COVID-19 Epidemic Information

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Contents

Set up

R Libraries

R is extended using packages or libraries. For this analysis the following packages are used.

```
library(tidyverse)
```

```
## -- Attaching packages ------------------------------------------------------------------------ tidyv
```

```
## v ggplot2 3.3.0     v purrr   0.3.3
## v tibble  3.0.0     v dplyr   0.8.5
## v tidyr   1.0.2     v stringr 1.4.0
## v readr   1.3.1     v forcats 0.5.0
```

```
## -- Conflicts --------------------------------------------------------------------------- tidyverse_c
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
library(lubridate)
```

```
##
## Attaching package: 'lubridate'
```

```
## The following objects are masked from 'package:dplyr':
##
##     intersect, setdiff, union
```

```
## The following objects are masked from 'package:base':
##
##     date, intersect, setdiff, union
```

Note: the tidyverse package loads a set of packages that make up the tidy data universe. Use of the tidyverse package to load these packages is a convince instead of loading each individual backage.

Get data

Two R scripts are used to read in the data used. The source of this data is the WHO, for world wide data, and the CDC for US data. While the WHO data contains data for the US the CDC data is being used. The WHO data is a series of files scraped from their daily situtation reports and the CDC data is scraped from their web site for the CORANA virus. Due tothe WHO data being in 85 plus files the execution of these scripts is not shown to insure that the files is not overly large.

Create data set for Germany

The data for Germany is extracted from the WHO data for easy in displaying

```
germany <- WHO %>%
     filter(`Country Territory area` == "Germany")
germany$`Week Number` <- week(germany$date)
```

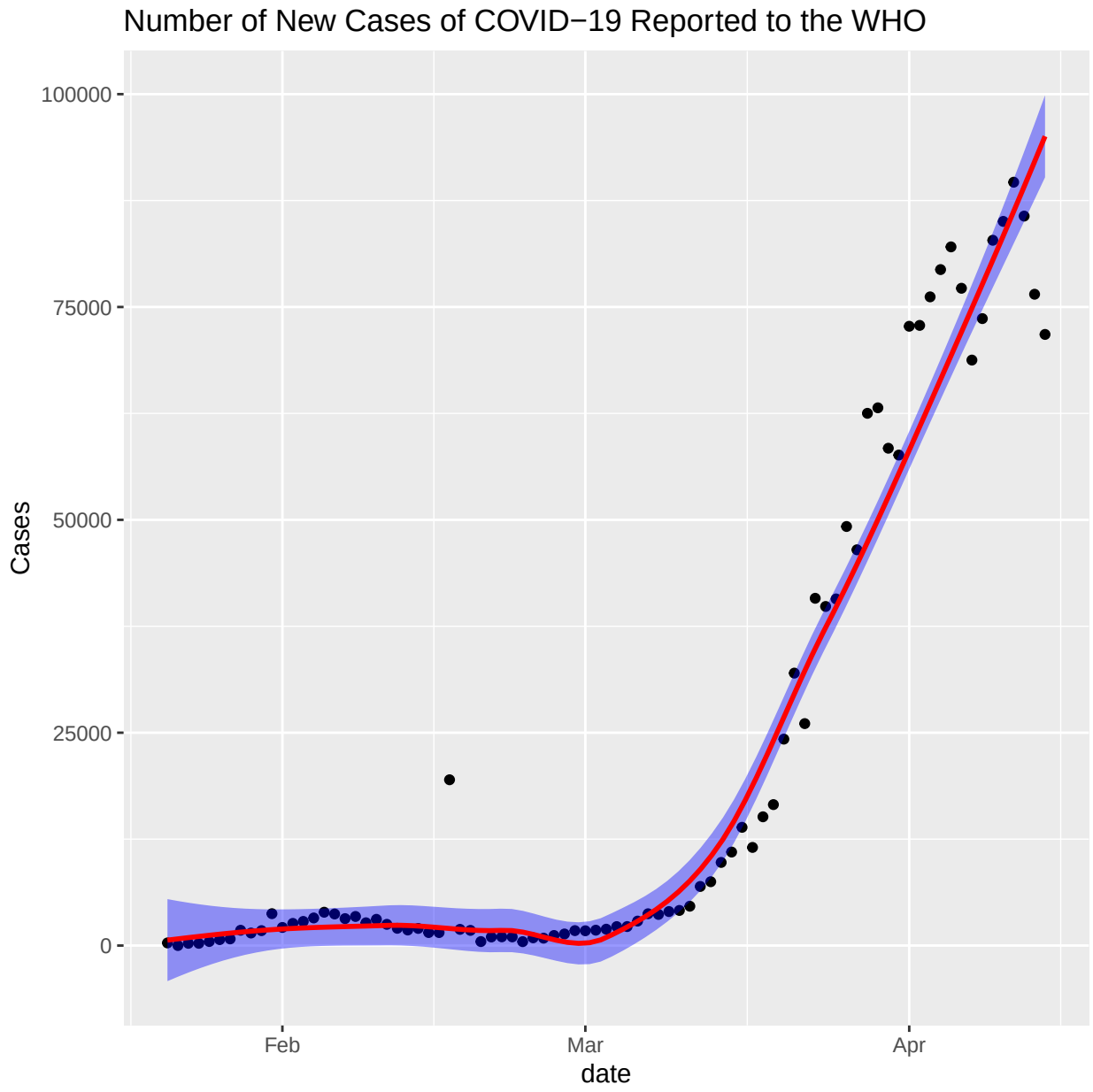
Create data set for world wide data

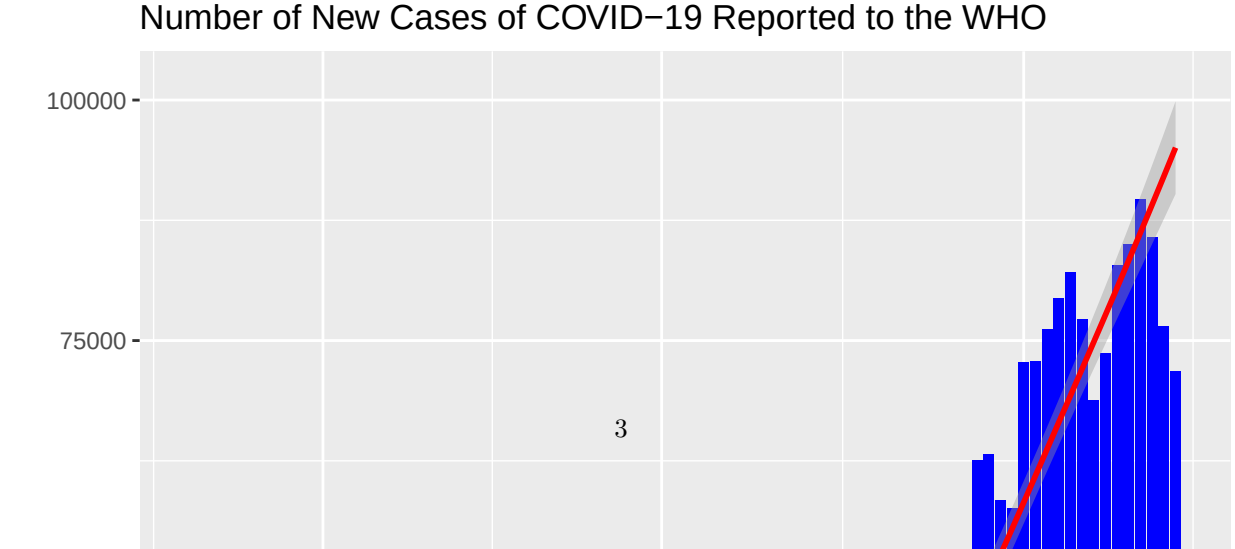
This data set displays the daily total for world wide data.

```
world <- WHO %>%
     group_by(`date`) %>%
     summarise(`Number of new cases` = sum(`Confirmed new cases`),
               cum = sum(`total Confirmed Cases`))
world$`Week Number` <- week(world$date)
```

