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Update on the Highly-Pathogenic Avian Influenza Outbreak of 2014-2015

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July 20, 2015

Congressional Research Service

7-5700

www.crs.gov

R44114

Summary

The U.S. poultry industry is experiencing a severe outbreak of highly-pathogenic avian influenza (HPAI). The U.S. Department of Agriculture's (USDA's) Animal and Plant Health Inspection Service (APHIS) has reported 223 cases of HPAI in domestic flocks in 15 states. With the start of summer, the finding of new cases slowed. The last reported new case was in Iowa on June 17, 2015. More than 48 million chickens, turkeys, and other poultry have been euthanized to stem the spread of the disease. Cases have been caused by several highly pathogenic H5 avian influenza (AI) strains that result in substantial mortality in domestic poultry. Turkey and egg-laying hen farms in Minnesota and Iowa have been hardest hit. Commercial broiler farms have not been affected to date. According to the Centers for Disease Control and Prevention (CDC), no infections in humans have been associated with the HPAI outbreak, and the public health risk is low.

Under the Animal Health Protection Act (AHPA; 7 U.S.C. §8301 et seq.), APHIS, in cooperation with state and local animal health officials, has the authority to take extraordinary measures, such as seizing, restricting movement, or euthanizing animals to protect the health of animals. During the current outbreak, APHIS has paid to euthanize poultry, clean and disinfect poultry premises and equipment, and then test for the AI virus to ensure poultry farms can be safely repopulated. USDA has indemnified poultry owners for euthanized poultry.

USDA has received approval to use nearly \$700 million in additional funds from the Commodity Credit Corporation (CCC) to address HPAI. As of July 7, 2015, APHIS has committed over \$500 million of the \$700 million to help producers control the spread of HPAI, including \$190 million for indemnity payments. The agency is committed to covering cleaning and disinfecting costs on affected farms.

The cost of the HPAI outbreak to the poultry industry is high. The value of turkey and laying hen losses is estimated at nearly \$1.6 billion. Economy-wide losses are estimated at \$3.3 billion. Since the HPAI outbreak in December 2014, 18 U.S. trading partners have imposed bans on all shipments of U.S. poultry and products, and 38 trading partners have imposed partial, or regional, bans on shipments from states or parts of states with HPAI cases. China, Russia, and South Korea, 3 of the top 10 destinations for U.S. poultry meat in 2014, have banned all imports of U.S. poultry.

It is believed that an HPAI outbreak is likely to occur again in the fall when wild birds begin their migrations through the four flyways. This may result in more spread of AI, possibly in the poultry-producing eastern and southeastern regions untouched by the current outbreak. APHIS and the poultry industry are taking lessons from the current outbreak to prepare for the fall. USDA is developing a vaccine to be available for manufacture if the agency decides to adopt a vaccination policy to manage any future outbreak. APHIS and the poultry industry are reassessing biosecurity, indemnity payment formulas, and other measures that aim to improve the containment and elimination process.

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The U.S. poultry industry is experiencing a severe outbreak of highly-pathogenic avian influenza (HPAI).¹ As of June 17, 2015, the U.S. Department of Agriculture's (USDA's) Animal and Plant Health Inspection Service (APHIS) reported 223 cases of HPAI in domestic flocks in 15 states. (In this context, a "case" is an affected premise.) More than 48 million chickens, turkeys, and other poultry have been euthanized to stem the spread of the disease. Cases have been caused by several highly pathogenic H5 avian influenza (AI) strains that result in substantial mortality in domestic poultry.² Turkey and egg-laying hen farms in Minnesota and Iowa have been hardest hit. Commercial broiler farms have not been affected to date. According to the Centers for Disease Control and Prevention (CDC), no infections in humans have been associated with the current HPAI outbreak, and CDC considers the public health risk to be low.

Prior HPAI outbreaks in the United States occurred in 1924, 1983, and 2004. The 1924 and 2004 outbreaks were quickly contained. To control the 1983 outbreak, 17 million birds were euthanized in the U.S. northeast. Outbreaks of low pathogenic avian influenza (LPAI) are more frequent, but result in minor illness in poultry. Nonetheless, efforts are made to also eliminate LPAI outbreaks, because LPAI strains could potentially mutate to become more pathogenic.

Established U.S. animal health policy is to eliminate the AI virus (both HPAI and LPAI strains), when it is found, through depopulation (i.e., euthanasia and disposal) of affected poultry. APHIS, state, and local animal health officials euthanize poultry, clean and disinfect premises and equipment, and then test for elimination of the virus to ensure that farms can be safely restocked. USDA indemnifies poultry owners and pays for cleaning, disinfecting, and testing. This process is time consuming, and poultry producers lose significant income as barns and laying houses are out of production for several months. The poultry export sector is also faced with numerous bans on shipments of U.S products. With loss of production, consumers see higher retail prices.

Onset of the HPAI Outbreak

The current HPAI outbreak was discovered in December 2014 in backyard flocks in the Pacific Northwest, and in two commercial turkey and chicken flocks in California. It is thought to have been introduced from Eurasia by wild birds migrating along the Pacific flyway and has continued to move eastward to and along the Central and Mississippi flyways (see **Figure 1**). It is primarily infecting flocks of egg-laying hens in Iowa and turkeys in Minnesota, with cases in several other states (see **Figure 2**). In addition to cases in domestic flocks, outbreak strains of HPAI have been found in free-ranging and captive wild birds in Washington, Oregon, Idaho, Montana, California, Nevada, Utah, New Mexico, Wyoming, Kansas, Missouri, Kentucky, Michigan, and Wisconsin.³

¹ USDA provides updates on the HPAI outbreak on its website at http://www.usda.gov/wps/portal/usda/usdahome?contentidonly=true&contentid=avian_influenza.html.

² Most of the cases in the Midwest are from the H5N2 strain. The Asian H5N1 strain that reemerged in China in 2003 has public health implications and has not been found in humans or poultry in the current outbreak. Centers for Disease Control and Prevention (CDC), "Information on Avian Influenza," <http://www.cdc.gov/flu/avianflu/index.htm>.

