

ANIMAL AND HUMAN HEALTH PREVENTION OPPORTUNITIES

Swine Influenza and Variant (Swine Origin) Influenza Virus

Swine influenza is a respiratory disease in pigs caused by infection with multiple subtypes of influenza A virus. Outbreaks of infection (epizootics) occur commonly among pigs, cause a high percentage of the herd to suffer illness, but rarely result in animal death. Swine influenza viruses usually do not infect humans. However, sporadic human infections can occur with influenza viruses circulating in swine; these influenza viruses are termed 'variant viruses'. Influenza virus transmission from pigs to humans typically occurs among those reporting a history of having close proximity to pigs (e.g., at swine production barns, livestock exhibits at fairs, and slaughter houses). Since December 2005, 347 cases of human infections with variant influenza viruses have been reported in 17 states (**Table**). No cases have been detected in Montana.

In this issue of *Montana One Health*, we review important details of swine influenza and the human health implications of infection with variant (swine origin) influenza viruses, including recommendations for diagnostic testing, treatment, disease prevention, and public health investigation of human cases.

Swine influenza

Influenza is a highly contagious respiratory disease in pigs. Epizootics are most common in fall or winter months. Transmission among pigs occurs primarily through aerosolization of the virus and through pig-to-pig contact. The virus is maintained in carrier animals for up to three months and can often be isolated from clinically normal animals between epizootics. A classic epizootic of swine influenza includes sudden onset of clinical signs in a high percentage of animals. The primary clinical signs include fever, depression, anorexia, cough, dyspnea, weakness, prostration, and mucous discharge from eyes and nose. Mortality from swine influenza is low (<5%).

In pigs, a presumptive diagnosis can be made based on clinical and pathological findings. Confirmation of infection requires virus isolation from either nasal swabs or on post-mortem examination of lung tissue, or demonstration of virus-specific antibody.

No treatment exists for swine influenza although antimicrobials might be necessary to treat secondary bacterial infections. Influenza vaccination and strict import controls are the best preventive measures. Good herd management practices, particularly reductions in stressors such as crowding and dust exposure, can also reduce losses. Commercially available killed vaccines containing both H1N2 and H3N2 subtypes appear to induce a strong protective immune response.

Pigs are susceptible to infection with influenza viruses of both mammalian and avian species, allowing them to serve as an intermediary in the transmission of influenza viruses from birds to humans. Wild waterfowl provide an immense natural reservoir of influenza viruses. The viruses can be shed in the bird's feces onto ground occupied by or water sources used by domestic pigs.

Infection of pigs with multiple types of influenza viruses is concerning for two reasons:

Table. Number of reported human infections with variant influenza viruses by state since December 2005

| Reporting State | H3N2v | H1N1v | H1N2v |
|-----------------|------------|-----------|----------|
| Hawaii | 1 | | |
| Illinois | 4 | 1 | |
| Indiana | 140 | | |
| Iowa | 5 | 3 | |
| Kansas | 1 | | |
| Maine | 2 | | |
| Maryland | 12 | | |
| Michigan | 6 | | 1 |
| Minnesota | 7 | 2 | 4 |
| Missouri | | 2 | |
| Ohio | 107 | 2 | |
| Pennsylvania | 16 | | |
| South Dakota | | 1 | |
| Texas | | 1 | |
| Utah | 1 | | |
| West Virginia | 5 | | |
| Wisconsin | 21 | 2 | |
| Total | 328 | 14 | 5 |

*Table adapted from the Centers for Disease Control and Prevention. <http://www.cdc.gov/flu/swineflu/variant-cases-us.htm#table-infections>

- ◆ Replication of an avian influenza virus within pigs might result in adaptation of the virus, thus allowing for infection of other mammals, including humans.
- ◆ Infection of pigs with two or more influenza viruses might result in the exchange of genetic material between viruses during replication. Three human pandemics of influenza are attributable to viruses with genes from both human and avian influenza viruses.

Human variant (swine origin) influenza infections

The majority of human infections of variant influenza occur among persons exposed to infected pigs. Transmission from pigs to humans is thought to occur via exposure to contaminated respiratory droplets, touching surfaces contaminated with infected respiratory secretions, or inhalation of contaminated dust. Eating properly handled pork products is not a risk factor for variant virus transmission. Rare cases linked to limited person-to-person transmission of variant influenza viruses have been documented.

Human infections with variant influenza viruses are of concern because influenza vaccines typically do not include influenza strains circulating in swine and are

unlikely to protect against variant influenza viruses.

Human infections with variant influenza virus are likely to cause disease similar to seasonal influenza, and in some cases severe disease. During June–November 2011, of the 10 cases of infection with A(H3N2)v, 7 patients had mild clinical illnesses and 3 were hospitalized. All patients recovered fully.

Diagnosis of variant influenza illness requires testing of a respiratory specimen for variant influenza viruses. Specimens should be collected as early in the illness as possible. Illness caused by variant influenza viruses should be treated similar to illness caused by seasonal influenza. When using antiviral medications, oseltamivir or zanamivir should be used for treatment.

Variant (Swine Origin) Influenza Virus Key Points

Animal Health

- Swine producers should be encouraged to minimize herd stressors that could increase the likelihood of a swine influenza epizootic
- Animal health authorities should encourage producers, exhibitors, and animal caretakers to practice biosecurity measures, including ensuring persons wash their hands before and after close contact with pigs, wearing personal protective equipment before coming into contact with pigs suspected of being ill, and ensuring persons with influenza-like illness avoid contact with pigs

Human Health

- Clinicians should consider the diagnosis of influenza in patients with febrile respiratory illnesses who have had contact with pigs
- Clinicians suspecting variant influenza infection should obtain a nasopharyngeal swab from the patient, contact the state laboratory at 1-800-821-7284 to facilitate timely transport and testing of the specimen, and treat with oseltamivir when indicated
- Public health authorities should investigate each case of variant influenza to assure human-to-human transmission has not occurred

References

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