

## **Avian influenza:**

### **Guidelines for prevention in North American zoos**

American Zoo and Aquarium Association

Animal Health Committee

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Avian influenza is an infectious disease of birds caused by type A strains of influenza virus. The infection causes a wide variety of signs in domestic birds that range from mild illness to a highly contagious and rapidly fatal disease and can result in severe epidemics with high mortality. The signs of highly pathogenic strains (HPAI) are characterized by sudden onset, severe illness, and rapid death. Migratory waterfowl and shorebirds are the natural reservoir for avian influenza viruses. Recently, a strain identified as HPAI H5N1 has spread through much of Asia and parts of Europe probably along migratory bird routes.

The HPAI H5N1 virus strain could enter North America in a variety of ways including through migratory birds, infected poultry, or infected humans. Zoo managers are well advised to develop preventive measures in advance of such an occurrence. The guidelines presented here are suggestions to help zoos generate their own preventive measures. Cooperation and communications with local, state, regional USDA, and Public Health agencies is highly recommended in advanced of an outbreak. These guidelines are geared for prevention of the disease in North American zoos. Additional and separate measures could be necessary in the event of an outbreak occurring within a zoo.

The following biosecurity measures are recommended in the event of HPAI occurring in the region of a zoological institution. Many of these are based on experience from a 2003 outbreak of Exotic Newcastle Disease in southern California. The measures are categorized as they relate to 1) employees, 2) collection birds, 3) public guests/visitors, 4) food and feeds, 5) vendors, contractors, and consultants, and 6) wild/feral birds. Note: The major differences between an outbreak of END and a potential outbreak of HPAI include: 1) HPAI H5N1 is potentially a serious zoonotic disease, and END is not and 2) HPAI H5N1 is effectively spread by migratory waterfowl and shorebirds and in bodies of water whereas END is much less likely to be transmitted in that manner.

#### **Avian influenza - key facts:**

1. Avian influenza virus is shed in feces, saliva, and nasal discharges.
2. Since 2003, a highly pathogenic strain (HPAI) of the virus, H5N1, has emerged in Asia. This strain is a threat to domestic poultry and to date has caused death in over 60 people in Asia, most of whom had close contact with domestic poultry. World health authorities are concerned about the propensity of avian influenza viruses to mutate into a form that could be readily transmissible among humans. This could lead to a worldwide pandemic.
3. The H5N1 strain caused death in tigers and leopards that fed on infected poultry carcasses in a Thai zoo (2004). Evidence showed that there was likely tiger-to-tiger transmission in a second outbreak in Thailand.

4. Large-scale mortalities from H5N1 in migratory birds have occurred in central China (April 2005). The progressive spread of H5N1 northwestward through China, Mongolia, Russian, and Kazakhstan strongly suggests that migratory species of birds are playing a role in the spread of the disease (Aug 2005).
5. Presence of the H5N1 strain has also been reported in zoo birds in Jakarta, Indonesia. A few zoo employees and visitors have been hospitalized with signs of influenza. As a result, the zoo was closed to the public (Sept 2005).

### **Preventive Measures:**

#### ***Biosecurity:***

##### ***1. Employees***

- 1) Require that employees wash hands when arriving at work and before handling uniforms. If employee has contact with other birds outside the workplace, the employee must shower upon arrival and before putting on uniform.
- 2) Require that employees working in bird areas wear footwear that does not leave the workplace and is cleaned and disinfected before entering to or exiting from bird areas.
- 3) Require that employees entering bird areas wear uniforms that are supplied and laundered. Do not permit uniforms go home with the employee.
- 4) Require all employees working in bird areas to disinfect their shoes when first coming to work.
- 5) Place informational signage at the entrance to all bird areas identifying them as a site for biosecurity precautions.
- 6) Instruct employees not to come to work and to call their supervisors if they have a bird at home that is sick or has died.
- 7) Include employee education efforts such as the following measures:
  - a) Hold general employee biosecurity briefings at multiple times during the course of the outbreak.
  - b) Bring in regulatory officials to provide outreach presentations.
  - c) Create and distribute summary publications to all employees.
  - d) Provide periodic email updates to all employees with latest information on the outbreak situation.
  - e) Create and distribute documents listing biosecurity measures to employees.
  - f) Distribute information letters to all employees describing the disease outbreak and precautions that they could take as individuals.
  - g) Discourage employees from visiting other bird or bird product facilities (e.g. pet stores, feed stores, etc).
- 8) Develop a protocol for employees leaving grounds and returning same day.
- 9) Develop a protocol for proper footbath preparation, maintenance, and disposal techniques.

2. Collection Animals:

- 1) Discontinue movement of birds and select mammals into and out of the collections, including transfers between local facilities.
- 2) Discontinue all free-flight bird programs to avoid escapes and contact with free-ranging birds.
- 3) Consult regulatory authorities regarding rules for sending laboratory samples from collection animals outside the outbreak area.
- 4) 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.
- 5) Develop infection control procedures for transporting birds and select mammals that die.
- 6) Quarantine and test if appropriate any collection birds that escape and are recaptured.
- 7) Consider surveillance testing of collection birds and select mammals as recommended by regional regulatory officials.

