The SCRC & RAMP

The Scottish COVID-19 Response Consortium (SCRC) was originally formed in 2020 by the Boyd Orr Centre for Population and Ecosystem Health (University of Glasgow), Biomathematics and Statistics Scotland (BIOSS), and the Scottish Government’s Centre of Expertise on Animal Disease Outbreaks (EPIC). We responded to a call by the Royal Society to develop epidemiological models of COVID-19 spread (Rapid Assistance In Modelling The Pandemic: RAMP).

Contact-Tracing

The isolation of symptomatic / positive cases and tracing of contacts has been used as an early and effective COVID-19 containment measure in many countries. To maintain control of infection, there is a need to understand what combination of measures—including manual and novel digital tracing approaches—might be required to reduce transmission whilst also minimising disruption to populations.

Model features

- **Language**: Java
- **Spatial scale**: No explicit spatial scale but a form of ‘location’ is retained
- **Model type**: Individual-based stochastic network model; Model uses compartmental structure for disease progression
  - Age-structured individuals
  - Weighted contacts
- **Features**: Flexible contact tracing scenarios
- **Mode**: Forward simulation, user-defined timesteps

Disease progression

Comparing policy scenarios: an example

Example of policy comparison on individual transmission chains (Fig. left): Transmissions at school cause most of the large infections chains in our model. Here, we investigate the effect of different policy settings on school transmissions by comparing two isolation policy settings: (i) a policy whereupon becoming symptomatic, the person and all their contacts from the last 3 days isolate for 3 days, and (ii) a policy where they isolate for 7 days instead. This extra isolation time has a large impact overall in preventing infections, including in school settings (Figure (d)). Note that for some infections chains in (Figure (d)), infection remains the same between policies and transmission is not prevented through longer isolation time. Closer inspection revealed that the index cases for these infection chains were asymptomatic, and thus did not go into isolation until one of their contacts became symptomatic.