Charts and graphs

World Wide





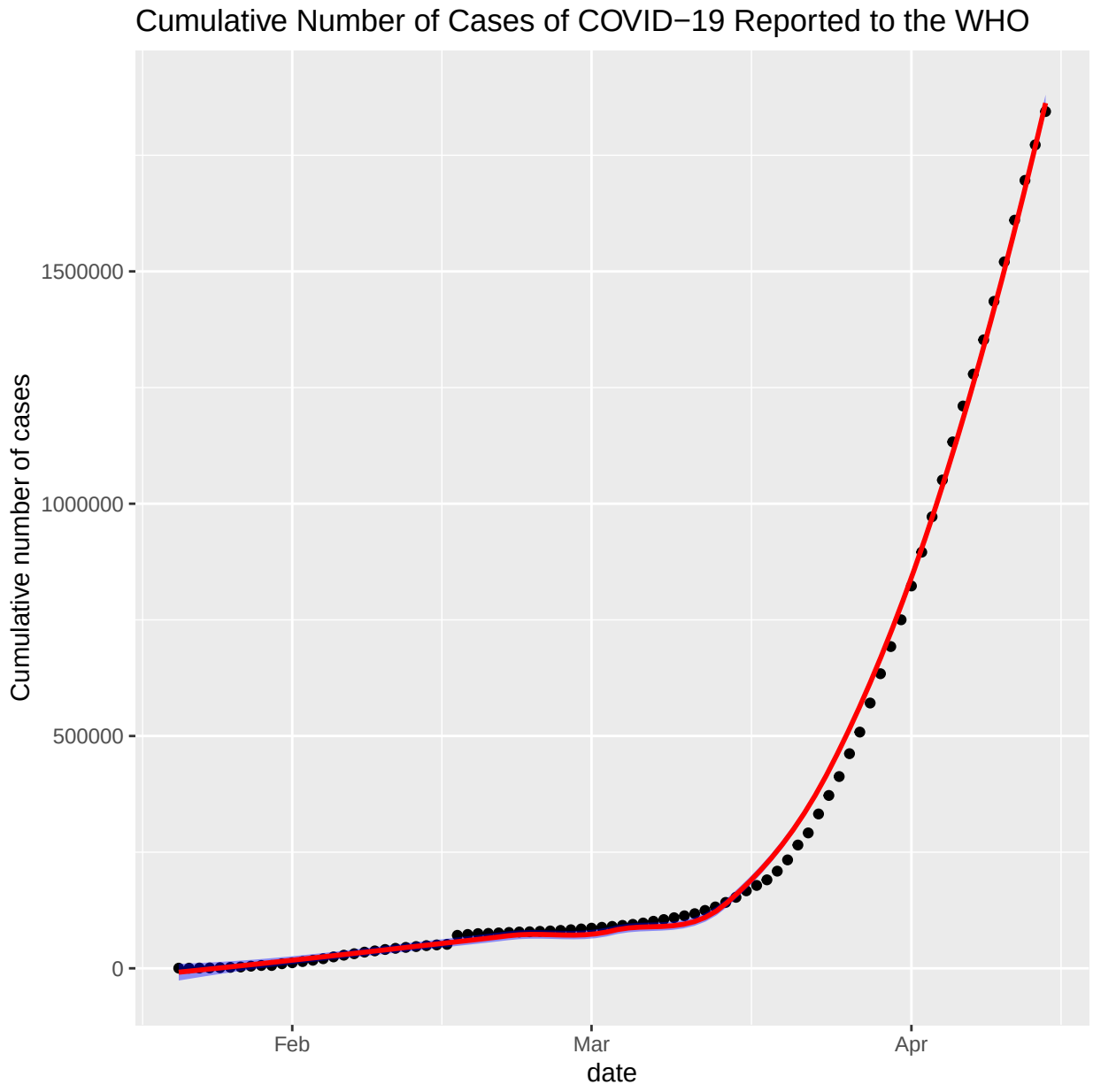


Figure 1: Cumulative cases

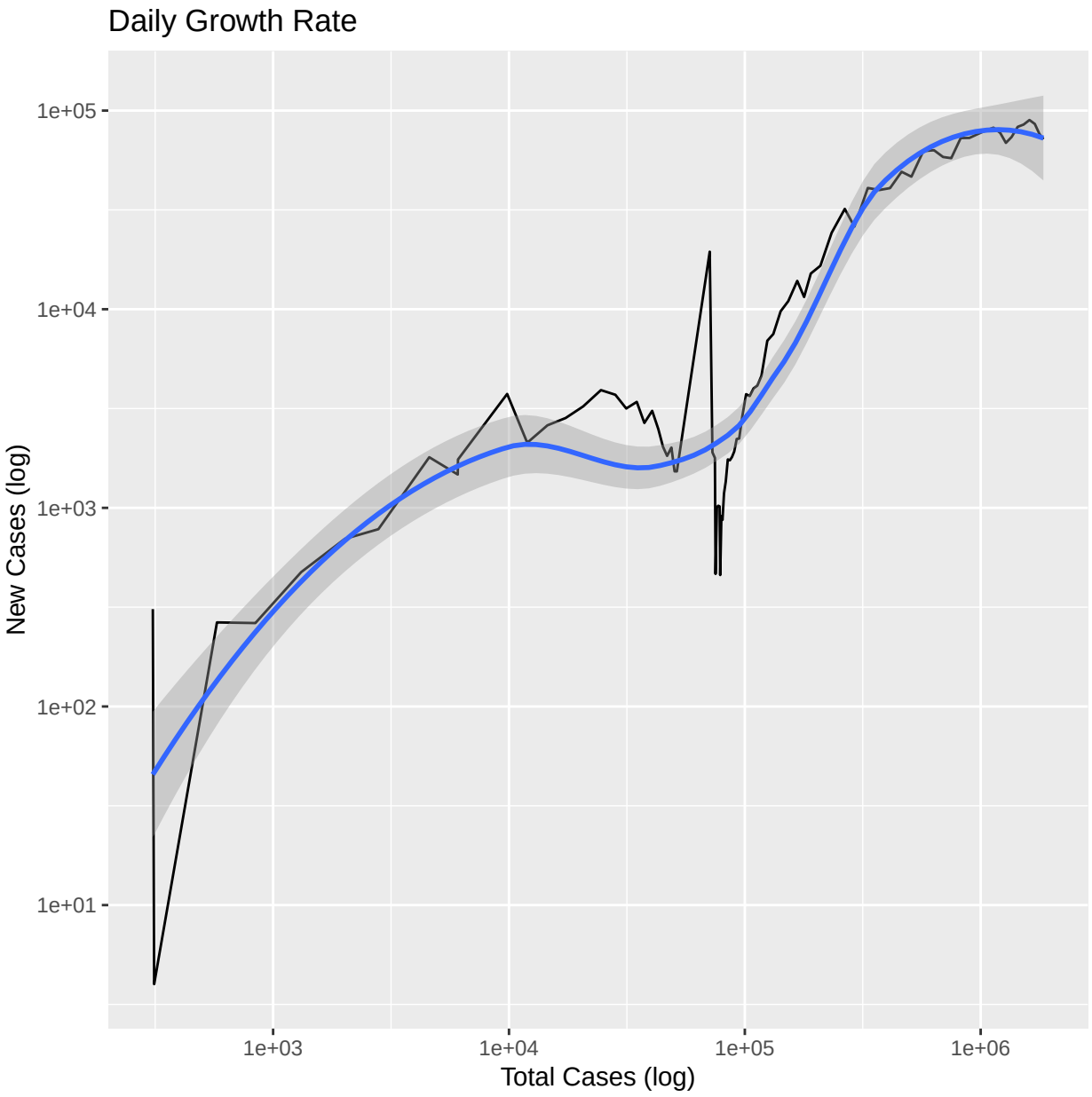


Figure 2: Growth Rate

Germany

US

Complete data set

CDC designates a date to which they consider the data "good". Reported data after that date is considered incomplete due to delays in reporting. This intial set of plots uses the complete data set

```
## Warning: Transformation introduced infinite values in continuous y-axis
```

```
## Warning: Transformation introduced infinite values in continuous y-axis
```