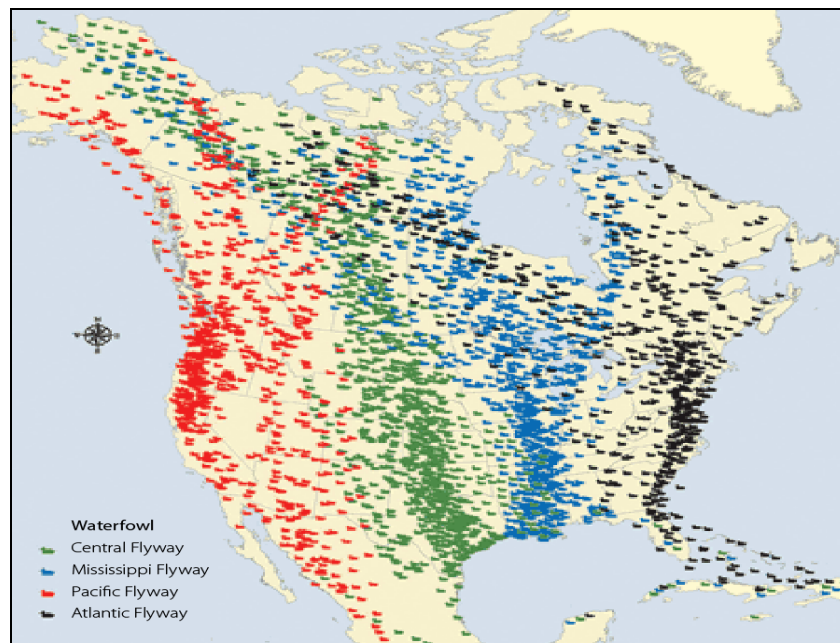
³ HPAI findings in wild birds are reported at http://www.aphis.usda.gov/wildlife_damage/downloads/WILD%20BIRD%20POSITIVE%20HIGHLY%20PATHOGENIC%20AVIAN%20INFLUENZA%20CASES%20IN%20THE%20UNITED%20STATES.pdf.

In June 2015, APHIS issued a report on the epidemiology of the outbreak. Although its studies showed that wild birds probably introduced the virus into U.S. poultry flocks, APHIS said that lapses in biosecurity practices—such as movement of vehicles, equipment, and persons from infected to uninfected farms—contributed to the continued spread of the virus. APHIS also raised concern about possible airborne spread of the AI virus.⁴

In general, colder temperatures favor transmission of influenza viruses, and cooler temperatures in the spring of 2015 could have extended the spread of HPAI. With the start of summer, the rate of new cases slowed. The last reported new case was in Iowa on June 17, 2015. Despite this, USDA said it is preparing for the possibility that HPAI could resurge in the fall as migratory birds fly south for the winter.⁵ With all flyways likely involved, HPAI could be introduced into large poultry production areas in the southeastern United States that have not been affected so far. In June 2015, APHIS updated interagency surveillance plans for migratory birds—a collaboration of APHIS, the U.S. Fish and Wildlife Service, the U.S. Geological Survey, state and local governments, and the private sector—with the goal of early detection and monitoring of HPAI before it again threatens domestic poultry flocks.⁶

Figure 1. North American Flyways for Waterfowl

Pathways for Avian Influenza



Source: U.S. Fish and Wildlife Service.

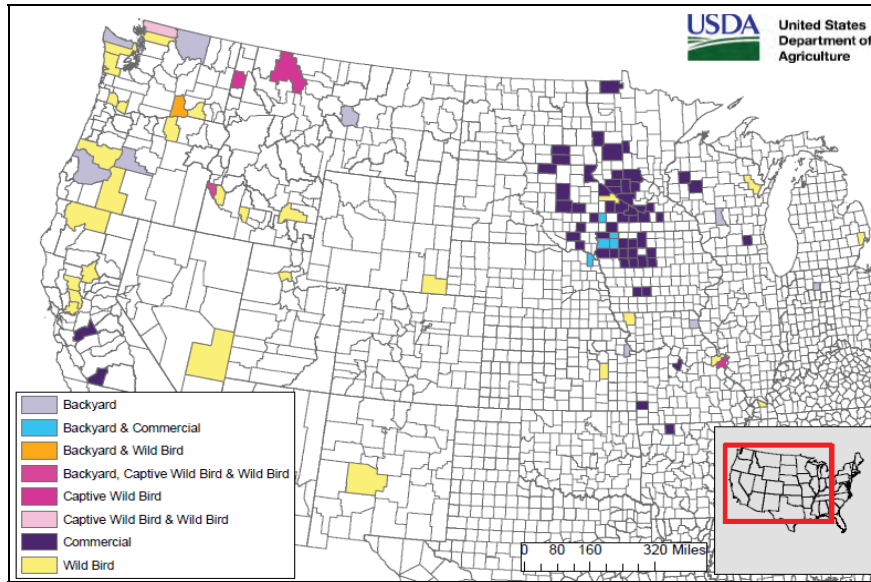
⁴ APHIS, *Epidemiologic and Other Analyses of HPAI-Affected Poultry Flocks: June 15, 2015 Report*, June 15, 2015, http://www.aphis.usda.gov/animal_health/animal_dis_spec/poultry/downloads/Epidemiologic-Analysis-June-15-2015.pdf.

⁵ Thorton, Gary, “Analysis: Avian Flu Will Be in All Flyways This Fall,” *WATTAgNet*, June 18, 2015.

⁶ APHIS, *Surveillance Plan for Highly Pathogenic Avian Influenza in Waterfowl in the United States*, June 2015, http://www.aphis.usda.gov/animal_health/downloads/animal_diseases/ai/2015-hpai-surveillance-plan.pdf; and *Early Detection and Monitoring for Avian Influenzas of Significance in Wild Birds*, June 2015, http://www.aphis.usda.gov/animal_health/downloads/animal_diseases/ai/wild-bird-strategic-plan.pdf.

