**Methodology**

A SIR model without demography was implemented to explore the effects of time-limited social distancing measures (SDM) on a hypothetical outbreak scenario (eqn 1.1). We assume that S, I and R compartments represent the proportion of the population that is susceptible, infectious or recovered respectively.

eqn 1.1

Individuals in compartment S become infected and move into the I compartment with the time-varying rate β(t), which represents the daily per capita rate of transmission under the assumption of random mixing of the population. The daily per capita rate of recovery, μ, was assumed to be a function (reciprocal) of the average duration of infectiousness or the generation time, assuming a negligible latency period.

Using an epidemic doubling time (T2) of six days and basic reproduction number (R0) of two, the generation time (G) or average duration of infectiousness (1/μ) was calculated to be 8.62 days using eqn 1.2. The reciprocal of the generation time (μ) and a baseline R0 of 2 was used in eqn 1.3 to obtain a baseline β(t) and μ value of 0.231 and 0.116 respectively.

eqn 1.2

eqn 1.3

Time-limited SDMs were modelled through reductions to the β(t) parameter, with these interventions differing based on the temporal distribution of the β(t) reductions. We explored six different scenarios, each lasting for 12 weeks (84 days) and with identical magnitudes of β(t) reductions over the 12-week period (Table 1). All SDM interventions were initiated at day 41 (I(t) = 0.01). All models were initiated with the following initial conditions: S = 0.9999, I = 0.0001, R = 0. All simulated outbreaks were run for 365 days.

**Table 1** – Description of the six different SDM intervention scenarios.

|  |  |  |
| --- | --- | --- |
| Scenario | Description | Beta over 12 Weeks |
| 1 | No SDMs. |  |
| 2 | Constant 0.625\*β(t) reduction.  (Min β(t) = 0.144) |  |
| 3 | Immediate 0.25\*β(t) reduction followed by a linear increase back to baseline β(t).  (Min β(t) = 0.058) |  |
| 4 | Linear decrease to 0.25\*β(t) followed by an immediate return to baseline β(t).  (Min β(t) = 0.058) |  |
| 5 | Linear decrease to 0.25\*β(t) at week 6, followed by a linear increase back to baseline β(t).  (Min β(t) = 0.058) |  |
| 6 | A “pulsing” SDM with 0.25\*β(t) reductions between weeks 1-3, 5-7 and 9-11.  (Min β(t) = 0.058) |  |

Three summary statistics were used to explore the efficacy of each SDM intervention: 1) Total fraction of infected individuals (i.e. outbreak size), timing of the epidemic peak and the fraction of infected individuals at the epidemic peak (peak incidence).

All model simulations were carried out using R (v3.6.2) and C++. The “desolve” package was used for all R based simulations.