

EGU24-7794, updated on 19 May 2024

<https://doi.org/10.5194/egusphere-egu24-7794>

EGU General Assembly 2024

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Weather, influenza epidemics and mortality patterns in central Europe

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In temperate climates, influenza follows a seasonal pattern with peak incidence in winter and contributes significantly to excess winter mortality. The relationship between weather variability, influenza and human health is complex and the underlying mechanisms remain unclear. This study investigated the links between meteorological variables, influenza epidemics, and mortality in the Czech Republic over the 1982/83 to 2019/20 epidemics seasons. Results showed that severe influenza outbreaks with largest mortality impacts, primarily driven by A/H3N2 viruses, were preceded by falling temperatures, increasing relative humidity and cloud cover, and low air temperatures, high cloud cover and high relative humidity prevailed for their duration. In contrast, A/H1N1-related epidemics with lower mortality impacts occurred usually during periods of average or above-average temperatures, accompanied by elevated relative humidity and cloud cover. Influenza epidemics peaking later in winter or in early spring were associated with high excess mortality, usually lasted longer and were accompanied by prolonged periods of low temperatures. The results highlight the importance of ambient temperature and other weather variables in the transmission of influenza virus and course and severity of the epidemics. Prolonged periods of low temperatures in winter, together with the prevalence of influenza A/H3N2 in the population, were identified as an important contributing factors to the significant excess mortality in the temperate climate of central Europe.