

# **THE BRITISH COLUMBIA EXPERIENCE WITH AVIAN INFLUENZA: HOW ANIMAL DISEASE OUTBREAK RESPONSE HAS IMPROVED IN CANADA**

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## **INTRODUCTION**

The Fraser Valley of British Columbia (BC) is a concentrated multi-commodity agricultural area encompassing approximately 400 square miles. Eighty-five percent of the provincial domestic poultry market is raised here, with an anytime total of 17 million commercial birds. In addition, there is a well established “specialty poultry” sector that produces organic free-range chicken & eggs, squab, pheasant, game birds, ducks and geese for both domestic and export markets. The Fraser Valley is also home to hundreds of small backyard mixed species flocks. The area also shares territory with the resident and migratory waterfowl of the Pacific Flyway, a well established stable reservoir for avian influenza viruses.

Highly pathogenic avian influenza (HPAI) is an Immediately Notifiable Foreign Animal Disease (FAD). The Canadian Food Inspection Agency (CFIA) has the ultimate responsibility for the timely eradication of all federally notifiable diseases to ensure minimal disruption to the international trade of agricultural livestock products exported from Canada.

In February, 2004 an outbreak of HPAI, subtype H7N3, occurred in the commercial poultry sector. The active outbreak lasted more than 90 days, 42 poultry farms were identified as positive and more than 17 million birds were killed, culled or processed. Through the depopulation of HPAI-positive farms and the strategic depopulation of adjacent test-negative farms, a total of 410 commercial poultry farms (90% of the Fraser Valley production) were emptied in a successful effort to gain control of the outbreak.

The recovery aspect of this outbreak was initiated even before the barns were cleared. Teams comprised of members from industry, provincial and federal governments worked together to address the compelling issues: compensation, restocking strategy, enhanced biosecurity, disease risk mitigation and the modification of current disease response plans based on the lessons learned from this outbreak. The recovery efforts, still ongoing, have affected significant change to the way outbreaks of reportable poultry diseases will be handled in the future. More importantly, the way poultry is raised in the Fraser Valley has significantly changed with a stronger emphasis on biosecurity and disease risk mitigation.

## OUTBREAK SUMMARY

In early February 2004, a low pathogenicity avian influenza (LPAI), subtype H7N3, was isolated from a 52-week-old commercial broiler breeder flock in the Abbotsford area. The virus was detected during a routine diagnostic workup of reduced feed consumption rate, egg production drop and slight increase in mortality thought initially to be related to a “bad load of feed”. Replacement of the feed did not result in immediate resolution of clinical signs although by the time the preliminary diagnostic test results were completed the mortality, feed consumption and egg production in this flock were beginning to return to normal. Ten days later an adjacent barn of approximately 9,200 24-week-old broiler breeders experienced an alarming spike in mortality (98, 100, 800, and 1000 per day). The subsequent isolation and genetic characterization of an H7N3 avian influenza virus of high pathogenicity (HPAI) from this flock indicated that the LPAI virus had mutated to HPAI at some point between the two barns on the same farm. Despite containment zoning, strict movement controls and enhanced biosecurity measures, HPAI eventually spread to infect a total of 42 commercial poultry operations in the Abbotsford area.

On April 5, 2004 (Day 48), with 20 commercial flocks now positive, the Provincial Emergency Program (PEP) was activated. Working from an “incident command” emergency management system (ICS), not employed by CFIA at the time, the PEP team was able to efficiently manage the logistical challenges of the outbreak in a much more effective and expedient way. At the same time the poultry industry assisted in a massive “pre-emptive cull” of the commercial poultry population located near Abbotsford. Producers and processors worked together to systematically clear all test-negative barns through the normal processing channels (slaughter, rendering or centralized composting), which then freed the CFIA to concentrate on the disease control strategy and the management of the outbreak (Table 1). All 410 commercial poultry farms and hatcheries in the Abbotsford area were emptied by May 21, 2004. For the next 51 days the industry endured an imposed “downtime” in which barns did not house birds, hatcheries were not receiving or setting eggs, feed companies were not manufacturing or delivering feed and processors were restricted to processing US sourced product to be able to continue to supply the BC domestic market with chicken and eggs. Fortunately, through consistent public messaging, consumer confidence in the safety of BC poultry products was maintained.

Cleaning and disinfection of all positive farms, at an industry cost of \$3 million, was completed and signed off by CFIA inspectors in mid-June. On July 9, 2004 the Federal Minister of Agriculture declared that restocking of Fraser Valley poultry barns could begin. Broiler barns were the first and easiest to be restocked since the long-lived flocks had to be repopulated in a staggered fashion because of production scheduling.

