

Florida (Non-Spatial Analysis) Results

2022-08-25

Associated RData file (fl_results.RData) can be downloaded at: <https://mega.nz/folder/yBpA0IpA#jUZw1qrXeGQioN3bImE-Wg>

Models 1-3: 77 timepoints

- Model 1: Unconstrained growth; no interventions
- Model 2: Baseline intensity plus linear time component beginning on first intervention date (school closure)
- Model 3: Baseline intensity plus two linear time components, beginning on respective intervention dates (school closure and state mandated stay-at-home-order)

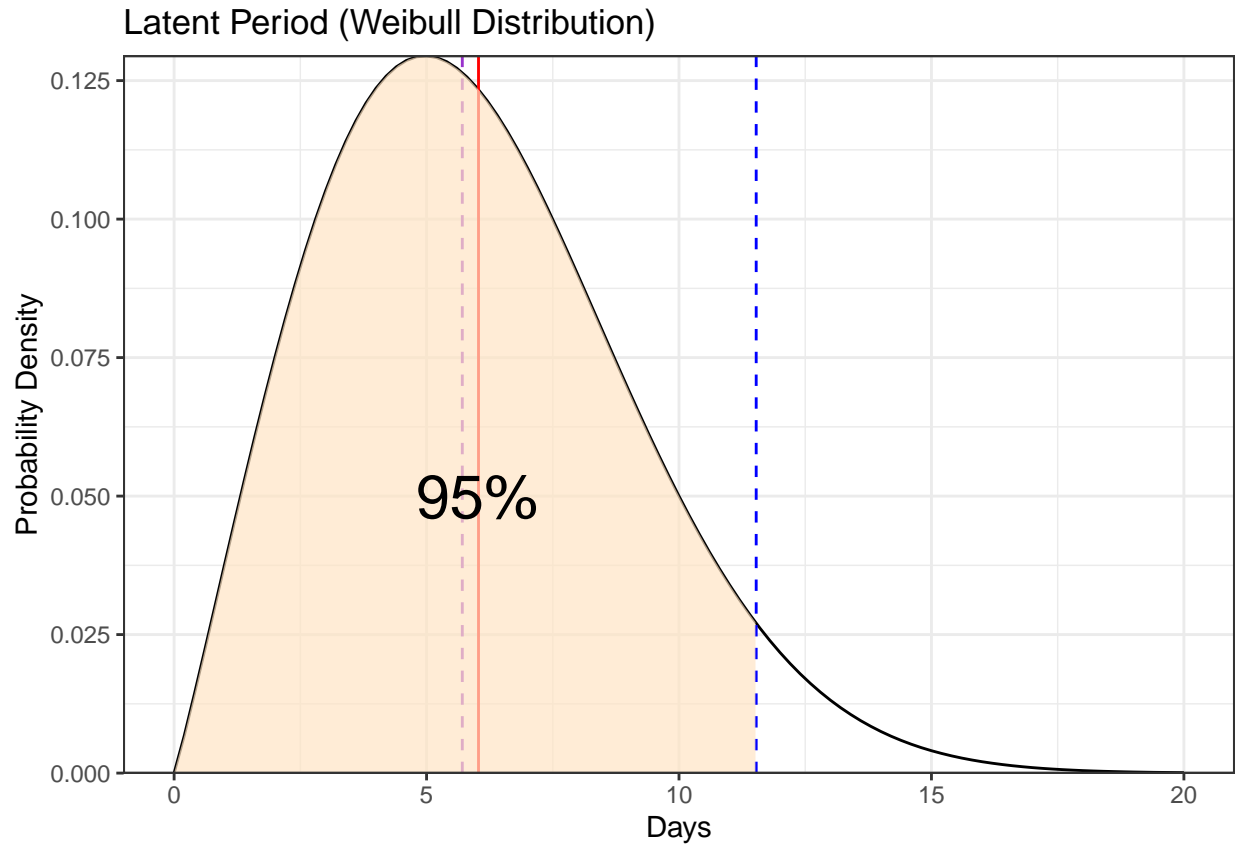
Models 4-14: 184 timepoints

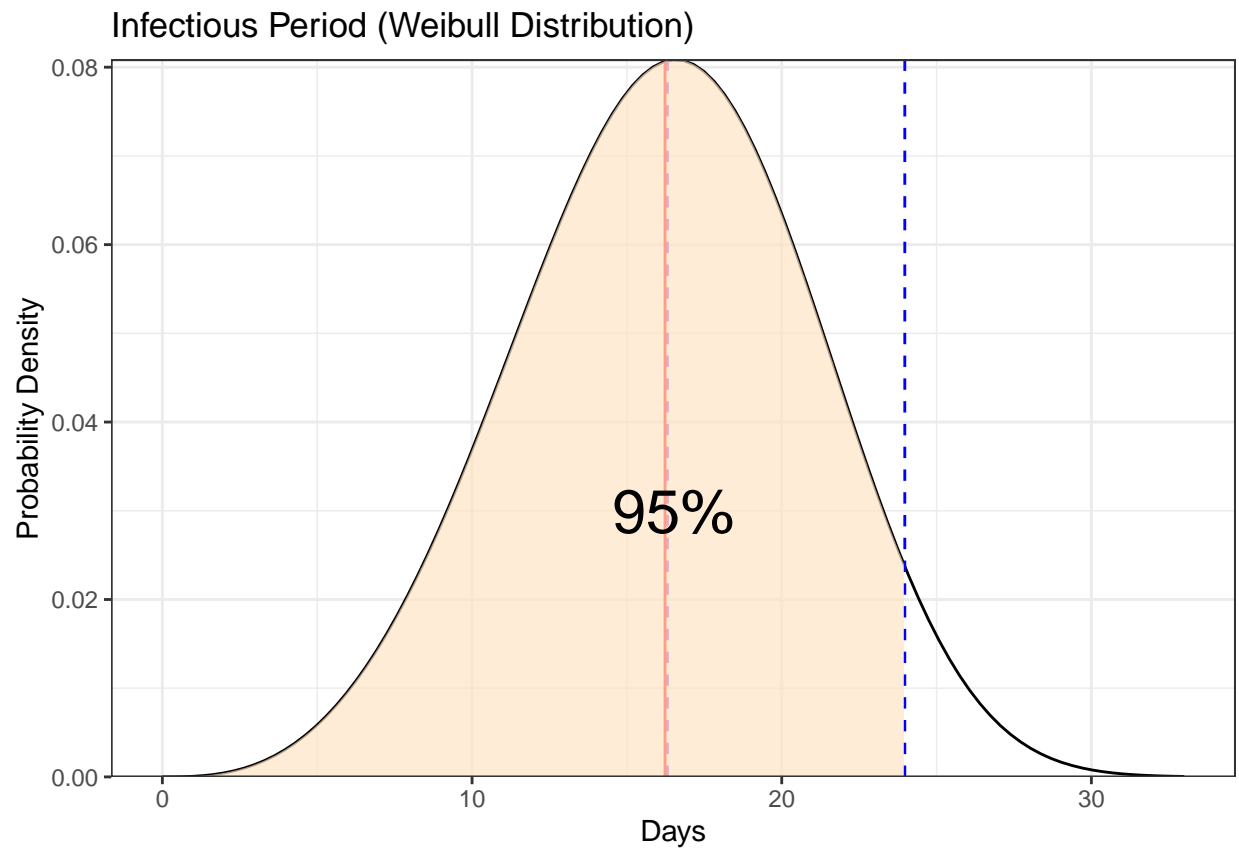
- Model 4: Baseline intensity plus two linear time components, beginning on respective intervention dates (school closure and state mandated stay-at-home-order)
- Model 5: Baseline intensity plus two linear time components, beginning on respective intervention dates (school closure and state mandated stay-at-home-order) and temporal basis splines of 3 degrees of freedom
- Model 6: Baseline intensity plus two linear time components, beginning on respective intervention dates (school closure and state mandated stay-at-home-order) and temporal basis splines of 4 degrees of freedom
- Model 7: Baseline intensity plus two linear time components, beginning on respective intervention dates (school closure and state mandated stay-at-home-order) and temporal basis splines of 5 degrees of freedom
- Model 8: Baseline intensity plus two linear time components, beginning on respective intervention dates (school closure and state mandated stay-at-home-order) and temporal basis splines of 6 degrees of freedom
- Model 9: Baseline intensity plus three linear time components, two beginning on respective intervention dates (school closure and state mandated stay-at-home-order) and one beginning on the end of the stay-at-home order
- Model 10: Baseline intensity plus three linear time components, two beginning on respective intervention dates (school closure and state mandated stay-at-home-order), one beginning on the end of the stay-at-home order and temporal basis splines of 3 degrees of freedom
- Model 11: Baseline intensity plus three linear time components, two beginning on respective intervention dates (school closure and state mandated stay-at-home-order), one beginning on the end of the stay-at-home order and temporal basis splines of 4 degrees of freedom
- Model 12: Baseline intensity plus three linear time components, two beginning on respective intervention dates (school closure and state mandated stay-at-home-order), one beginning on the end of the stay-at-home order and temporal basis splines of 5 degrees of freedom
- Model 13: Baseline intensity plus three linear time components, two beginning on respective intervention dates (school closure and state mandated stay-at-home-order), one beginning on the end of the stay-at-home order and temporal basis splines of 6 degrees of freedom

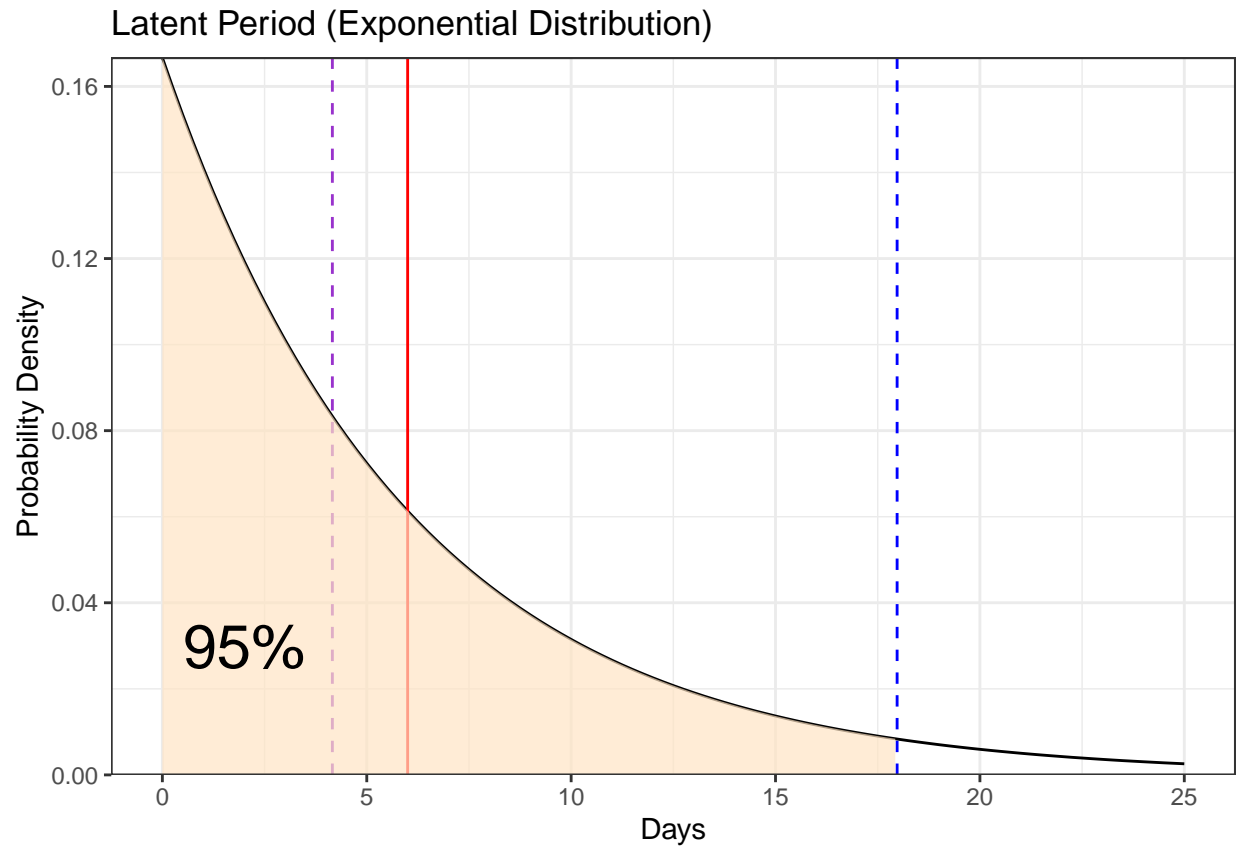
- Model 14: Baseline intensity plus three linear time components, two beginning on respective intervention dates (school closure and state mandated stay-at-home-order), one beginning on the end of the stay-at-home order and a temporal trigonometric term

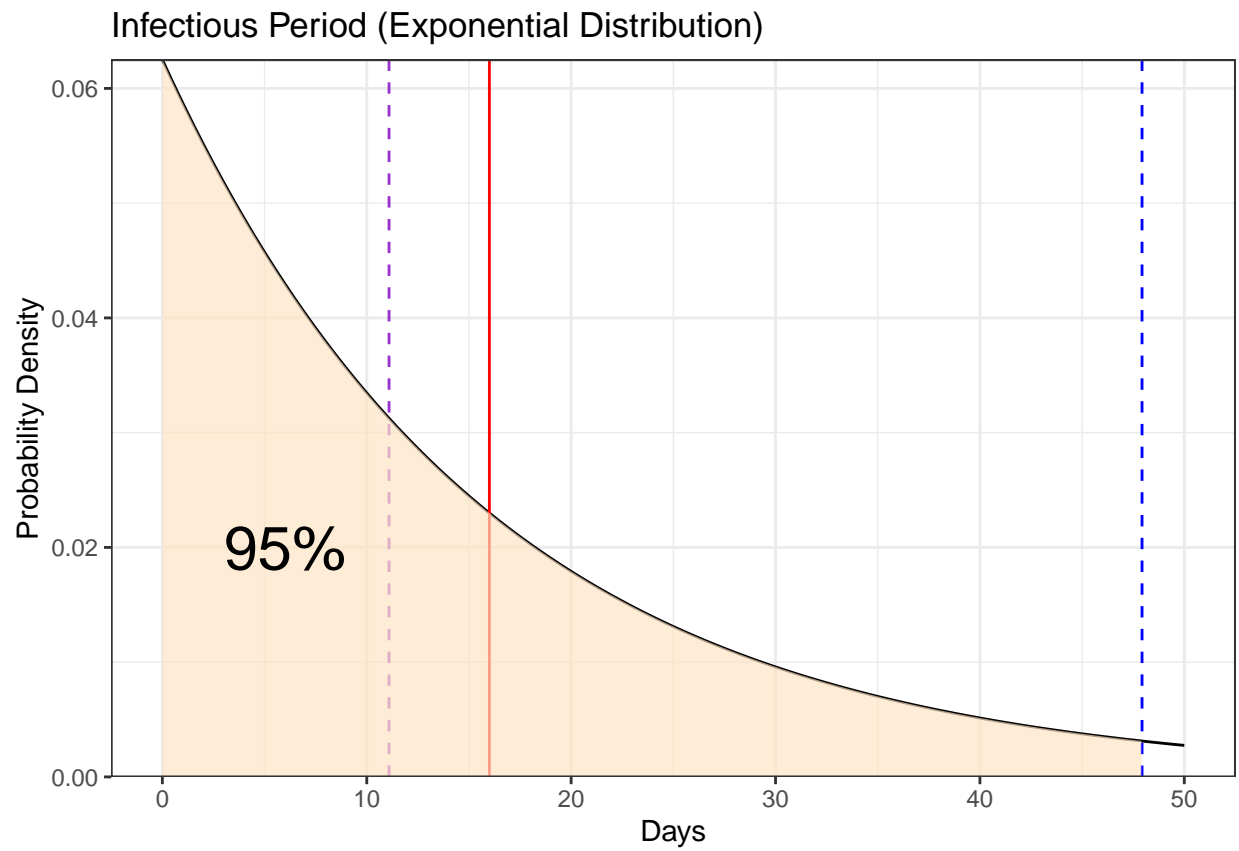
Models 15: 121 timepoints

- Model 15: Baseline intensity, a temporal trigonometric term and proportion of population vaccinated (at least one vaccine shot) and proportion fully vaccinated (all doses prescribed by the initial vaccination protocol)

