Landfills and Highly Pathogenic Avian Influenza (HPAI) Response

May 2016
USDA APHIS Veterinary Services
“Worst agricultural disaster in decades”

Why does it matter?

• Financial impact of HPAI
  • US, Regional, State economies
  • $960+ million spent on response since December 2014
  • International trade: several countries banned poultry from the United States
    • Billions in lost exports
  • Direct/indirect impacts-jobs, affiliated industries, emotional impact

• Safe food supply (perception)
  • Safe to eat meat, eggs

• Potential public health issues
  • NOT currently infectious to humans, virus can change
DEFINITIONS

• USDA APHIS Veterinary Services
  • US Department of Agriculture, Animal and Plant Health Inspection Service
  • Veterinary Services oversees pre-harvest animal production
• FAD: foreign animal disease
• HPAI: highly pathogenic avian influenza
  • Also referred to as “high path AI”
  • Differentiated from low pathogenic AI based on morbidity and mortality, or how quickly birds get sick and/or die from the disease
  • Current high path strain in U.S. is mainly H5
• FMD: foot and mouth disease
• PPE: personal protective equipment
• Zoonotic Disease: a disease that can be spread from animals to humans
• Depopulation: also known as “culling” or “stamping out” a large number of animals to quickly eliminate the disease
HOW ARE DISEASE OUTBREAKS HANDLED?

• Is it a disease of high consequence?
  • e.g., High Path Avian Influenza, Foot and Mouth Disease, African Swine Fever, Rift Valley Fever, Glanders

• What is the scope of the outbreak?
  • County, State, Regional, National
  • Can that jurisdiction respond without national assistance (funding, equipment, people)?

• Is it a zoonotic disease?
  • Will humans become infected?

• Who would be the lead agency?
  • Animal Diseases: State Departments of Agriculture, USDA APHIS Veterinary Services
  • Human Diseases: Center for Disease Control and Prevention (U.S. Department of Heath and Human Services), State Public Health Departments
WHAT ARE THE GOALS IN A FAD OUTBREAK?

In the event of an FAD outbreak, the three key response goals are:

1) Detect, control, and contain the outbreak as quickly as possible.
2) Eradicate the FAD using strategies that stabilize animal agriculture, the food supply, the economy, and protect public health and the environment.
3) Provide science- and risk-based approaches and systems to facilitate continuity of business for non-infected animals and non-contaminated animal products.

Achieving these three goals will allow individual livestock facilities, States, Tribes, regions, and industries to resume normal production as quickly as possible. They will also allow the United States to regain FAD-free status.
The most recent Census of Agriculture reported 233,770 poultry farms in the United States in 2012.

In 2014, the U.S. poultry industry produced:
• 8.54 billion broilers,
• 99.8 billion eggs, and
• 238 million turkeys.

The combined value of production from broilers, eggs, turkeys, and the value of sales from chickens in 2014 was $48.3 billion, up 9 percent from $44.4 billion in 2013.
Today’s Commercial Industry

- 8.5 billion meat chickens
- 150 million meat turkeys
- 250 million table egg layers
- 88 million meat type chicken breeders
- 4.5 million egg type chicken breeders
- 8 million breeder turkeys
- 253 meat type chicken hatcheries
- 35 turkey hatcheries
Figure 1. Broiler Production by State Number Produced, Thousand, 2012

U.S. Total: 8.61 Billion Head

- 8.07 Billion Head, 94% of U.S. Total
- All Other Production States

CA, OR, WA, NE, IA, MN, WI, MI, PA, NY, DE, MD, VA, NC, SC, TN, FL, WA, OK, TX, AR, MS, AL, GA
<table>
<thead>
<tr>
<th>National Ranking</th>
<th>State</th>
<th>Billions of Broilers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Georgia</td>
<td>1.362</td>
</tr>
<tr>
<td>2</td>
<td>Alabama</td>
<td>1.004</td>
</tr>
<tr>
<td>3</td>
<td>Arkansas</td>
<td>0.977</td>
</tr>
<tr>
<td>4</td>
<td>North Carolina</td>
<td>0.800</td>
</tr>
<tr>
<td>5</td>
<td>Mississippi</td>
<td>0.751</td>
</tr>
</tbody>
</table>
Figure 2. Number of Turkeys Raised, 2010 (Per Thousand Head)

- CA: 15,200
- UT: 4,600
- MN: 47,000
- SD: 4,600
- AR: 28,000
- MO: 18,000
- SC: 11,900
- WV: 3,100
- OH: 4,600
- IN: 16,000
- VA: 17,000
- NC: 30,000
- PA: 7,400
### Table 2. Top Turkey Producing States in the US in 2011.

