



Avian Influenza: what ornithologists and bird banders should know

Introduction

Every day, the news is saturated with stories about avian influenza. The alarmism belies the fact that the impact to human health has been slight. In Asia, where the H5N1 (genotype Z) highly pathogenic form of the virus has been present since 1996 and where outbreaks have been occurring since 1997,¹ and where thousands of people come into contact with live poultry every day, only 125 human cases have been reported to the World Health Organization as of November 2005.² Although 62 of these cases resulted in deaths, the virus in its current state does *not* transmit easily to humans. All but one of these human cases – which have occurred primarily in healthy adults and children - are attributed to direct handling of infected poultry, consumption of undercooked poultry products, or contact with virus-contaminated surfaces/materials used in handling poultry.³

The HPAI H5N1 virus in its present form does not transmit efficiently between humans. Public health concerns about HPAI H5N1 rest on its documented propensity to acquire genes from viruses infecting other animal species and the possibility that humans infected with this flu and another virus could act as a ‘mixing vessel’,⁴ but no agreement exists as to the likelihood of this scenario.

Because ornithologists and bird banders handle live birds, prepare specimens, and handle blood and other tissues of avian origin, they need to understand the means of transmission and know effective means to protect themselves and the birds they study.

As this is a rapidly changing situation, this fact sheet will be updated as new relevant information becomes available. Ornithologists, banders, rehabilitators and others who study and handle wild birds should check periodically for updates. A list of general, authoritative sources on the status of H5N1 avian influenza can be found at

<<http://www.nmnh.si.edu/BIRDNET/OC/avianinfluenza.html>>.

¹ WHO http://www.who.int/csr/disease/avian_influenza/Timeline_28_10a.pdf

² WHO http://www.who.int/csr/disease/avian_influenza/country/cases_table_2005_11_09/en/index.html

³ WHO http://www.who.int/csr/disease/avian_influenza/avian_faqs/en/index.html#isthere

⁴ http://www.who.int/csr/disease/avian_influenza/avian_faqs/en/index.html#whatis

The basics

Various avian influenza viruses are found in wild birds in virtually every country,⁵ including the United States. The subtypes are named for the 16 hemagglutinin (H) and 9 neuraminidase (N) proteins on the viral surface. The avian influenza virus that is cause for concern is designated as Highly Pathogenic Avian Influenza (HPAI) subtype H5N1 genotype Z. Other avian influenza viruses are designated “LPAI” for low pathogenicity. The degree of pathenogenicity is established with testing methods developed by the World Health Organization and the International Office of Epizootics <<http://www.oie.int>>. Note that the pathogenicity designation pertains only to the behavior of the virus in domestic poultry. Many avian Influenza A viruses normally circulate as gastrointestinal infections in wild birds, causing little or no illness or mortality.⁶ The HPAI strain of H5N1 has caused mortality in over 40 species of wild birds,⁷ which is why ornithologists and bird banders should take precautions when handling birds and bird specimens. Most bird species appear to be susceptible to infection, but the principal means of transmission is through viral shed in feces, making waterbirds, especially ducks and geese, the most-commonly infected group of wild birds.

Current studies are underway by several international organizations to determine:

- To assess whether there are healthy carriers of the HPAI H5N1 strain
- If yes, to assess the role of healthy carriers in the spread of the disease
- To assess which main wildlife bird species could get clinically or sub-clinically infected and might be involved in the spread of the disease.
- To gather information on the routes and periods of migration of the relevant (infected) wild birds.

It is hoped that results of these studies could serve as the basis for a warning system for countries at risk of receiving the relevant (infected) wild birds.⁸

Where the highly pathogenic form of H5N1 avian influenza is found

In 2003, 2004, and 2005 outbreaks occurred primarily in poultry flocks (Cambodia, China, Indonesia, Japan, Laos, Malaysia, South Korea, Thailand, and Vietnam, Russia, Kazakhstan, Romania, Croatia, and Turkey) and in some wild birds. In 2005, the virus was confirmed to be present in wild waterfowl in Mongolia and Croatia.

