

Abstract:

Dynamics of infectious disease transmission by inhalable respiratory droplets

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Transmission of respiratory infectious diseases in humans, for instance influenza, occurs by several modes. Respiratory droplets provide a vector of transmission of an infectious pathogen that may contribute to different transmission modes. An epidemiological model incorporating the dynamics of inhalable respiratory droplets is developed to assess their relevance in the infectious process.

Droplet dynamics is determined by their physical properties (size), whereas population dynamics is determined by, among other parameters, the pathogen infectivity and the host contact rates. Three model influenza epidemic scenarios, mediated by different airborne or settled droplet classes, are analysed.

The scenarios suggest that airborne transmission, mediated by respirable droplets, provides the dominant transmission mode in middle and long-term epidemics, whereas inspirable droplets, be they airborne or settled, characterize short-term epidemics with high attack rates.