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Study of social contact patterns in Hong Kong will give insight into spread of epidemic

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One of the most densely populated cities in the world. Credit: Jonathan Read of Lancaster University

How people's social encounters influence the growth of epidemics

The first ever long-term study of patterns of social contact in Hong Kong will improve our knowledge of the growth of epidemics say researchers.

Hong Kong was where Severe Acute Respiratory Syndrome (SARS) emerged in 2002-2003. A hotel guest infected with the illness spread the virus to seven other guests who then caught flights, leading to almost 800 deaths in a global epidemic.

Dr Jonathan Read of Lancaster University in the UK with Dr On Kwok from the Chinese University of Hong Kong conducted a study of 1,450 residents in the city, which is one of the most densely populated in the world.

The researchers measured the daily number and type of social encounters made by participants.

Dr Read said: "It's the first time anyone has measured social contact patterns for a large representative sample of people for more than a single day per person, so will help inform mathematical models of epidemics, particularly for Hong Kong - where SARS emerged into the world—but also how those patterns change over time."

They found that on average:

- People met 12 to 13 individuals daily
- Their contacts were in three different locations around Hong Kong
- The daily time spent in contact with others was just over 9 hours
- More people were encounterd from Monday to Thursday than at the weekend

Age was an important factor:

- 10-20 year olds and 40-50 year olds had the highest rate of encountering others
- There was a sharp decline in encounter rates above the age of 60
- All age groups, except 20-39 and 40-64 year olds, were significantly more likely to have a greater number of contacts with a member of their own age group

Researchers also found that some people make, on average, more contacts than others - but they are not necessarily more likely to contract or spread disease.

"The number of contacts you make is often thought of as an important indicator of how likely you are to get infected or to pass infection on to others. People who make a lot of contacts, so called super-mixers, could perhaps be targeted to help control an epidemic. As this study is the first of its kind to follow people over several days, we can see how different people are to each other, compared to their own day-to-day pattern of encounters. Our study shows that there is surprisingly large day-to-day variation in the rate at which individuals interact. This means it may not help to target 'super-mixers', as they may well be making a reduced number of contacts the next day or while they are infectious.

"This may help to explain why contact tracing to prevent a disease, such as flu or Ebola or TB, from spreading is so hard."

More information: Kin On Kwok et al, Temporal variation of human encounters and the number of locations in which they occur: a longitudinal study of Hong Kong residents, *Journal of The Royal Society Interface* (2018). DOI: 10.1098/rsif.2017.0838

Provided by Lancaster University