

## AVIAN INFLUENZA

### Guidelines for Prevention and Control in CAZA Zoos April 2006

(Note: These guidelines are based on a document that has been developed for AZA by the Animal Health Committee of the American Association of Zoo Veterinarians, and with CFIA consultation)

#### Introduction

Avian influenza is an infectious disease of birds caused by type A strains of influenza virus. Migratory waterfowl and shorebirds are the natural reservoir for avian influenza viruses. The virus is shed in feces, saliva, and nasal discharges. The infection causes a wide variety of signs in domestic birds that include nasal discharge, incoordination, and diarrhea. Many low pathogenic strains of avian influenza (LPAI) exist in domestic poultry and free-ranging waterfowl; these are not of conservation or regulatory concern. Highly pathogenic strains (**HPAI**), on the other hand, are a major concern. Signs of HPAI in poultry include sudden onset of severe illness and rapid death; epornitics may occur with high mortality. In 2005, a strain identified as HPAI-H5N1 made an unprecedented spread through much of Asia and parts of Europe in poultry and wild birds, and has caused the death of more than 100 humans in Asia.

The HPAI-H5N1 virus is likely to spread to other parts of the world through infected imported poultry, pet birds, or migratory birds. In an outbreak of infection, the HPAI virus can be spread by wild birds, by objects contaminated with wild bird droppings (e.g., perching branches and other exhibit furnishings), by contaminated raw poultry meat, and by people who have come in contact with the avian flu virus (e.g., farm workers, casual farm visitors, others having access to poultry premises). Zoo managers are well advised to develop preventive measures in advance of such an occurrence, in case there is a need to implement them. Planning and dialogue with local, regional, and federal human and animal health regulatory agencies are key parts of preparedness.

The OIE, the World Organization for Animal Health, has defined HPAI and the low pathogenic H5 and H7 subtypes as Notifiable Avian Influenza (**NAI**), and trade is contingent on countries controlling NAI.

In the event of the detection of an outbreak of highly pathogenic avian flu or a low pathogenic H5 or H7 subtype in Canada, the Canadian Food Inspection Agency (CFIA) will evaluate the situation and designate a **quarantine zone** of at least 3km in radius around the infected premises. Depending on the course of the disease, a **surveillance zone** will be designated of at least 10km radius around the infected premises. Other poultry and bird facilities within the two zones would be considered to be at high risk for becoming infected with NAI. A buffer zone or **control area** around the surveillance zone would provide a wall around the infection that is easily recognizable and will ensure that the agent does not escape from the described area. Administrative or geographic boundaries would be used to designate the control area.

Poultry concentration points, including zoos, game farms, and aviaries, within the quarantine and surveillance zones would be closed, by order of CFIA. If NAI is confirmed in a zoo, game farm, or aviary, consideration of endangered species within that facility will be made between facility representatives and CFIA. Within the control area, special consideration can be given to premises based on existing biosecurity measures that may effectively provide isolation of the facility's bird collection.

The following guidelines are divided into three levels based on relative proximity of an institution to an outbreak of avian flu:

1. Routine Biosecurity – Preventive measures that should be incorporated into the day-to-day operation of zoological institutions that keep birds.
2. Enhanced Biosecurity Measures – Increased biosecurity is required if the institution is near an avian flu outbreak (e.g., within the established Control Area), and the suggested measures should be implemented in addition to the routine biosecurity level.
3. Outbreak Control Measures – Response to be initiated upon knowledge of suspicious or confirmed NAI cases in or near an institution.

## **1. Preventive Measures – Routine Biosecurity and Surveillance for Normal Operations**

The guidelines presented here are suggestions to help zoo managers develop day-to-day preventive measures that are appropriate to their institution's needs and abilities. An on-going biosecurity program is essential in order to prevent avian influenza and other animal diseases from entering the animal collection. Planning and continuing dialog with local, regional, and national regulatory agencies are key parts of preparedness. The biosecurity measures listed in this section are good general practices that could be implemented during normal operations:

### Staff

- Require that employees entering bird areas wear uniforms or outerwear that are supplied and laundered through the employer. Do not permit employees to take uniforms or outerwear from the facility.
- Require that employees wash hands when arriving at work and before handling uniforms.
- Require that employees working in bird areas wear footwear that does not leave the workplace and that the footwear is cleaned and disinfected before entering or exiting bird areas.
- Place informational signage at the staff entrance to all bird areas, identifying them as sites for biosecurity precautions.
- Develop a protocol for proper footbath preparation, maintenance, and disposal (see Morley, et al. Evaluation of the efficacy of disinfectant footbaths as used in veterinary hospitals. J Am Vet Med Assoc 2005;226:2053-2058). (NB: the NAI viruses are quite fragile; almost any disinfectant that affects the viral envelope will be effective. In an outbreak, CFIA will approve a specific disinfectant if it is to be used on an infected premises. Virkon was used in the 2004 outbreak.)
- Develop an employee education program that may include general biosecurity briefings.

### Collection animals

- Clean and disinfect transport cages, feed trays, and any equipment used with animals after each use and, where possible, restrict use within a specific group of animals.
- Quarantine and test, as appropriate, any collection birds that escape and are recaptured.
- Ensure that all collection animals that die receive prompt and appropriate necropsy.
- Develop infection control procedures for transporting dead birds and mammals.

### Animal feed

- If used, whole poultry eggs should be obtained through a reliable processing facility where they are cleaned, washed, and disinfected. Disposable, one-way egg packaging materials should be used.
- Prohibit bulk poultry feed or conveyances from entering the zoo. Instead, use bagged feed from suppliers that follow Canadian Food Safety and Quality Program (CFSQP) practices.
- Ensure that enrichment items (e.g., bird toys) are disinfected before being given to birds.
- Review general biosecurity measures at animal food storage and distribution facilities, using CFSQP principles.
- Exclude fresh poultry manure from entering the facility unless properly heat-treated or composted.

#### Wild and feral birds

- Develop or update protocols for handling sick and injured native birds brought to a facility or found within a facility (See Dierauf, Interim guidelines for the protection of persons handling wild birds with reference to highly pathogenic avian influenza H5N1. USGS Wildlife Health Bulletin 05-03. August 29, 2005).
- Eliminate, where possible, the co-mingling of collection birds and migratory waterfowl and shorebirds. The virus can remain infective in waterways. Discourage wild birds by controlling feeding of collection birds (i.e. remove attractants to wild waterfowl, make ponds less attractive and accessible).

## **2. Enhanced Biosecurity Measures Appropriate for Institutions Located in a Quarantine, Surveillance, or Control Area.**

Each institution should develop, in advance, a control strategy that would be implemented in the event of a NAI outbreak in or near the facility. Major goals of such a plan would be to avoid closure of the zoo and to avoid culling specimens with a high conservation value.

The following measures for enhanced biosecurity are in addition to those listed for day-to-day preventive measures.

#### Staff

- Require employees who have contact with birds outside the workplace to shower upon arrival at work, before putting on a uniform.
- Develop a protocol to handle situations where employees have a bird at home that is sick or has died. The protocol should instruct employees not to come to work until their supervisor is informed and can assess the situation (consulting, as necessary, with veterinary staff).
- Develop a protocol for employees leaving grounds and returning the same day that will avoid contamination from premises such as feed stores and pet shops.
- Develop an enhanced employee education program that includes general biosecurity briefings. In the face of an outbreak, the education program may include:
  - Holding general employee biosecurity briefings during the course of the outbreak.
  - Providing employees with information on how to prevent influenza in themselves and their families, and guidelines for when to stay at home and not come to work.
  - Bringing in regulatory officials to provide outreach presentations.
  - Distributing information letters to all employees describing the disease outbreak, and precautions that they could take as individuals.
  - Providing periodic updates to all employees with latest information on the outbreak situation.
  - Creating and distributing documents listing biosecurity measures to employees.
  - Discouraging employees from visiting other bird or bird product facilities (e.g., pet stores, feed stores, etc.).
  - Preparing employees in the event that culling of collection animals becomes necessary.

#### Collection animals

- Discontinue movement of birds into and out of the collection, including transfers to other locations on site.
- Discontinue free-flight bird programs, to avoid escapes and contact with free-ranging birds.
- Consult regulatory authorities regarding rules for sending samples from collection animals to laboratories outside the quarantine and surveillance zones, if the facility is located within those zones.