Note: The four U.S. migratory flyways show the predominant routes of north-south seasonal migration. The routes overlap somewhat over the United States, and converge in both the summer and winter ranges in Canada and Latin America, respectively. As a result, infectious diseases are often transmitted across flyways.

Figure 2. Location of HPAI Detections, Including Wild Birds
By county as of June 18, 2015



Source: USDA, APHIS.

HPAI Cases to Date

From December 2014 through June 17, 2015, there were 223 cases of HPAI in domestic flocks in 15 states (see **Table 1**). Of the 48 million birds euthanized to control this outbreak, the vast majority were chickens, specifically egg-laying hens (38.4 million). In Iowa, more than 25 million egg-laying hens and 5 million pullets (young chickens that have not entered the egg-laying flock) were euthanized. Nearly 7.8 million turkeys were euthanized, with the majority (4.8 million) on Minnesota farms. Iowa turkey farms have had 1.5 million euthanized birds. In addition to the cases in commercial operations, 20 cases in 11 states involved backyard flocks, affecting about 10,000 birds. Most of these cases were classified as mixed poultry, which may include quail, guinea fowl, ducks, geese, and pheasants.

Table 1. HPAI Cases in Domestic Flocks in the United States in 2014-2015
Last finding was on June 17, 2015

State	Cases	Species Infected	# of Affected Birds
Arkansas	1	turkey	40,020
California	2	chicken, turkey	247,300
Idaho	1	mixed poultry	30
Indiana	1	mixed poultry	N/A
Iowa	75	chicken, turkey, mixed poultry, duck	31,723,300

State	Cases	Species Infected	# of Affected Birds
Kansas	1	mixed poultry	10
Minnesota	105	turkey, chicken, mixed poultry	8,996,050
Missouri	3	turkey, mixed poultry	53,100
Montana	1	mixed poultry	40
Nebraska	4	chicken	3,794,100
North Dakota	2	turkey, mixed poultry	111,500
Oregon	2	mixed poultry	200
South Dakota	10	chicken, turkey	1,168,200
Washington	5	mixed poultry	6,710
Wisconsin	10	turkey, chicken, mixed poultry	1,950,733
Total	223		48,091,293

Source: USDA, APHIS. Data from December 2014 through June 17, 2015.

Notes: N/A is not available. Mixed poultry cases are usually from backyard flocks. Chicken (egg-laying hens, pullets) and turkey cases are on commercial operations.

In addition, HPAI findings in wild birds have been reported in 14 states.

Containing and Eliminating HPAI

Established U.S. animal health policy is to eliminate the AI virus through depopulation of poultry where the virus is found. In order to achieve this, the Animal Health Protection Act (AHPA; 7 U.S.C. §8301 et seq.) authorizes USDA to take extraordinary measures, such as seizing, restricting movement, or euthanizing animals to protect the health of animals.⁷ USDA has established a five-step process that federal and state responders use to address HPAI:⁸

1. Quarantine—restrict movement of poultry and poultry-moving equipment into and out of the control area;
2. Eradicate—humanely euthanize affected flocks;⁹
3. Monitor region—test wild and domestic birds in a broad area around the outbreak;
4. Disinfect—kill the virus in the affected flock locations and operations; and
5. Test—confirm the poultry farm is AI virus-free.

APHIS, in cooperation with state and local animal health officials, euthanize poultry, disinfect and clean poultry premises and equipment, and then test for the virus to ensure poultry farms can be safely repopulated. Poultry owners are indemnified for euthanized poultry, and APHIS pays for cleaning and disinfecting, and testing.

⁷ Regulations governing HPAI are in 9 C.F.R. Part 53.

⁸ APHIS, *Questions and Answers: Highly Pathogenic Avian Influenza*, May 2015, http://www.aphis.usda.gov/animal_health/downloads/animal_diseases/ai/QA-producerquestionsHPAI.pdf.

⁹ APHIS has primarily used a water-based foaming method for turkeys and CO₂ for laying hens.

Once laboratory tests indicate a presumptive positive for HPAI, the poultry producer must develop a flock plan. The flock plan establishes the steps that will be taken to eliminate the virus, and to clean and disinfect the premises in order to be able to resume business. The flock plan must be signed by the producer, a state animal health official, and APHIS. After the flock plan is in place, APHIS prepares an appraisal document for indemnity.

Compensation

Under the authority of the AHPA (7 U.S.C. §8306(d)), USDA compensates producers for birds that must be euthanized. Payment is based on the “fair market” value as determined by USDA appraisers.¹⁰ Based on the inventory, age, and intended use of birds, APHIS prepares an appraisal calculated on available prices, costs, and bird productivity. The indemnity is usually for 100% of the appraised value. APHIS also pays for the disposition of birds and for destruction of infected materials. Producers are neither compensated for birds that die prior to the confirmation of HPAI, nor for lost income from barns and hen houses being idle. If the producers elect to perform some of the tasks involved in eliminating HPAI, they must sign a compliance agreement with APHIS that identifies who is responsible for what tasks, and what it is expected to cost. Some producers may choose this option in order to keep their workers employed through the outbreak crisis.

Disposition and Restocking

Each state develops HPAI response plans that account for specific environmental and resource requirements in each state. APHIS works with the states and poultry producers to identify which of the options works best given the conditions at the premises—flock size, space, depopulation method—and meet state and local requirements. Usually euthanized birds may be disposed of through composting, landfills, burial, and incineration. It takes around 30 days for bird carcasses that are composted to be cleared as virus free.

In general, repopulation of barns or hen houses may not begin for at least 21 days (the incubation period for the AI virus) after barns and hen houses are cleaned and disinfected, and environmental testing of the premises is completed. The actual number of days may vary for each case. Also, the area around the premises to be restocked must be assessed for risk of the premises becoming infected again. Producers must have written approval from APHIS and state officials to restock a facility. As a condition for restocking, producers are required to follow surveillance, movement, and biosecurity requirements. If a farm restocks without the approval of APHIS and state officials, APHIS will not indemnify the producer should the restocked flock become infected again.