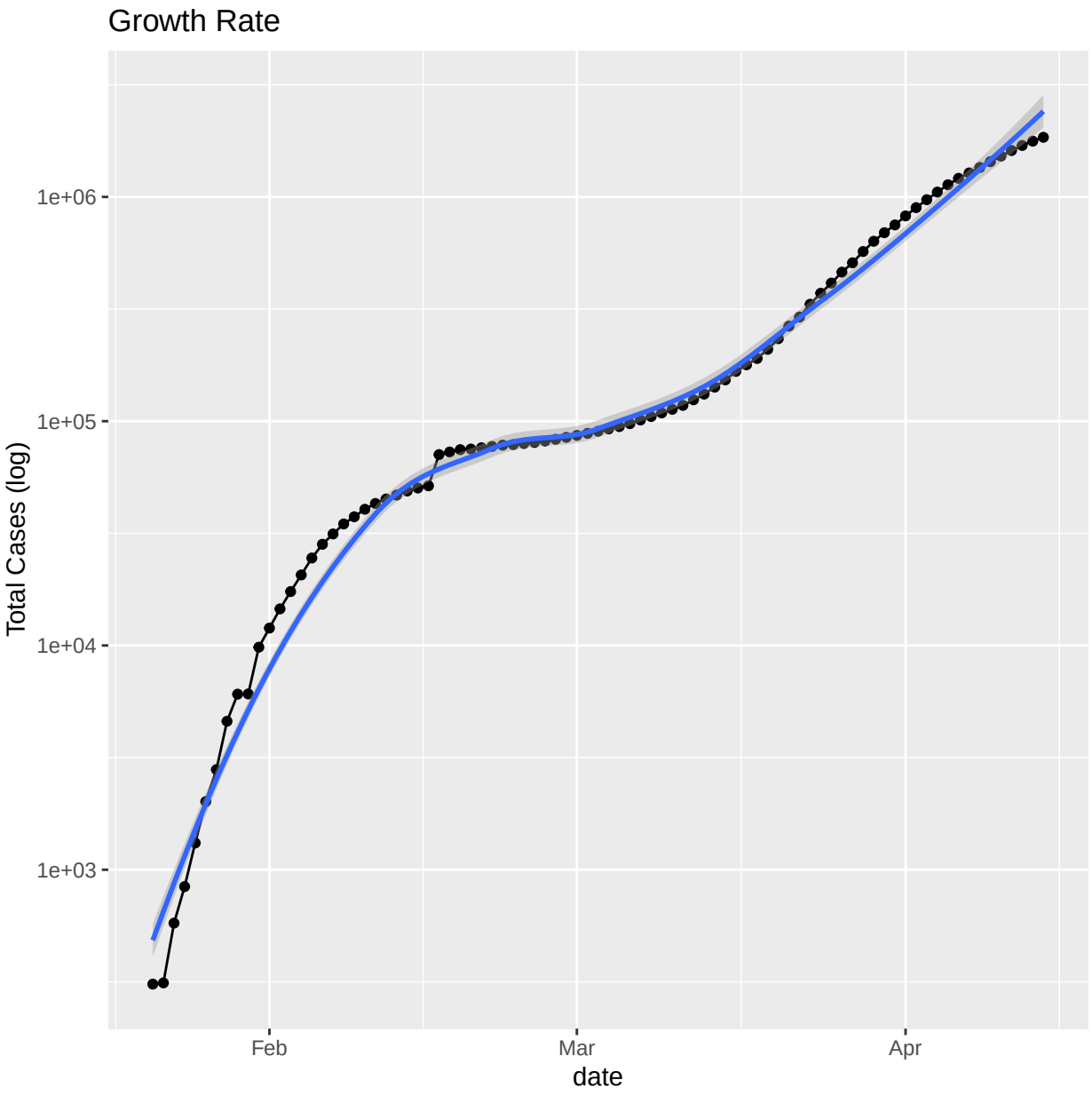


Figure 3: Another look at growth

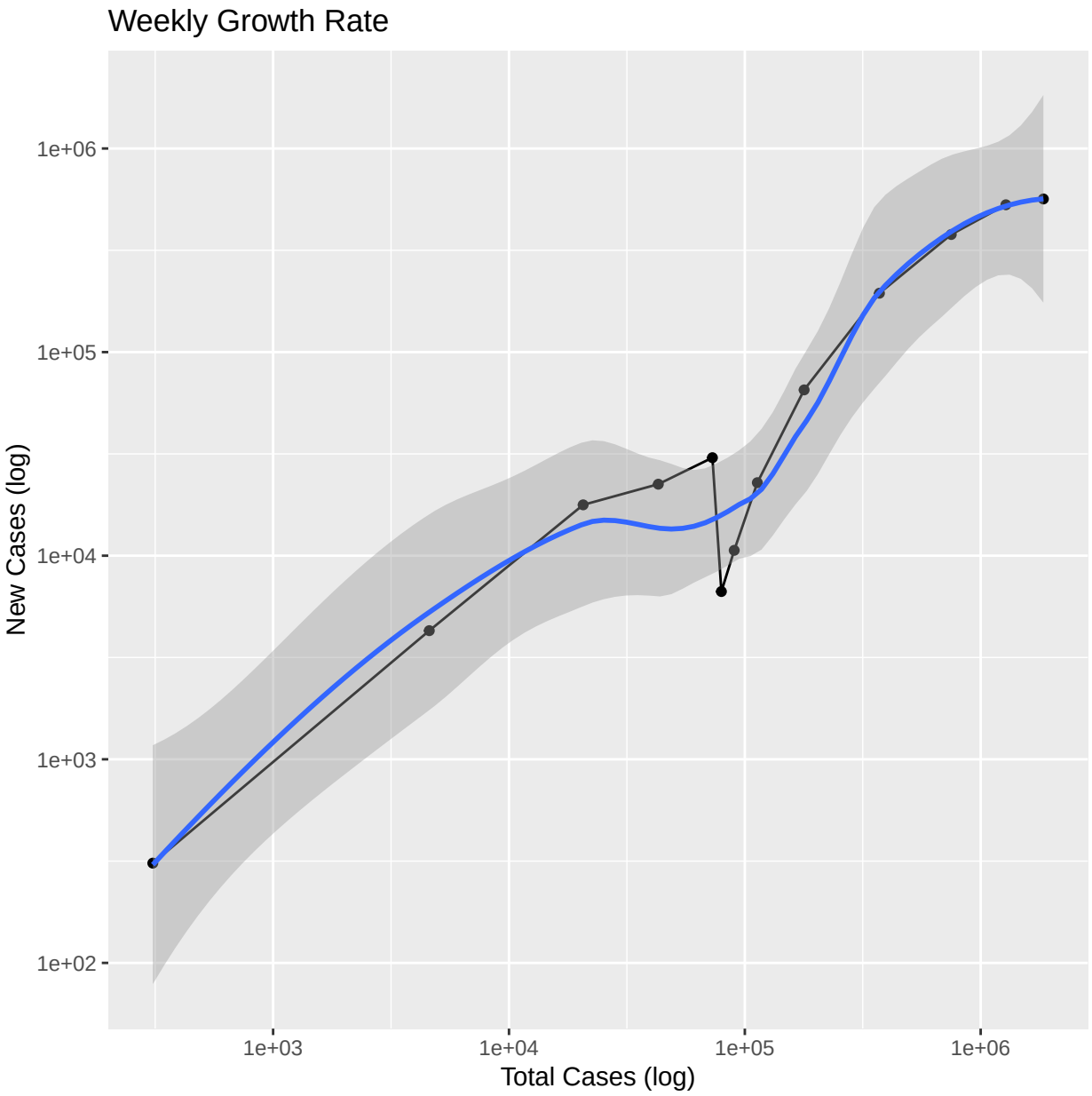


Figure 4: weekly growth rate

Figure 5: Another look at growth

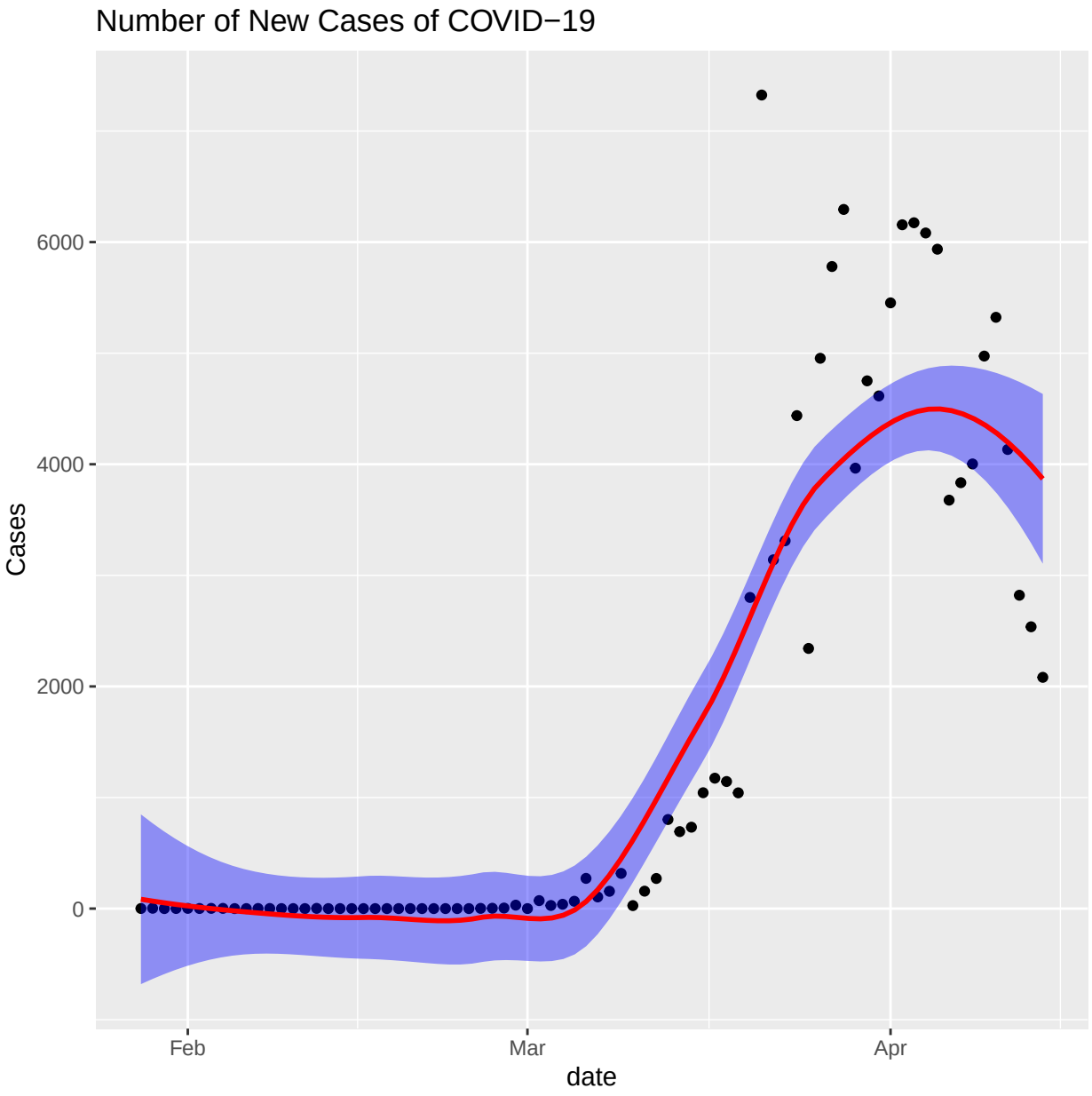


Figure 6: Epi curve 1

