

Live Bird Markets of the Northeastern United States

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Abstract

The live bird marketing system (LBMS) in the Northeastern United States (US) consists of a complex system of production flocks, dealers/haulers and live bird markets (LBMs). The States of New York (NY), Pennsylvania (PA) and New Jersey (NJ) have the most active systems with New York State having the most markets presently at 87. The states of Massachusetts, Maine and Connecticut have very few markets. Live bird markets serve mainly ethnic immigrant populations in large urban centers of Northeastern states. The markets are important in the epidemiology of avian influenza viruses (AIV) especially H5 and H7 strains that have zoonotic potential and an effect on trade with United States trading partners. Massive surveillance efforts are carried out to detect and control the spread of these virus strains in the markets under a state/federal/industry program. The program, named the “Prevention and Control of H5 and H7 Avian Influenza in the Live Bird Marketing System: Uniform Standards for a State-Federal-Industry Cooperative Program” is managed mainly by the states, with the federal government assisting in the lab detection and characterization of viruses isolated from the markets. This paper will describe the Northeastern market systems with emphasis on the largest system in NY State and will give a glimpse into its structure, clientele, general regulations, risk factors and avian influenza surveillance.

Introduction

The Northeastern United States has the largest number of live bird markets (LBMs) in the United States.¹ These markets are located in the States of New York (NY), Pennsylvania (PA), New Jersey (NJ), Connecticut (CT), Maine (ME), Massachusetts (MA) and Rhode Island (RI). In the past two decades, the live bird markets in CT, ME, RI and MA have decreased in number and importance, while those in the metropolitan areas of NY, NJ and PA thrive with the influx of new immigrants arriving from Asia, Africa and the Middle East. The only other region in the US that has a significant amount of live bird markets is in California (CA) on the West Coast.² Despite the fact that each state has its own unique way of running the LBMs, there are many similarities in the way the markets are structured. There is also similarity in the way poultry flows from production sites all over the Northeast, the Mid-West, Mid-Atlantic and Canada into the urban markets.³ The poultry value chain for the LBMS in the Northeast is very simple compared to what has been observed in other countries. Poultry are raised on special production farms or commercial farms (spent layers) that sell wholesale to dealers and haulers who in turn sell to LBM owners who sell retail to consumers. Depending on customer preferences, birds brought into the markets are broilers (white or brown), spent hens, game fowl, ducks, geese, pigeons, guinea fowl, quail, and specialty chickens such as Silkies. Many come from large farms but an increasing number also come from smaller farms and backyard flocks. Many markets also sell turkeys and other animals such as sheep, goats and rabbits.⁴

Apart from the obvious economic benefits the states get from the presence of LBMs in the form of taxes and income for owners, dealers, haulers, farmers and jobs for many people, the LBMs are also noted for having AIV isolated frequently from birds and in the environment. Avian influenza viruses of the H7 and H5 types can become highly pathogenic and change into potentially zoonotic viruses.³ To decrease circulating AIV, the whole market system revolves around surveillance, sanitation and regulatory measures through a state/federal/industry program managed by the United States Department of Agriculture's (USDA) Animal and Plant Health Inspection Services (APHIS). The program is the aptly named "Prevention and Control of H5 and H7 Avian Influenza in the Live Bird Marketing System: Uniform Standards for a State-Federal-Industry Cooperative Program". It is used by all states in the US, and is the standard regulatory guide. The USDA also set up an LBM advisory group, "The Live Bird Market Working Group" which meets annually with all state stakeholders, federal personnel, federal and state laboratories to provide updates on state LBMs and AIV testing of markets and flocks.⁵

Components of Northeast Live Bird Market System (LBMS)

Production Farms and Regulations

Producers from Pennsylvania provide the majority of the birds going into the LBMS for all the Northeastern States (Table 1). The Northeast LBMs provide about 500,000 birds weekly for LBMs in NY, NJ and PA, and the numbers increase during high demand periods such as holidays. The LBMs also receive poultry from other Northeastern states, the Midwest, the Mid-Atlantic region, and Canada. All Northeastern states require LBM source birds to be from an established, healthy, AI negative flock. Registration of supply flocks with departments of agriculture is required annually. Each farm is given a unique premises ID that is used for interstate movement of birds and all business conducted at LBMs. Producers also have to keep meticulous records of the farm operations and to keep them for at least a year. Animal health officers working for the state can go to farms at any time for inspection of the farm and records.⁵