Restocking will vary by the type of operation affected by the outbreak. Egg-laying hen operations will phase restocking to reestablish variable hen ages in the flock. The age variability allows for even, year-round egg production. This phased restocking could take 18 months or more to accomplish before the producer will reestablish a normal income flow. A turkey operation, on the other hand, will restock the barn with birds of similar age that will be market-ready at about the same time. An HPAI outbreak results in a significant income disruption for the producers, which existing indemnities address only in part.

¹⁰ APHIS, *HPAI Outbreak 2014-2015, Indemnity Procedures*, April 22, 2015, http://www.aphis.usda.gov/animal_health/emergency_management/downloads/hpai/indemnity_procedures.pdf.

HPAI and Public Health

As deadly as they are in poultry, most HPAI strains are not easily transmissible to humans. However, influenza viruses mutate and transfer genes with notable frequency, and public health officials track H5 avian influenza strains for signs of increased risk of human infection.¹¹

According to the Centers for Disease Control and Prevention (CDC), no infections in humans have been associated with the ongoing HPAI outbreak, and CDC considers the public health risk to be low. However, human infections with other AI strains have occurred, most often in persons, such as poultry workers, who have had close contact with infected birds. With the possibility of bird-to-person infection, CDC's National Institute for Occupational Safety and Health (NIOSH) and the Department of Labor's Occupational Safety and Health Administration (OSHA) advise all farm workers and responders to the outbreak to wear proper protective clothing, practice good hand washing and showering practices, and participate in health monitoring programs for a period of time after exposure to infected poultry.¹²

In addition to guidance for poultry workers, CDC has developed guidance for health officials and providers for monitoring, diagnosis, and treatment of infections in humans.¹³ According to CDC testimony before the Senate Homeland Security and Governmental Affairs Committee, the agency has also issued guidance to state preparedness officials to allow the use of federally subsidized antiviral medications stockpiled at the state level, and instructions for requesting supplies from the Strategic National Stockpile if needed. In addition, CDC has developed an HPAI virus strain that could be used to produce a vaccine for use in humans, if needed.¹⁴

Funding for the HPAI Response

In the event of an animal health emergency, USDA has the authority¹⁵ to request additional funds from the Commodity Credit Corporation (CCC)¹⁶ as necessary, and the Office of Management and Budget (OMB) may make an apportionment to provide money to contain and eliminate an animal disease. APHIS noted in its FY2016 budget document that an AI outbreak similar to the

¹¹ Centers for Disease Control and Prevention (CDC), "Information on Avian Influenza," <http://www.cdc.gov/flu/avianflu/index.htm>.

¹² CDC, "Recommendations for Worker Protection and Use of Personal Protective Equipment (PPE) to Reduce Exposure to Highly Pathogenic Avian Influenza A H5 Viruses," updated June 2, 2015, <http://www.cdc.gov/niosh/topics/avianflu/default.html>; and OSHA, "Guidance for Protecting Employees Against Avian Flu," <https://www.osha.gov/dsg/guidance/avian-flu.html>.

¹³ CDC, "Bird Infections with Highly-Pathogenic Avian Influenza A (H5N2), (H5N8), and (H5N1) Viruses: Recommendations for Human Health Investigations and Response," CDC Health Advisory, June 2, 2015, <http://emergency.cdc.gov/han/han00378.asp>.

¹⁴ Senate Homeland Security and Governmental Affairs Committee hearing, *Stopping an Avian Influenza Threat to Animal and Public Health*, July 8, 2015, testimony of Dr. Anne Schuchat, MD, Director, National Center for Immunization and Respiratory Diseases, CDC.

¹⁵ AHPA, 7 U.S.C. §8316.

¹⁶ For information on CCC, see CRS Report R43669, *Agriculture and Related Agencies: FY2015 Appropriations*, Agriculture and Related Agencies: FY2015 Appropriations.

1980s outbreak could cost in excess of \$1 billion for control and indirect costs to the poultry industry.¹⁷

The Senate and House Agriculture Committees, in a recent letter to OMB, expressed concern about the need for adequate funding and encouraged USDA to pursue whatever funding is necessary.¹⁸ USDA has received approval to use additional funds for HPAI from the CCC of nearly \$700 million.¹⁹ As of July 7, 2015, APHIS has committed over \$500 million to help producers control the spread of HPAI, including \$190 million for indemnity payments.²⁰

Separately, the ongoing annual appropriation to APHIS for avian health has been about \$52 million in recent years. According to USDA, the avian health program includes AI prevention and control activities; avian health and management studies; disease threat planning and response for the livestock, poultry, and zoological industries; comprehensive poultry disease surveillance (including wildlife surveillance); and zoonotic disease prevention and response. The National Poultry Improvement Plan (NPIP), a cooperative federal-state-industry program focused on AI surveillance, is funded through the avian health appropriation.²¹

On July 8, 2015, the House Committee on Appropriations marked up the FY2016 agriculture appropriations bill (H.R. 3049), which includes \$55 million for avian health, \$3 million more than appropriated for FY2015. The House bill also includes an additional \$5 million, on top of a base of \$7 million, for the APHIS portion of funding for the National Animal Health Laboratory Network (NAHLN). APHIS has been utilizing funds apportioned from CCC to reimburse the NAHLN for HPAI testing.

On July 16, 2015, the Senate Committee on Appropriations marked up the FY2016 agriculture appropriations bill (S. 1800), which would provide APHIS with \$52 million for avian health, unchanged from FY2015.

The House and Senate Appropriations Committee reports (H.Rept. 114-205 and S.Rept. 114-82) accompanying the FY2016 agriculture appropriations bills also would direct USDA to use its existing authority to transfer funds from CCC as needed to address the HPAI outbreak.

Economic Impacts of the HPAI Outbreak

The cost of the HPAI outbreak to the poultry industry is high. The direct losses from euthanized turkeys and egg-laying hens are estimated at nearly \$1.6 billion, \$530 million for turkeys and

¹⁷ APHIS, *2016 Explanatory Notes*, Congressional Justification, February 2015, p. 20-21, <http://www.obpa.usda.gov/20aphis2016notes.pdf>.

