SIR Testing

Graham Casey Gibson

5/28/2020

Stochastic Simulation

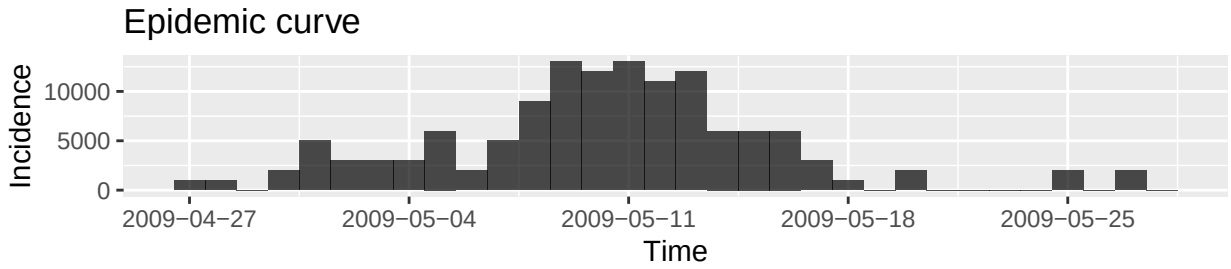
```
library(EpiEstim)
library(ggplot2)
data(Flu2009)
## incidence:
head(Flu2009$incidence)
```

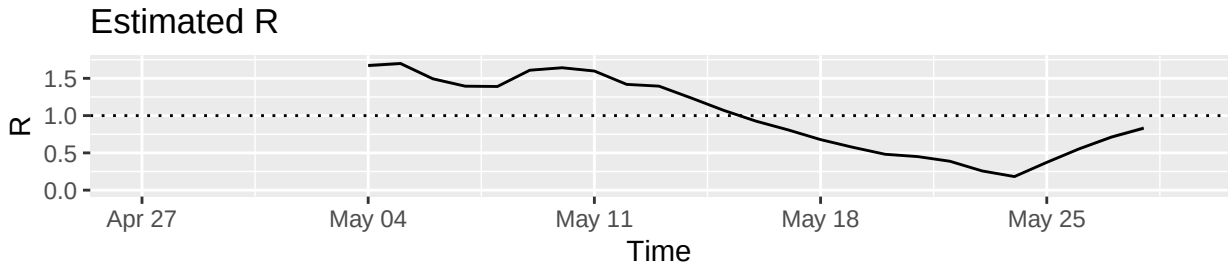
```
##        dates I
## 1 2009-04-27 1
## 2 2009-04-28 1
## 3 2009-04-29 0
## 4 2009-04-30 2
## 5 2009-05-01 5
## 6 2009-05-02 3
```

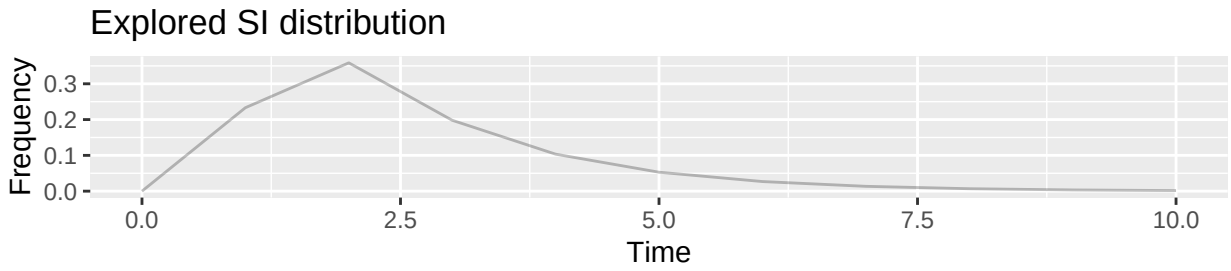
```
library(incidence)
plot(as.incidence(Flu2009$incidence$I, dates = Flu2009$incidence$dates))

Flu2009$incidence$I <- Flu2009$incidence$I*1000
res_parametric_si <- estimate_R(Flu2009$incidence,
                                method="parametric_si",
                                config = make_config(list(
                                  mean_si = 2.6,
                                  std_si = 1.5))
)
```

```
## Default config will estimate R on weekly sliding windows.
##     To change this change the t_start and t_end arguments.
```

```
plt_original <- plot(res_parametric_si, legend = FALSE)
```