<table>
<thead>
<tr>
<th>Rank</th>
<th>State</th>
<th>Number of Birds (head, millions)</th>
<th>Pounds Produced (millions)</th>
<th>Value (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Minnesota</td>
<td>46.5</td>
<td>1,171.8</td>
<td>799.2</td>
</tr>
<tr>
<td>2</td>
<td>North Carolina</td>
<td>32.0</td>
<td>1,132.8</td>
<td>772.6</td>
</tr>
<tr>
<td>3</td>
<td>Arkansas</td>
<td>30.5</td>
<td>603.9</td>
<td>411.9</td>
</tr>
<tr>
<td>4</td>
<td>Missouri</td>
<td>17.5</td>
<td>568.8</td>
<td>387.9</td>
</tr>
<tr>
<td>5</td>
<td>Virginia</td>
<td>17.5</td>
<td>460.3</td>
<td>313.9</td>
</tr>
<tr>
<td>6</td>
<td>Indiana</td>
<td>16.0</td>
<td>579.2</td>
<td>395.0</td>
</tr>
<tr>
<td>7</td>
<td>California</td>
<td>15.0</td>
<td>421.5</td>
<td>287.5</td>
</tr>
<tr>
<td>8</td>
<td>South Carolina</td>
<td>11.5</td>
<td>448.5</td>
<td>305.9</td>
</tr>
<tr>
<td>9</td>
<td>Pennsylvania</td>
<td>7.5</td>
<td>174.8</td>
<td>119.2</td>
</tr>
<tr>
<td>10</td>
<td>Ohio</td>
<td>5.0</td>
<td>210.0</td>
<td>143.2</td>
</tr>
<tr>
<td>11</td>
<td>South Dakota</td>
<td>4.4</td>
<td>180.4</td>
<td>123.0</td>
</tr>
<tr>
<td>12</td>
<td>Utah</td>
<td>4.3</td>
<td>97.6</td>
<td>66.6</td>
</tr>
<tr>
<td>13</td>
<td>West Virginia</td>
<td>3.3</td>
<td>92.4</td>
<td>6309</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>37.5</td>
<td>1,177.4</td>
<td>803.0</td>
</tr>
</tbody>
</table>

Source: USDA, National Agricultural Statistics Service, 2012 Summary
Figure 1. U.S. Turkey Exports (1,000 pounds) by Country from 2006-2010

- Mexico: 1,555,763
- Other: 532,168
- Russia: 100,963
- Hong Kong: 96,988
- China (Taiwan): 69,333
- China (Mainland): 308,755
- Panama: 52,103
- Dominican Republic: 63,152
- Canada: 105,612
### Table 1. Leading Egg Production States (2012)

<table>
<thead>
<tr>
<th>National Ranking</th>
<th>State</th>
<th>Millions of Layers in Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Iowa</td>
<td>52.3</td>
</tr>
<tr>
<td>2</td>
<td>Ohio</td>
<td>26.9</td>
</tr>
<tr>
<td>3</td>
<td>Pennsylvania</td>
<td>24.4</td>
</tr>
<tr>
<td>4</td>
<td>Indiana</td>
<td>22.8</td>
</tr>
<tr>
<td>5</td>
<td>California</td>
<td>18.9</td>
</tr>
</tbody>
</table>

### Table 2. Leading Egg Production Companies (2012)

<table>
<thead>
<tr>
<th>National Ranking</th>
<th>Company</th>
<th>Millions of Layers in Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cal-Maine Foods</td>
<td>33.5</td>
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<tr>
<td>2</td>
<td>Rose Acre Farms, Inc.</td>
<td>23.7</td>
</tr>
<tr>
<td>3</td>
<td>Moark, LLC</td>
<td>14.9</td>
</tr>
<tr>
<td>4</td>
<td>Daybreak Foods</td>
<td>13.5</td>
</tr>
<tr>
<td>5</td>
<td>Rembrandt Enterprises</td>
<td>13.4</td>
</tr>
</tbody>
</table>
Lesser known poultry industries: game birds, backyard birds, and hobby birds of any species
How did we get here?
2014-2015 and 2016 HPAI Outbreaks
Update on Avian Influenza Findings
Poultry Findings Confirmed by USDA’s National Veterinary Services Laboratories