¹⁸ Senate and House Agriculture Committees, "Agriculture Committee Leadership Ask for Avian Flu Emergency Assistance," press release, April 29, 2015, <http://agriculture.house.gov/press-release/agriculture-committee-leadership-ask-avian-flu-emergency-assistance>.

¹⁹ Table of CCC fund transfer history, provided by APHIS.

²⁰ Senate Committee on Agriculture, Nutrition and Forestry, *Highly Pathogenic Avian Influenza: The Impact on the U.S. Poultry Sector and Protecting U.S. Poultry Flocks*, July 7, 2015, testimony of Dr. John Clifford, DVM, Deputy Administrator, Veterinary Services, APHIS, <http://www.ag.senate.gov/hearings/highly-pathogenic-avian-influenza-the-impact-on-the-us-poultry-sector-and-protecting-us-poultry-flocks>. (Hereinafter referred to as the Senate Agriculture Committee HPAI hearing.)

²¹ APHIS, *2016 Explanatory Notes*, p. 20-21.

\$1.04 billion for laying hens. These estimates do not cover such activities as clean-up and restocking, or future lost production. Other sectors of the economy, such as feed and trucking, have suffered losses from lost business with the poultry industry, and egg shortages have caused higher prices for food processors and consumers in retail markets. The economy-wide impact to date is estimated at \$3.3 billion.²²

Turkeys

The nearly 7.8 million turkeys euthanized during the outbreak amounts to about 3% of the turkeys produced in the United States in 2014. In February 2015, before HPAI began infecting turkey flocks, USDA forecasted that turkey meat production would rise 6% in 2015. As a result of HPAI, USDA expects 2015 production to be more than 3% lower than in 2014.²³ With decreased supplies, USDA raised its forecast for national wholesale turkey prices for 2015. Recovery from the HPAI outbreak is also expected to slow turkey production into 2016. USDA reports that fewer poults (young turkeys) are being placed on feed for growout through May. Turkey operations affected by HPAI in early March did not come back online until June because of the time needed to clean, disinfect, and test to ensure farms are free of the HPAI virus.

The potential for Thanksgiving supply disruptions may be relatively small because the industry has had time to prepare. According to agricultural economists from the University of Illinois, stock building of whole turkeys held in cold storage typically starts in December and continues through the summer.²⁴ USDA cold storage data shows that supplies of whole turkey at the end of May 2015 were 3% higher than a year ago.

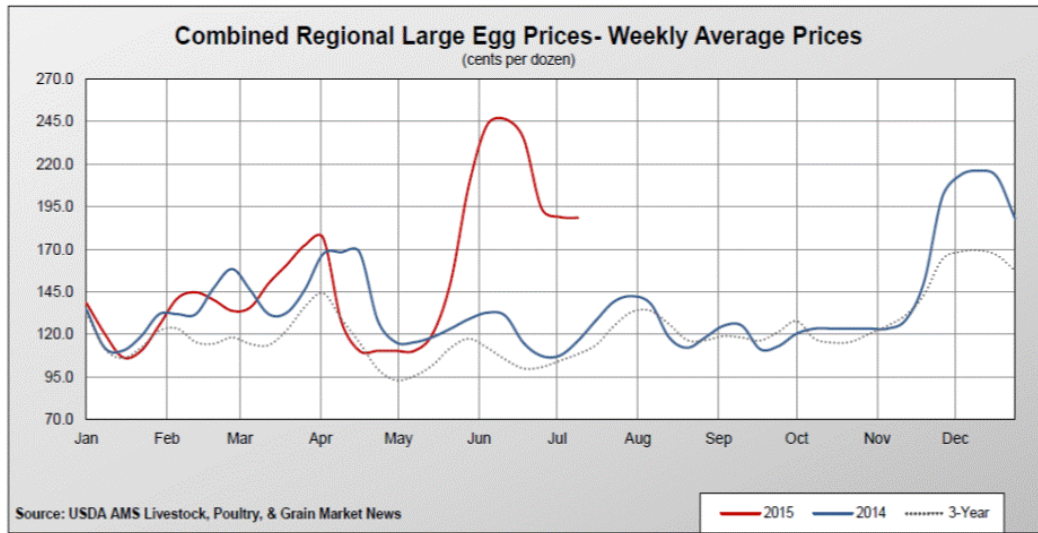
Eggs

On June 22, 2015, USDA reported that there were 341 million egg-laying hens on U.S. farms during May, down 5% from a year earlier. Hardest hit has been Iowa, where the number of laying hens was down 26% from a year earlier. Hens euthanized because of HPAI account for 11% of the total U.S. egg-laying flock. USDA forecasts 2015 egg production to decline 4% in 2015, and its benchmark New York Grade A large egg price is forecast to be 19% higher than in 2014. Wholesale egg prices increased significantly in May, topping out at nearly \$2.50 per dozen in early June. Prices retreated some by the end of June and leveled off during July (see **Figure 3**).

²² Senate Agriculture Committee HPAI hearing, testimony of Dr. Tom Elam, FarmEcon LLC.

²³ World Agricultural Outlook Board (WAOB), *World Agricultural Supply and Demand Estimates*, July 10, 2015, p. 31, <http://usda.mannlib.cornell.edu/usda/current/wasde/wasde-07-10-2015.pdf>. USDA forecast data for broilers, turkeys, and eggs are sourced from the July 10, 2015 WAOB report.

²⁴ Newton, J., and T. Kuethe, "Economic Implications of the 2014-2015 Bird Flu," *farmdoc daily* (5):104, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, June 5, 2015.

Figure 3. U.S. Wholesale Egg Prices

Source: USDA, Agricultural Marketing Service.

