

# *Special Report*

## **Perspectives on Avian Influenza Risk Management for Food Safety Professionals**

**Prepared by The International Association for Food Protection®**

Scientists, animal health, and public health advisors from government, academia, and industry are mobilizing to address the Asian form of the H5N1 avian influenza (AI, bird flu) spreading in Southeast Asia. While avian influenza primarily affects birds, health experts also are concerned that events in Southeast Asia could lead to a new human pandemic form, resulting from mutation of the virus or recombination between this virus and the human influenza virus. Given these events, scientists and advisors are cooperating to educate poultry producers, the food industry and the general public about avian influenza. The objective of this brief is to provide food safety professionals with a background on the Asian H5N1 avian influenza virus, methods to control its spread, suitable procedures to inactivate the virus should poultry or eggs be contaminated, and links to agencies for additional details.

Background on influenza: Influenza viruses are ubiquitous and normally attack only the one species they're named after; in other words, bird flu attacks birds. The current bird flu in Southeast Asia is caused by a specific strain of AI virus H5N1. Virus subtypes (ex. H5N3, H7N7) are named based on tests for specific surface proteins, hemagglutinin (H) and neuraminidase (N). Unfortunately, even specific strain designations can cover a whole range of viruses, some of which result in mild illness whereas others have higher morbidity and mortality. Therefore, strain designation itself, such as H7N3 or H5N1, does not provide the entire picture on virulence or ability to transmit between host species.

Recently, bird-to-human transmission of Asian-H5N1 has been responsible for cases of human respiratory disease and deaths in SE Asia. The reported human cases have been few, demonstrating that while the virus is very pathogenic it lacks the ability to easily infect humans. However, an even bigger concern is that sometime in the future, as a result of repeated human infections, this H5N1 poultry strain could mutate or combine with a human flu virus and create a new form that could spread from person-to-person. If this new virus is unique from other flu viruses and retains high virulence, then it has the potential to cause a flu pandemic similar to that seen in 1918, 1957, and 1968. However, at the moment the circulating H5N1 bird flu strain does not have this capability to be transmitted from human to human.

These H5N1 infections are primarily a problem of poultry. The World Organization for Animal Health (OIE) recommends early detection and rapid depopulation of any affected poultry flock in the event highly pathogenic avian influenza (HPAI) is detected. Poultry flocks containing HPAI-affected birds are humanely euthanized and destroyed to prevent the virus from spreading to other birds. Stopping the spread of virus among poultry populations also helps protect human health, as there are fewer opportunities for this virus to infect humans.

More on Avian Influenza: Infection of wild and domestic bird populations by low-pathogenic strains of AI (LPAI) have been reported globally for more than 125 years, carried without symptoms by wild birds, and typically presenting only mild illness in domestic birds. Research has demonstrated that low-pathogenic AI virus has a limited distribution in affected birds and is not found in muscle meat or eggs.

Recent infections due to HPAI, specifically the Asian-H5N1 form, have resulted in the destruction of more than 150 million birds in Southeast Asia alone, either directly by virus infections or indirectly because of the destruction of suspect flocks as a method to control spread of the disease. Once domestic poultry are infected with HPAI, 50-100% of them die within 4 days. The remaining birds that survive stop eating and laying eggs, lose weight, have diarrhea, and become dehydrated and lethargic.

The current problem with the specific HPAI strain (Asian-H5N1 HPAI), appears to have developed in the 1990s in China, was first documented in the 1997 Hong Kong outbreak, and since has begun to move to other parts of Asia, Europe, and other regions of the world, through migratory birds and through legal and illegal agriculture commerce. Chickens are particularly susceptible to this H5N1 strain. In cases where people have become infected, it has been as a result of intimate contact with sick birds, like the slaughtering and destruction of sick birds. More than 130 people have developed illness and almost half of these people have died. There are no reported cases of human infections resulting from the consumption of cooked infected poultry.

While the current Asian H5N1 strain is clearly a serious concern to animal health and to the health of those who are directly exposed to infected birds, the risk of the virus to be transmitted through the food supply is very low. Even though the high pathogenic AI virus can be found in the muscle and eggs of the infected poultry, research and epidemiological investigations continue to show that contaminated poultry and eggs that have been properly cooked do not spread the disease. Consumption of raw poultry ingredients (e.g., raw blood-based dishes) is a high-risk practice and is discouraged.