The official disease status for each country can be found on the websites of the Organization of International Epizootics <http://www.oie.int/eng/info/en_urgences.htm> or the website of the USDA Animal Plant and Health Inspection Service, Veterinary Services, National Center for Import and Export <<http://www.aphis.usda.gov/vs/ncie/country.html>>.

⁵ WHO http://www.who.int/csr/disease/avian_influenza/avian_faqs/en/index.html#whatis

⁶ Webster et al. (1992) Evolution and ecology of influenza A viruses, *Microbiological Review*, 56:152-179

⁷ http://www.nwhc.usgs.gov/research/avian_influenza/HPAI082005.pdf

⁸ OIE; http://www.oie.int/eng/press/en_051004.htm

Impacts on ornithologists in the field

Infected birds shed flu virus in their saliva, nasal secretions, but mostly in their feces; note that birds shedding the virus may not show signs of illness. To date, little is known about the transmission of HPAI H5N1 in wild avian species, though migratory waterfowl have tested positive in five countries (China, Mongolia, Romania, Croatia, and Russia). Although there are no known cases of transmission from wild birds to humans, precautions should be taken when handling any wild bird in countries or regions or on migratory pathways where HPAI H5N1 is present. Most of these precautions actually should be standard operating procedures for ornithologists and banders, given (a) that wild birds might carry other diseases to which humans are susceptible (e.g., ornithosis) and (b) wild birds may carry diseases that do not transfer to humans but that can be transferred to any bird handled if precautions are not taken.

Precautions to take to protect yourself:

- Avoid unprotected contact with feces, secretions, blood, and fluids. If you cannot do so, decontaminate and clean yourself immediately after exposure, using a detergent-based cleanser.
- Wear gloves; change or decontaminate gloves with 70% ethanol or other appropriate substance after handling each bird to avoid transmission from one bird to another.
- Wear clothing (including shoe covers or rubber boots) that can be disposed of or disinfected.
- Learn to remove gloves and protective clothing in a manner that avoids skin contact; consult your safety officer or safety manual. Typical instructions say to remove the first glove by grasping the cuff – being careful to avoid touching the bare skin of the wrist or arm - and peeling the glove off the hand so that the glove is inside out. Repeat this process with the second hand, touching the inside of the glove cuff, rather than the outside. Wash hands immediately with soap and water
- Wear eye protection when handling birds.
- Use a respirator or mask to avoid inhalation of aerosolized droplets; otherwise, work upwind of birds to avoid inhaling aerosolized fecal material, feathers, and dander.
- Avoid eating or drinking while handling birds or bird parts; after handling birds, use detergent-based cleansers to wash hands, equipment, and clothing.
- Alcohol or alcohol-based cleansers or diluted household bleach (10% strength) will also kill the virus.
- Consider having antiviral medications on hand. The H5N1 virus has been found to be resistant to amantadine and rimantadine but sensitive to oseltamivir (Tamiflu) and zanamivir (Relenza). The Centers for Disease Control recommends that, “Individuals who develop a febrile respiratory illness within a week after their last exposure to avian-infected or exposed birds or potentially contaminated surfaces should consult a health-care provider. Before visiting a health-care setting, tell the provider about symptoms and recent possible exposures to avian influenza.” If you expect to be in a situation where you may not be able to see a

physician promptly, consult with a physician before going to the field. Ask the physician for appropriate medications and instructions for taking those medications.⁹

- Any influenza strain can become resistant to one or more drugs; genetically distinct H5N1 subtypes have already been found in Asia and some antivirals may be more effective for some subtypes than for others. Be sure to check current health information from a credible source, such as the Centers for Disease Control for both country disease status and antiviral recommendations and seek a prescription for the appropriate medication from your physician.
- Consider vaccines, if they are available. The National Institutes of Health began testing a vaccine in clinical trials in April 2005. The current CDC recommendations to travelers to and residents of HPAI H5N1 countries do not include vaccination, but recommend avoiding contact with domestic and wild birds. As ornithologists and banders will of course handle wild birds, a consultation with your physician or infectious disease specialist about the use of an appropriate vaccine is recommended.