Mass euthanasia of commercial poultry barns with subsequent disposal of the infectious carcasses was something that had not been attempted on this scale before in Canada and posed significant operational challenges. It was initially believed that HPAI had been contained on the index farm due to the strict “self-quarantine” immediately implemented by the producer and his poultry veterinarian. Unfortunately, biocontainment was not

achieved and 12 days following the whole barn gas depopulation of the index farm, and 3 weeks after onset of the first clinical signs of HPAI, a second broiler breeder farm 1.5km away broke with HPAI. The infection had now become an outbreak.

The CFIA, under the *Health of Animals Act*, is mandated to eradicate foreign animal disease with the support and assistance of provincial agencies and the local poultry industry based on pre-determined animal disease emergency response plans which at the time were in internal draft. An infectious fast-moving multi-farm poultry disease outbreak of this magnitude had never been experienced before in Canada. Throughout the outbreak there were unexpected operational challenges to many aspects of the eradication effort which allowed the disease outbreak to progress at an alarming rate. Better defined disease response plans at both the industry and regulatory level could have provided more clearly outlined role definitions, designated responsibilities and vital operational protocols.

Through the combined efforts of multi-level governmental agencies and especially the poultry industry itself, this HPAI outbreak was contained within the Fraser Valley and the objective of timely eradication was eventually achieved.

**Table 1**

**Three key events that lead to control of the outbreak:**

1. The strategic depopulation of negative poultry barns:
  - The poultry industry worked together to either process, render or compost over 13.5 million negative commercial birds and empty 410 farms so there would be a lack of susceptible birds for the virus to spread to. This was accomplished in 6 weeks.
2. Activation of the Provincial Emergency Program (PEP):
  - The expertise of PEP more efficiently managed the logistics of the emergency.
3. CFIA was freed up to focus on the identification and

**POST-OUTBREAK RECOVERY INITIATIVES**

As a key component of recovery, a clear and factual comprehensive review of the outbreak dynamics and the disease control strategies employed is vital to modeling future approaches to effective and efficient disease outbreak management. Immediately following the outbreak multi-jurisdictional reviews identified the strengths and weaknesses of the response (2). A tabulated summary of some of the significant lessons learned and the corrective actions taken to date are provided in Table 2. In Oct, 2004 a 2-day AI Outbreak Forum was convened and its recommendations were summarized in a public report (5).

The 5 key action items for further development are as follows:

1. Animal health/Human health partnerships
2. Review of *Health of Animals* compensation
3. Establishment of national biosecurity standards for poultry
4. Development of a national mortality disposal plan
5. Animal health emergency disease management

The industry-led challenge to the initial compensation values offered by the federal government, especially for specialty and breeder birds, resulted in a review of the *Health of Animals Act* which provides only for the “fair market value” of birds ordered destroyed. The BC Poultry Industry continues to explore a private insurance scheme to cover the non-compensatable financial losses experienced by producers and the allied trades during regulatory disease outbreak responses.

The BC Poultry Association, in collaboration with the federal and provincial governments, has developed the comprehensive and mandatory BC Poultry On-Farm Biosecurity Program for strengthening daily operational biosecurity on poultry farms (1). This includes a well-defined Self-Quarantine Protocol that empowers the producer to take the initial steps in disease containment upon the first suspicion of a disease event. The BC Poultry Industry Emergency Disease Response Plan has been written using the incident command system for compatibility with government plans (6). Specific cross-commodity industry members have been identified and have undergone initial training in their emergency roles. Two subsequent detections of Notifiable Avian Influenza (NAI) in 2005 & 2009 have provided valuable real-time outbreak management experience for all partners. Part of the industry’s emergency planning included the development of the Poultry Premises ID Project in which every commercial poultry premises in BC is identified with a unique number and has been mapped with geographic coordinates. The BC Poultry Risk Assessment Report has provided valuable recommendations for future disease risk mitigation strategies that the industry is currently considering. A new FADES agreement (federal-provincial Foreign Animal Disease Emergency Support Plan) has been recently updated, signed off and is in place for the next FAD outbreak in BC (3).

National initiatives championed by CFIA included the development of the Hazard Specific Plan for Notifiable Avian Influenza which had an extensive external consultative process (4). A Canadian Poultry Expert Committee was identified and consulted in protocol development and the National Office of Animal Biosecurity was formed. The Canadian Veterinary Reserve (CVR) has identified and trained >100 Canadian private veterinarians willing to provide outbreak support to CFIA as needed. The National Wild Bird AI Surveillance Program is now in its 6<sup>th</sup> year of monitoring for the introduction of H5N1. Six provincial veterinary diagnostic labs, including the one in BC, have been networked (Canadian Animal Health Laboratory Network) and accredited for AI testing so that local laboratory support can now be provided in addition to testing at the National Centre for Foreign Animal Disease (NCFAD) in Winnipeg, Manitoba.