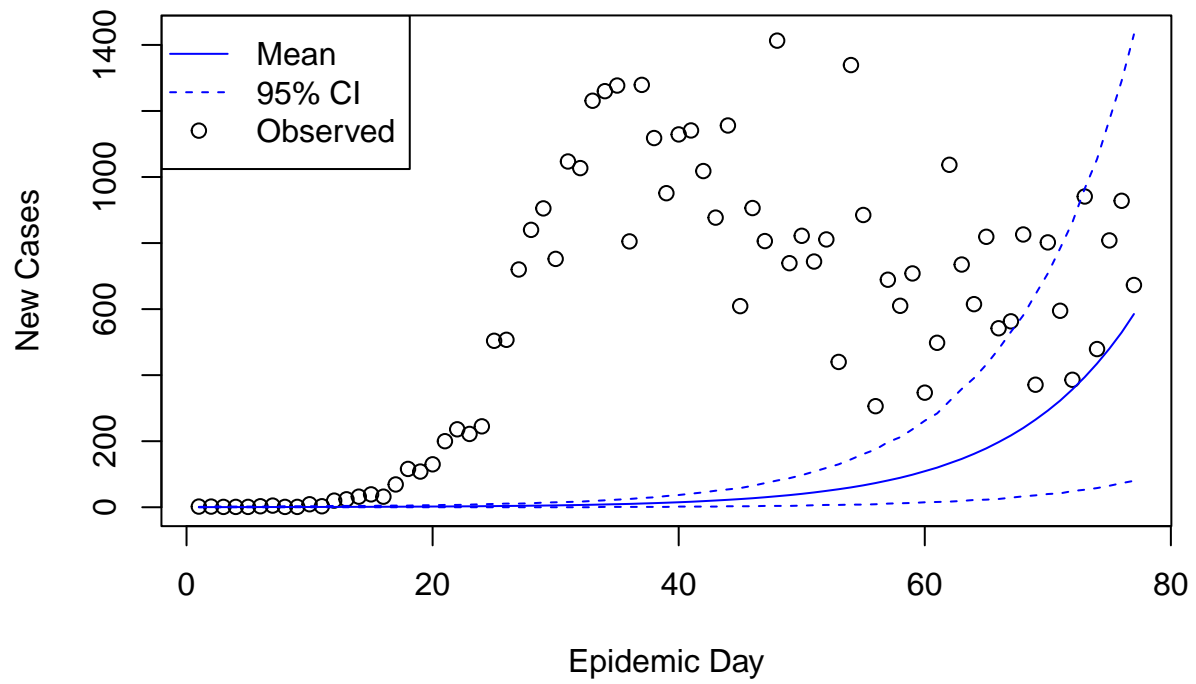




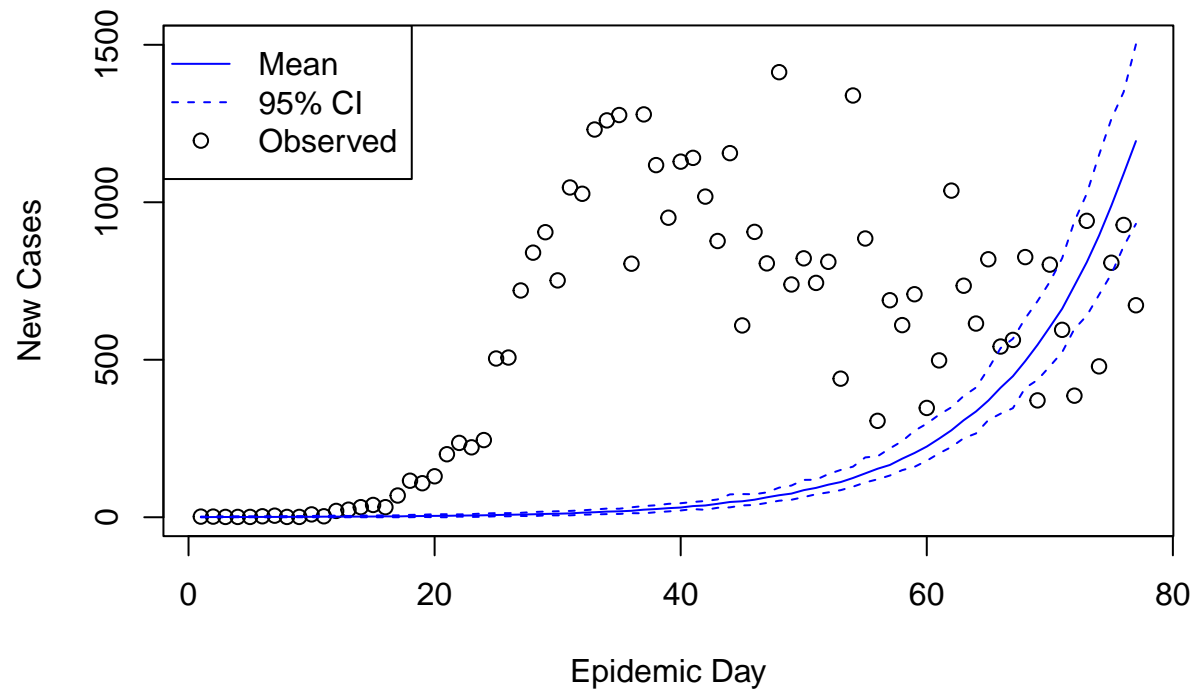




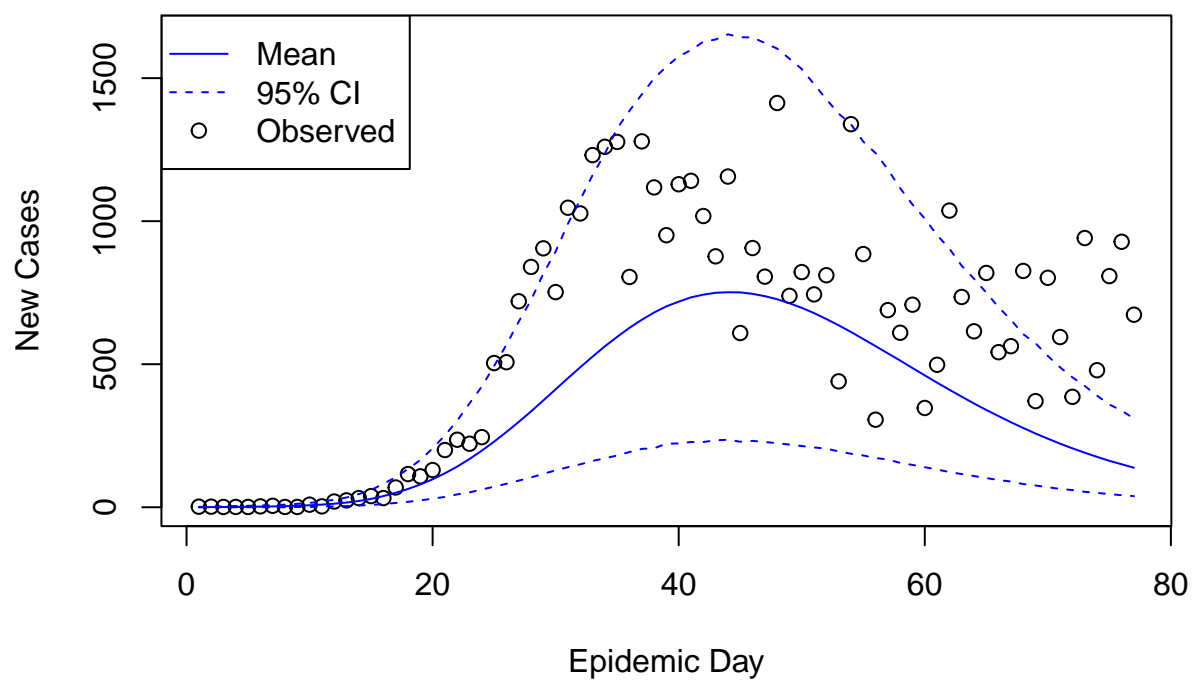
Model 1: Posterior Predictive Distribution



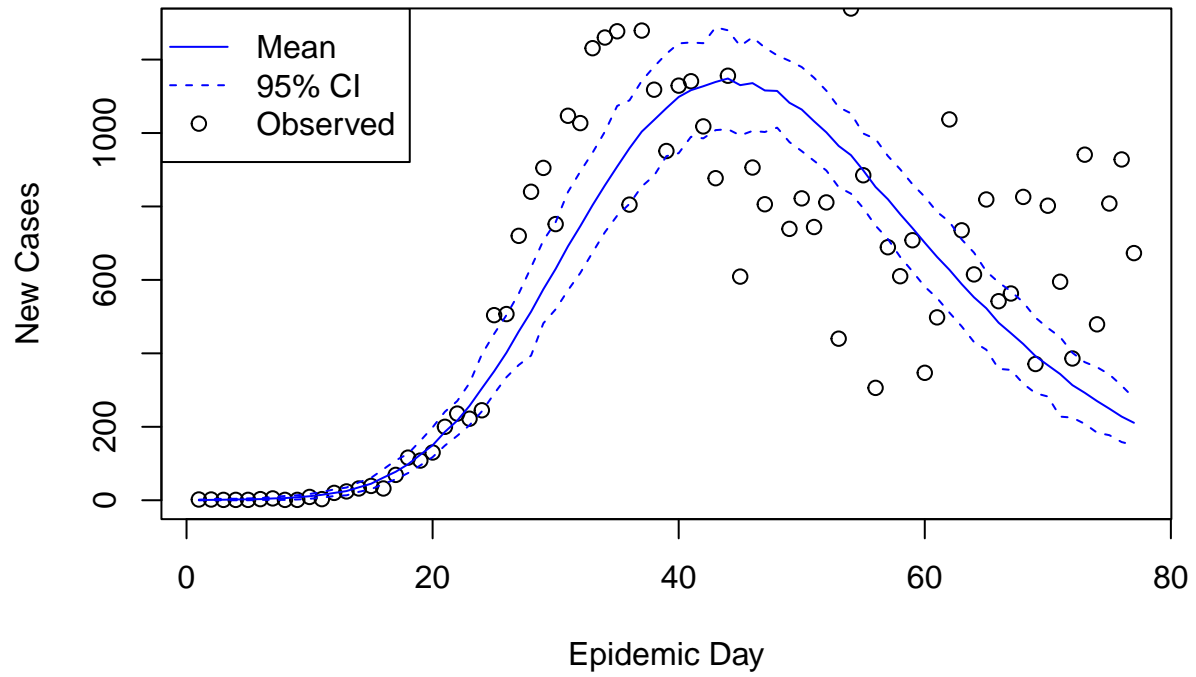
Model 1: Posterior Distribution



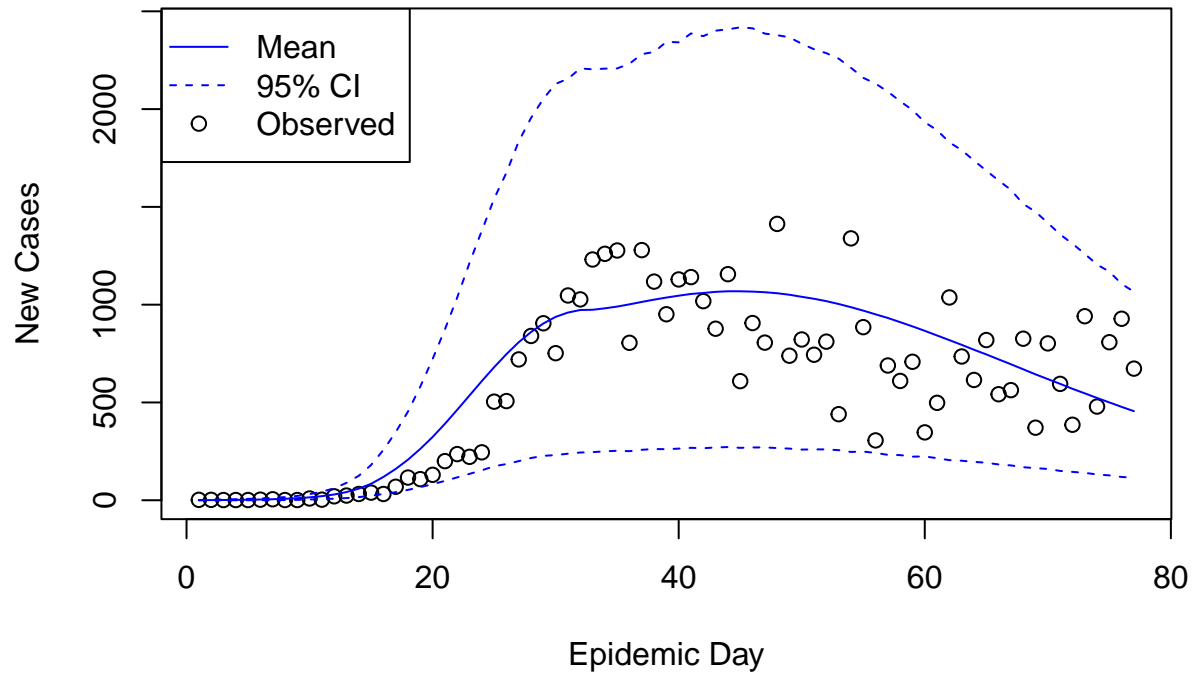
Model 2: Posterior Predictive Distribution



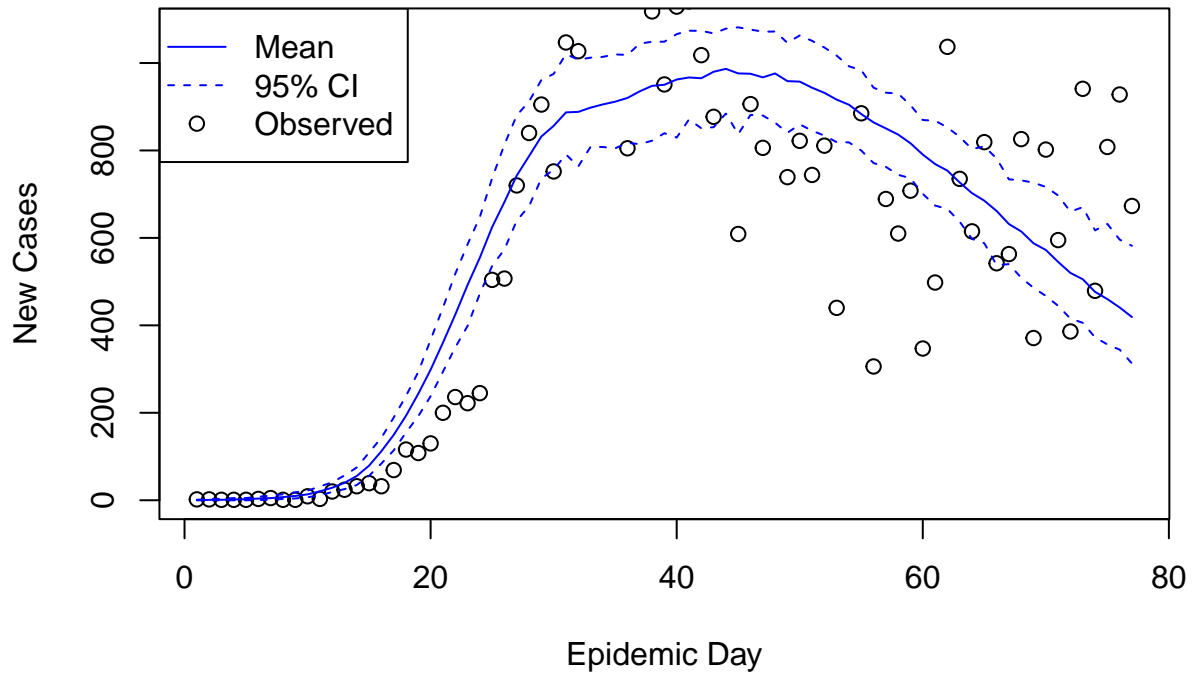
Model 2: Posterior Distribution



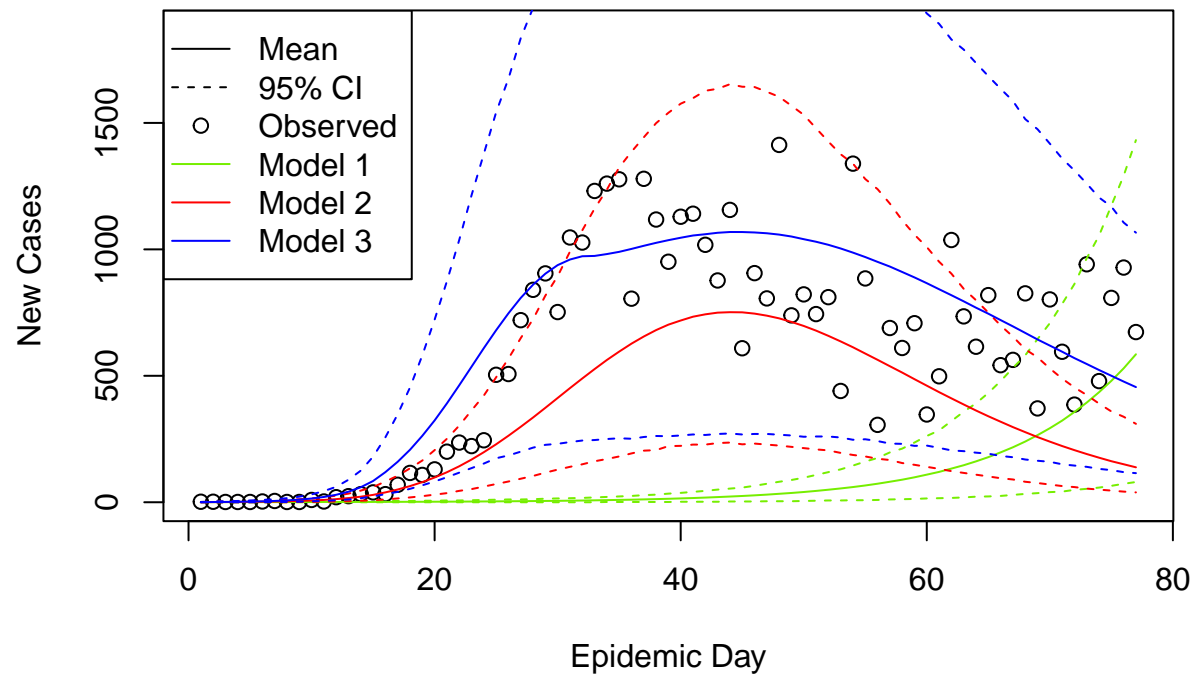
Model 3: Posterior Predictive Distribution



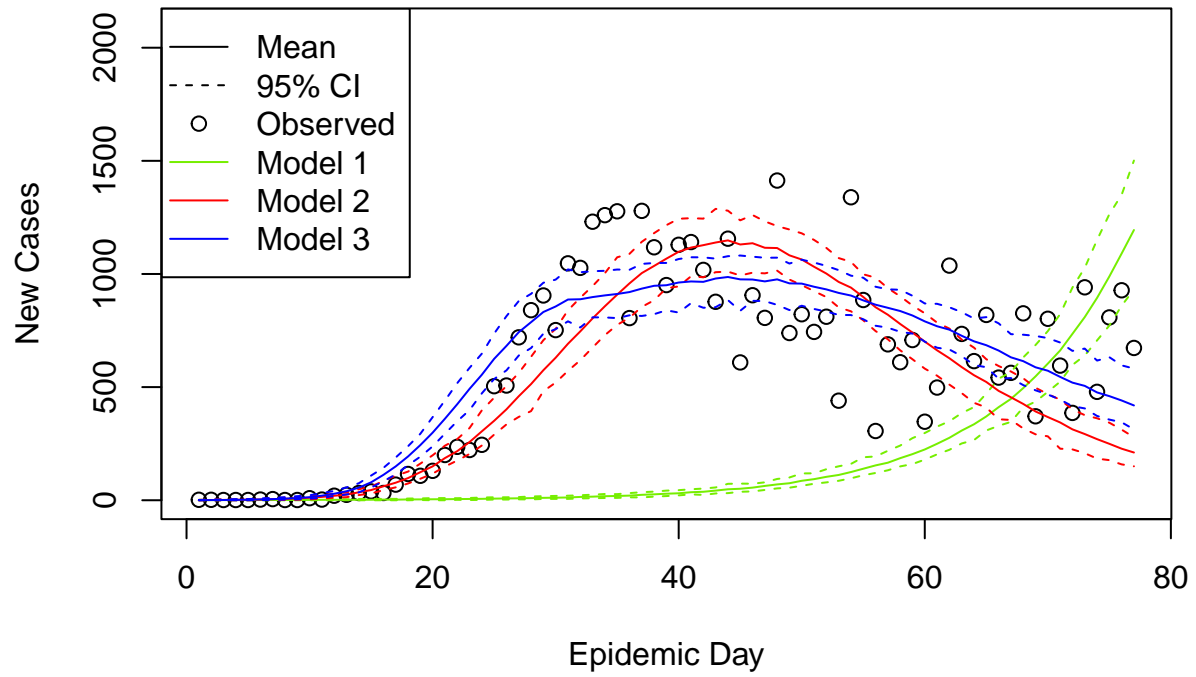
Model 3: Posterior Distribution



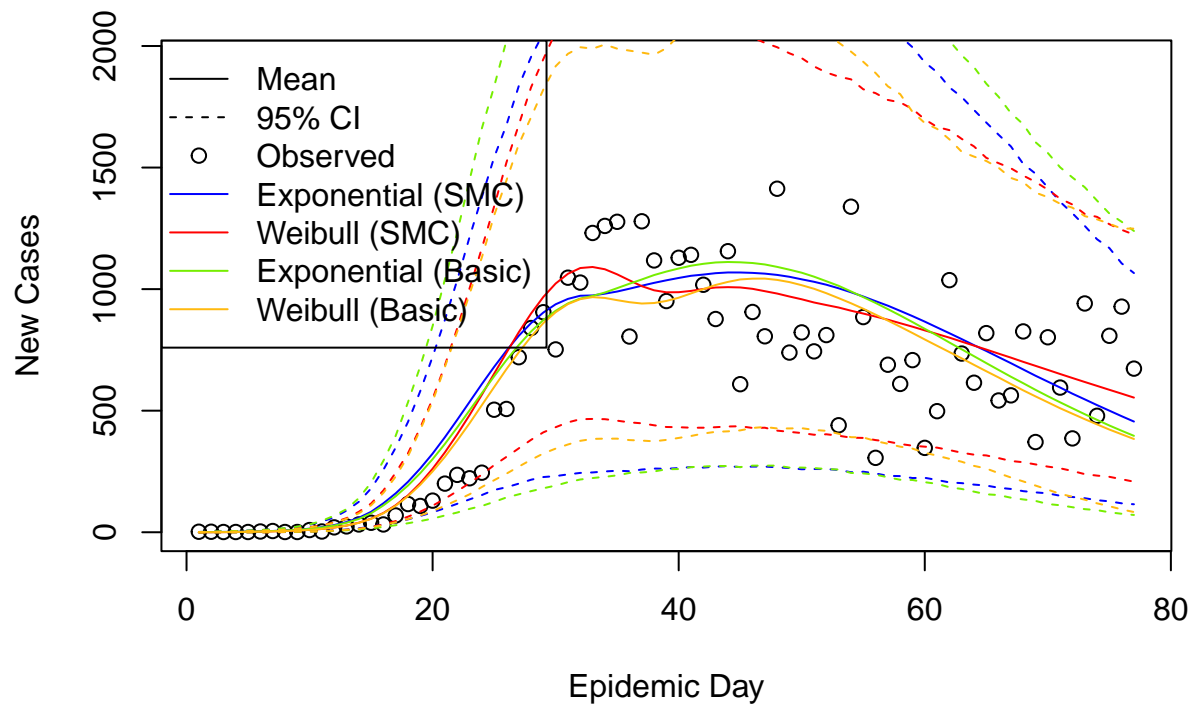
Posterior Predictive Distribution: Model 1 vs Model 2 vs Model 3