Many of the egg farms infected with HPAI in Iowa supplied breaking eggs (used to produce eggs in liquid form) to food manufacturers, particularly the baking sector. When supplies of breaking eggs tightened, the price of table eggs sold in retail or the food service sectors increased. Food manufacturers began to bid up the price of eggs to pull supplies away from the table egg market and into the breaking market. Reportedly, H.E.B., a Texas grocery chain, limited the number of eggs that could be purchased in its stores in order to prevent commercial buyers from emptying retail supplies.²⁵

Imports of eggs and egg products are limited. In order to address tight egg supplies, on June 1, 2015, the USDA's Food Safety and Inspection Service (FSIS) certified that five establishments in the Netherlands would be eligible to ship pasteurized egg products to the United States.²⁶ Canada is also eligible to ship egg products to the United States.

Broilers

Because HPAI has not hit major commercial broiler-producing areas, the primary impact of HPAI on the broiler sector has been in the trade arena (see "Trade Implications" below). Broiler meat production is expected to increase 5% in 2015. With a slowdown in broiler meat exports, USDA's cold storage data at the end of May 2015 shows a 21% increase in broiler meat stocks compared with a year ago. Lower exports and higher stocks have pushed down broiler meat prices. For the week ending July 10, 2015, wholesale broiler prices were 12% lower than a year earlier.

²⁵ Strom, S., "Bird Flu Send Egg Prices Up, But Slowing Demand Prevents Shortages," *New York Times*, June 16, 2015.

²⁶ FSIS, *Netherlands - Eligible Plants Certified to Export Egg Products to the United States*, June 1, 2015, http://www.fsis.usda.gov/wps/wcm/connect/3e46dda8-4669-4f71-b2ff-60f90d05f394/Netherlands_Egg_establishments.pdf?MOD=AJPERES.

Trade Implications

In 2014, the United States exported to global markets over 4 million metric tons of poultry meat, valued at \$5.5 billion (see **Table 2**). The vast majority of exports was broiler meat (\$4.1 billion), followed by turkey (\$767 million) and other poultry meat (\$671 million). In addition, the United States exported \$637 million worth of eggs and egg products in 2014. In 2014, the United States exported 19% of its broiler meat production, 14% of turkey output, and 5% of eggs.

For 2015, USDA forecasts broiler meat exports to be more than 6% lower than in 2014, turkey exports 26% lower, and egg exports nearly 8% lower. Data for 2015 U.S. poultry exports are available for the January-May period. Broiler meat exports are 9% lower compared with the same period a year ago. Turkey exports are 17% lower, but egg exports are up 11% because of strong shipments to Mexico.²⁷

Table 2. Top 10 Poultry Meat Export Markets in 2014

	\$ million	Current Bans on U.S. Poultry due to HPAI
Mexico	1,282	Regional
Canada	589	Regional
Hong Kong	521	Regional
China	315	Total
Angola	264	*
Russia	150	Total
Cuba	148	Regional
Taiwan	143	Regional
South Korea	113	Total
Guatemala	104	Regional
Top 10 Total	3,630	
All Poultry Meat Exports	5,501	

Sources: USDA, Foreign Agricultural Service, Global Agricultural Trade System Online. Poultry meat includes broiler meat, turkey, and other poultry meat. Ban information is from the Export Library, Food Safety and Inspection Service, USDA.

Notes: * Information on Angola is not included in the Export Library. <http://www.fsis.usda.gov/wps/portal/fsis/topics/international-affairs/exporting-products/export-library-requirements-by-country>.

Totals may add due to rounding.

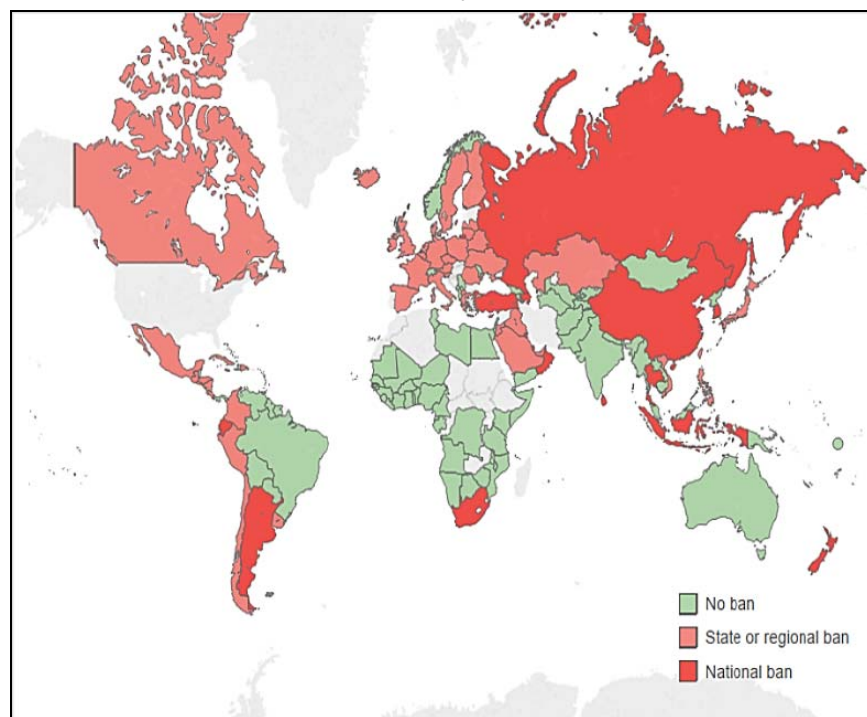
Since the HPAI findings in December 2014, 18 trading partners have imposed bans on all shipments for U.S. poultry and products, and 38 trading partners have imposed partial, or regional, bans on shipments from states or parts of states experiencing cases (see **Figure 4**). China, Russia, and South Korea, 3 of the top 10 destinations for U.S. poultry meat in 2014, have banned all imports of U.S. poultry. Based on World Organization for Animal Health (OIE) avian

²⁷ USDA, Economic Research Service, *Livestock & Meat International Trade Data*, <http://www.ers.usda.gov/data-products/livestock-meat-international-trade-data.aspx>.

influenza guidelines, regional, or compartmental, bans are acceptable for handling concerns with disease and effects on trade.²⁸ If USDA decides to implement a vaccine strategy to address an HPAI outbreak should it occur later this year, the U.S. poultry industry could experience increased disruptions in trade. Some trading partners have already told APHIS that if the United States adopts a vaccination strategy for HPAI, they will halt all trade until risk assessments of the U.S. strategy can be evaluated (see “Vaccine Use Policy”).

