

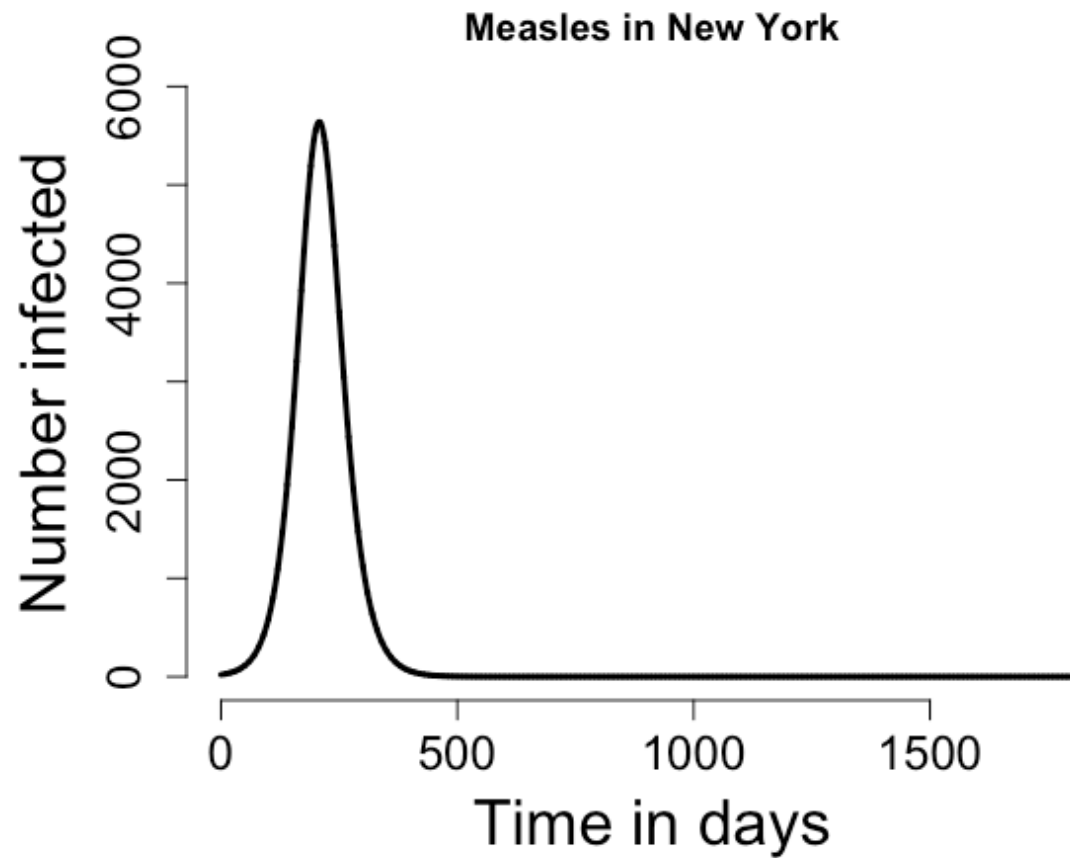
Lab 1: ODE models in R

Summary

- We can specify an ODE model in R with the following elements
 - Function [inputs: state variables, time, parameters]
 - Initial conditions
 - Timestep (value for Δt of output; not for evaluation)
- The deSolve package numerically integrates the model to provide accurate, computationally efficient trajectories of the state variables through time

Benchmark Question 1

- What happens after 5 years?



