

H7N9: The Tip of the Iceberg?

Current Situation

As of April 19th, a new strain of influenza, H7N9, has infected 91 people and killed 17 in China. The first human case was reported in late March. Since then, case numbers have been climbing steadily, creating concerns around a potential pandemic. Currently, there is no evidence of sustained human-to-human transmission, but two family clusters indicate limited human-to-human transmission. The virus has been isolated from poultry and pigeons, but only some of the human cases reported close contact with poultry. Culling of poultry and closing of live markets have been implemented in China to control the spread of the virus. Other animals are being investigated as potential reservoirs of H7N9 as well.

The H7N9 virus typically circulates in birds and causes asymptomatic or mild infection. In contrast, the majority of known human cases have been severe, progressing quickly to pneumonia. The age profile of known cases skews toward the elderly, with median age of the first 60 human cases of H7N9 at 65 years. Some of the patients suffered from pre-existing conditions, such as Hepatitis B and chronic lung disease. RMS believes that the pattern of emergence of this new disease in humans is an example of what is known as the “iceberg effect”—the first cases tend to be most severe ones, but continued surveillance will reveal many more cases, including less severe ones that are currently hidden from view. The report of an asymptomatic case, a 4-year old boy in Beijing, as well as recent reports of mild cases, suggest that more variability in severity exists than is currently reported. If there are mild cases, the virus is probably more widespread geographically than what is currently reported.

Pandemic Potential

Influenza A viruses are classified based on viral surface proteins hemagglutinin (H) and neuraminidase (N). Human H7 subtype infections are reported rarely in Asia, and there are no known human N9 cases. Humans therefore have little or no pre-existing immunity to the novel H7N9 virus, and a vaccine does not yet exist. Early genetic analysis shows evidence that the virus has adapted to infect humans, and has acquired a mutation believed to promote deep lung infection, which is associated with more severe disease. Flu viruses mutate rapidly, and encountering new hosts provides them opportunity for further mutation. The H7N9 virus is “silent” (is mild or does not cause disease) in birds, so bird die-offs cannot be used as a signal for spread, making surveillance more difficult. All of these reasons trigger concern about the pandemic potential of the novel virus. However, the virus seems to be susceptible to antiviral drugs like oseltamivir (Tamiflu) or zanamivir (Relenza), and has not yet acquired the ability to transmit easily between humans. Enhanced surveillance efforts are underway globally, and the development of a candidate vaccine virus has begun, should a vaccine become necessary.

RMS expects the spread of this novel virus to follow one of two trajectories: like the spread of H5N1 or that of the 2009 H1N1 virus. There is evidence of limited human-to-human transmissibility, but the virus could remain low in transmissibility, with only sporadic human-to-human cases for many years, like H5N1. It is possible that transmissibility is higher than currently suspected, but virulence is lower. Early reports of the 2009 H1N1 strain in Mexico pointed to a more virulent, less transmissible pathogen than observed. Either way, it is clear that this is not the last we will be hearing of H7N9. At this point, H7N9 appears to be less virulent than H5N1 and less transmissible than H1N1, and current genetic evidence suggests the virus is not yet well-adapted to transmit easily between humans. Without sustained human-to-human transmission, RMS will not change probability assumptions for its RMS[®] Infectious Disease Model. RMS will monitor the evolving situation closely and will post updates as more information becomes available.

RMS information is provided to insurance risk professionals to assist them with their risk management, loss reserving and capital management decisions.