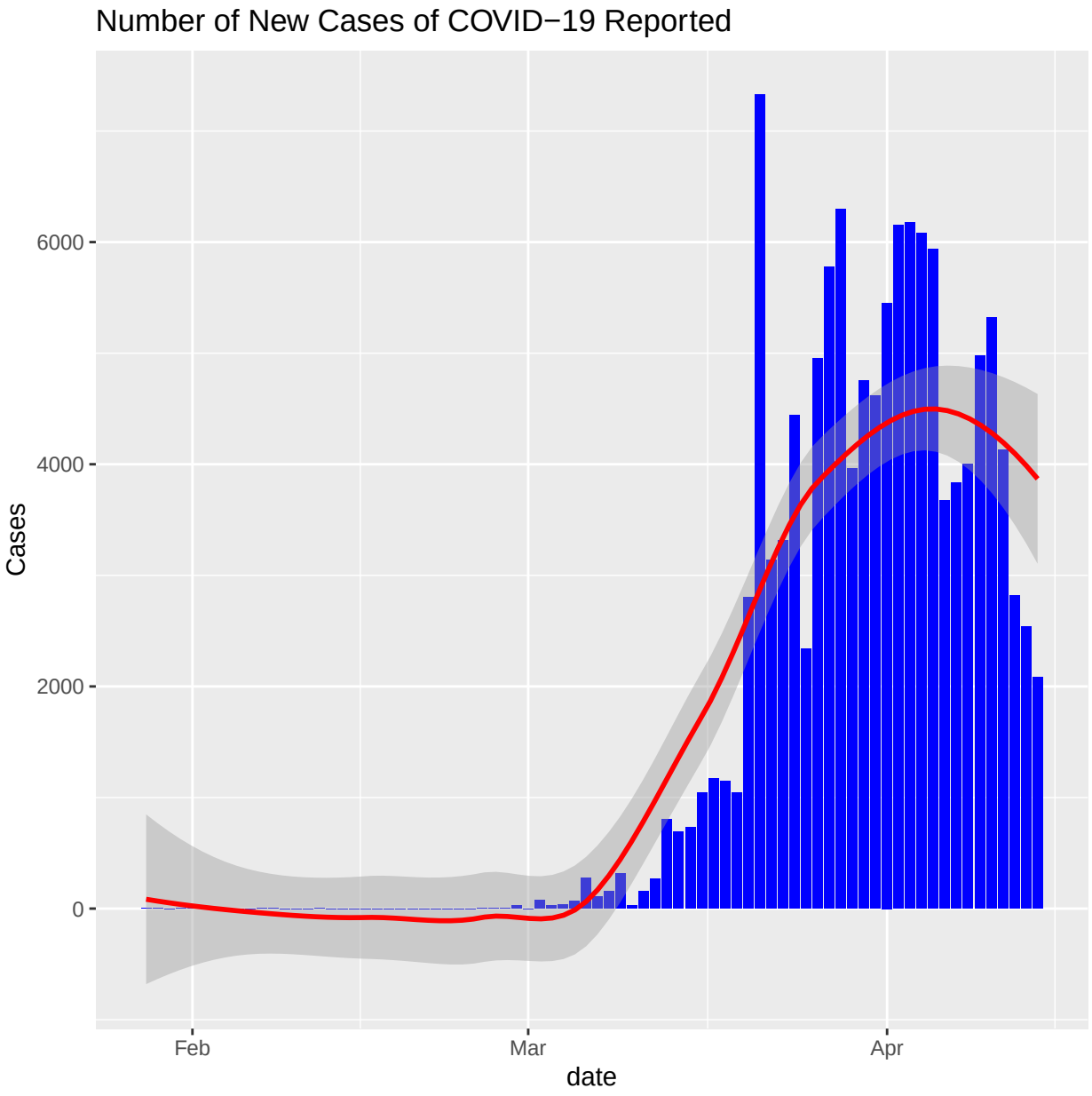


Figure 7: Epi curve 2, traditional

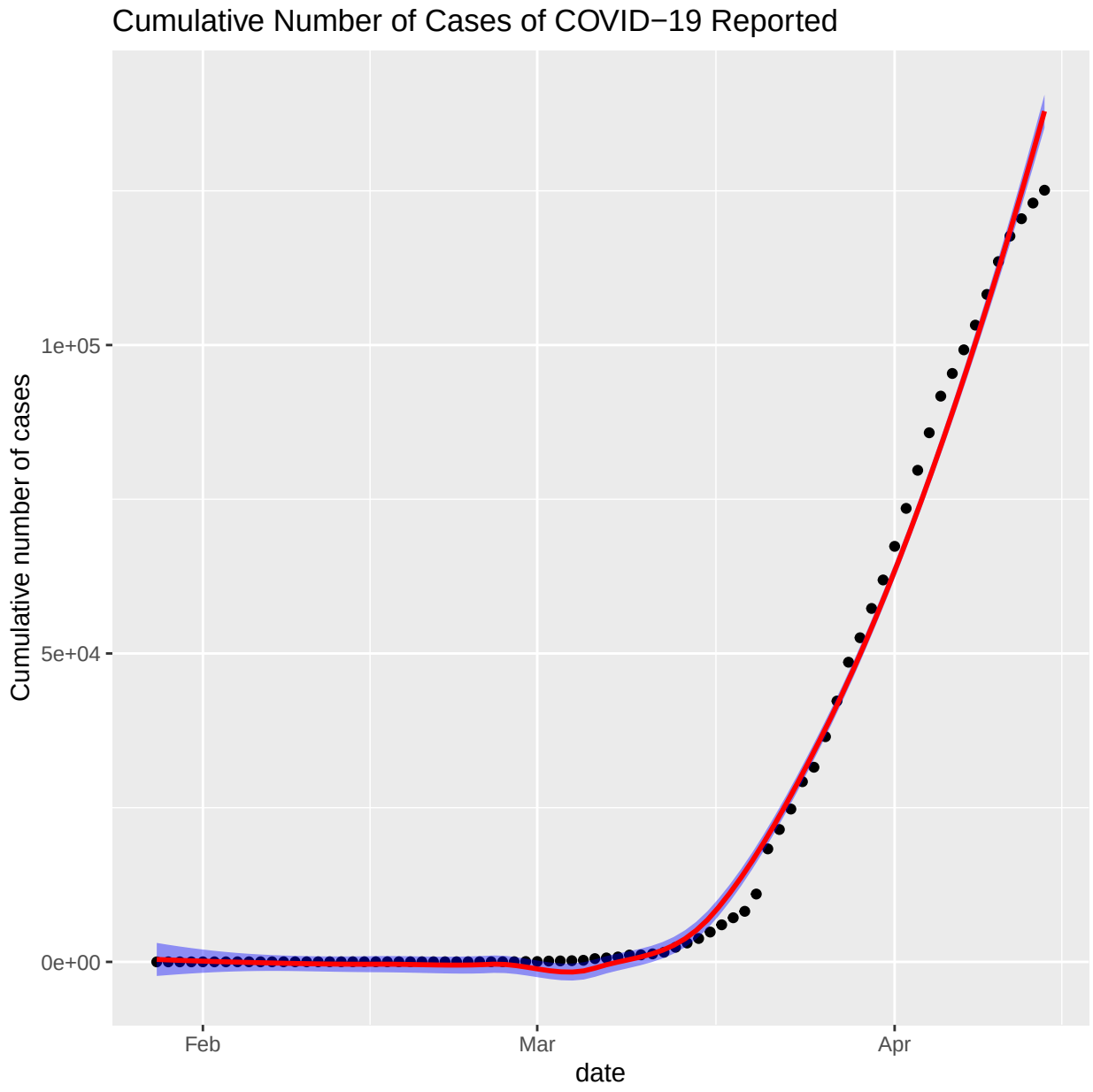


Figure 8: Cumulative cases

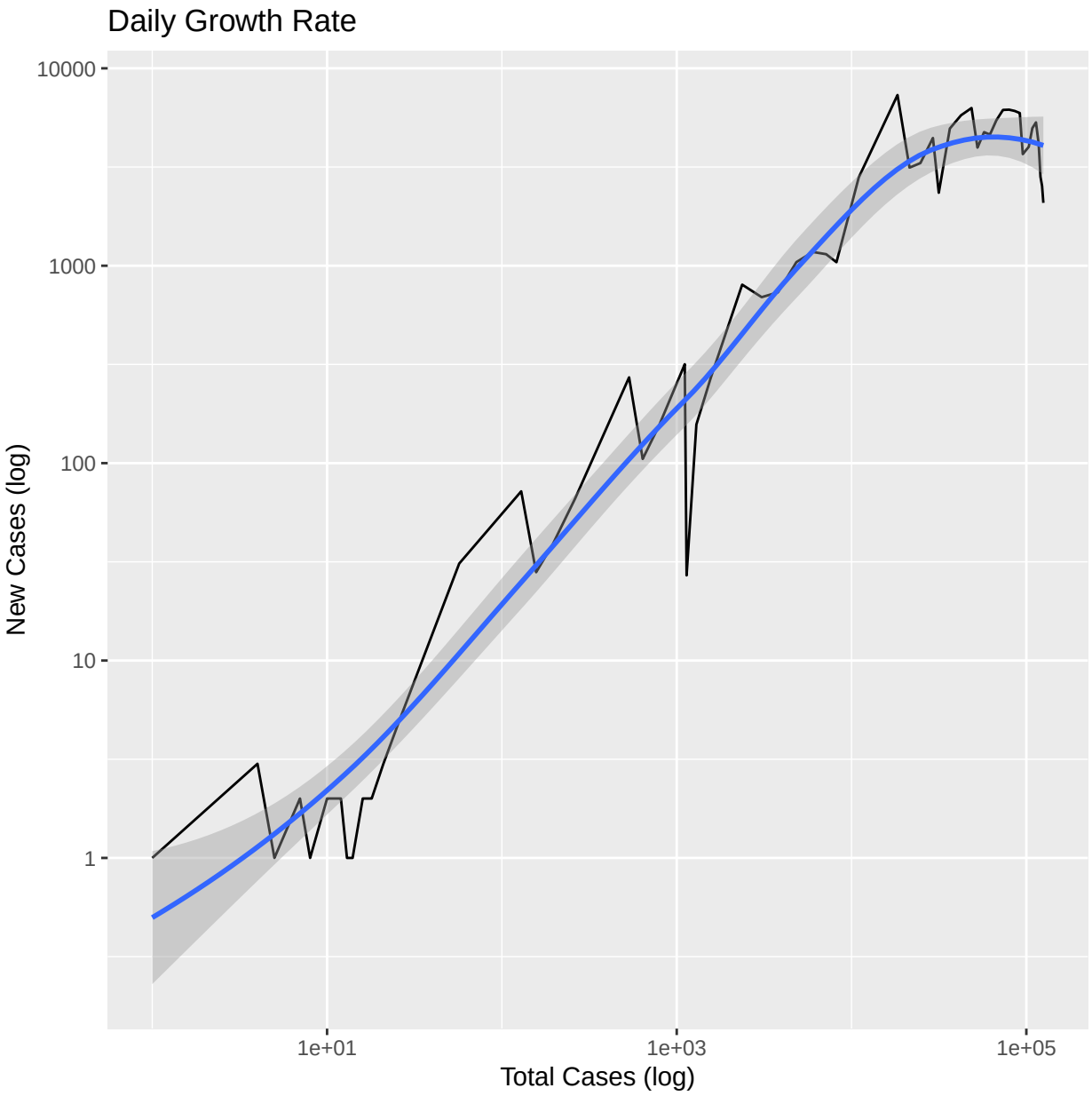


Figure 9: Growth Rate

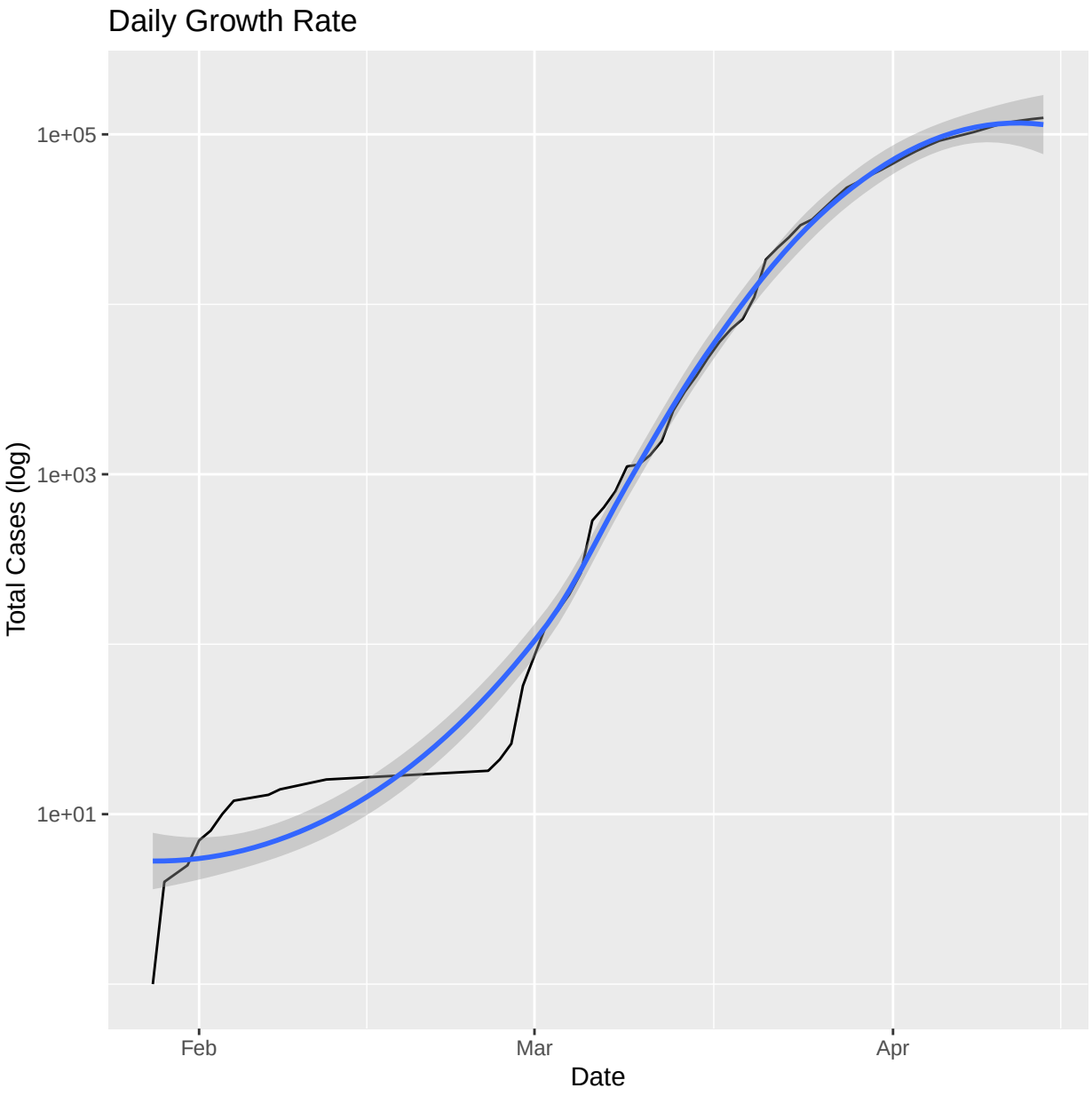


