

Zoonosis Associated with Pigs: A Major Public Health Significance

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Pig production is a rapidly growing segment of the global livestock sector, especially in Asia and Africa. This article provides information on various diseases that can be passed from swine to humans. Global pork production has rapidly increased over the past 30 years, leading to the intensification of the swine industry. This increases the transmission of pathogens both amongst animal herds, and between animals and their human caretakers. Meat products, which then make their way to consumers world-wide. As such, swine and their meat products have the potential to introduce zoonotic diseases into populations by multiple routes of transmission.

Here we discuss several examples of zoonotic diseases of swine origin which includes diseases like bacterial, viral or parasitic in origin:

Japanese encephalitis virus is an enveloped, positive sense, single stranded RNA virus within the Flavivirus genus of the *Flaviviridae* family. JEV is closely related to dengue, yellow fever and West Nile viruses. Twenty-six countries in Southeast Asia and Western Pacific regions have a JEV transmission risk, which encompasses over half of the global human population. *Culex* spp. mosquitoes transmit JEV from animals to humans.

Swine influenza is caused by influenza viral strains, which primarily infect swine but can be transmitted to people in close contact with infected pigs. Animals with the virus may not have any signs of illness but if they do, these include fever, nose or eye discharge, depression, lack of appetite, coughing, sneezing, and difficulty breathing. Symptoms in people are also typical flu-like ones, such as fever, coughing, lack of appetite, fatigue nausea, vomiting, abdominal pain, and diarrhea. The disease can progress to more serious



complications, including inflammation of organs like the heart and brain as well as organ failure.

Streptococcosis can be acquired by people via contact with infected animals or their body fluids and tissues, and by consumption of undercooked pork meat. *Streptococcosis* in pigs may present as inflammation in several organs, septicemia and sudden death. The causative agent can cause serious illness in people, including meningitis and endocarditis.

Erysipelas (also known as diamond skin disease) is transmitted through direct contact with animals, tissues and droppings. The risk of infection increases if persons have unprotected cuts or abrasions on their hands. In pigs, erysipelas cause fever, skin lesions, arthritis, or sudden death. Disease in humans may present as cellulitis, bacteremia, endocarditis, encephalitis, and arthritis.

Leptospirosis causes reproductive problems, and liver and kidney failure in pigs. The bacteria are typically shed in the urine of infected animals. People acquire the infection by accidental ingestion and contact with contaminated urine, placenta, and fetal tissues. The organism can infect through abraded skin. In people, the disease causes fever, headache, abdominal and muscle pain, vomiting, diarrhea, jaundice, and rash. In more severe cases, it can cause hemorrhagic pneumonia, liver and kidney failure and can lead to death.

Brucellosis is a potential bacterial zoonoses in pigs. The disease can spread from pigs to people by direct contact with infected animals or animal tissues and fluids, such as blood. The bacteria can penetrate damaged skin and mucous membranes. Infected people typically have flu-like symptoms and the disease can affect the reproductive organs and cause miscarriages.

Trichinellosis, also called trichinosis, results from roundworms (nematodes) from the genus *Trichinella*. It is a parasitic infection. It is caused by consuming undercooked or raw meat (usually pork). It can cause symptoms varying from generalized fever, abdominal pain, diarrhea, nausea, vomiting, myalgia to more severe like myocarditis and encephalitis.

Teniasis, *T. solium* taeniasis is acquired by humans through the ingestion of the parasite's larval cysts (cysticerci) in undercooked and infected pork. Humans can also become infected with *T. solium* eggs due to poor hygiene (via the fecal-oral route) or ingesting contaminated food or water. Ingested *T. solium* eggs develop to larvae (called cysticerci) in

various organs of the human body. When they enter the central nervous system, they can cause neurological symptoms (neurocysticercosis) with epileptic seizures.

Persons with specific medical conditions such as a chronic illness, immunodeficiency and pregnancy may be at higher risk of developing disease or complications from a zoonotic disease and should consult with their physician before working with animals. Swine and their products have become a central part of food systems around the world which consist of major cause of such diseases.

Prevention and control:

- Handle animals appropriately and safely to avoid bites and injuries.
- Thoroughly wash any bite wounds and report injuries.
- Do not eat, drink, apply cosmetics or use tobacco products while handling animals or in animal housing areas.
- Wear gloves when handling ill animals, animal tissues, body fluids and waste and wash hands after contact.
- Wear dedicated protective clothing such as a lab coat or coveralls and boots or shoe covers when handling animals. Launder the soiled clothing separate from your personal clothes and preferably at the animal facility.
- Keep animal areas clean and disinfect equipment after using it on animals or in animal areas.
- Safe and effective JE vaccines for use in humans have been shown to control disease in endemic countries
- Multivalent vaccination of pigs could in turn safeguard human health.