Suppose we have constant testing.

```
library(EpiEstim)
library(ggplot2)
data(Flu2009)
## incidence:
head(Flu2009$incidence)

library(incidence)
plot(as.incidence(Flu2009$incidence$I, dates = Flu2009$incidence$dates))

Flu2009$incidence$I <- Flu2009$incidence$I*.2*1000
res_parametric_si <- estimate_R(Flu2009$incidence,
                                method="parametric_si",
                                config = make_config(list(
                                  mean_si = 2.6,
                                  std_si = 1.5))
)
```

```
## Default config will estimate R on weekly sliding windows.
##     To change this change the t_start and t_end arguments.
```

```
plt <- plot(res_parametric_si, legend = FALSE)

plt_uniform_testing <- plot(res_parametric_si, legend = FALSE)
```

Suppose we slowly increase testing

```
library(EpiEstim)
library(ggplot2)
data(Flu2009)
## incidence:
head(Flu2009$incidence)

library(incidence)
plot(as.incidence(Flu2009$incidence$I, dates = Flu2009$incidence$dates))

Flu2009$incidence$I <- Flu2009$incidence$I*1000*seq(.1,.5,length.out=length(Flu2009$incidence$I))
res_parametric_si <- estimate_R(Flu2009$incidence,
                                method="parametric_si",
                                config = make_config(list(
                                  mean_si = 2.6,
                                  std_si = 1.5))
)
```

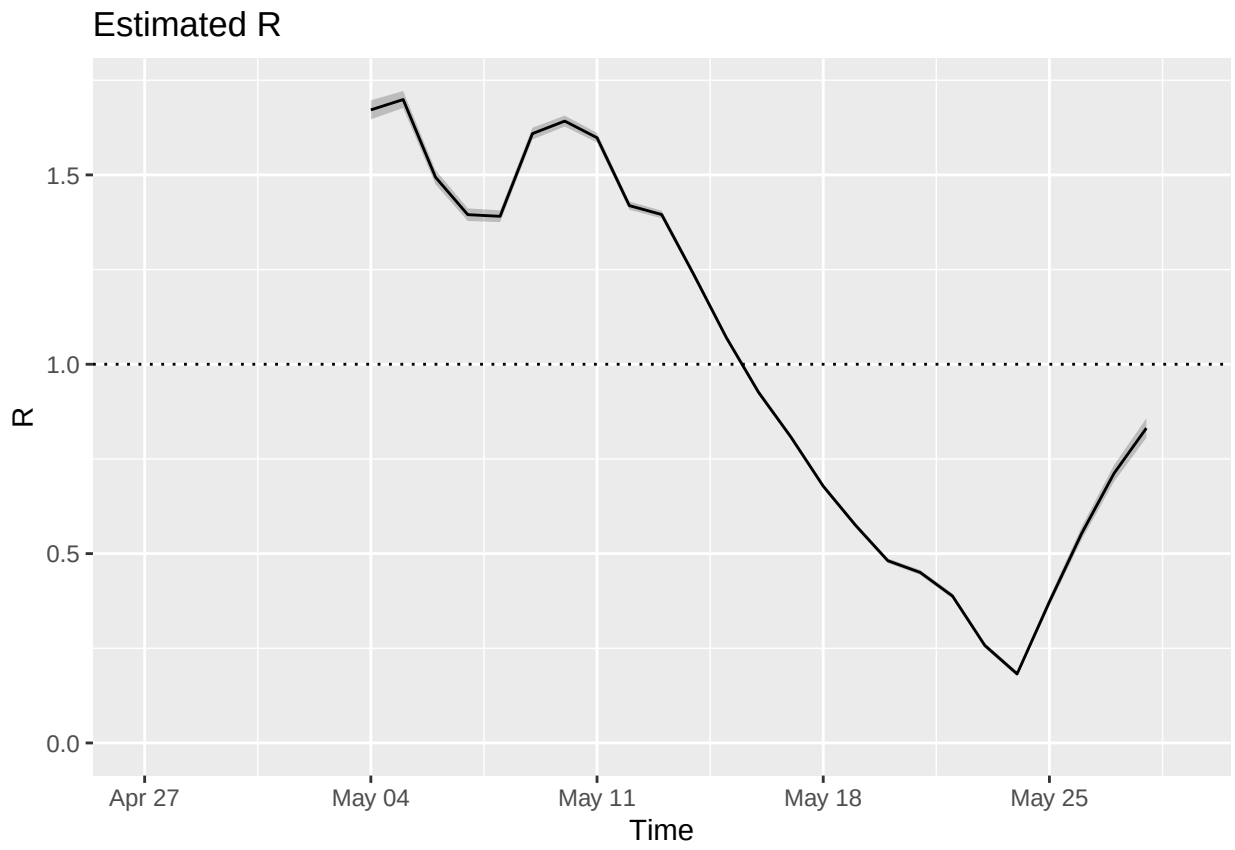
```
## Default config will estimate R on weekly sliding windows.
##     To change this change the t_start and t_end arguments.
```

```
plt <- plot(res_parametric_si, legend = FALSE)

plt_variable_testing <- plot(res_parametric_si, legend = FALSE)
```

```
print ("Original")
```

```
## [1] "Original"
```

