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Spatial and temporal analysis of FluTracking data and implications for influenza spread in Australia

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Modelling the spread of influenza across Australia is of substantial public health concern. However, there are many challenges in creating accurate models, including how best to capture the spatial and temporal characteristics of the disease spreading process, and aligning with the actual contact process and mobility of individuals in the population. How influenza spreads spatially, whether by infecting neighbouring regions or through major domestic centres via air traffic, is of particular interest in building predictive models. Recent work has suggested the spread of influenza in the United States is dominated by work commutes rather than air traffic. In contrast, influenza in Australia has been shown to have highly synchronized epidemics between major cities across large geographic distances and varying climates.

FluTracking is a participatory online health surveillance system for monitoring influenza-like-illness (ILI), with one of its principal aims to detect the onset of influenza in Australia. Since 2010, there are over 10,000 participants each year, with participation continuing to increase. In this work, we analyse weekly reports from the FluTracking system from May 2011 to October 2017 to infer spatial and temporal dynamics of influenza in Australia. These dynamics could then be used as a starting point for building contact and contagion networks in models for epidemic forecasting, and lead to a greater understanding of the mechanisms behind the spread of influenza-like-illness in Australia.

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