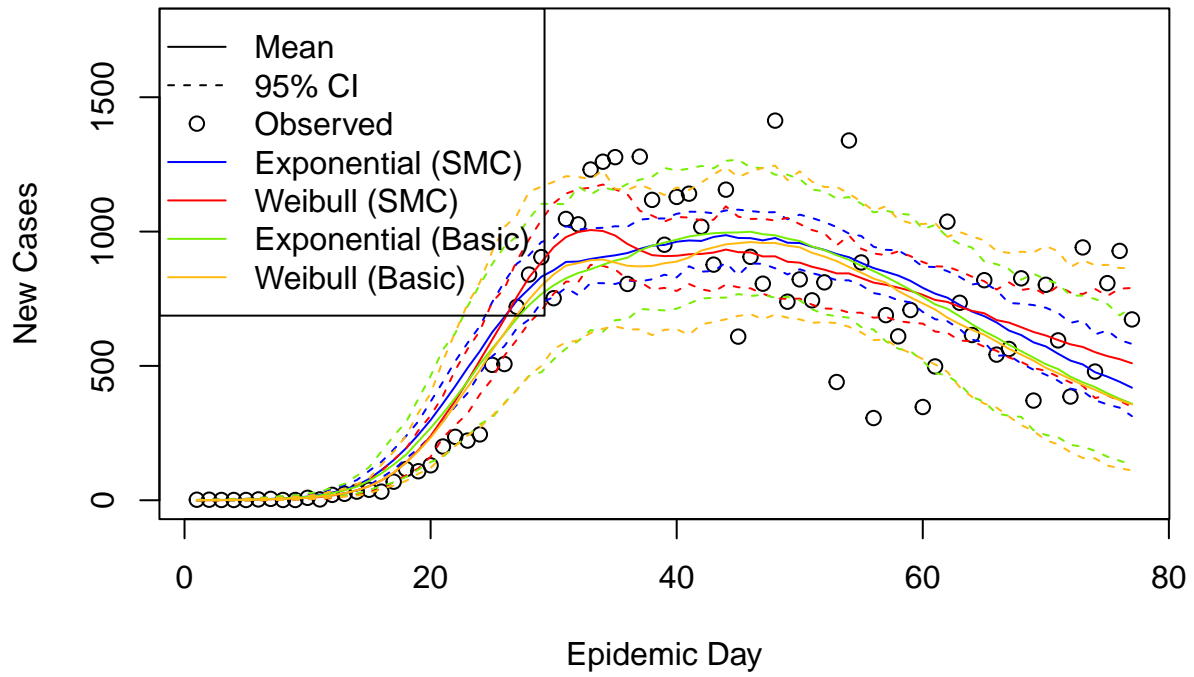
Posterior Distribution: Model 1 vs Model 2 vs Model 3



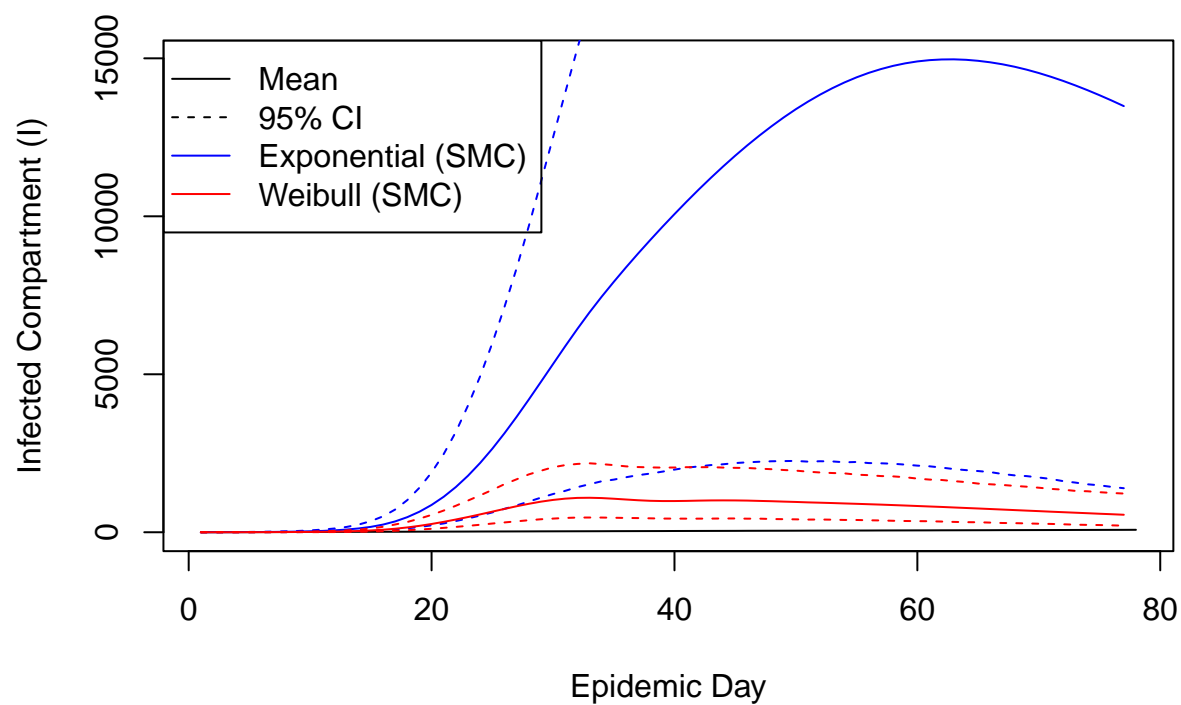
Posterior Predictive Distribution: Model 3



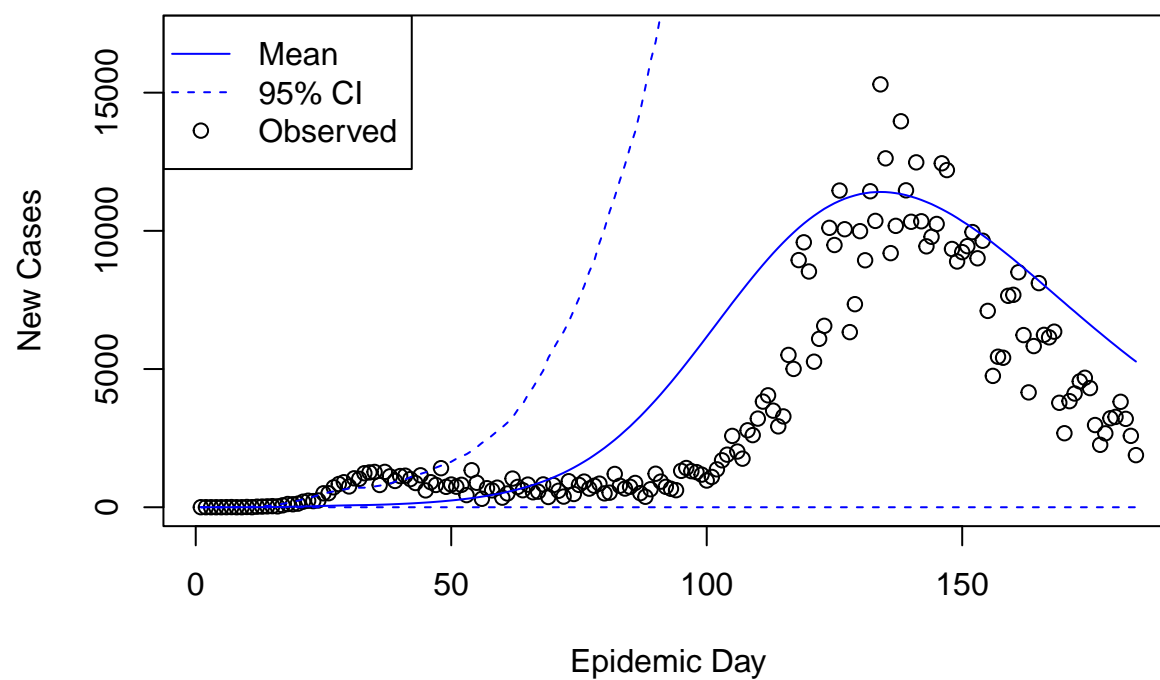
Posterior Distribution: Model 3



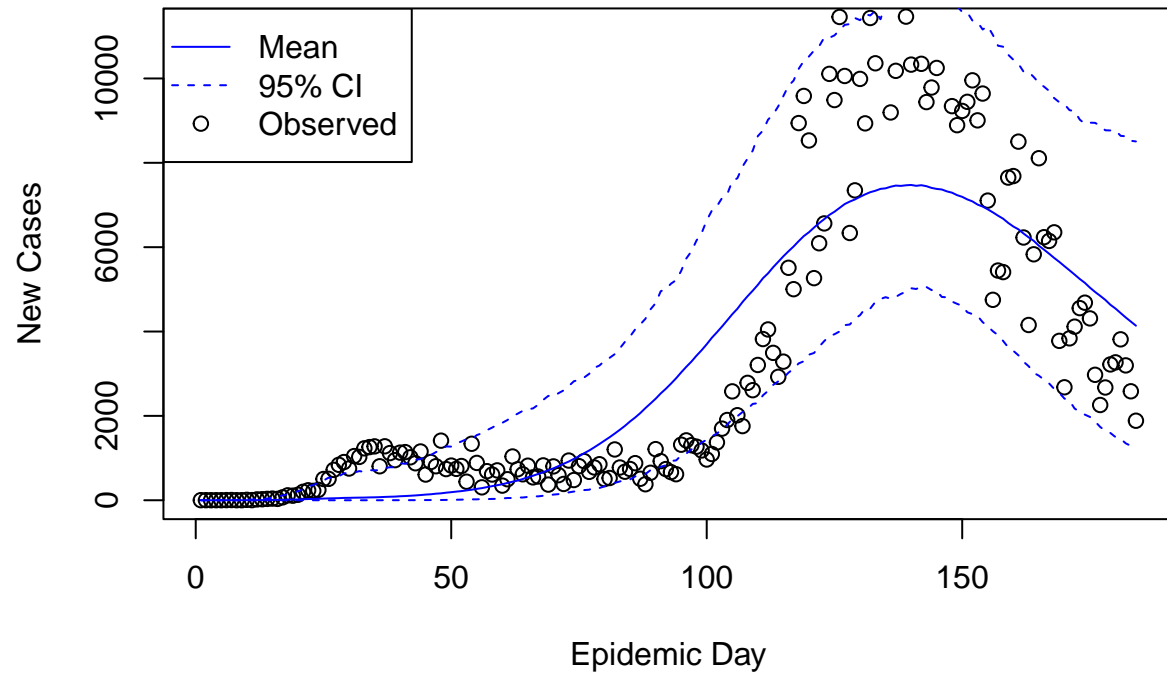
Posterior Predictive Distribution: Model 3



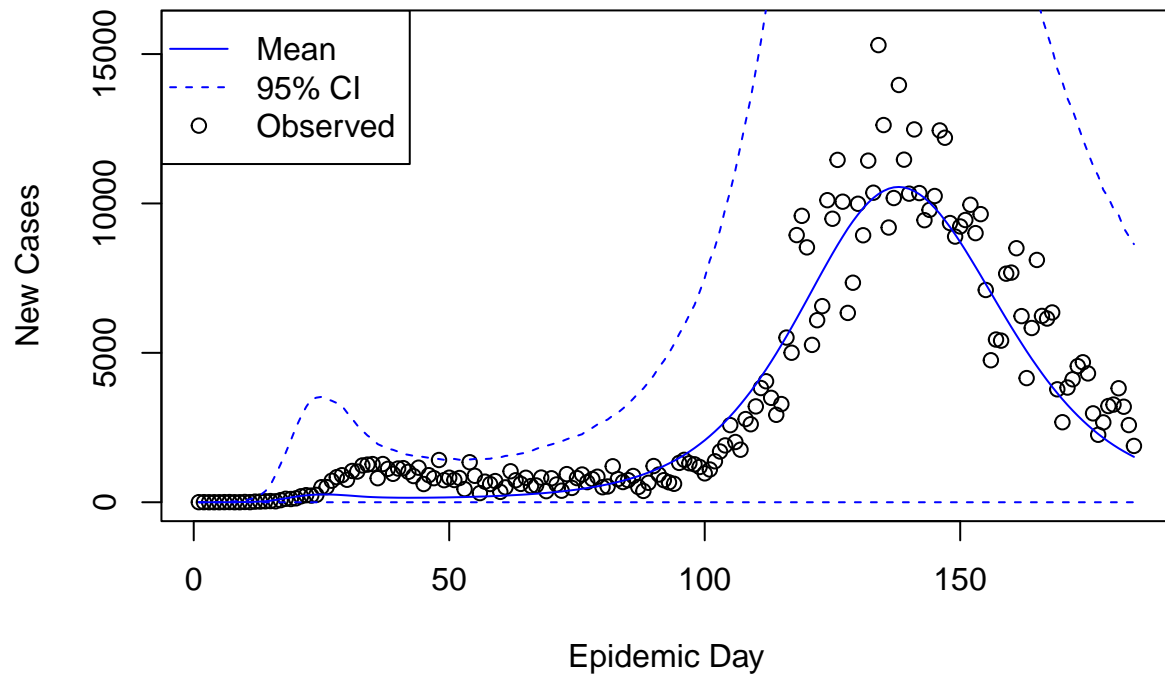
Model 4: Posterior Predictive Distribution



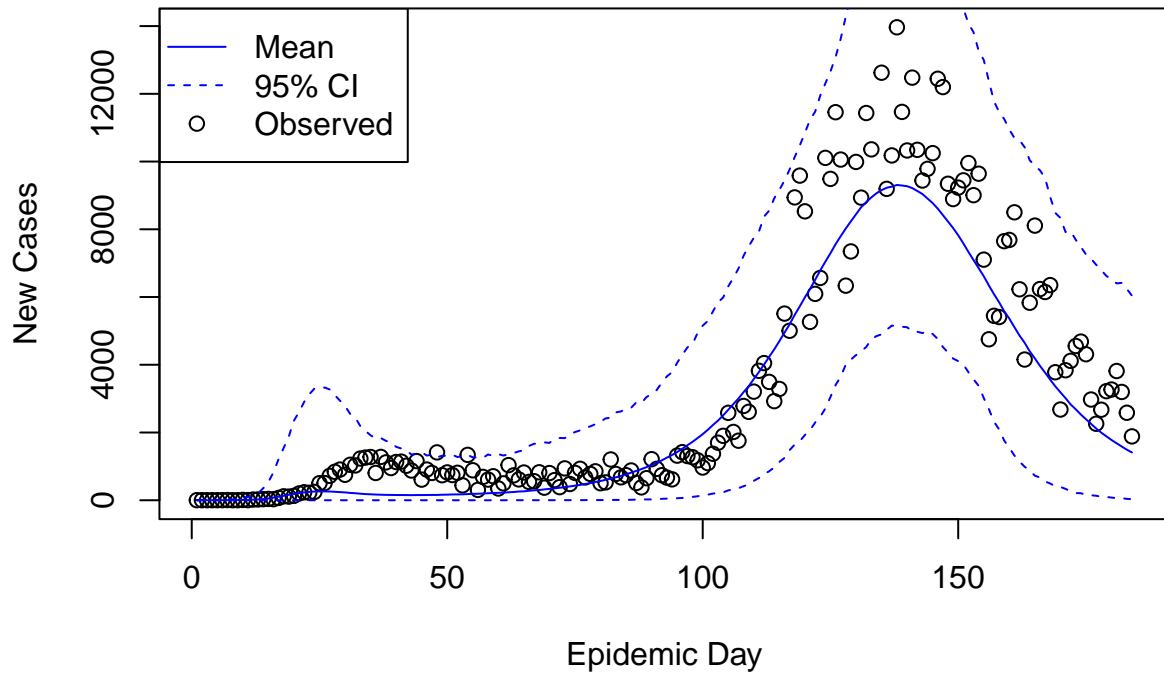
Model 4: Posterior Distribution



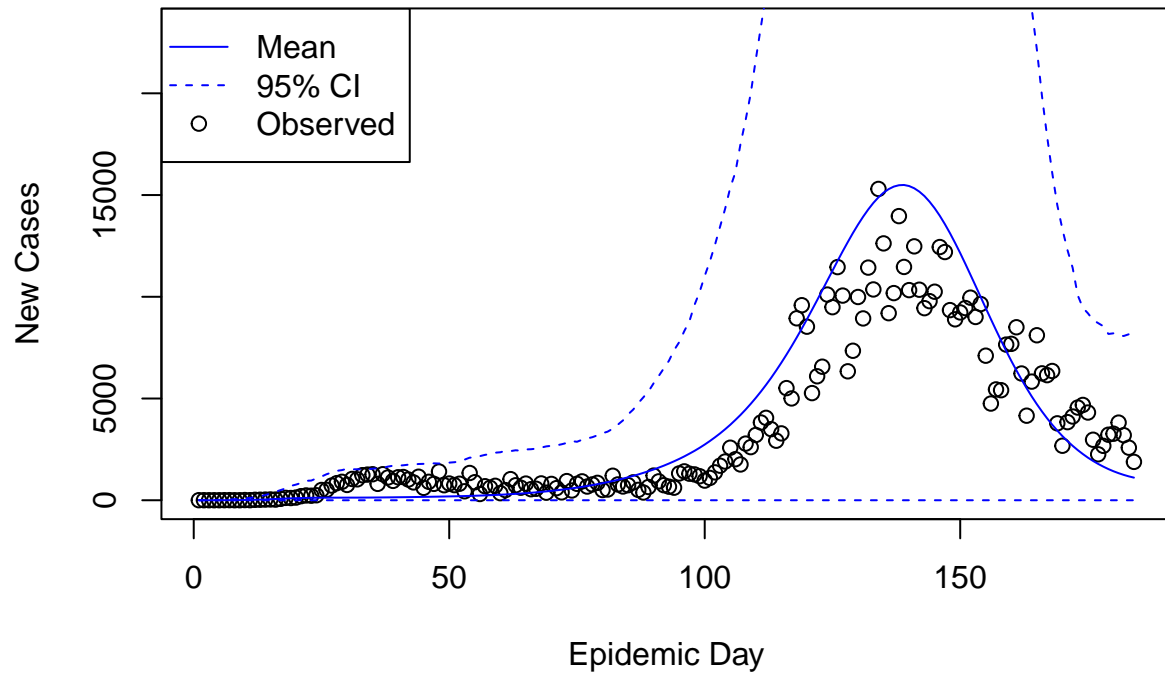
Model 5: Posterior Predictive Distribution



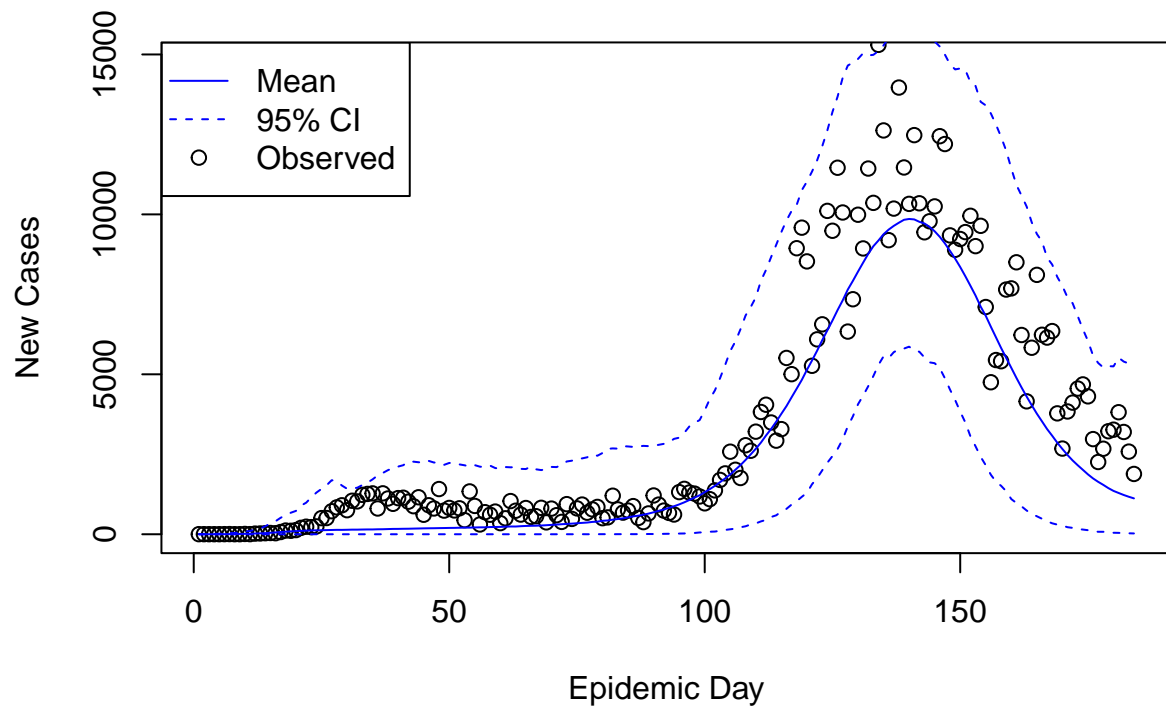
Model 5: Posterior Distribution



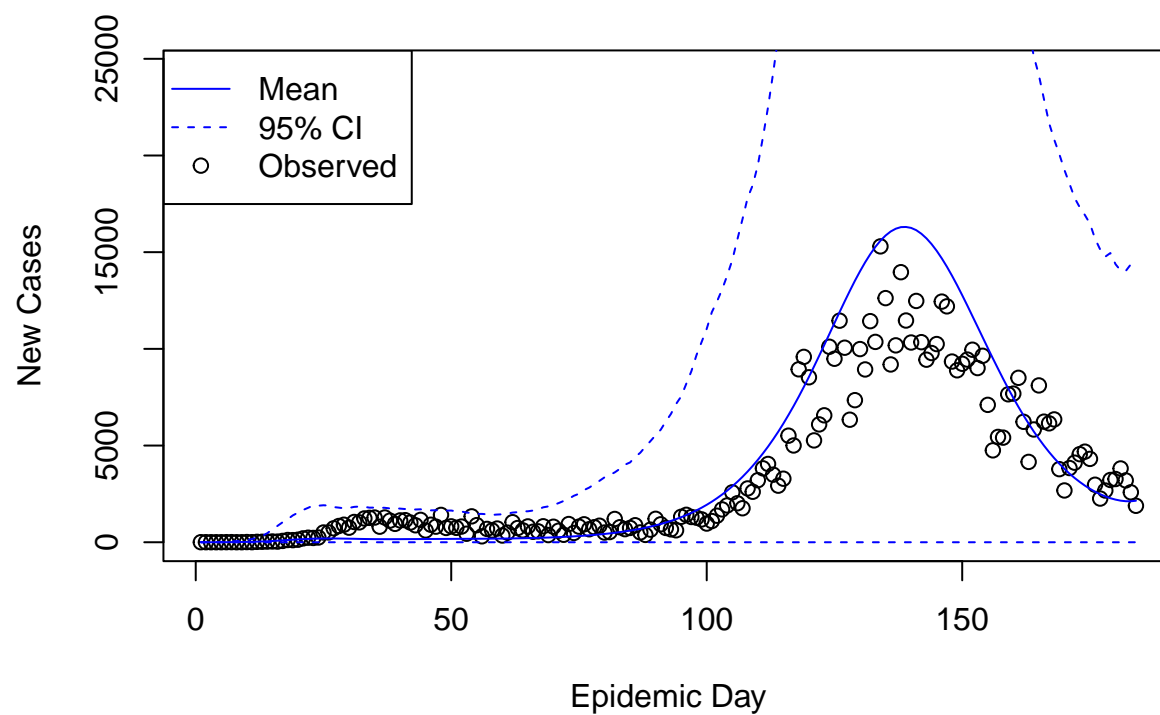
Model 6: Posterior Predictive Distribution