232
Detections Reported

6/17/2015
Last Reported Detection (IA)

12/19/2014
First Detection Reported

49.6 Million
Number of all birds affected
2014-2015 HPAI Outbreak in the United States

• First case detected in Oregon, December 2014

• Total number of HPAI positive premises: 232
  • 211 commercial (MN-109, IA-72, WI-9, SD-10, NE-5, CA-2, MO-2, ND-2, AR-1)
  • 21 backyard

• Commercial poultry depopulated
  • Turkeys: approx. 7.5 million
  • Chickens, laying hens and pullets: approx. 42.1 million
Impact

• Approximately 10% of the poultry meat and egg supply was destroyed in 6 months in 2015.

• Food prices increased.

• Virus prefers cold, damp weather, so it “slowed down” during the hot summer months (last confirmed positive in Iowa mid-June, 2015).

• Birds that commingle up north will fly south for the winter, potentially exposing wild, commercial, and backyard birds to the virus.
Trade Implications from the 2014-2015 HPAI Outbreak

• Trade impact
  • 18 countries imposed bans on ALL U.S. poultry and products
  • 38 countries imposed partial or regional bans

Trade bans on U.S. exports of broiler and turkey meat related to HPAI as of June 16, 2015 (data from USDA ERS)
2016 HPAI Outbreak

• First case detected January 16, 2016 in Dubois County, Indiana:
  • One case of HPAI in commercial turkeys
  • Nine cases of LPAI in commercial turkeys
    • Strain similar to that seen in wild birds in North America
  • 415,000 birds euthanized
  • Economic cost: over $20 million.
Does HPAI pose a health threat to humans?

• To date, there have been no human cases related to this H5 strain of HPAI (nearly 4300 responders nationwide).

• The Centers for Disease Control and Prevention (CDC) considers the risk to people from these H5/H7 infections to be low. No humans cases of these H5/H7 viruses have been detected in the United States, Canada, or internationally.

• Historically, human infections with other avian influenza viruses have occurred after close and prolonged contact with infected birds or the excretions/secretions of infected birds (e.g., droppings, oral fluids), as in SE Asia.
What happens once a farm is infected?
Roles of Landfills

With billions of birds, seeking landfills that could accept:

• Bird carcasses: adults and pullets/poults (young birds)
  • Adults range from 6-8 lbs (layers & broilers) up to 80 (for tom turkeys)
• Waste products, such as manure and litter (typically shavings or pellets), egg flats, pallets
• Hatchery waste
• Leftover feed
• Eggs and egg product that cannot enter the food supply
• PPE (personal protective equipment such as Tyvek coveralls, gloves, etc.)
• Cleaning and disinfection materials/supplies
• Or any combination of the above.
Disposal needs beyond bird carcasses:

- Egg Washing System
- Candling of Eggs
- Egg Packaging System
- Eggs in Cartons and in Boxes
Management considerations at landfill:

Leachate Management
• Storage/recirculation/land application?
• County/state specific
• USDA white paper on risk of leachate expected summer 2016

Operations/Logistics
• Consider working hours, scale operations, tracking AI waste, tipping fees, billing, transportation to and from
• Scheduling delivery of waste
• Use of contractors at landfills
• Clean/disinfection/gray water management

Public Relations/Outreach
• MSW vs. private landfill
• Accepting waste can help protect animal and human health
• Work with State/Fed Depts of Agriculture PIO

Regulations/Permitting
• County/state regulations
• Modification of permits needed?
• Will permitting be handled differently in emergency/disease outbreak?
Use of contractors at landfills:

• USDA contractor responsible for logistics and biosecurity, but rely on landfill operators to assist with identifying local resources.
  • Heavy equipment rentals, power sprayer rentals, frac tanks, tents, gravel for roads and command area, wooden mats, odor control mister, portable toilets, food for workers, etc.

• Landfill needs a system for weighing and tracking AI wastes simultaneously with regular MSW receipts.