Figure 10: Another look at growth

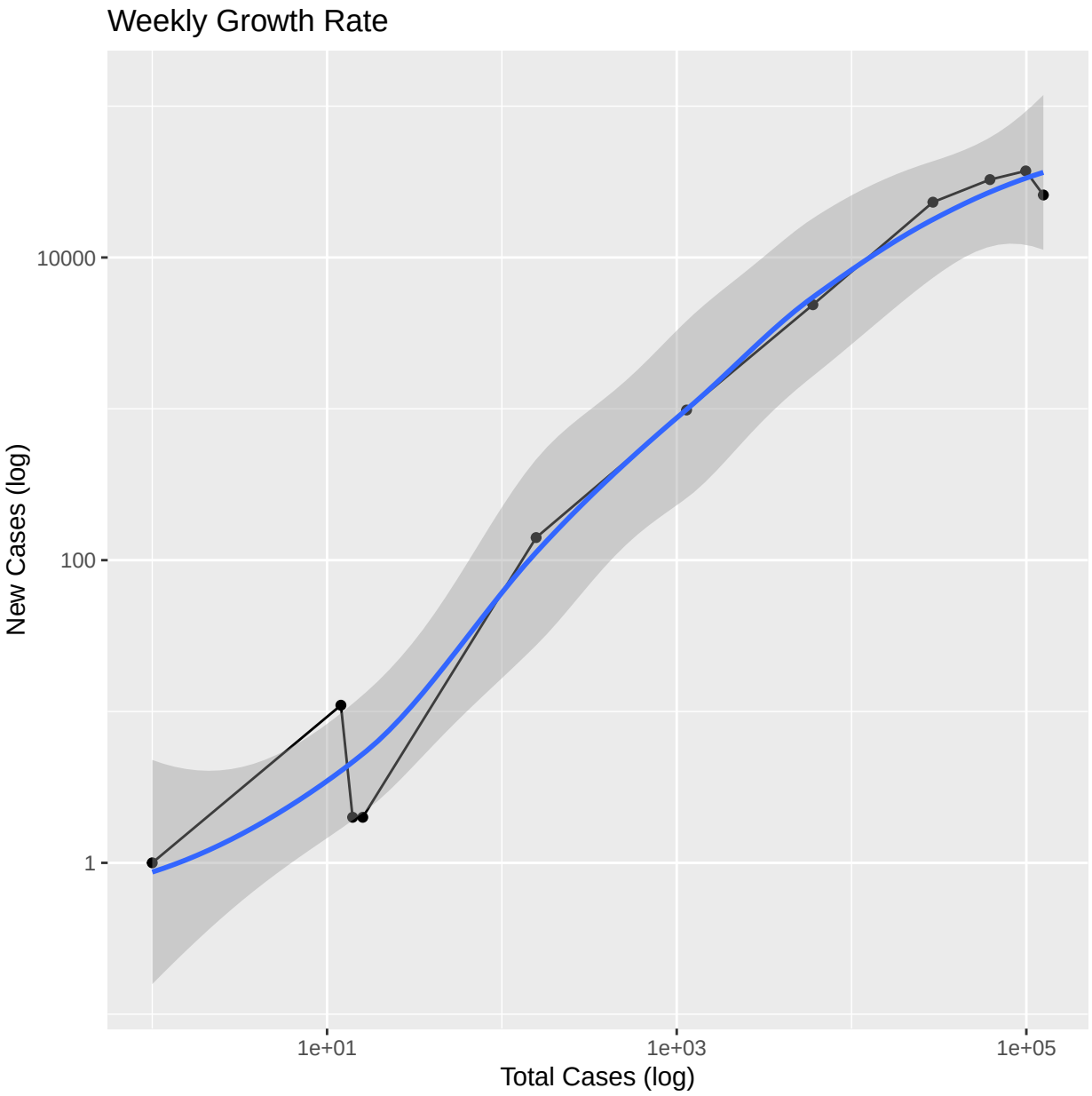


Figure 11: Weekly growth rate

Figure 12: Another look at growth

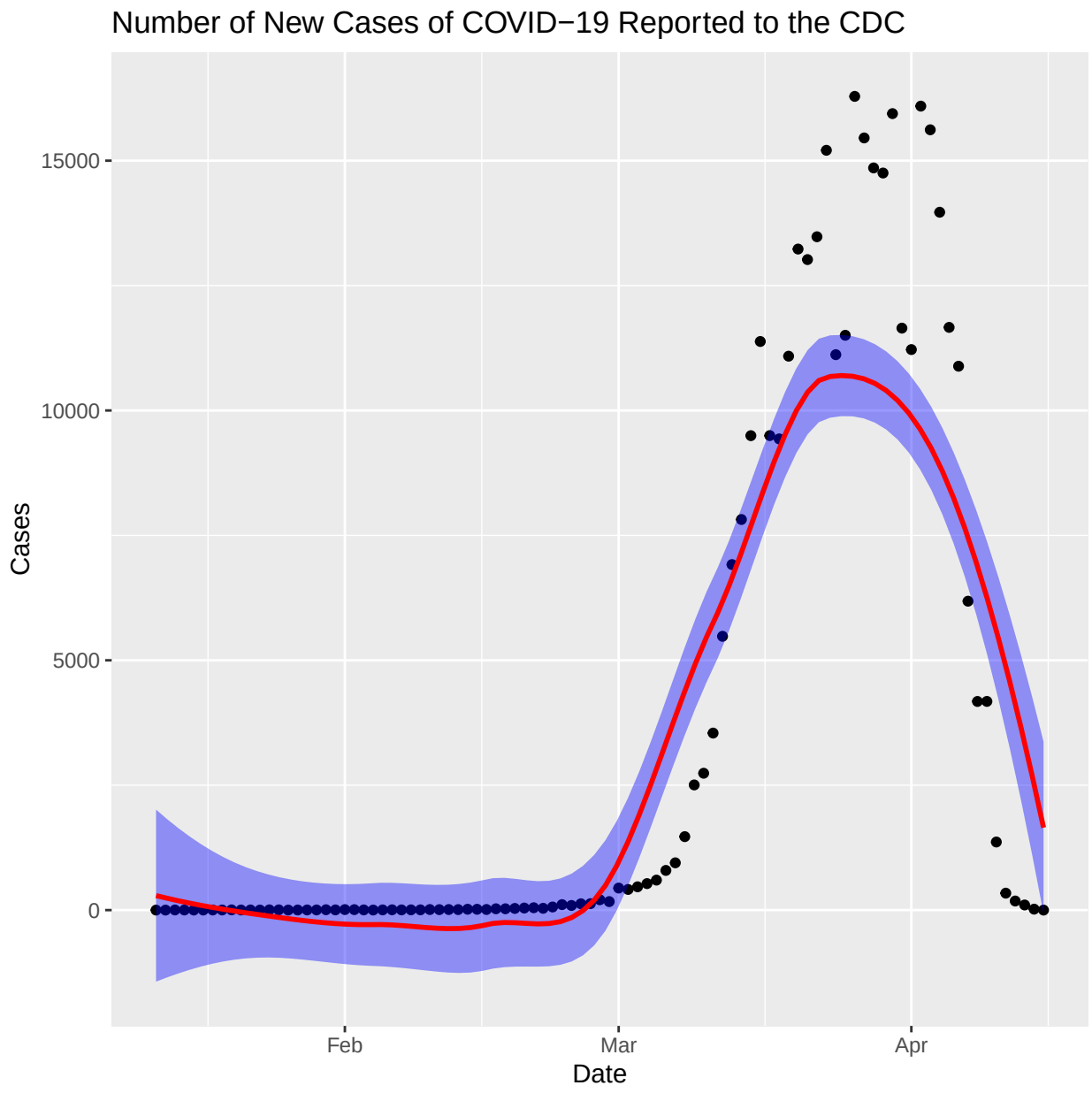


Figure 13: Epi curve 1

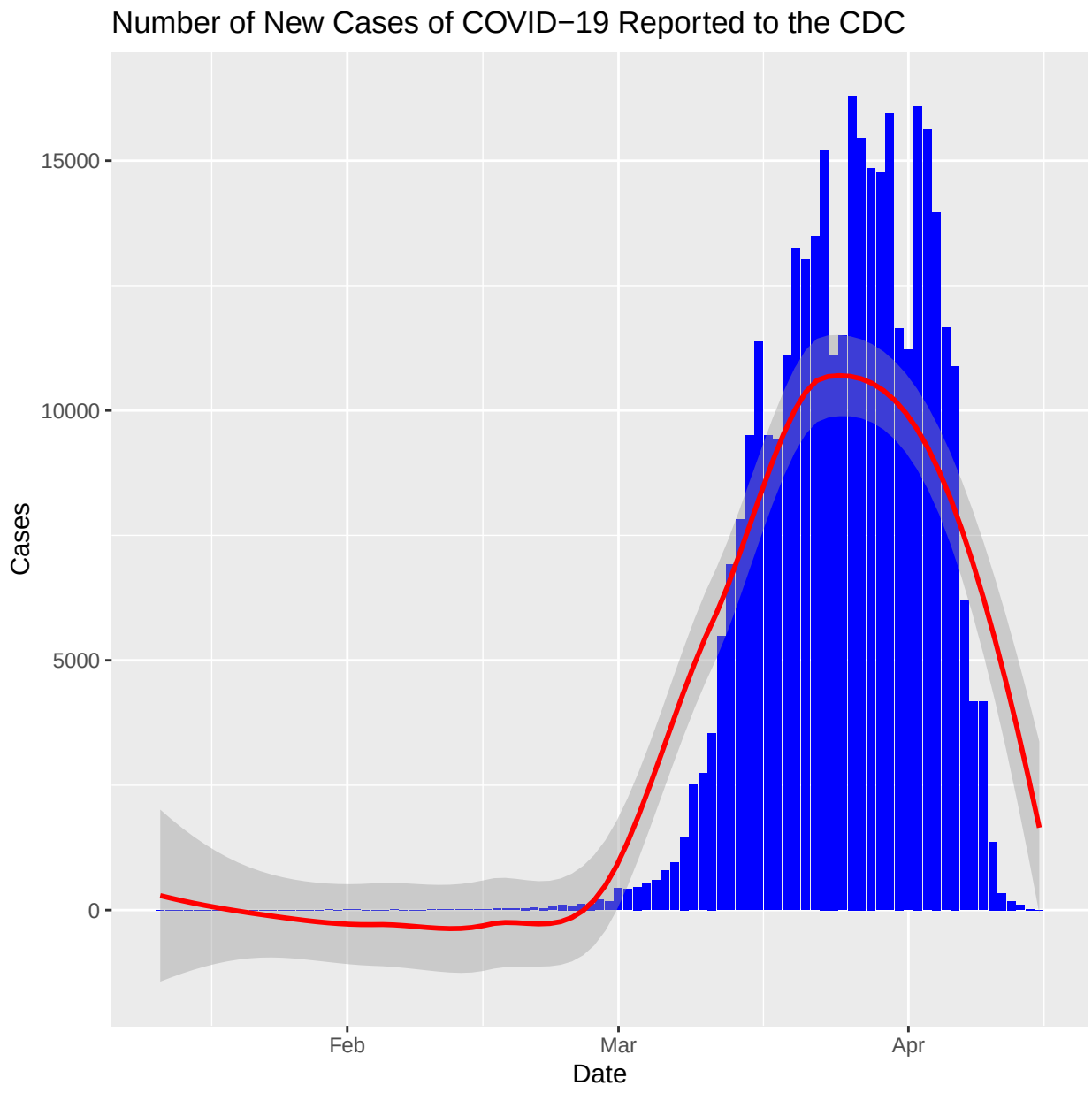