Table 1. Northeast LBM system – Numbers of producers, dealers and LBMs

	Producers	Dealers/Haulers	# of LBM
NY	5	15	87
PA	310	26	11
NJ	1	32	36

Producers have to participate in AIV surveillance and can choose to have their flocks either monitored or tested. Monitored flocks are tested monthly using 30 randomly selected birds and have to test negative three times before birds can be moved to LBMs. Any breaks in the monthly testing means the birds will go to tested flock status until they can go back to being a monitored flock. The tested flock program requires birds to be on a farm for 21 days without any contact with other birds. Similar to the monitored flock, 30 birds are randomly selected for testing. Birds can only be moved to the LBMs if they test negative for AIV within a ten-day window of being moved. Samples for monitored and tested flocks are swabs, blood samples and sometimes eggs.⁵ Producers are provided with poultry inspection certificates that specify monitored or tested flocks and contain testing information for AIV. These certificates are required for interstate movement of birds and are valid for 30 days from date of sample collection in monitored flocks and 10 days from sample collection in tested flocks.

If birds test positive for H7 or H5 AIV for either monitored or tested status, the farms have to be quarantined after confirmation by the National Veterinary Service Laboratory (NVSL) and the birds depopulated. After depopulation, the USDA, in concert with the state, conducts sanitation measures such as cleaning and disinfection of the premises and observation of farm downtimes until the premises test negative again. Routine sanitation and biosecurity are required for all farms at all times. Cleaning and disinfection of premises, equipment, vehicles and crates for transporting birds are also part of the sanitation plan for production sites. Farms are not allowed to mix poultry species in one location, especially ducks and geese that are known to be natural reservoirs of AIV.³ Other biosecurity measures include housing birds properly to prevent birds being exposed to migratory waterfowl. Regulations also include training of farm personnel in biosecurity.⁵

Dealers and Haulers

Dealers (distributors and wholesalers) and haulers are the link between the farms and the LBMs. Dealers are companies or individuals that obtain live poultry from different farms for sale to LBM owners. Haulers are businesses or individuals that solely transport live birds for others. Wholesalers and distributors usually have permanent facilities where trucks carrying birds assemble before distribution and return to have trucks and crates cleaned and disinfected.

Dealers, haulers, distributors and wholesalers also have to meet the regulatory standards set in the Uniform Standards Program. These include having a biosecurity program, registration in all states where they do business (including picking up birds and selling birds), and a premises identification number. AIV surveillance includes quarterly sampling and testing of transport crates, birds, trucks and environmental sampling. Dealers also have to clean and disinfect all trucks, crates and holding areas before returning to farms. Their facilities should have mechanical crate washers and all season wash facilities as required by the state. Dealer premises are inspected once a month, and cleaned and disinfected quarterly. All routine inspections are unannounced except for cleaning and disinfection inspections. They are also required to have a biosecurity plan in place that is approved by the state of residence. Similar to production sites, any positive H5/H7 test results confirmed by NVSL require quarantine and depopulation of birds in the facility, followed by cleaning and disinfection. Monthly testing is done until the facility has three consecutive negative tests that will allow the dealer to return to quarterly testing.

Live Bird Markets

We will use the example of New York State to describe the LBMs. New York State has 84 markets located in or near New York City (NYC). The majority are located in the boroughs of Brooklyn, Queens and the Bronx. Outside of NYC, there is one in Schenectady, one near Buffalo and a new market in Syracuse totaling 87 markets. The LBMs in the NYC are located in separate buildings or storefronts (Figure 1). The markets are where different types of poultry are custom slaughtered and sold to the public. The City of New York will not allow any new LBMS to be constructed, but will allow existing ones to be sold and used for the same purpose. The different types of poultry are contained in metal cages (Figure 2) where patrons can easily see them and make their choice before purchase and slaughter.

Figure 1. Storefront of a Live Bird Market



Figure 2. Cages with Live Birds in New York City



As per state and federal regulations, all birds purchased at live bird markets have to be slaughtered at the market. No one is allowed to take live birds home. Broilers and other birds are weighed and sold to patrons by the pound but some, such as spent hens are sold as single birds. Market owners cater to a large immigrant population in NYC, and some of the markets may cater to a single ethnic group. In a recent poll carried out in NYC markets by the New York State Department of Agriculture and Markets (NYSDAM), patrons who frequented the markets spoke a total of eight languages including Spanish, Bengali, Arabic, Vietnamese, Chinese, Haitian Creole and Korean. The patrons tend to be new and first generation immigrants. Many types of poultry are sold in the LBMs including geese and ducks, quail, white and red broilers, pigeons, guinea fowl and spent layers. The different nationalities have their bird preferences, with red broilers prized among Dominicans and Puerto Ricans, spent hens or spent breeder fowl among West African immigrants and Silkies considered a delicacy among Asians.