• Landfill bills USDA, contractor, or producer (depending on who hired the landfill).
Planning/Operations

• Use landfill staff or contractors for excavation and disposal activities (includes cleaning/disinfection of vehicles)?
• Amount of time necessary to excavate trenches?
• Separate areas for MSW and AI waste staging and disposal.
• Dedicated trucks and decontamination areas for the hot, warm, and cool zones (typically supplied by contractor).
• Ability of farms to stage wastes on-site to control timing of delivery to landfills.
  • Consider both space and container constraints.
• How many loads of wastes can the landfill expect to receive based on the size of farm and the amount of time it takes to depopulate and containerize wastes?
• How will landfill control odor, flies, scavenger birds/wildlife?
On Site Operations
Scale house
Roll-off Staging Area/Access Road

Courtesy Rebecca Joniskan
Command Area

Courtesy Rebecca Joniskan
Command Area: PPE Supplies
Command Area: USDA and Contractor Office
Full Roll-off Staging Area

Truck tire decontamination in foreground.

Courtesy Rebecca Joniskan
Excavated disposal trench
Excavated disposal trench

Courtesy Rebecca Joniskan
Full load approaching disposal trench.
Tailgate being unlatched; hot zone delineated by yellow caution tape.
Preparing to dispose of load. Excavator and delivery truck personnel communicate using a series of honks.
Disposal of waste in trench.

Courtesy Rebecca Joniskan
Breaching of waste bag: State- or locality-specific regulations.

Courtesy Rebecca Joniskan
Constructed road at landfill. Contractors cleaning and disinfecting roll-offs after tipping.
Truck tire decontamination adjacent to a hot zone.
Decontamination station

Courtesy Rebecca Joniskan
Decontamination station: roll-offs are steam cleaned after disposal using a power-sprayer with bleach and surfactant. Decontamination liquids are collected and pumped into a frac tank for off-site disposal.

Courtesy Rebecca Joniskan
Decontamination of tarp.

Courtesy Rebecca Joniskan
Removing liner at decontamination station. Disposed of in landfill with other contaminated PPE.
Wooden crane mats.

Courtesy Rebecca Joniskan
Wooden crane mats.
Odor control product and mister unit.
Final truck tire decontamination station at facility exit.

Courtesy Rebecca Joniskan
Landfill Challenges in 2015 IA Outbreak

- Concerns about risk of infected leachate, protection of operators, public opposition, and potential lawsuits.
- APHIS, state DNR and landfill companies developed waste acceptance criteria to address operational issues.
- APHIS, CDC and NIOSH developed safety guidelines for operators.
- APHIS developed Frequently Asked Questions for public.
- Landfill companies requested federal indemnification but it was prohibited by law.
Lessons learned in Iowa and Minnesota:

• Educate people before a disease outbreak.

• Because of the potential volume of birds and waste materials, large landfills are ideal for birds and smaller ones could take egg or hatchery waste, PPE, etc.

• States worked to modify transportation weight restrictions in case of an outbreak, allowing larger (but still safe) loads to be hauled. States rerouted trucks to avoid passing poultry farms.

• Keep documentation for HPAI operations separate.

• Consider the weather, road conditions, and any extra equipment needed.

• Odor and fly control.

• Work with USDA APHIS LPA or IMT’s Public Information Officer to craft appropriate messaging for stakeholders and public.
Support for Landfills

• For any who may be interested in accepting HPAI waste, state, federal and industry partners would work closely to ensure:
  • Worker safety, including in person training and supplying with any PPE needs.  **Most important!**
  • Work to establish SOPs for accepting waste that will be beneficial to your operation.
  • Supply contractors if needed to bring in roll-offs and trucks, assist in tipping, cleaning and disinfection, directing traffic, and managing a staging area.
  • *Landfill may be hired by a state or federal government, clean up contractor, or by a poultry grower/company.*
  • We will work with you to manage public perception, prepare for town hall meetings if needed- *landfills could provide a valuable public service by assisting in disposal during an outbreak.*
Interested?

- USDA can supply job aids that have already been developed and can work one on one with landfills to facilitate their involvement.

- To start the process of becoming a federal contractor:
  - [www.sam.gov](http://www.sam.gov)

This process can take several weeks, so please plan ahead.
Other Resources on HPAI and Landfills

Information about HPAI and landfills:


CDC guidelines for landfill workers:


Reach out to your State departments of agriculture, USDA, or poultry producers to let them know of your interest.
Please contact with questions or concerns:

[add presenter’s contact information]