Figure 14: Epi curve 2, traditional

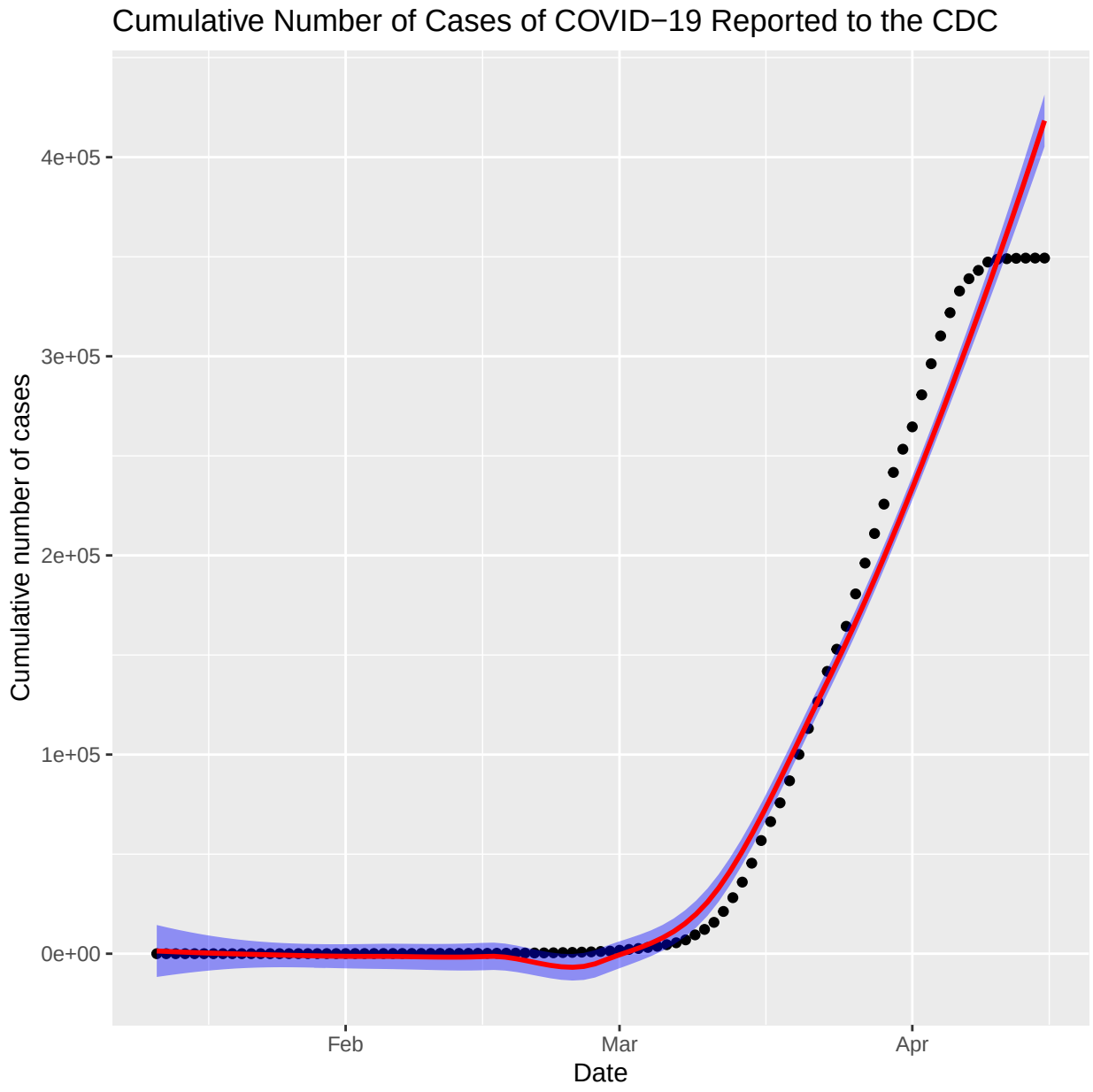


Figure 15: Cumulative cases

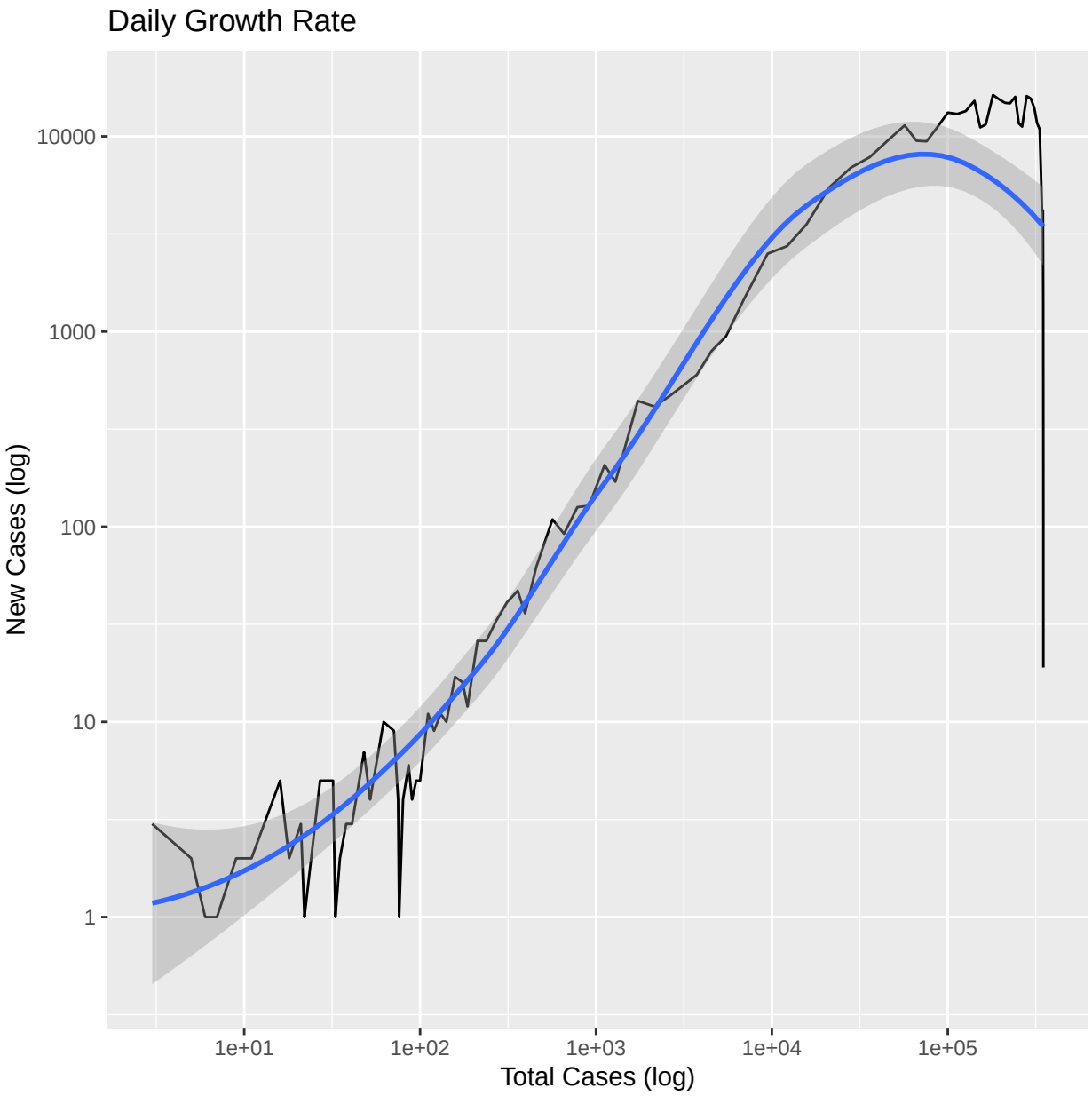


Figure 16: Growth Rate

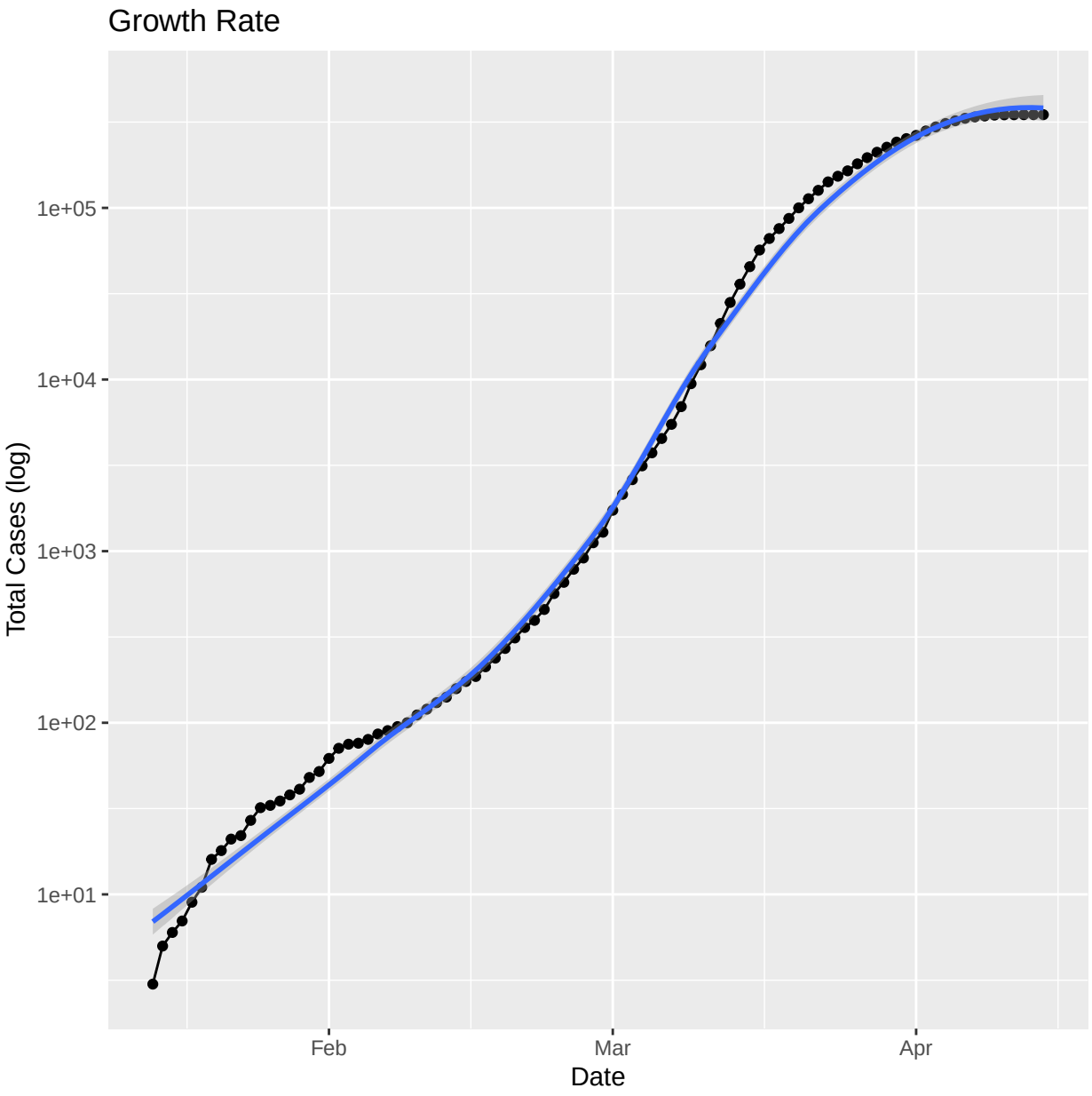


Figure 17: Another look at growth

```