## **CONCLUSION**

It is fair to say that the 2004 BC outbreak of HPAI turned out to be one of the most significant veterinary challenges that Canadian animal health officials have ever had to face. From the outset nobody could have predicted the course this outbreak would take or the obstacles that would arise to challenge an unprepared industry and the unpracticed disease response plans of the governmental agencies responsible for disease eradication.

This unique experience provided valuable lessons that emphasize the importance of early disease detection, local disease response plans, disease containment strategies, industry-governmental partnerships and expedited recovery. The post-outbreak recovery efforts have been intensive and as a country, a province and an industry we are much better prepared to manage future outbreaks of Notifiable Avian Influenza (NAI) and other FADs.

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Table 2

| LESSON LEARNED  | CORRECTIVE ACTION TAKEN  |
|---|--|
| <p><b>NEVER UNDERESTIMATE AN AVIAN INFLUENZA VIRUS!</b><br/>Every Avian Influenza virus is unique and may not follow general assumptions. All H5 and H7 influenzas, regardless of pathogenicity, should be treated seriously and eradicated ASAP.</p>   | <p>The Notifiable Avian Influenza Hazard Specific Plan (CFIA) is a scenario based plan that outlines the specific disease control strategy based on the assessed situation as the outbreak progresses. It recognizes the need for flexibility in decision-making.</p>  |
| <p><b>AN OUTBREAK WOULDN'T BE AN OUTBREAK IF DISEASE IS CONFINED TO ONLY ONE FARM!</b><br/><br/>A producer/veterinarian/service industry SELF-QUARANTINE PROTOCOL is the key to effective and early disease containment.</p>  | <p>The BC On-Farm Biosecurity Program promotes the implementation of a self-quarantine protocol by a producer upon the initial suspicion of disease. The protocol dictates initiating a diagnostic investigation and restricting the movement of birds, product and people on and off the farm while results are pending.</p>  |
| <p>Animal Disease Emergency Response Plans should:</p> <ul style="list-style-type: none"> <li>• Detail partner roles and responsibilities</li> <li>• Be updated &amp; adapted to new information and experiences</li> <li>• Provide locally specific protocols for humane mass euthanasia &amp; carcass disposal</li> <li>• BE PRACTISED</li> </ul> | <p>The BC Foreign Animal Disease Emergency Support Plan (FADES Plan) is a BC-specific federal-provincial agreement clearly defining the partner roles and responsibilities during an outbreak of a federally reportable disease. The details of the BC-FADES Plan are reviewed regularly. The industry is recognized as a key partner in disease control activities. The BC Poultry Industry has developed its own Emergency Response Plan and has identified and trained industry representatives. Several tabletop exercises in mock Avian Influenza outbreaks have already taken place.</p> |
| <p>Do not move infected birds outside of barns or off the premises until heat, chemical or time treated to destroy the virus.</p>   | <p>There are now scientifically valid and effective protocols for in-barn composting in place.</p>   |
| <p>Delays in testing or delays in response allow so much virus to be generated that biocontainment is impossible to achieve. In 2004 all suspected AI results had to be confirmed at NCFAD in Winnipeg before action could be taken on a farm, sometimes leading to delays of over a week before affected farms were depopulated.</p>               | <p>Depopulation and other official containment activities no longer wait until official test confirmation by NCFAD. The testing results of the BC provincial veterinary diagnostic lab, as a CFIA-certified member of the National AI Network Lab system, are considered confirmatory and appropriate actions can follow. The local lab now provides the bulk of the testing support during an outbreak.</p>   |
| <p>Identify and utilize local species-specific veterinary expertise early in the outbreak. They know their specific industry infrastructure, relationships and politics. They have valuable global contacts.</p>  | <p>A Poultry Vet Expert Committee is identified and engaged in providing real-time opinion and recommendations that affect decisions made during a NAI outbreak.</p>   |
| <p>In consultation with Public Health Authorities, disease response plans should include provisions for working with potentially zoonotic diseases such as Influenza.</p>   | <p>The provincial Medical Health Officer is a signatory to the BC-FADES Plan. Public Health actively monitors worker health and safety during AI outbreaks.</p>  |
| <p>The recovery &amp; review aspects of an outbreak will require far more sustained time, energy and effort than the active outbreak itself.</p>  | <p>Recovery Plans are now initiated even before an outbreak is declared over. Post-outbreak recovery and mitigation initiatives follow from the partners' internal and shared debriefing activities. Plans are updated based on lessons learned.</p>   |