

ONE HEALTH ATLAS

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Cross-species influenza threats: the critical role of One Health surveillance and control

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Influenza viruses are known to mutate easily and cross the species barrier, with phylogenetics studies showing how human and animal viruses are interconnected (Figure 1). For this reason, it is essential to adopt One Health approaches for surveillance and control of these viruses in animal and human populations.

The low pathogenic avian influenza H7N9 surveillance and control in Asia is a good illustration. H7N9 has low pathogenicity in poultry but has been responsible for many cases in humans. H7N9 was first detected in humans in February 2013 in Shanghai and Anhui, China. Between February 2013 and July 2018, more than 1,500 human cases were confirmed and more than 600 people died, mainly in China (Figure 2). Over this period, five waves of human infections occurred, typically starting in October and ending in June. Like H5N1 viruses, human transmission of H7N9 viruses occurs through exposure to infected poultry. However, the proportion of transmission through accidental contact is much higher for H7N9 than for H5N1, whose transmission is often associated with risky practices close

to birds. Surveillance of live poultry markets combined with the closure of infected markets has reduced the number of human cases. The implementation of a vaccination campaign in domestic birds has been effective in reducing the prevalence of infection and the risk of transmission to humans. In the case of H7N9 management, the surveillance and the control of birds successfully reduced infections in humans.

Moreover, some countries like France recommend pig and poultry farm workers get vaccinated for the seasonal human flu. Doing so limits the risk of transmission between animals and humans and prevents the introduction of seasonal human virus into the pig or poultry population. Indeed, this introduction could lead to recombination with circulating animal influenza viruses and the emergence of a potentially zoonotic virus. Pigs are often considered to be “mixing-vessels” as they are susceptible to both avian and human influenza viruses and provide the opportunity to produce a reassortment from swine, avian and human influenza viruses.

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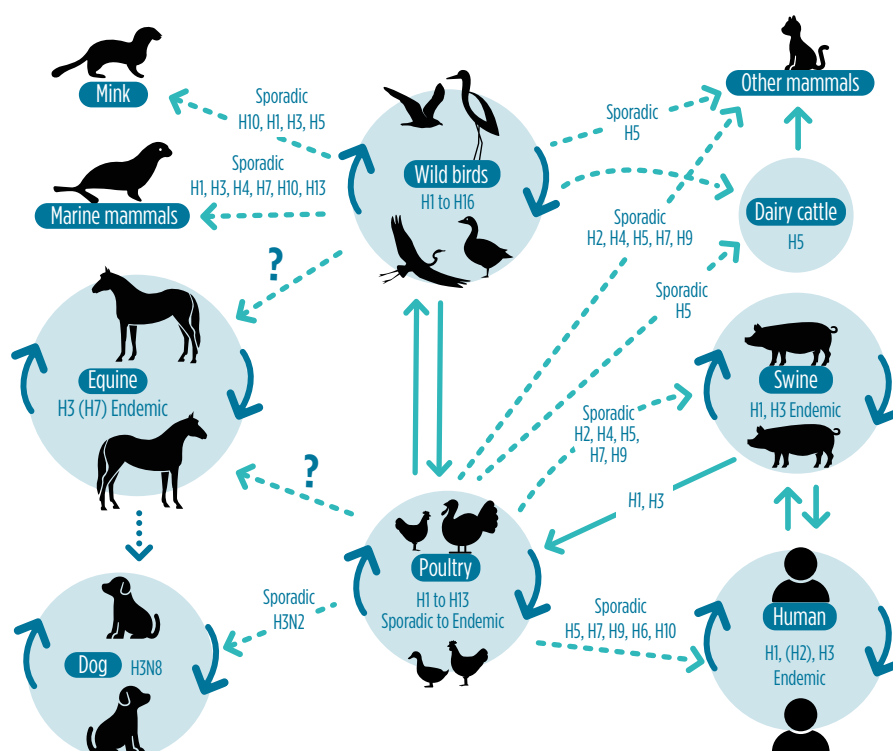


Figure 1. Influenza viruses transmission between species. H: hemagglutinin sub-type. Adapted from Swayne 2016.



Figure 2. Farm outbreaks and human cases due to H7N9 viruses in 2017. HPAI: highly pathogenic avian influenza; LPAI: low pathogenic avian influenza. Source: FAO 2019.