Figure 4. Bans on U.S. Poultry

Trade bans as of June 15, 2015



Source: USDA, Economic Research Service.

Note: Excluding the United States, information not available for gray areas.

Selected Issues

On July 7, 2015, the Senate Committee on Agriculture, Nutrition and Forestry held a hearing on the HPAI outbreak and its impact on the poultry sector, and on July 8, 2015, the Senate Homeland Security and Governmental Affairs Committee held a hearing reviewing the threat of avian influenza to animal and public health.²⁹ The hearings covered the experiences and lessons learned

²⁸ OIE, *Terrestrial Animal Health Code*, Chapter 10.4, Infection with Avian Influenza Viruses, http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_avian_influenza_viruses.htm.

²⁹ Senate Committee on Agriculture, Nutrition, and Forestry, *Highly Pathogenic Avian Influenza: The Impact on the U.S. Poultry Sector and Protecting U.S. Poultry Flocks*, July 7, 2015, <http://www.ag.senate.gov/hearings/highly-pathogenic-avian-influenza-the-impact-on-the-us-poultry-sector-and-protecting-us-poultry-flocks>; and Senate Committee on Homeland Security and Governmental Affairs, *Stopping an Avian Influenza Threat to Animal and Public Health*, July 8, 2015, <http://www.hsgac.senate.gov/hearings/stopping-an-avian-influenza-threat-to-animal-and-public-health> (continued...)

from containing and eliminating the current outbreak, and touched on issues to be addressed for the future.

It is believed that an HPAI outbreak is likely to occur again in the fall when wild birds begin their migrations through the four flyways. This may likely result in more spread of AI, possibly in the poultry-producing eastern and southeastern regions untouched during the current outbreak. In response to questions from the Agriculture Committee, APHIS stated that it is preparing for the worst-case scenario this fall and defined this as 500 HPAI cases spread through 20 major poultry producing states, infecting turkey, laying hen, and broiler premises.

The following sections discuss several issues that were raised during the hearings and are expected to be the focus of preparations for another potential outbreak in the fall/winter: vaccine use, biosecurity, timeliness, indemnification, and stakeholder communications.

Vaccine Use Policy

The World Organization for Animal Health (OIE) recommends that poultry flocks be depopulated to eliminate the AI virus. The OIE recognizes, however, that some countries may choose vaccination as part of their HPAI containment and elimination strategy. OIE states that:

Culling may be complemented by a vaccination policy for poultry in a high-risk area. Vaccination aims to protect the susceptible population of birds from potential infection thereby reducing the incidence or the severity of disease. Vaccination strategies can effectively be used as an emergency effort in the face of an outbreak or as a routine measure in an endemic area. Careful consideration must be given prior to implementing a vaccination policy and requires that the recommendations from the World Organisation for Animal Health (OIE) on vaccination and vaccines are closely followed. Any decision to use vaccination must include an exit strategy.³⁰

Vaccination is often considered a last resort in HPAI control. Among other concerns, it can mask continued transmission of the disease, making it more difficult for animal health officials to understand, and trade partners to trust, a country's status. Accordingly, OIE recommends that a country plan to adopt vaccination for HPAI control includes a plan to transition back to the preferred culling approach, without vaccination, once it has achieved control through vaccination.

USDA has not approved a vaccine for HPAI.³¹ According to USDA, current AI vaccines are only effective about 60% of the time in chickens. Effectiveness in turkeys is still being evaluated.³² The Southeast Poultry Research Lab (SEPRL), part of USDA's Agricultural Research Service (ARS), develops and evaluates AI vaccines. According to testimony by Dr. David Swayne of SEPRL before the Senate Agriculture Committee, for the next several months the lab will be working on vaccines and vaccination protocols for use in the fall. The challenge for vaccine

(...continued)

health. Hearing videos and witness statements are available on each Senate committee's website. Transcripts are available from *CQ Transcripts*, <http://www.cq.com/transcripts/congressional?1>.

³⁰ OIE, *Avian Influenza*, General Disease Information Sheets, <http://www.oie.int/doc/ged/D13947.PDF>.

³¹ The APHIS Center for Veterinary Biologics regulates vaccines for use in animals.

³² APHIS, *Additional Criteria Must Be Met Before Emergency Use of Vaccine for Highly Pathogenic Avian Influenza Can Be Approved*, Stakeholder Announcement, June 3, 2015.

development is finding one that will be effective against circulating H5 strains, recognizing that the strains change over time. The experience of countries using vaccines for H5N1 strains (99% of H5N1 vaccines are used in China, Egypt, Vietnam, and Indonesia) shows that vaccines fail, effectiveness diminishes over time, and resistance develops.³³

The decision to adopt a vaccine strategy is made by USDA and not state animal health officials. APHIS expects that an effective vaccine could be developed by fall to late fall.

The use of vaccines negatively affects exports of poultry products. According to APHIS, some trading partners have stated that if the United States adopts a vaccination policy, they would immediately ban shipments of U.S. poultry products. The trading partners would conduct risk assessments of U.S. vaccination policy before allowing shipments to resume. APHIS is already engaging with other countries to mitigate impacts on trade if the USDA changes its policy. In order to address the trade issue, SEPRL is engaged in research to distinguish whether immunity in a bird is due to infection or vaccination. This concept has been demonstrated experimentally but is less successful in the field.

