For better or worse: The feedback between disease spread and individuals' reactions

O. Woolley

ETH Zurich. Switzerland

To control the spread of disease, we need a more systematic understanding of the role that human reactions play. Most straightforwardly, individuals who fall ill may be forced to change their behavior. More challenging to understand and predict, individuals may choose to behave differently as disease incidence varies. I will present results that consider both of these cases. First I will consider a model where sick individuals can no longer work, inflicting an economic burden on the system. I will show that under specific conditions this burden makes it impossible to contain the disease. When it comes to voluntary behavioral reactions, an interesting twist is that individuals react to the information that they are exposed to, which does not necessarily capture the objective situation. I will show that the preventive responses of individuals, such as voluntary vaccination, can successfully control the spread of disease only if individuals react to information that captures local variations in disease incidence. Furthermore, with this information, disease control can be most cost effective. I will connect these theoretical findings to the design of information platforms to monitor and control the spread of disease.