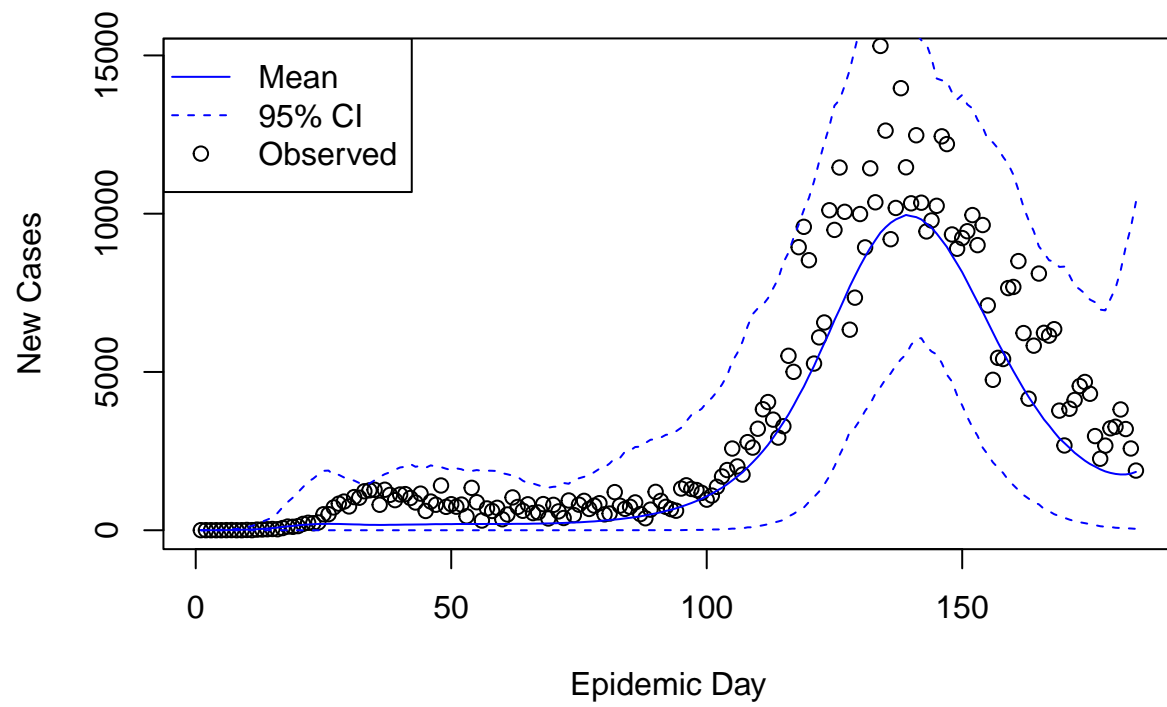
Model 6: Posterior Distribution



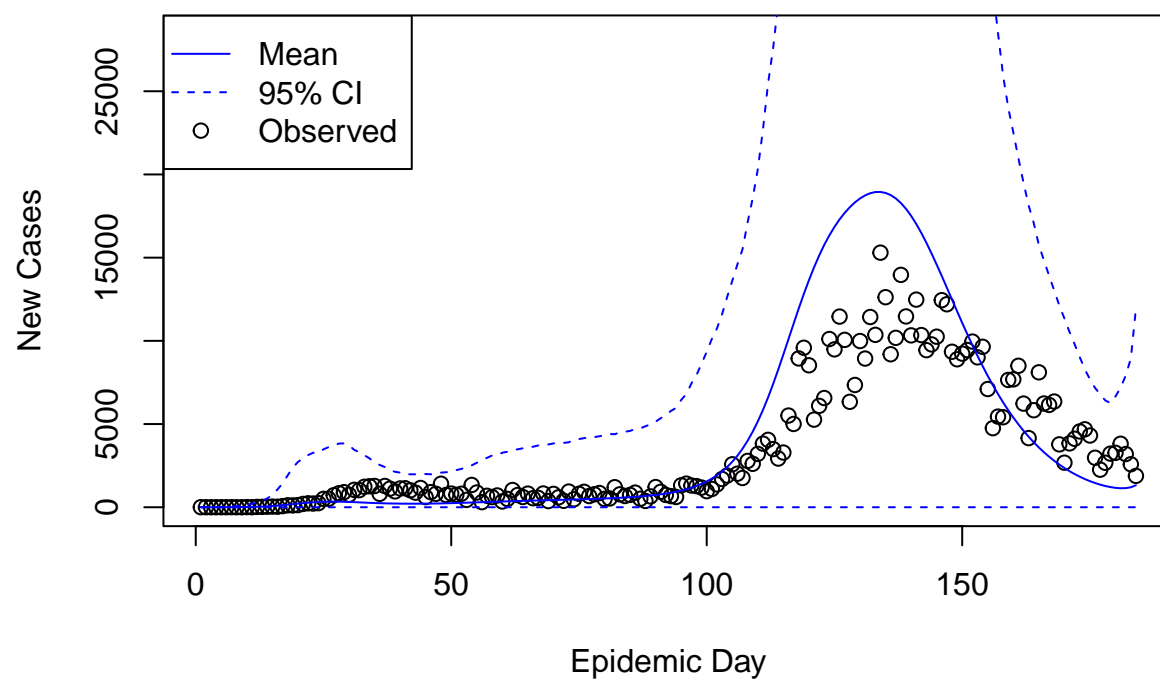
Model 7: Posterior Predictive Distribution



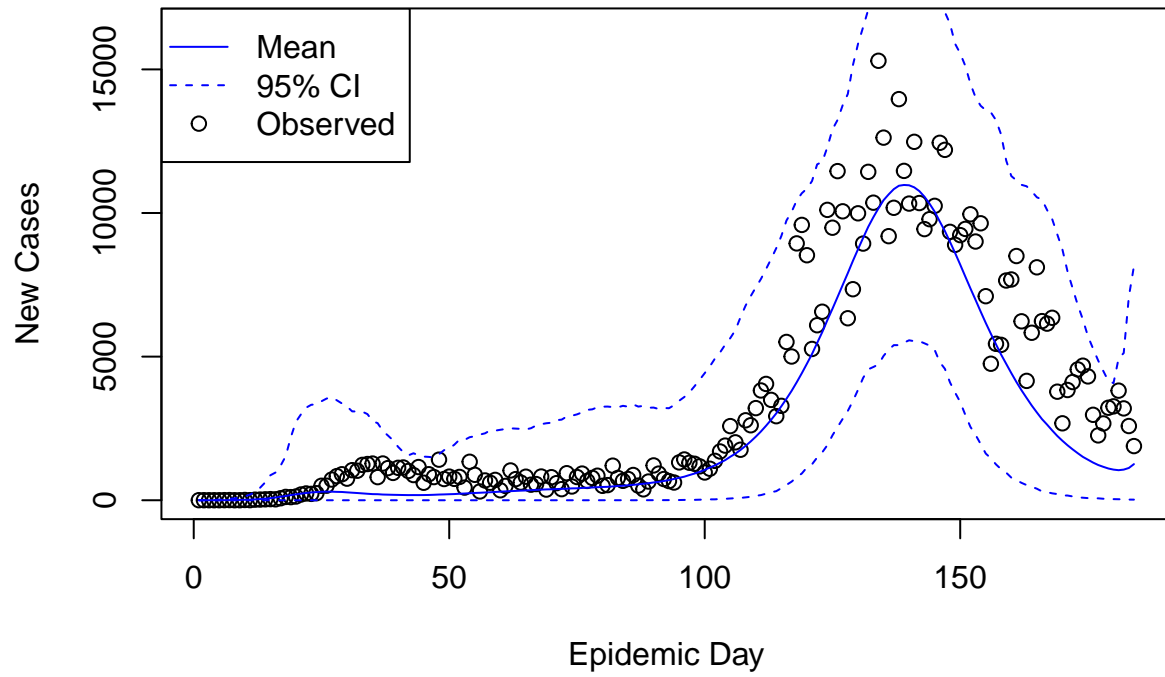
Model 7: Posterior Distribution



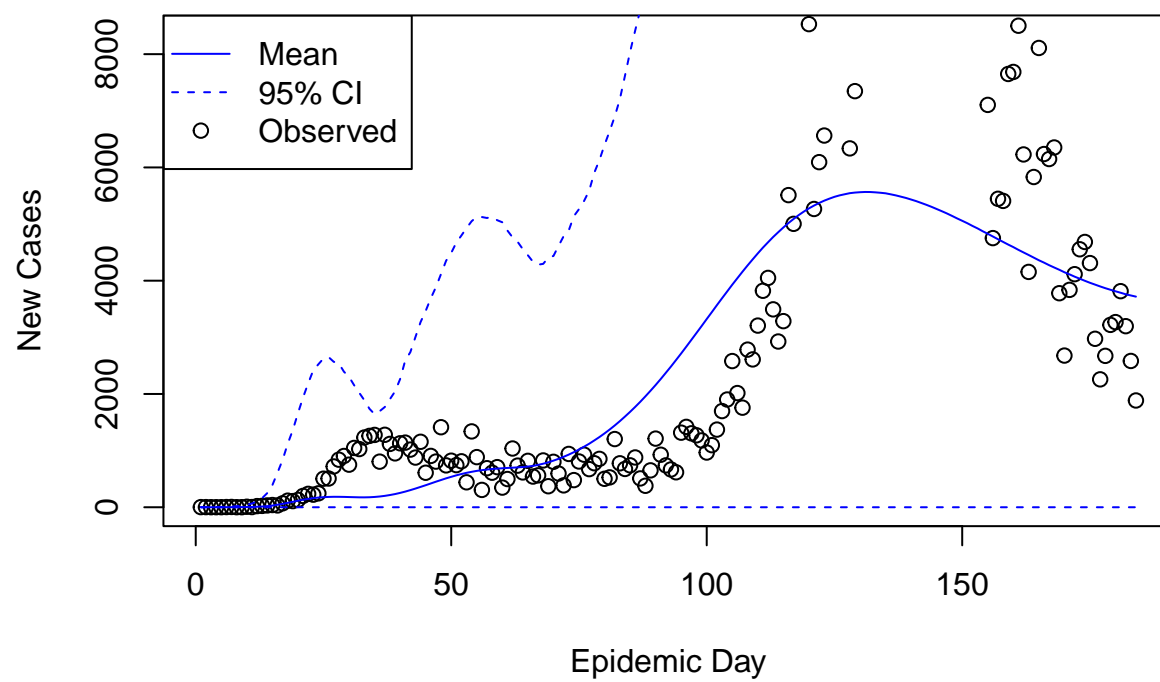
Model 8: Posterior Predictive Distribution



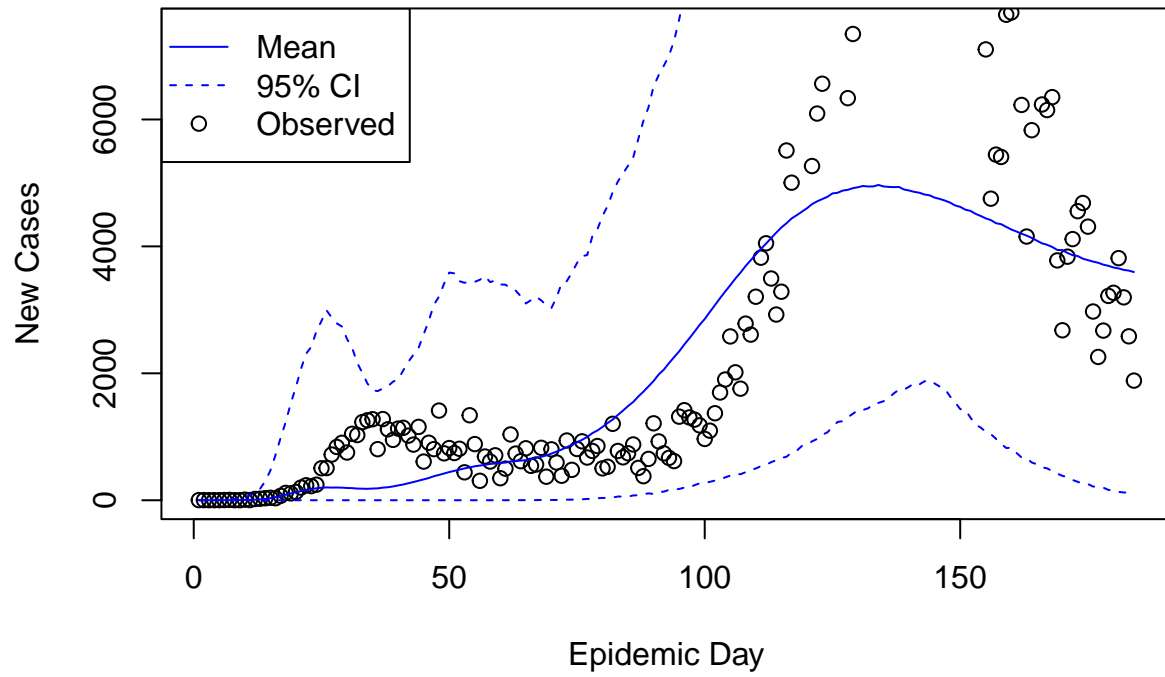
Model 8: Posterior Distribution



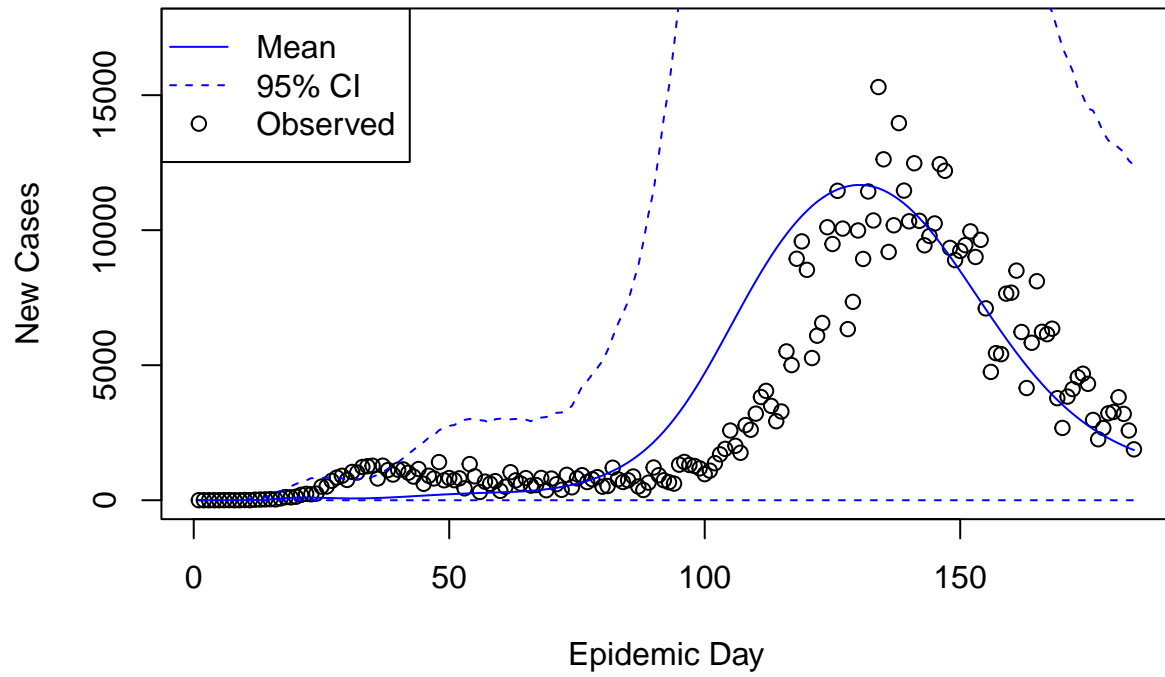
Model 9: Posterior Predictive Distribution



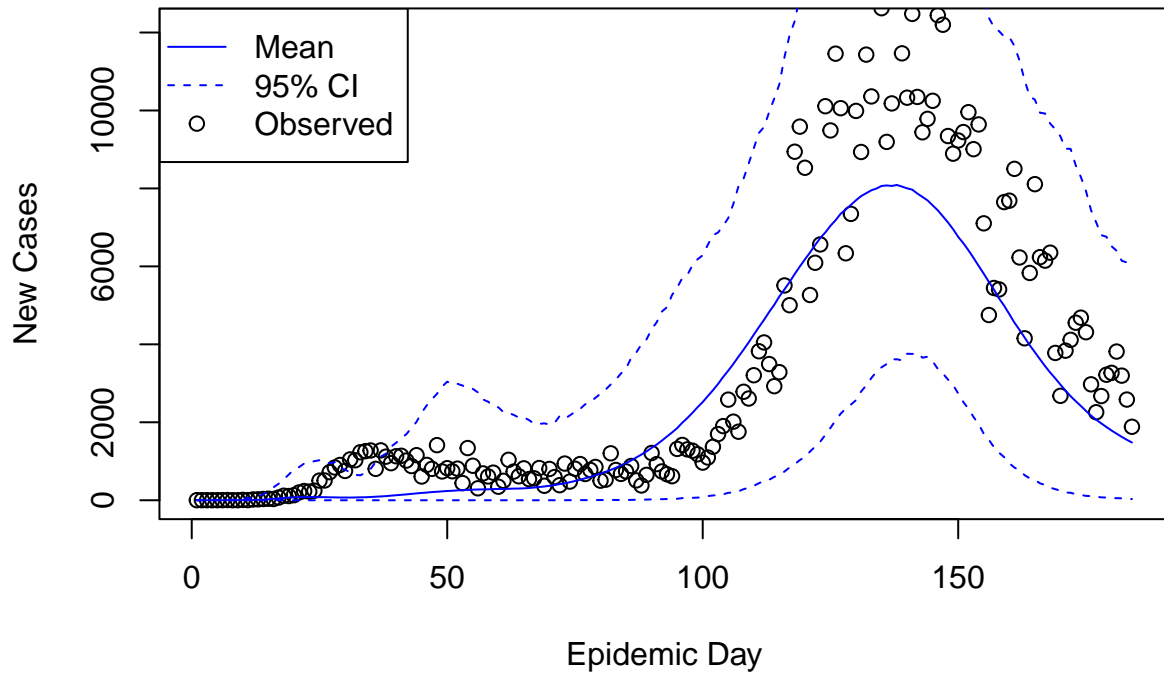
Model 9: Posterior Distribution



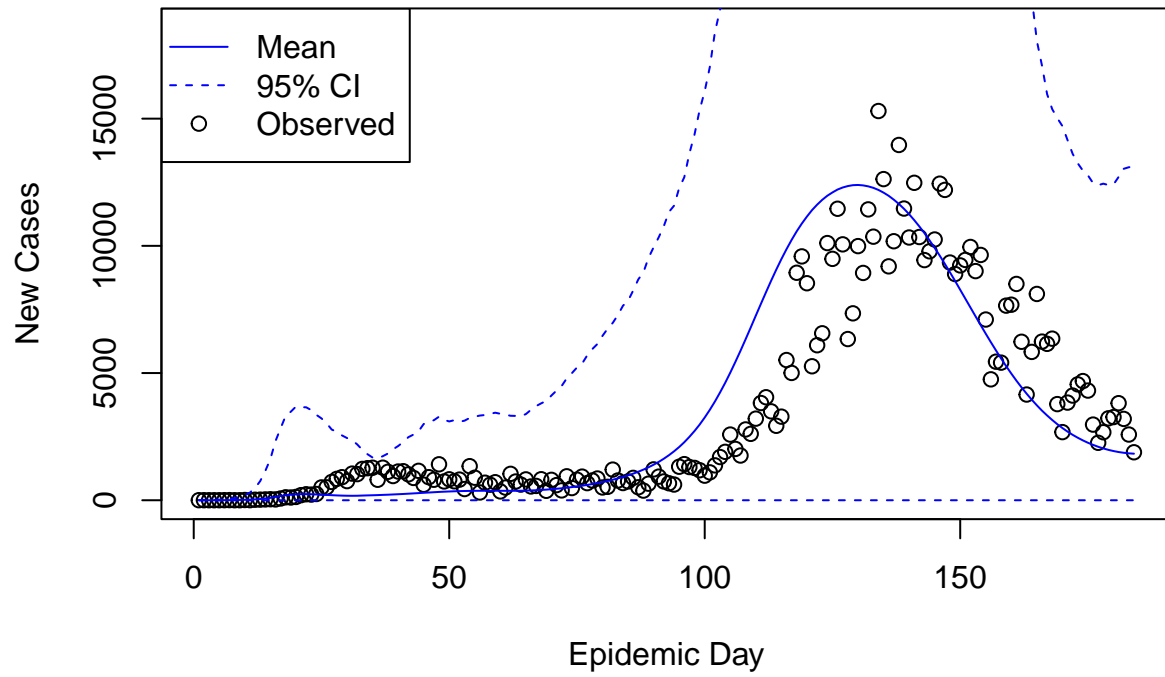
Model 10: Posterior Predictive Distribution



