

New study: Swine flu transmission is most intensive between children of same class

Boys predominantly pass on flu to other boys and girls to girls, according to a new study of how swine flu spread in a primary school during the 2009 pandemic, published today in the journal *Proceedings of the National Academy of Sciences*. The results also suggest that flu transmission is most intensive between children of the same class, but that sitting next to an infected person does not significantly increase a child's risk of catching flu. The data will help researchers to model how epidemics spread and how interventions such as school closures can help contain an outbreak.

In the study, researchers from Imperial College London, the US Centres for Disease Control and Prevention (CDC) and the Pennsylvania Department of Health analysed how social networks influenced the spread of H1N1 pandemic flu in an elementary school in Pennsylvania.

The results show that children are about three times more likely to transmit flu to children of the same gender than to children of the opposite gender. The researchers also found that the transmission rate is about five times higher between classmates than between children in a different class in the same grade, and about 25 times higher than between children in different grades. However, sitting next a child with flu does not significantly raise a child's risk of catching it.

Pattern of spread reconstructed

The study involved 370 pupils (81% of children in the school) from 295 households. The researchers collected extensive data from seating charts, school timetables, bus schedules, nurse logs, attendance records and questionnaires. Although it is impossible to determine exactly who caught flu from whom, the researchers used sophisticated statistical methods to probabilistically reconstruct the pattern of spread and estimate the rates of transmission in different settings.

"Mathematical models are useful for predicting how outbreaks will spread, but in order to make the models accurate, we need to supply them with data about how disease spreads in the real world," said Dr Simon Cauchemez, the lead author of the study from the Medical Research Council Centre for Outbreak Analysis and Modelling at Imperial College London. "This is one of the most comprehensive studies to date on how a flu epidemic spreads between children in school, and it tells us a great deal about how social networks influence transmission."

Model could help public health officials

"The data from this study will help us make more accurate models, which can help public health officials to handle epidemics effectively. For example, these new models could help us better understand whether and when it would be appropriate to close a school, or whether it might be better to close individual classes or grades."

The school that was studied in this project closed 18 days after the outbreak began, when 27% of pupils had already shown symptoms. According to the analysis, transmission rates were falling at this stage, and closing the school probably had little impact on the spread of the epidemic.

Dr David Swerdlow, senior advisor for Epidemiology and Emergency Response, National Centre for Immunisation and Respiratory Diseases, at the CDC, said: "This was a unique opportunity at the inception of the 2009 influenza A (H1N1) pandemic to learn about transmission in social networks. The investigation demonstrates the benefits of partnerships as the collaboration included Imperial College London, the Pennsylvania Department of Health, and CDC."

Source: Imperial College London

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