COVID-19 INDIVIDUAL BASED MODEL WITH INSTANTANEOUS CONTRACT TRACING

ROB HINCH, WILL PROBERT, ANEL NURTAY, CHRISTOPHE FRASER

1. Overview

The individual based model (IBM) is for simulating the spread of COVID-19 in a city and to analyse the effect of both passive and active intervention strategies. The model includes demographic data, which control both the dynamics of the interactions of individuals as well as the the outcome of the disease. The disease is spread via interaction between individuals which are remembered to facilitate contact tracing. Intervention strategies such as self-quarantining, testing and contact-tracing can then be analysed.

2. Demographics

The demographics of the model are based upon UK-wide data for 2018 from the Office of National Statistics (ONS). Individuals are put in one of 3 categories: child (0-17 years), adult (18-64 years) and elderly (65+). Every individual is part of household which forms an important part of each persons daily interactions. We use household size data from the ONS.

Demographic Parameters		
Name	Description	Value
uk_pop_0_17	UK population 0-17 years old (millions)	14.05
uk_pop_18_64	UK population 18-64 years old (millions)	40.22
uk_pop_65	UK population 65+ years old (millions)	10.04
uk_house_1	UK households with 1 person (thousands)	8,198
uk_house_2	UK households with 2 person (thousands)	9,609
uk_house_3	UK households with 3 person (thousands)	4,287
uk_house_4	UK households with 4 person (thousands)	3,881
uk_house_5	UK households with 5 person (thousands)	1,254
uk_house_6	UK households with 6 person (thousands)	596