Animal Surveillance: Obligations, Incentives and Challenges

High Level Meeting on Lessons Learned from Influenza (H1N1)
Cancun, Quintana Roo, Mexico
July 2-3, 2009
Presentation plan

- Influenza A (H1N1) – General Overview
- Detection of the Novel H1N1 in Swine
- Addressing Scientific Uncertainty
- Perspective and Challenges for Animal Level Surveillance
The presence of Influenza A viruses in swine populations is neither novel nor geographically unique (Europe, Asia, Kenya, Americas).

Detectations of classical H1N1 in swine date to 1930 which for over sixty years was the dominant type of Influenza A virus in swine populations.

In 1998 a triple reassortant H3N2 emerged and spread rapidly in the North American swine population.

Subsequently new recombinants have been identified including H1N2, H3N1, H2N3, H3N3 and H4N6 in various countries.

The recent human Influenza A H1N1 can be transmitted from humans to swine and this also is not novel.

Given the number of human cases confirmed and suspected globally it is expected that exposure of swine to infected humans will occur with resulting routine detections of infection in swine populations.
This novel virus contains genes of several known viruses of swine (unique Eur-Asian and North American components), avian and human.
Pre-requisites for surveillance and detection are founded in awareness, engagement, competency, stewardship and incentives.

The Canadian experience is certainly a reflection of these determinants.

With advisement by Public Health officials of the emerging human situation on April 19, 2009 and ramping up of activities on April 23, the CFIA initiated an awareness alert to the Canadian animal health community including the Provincial Agriculture Ministries, laboratories, veterinary colleges, the Canadian Veterinary Medical Association and the Canadian Pork Council.

Requested to review all existing investigations and to be vigilant in their assessment and reporting of suspected swine influenza cases.
Pre-Requisites for Detection of the Novel H1N1 in Swine

- National Centre for Foreign Animal Disease (CFIA) – Winnipeg
- National Microbiology Laboratory (PHAC) – Winnipeg
Detection of the Novel H1N1 in Swine

- **National Centre for Foreign Animal Disease (CFIA)**
  Winnipeg (National laboratory)
  - PCR and sequencing for H1N1
    02/05/2009: Positive
  - Complete sequencing of virus
    07/05/2009

- The World Organisation for Animal Health (OIE) was immediately notified.
- Expertise and methods have been shared among many different countries and genetic sequencing posted to international data bases.
Detection of the Novel H1N1 in Swine

- Reporting obligation internationally based on any one of six epidemiological criteria
  - First occurrence of a disease and/or infection in a country, zone or compartment
  - Reoccurrence of a disease and/or infection in a country, zone or compartment following declaration of eradication
  - First occurrence of a new strain of a pathogen of a disease in a country, zone or compartment
  - Sudden and unexpected increase in the distribution, incidence, morbidity or mortality of a disease
  - An emerging disease with significant morbidity, mortality or zoonotic potential
  - Evidence of change in the epidemiology of a disease including host range, pathogenicity, in particular if there is a zoonotic impact
Pre-requisites for the Detection of the Novel (H1N1) in Swine

- Incentives for producer and industry participation include:
  - Potential health consequences to themselves, their families and their employees
  - Realization of risk to market access should another country be sentinel to an undetected or unreported infection through trade
  - Meaningful compensation for additional costs or loss of revenue
- However, the private sector commitment to surveillance and reporting will not be forthcoming or maintained in the absence of knowledge of the impacts and actions to be taken in response to detections in the current perceived punitive environment
- Evidence to date strongly indicates that the behaviour and consequence of H1N1 in swine does not differ from other Influenza A viruses common in swine at the global level. Therefore there will be resistance to testing of clinically healthy swine.
Addressing the Scientific Uncertainty

**Medium and long-term studies:**

- Improvement of diagnostic methods and differentiation of viral strains (HI, ELISA, VNT)
- Pathogenesis and transmissibility to other susceptible species (ducks, geese, quail, other birds, and other species e.g. ruminants)
- Disease surveillance studies in susceptible animal species and efficacy of current vaccines
- Long term diagnostic test development including monoclonal antibodies, epitope mapping and determination of the sequence motifs in the novel H1N1 virus that may determine efficient transmission in mammalian hosts including swine
- Scientific uncertainty is best dealt with by transparency
Perspective - It Is Imperative to:

- Increase knowledge of the epidemiology of this virus in human and animal populations.

- Continue to share scientific and technical knowledge with the international community.

- In light of this new threat, promote and enhance the concept of One World/One Health to protect the health of animals and public health.
Perspective and Challenges

• Canada remains committed to transparency, information sharing and respecting its international obligations.

• Unfortunate that we must collectively once again re-learn the lessons of the past.

• Actions taken by some countries undermine the recommendations, solidarity and efforts of international organizations.

• Actions taken can serve as disincentive for countries, industries and producers to invest in surveillance, detection and reporting.

• Actions taken on imports serve to confuse and alarm consumers, pose problems should the disease be subsequently found in their own country or are inconsistent with actions taken domestically.
Perspective and Challenges

• With increased investments in surveillance there is a critical need to establish a global agreed framework and process for nomenclature of newly emerging viruses.

• Neither human to animal transmission nor animal to human transmission of influenza viruses are novel events and interventions must be consistent and aligned with the relative risks in both human and animal populations.

• With increasingly sophisticated diagnostic methods and the increased integrated surveillance in place such events will become more frequent requiring greater context in reporting and interpreting for the general public.

• Should efficacy of commercial vaccines be demonstrated, it will be imperative that gene deleted or marker vaccines and associated Differentiating Infected from Vaccinated Animals (DIVA) diagnostic methods be developed to allow for meaningful interpretation.
Perspective and Challenges

• Absence of evidence is not evidence of absence. It is incumbent on the animal health community to actively assess the swine population, monitor the evolution of the behaviour of the virus and to share the sequencing of isolates for analysis and modelling.

• The reporting in Indonesia of sub-clinical infection of pigs with H5N1 highly pathogenic avian influenza raises the potential that a mixed H5N1/H1N1 infection could occur with the subsequent generation of reassortant viruses going undetected and unrecognized in the absence of active surveillance.

• The existence of wild boar populations in many countries may also serve as a reservoir of infection subsequent to exposure, require a different approach to surveillance and increased investments in bio-security.
Perspective and Challenges

• While potential for re-assortment in swine is possible, equally re-assortment in humans is equally possible with possibly greater consequence.

• Animal surveillance will require the Public Health community to be visible, vocal advocates and supporters of Government investment of the resources necessary.