$$\frac{dS}{dt} = -S\beta\frac{I}{N}$$

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$$\frac{dI}{dt} = \frac{\beta SI}{N} - \gamma I$$

$$\frac{dR}{dt} = \gamma I$$

$$P\,(\text{susceptible}) = \frac{S}{N}$$

$$P\,(\text{infected}) = \frac{I}{N}$$

$$P\,(\text{recovered}) = \frac{R}{N}$$