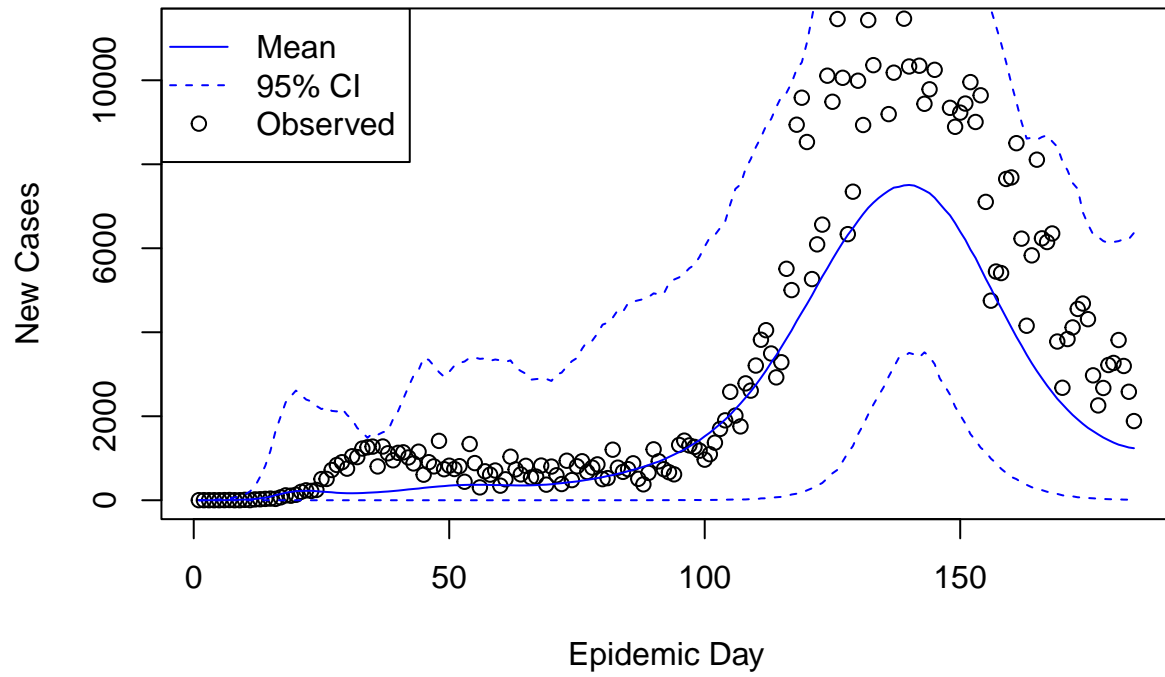
Model 10: Posterior Distribution



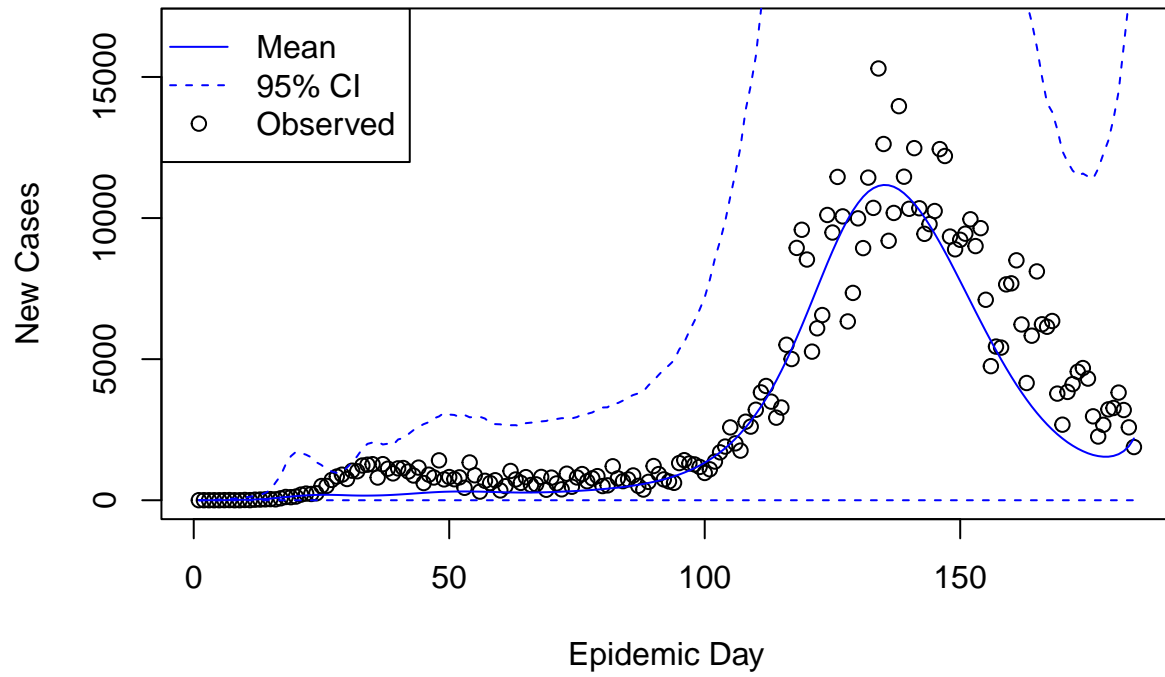
Model 11: Posterior Predictive Distribution



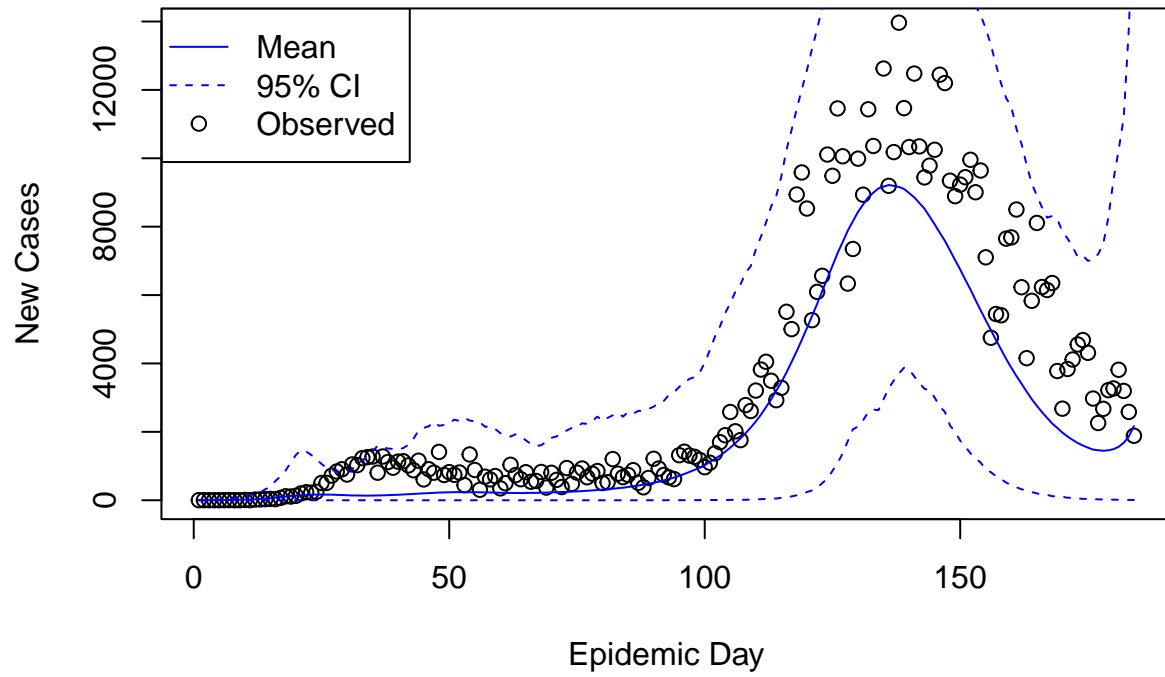
Model 11: Posterior Distribution



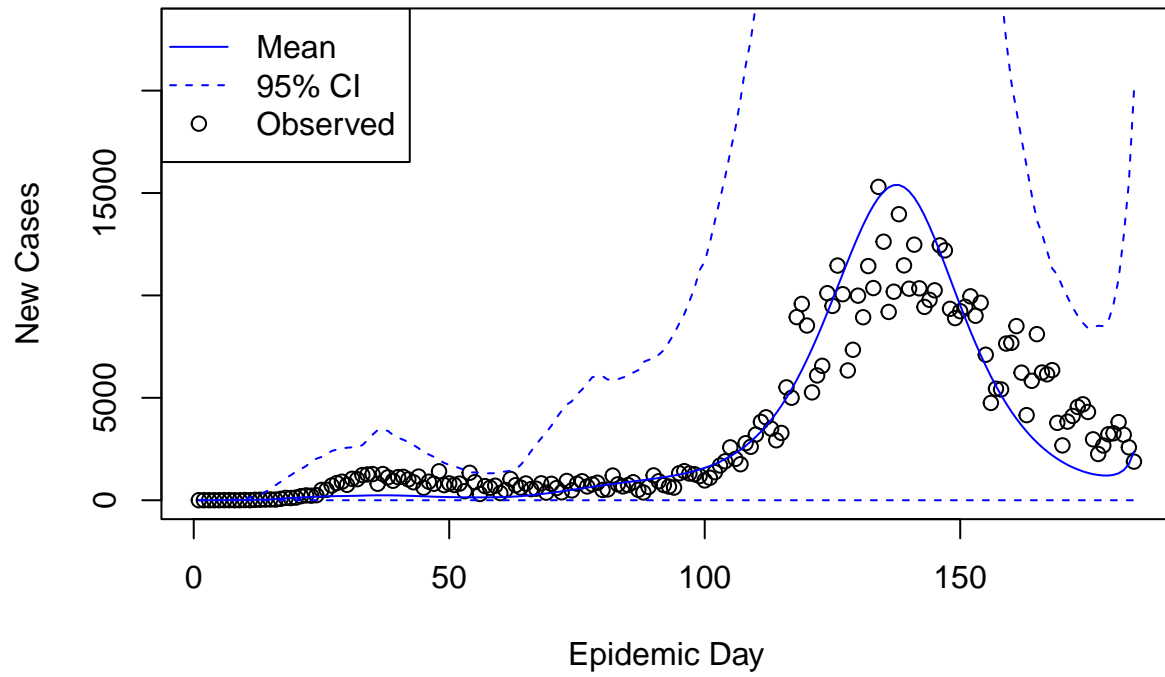
Model 12: Posterior Predictive Distribution



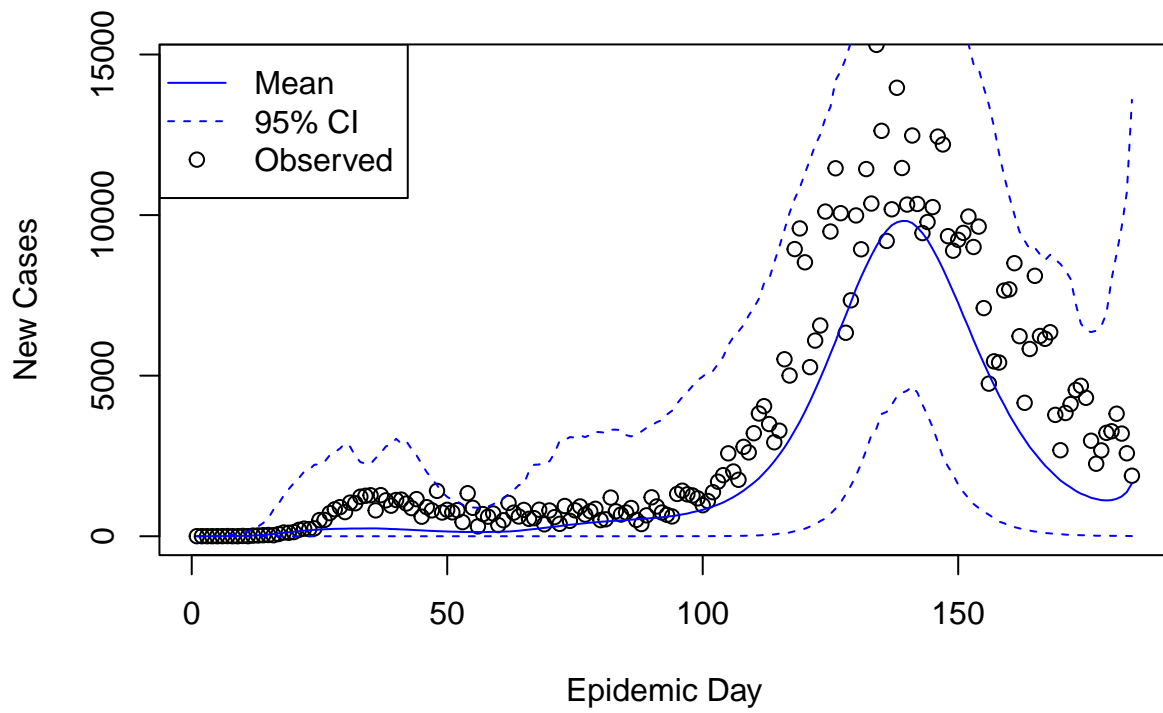
Model 12: Posterior Distribution



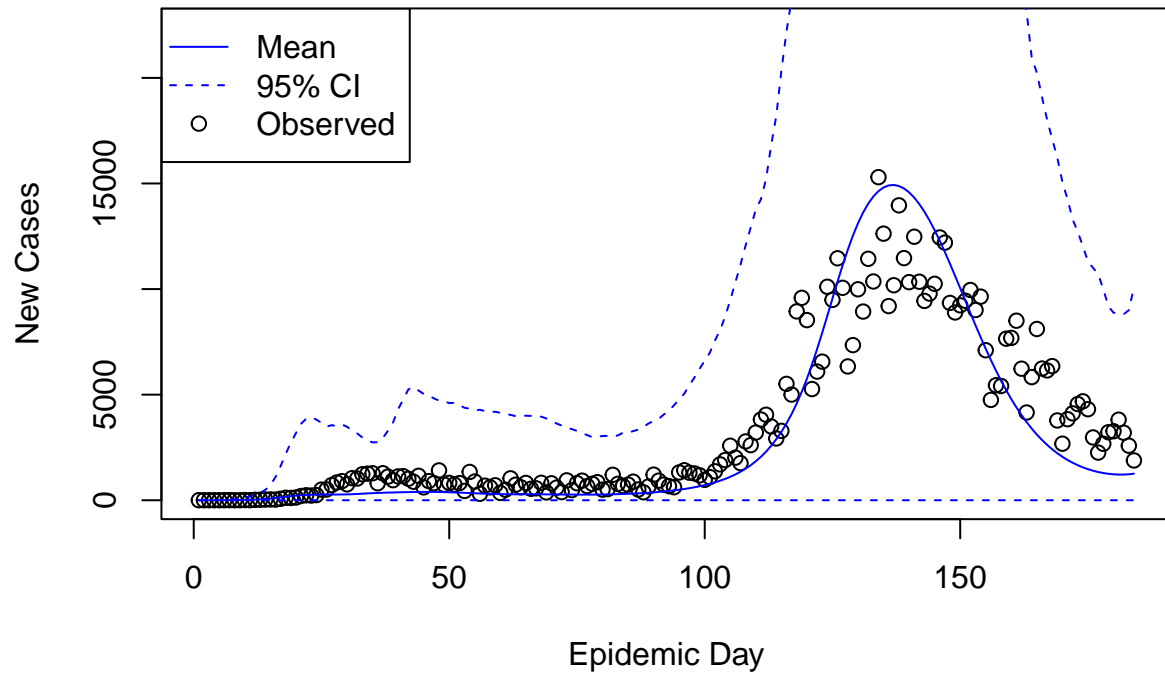
Model 13: Posterior Predictive Distribution



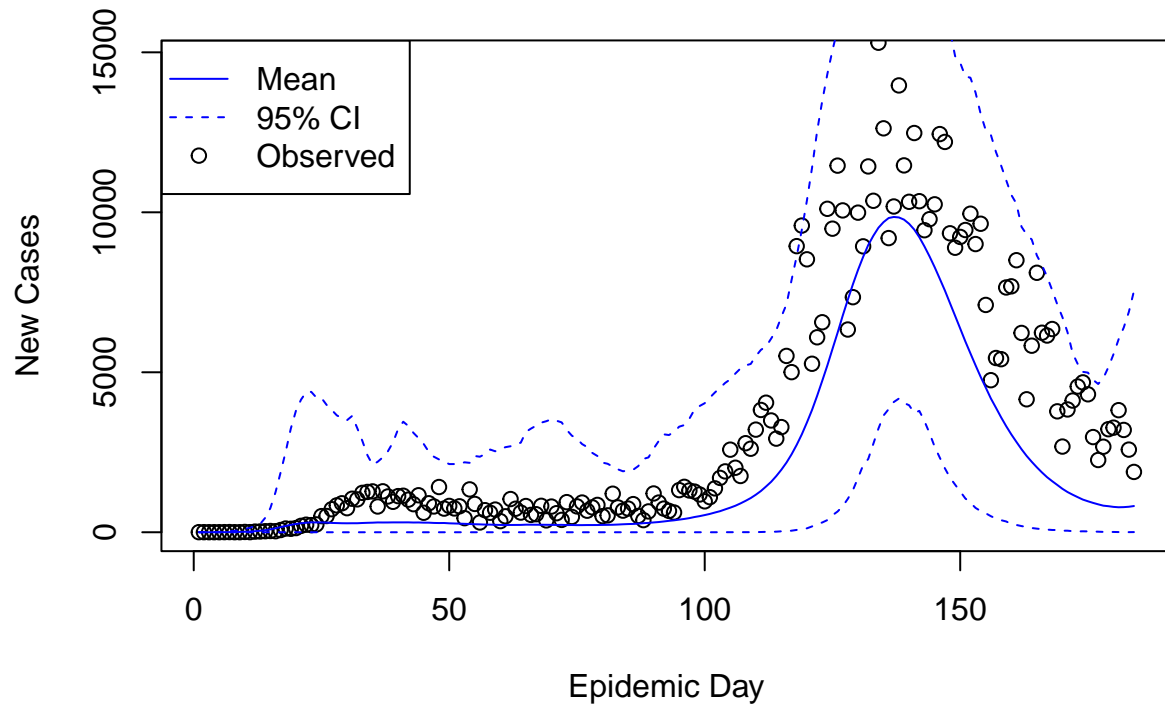
Model 13: Posterior Distribution



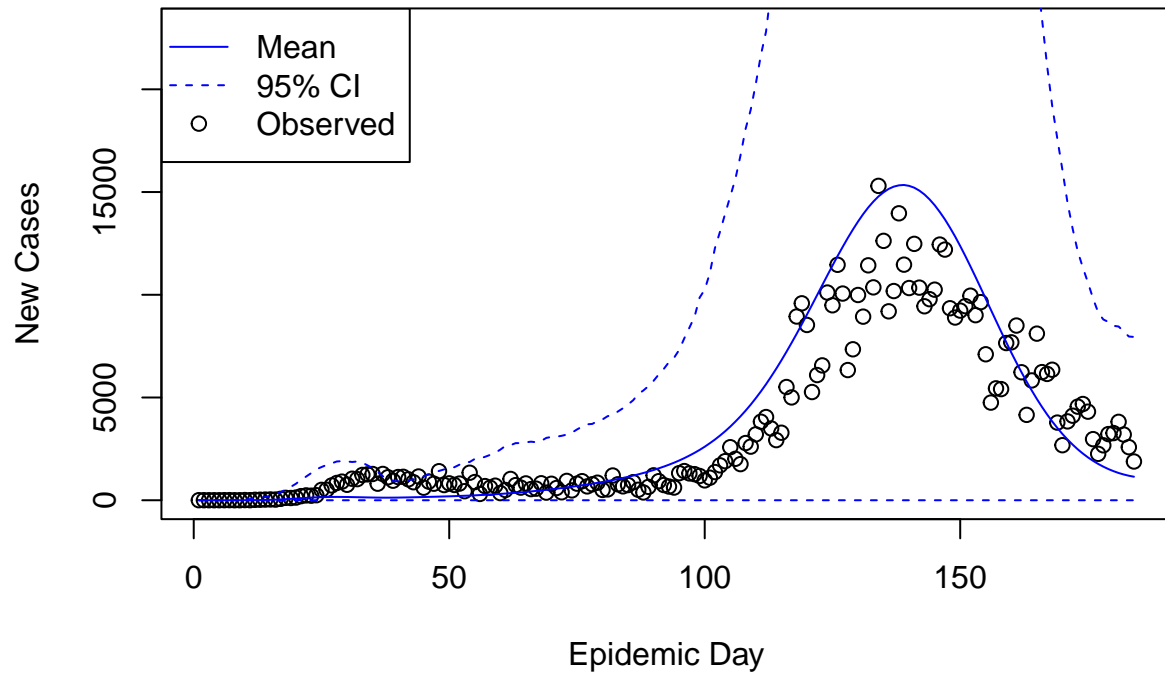
Model 14: Posterior Predictive Distribution