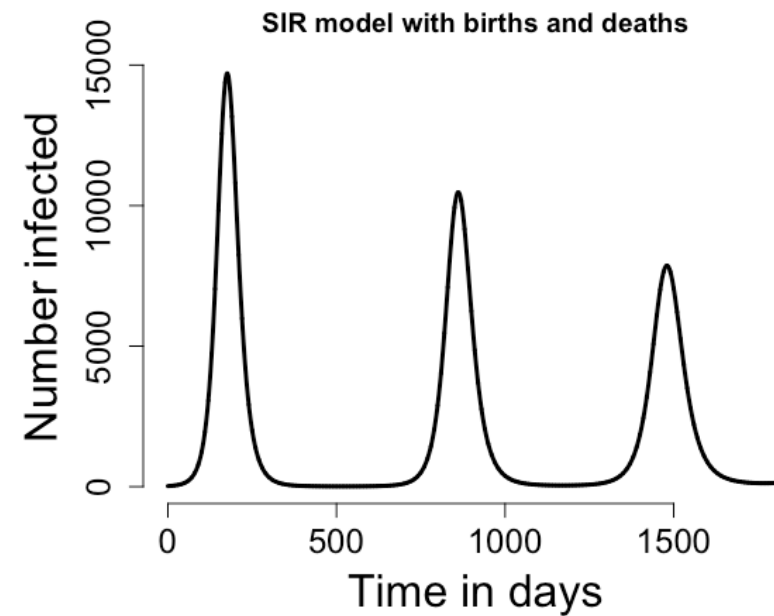
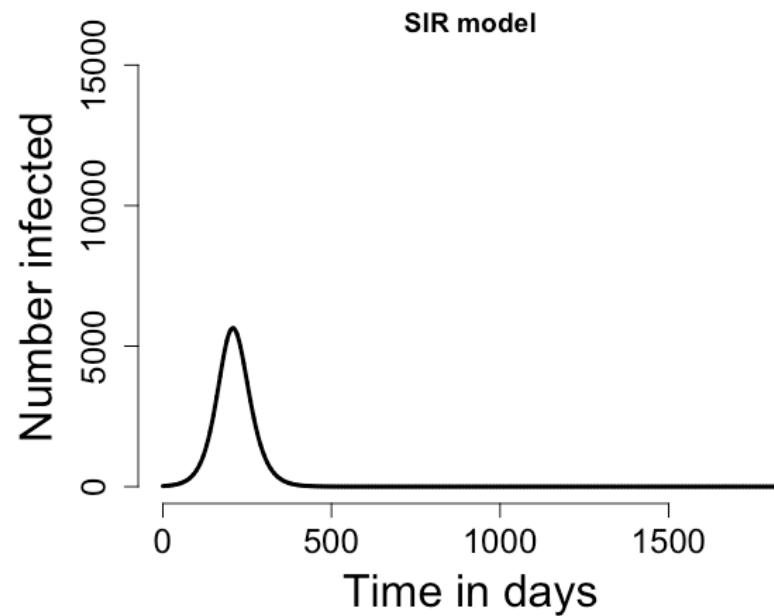
Benchmark Question 2

- Add births and deaths, with constant population size and a life expectancy of 60 years