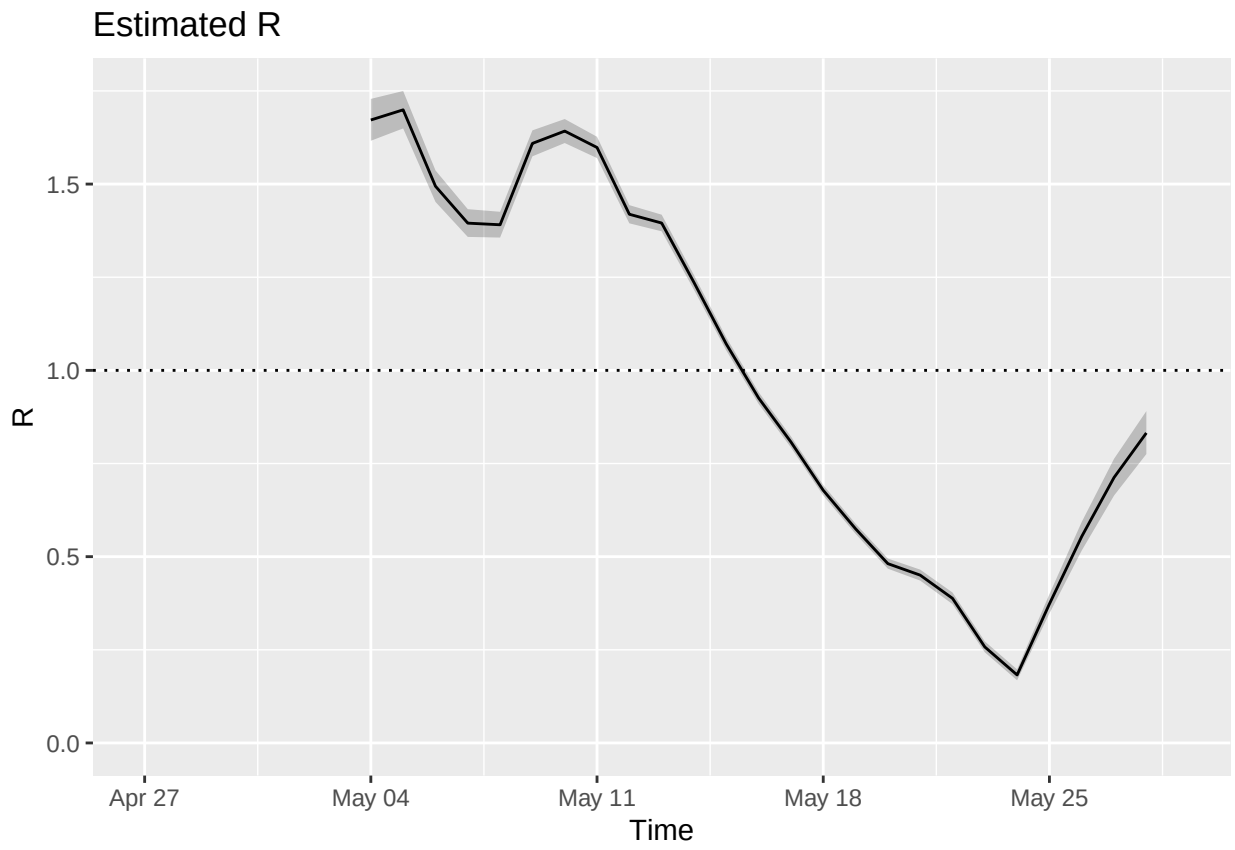
```
plot(plt_original$grobs$R)
```




```
print ("Uniform Testing")
```

```
## [1] "Uniform Testing"
```

