Canada's Inter-agency Wild Bird Influenza Survey

OPERATIONAL PLAN – 2013-14

(18 March 2013)

Introduction

Canada's wild bird influenza survey has been carried out each year since 2005. Its purpose now is primarily to be vigilant for highly-pathogenic strains of Influenza A viruses that may cause mortality in wild birds and be recognized for this reason. Previously, and to a lesser extent now, it has provided information on the forms of Influenza A in circulation among wild birds each summer, including H5 and H7 variants of potential importance to poultry.

The Survey is undertaken by the governments of Canada and of Canada's provinces and territories, and is coordinated on behalf of these government agencies by the Canadian Cooperative Wildlife Health Centre (CCWHC). The survey was extensive in 2005-2007 and has been reduced substantially in scale since then.

What's new in the 2013-14 Survey?

The Survey proposed for 2013-14 is similar to the Survey's conducted in the previous two years, but with one major difference. It is proposed that, in 2013-14, all participants make an effort to obtain a large proportion of dead bird samples from water-associated birds and, especially, from ducks.

We now have evidence from our own Survey that the prevalence of Influenza A viruses in our annual sample of wild birds found dead is very low. We also have evidence that the prevalence of infection is higher in ducks (especially dabbling ducks like mallards and teal) than in other taxonomic groups. The Survey based on dead birds provides not only vigilance for important virus strains but also information on the strains in circulation in the current year. To maximize the return in useful information from the investment made in the Survey, it is proposed that each province and territory do what it can to obtain a greater proportion of total dead bird samples as ducks and other water-associated birds.

Surveillance Using Wild Birds Found Dead

Purpose: The purpose of this main element of the Survey is to achieve vigilance for highly-pathogenic avian influenza viruses (HPAI) that threaten animal or human health and to characterize the virus strains in circulation in wild bird populations in the current year.

Procedures: Provincial and Territorial governments will take primary responsibility for organizing the detection of dead wild birds and their conveyance to participating veterinary

diagnostic laboratories. Each will do what can be done within its program to obtain dead ducks and other water-associated birds for the Survey. Procedures and the scale of activity may differ among provinces and territories. Engagement of the public, or of specific groups such as waterfowl biologists within and outside of government, is a strategy that can be used to improve sample size and the proportion of ducks and water-associated birds.

The degree of vigilance achieved by the Survey depends on the number of specimens examined in each area of the country. The table below shows the number of dead wild birds tested in 2012 from each province and territory. This is typical of the samples taken in each of the past several years. This total sample size is a smaller than the original target of approximately 3000 dead birds to be tested across Canada.

Region	Year to Date	
	Tested	**Matrix Positive***
British Columbia	295	2
Alberta	97	0
Saskatchewan	355	0
Manitoba	29	0
Ontario	166	3
Quebec	529	3
New Brunswick	30	0
Nova Scotia	46	3
Prince Edward Island	105	0
Newfoundland	1	0
Yukon Territory	2	0
Northwest Territories	7	0
Nunavut	0	0
Total	**1662**	**11**

* No highly pathogenic viruses were detected

- Dead wild birds will be examined in participating laboratories for cause of death and will be tested by PCR for avian influenza virus. Samples to be tested for influenza will consist of two swabs, one from the oropharynx and one from the cloaca, combined in one vial of virus transport medium[1] and tested as a single sample, as noted in greater detail below under General Survey Methods. All matrix protein gene-positive samples will be tested

[1] The universal transport medium (UTM) kit by COPAN innovation (www.copaninnovation.com) is now recommended by the influenza lab of NCFAD; all samples should be kept cold continuously or frozen between collection and testing.

by PCR for H5 and H7 viruses and any samples positive by these tests will be notified immediately to the National Centre for Foreign Animal Diseases (NCFAD) and sent there for further characterization.

- The notion of vigilance implies rapid testing of birds found dead. Each interval in the chain of events from finding a dead bird to conveying it to a laboratory to testing the bird to entering the test results in the national database can impose a delay and reduce vigilance. All participants thus must take all feasible steps to reduce these potential delays and minimize the interval between finding a dead bird and obtaining the test result for influenza.

Surveillance in Live Wild Birds

This is no longer a funded and formal part of the Survey, but remains a source of highly-important information. For this reason, research scientists in Environment Canada and the Canadian Food Inspection Agency have collaborated in the past to sample and test several hundred apparently-healthy live wild ducks for Influenza A viruses. If possible, this collaboration will continue in 2013. CCWHC will help coordinate this program.

Purpose: The purpose of this element of the Survey is to obtain and characterize a representative sample of the Influenza A viruses circulating in wild bird populations across Canada in summer and fall of 2013. Wild ducks, in particular, constitute the largest known reservoir and source of Influenza A viruses world-wide. This element of the Survey contributes to understanding patterns of virus occurrence over multiple years and the genetic changes and exchanges which occur within this important reservoir of Influenza A viruses. This element of the Survey is of particular interest and importance to assessing risks to agriculture and to public health.

Procedures: Apparently-healthy, live wild birds will be captured and samples (oral and cloacal swabs – see below) during research activities at locations in Manitoba, Saskatchewan and Alberta, with a target sample size of 600 birds.

General Survey Methods – Live and dead birds

- Both a cloacal and an oral swab will be taken from each bird and combined in a single vial containing 3 ml of virus transport medium. Swab tips will remain in the vials until the samples are tested. For samples taken in the field, vials will be placed directly into a liquid nitrogen container and will be held at -80C or colder until processed at a laboratory. Samples will be re-frozen at -80C or colder immediately after testing at regional laboratories if further testing is anticipated.