Live Bird Market Regulations

Live bird market owners are participants under the Uniform Standards Program. They register with participating states in the Northeast and are given a premises identification number. Records of all birds accepted into the facilities and sold to customers are kept and can be inspected randomly by state animal health inspectors during unannounced inspections and AIV testing that

are done quarterly. All markets are also required to voluntarily sell all their poultry and clean and disinfect at least once every quarter; this has been in place since 2003 and has been found to be effective in controlling pathogens in the market.⁶

In addition to the Standards Program, live bird markets must also work with the different municipalities to follow local public health, environmental and sanitation laws and the Federal Poultry Products Inspection Act. Owners and workers are also required to undergo training in biosecurity and the Uniform Standards program.

Sampling and Testing Procedures for AIV Surveillance in LBMs

Inspectors that visit the markets wear appropriate personal protective equipment (PPE). PPE is changed for each market visited, and inspectors must observe biosecurity protocols and allow 48-72 hours before they can visit a farm. Live bird markets are inspected and tested at least once per quarter. Birds are examined and records are reviewed for compliance with state regulations. Records that may be examined at inspection include poultry inspection certificates, invoices/receipts and cleaning and disinfection log books.

During inspection visits that include sampling, inspectors randomly select from five to eleven birds of each type to sample. For gallinaceous species, samples are swabbed from the trachea or oropharyngeal area and pooled up to 11 birds per tube for real time reverse transcriptase polymerase chain reaction (rRT-PCR) testing. Domestic ducks and geese are swabbed in the cloaca and pooled up to five birds/tube for rRT-PCR testing. Sample pools have to be from the same species and must be taken from the same area.

Environmental samples include swabs from floors, cages, drains, walls, scales, door handles, etc. and are pooled up to five swabs per tube for virus isolation testing. Following cleaning and disinfection procedures, markets are inspected and environmental samples collected prior to restocking. Markets are permitted to re-open pending results. All samples are shipped to state diagnostic labs for testing.

Markets found to be positive for H5/H7 AIV per confirmation by NVSL will be quarantined, depopulated, cleaned, and disinfected. New birds will not be allowed until the market passes inspection and environmental samples are negative by virus isolation. In 2019, New York State surveillance figures showed 709 inspections, 24,053 birds tested and 4,678 environmental tests done. None was positive for H5/H7 AIV.⁷

Avian Influenza in Live Bird Markets

From 1983-1984, the state of Pennsylvania experienced a catastrophic outbreak of HPAI H5N2. The strain was found to be similar to a low pathogenic strain that had been circulating in NY LBMs.³ Low pathogenic strains of avian influenza (LPAI) were not part of the minimal surveillance programs in place in the 1980s. Despite interventions in closing, cleaning, and disinfecting the markets, LPAIs were responsible for five outbreaks seen on commercial poultry farms from 1996-2002. LPAI viruses were also shown to mutate into highly pathogenic AIV after amino acid changes at the cleavage site of the virus.³ In the commercial farm outbreaks, epidemiological studies showed that vehicles taking birds to LBMs had been on farm premises in PA and RI. By the end of the 1990s, the State of New York put in the first regulations to try and eradicate low pathogenic H5/H7 viruses from the markets.³ Samples taken in Northeast LBMs in the early 2000s found 60-80% LPAI H7 strains in live bird markets.⁸ Additional regulations were

added by NY State, forcing markets and dealers to have quarterly closings followed by cleaning and disinfection and stopping the movements of live birds out of LBMs when they were already in the facility.⁶

