

## Modelling household epidemics on networks, with application to COVID-19

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### Abstract

In order to assess the effect of tracking methods for COVID-19 it is important to understand the time course of the epidemic before tracking is put into place. As the disease is transmitted through social contacts, the social network structure may be crucial in modelling the epidemic. In this work we employ a configuration model which includes households and use branching process approximations to determine the asymptotic time course of the epidemic. The model includes realistic distributions for the duration of the epidemic and for the spreading mechanism, and is hence non-Markovian. It can be used to give an asymptotic  $R$  parameter which is obtained not from the initial stages of the epidemic but from the time course of an epidemic which has taken off.

This is joint work with Frank Ball, Elizabeth Fearon, Martyn Fyles, and Thomas House