- Regional laboratories in the Avian Influenza Virus Laboratory Network will test each sample by PCR for the matrix protein gene, and also for H5 and H7 protein genes. The newest PCR primers for matrix protein gene, H5 and H7 genes available from NCFAD will be used to ensure detection of the broadest possible range of Influenza A viruses, including the 2009 H1N1 strain.

- PCR testing of wild birds found dead should be completed within four working days after the bird is received by the laboratory.

    - Results of matrix protein PCR should be entered into the Survey database and displayed on the CCWHC website within two working days of completing PCR tests.

- All samples that are positive by PCR test for H5 or H7 viruses will be sent immediately to the National Centre for Foreign Animal Diseases (CFIA – Winnipeg) for further characterization. As viruses are further characterized, these results, also, will be entered into the Survey database.

- The CCWHC will send regular updates on Survey result to all who request these updates (generally every two weeks) and will maintain this same information on its website (http://www.ccwhc.ca/avian_influenza_virus.php).

Canada's Inter-agency Wild Bird Influenza Survey - General Background

In 2005, Canada initiated a national inter-agency survey for influenza A viruses in healthy live wild ducks. This survey was stimulated, in the first instance, by a major outbreak of influenza in the Canadian poultry industry in 2004, and subsequently by the spread of the Asian H5N1 highly pathogenic strain from SE Asia to Europe and Africa in 2004-05. The Survey objectives were to identify strains of influenza viruses present in Canada's wild bird reservoir, to acquire information needed to assess the biosecurity of Canada's poultry industry, and to monitor viral genes of concern to human and animal health.

These Survey has been highly successful. The importance of wild duck populations as reservoirs for avian influenza viruses, particularly compared with other related bird species, was clarified. The probable precursor virus of Canada's 2004 and 2007 influenza outbreaks in poultry, a low-pathogenicity H7N3 strain, was discovered in wild duck populations. Canada's national *Avian Influenza Virus Laboratory Network* was greatly strengthened through the conduct of the Survey. New communications challenges associated with responses to important epidemic diseases were identified and protocols were established to overcome them. Collaborations among federal, provincial and territorial agencies responsible for animal health, public health and wildlife, and with Canada's veterinary college wildlife health expertise, were greatly advanced through the planning and conduct of the Surveys, and new tools and methods for complex data management on a national scale were developed, tested and improved. The entire genetic composition of over 100 avian influenza viruses has been sequenced. Through this Survey, Canada participated in Canada-USA-Mexico Tri-lateral collaborations for continental surveillance for avian influenza, and in analysis of the risks posed to commercial poultry by avian influenza viruses in wild birds, collaboratively with the US Department of Agriculture.

Rationale For Avian Influenza Surveillance In Wild Birds In Canada In 2013-14:

Surveillance for Avian Influenza in wild birds serves several important purposes.

Protection of Canada's export trade in poultry and poultry products

- Mitigation efforts to minimize the socioeconomic impact of the most recent occurrence of Avian Influenza in poultry in BC (domestic ducks, fall 2005; domestic turkeys January 2009), and Saskatchewan (fall 2007) benefited greatly from background information on virus strains in wild ducks and the evidence of Canada's high level of veterinary infrastructure provided by the wild bird survey. It is predicted that current, credible data on avian influenza strains in wild birds in Canada will similarly reduce the socioeconomic impacts of future outbreaks of Avian Influenza in commercial poultry in Canada. Conversely, absence of such data is an important risk factor for larger socioeconomic impacts. Biosecurity issues for the Canadian poultry industry have been clarified by the Survey.

Early detection of highly pathogenic Avian Influenza (HPAI) strains

- Surveillance based on wild birds found dead is a sensitive surveillance method for detection in wild birds of HPAI strains, such as the Eurasian H5N1 strain, irrespective of how these strains may arrive in Canada. Detection of such strains as early as possible upon their arrival or evolution in Canada is one of the most critical mitigation factors in reducing their human health and socioeconomic impacts.

Maintenance and improvement of national laboratory and surveillance capacity for Avian Influenza viruses

- Analysis of wild duck samples in 2005 identified many weaknesses in Canada's national capacity to manage Avian Influenza in any species, but the survey also produced many solutions and improvements to national capacity. These were further tested in subsequent surveys and were further improved. Continuation of the wild bird survey will play a critical role in maintaining national Avian Influenza surveillance capacity, including field, laboratory, and communication components, and contributions to the evolution of government policies.

Risk analysis and risk communication

-The risk factors posed by Avian Influenza viruses in wild birds in Canada to the poultry industry, human health, other human economies and natural resources can only be assessed on the basis of correct information about the range of Avian Influenza virus strains, their distribution among species and regions, their variation among years, regions and species, and the extent of interchange with pools of virus strains in Asia, Europe, Central and South America. Wild bird Avian Influenza surveillance is the only means of obtaining this information.

International contributions and obligations

- In the current climate of concern regarding potential pandemic Avian Influenza, Canada is obliged to contribute to the global understanding of Avian Influenza virus strains in wild birds, since wild birds are the ultimate global reservoir of the Avian Influenza gene pool. Canada is geographically situated such that early detection of foreign virus strains arriving in the Americas via transatlantic bird migration can best be achieved by surveillance conducted in Canada. Canada also must consider potential routes of virus transfer from the Americas northward into Canada and from Canada southward to the Americas.