Several factors along the “farm-to-fork” continuum contribute to the low probability of food as a vehicle for AI spread in humans and should continue to be practiced.

- Procedures to control AI in commercial flocks:
  - *Biosecurity*: Most commercial flocks, such as those in the US and Canada, are raised in enclosed housing to prevent contact with wild birds that may carry disease. Strict biosecurity measures limits exposure from all sources. Domestic flocks raised on range or in open flight pens may become exposed to fecal contamination from infected wild birds, and thus should be protected.
  - *Surveillance*: Commercial flocks are under continuous surveillance for the presence of any disease. HPAI can cause serious illness and death in chickens and turkeys. Infected layer flocks, even with LPAI, significantly reduce egg production and soon stop laying. Such indications are often enough to alert farmers, and remove laid eggs from the food chain. Any sign of widespread illness, death, or reduced egg laying brings animal health specialists to investigate.
  - *Intervention*: In many countries, like the United States, bird flu is a reportable disease. If avian influenza is found, government veterinarians move quickly to quarantine the farm and, where appropriate, humanely euthanize the birds. Afterwards, the housing facilities are vigorously cleaned and disinfected. Furthermore, the area is intensively monitored afterwards to watch for any signs that the deadly bird flu has remained. The United States has authority to compensate for losses resulting from these emergency measures.
  - *Inspection*: Poultry destined for slaughter in the US are inspected, another key tool for detecting potential disease and keeping sick animals from entering the food supply. Animal health officials are working cooperatively with the poultry industry to conduct surveillance at breeding flocks, slaughter plants, live-bird markets, livestock auctions, and poultry dealers.
- Interventions in food processing:
  - Regardless of whether a region is experiencing a bird flu outbreak, standard food processing practices used to reduce other microbial hazards such as *Salmonella* are sufficient to inactivate the AI virus. Therefore, the cooking, pasteurization, cleaning and sanitizing practices used to produce our food will inactivate the Asian H5N1 virus. Refrigeration or freezing has little effect.
  - *Detergents and Sanitizers*: Like other viruses with lipid envelopes, the H5N1 virus is also sensitive to most detergents and disinfectants used at the recommended concentrations.

- *Carcass washes*: Antimicrobial carcass washes used to reduce *Salmonella* and *Campylobacter* will inactivate the AI virus.
- *Egg surface disinfection*: Commercial egg suppliers in North America wash and then disinfect the outside of eggs with chlorine prior to breaking or packaging to eliminate shell contamination with both LPAI and HPAI from contaminated poultry droppings.
- *Cooking*: Normal cooking for poultry meat will inactivate the virus. HPAI virus is inactivated in poultry meat held at 70°C for one second, which is significantly less than the 82°C recommended to consumers for best flavor and to reduce other bacterial pathogens on poultry.
- *Egg Pasteurization*: Temperatures\* that are used by industry in the preparation of foods to inactivate other pathogens are more than sufficient to inactivate AI. The World Organization for Animal Health (OIE) has published the following table of inactivation temperatures for HPAI virus present in egg and egg products:

	Temperature °C	Time
<i>whole egg</i>	60	210 sec
<i>whole egg blends</i>	60	372 sec
<i>whole egg blends</i>	61.1	210 sec
<i>liquid egg white</i>	55.6	372 sec
<i>liquid egg white</i>	56.7	210 sec
<i>10% salted yolk</i>	62.2	372 sec
<i>10% salted yolk</i>	63.3	210 sec
<i>dried egg white</i>	67	15 days

\*These are not minimal temperatures required for the inactivation, but the temperatures normally used by industry in the preparation of these products, guaranteeing the inactivation of other pathogens as well.

Source: [www.oie.int/eng/AVIAN\\_INFLUENZA/Terrestrial%20Code\\_Draft\\_Guidelines%20for%20AI%20inactivation.pdf](http://www.oie.int/eng/AVIAN_INFLUENZA/Terrestrial%20Code_Draft_Guidelines%20for%20AI%20inactivation.pdf)

- *Advice for consumers*: For people traveling to areas of the world where the HPAI H5N1 bird flu has been found, several common sense precautions will minimize any chance of exposure: Avoid unprotected, direct contact with live poultry and pigs that may be infected with influenza, such as at farms or open-air markets. Follow all recommended food safety practices, including proper cooking and preventing recontamination. For best flavor and greatest margin of safety, cook poultry until no longer pink in any part (82°C; 180°F) and eggs until yolks are no longer runny (71°C; 160°F). And don't forget about hand washing – probably the most effective tool for protecting one's self from a whole range of disease-causing foodborne viruses, protozoan parasites, and bacteria.

