

Derivation of hospital system transfer network structure from incomplete data for simulations of hospital-acquired pathogen spread

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Abstract

Multidrug-resistant bacteria (MDR) recently became a more serious health threat. These pathogens can spread within the hospital populations, e.g. by direct or indirect transfers of infectious patients between hospitals. Hence, modelling of inter-hospital transmissions may be useful in finding efficient prevention strategies.

In order to derive the structure of a hospital system transfer network, admission and discharge records are analysed. The dataset provided by AOK Plus (German health insurance company) contains hospitalization data from years 2010–2016 from healthcare facilities located mainly in Saxony and Thuringia (Germany). However, it does not contain patients' transfer data. The properties of this dataset are presented and discussed.

Based on the obtained admission and discharge data, the inter-hospital network is created and briefly analysed. Spread of a pathogen through the generated network is simulated using a numeric model and the outcomes depending on different initial infection conditions are compared. General conclusions about the progress of the epidemic are also drawn.

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