

Agent-based model for disease spread

We have developed an agent-based model with the following features

- Each agent (person) has both a disease status (Susceptible, Infected, Recovered, Immunized), and demographic status (<25, 25-65, >65).
- Two contact networks, static and dynamic. Dynamic contact networks are resampled each timestep, static is the same for whole simulation.
- Contacts are further divided into their place of occurrence: household (HH), work/school (WS), and everything else (Rest)

Static contacts

- People are randomly placed into households with household demographic status following data from Statistics Canada
- Each household is assumed to be a fully connected subgraph
- House contacts have a duration, which is derived from household contact duration distributions derived by Mark

Generating dynamic graphs

- Given contact distributions for each age group, we sample degrees (number of contacts) for each person for both WS and Rest
- Construct graphs from the degree vectors generated in previous step
- Contact durations are sampled for each edge in the dynamic graph
- Infections are advanced over resulting graph