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Emergence and development of the novel H7N9 and H10N8 influenza viruses in China

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The occurrence of human infections with the novel avian H7N9 and H10N8 influenza virus since 2013 in China demonstrates the continuing threat posed by zoonotic pathogens. The repeated re-emergence in the past winter seasons and the ongoing outbreaks of H7N9 raised concerns of new pandemic threats. However, the emergence/re-emergence and development of these viruses are not fully understood. Through a combination of active surveillance, screening of virus archives and evolutionary analyses, we found that H7 and H10 viruses have frequently transferred from wild birds to domestic ducks and then further transmitted to chickens in China on several independent occasions. Subsequently they reassorted with enzootic H9N2 viruses to generate the H7N9 or H10N8 outbreak lineages. The H7N9 outbreak lineage has spread over a large geographic region and become persistent in chickens at live poultry markets that appear to be the immediate source of human infections. This has led to the establishment of multiple regionally distinct lineages with different reassortant genotypes. Most of the H7N9 and H10N8 variants were readily infectious in ferrets and some even had the airborne transmissibility. Continued prevalence of this family of viruses in poultry could lead to further sporadic human infections with an ongoing risk that the virus might acquire efficient human-to-human transmissibility.

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Endemicity of H9N2 and H5N1 avian influenza virus in poultry in China poses a serious threat to poultry industry and public health

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The Avian influenza virus of the H9N2 and H5N1 subtypes have circulated in poultry in China and become endemic since 1998 and 2004, respectively. However, because of this endemicity of these subtypes in China, they actively involved in the generation and establishment of the novel lineages of other subtypes of influenza virus, including the newly emerging highly pathogenic avian influenza viruses H5N2, H5N5, H5N6 and H5N8 and the 2013 novel H7N7, H7N9 and H10N8 viruses, thereby threatening both the poultry industry and public health. Here we will review briefly mainly the epidemiology, pathogenicity, transmission, disease control of these two subtype viruses and also discuss how they affect the overall situation of Avian influenza in China.

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