosporins (injected). However, the drugs widely used in adults are not recommended for infants.

How can I prevent salmonella infection from backyard birds?

The best way to prevent an infection is good personal hygiene (e.g. wearing gloves when handling sick or dead birds, thoroughly washing hands after handling animals or refilling and cleaning feeders, avoiding smoking, eating or touching the face when handling wild birds or feeders). Regularly cleaning (once/month) plastic or metallic bird feeders with commercially available disinfectants will decrease contamination.

Can my pets become infected with *Salmonella*?

Yes. Dogs and cats can certainly become infected after coming into contact with contaminated food, manure, sewage, sick or dead birds, or other infected vertebrates (e.g. reptiles). They may not display symptoms but can shed the bacteria in their feces for weeks. On the other hand, they can develop diarrhea, vomiting and other symptoms similar to people. A veterinarian can diagnose salmonellosis in your pet by collecting a stool sample for culture.

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Further reading

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