The university or research institution may attempt to restrict field research. Be prepared to know the disease status of the countries where you intend to work and be prepared to explain to the risk management office (or, in the United States, the Institutional Animal Care and Use Committee, which, in many universities, performs risk management functions) the precautions you plan to take. It is the researcher's responsibility to know the recommended precautions and to make arrangements to obtain and use the appropriate materials, such as disinfectants, gloves, and eye protection.

Ornithologists should know that the USDA restricts imports of birds and bird products (defined by the USDA as "anything that was once a bird or a part of a bird") from countries where the HPAI H5N1 subtype of avian influenza is known to exist. Permits for such imports are conditioned upon the importer promising, in the permit application, to treat the specimens and tissues with a USDA-approved method and importers must supply a certification, upon arrival in the United States, that the imported materials have, in fact, been treated in accordance with the methods delineated in the permit. The Ornithological Council has published detailed guides to the import of birds and bird products <<http://www.nmnh.si.edu/BIRDNET/PERMITS.html>>. If your institution has a permit that does not include imports from the countries where HPAI H5N1 is found, and your staff plan to import materials from these countries, apply for a permit amendment and be prepared to treat the materials prior to import and provide a certification that the materials have been treated.

In the laboratory

Ornithologists preparing specimens or working with blood or tissue from fresh birds should be aware that the virus will remain viable in dead birds for several days, particularly in cool or wet climates. Viruses are not killed by freezing; those working with thawed tissue from birds originating in countries or regions where HPAI H5N1 occurs should take appropriate precautions.

⁹ <http://www.cdc.gov/flu/avian/professional/possible-exposure.htm>

The USDA-approved treatment methods will inactivate the virus. If you have imported birds from HPAI H5N1 countries, you will have been required to use one of these methods, and will have inactivated the virus. Nonetheless, it is required by the USDA and recommended by the World Health Organization that work be conducted in a laboratory that meets Biosafety Level 2 (BSL2) conditions. The Biosafety in Microbiological and Biomedical Laboratories Manual (BMBL) can be found at <<http://bml.od.nih.gov/>> or <<http://www.cdc.gov/od/ohs/biosfty/bml4/bml4toc.htm>>. Note that a new edition is to be published in late 2005; also note that the Centers for Disease Control and the National Institutes of Health have published interim guidelines pertaining to avian influenza: <http://www4.od.nih.gov/oba/rac/SSSept04/pdf/bml-flu_update.pdf>.

A university or research institution's risk management office may attempt to impose a restriction on work involving materials imported from countries where HPAI H5N1 occurs because the 4th edition of the BMBL states that BSL3 is appropriate when "work is done with indigenous or exotic agents with a potential for respiratory transmission, and which may cause serious and potentially lethal infection." Should this occur, the researcher can explain to the university that the import permit required pre-import inactivation of the virus, using a USDA-approved method, so the materials do not contain such agents. Alternatively, the Biosafety Manual includes a protocol for "BSL3 conditions in a BSL2 laboratory" <<http://www.cdc.gov/od/ohs/biosfty/bml4/bml4s3.htm>>.

However, if H5N1 is present in the country where you work, you should consider using one of the USDA-approved methods to inactivate the virus. If you have not done so, then BSL3 conditions are probably appropriate.

Precautions against transmission to birds and other wildlife

- Ornithologists and bird banders should not re-use contaminated bags, boxes or other holding/carrying devices and other devices used to restrain birds during processing. The North American Banding Council manual states, "Launder bird bags frequently, as they must be kept clean," and "If a diseased bird is caught, it is extremely important to put that bag aside until it has been washed and disinfected." However, as it is not possible to determine if a bird is shedding virus, the better practice would be to carry an ample supply of bags or other holding/carrying devices so that no bag or other holding device is used more than once before laundering. The virus can survive, at cool temperatures, in contaminated manure for at least three months. Wash bags with detergent and/or household bleach before reuse.
- When preparing specimens in the field, place waste material in a biosafety bag, seal it, and burn it, or carry it out with you and burn it later.
- Never re-use needles, scalpel blades, calipers, rulers, banding pliers or other equipment that touches any part of a bird unless the equipment decontaminated with a fresh 10% bleach solution after use on each individual.

