
VS develops, implements SIV surveillance plan

Veterinary Services (VS) has developed and implemented a surveillance plan for swine influenza virus (SIV), including the pandemic H1N1 2009 virus¹ (pH1N1), in swine. The plan is based on the most current information available on this novel influenza virus strain. Surveillance is aimed to identify the pH1N1 strain as well as other non-typical strains of SIV in swine.

The immediate goals of the surveillance program are to:

1. Determine if the pH1N1 virus strain currently exists in U.S. swine;
2. If the pH1N1 strain is present, determine the distribution to inform further policy decisions;
3. Detect other novel influenza virus strains in swine in a timely manner; and
4. Determine genetic characteristics of novel viruses necessary for vaccine and diagnostics development.

The surveillance plan will allow for the differentiation of novel influenza virus strains from other circulating endemic strains of SIV, and monitor genetic changes of SIV isolates in pigs with influenza-like illness (ILI). Although participation in this surveillance program is voluntary, VS highly recommends participation due to the pandemic potential of novel influenza virus infection in people and the subsequent economic impacts to the swine industry.

Currently, much remains unknown about the epidemiology of novel influenza virus strains. Information released by the Canadian Food Inspection Agency on May 2 regarding a confirmed pandemic H1N1 2009 virus strain infection in a swine herd in Alberta, Canada, suggested that this particular virus is capable of infecting and causing disease in swine. Subsequent infections in swine herds have since been noted in both Canada and Argentina. Although the source of the infection of these swine herds remains unknown, current information suggests that the virus moved from humans into swine. The surveillance plan will be appropriately revised as additional information becomes available.

The current surveillance components of SIV surveillance include:

- 1) Surveillance of swine populations epidemiologically linked to a human case of SIV.** This surveillance will cover swine populations known to be linked with a human infection of SIV (including the pH1N1 2009 virus strain). Animal health officials, in cooperation with public health investigators, will collect samples from swine that are known to be linked with a human infection of SIV. The extent of swine sampling as a result of human exposure will be decided on a case-by-case basis.

¹ Official designation by the World Organization for Animal Health (OIE)
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- 2) Case-compatible swine accessions submitted to veterinary diagnostic laboratories.** This surveillance will cover on-farm swine populations in which pigs are showing ILI signs. Producers, veterinarians, or other personnel who observe pigs on farms should collect and submit samples from pigs showing ILI signs for SIV testing. Samples from this surveillance stream consist of nasal swabs from live sick pigs or lung tissues from mortalities meeting the case definition criteria for SIV (including the H1N1 flu outbreak virus). This surveillance is aimed primarily at commercial populations; however, with education and outreach, the surveillance may also target small enterprises.

- 3) Surveillance of sick pigs at first points of concentration or commingling events.** Example locations would include auction houses, markets, fairs, zoos, and exhibitions. This surveillance targets primarily small farm and backyard herds. These are sites with an increased potential for disease spread and/or elevated human exposure. Animal health officials or licensed veterinarians who observe pigs with ILI at these events should be aware of influenza virus in pigs and the potential for certain strains in humans to infect pigs and vice versa. Samples from pigs showing ILI signs should be submitted for SIV testing. Samples will consist of nasal swabs or lung tissue if the veterinarian has conducted a post-mortem exam.

Sampling of swine at slaughter or processing facilities is not a component of SIV surveillance at this time. Swine with signs of ILI that arrive at federally inspected facilities should be handled according to USDA Food Safety and Inspection Service standard protocols and procedures.

Samples obtained through these surveillance components will be submitted to approved National Animal Health Laboratory Network (NAHLN) system labs. Samples will be assayed for swine influenza antigen via a standardized PCR and virus isolation protocol designed to fully characterize isolates for further analysis and assessment.

Although one of the surveillance plan's objectives is timely detection of the presence and distribution of pH1N1 2009 virus strain in U.S. swine to protect public health and swine markets, many of the same principles are used to maintain a broader surveillance effort aimed at all novel swine influenza strains. The broader surveillance objectives are to:

- Detect changes in the swine influenza virus genome from isolates of sick pig case submissions received by NAHLN-associated diagnostic laboratories from producers and swine veterinarians. Isolates will be shared with the Centers for Disease Control and Prevention (CDC) per a CDC-USDA interagency agreement.

- Provide geographical and temporal data related to novel genomic sequences of interest to animal and public health officials.

Immediate expected outcomes include:

- Knowledge of the presence and distribution of novel influenza viruses (including H1N1 flu outbreak virus) in U.S. swine populations that can be used to make timely, informed, and scientific decisions about disease control measures, diagnostic reagents, preventative measures, human health implications, and trade negotiations;
- Establishing a baseline for novel SIV genomics in U.S. swine; and
- Aggregating and sharing SIV isolate information that will assist researchers and the animal health industry in developing targeted swine influenza diagnostic assays and effective vaccines.

Long-term outcomes of this effort may include building “One Health” protocols and system capacity for emerging zoonotic SIV viruses as well as other possible emerging pathogens; facilitating further research and understanding of the ecology and epidemiology of SIV infection in swine; and developing a better understanding of epidemiological factors and procedures that either limit or enhance the mutation and spread of SIV in the swine population.