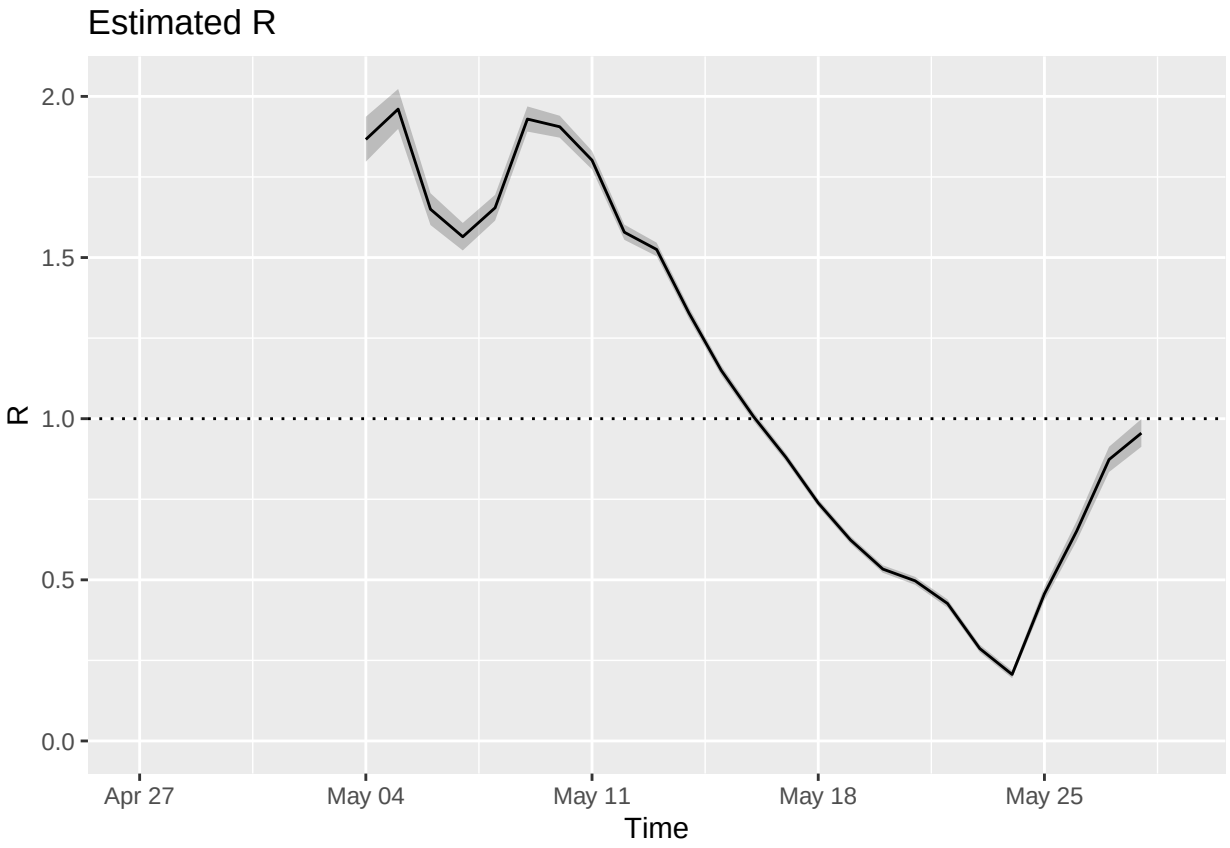
```
plot(plt_uniform_testing$grobs$R)
```




```
print ("Variable Testing")
```

```
## [1] "Variable Testing"
```

```
plot(plt_variable_testing$grobs$R)
```


Estimated R
2.0
1.5
1.0
0.5
0.0
R
Apr 27
May 04
May 11
May 18
May 25
Time