What ornithologists and banders can do

Ornithologists, banders, and bird observatories can greatly extend biosurveillance capacity, and are invited to work through the Ornithological Council, North American Banding Council, and other professional organizations to coordinate these efforts among themselves and with the federal and state agencies. US scientists and veterinarians who work w/ birds in outdoor aviaries (including rehabilitation facilities, zoos and other educational facilities) should be involved in the monitoring process and take extra precautions when handling their subjects. It is important to develop and adhere to standard protocols, including data standards, to direct effort where it is needed, and to share the most current information about testing protocols, health precautions, and other aspects of this work.

Canada has a surveillance program in place and banders have been involved in collecting over 4800 cloacal swabs from waterfowl from across Canada and there are plans to expand the program. The research is being directed through the Canadian Cooperative Wildlife Health Centre (CCWHC) <<http://wildlife1.usask.ca/ccwhc2003/>> and CWS. The Canadian Banding Office <http://www.cws-scf.ec.gc.ca/nwrc-cnrf/migb/bbo_e.cfm> is coordinating bander involvement. All banders, ornithologists and the general public can contribute to Avian influenza surveillance in Canada by contacting regional CCWHC, CWS or provincial/territorial wildlife offices upon detection of large numbers of sick or dead birds.

In addition, ornithologists and banders can and should develop relationships with their state or provincial health and agriculture departments. Should HPAI H5N1 or other emerging infectious wildlife diseases carried by birds arrive in your country, state, or province, you will be prepared to help persuade your state officials to continue monitoring wildlife after occurrence is confirmed, can help to share accurate scientific information about wild birds with these agencies and with the public, and can help address calls from the public or from government officials to cull wild birds. Every international and national agriculture and public health organization, including the World Health Organization and the United Nations Food and Agriculture Organization, have concluded that culling of wild birds or destruction of their habitat – such as the draining of wetlands – is neither practical nor feasible, from logistical, environmental, public health, and biodiversity points of view. In fact, the FAO points out that the attempt to cull or the destruction of habitat could result in the dispersion of birds and if those birds were infected, dispersion would result in spread of the virus to a wider area.¹⁰

Ornithologists can also serve as experts to provide information to the general public and the media, but should be careful to avoid speculating about how or how quickly the disease might spread; if, when, and how it might arrive in the Western hemisphere' or about any other matter about which information is lacking or incomplete. Speculation can lead to calls for inappropriate measures.

Ornithologists and banders can also support their professional organizations, which are also working or will soon work with federal and state and provincial wildlife, health, and agricultural agencies and the professional organizations of the poultry industry to assure that appropriate

¹⁰ <http://www.fao.org/ag/againfo/subjects/documents/ai/HPAIGlobalStrategy31Oct05.pdf>, appendix 10

measures are taken to persuade federal and state legislatures to provide adequate funding for monitoring and research pertaining to wild bird populations. These professional organizations are also beginning to formulate plans to develop a media strategy, a public outreach plan, and to educate lawmakers about HPAI H5N1 and the role of and impact on wild birds.

This publication was reviewed by scientific experts under the auspices of the Ornithological Council. You may contact the Council for further information.

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The Ornithological Council (OC) was founded in 1992 as a non-profit organization by the American Ornithologists' Union, Association of Field Ornithologists, Cooper Ornithological Society, Pacific Seabird Group, Raptor Research Foundation, Waterbird Society, and Wilson Ornithological Society. The Society for the Conservation and Study of Caribbean Birds, Sección Mexicana del Consejo Internacional para la Preservación de las Aves (CIPAMEX), and the Society of Canadian Ornithologists/Société des Ornithologistes du Canada have joined the OC in recent years.

The Ornithological Council represents scientific ornithology on a wide variety of public issues concerning the science of ornithology, birds, and bird habitat. The Council gives ornithologists a means to provide timely and relevant information from ornithological science to legislators, managers, conservation organizations, and private industry. The Council also keeps ornithologists informed about policy issues affecting birds.

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