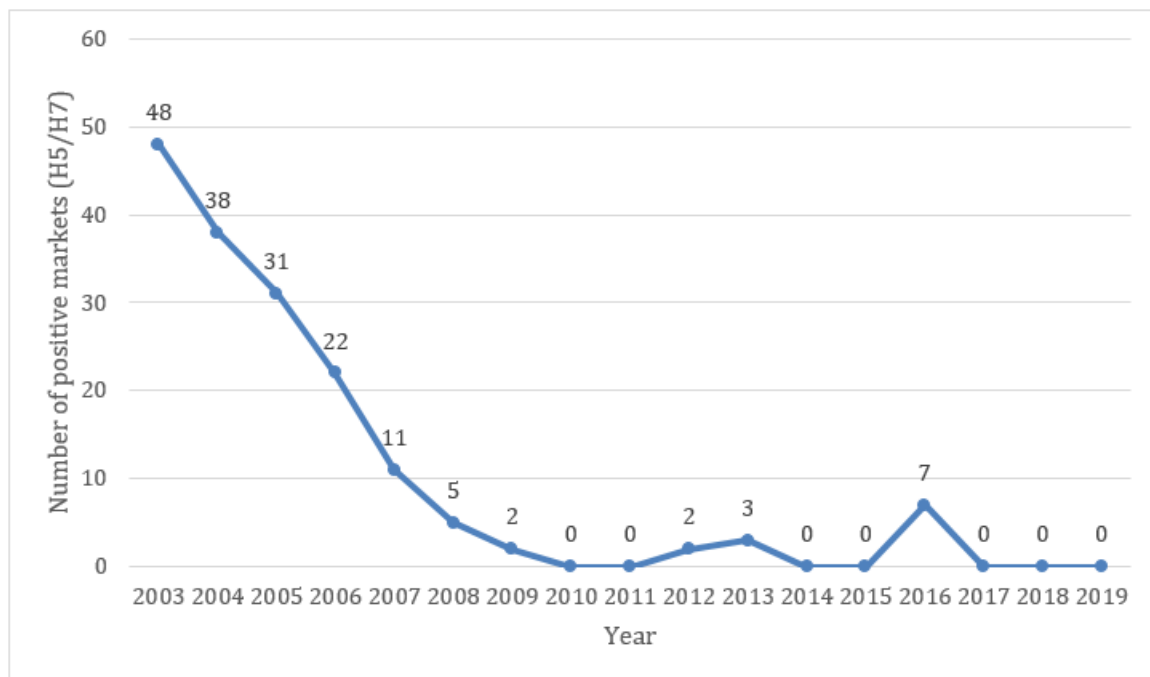
Risk of Avian Influenza in LBMs

The risk of Avian Influenza entering into LBMs is always high and comes from the large number of birds that are constantly present in the market and the variety of sources the birds come from.² Delivery trucks, crates and equipment used to transport the birds and not sufficiently cleaned or disinfected can carry the virus between farms and markets. Another risk seen in LBMs occurs when market owners or their employees mix different species together in the same market and in the same cages. Spaces in LBMs are closely confined and allow cages to be in close proximity. Waterfowl are the natural reservoir for AIV; chickens and waterfowl such as ducks and geese should not be placed in the same cage, but before regulations were enacted, it was a common practice in LBMs.

Conclusion and Accomplishments

Since 2003, when strict regulations were introduced by a state, federal and industry partnership, the Northeast United States has seen a substantial decrease in the number of markets testing positive for the potentially zoonotic H5/H7 influenza viruses (Figure 3).

Figure 3. Number of NY markets positive for avian influenza H5/7 by year (courtesy NYSDAM)



The interventions of state and federal regulations covering production sources, dealers, haulers and the markets themselves have made a big difference. Quarterly cleaning and disinfection, unannounced inspections, meticulous record keeping and a strict surveillance program have all contributed to the success seen in Northeastern live bird markets.

In 1997, six people out of 18 infected died in a LBM in Hong Kong. It was later determined that they died of highly pathogenic Avian Influenza H5N1. This was the first time that human deaths had been recorded for Avian Influenza viruses.³ H5N1 is a zoonotic virus and its presence in many countries all over the world is one of the reasons we must be vigilant. According to the World Health Organization, to date, 455 people in various countries out of 862 infected have died of HPAI H5N1 infections. The virus is endemic in poultry populations in Indonesia, Egypt and Vietnam. There is no evidence of human-to-human transmission and the virus has never been isolated in the United States.⁹

Another recent zoonotic virus, H7N9, also emerged in China in 2013 that was traced to poultry coming from live bird markets. A total of 1567 persons have been infected since then and of these 615 died. H7N9 has been described as a low pathogenic strain that does not make chickens sick but can produce illness in humans.¹⁰ In view of the present COVID-19 pandemic and the origin of the virus from an animal market, there is an even greater need to keep out zoonotic HPAI H5N1 from the United States through the strict surveillance and regulation of live bird markets.

Acknowledgements: I would like to thank my co-authors Dr Joy Bennett and Dr Eireann Collins of the New York State Department of Agriculture and Markets. Thanks also to Dr Aliza Simeone of the Pennsylvania Department of Agriculture and Jennifer Niper of the New Jersey Department of Agriculture for the information provided.

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