Epidemic Risk Evaluation From (Incomplete) Proxies of Contact Network Data

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Face-to-face contacts between individuals play an important role in social interactions and can also determine the potential transmission routes of infectious diseases, in particular of respiratory pathogens. An accurate description of these patterns is therefore of interest for the fundamental knowledge and understanding of human behaviour and social networks as well as in epidemiology, in order to identify contagion pathways, to inform models of epidemic spread, and to design and evaluate control measures such as the targeting of specific groups of individuals with appropriate prevention strategies or interventions.

An increasing number of datasets describing contacts between individuals in different contexts has become available. These datasets have been obtained using either surveys or wearable sensors that can detect contacts or simply co-presence, at varying resolution. Data are moreover often incomplete or biased, due on the one hand to population sampling and on the other hand to underreporting or bad estimation of contact durations for surveys. The low spatial resolution of co-presence data might moreover be insufficient to feed data-driven models. In this talk, I will review recent progresses in the understanding of how even incomplete, biased or low-resolution data can bias the outcome of simulations of epidemic spreading processes, and in the development of methods to compensate for such biases.