

## Emergency Response Planning for Disposal of Avian Influenza Affected Birds in NYS

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**Abstract.** Avian influenza (AI), or bird flu, is caused by avian influenza viruses that are carried by wild waterfowl and shed in the saliva, nasal excrements and feces. Domestic poultry get the disease when they come in contact with the viruses either directly from waterfowl (drinking from contaminated water, foraging in places where waterfowl have been), or from contact with other infected domestic birds, cages, feed, feces or workers that may be carrying the virus on their clothes or vehicles. It can also be spread easily with wind currents, therefore, the less birds are moved, especially off-site, the better. Static pile composting provides a tool to manage the birds on site, reducing the risk of spreading disease. CWMI, in collaboration with New York State Department of Environmental Conservation, Department of Agriculture and Markets and the Workplace Health and Safety Programs in the New York State College of Industrial and Labor Relations, developed and disseminated educational materials for a composting component of a state emergency response plan for avian influenza. Materials that were developed include a literature review of AI and methods of disposal of affected poultry, a 12 page illustrated fact sheet and poster entitled *Natural Rendering: Composting Poultry Mortality* and a 6-minute video that provide technical assistance for routine mortality and for emergency situations. These materials, available at <http://cwmi.css.cornell.edu/ai.htm>, will help reach large scale poultry farms who already compost manure all the way down to backyard flocks that could spread disease. The plan includes effective use of personal protective equipment for workers, how to compost birds, different phases of the process, clean up and ultimate use of the compost. If there is a disease outbreak, it will be important for farmers to get the support they need. With a simple download, farms will have the information and will be able to follow steps to disinfect their operation.

**Keywords.** Emergency planning, Response planning, Disposal, Avian Influenza, HPAI, Composting

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## Introduction

The laws of the State of New York (Ag & Markets Law, Article 5, §73) require that *“every person shall immediately report to the commissioner the existence among animals of any infectious or communicable disease coming to his knowledge. Every report shall be in writing and shall include a description of the diseased animal or animals, the location thereof, the name of the disease suspected, and, if known, the name and address of the owner or person in charge of such animal or animals.”* HPAI (any H5 or H7) is a reportable avian disease at the Federal (Animal and Plant Health Inspection Service), State (NYS Department of Agriculture and Markets and Department of Health) and Local (Cornell University) level. But then what happens?

New York State Agriculture and Markets (NYS DAM) asked New York State Department of Environmental Conservation (NYS DEC) how to handle the disposal of animals in an Avian Influenza (AI) outbreak. The knee jerk reaction to any emergency, whether due to disease outbreak or natural disaster, is to bury. Since burial is not necessarily the best option, DEC asked Cornell Waste Management Institute (CWMI) to assist in the development and dissemination of a composting component of a state emergency response plan for avian influenza. The purpose was to convey best management practices for static pile composting as a means to manage routine avian mortality and situations resulting from disease outbreak and natural disasters. CWMI was charged with getting the information out to farmers, veterinarians, emergency response people, federal, state and local environmental, health and conservation personnel. CWMI, in collaboration with NYS DEC, NYS DAM and New York State College of Industrial and Labor Relations (NYSILR), developed and disseminated educational materials for a composting component of a state emergency response plan for avian influenza. This paper details the procedure and particulars of gathering, putting together and getting the information out to those who need it.

## Procedure

The first step in any emergency disease planning is to gather information about the disease and its control. Avian influenza (bird flu) is caused by AI viruses that are carried by wild waterfowl and shed in the saliva, nasal excrements and feces. Domestic poultry get the disease when they come in contact with the viruses either directly from waterfowl (drinking from contaminated water, foraging in places where waterfowl have been), or from contact with other infected domestic birds, cages, feed, feces or workers that may be carrying the virus on their clothes or vehicles. Avian Influenza can be classified into two forms based on the severity of illness they cause in birds. Low pathogenic avian influenza (LPAI) may go undetected and causes only mild symptoms such as ruffled feathers and a drop in egg production. It is rarely transmitted to humans and is not life-threatening. Highly pathogenic avian influenza (HPAI) causes serious illness and death in infected birds, often within 48 hours of onset. It is easily spread through a flock by contact among birds and through litter, cages, equipment and air (particularly within poultry houses). It is a serious often deadly disease if contracted by people. It is not known to be transmitted from person-to-person.

Only certain avian influenza viruses are known to cause the highly pathogenic form. Some LPAI viruses, when allowed to circulate in poultry populations, can mutate, usually within a few months, to the highly pathogenic form. The cycle for AI (Figure 1) is transmission of LPAI from wild birds to domestic flocks that can then circulate in the flock and be transported to other flocks. LPAI may undergo mutation into HPAI that can circulate in the flock and be transported to other flocks. Control of LPAI can thus help to prevent creation of HPAI. Once a flock has

contracted HPAI, preventing off-site movement of birds, litter and contaminated equipment is important. Composting of dead birds and litter can control the viruses.