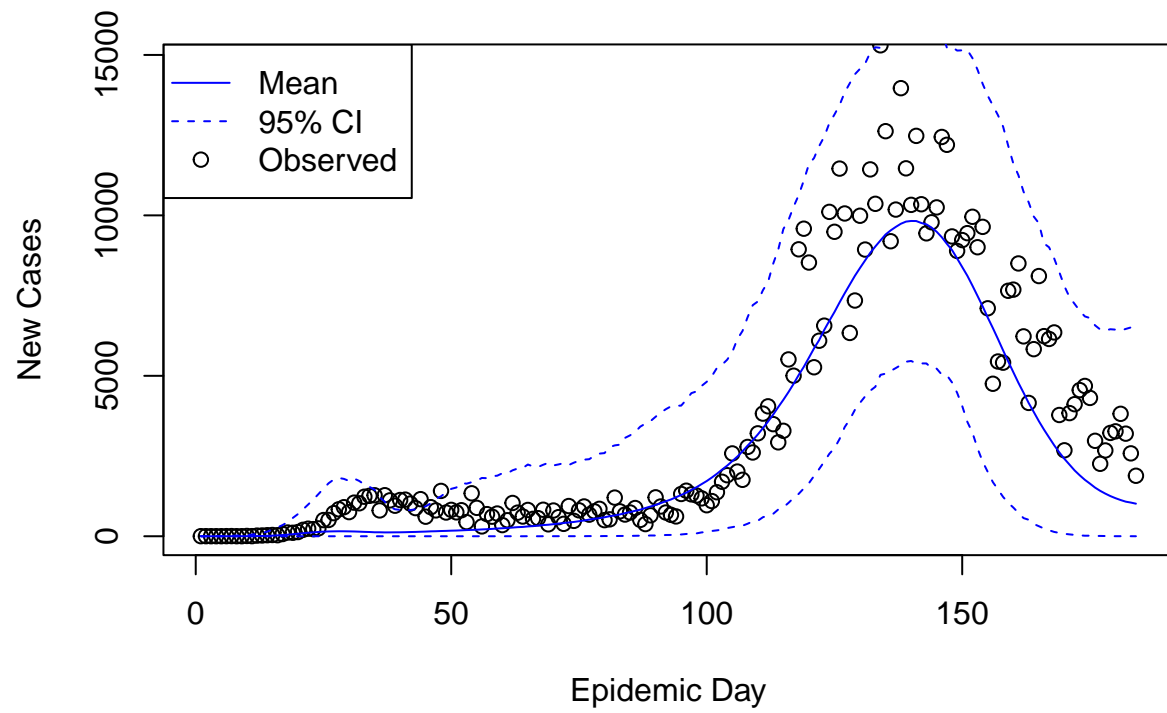
Model 14: Posterior Distribution



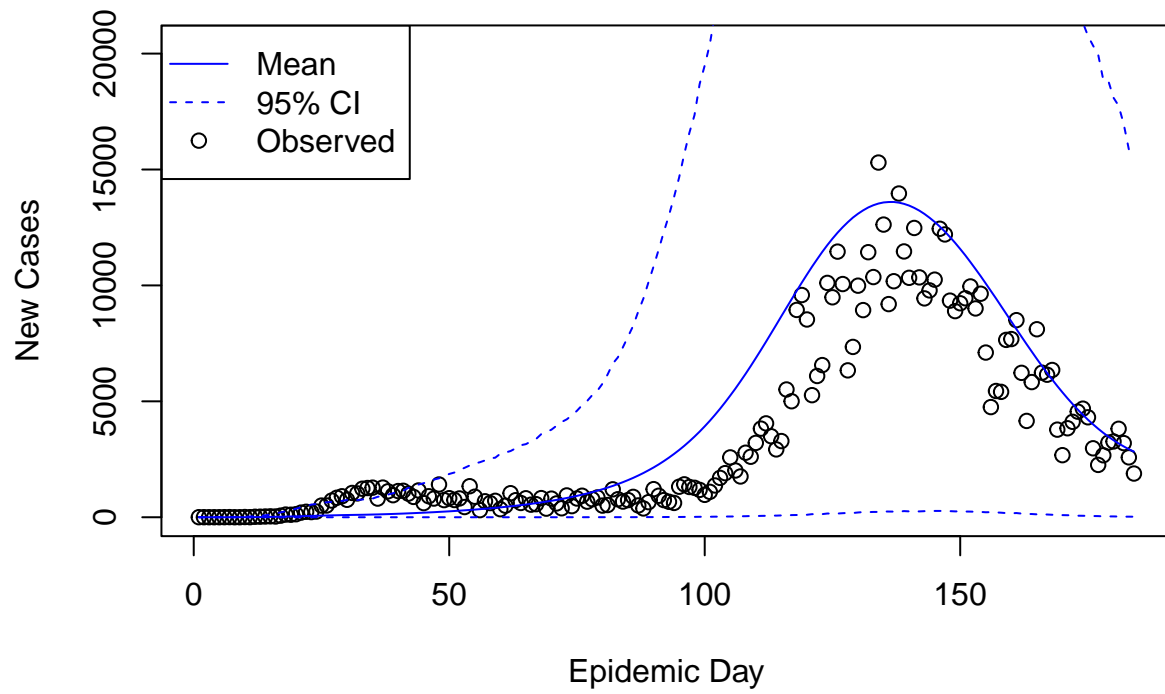
Model 6 (Weibull Distribution): Posterior Predictive Distribution



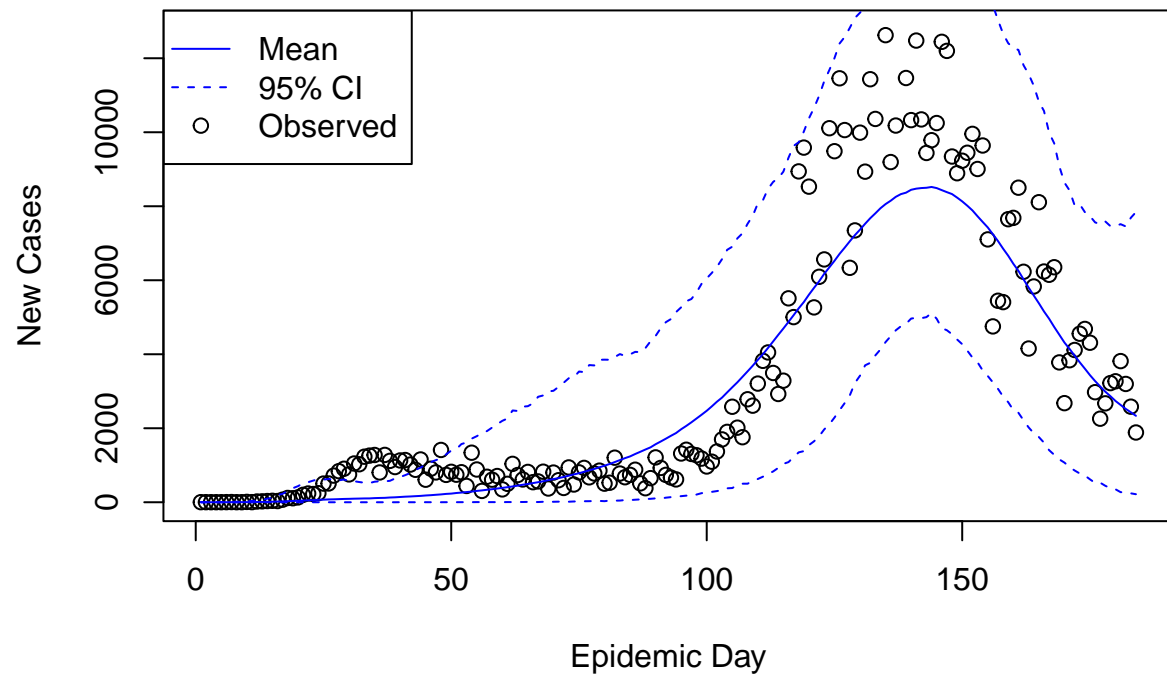
Model 6 (Weibull Distribution): Posterior Distribution



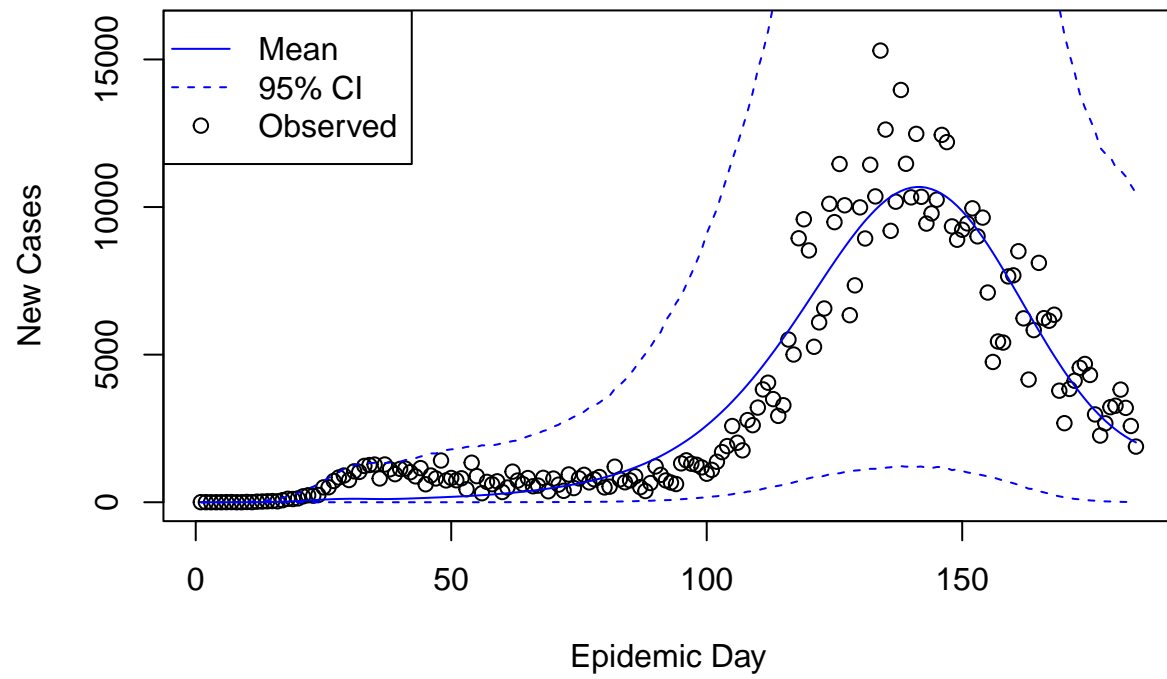
Model 6 (Basic ABC): Posterior Predictive Distribution



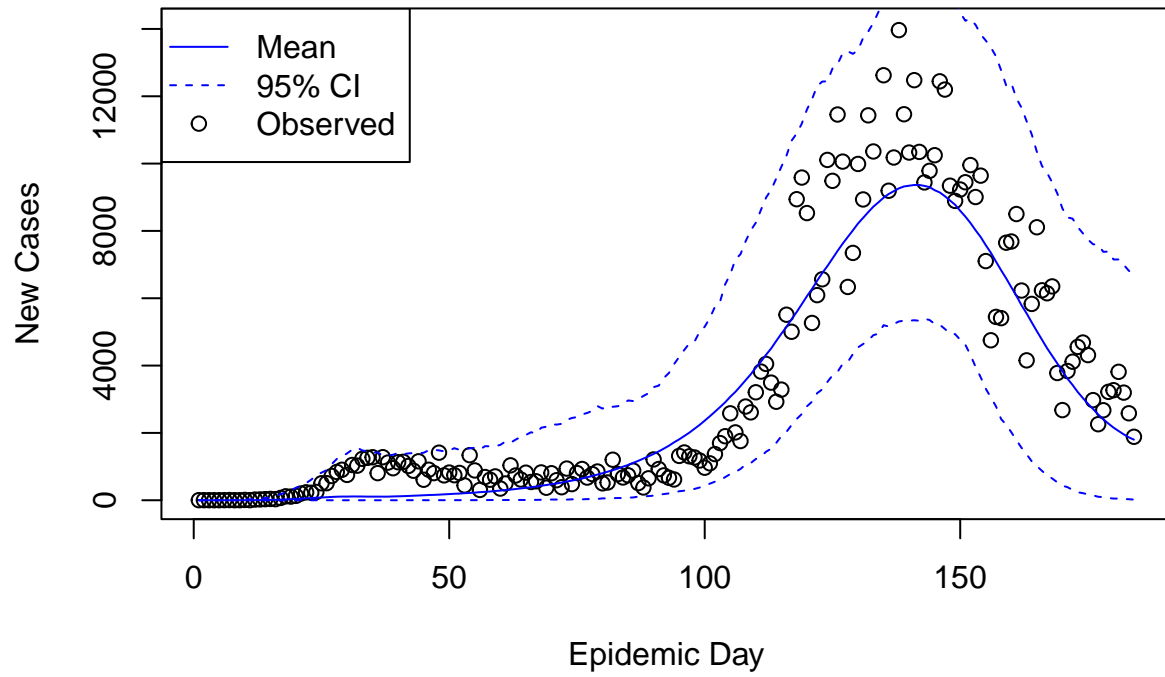
Model 6 (Basic ABC): Posterior Distribution



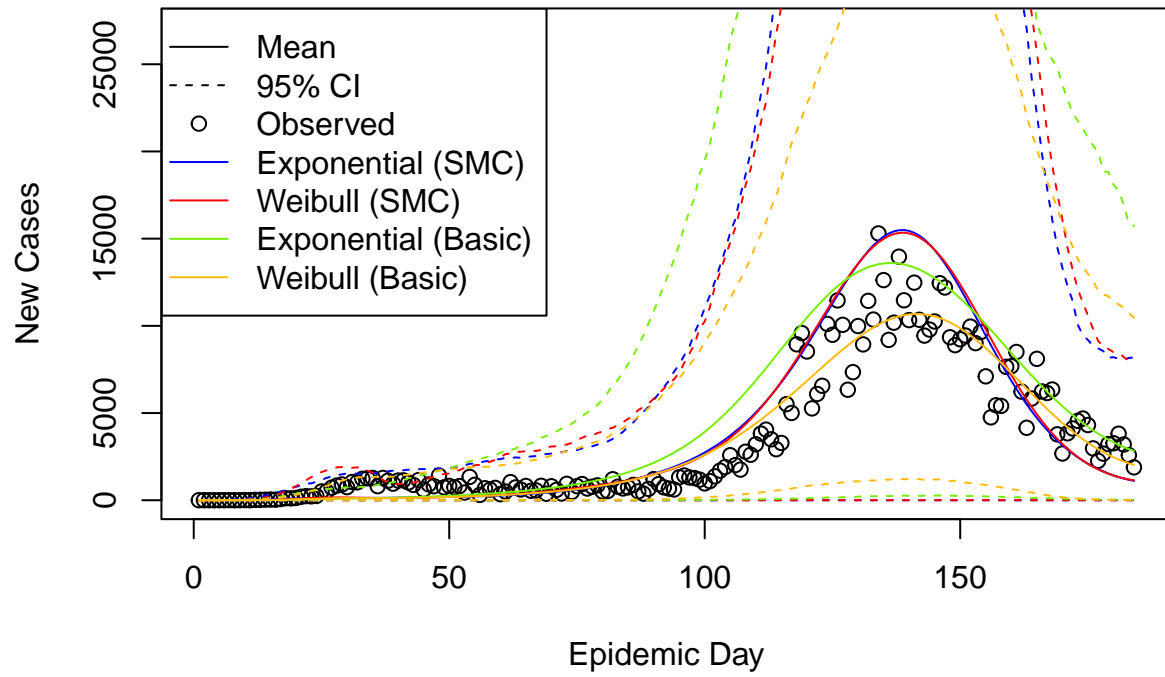
Model 6 (Weibull, Basic ABC): Posterior Predictive Distribution



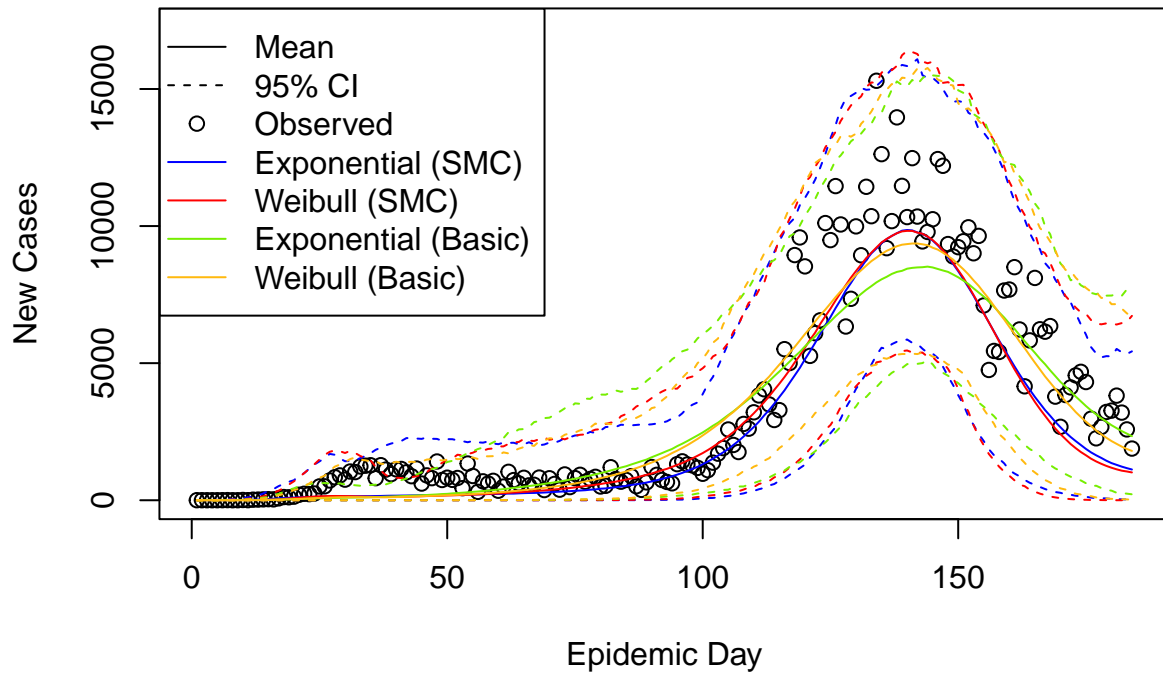
Model 6 (Weibull, Basic ABC): Posterior Distribution



