

Influenza transmission: pigs to people and back

Prof. Kristien Van Reeth

Laboratory of Virology, Faculty of Veterinary Medicine, Ghent University, Ghent, Belgium

Pigs are naturally susceptible to the same influenza A virus subtypes as humans and H1N1, H3N2 and H1N2 viruses are endemic in swine populations worldwide. However, the epidemiology of swine influenza is complex, because swine influenza viruses (SIVs) have a different history and origin in different regions of the world. Human influenza viruses, H3N2 viruses in particular, regularly transmit from humans to pigs. H3N2 SIV lineages in Europe and North America have a human haemagglutinin (HA), but they have acquired other viral genes from swine-adapted or avian viruses through the process of genetic reassortment. These SIVs are thus genetically distinct from their human counterparts, and they also show slower drift in their HA. Pigs can therefore serve as “reservoirs” for older human influenza viruses. The other way round, SIVs occasionally transmit from pigs to humans. Most humans with SIV reported a recent exposure to pigs, and they had a mild influenza-like illness or pneumonia. While the number of proven SIV cases in humans remains small compared to the total number of humans with occupational exposure to pigs, serological studies for SIV antibodies in humans suggest that zoonotic SIV infections are much more widespread and that many asymptomatic infections go undetected. Unfortunately, the interpretation of such studies is disputed, because of technical limitations of differentiating between swine and human influenza viruses by serology. Most important, there is little evidence for person-to-person spread of swine-lineage viruses and the swine-to-human transmissions have been epidemiologically dead end events. The single known exception is the pandemic H1N1 2009 influenza virus. Unlike other swine-origin viruses, this virus clearly spreads readily between humans, and we don't know why it has this capacity.

As a swine influenza virus researcher, I will present my personal viewpoint on the public health significance of influenza in pigs. I will tackle some timely questions. Should we worry about zoonotic SIV infections in humans? What do we really know about the species barrier between humans and pigs? What have we learned from the 2009 pandemic? Will the next influenza pandemic come from pigs or from birds?