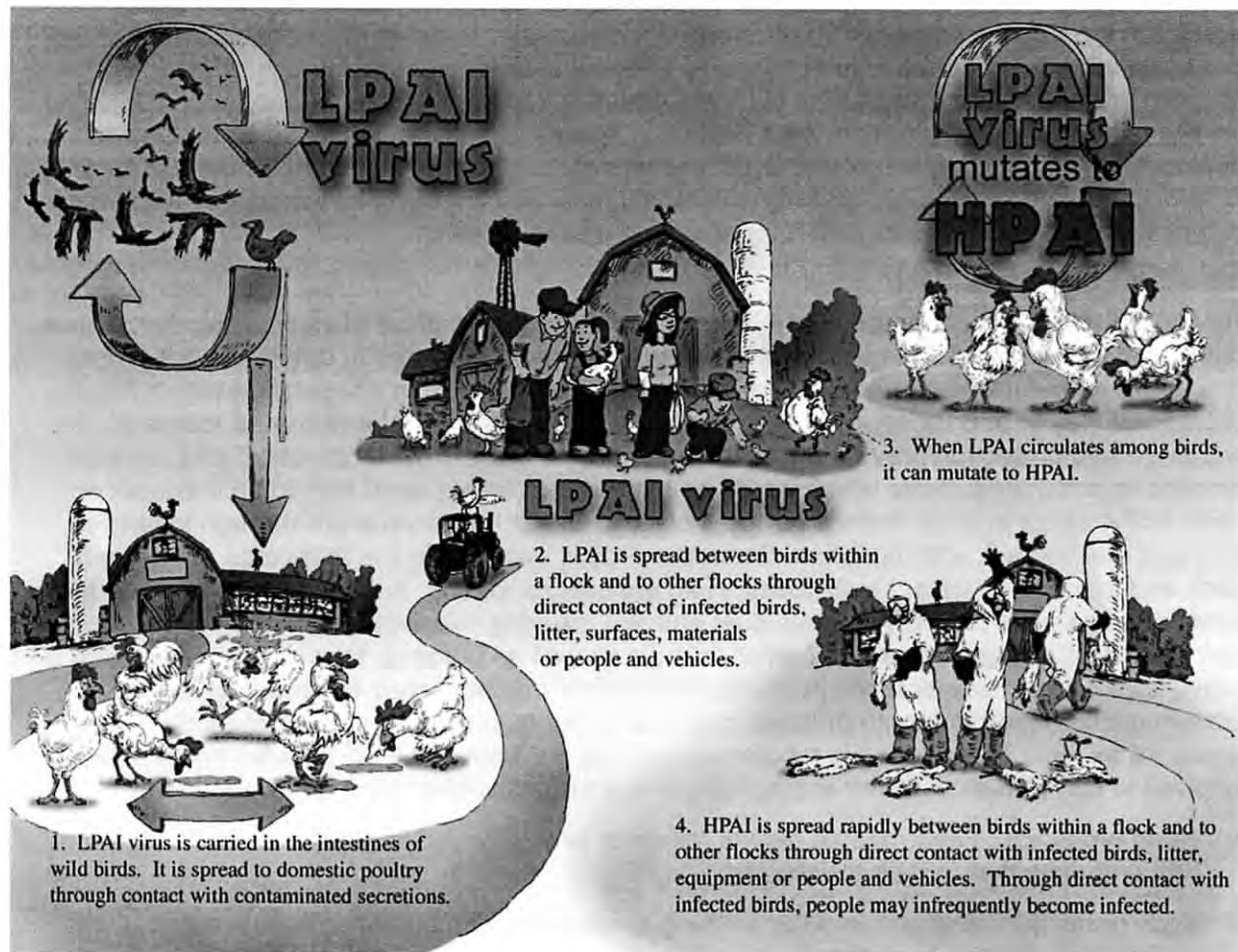


Figure 1. Avian Influenza (bird flu) Cycle. Illustration by Bill Davis.

Prevention of LPAI is a step in preventing HPAI from occurring and thus preventing outbreaks or a pandemic. This is best done through bio-security for poultry flocks: no contact with wild birds or water sources where wild birds congregate, essential personnel only in poultry facilities, clean/disinfect clothing, equipment, tires, etc., and no contact with other poultry or live bird markets. If flocks are infected, and LPAI mutates into HPAI, disposal of dead birds and infected litter becomes an issue. Moving the birds offsite for disposal can easily spread the disease. Heat destroys the virus, but it remains viable at moderate temperatures for long periods, and indefinitely in frozen material. The virus is killed by heat (56°C for 3 hours, 60°C for 30 minutes). Since properly managed composting meets these time/temperature requirements, static pile composting provides a tool to manage infected birds on site and kill the virus, reducing the risk of spreading disease.

