

# Modelling the spread of COVID-19 in urban areas

In spring 2020, the Royal Society announced its Rapid Assistance in Modelling the Pandemic (RAMP) initiative, which called on the UK's diverse community of modelling experts to support with understanding the evolution of the pandemic and the effects of different lockdown strategies. The Turing responded by leading RAMP's **urban analytics workstream**, which sought to augment epidemiological models with data relating to people's movements and behaviour patterns around towns and cities.

The workstream, led by Mark Birkin, the Turing's Programme Director for Urban Analytics, rapidly convened a team of researchers from four Turing university partners – the Universities of Leeds, Cambridge and Exeter, and University College London – to repurpose an existing model developed at the Turing called **SPENSER**. This simulates the day-to-day

movements of a 'synthetic population', which matches the real UK population in key characteristics such as age, ethnicity, sex and household composition. By linking this model to highly realistic data of people's activities – such as the time they spend at home, shopping, at school and at work – the team could simulate COVID-19 transmission within a population at an individual level.

The main outcome so far is a demonstration model of Devon's entire 800,000-person population, which allows researchers to compare the impact of different intervention scenarios at a local authority level, such as closing schools or restricting the opening hours of shops or hospitality venues. The team is now scaling up its model to a national level, and is in dialogue with policy makers and the government about using this technology to inform decision-making in this pandemic and future health emergencies.



“Our work is demonstrating the value of linking models of disease transmission to detailed data about people's daily activities.”

**Mark Birkin**  
Programme Director for Urban Analytics  
The Alan Turing Institute