$$\frac{\mathrm{d}S(t)}{\mathrm{d}t} = -\beta(t)\cdot S(t)\cdot\left[\frac{I(t)+l(t)\cdot J(t)}{N(t)}\right] \tag{1}$$

$$\frac{\mathrm{d}E(t)}{\mathrm{d}t} = \beta(t)\cdot S(t)\cdot\left[\frac{I(t)+l(t)\cdot J(t)}{N(t)}\right]-\kappa\cdot E(t) \tag{2}$$

$$\frac{\mathrm{d}I(t)}{\mathrm{d}t} = \kappa\cdot E(t)-[\alpha+\gamma]\cdot I(t) \tag{3}$$

$$\frac{\mathrm{d}J(t)}{\mathrm{d}t} = \alpha\cdot I(t)-\gamma_r\cdot J(t) \tag{4}$$

$$\frac{\mathrm{d}R(t)}{\mathrm{d}t} = \gamma\cdot[1-f]\cdot I(t)+\gamma_r\cdot[1-f]\cdot J(t) \tag{5}$$

$$\frac{\mathrm{d}D(t)}{\mathrm{d}t} = \gamma\cdot f\cdot I(t)+\gamma_r\cdot f\cdot J(t) \tag{6}$$

$$\frac{\mathrm{d}C(t)}{\mathrm{d}t} = \beta(t)\cdot S(t)\cdot\left[\frac{I(t)+l(t)\cdot J(t)}{N(t)}\right] \tag{7}$$

$S(t)$ = susceptible individuals.
$E(t)$ = exposed individuals.
$I(t)$ = Infectious and symptomatic individuals.
$J(t)$ = hospitalized individuals.
$R(t)$ = individuals removed from isolation after recovery.
$D(t)$ = individuals removed from isolation after disease-induced death.
$C(t)$ = cumulative second cases.

R_0 = basic reproduction number.
$\beta(t)$ = transmission rate. Determine β according to a given value of R_0 as follows:

$$\beta = \frac{R_0\cdot[\alpha+\gamma]\cdot\gamma_r}{\alpha\cdot l+\gamma_r} \tag{8}$$

$l(t)$ = effectiveness of isolation strategy ($l = 1$ denotes no isolation, $l = 0$ denotes perfect isolation).
$N(t)$ = population size.
κ = latency period.
α = average time from onset of symptoms to hospitalization.
γ = average infectious period.
γ_r = average time individuals stay in the hospital.
f = case fatality ratio.