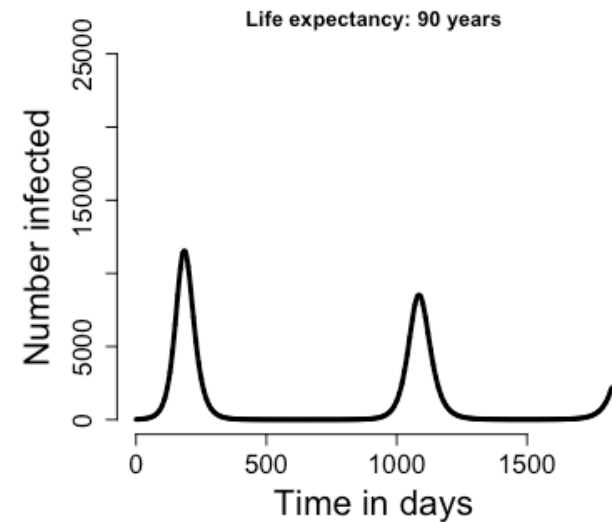
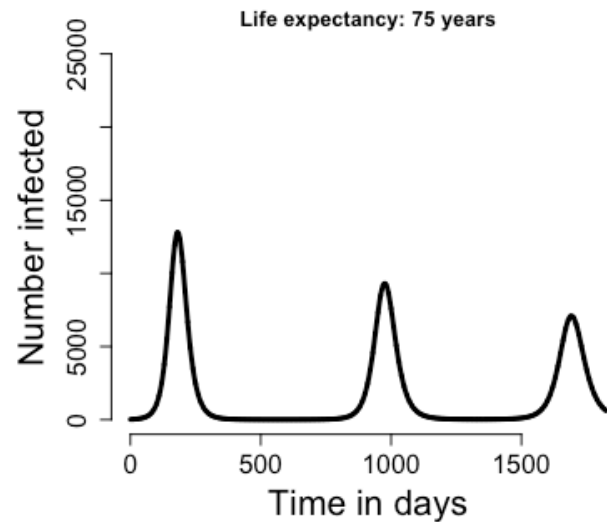
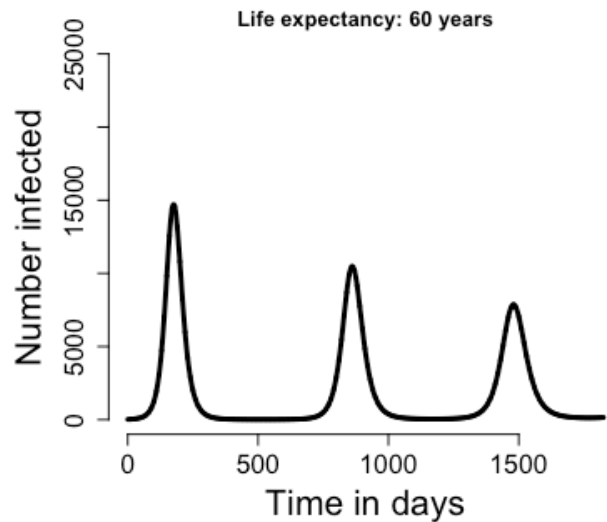
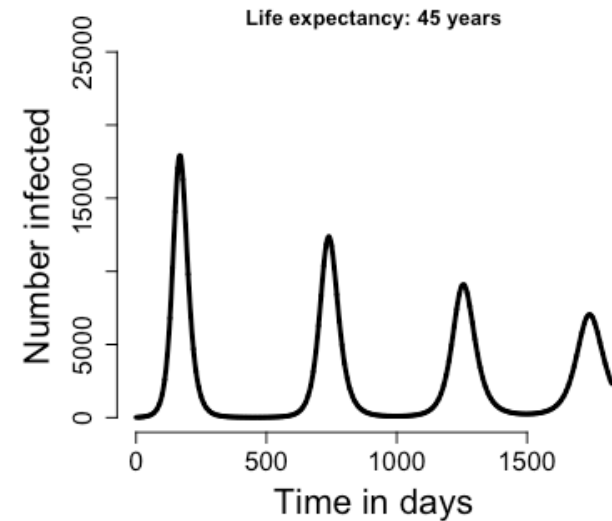
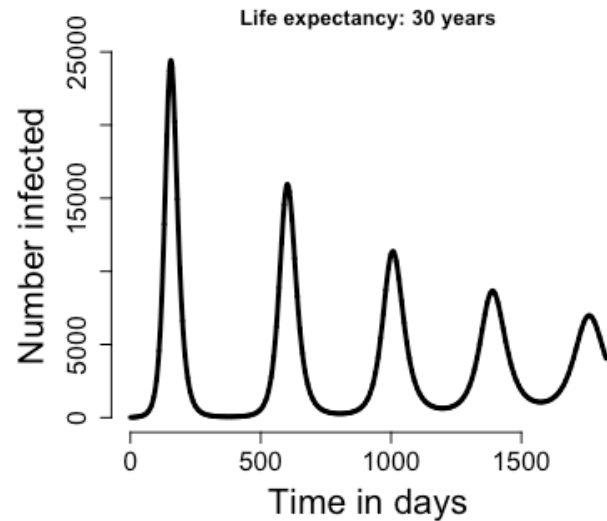
```
sir.bd <- function(t,y,parms){  
  with(c(as.list(y),parms),{  
    dSdt <- N/L-beta*S*I/N - S/L  
    dIdt <- beta*S*I/N - gamma*I - I/L  
    list(c(dSdt,dIdt))  
  })  
}
```

Benchmark Question 3

- Compare the dynamics between `sir()` and `sir.bd()`

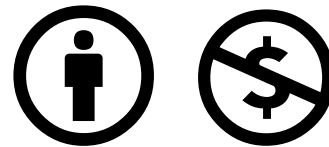


Benchmark Question 4





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Title: **Lab 1: ODE Models in R**

Attribution: **Juliet Pulliam**, Clinic on the Meaningful Modeling of Epidemiological Data

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For further information please contact admin@ici3d.org.