3. Public quests/visitors:

- 1) Discontinue direct public contact with collection birds.
- 2) Do not allow collection birds to go off premises for any reason.
- 3) Close walk-through aviaries to the public.
- 4) Discontinue behind-the-scenes tours of animal food preparation and storage areas and bird housing.
- 5) Notify neighbors of the disease outbreak and provide educational materials to encourage the use of established biosecurity measures

4. Foods and Feeds:

- 1) Discontinue the use of poultry as food items for all collection animals (not just for avian and felid species).
- 2) Consider excluding whole egg products from entering facility. If use, whole poultry eggs should be cleaned, washed, and disinfected through a reliable processing facility. Source flocks should be monitored for disease. Also, packaging material should be "one-way" disposable material.
- 3) Exclude fresh poultry manure (unless properly heat treated or composted) from entering the facility.
- 4) Prohibit bulk poultry feed or their conveyances from entering into facilities.
- 5) Do not allow fresh or frozen poultry used for human consumption to enter facility unless obtained from vendors outside the quarantine area.
- 6) Ensure that bird toys used for enrichment are disinfected before being given to birds.
- 7) Scrutinize feed sources for possible exposure to poultry (e.g. cricket and rabbit suppliers may have poultry operations on the same facilities, and rabbit suppliers often deliver to live bird markets).
- 8) Review general biosecurity measures at animal food warehouses using HCCP principles.

5. Vendors, Contractors, Volunteers, and Consultants:

- 1) Spray the tires and wheel-wells of all non-company vehicles with an appropriate disinfectant when they service entrances. Query drivers regarding their recent bird contact and delivery routes and require them to step in footbaths.
  - 2) Provide shoe disinfection and protective outerwear for those needing to go into bird areas. Limit access of vendors, contractors, etc. to bird areas as much as possible (e.g., delaying nonessential repair work, research, etc. until the outbreak is over).
6. Wild/feral Birds:
- 1) Develop or update protocols for handling sick and injured native birds brought to facility or found within facility.
  - 2) Discontinue on-site rehabilitation programs for free-ranging waterfowl. Discourage staff from participating in off-site wildlife rehabilitation programs.
  - 3) Develop protocols for short-term treatment of sick and injured native bird species before release to rehabilitation facilities.
  - 4) Remove or confine free-roaming birds (e.g. domestic chickens, peafowl, and guinea fowl) where feasible.
  - 5) Eliminate, where possible, the commingling 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). Do not collect and incubate eggs from free-ranging waterfowl.
  - 6) Consider feasibility of bringing indoors those collection birds that commingle with free-ranging waterfowl.
  - 7) Consider performing surveillance of wild birds in concert with regulatory programs.

**Vaccination:**

Vaccination should be considered during an outbreak to protect collections of endangered bird species but must be combined with a program of stringent biosecurity. An appropriate safe and effective vaccine is necessary as is regulatory approval for its use. An ideal vaccine would make it possible to distinguish vaccinated birds from infected birds. Strict conditions for its 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 some published reports of the efficacy of vaccination against avian influenza in zoo birds.

**Contingency planning in the event of an HPAI outbreak within a zoo:**

Contingency planning in advance is recommended for scenarios such as a confirmed outbreak of HPAI-H5N1 disease in a zoo's collection birds, Features of such a plan might include:

1. Dialog, in advance, with local and regional regulatory officials concerning likely courses of action necessary.
2. Understanding of all parties concerning the operational effects of such an outbreak on zoos.
3. Preventive measures necessary to protect employee and guest health.
4. Surveillance measures for free-ranging wildlife and collection birds.
5. Vaccination planning.

6. Develop “response trigger” (e.g. five or more birds found dead in one day) that, if HPAI infection were confirmed, would initiate an outbreak investigation that could include:
  - a. Partitioning facility to isolate affected areas (separate tools, keepers, feed storage).
  - b. Euthanizing animals exposed birds, as appropriate.
  - c. Decontaminating affected areas.
  - d. Removing and isolating most valuable exposed birds into strict quarantine.

Additional information and resources:

1. Avian Influenza Technical Task Force, FAO. 2005. Potential risk of highly pathogenic avian influenza (HPAI) spreading through wild water bird migration. FAOAID news, Special issue No. 33.  
([http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/avian\\_HPAIrisk.html](http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/avian_HPAIrisk.html))
2. Dierauf, L. 2005. 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.
3. Janssen, DL, Sutherland-Smith, M, Papendick, et al. 2003. Exotic Newcastle Disease outbreak in southern California – Biosecurity measures for prevention in zoo collections. Proc Am Assoc Zoo Vet. Pp107.
4. Monto, AS. The threat of an avian influenza pandemic. January 27,2005. N Engl J Med 352;4: 323-325.
5. Morley, PS, Morris, SN, Hyatt, DR, Van Metre, C. Evaluation of the efficacy of disinfectant footbaths as used in veterinary hospitals. J Am Vet Med Assoc 2005;226:2053–2058.
6. Oh, S, Martelli, P, O Hock, OS, et al. 2005. Field study on the use of inactivated H5N2 vaccine in avian species. Vet Rec. 157: 299-300
7. Philippa, JDW, Munster, VJ, van Bolhuis, H, et al. 2005. Highly pathogenic avian influenza (H7N7): vaccination of zoo birds and transmission to non-poultry species. Vaccine, in press.
8. Scullion, F, Scullion, G. 2005. Development of health management plans for the prevention of avian influenza in wild animal collections. Proceedings, 142nd AVMA Annual Convention/28th World Veterinary Congress, Minneapolis, MN, USA.
9. USDA-APHIS-VS. Highly pathogenic avian influenza fact sheet. March 2004.  
[http://www.aphis.usda.gov/lpa/pubs/fsheet\\_faq\\_notice/fs\\_ahavianflu.pdf](http://www.aphis.usda.gov/lpa/pubs/fsheet_faq_notice/fs_ahavianflu.pdf)