The poultry industry is divided over whether or not vaccines should be used to fight HPAI outbreaks. The United Egg Producers (UEP) position is one of caution about vaccine use, in part due to trade issues, and also because the three-vaccine regime in a laying hen would mean increased contact with the birds in the houses. Handling hens during production could cause a decrease in egg output. Other witnesses from the turkey and egg sectors were ready to adopt vaccines as a tool to use against HPAI.³⁴

Biosecurity Practices

USDA's June 2015 epidemiological report identified pathways for the transmission of HPAI. Besides wild birds shedding the AI virus, APHIS found that HPAI may have been spread through lax biosecurity measures. These include sharing of equipment and employees between infected and non-infected farms, the inadequate cleaning of vehicles moving between farms, and the presence of rodents or small wild birds inside poultry barns. APHIS also found that environmental factors could play a role as the HPAI virus was found in air samples that could be transmitted by wind to other farms.³⁵

Scrupulous biosecurity practices may not fully protect against AI. The poultry industry increased biosecurity after the 1980s HPAI outbreak. Other regulations, such as the Food and Drug Administration's *Egg Safety Rule*,³⁶ require egg producers to implement certain biosecurity measures. But as the UEP witness pointed out in testimony, his farm, one of the largest egg farms in Iowa, received a perfect score on a USDA biosecurity audit two months before being infected with HPAI.

³³ Senate Agriculture Committee HPAI hearing, testimony of Dr. David Swayne, Laboratory Director, SEPRL, ARS.

³⁴ Senate Agriculture Committee HPAI hearing, testimony of Brad Moline, on behalf of the National Turkey Federation.

³⁵ APHIS, *Epidemiologic and Other Analyses of HPAI-Affected Poultry Flocks: June 15, 2015 Report*.

³⁶ 21 C.F.R. §118.4 Salmonella Enteritidis (SE) prevention measures.

Biosecurity has often been thought of in terms of farm biosecurity. Biosecurity at the barn or hen house level for operations with multiple facilities may be more effective for an HPAI outbreak. For example, this could mean restricting movement between barns or hen houses on the same farm, requiring different clothing for each, and boosting disinfection measures for equipment shared between each barn. Producers may need to consider adding filtration systems in barns and hen houses because of potential airborne contamination.³⁷

Poultry groups such as the National Turkey Federation and the U.S. Poultry and Egg Association recommend that producers reevaluate their biosecurity programs to prepare for future outbreaks. APHIS will be holding a meeting at the end of July in Iowa to discuss biosecurity issues with state veterinary officials and the poultry industry.

Timely Depopulation and Disposal

Depopulating AI infected birds as quickly as possible is critical to halting the spread of the virus. Poultry producers have been concerned that it took too long between HPAI confirmation and the start and completion of depopulation. APHIS recognizes this concern and is seeking alternatives that could speed the process. APHIS has suggested that shutting off ventilation in barns and laying houses and turning up the heat would humanely euthanize the flocks. This could speed up the depopulation process and save time getting foaming or CO₂ equipment for depopulation in place. APHIS is working with the poultry industry and the American Veterinary Medical Association on the viability of such an approach.

After depopulation, the disposal of dead birds is a considerable challenge for poultry producers. Many of the dead birds were composted, which, once tested to be free of virus, may be used on fields. In Iowa there was concern about moving euthanized poultry to landfills because of fear of virus contamination through feathers, dust, or on vehicles.³⁸ States and the poultry industry are expected to reassess and implement disposal plans to manage a potential fall outbreak.

Indemnity Payments

Egg producers have expressed concern that APHIS, in calculating indemnity payments, is not capturing the true value of future egg production from lost layers. According to the regulations (9 C.F.R. §53.3(b)) that govern HPAI appraisals for indemnity payments, “The appraisal of animals shall be based on the fair market value and shall be determined by the meat, egg production, dairy or breeding value of such animals.” Regulations for low pathogenic avian influenza (LPAI) outbreaks are in a different section (9 C.F.R. §56.4(a)) than the HPAI regulations and address future production. The LPAI regulations specifically state that, “For laying hens, the appraised value should include the hen’s projected future egg production.” Egg industry groups have been in contact with APHIS and have made proposals for changing the indemnity formulas.

In addition, indemnity regulations require payment to owners of poultry, but many poultry producers are contract growers and not the owners of the birds. This raises concerns about whether some producers are being adequately indemnified. LPAI regulations (9 §C.F.R. 56.8(a))

³⁷ Senate Committee on Homeland Security and Governmental Affairs, *Stopping an Avian Influenza Threat to Animal and Public Health*, July 8, 2015, testimony of Dr. John Clifford, APHIS.

³⁸ Clyton, C., “Iowa Dealing with Bird Deaths,” *DTN*, May 8, 2015.

specifically address the contract issue by setting a formula for splitting the indemnity payment between the contractor and the grower. The regulations for HPAI do not include such a provision.

Besides indemnity payments, witnesses suggested that poultry producers need other options, such as insurance policies, to cover losses from an outbreak. The 2014 farm bill (P.L. 113-79) directed USDA's Federal Crop Insurance Corporation to conduct a study to determine the feasibility of insuring poultry producers for a catastrophic event.³⁹ The study was to be submitted to the Senate and House Agriculture Committees one year after the farm bill was enacted (February 2014), but it has not been submitted yet.

Communication with Producers

Some poultry producers believe that communication between APHIS and producers was a problem, at least in the early stages of the outbreak. As APHIS rotates personnel assignments, farms worked with different APHIS employees at different stages, and some producers said this was frustrating and contributed to slowing the containment and elimination process. Also, some producers believed that some APHIS contractors (APHIS has employed 3,000) were not well trained and provided incorrect information.⁴⁰ APHIS indicated that it plans to address communication issues in the future by assigning one APHIS employee to work with each producer dealing with an outbreak from the start to finish of the process. Also, APHIS plans to embed an APHIS employee with each contractor team.⁴¹

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³⁹ Section 11022(a)(21) of P.L. 113-79.

⁴⁰ Senate Agriculture Committee HPAI hearing, testimony of Brad Moline, National Turkey Federation.

⁴¹ Senate Agriculture Committee HPAI hearing, testimony of Dr. John Clifford, APHIS.