Research in many states indicates composting is effective in inactivating the avian influenza virus (AIV). Lu, et al, 2003 showed that mixing AIV with chicken manure that contains microorganisms or their digestive enzymes or by products has the ability to destroy the virus in less than a week at ambient or higher temperatures. Senne, et al, 1994, composted birds in bins that were inoculated with HPAI virus and were unable to isolate any virus from the tissue after

10 or 20 days of composting. Research on other poultry viruses has shown them to be inactivated through composting, not only because of temperature but also due to biological activity in the composting process (Glanville, et al, 2006). Composting has also been shown to be an effective means of disposal for all sizes of birds (Flory, et al, 2007) and thus has prompted the Virginia Department of Environmental Quality to list in-house composting as the preferred method of disposal in response to disposal of entire flocks of poultry after an outbreak of avian influenza. According to the United States Environmental Protection Agency (US EPA), on-site composting has been proven effective in deactivating avian influenza virus. On-site composting limits the risk of groundwater and air pollution contamination, the potential for farm to farm disease transmission, and transportation costs and tipping fees associated with off-site disposal. Also, there is the benefit of producing a usable product.

Having determined that composting is not only an adequate method of inactivating the AI virus, but is also environmentally sound and bio-secure, the next step was to determine the proper procedure to ensure worker health and safety while composting. In cooperation with NYSILR Workplace Health and Safety Program, a report was generated that anticipated routes of exposure and protection/prevention for farm owner/operators, their employees, and compost process experts/consultants which would be expected to be exposed should an outbreak of HPAI H5N1 occur in NYS. Potential routes of exposure of the AI virus are through inhalation, skin and eye contact, and ingestion. Since the virus is excreted in the droppings of infected birds and in their respiratory secretions, in an agricultural setting, animal manure and secretions containing the virus can contaminate dust and soil, causing infection when inhaled. The virus can be carried on the bodies and feet of animals as well as humans, thus direct contact with saliva, nasal secretions or feces from infected birds or contaminated surfaces can cause contamination. Hand to mouth or hand to nose transfer is assumed to be a potential route of exposure as well. Therefore, it is recommended that the following PPE be worn by all of those involved in culling/depopulation and composting of birds and litter from an AI outbreak:

- Hand protection: impermeable gloves (nitrile or vinyl disposable gloves, or heavy-duty 18-mil rubber gloves that can be disinfected).
- Body protection: disposable outer clothing or coveralls with an impermeable apron. Light clothing will prevent heat stress.
- Head protection: disposable head cover or hair cover.
- Foot protection: disposable shoe covers or rubber or polyethylene boots that can be reused after disinfection.
- Eye protection: safety goggles or a respirator with a full face-piece, hood, helmet or loose-fitting face-piece.
- Respiratory protection: National Institute for Occupational Safety and Health (NIOSH)-approved disposable respirator (N-95, N-99 or N-100) or NIOSH-approved reusable particulate respirator, properly fit-checked and sealed.
- For employees who are unable to wear a disposable particulate respirator because of facial hair or other fit limitations, they can wear a loose-fitting helmeted or hooded powered air-purifying respirator (PAPR) with high-efficiency particulate air (HEPA) filters.

Once all of the information was gathered, educational materials needed to be developed and made available through outreach for those that might be affected. The literature review is posted on CWMI's website at <http://cwmi.css.cornell.edu/aisummary.pdf>. A 12-page fact sheet was created that details disposal of avian mortality using composting, including the need, the risks of

different disposal methods, the benefits of composting and the procedure and process of composting for routine mortality. The fact sheet then goes on to describe composting in the event of an AI outbreak, including the effectiveness of composting, the use of PPE, safety in managing avian carcasses, worker protection (recommended vaccinations and vigilance of fever, respiratory symptoms or conjunctivitis for 10 days after last exposure), do and don'ts, doffing PPE and troubleshooting the compost pile. The fact sheet can be found as a pdf file at <http://cwmi.css.cornell.edu/ai.htm>. A poster that can be laminated and hung directly in the barn, describing how to compost avian mortalities, is also available online at the same site as either a power point or pdf file. In addition, CWMI, created a 6 minute DVD available for downloading at the previous url, or directly at <http://hdl.handle.net/1813/11663>, which shows the procedure for donning PPE, building the compost pile including safety precautions, the composting process, and doffing PPE. All materials are available free of charge and are only a click away for use in an emergency.

To effectively get information out on emergency procedures to be followed in case of an AI outbreak, multiple audiences needed to be reached. Most large and some smaller farms are active in the NYS Poultry Association and CWMI was able to reach these farms through their annual meetings at which a power point was shown, fact sheets and DVDs were distributed, and, at some, field demonstrations were performed. Many small farms were and still are being reached through organic groups, annual small farms conferences and small farms quarterly publications. People with backyard flocks are an audience that is harder to reach but would have potential to be affected. Backyard flocks are common especially in suburban and rural areas but there are few records of their existence. This audience needs to be alerted so that they do not facilitate the spread of disease. CWMI works with Cornell Cooperative Extension and other agriculture educators to help get information out to this audience. In addition, all State Veterinarians that deal with poultry have the information available to distribute. So far, CWMI has reached over 4000 people with this information.

## Conclusion

With cooperation from several different stakeholders in NYS, the role of composting as a component of an emergency response plan in the case of an AI outbreak was developed and disseminated in such a fashion that it will effectively reach those that need it. Although this was developed for an AI outbreak response, the same protocols can be used with other disease outbreaks and mass casualty events as needed. Resources exist on our website to address composting of livestock, meat residuals and road-kill.

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