What to do in a flu epidemic? Stay at home and watch TV

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Non-pharmaceutical interventions (NPIs) include actions individuals can take to reduce disease spread, such as hand washing and minimizing contacts with sick people. These can play a key role in reducing the spread of infectious diseases such as influenza, according to research published in the open access journal *BMC Infectious Diseases*.

Social distancing, staying indoors and avoiding social activity, is an important NPI in the event of an epidemic, especially when a vaccine is unavailable or limited. Whether privately initiated or policy directed, NPIs calling for the closure of schools and entertainment venues, and cancelling public events are becoming more relevant in control strategies.

"The swine flu outbreak that hit Mexico City in April 2009 could have been worse, but spread of the virus was reduced by people's behavioral response of distancing themselves from each other," says University of California at Davis economist Michael Springborn, lead author of the study. The study drew on the combined disciplinary strengths of epidemiology and economics to create a new model that incorporates behavioral responses into existing models of disease spread.

Following confirmation of a novel strain of A/H1N1 influenza virus (swine flu), on Friday 24th April 2009 the Mexican federal government closed public schools in Mexico City and 'social distancing' measures were put in place. Researchers from University of California, Arizona State University, Georgia State University, and Yale University used

home television viewing in Central Mexico as an indicator of behavioral response during the pandemic.

Television ratings data are consistently and widely available and "highly correlated with time spent in the home," says Springborn. These data provide a good indicator for the level of social interaction, because time spent watching television generally increases with time spent at home. When people are home, they are limiting the number of contacts they make.

"We found that the behavioral response to the outbreak was initially strong but waned sooner than expected," says Springborn. This dynamic is interpreted as a "rebound effect". At the onset of a flu outbreak, the public responds strongly to the directed control policies. After a prolonged period of staying indoors people began to spend less time in the confines of their homes.

Springborn explains "This suggests that efforts to utilize social distancing to mitigate disease spread may have a limited window of efficacy, i.e. before pent up-demand for activities outside the home takes precedence." There is historical evidence for this behavior. Observations from the 1918 influenza pandemic in Australia showed that when the perceived risk decreased the public reverted back to normal behavior.

"Our study reinforces the view that capturing behavioural changes that amplify or blunt the transmission rate is key to improve our ability to make predictions about the impact of epidemics," says co-author Gerardo Chowell, who is a newly appointed faculty member in the School of Public Health at Georgia State University.

Certain age groups and socio-economic groups responded more strongly than others. The researchers found that the increase in TV watching for children and wealthier groups was more pronounced. The authors

speculate that those from poorer backgrounds may face greater difficulty in taking self-protective actions like social distancing, e.g. due to less flexibility with working hours. These differences between demographic groups could have public health policy implications for directing outbreak response assistance to those with lower financial means or increasing access to paid sick-leave for low-wage workers.

Behavioral responses clearly affect the course of the disease. "This affects public health authorities tasked with planning for epidemics," says Springborn. This has implications for management advice, including the allocation of resources between pharmaceutical and non-pharmaceutical interventions.

Within the set of NPIs, the findings provide insight for selection of the duration and strength of major interventions (closing of businesses and cancelling public events) versus other forms of assistance, such as distributing masks.

Social distancing policies may be effective against pandemic influenza. However, people don't need to wait. It is important to remember that other behaviors, such as washing hands and wearing facemasks, could contribute and should be routine in order to reduce transmission.

More information: Accounting for Behavioral Responses during a Flu Epidemic Using Home Television Viewing , Michael R Springborn, Gerardo Chowell, Matthew MacLachlan and Eli Fenichel , *BMC Infectious Diseases* 15:21, dx.doi.org/10.1186/s12879-014-0691-0

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