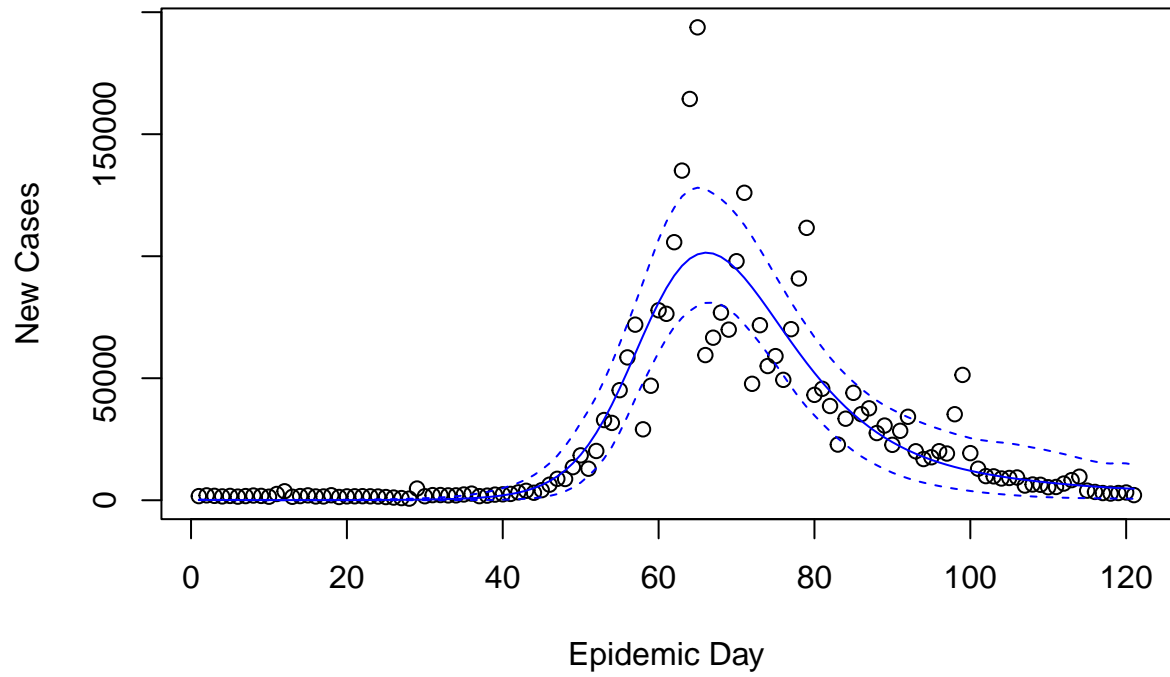
Posterior Predictive Distribution: Model 6



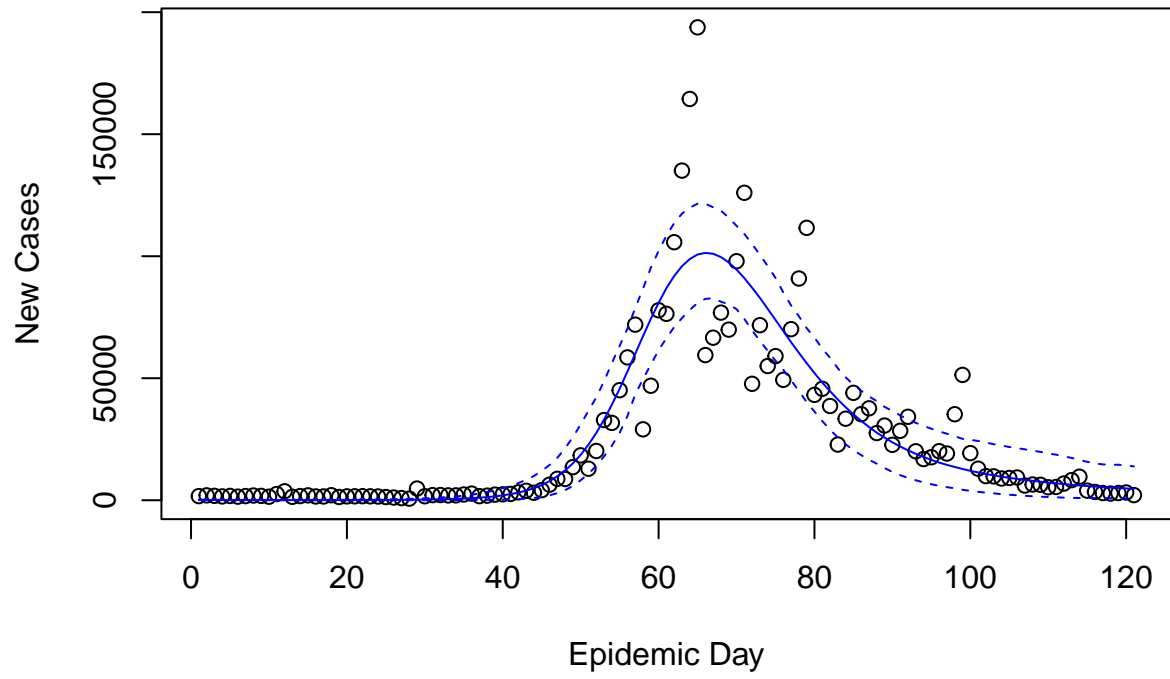
Posterior Distribution: Model 6



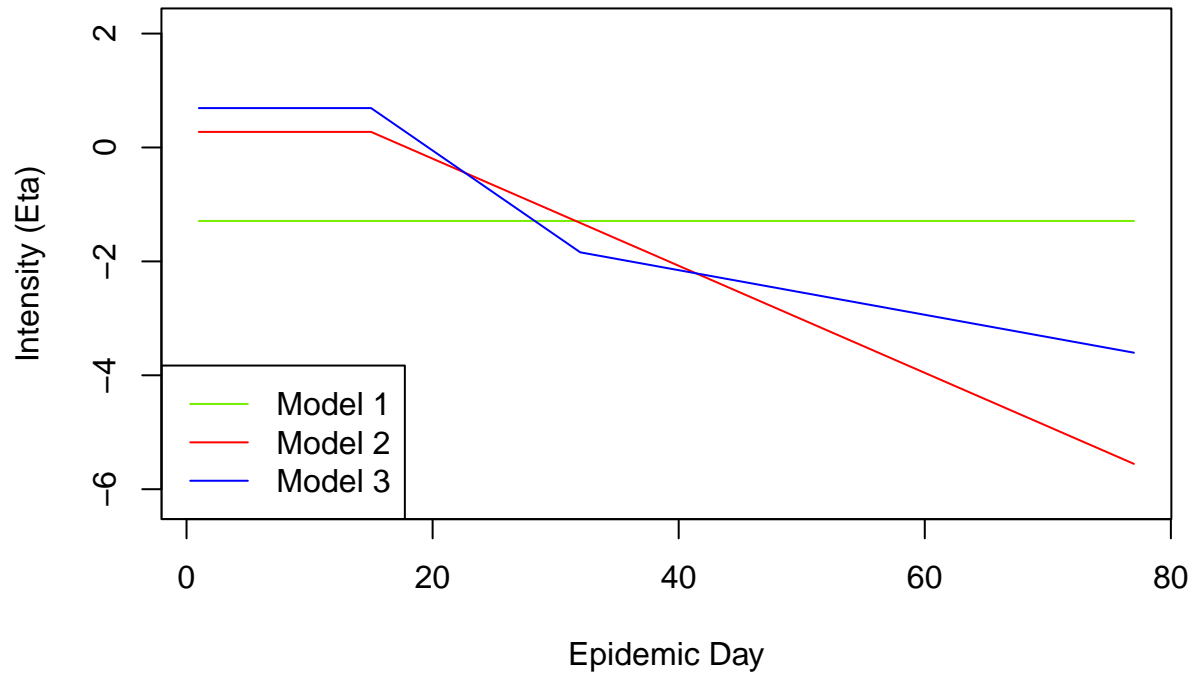
Model 15: Posterior Predictive Distribution



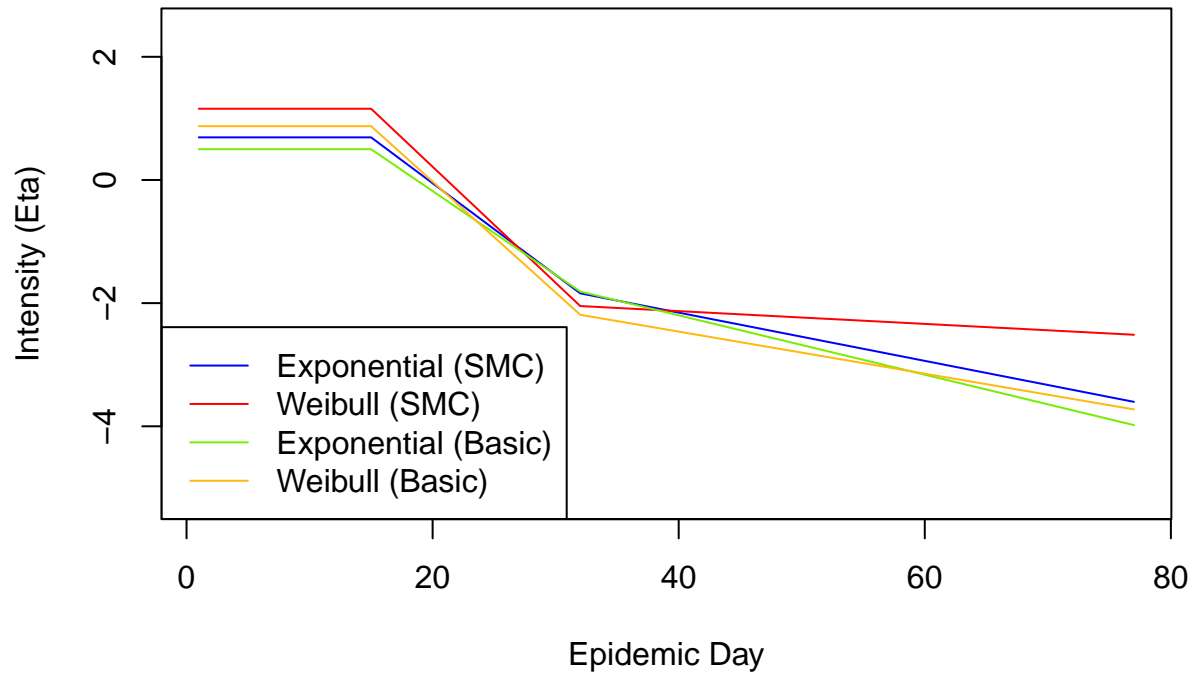
Model 15: Posterior Distribution



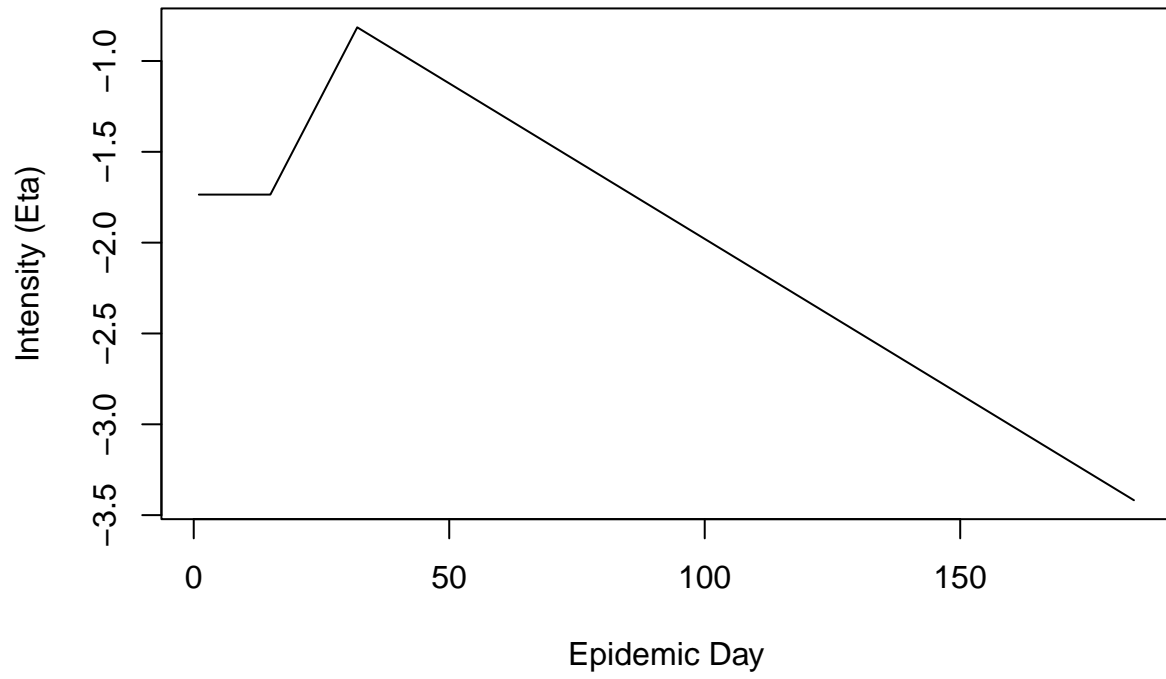
Intensity Prediction



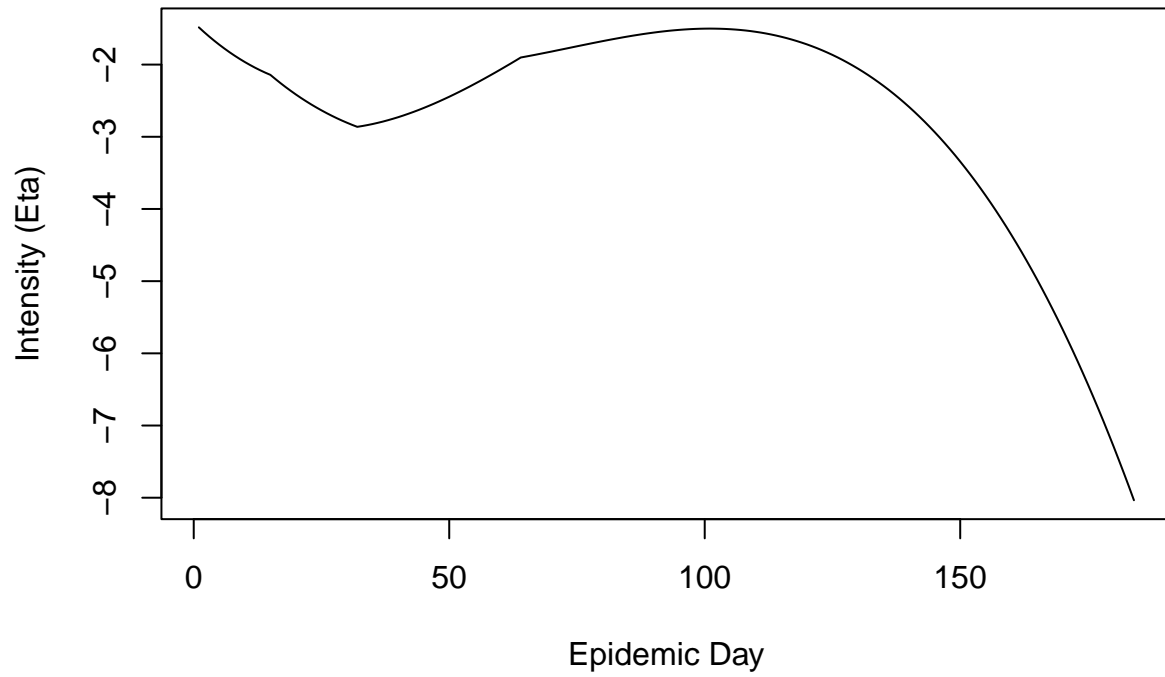
Model 3 Intensity Prediction



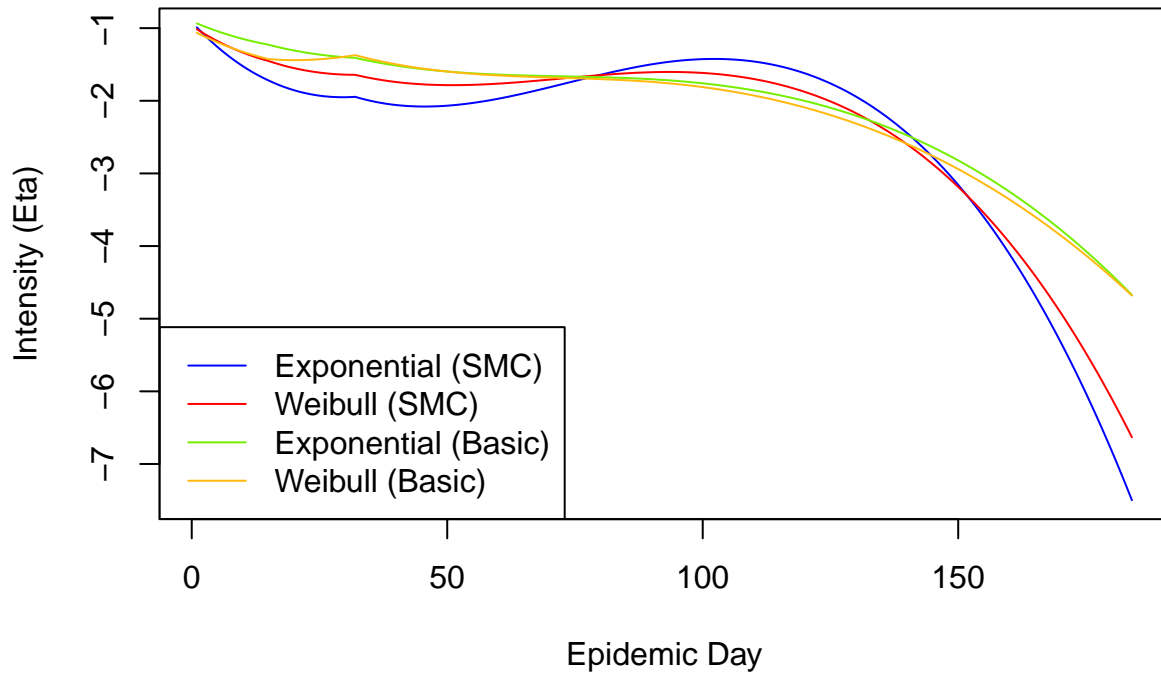
Model 4 Intensity Prediction



Model 11 Intensity Prediction



Model 6 Intensity Prediction



Model 1

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 77
## Data Model Parameters: 0
## Exposure Process Parameters: 1
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
##           Mean    SD      95% LB      95% UB
## Beta_SE_1  -1.290 0.052   -1.404   -1.200
## gamma_EI    0.170 0.009    0.152    0.191
## gamma_IR    0.064 0.009    0.050    0.081
## S0_1       21477737.000 0.000 21477737.000 21477737.000
## E0_1         2.000 0.000     2.000     2.000
## I0_1         2.000 0.000     2.000     2.000
## R0_1         0.000 0.000     0.000     0.000
```

Model 2

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 77
## Data Model Parameters: 0
## Exposure Process Parameters: 2
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
##           Mean    SD      95% LB      95% UB
## Beta_SE_1    0.274 0.224    -0.129    0.659
## Beta_SE_2   -0.940 0.050    -1.023   -0.826
## gamma_EI     0.143 0.042     0.095    0.259
## gamma_IR     0.034 0.028     0.001    0.099
## SO_1        21477737.000 0.000 21477737.000 21477737.000
## EO_1         2.000 0.000     2.000     2.000
## IO_1         2.000 0.000     2.000     2.000
## RO_1         0.000 0.000     0.000     0.000
```

Model 3

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 77
## Data Model Parameters: 0
## Exposure Process Parameters: 3
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
##           Mean    SD      95% LB      95% UB
## Beta_SE_1    0.692 0.218     0.309    1.132
## Beta_SE_2   -1.490 0.141    -1.741   -1.207
## Beta_SE_3    1.098 0.134     0.850    1.349
## gamma_EI     0.151 0.039     0.073    0.224
## gamma_IR     0.085 0.056     0.009    0.212
## SO_1        21477737.000 0.000 21477737.000 21477737.000
## EO_1         2.000 0.000     2.000     2.000
## IO_1         2.000 0.000     2.000     2.000
## RO_1         0.000 0.000     0.000     0.000
```

Model 3 (Weibull)

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 77
## Data Model Parameters: 0
## Exposure Process Parameters: 3
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 4
##
##
## Parameter Estimates:
##           Mean    SD      95% LB      95% UB
## Beta_SE_1      1.157 0.197      0.830      1.574
## Beta_SE_2     -1.885 0.141     -2.166     -1.618
## Beta_SE_3      1.781 0.148      1.555      2.094
## latent_shape    2.619 0.747      1.304      4.285
## latent_scale    7.296 1.131      5.352      9.286
## infectious_shape 8.738 4.780      2.084     20.911
## infectious_scale 8.636 2.407      4.354     13.117
## S0_1          21477737.000 0.000 21477737.000 21477737.000
## E0_1              2.000 0.000      2.000      2.000
## I0_1              2.000 0.000      2.000      2.000
## R0_1              0.000 0.000      0.000      0.000
```