**Members of the International Association for Food Protection** can access PDF files of slide presentations from the **Symposium on Avian Influenza held at IAFP 2005 in Baltimore, MD** by visiting the Members Only section of the IAFP Web site [www.foodprotection.org](http://www.foodprotection.org). Log in with your membership number and last name.

**History and Classification of the H5N1 Virus** – David Swayne, U.S. Department of Agriculture, Southeast Poultry Research Laboratory, Athens, GA, USA

**Risk Assessment, Risk Communication and Consequences** – William Hueston, University of Minnesota, St. Paul, MN, USA

**Risk Management Strategies in Southeast Asia** – Mike Robach, Cargill, Minneapolis, MN, USA

**Risk Management Strategies in the United States** – Bruce Stewart-Brown, Perdue Farms, Salisbury, MD, USA

**Decontamination Technologies** – Bruce Cords, Ecolab, Mendota Heights, MN, USA

**Avian Influenza – a Global Perspective** – Alex Thiermann, International Office of Epizootics, Paris, France

Further WHO/FAO/OIE and CDC information on Avian Influenza, food safety issues, and disinfecting procedures is available at:

[http://www.who.int/foodsafety/fs\\_management/No\\_07\\_AI\\_Nov05\\_en.pdf](http://www.who.int/foodsafety/fs_management/No_07_AI_Nov05_en.pdf)

<http://www.who.int/foodsafety/micro/avian/en/index.html>.

[http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/avian\\_qa.html](http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/avian_qa.html)

<http://www.fao.org/ag/againfo/subjects/documents/ai/AVIbull035.pdf>

[http://www.oie.int/eng/AVIAN\\_INFLUENZA/Terrestrial%20Code\\_Draft\\_Guidelines%20for%20AI%20inactivation.pdf](http://www.oie.int/eng/AVIAN_INFLUENZA/Terrestrial%20Code_Draft_Guidelines%20for%20AI%20inactivation.pdf)

[http://www.cdc.gov/flu/avian/professional/symposium\\_110304\\_archive.htm](http://www.cdc.gov/flu/avian/professional/symposium_110304_archive.htm)

European Food Safety Authority Press Release on Avian Influenza

[http://www.efsa.eu.int/press\\_room/press\\_release/1193\\_en.html](http://www.efsa.eu.int/press_room/press_release/1193_en.html)

Questions and Answers on Avian Influenza and Risk to FDA Regulated Shell Eggs and Egg Products

<http://www.cfsan.fda.gov/~dms/avfluqa.html>

Food Safety Information Center, National Agricultural Library, on Avian Influenza

<http://www.nal.usda.gov/fsrio/topics/tpavianflu.htm>

Center for Food Security and Public Health, Iowa State University

[http://www.cfsph.iastate.edu/Feature/AIFeatureFiles/HPAI\\_technicalkeypoints.pdf](http://www.cfsph.iastate.edu/Feature/AIFeatureFiles/HPAI_technicalkeypoints.pdf)

Partnership for Food Safety Education Answers Questions on Consumption of Poultry & Poultry Products

[http://www.fightbac.org/pdf/Poultry\\_Q\\_A.pdf](http://www.fightbac.org/pdf/Poultry_Q_A.pdf)

General information on the safe handling, preparation and cooking of foods can be obtained from national food safety authorities and from the WHO at:

<http://www.who.int/foodsafety/publications/consumer/5keys/en/index.html>

[http://www.fsis.usda.gov/Food\\_Safety\\_Education/index.asp](http://www.fsis.usda.gov/Food_Safety_Education/index.asp)

<http://www.canfightbac.org>

***Special thanks to Kathleen A. Glass, University of Wisconsin-Madison,  
Food Research Institute, for coordinating and accumulating this  
information. Thanks also to those who contributed to this scientific brief.***

Sabah Bidawid, Health Canada

Jeffrey Farber, Health Canada

Will Hueston, University of Minnesota

Lee-Ann Jaykus, North Carolina State

Morrie Potter, Food and Drug Administration

David Swayne, US Dept. of Agriculture

Alex Thiermann, International Office of Epizootics