

Four types of animal-to-human (zoonotic) infections increasing at “exponential rate”

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Zoonotic epidemics generally have become larger and more frequent over past 60 years

Four types of animal-to-human (zoonotic) Infections have been increasing at an “exponential rate,” amid a general pattern of increasingly larger and more frequent ‘spillover’ epidemics, finds an analysis of 60 years of historical epidemiological data, published in the open access journal **BMJ Global Health**.

Based on current trends, these 4 types of viral pathogens are collectively set to kill 12 times as many people in 2050 as they did in 2020, warn the researchers.

Climate and land use changes are predicted to drive the frequency of spillover events, facilitated by population density and connectivity, explain the researchers. Animal-to-human infections have been the cause of most modern epidemics.

But the implications for future global health are difficult to characterise, given limited historical data on the annual frequency and severity of zoonotic spillover over time, they add.

To get round this, they drew on their own extensive epidemiological database to look for trends in spillover events that might shed light on future expected patterns.

This database draws on a wide range of official sources. It covers epidemics reported by the World Health Organization in the form of Disease Outbreak News reports (WHO DON); outbreaks caused by a viral pathogen that killed 50 or more people; and historically significant outbreaks, such as the 1918 and 1957 flu pandemics.

The researchers focused on Filoviruses (Ebola virus, Marburg virus), SARS Coronavirus 1, Nipah virus, and Machupo virus, which causes Bolivian hemorrhagic fever, because of their potential to pose a significant risk to public health and economic or political stability.

They looked at over 3150 outbreaks and epidemics between 1963 and 2019 to analyse time trends in the number of outbreaks and associated deaths caused by these viral pathogens.

They identified a total of 75 spillover events occurring in 24 countries during this period. These caused a total of 17,232 deaths, of which 15,771 in 40 outbreaks—mostly in Africa—were caused by Filoviruses.

Their analysis, which excluded the COVID-19 pandemic, shows that the number of spillover events and reported deaths attributable to these four groups of viruses have been increasing by almost 5% and 9%, respectively, every year between 1963 and 2019.

“If these annual rates of increase continue, we would expect the analysed pathogens to cause four times the number of spillover events and 12 times the number of deaths in 2050 than in 2020,” they estimate.

These figures are likely to be an underestimate, they suggest, due to the strict inclusion criteria for the pathogens in the analysis, which effectively ruled out the impact of advances in surveillance and detection over the study period; and the exclusion of the ongoing COVID-19 pandemic.

“Our evaluation of the historical evidence suggests that the series of recent epidemics sparked by zoonotic spillover are not an aberration or random cluster, but follow a multi-decade trend in which spillover-driven epidemics have become both larger and more frequent,” they write.

“The ultimate package of measures to support global prevention, preparedness, and resilience is not yet clear. What is clear, however, from the historical trends, is that urgent action is needed to address a large and growing risk to global health,” they conclude.