Model 3 (Weibull, Basic)

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 77
## Data Model Parameters: 0
## Exposure Process Parameters: 3
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 4
##
##
## Parameter Estimates:
##           Mean    SD      95% LB      95% UB
## Beta_SE_1      0.874 0.160      0.617      1.172
## Beta_SE_2     -1.802 0.264     -2.310     -1.391
## Beta_SE_3      1.461 0.434      0.817      2.319
## latent_shape    2.193 0.082      2.044      2.357
## latent_scale    6.546 0.223      6.148      7.003
## infectious_shape 4.379 0.481      3.601      5.309
## infectious_scale 15.779 1.621     12.673     18.212
## S0_1          21477737.000 0.000 21477737.000 21477737.000
## E0_1              2.000 0.000      2.000      2.000
## I0_1              2.000 0.000      2.000      2.000
```

```
## R0_1          0.000 0.000          0.000          0.000
```

Model 3 (Exp, Basic)

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 77
## Data Model Parameters: 0
## Exposure Process Parameters: 3
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
##           Mean      SD      95% LB      95% UB
## Beta_SE_1    0.500 0.161      0.205      0.799
## Beta_SE_2   -1.360 0.242     -1.821     -0.925
## Beta_SE_3    0.878 0.379      0.226      1.673
## gamma_EI     0.166 0.006      0.155      0.177
## gamma_IR     0.062 0.007      0.049      0.075
## S0_1        21477737.000 0.000 21477737.000 21477737.000
## E0_1          2.000 0.000          2.000          2.000
## I0_1          2.000 0.000          2.000          2.000
## R0_1          0.000 0.000          0.000          0.000
```

Model 4

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 184
## Data Model Parameters: 0
## Exposure Process Parameters: 3
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
##           Mean      SD      95% LB      95% UB
## Beta_SE_1   -1.736 1.302     -3.806      0.389
## Beta_SE_2    0.542 1.027     -1.297      2.169
## Beta_SE_3   -0.713 1.071     -2.416      1.240
## gamma_EI     0.170 0.015      0.138      0.201
## gamma_IR     0.060 0.016      0.032      0.088
## S0_1        21477737.000 0.000 21477737.000 21477737.000
## E0_1          2.000 0.000          2.000          2.000
## I0_1          2.000 0.000          2.000          2.000
## R0_1          0.000 0.000          0.000          0.000
```


Model 5

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 184
## Data Model Parameters: 0
## Exposure Process Parameters: 6
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
##           Mean    SD      95% LB      95% UB
## Beta_SE_1    -1.251 1.658    -4.671     1.361
## Beta_SE_2    -0.745 1.195    -3.124     1.189
## Beta_SE_3     0.728 1.235    -1.397     3.314
## Beta_SE_4     0.244 3.593    -6.002     7.776
## Beta_SE_5     3.764 4.789    -5.715    13.239
## Beta_SE_6    -3.450 5.064   -12.215     5.996
## gamma_EI      0.165 0.025     0.119     0.204
## gamma_IR      0.057 0.023     0.014     0.104
## SO_1         21477737.000 0.000 21477737.000 21477737.000
## EO_1          2.000 0.000      2.000      2.000
## IO_1          2.000 0.000      2.000      2.000
## RO_1          0.000 0.000      0.000      0.000
```

Model 6 (SMC-ABC, Exponential Distribution)

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 184
## Data Model Parameters: 0
## Exposure Process Parameters: 7
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
##           Mean    SD      95% LB      95% UB
## Beta_SE_1    -0.989 1.876    -4.418     2.181
## Beta_SE_2    -0.010 1.446    -2.905     2.581
## Beta_SE_3    -0.257 1.624    -3.555     2.918
## Beta_SE_4    -2.238 3.859    -9.918     6.064
## Beta_SE_5     2.332 3.307    -2.575     9.014
## Beta_SE_6     2.177 3.790    -5.730     9.316
## Beta_SE_7    -2.433 3.295    -8.391     4.035
## gamma_EI      0.168 0.011     0.148     0.189
## gamma_IR      0.059 0.015     0.029     0.092
```

```
## S0_1      21477737.000 0.000 21477737.000 21477737.000
## E0_1      2.000 0.000      2.000      2.000
## I0_1      2.000 0.000      2.000      2.000
## R0_1      0.000 0.000      0.000      0.000
```

Model 6 (SMC-ABC, Weibull Distribution)

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 184
## Data Model Parameters: 0
## Exposure Process Parameters: 7
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 4
##
##
## Parameter Estimates:
##           Mean      SD      95% LB      95% UB
## Beta_SE_1    -1.015 1.440     -4.354      1.952
## Beta_SE_2    -0.049 1.163     -2.634      2.319
## Beta_SE_3    -0.165 1.302     -2.573      2.495
## Beta_SE_4    -1.355 2.692     -7.030      3.263
## Beta_SE_5     1.598 2.233     -2.609      5.612
## Beta_SE_6     1.332 2.849     -4.297      5.981
## Beta_SE_7    -2.273 2.900     -8.369      2.238
## latent_shape  2.176 0.136      1.937      2.416
## latent_scale  6.607 0.384      5.857      7.244
## infectious_shape 4.384 0.841      2.946      6.392
## infectious_scale 15.940 1.902     12.019     19.425
## S0_1      21477737.000 0.000 21477737.000 21477737.000
## E0_1      2.000 0.000      2.000      2.000
## I0_1      2.000 0.000      2.000      2.000
## R0_1      0.000 0.000      0.000      0.000
```

Model 6 (Basic ABC, Weibull Distribution)

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 184
## Data Model Parameters: 0
## Exposure Process Parameters: 7
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 4
##
##
## Parameter Estimates:
##           Mean      SD      95% LB      95% UB
```

## Beta_SE_1	-1.065	1.198	-3.323	1.322
## Beta_SE_2	0.113	0.945	-1.895	1.563
## Beta_SE_3	-0.300	1.006	-1.848	1.859
## Beta_SE_4	-1.077	1.701	-4.132	2.463
## Beta_SE_5	0.811	1.723	-2.150	4.048
## Beta_SE_6	0.456	1.717	-2.909	3.516
## Beta_SE_7	-0.966	1.963	-5.071	2.163
## latent_shape	2.198	0.076	2.064	2.368
## latent_scale	6.518	0.197	6.183	6.868
## infectious_shape	4.358	0.450	3.506	5.251
## infectious_scale	15.870	1.500	13.014	18.922
## S0_1	21477737.000	0.000	21477737.000	21477737.000
## E0_1	2.000	0.000	2.000	2.000
## I0_1	2.000	0.000	2.000	2.000
## R0_1	0.000	0.000	0.000	0.000

Model 6 (Basic ABC, Exponential Distribution)

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 184
## Data Model Parameters: 0
## Exposure Process Parameters: 7
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
```

##	Mean	SD	95% LB	95% UB
## Beta_SE_1	-0.935	1.255	-3.457	0.976
## Beta_SE_2	-0.049	1.051	-1.814	1.874
## Beta_SE_3	-0.120	1.114	-2.171	1.932
## Beta_SE_4	-0.886	1.675	-4.152	2.331
## Beta_SE_5	0.795	1.707	-2.501	3.910
## Beta_SE_6	0.591	1.991	-2.918	4.523
## Beta_SE_7	-1.095	1.823	-4.630	2.106
## gamma_EI	0.166	0.006	0.155	0.178
## gamma_IR	0.062	0.006	0.052	0.074
## S0_1	21477737.000	0.000	21477737.000	21477737.000
## E0_1	2.000	0.000	2.000	2.000
## I0_1	2.000	0.000	2.000	2.000
## R0_1	0.000	0.000	0.000	0.000

Model 7

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 184
```

```

## Data Model Parameters: 0
## Exposure Process Parameters: 8
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
##           Mean      SD      95% LB      95% UB
## Beta_SE_1    -0.890 1.742    -4.392     2.124
## Beta_SE_2    -0.203 1.348    -2.957     2.309
## Beta_SE_3     0.017 1.512    -2.901     2.928
## Beta_SE_4    -1.564 2.954    -7.467     4.304
## Beta_SE_5    -0.639 2.636    -5.349     3.361
## Beta_SE_6     2.852 2.323    -1.216     6.911
## Beta_SE_7    -0.712 2.760    -5.063     4.427
## Beta_SE_8    -2.101 2.960    -7.801     2.356
## gamma_EI      0.167 0.009     0.151     0.181
## gamma_IR      0.060 0.009     0.043     0.078
## S0_1          21477737.000 0.000 21477737.000 21477737.000
## E0_1           2.000 0.000     2.000     2.000
## I0_1           2.000 0.000     2.000     2.000
## R0_1           0.000 0.000     0.000     0.000

```

Model 8

```

## Summary: SEIR Model
##
## Locations: 1
## Time Points: 184
## Data Model Parameters: 0
## Exposure Process Parameters: 9
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
##           Mean      SD      95% LB      95% UB
## Beta_SE_1    -0.815 1.936    -5.395     2.259
## Beta_SE_2    -0.346 1.534    -2.888     2.626
## Beta_SE_3     0.099 1.699    -3.236     3.025
## Beta_SE_4    -1.565 3.497    -7.432     5.390
## Beta_SE_5    -1.087 3.726    -8.353     5.430
## Beta_SE_6     1.421 2.709    -3.498     5.862
## Beta_SE_7     3.200 3.118    -1.783     9.041
## Beta_SE_8    -1.486 3.253    -7.171     4.567
## Beta_SE_9    -1.716 3.813    -9.435     4.379
## gamma_EI      0.165 0.012     0.143     0.185
## gamma_IR      0.060 0.015     0.029     0.088
## S0_1          21477737.000 0.000 21477737.000 21477737.000
## E0_1           2.000 0.000     2.000     2.000
## I0_1           2.000 0.000     2.000     2.000

```

```
## R0_1          0.000 0.000          0.000          0.000
```

Model 9

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 184
## Data Model Parameters: 0
## Exposure Process Parameters: 4
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
##           Mean      SD      95% LB      95% UB
## Beta_SE_1    -1.666  1.590     -4.509      1.116
## Beta_SE_2    -0.440  1.548     -2.963      2.627
## Beta_SE_3     0.814  2.178     -3.504      4.319
## Beta_SE_4    -0.597  0.957     -2.223      1.262
## gamma_EI      0.157  0.029      0.092      0.214
## gamma_IR      0.050  0.030      0.003      0.111
## S0_1          21477737.000 0.000 21477737.000 21477737.000
## E0_1           2.000  0.000      2.000      2.000
## I0_1           2.000  0.000      2.000      2.000
## R0_1           0.000  0.000      0.000      0.000
```

Model 10

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 184
## Data Model Parameters: 0
## Exposure Process Parameters: 7
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
##           Mean      SD      95% LB      95% UB
## Beta_SE_1    -1.802  1.704     -4.762      1.095
## Beta_SE_2    -0.357  1.581     -3.748      2.138
## Beta_SE_3     0.691  2.160     -2.772      4.767
## Beta_SE_4    -0.518  1.086     -2.421      1.681
## Beta_SE_5    -0.875  3.954     -7.736      7.210
## Beta_SE_6     2.708  4.038     -3.236     11.219
## Beta_SE_7    -2.203  4.806    -12.828      5.985
## gamma_EI      0.167  0.014      0.136      0.189
```

## gamma_IR	0.059	0.012	0.035	0.081
## S0_1	21477737.000	0.000	21477737.000	21477737.000
## E0_1	2.000	0.000	2.000	2.000
## I0_1	2.000	0.000	2.000	2.000
## R0_1	0.000	0.000	0.000	0.000

Model 11

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 184
## Data Model Parameters: 0
## Exposure Process Parameters: 8
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
```

##	Mean	SD	95% LB	95% UB
## Beta_SE_1	-1.484	2.007	-5.485	2.378
## Beta_SE_2	-0.304	1.724	-3.472	3.043
## Beta_SE_3	0.371	2.289	-3.651	4.538
## Beta_SE_4	-0.299	1.289	-2.369	2.365
## Beta_SE_5	-2.004	4.343	-10.485	6.024
## Beta_SE_6	1.952	4.373	-6.124	10.076
## Beta_SE_7	1.746	3.825	-5.407	8.348
## Beta_SE_8	-3.468	4.473	-12.774	5.290
## gamma_EI	0.169	0.011	0.148	0.188
## gamma_IR	0.053	0.018	0.021	0.089
## S0_1	21477737.000	0.000	21477737.000	21477737.000
## E0_1	2.000	0.000	2.000	2.000
## I0_1	2.000	0.000	2.000	2.000
## R0_1	0.000	0.000	0.000	0.000

Model 12

```
## Summary: SEIR Model
##
## Locations: 1
## Time Points: 184
## Data Model Parameters: 0
## Exposure Process Parameters: 9
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
```

##	Mean	SD	95% LB	95% UB
----	------	----	--------	--------

```

## Beta_SE_1      -1.123 2.246      -5.622      2.474
## Beta_SE_2      -0.317 2.110      -4.110      3.589
## Beta_SE_3       0.157 2.776      -5.108      4.894
## Beta_SE_4      -0.141 1.295      -2.701      2.110
## Beta_SE_5      -2.038 4.466     -11.219      5.206
## Beta_SE_6      -1.111 4.544     -10.764      6.783
## Beta_SE_7       4.642 3.544      -1.906     12.060
## Beta_SE_8      -0.271 3.719      -7.281      5.573
## Beta_SE_9      -1.953 3.603      -8.667      4.264
## gamma_EI       0.164 0.014       0.137      0.195
## gamma_IR       0.056 0.017       0.024      0.090
## S0_1           21477737.000 0.000 21477737.000 21477737.000
## E0_1           2.000 0.000       2.000      2.000
## I0_1           2.000 0.000       2.000      2.000
## R0_1           0.000 0.000       0.000      0.000

```

Model 13

```

## Summary: SEIR Model
##
## Locations: 1
## Time Points: 184
## Data Model Parameters: 0
## Exposure Process Parameters: 10
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
##      Mean      SD      95% LB      95% UB
## Beta_SE_1     -1.343 2.163     -6.216      1.977
## Beta_SE_2     -0.448 1.579     -3.130      2.612
## Beta_SE_3      0.698 2.270     -4.317      5.102
## Beta_SE_4     -0.618 1.614     -3.677      2.769
## Beta_SE_5     -1.190 4.113     -9.198      5.346
## Beta_SE_6     -2.557 4.555    -11.457      6.550
## Beta_SE_7      0.831 3.718     -5.913      7.435
## Beta_SE_8      3.754 3.208     -2.421      9.498
## Beta_SE_9     -2.175 4.476    -10.814      5.416
## Beta_SE_10    -1.260 4.354     -9.437      6.728
## gamma_EI      0.167 0.014      0.144      0.192
## gamma_IR      0.058 0.014      0.030      0.085
## S0_1          21477737.000 0.000 21477737.000 21477737.000
## E0_1          2.000 0.000      2.000      2.000
## I0_1          2.000 0.000      2.000      2.000
## R0_1          0.000 0.000      0.000      0.000

```

Model 14

```

## Summary: SEIR Model

```

```

##
## Locations: 1
## Time Points: 184
## Data Model Parameters: 0
## Exposure Process Parameters: 7
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
##           Mean      SD      95% LB      95% UB
## Beta_SE_1    -0.085  2.194    -4.124     3.661
## Beta_SE_2    -2.692  1.918    -6.532     0.649
## Beta_SE_3    -0.872  2.013    -4.434     2.298
## Beta_SE_4     1.659  2.170    -2.112     6.135
## Beta_SE_5    -0.525  1.593    -4.086     2.207
## Beta_SE_6     0.347  2.137    -3.626     5.024
## Beta_SE_7    -0.297  1.716    -3.574     3.338
## gamma_EI      0.167  0.009     0.151     0.185
## gamma_IR      0.060  0.009     0.041     0.078
## S0_1         21477737.000  0.000 21477737.000 21477737.000
## E0_1           2.000  0.000     2.000     2.000
## I0_1           2.000  0.000     2.000     2.000
## R0_1           0.000  0.000     0.000     0.000

```

Model 15

```

## Summary: SEIR Model
##
## Locations: 1
## Time Points: 121
## Data Model Parameters: 0
## Exposure Process Parameters: 7
## Reinfection Model Parameters: 0
## Spatial Parameters: 0
## Transition Parameters: 2
##
##
## Parameter Estimates:
##           Mean      SD      95% LB      95% UB
## Beta_SE_1    -0.028  7.756    -13.406    14.014
## Beta_SE_2    -0.290  7.211    -13.941    12.732
## Beta_SE_3     1.682  0.501     0.899     2.771
## Beta_SE_4    -1.697  0.520    -2.612    -0.822
## Beta_SE_5    -0.927  0.830    -2.583     0.568
## Beta_SE_6    -1.884 11.591    -22.361    19.515
## Beta_SE_7    -2.017 10.878    -23.838    18.023
## gamma_EI      0.155  0.054     0.068     0.271
## gamma_IR      0.069  0.036     0.014     0.142
## S0_1         21415373.000  0.000 21415373.000 21415373.000
## E0_1          1000.000  0.000    1000.000    1000.000
## I0_1          1694.000  0.000    1694.000    1694.000

```



```
## R0_1          59670.000  0.000    59670.000    59670.000
```

Bayes Factor (Model 2 vs Model 3 vs Model 3 (Weibull))

```
##      [,1]      [,2]      [,3]
## [1,]  NaN  0.00000 0.00000000
## [2,]  Inf  1.00000 0.05135952
## [3,]  Inf 19.47059 1.00000000
```

Bayes Factor (Comparison Between Models 4-8)

```
##      [,1]      [,2]      [,3]      [,4]      [,5]
## [1,] 1.0000000 0.8010013 0.7748184 0.9116809 1.149013
## [2,] 1.2484375 1.0000000 0.9673123 1.1381766 1.434470
## [3,] 1.2906250 1.0337922 1.0000000 1.1766382 1.482944
## [4,] 1.0968750 0.8785982 0.8498789 1.0000000 1.260323
## [5,] 0.8703125 0.6971214 0.6743341 0.7934473 1.000000
```

Bayes Factor (Comparison Between Models 9-14)

```
##      [,1]      [,2]      [,3]      [,4]      [,5]      [,6]
## [1,] 1.000000 0.7103960 0.6363636 0.6434978 0.7265823 0.7454545
## [2,] 1.407666 1.0000000 0.8957871 0.9058296 1.0227848 1.0493506
## [3,] 1.571429 1.1163366 1.0000000 1.0112108 1.1417722 1.1714286
## [4,] 1.554007 1.1039604 0.9889135 1.0000000 1.1291139 1.1584416
## [5,] 1.376307 0.9777228 0.8758315 0.8856502 1.0000000 1.0259740
## [6,] 1.341463 0.9529703 0.8536585 0.8632287 0.9746835 1.0000000
```

Bayes Factor (Model 6 vs Model 11)

```
##      [,1]      [,2]
## [1,] 1.0000000 1.603945
## [2,] 0.6234626 1.000000
```

Bayes Factor (Model 6: Exponential Distribution vs Weibull Distribution)

```
##      [,1]      [,2]
## [1,] 1.000000 0.9825378
## [2,] 1.017773 1.0000000
```

Runtimes

```
##      user.self sys.self elapsed
```

## model 1	375.599	6.037	54.145
## model 2	511.774	9.676	76.667
## model 3	579.565	10.708	198.104
## model 4	4702.412	51.270	683.723
## model 5	331.219	13.731	52.107
## model 6	1239.052	22.674	182.847
## model 7	1298.063	16.737	195.776
## model 8	1135.537	16.896	178.343
## model 9	1349.993	18.055	210.122
## model 10	1275.806	16.836	198.717
## model 11	897.741	12.775	135.069
## model 12	1742.396	23.287	270.864
## model 13	1248.183	20.035	202.015
## model 14	1283.735	20.784	209.601
## model 15	1184.804	20.033	195.820
## model 16	1267.504	19.162	203.757
## model 17	1005.582	15.906	158.613
## model 18	1227.843	18.600	195.543
## model 19	3119.865	47.148	524.453
## model 20	520.705	26.133	92.888
## model 21	1555.317	34.943	242.690