#### Public, guests, visitors

- Discontinue direct contact between visitors and collection birds (e.g. demonstrations, walk-through aviaries).
- Do not allow collection birds to go off site for any reason.
- Close walk-through aviaries to the public.
- Discontinue behind-the-scenes tours of animal food preparation and storage areas, and any area where birds are housed.
- Notify neighbors of the disease outbreak, and provide educational materials to encourage the use of established biosecurity measures.

#### Animal Feed and Human Food

- Prohibit the use of uncooked poultry as food items for all collection animals (not just for avian and felid species).
- Do not allow fresh or frozen poultry used for human consumption to enter the facility unless known to originate outside the affected region.
- Scrutinize feed sources for possible exposure to poultry (e.g., cricket and rabbit suppliers may have poultry operations on the same premises, and rabbit suppliers often deliver to live bird markets).

#### Vendors, Contractors, Volunteers, and Consultants

- Provide shoe disinfection and protective outerwear for those who need to go into bird areas. Limit access to bird areas as much as possible.
- Delay –as much as possible– non-essential repair work, research, etc., that requires entry into bird areas, until the outbreak is over.
- Maintain critical control points at service entrances. Spray the tires and wheel-wells of all vehicles with an appropriate disinfectant when they arrive. Query drivers regarding their recent bird contact and delivery routes, and require them to use footbaths.

#### Wild and feral birds

- Discontinue on-site rehabilitation programs for free-ranging waterfowl.
- Discourage staff from participating in off-site wildlife rehabilitation programs.
- Remove or confine the institution's free-roaming birds (e.g., domestic chickens, peafowl, and guinea fowl) where feasible.
- Do not collect or incubate eggs from free-ranging waterfowl.
- Consider the feasibility of bringing indoors those collection birds that co-mingle with free-ranging waterfowl. Testing and quarantine isolation is recommended.

### **Surveillance**

Each institution should develop a surveillance strategy in collaboration with local regulators and wildlife agencies. Surveillance of free-ranging waterfowl and shorebirds and/or collection birds can provide baseline prevalence of LPAI in the facility. Ongoing surveillance also would provide a tool for early detection of NAI, and provide a trigger for initiating control measures. The decision to initiate surveillance should be based on proximity of documented NAI disease, ability to interpret lab results, and ability to educate the local media on the significance of the results.

### **Vaccination**

With a sound biosecurity and surveillance program in place, vaccination should be considered when there is a significant threat of an outbreak of NAI in the region of the zoo.

- Priority for vaccination should be decided based on the conservation value of the specimens, susceptibility to infection, and degree of anticipated exposure.
  - Access to vaccines generally requires regulatory approval.
  - The vaccine should be available, safe, and effective.

- The nature of the vaccine should make it possible to distinguish vaccinated birds from infected birds.
- Conditions for vaccine use might include collection of blood before and after vaccination, documentation of all vaccinated birds, and prohibition of movement of vaccinated birds pending regulatory approval.
- There are published reports of the efficacy of vaccination against avian influenza in zoo birds (see Oh, et al. 2005. Field study on the use of inactivated H5N2 vaccine in avian species. Vet Record. 157:299-300).
- In October 2005, The Commission of the European Communities established requirements for the prevention of HPAI-H5N1 in susceptible birds kept in zoos in the Member States (see Commission of the European Communities, 21 October 2005. <http://europa.eu.int/comm/index>).

### **3. Outbreak Control Measures**

Each institution should develop, in advance, a control strategy that would be implemented in the event of a NAI outbreak in or near the facility. Features of such a plan (in addition to the guidelines above) might include:

- Dialogue, in advance of an outbreak, with local and regional regulatory officials concerning various scenarios and likely courses of action. Understanding by all parties concerning the operational effects of such an outbreak on the facility.
- Develop a public relations plan including press releases and talking points for various disease outbreak scenarios.
- Develop outbreak control measures that would be initiated upon knowledge of suspicious or confirmed NAI cases. These measures could include:
  - Enhance the protective clothing worn by staff when working with birds (especially protective mask and goggles)
  - Partition the facility to isolate affected areas (separate tools, keepers, feed storage).
  - Decontaminate affected areas, according to CFIA directions.
  - Test then remove and isolate the most valuable birds into quarantine isolation.
  - Consider treatment of selected susceptible mammals and birds using antiviral drugs, if permitted.
  - Close part or all of the facility to visitors.
  - Euthanasia of exposed animals, where necessary and appropriate.