## Warning: Transformation introduced infinite values in continuous y-axis
## Warning: Removed 1 rows containing non-finite values (stat_smooth).
```

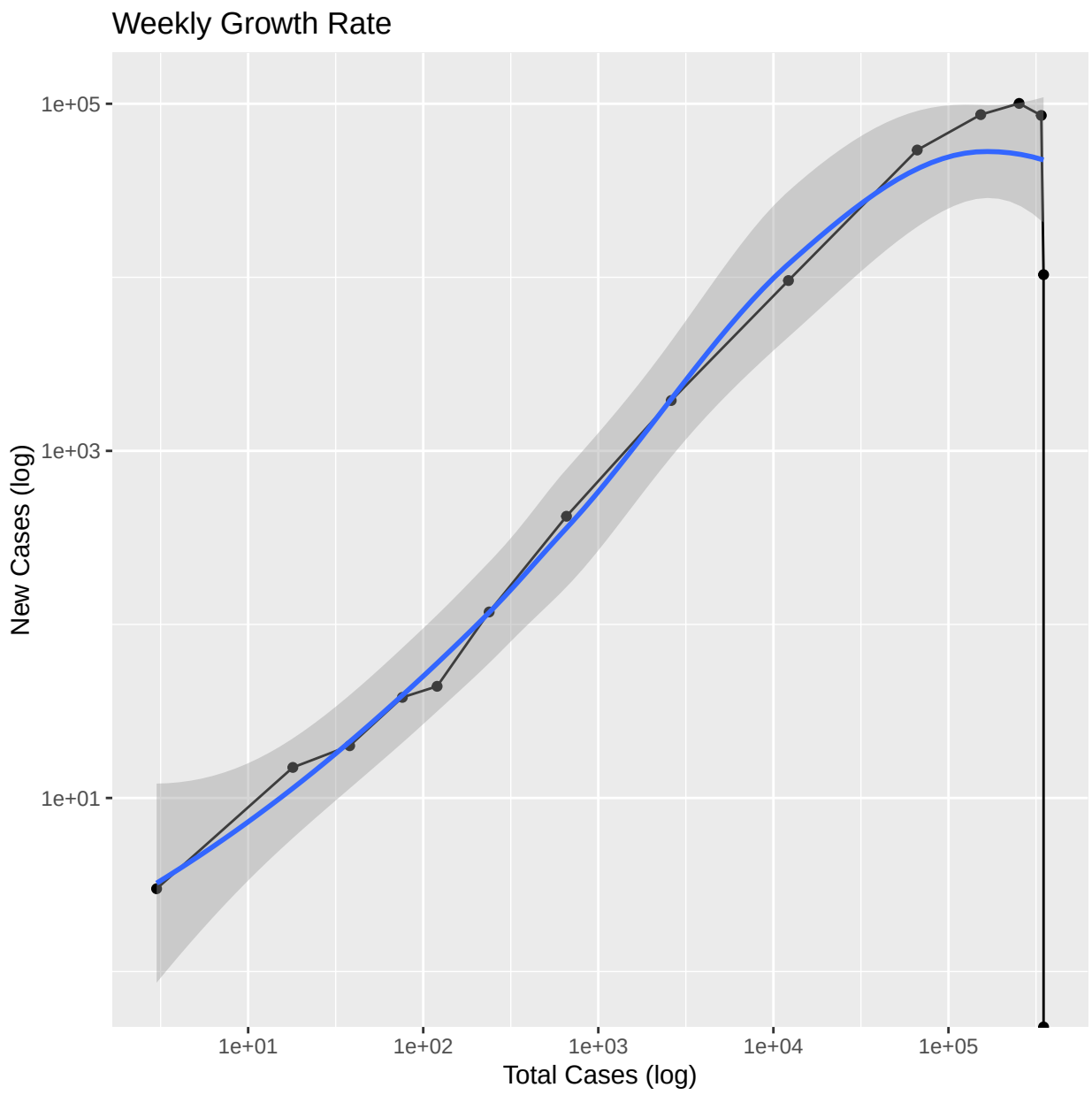


Figure 18: weekly growth rate

```
## Warning: Transformation introduced infinite values in continuous y-axis
## Warning: Transformation introduced infinite values in continuous y-axis
## Warning: Transformation introduced infinite values in continuous y-axis
## Warning: Removed 1 rows containing non-finite values (stat_smooth).
```

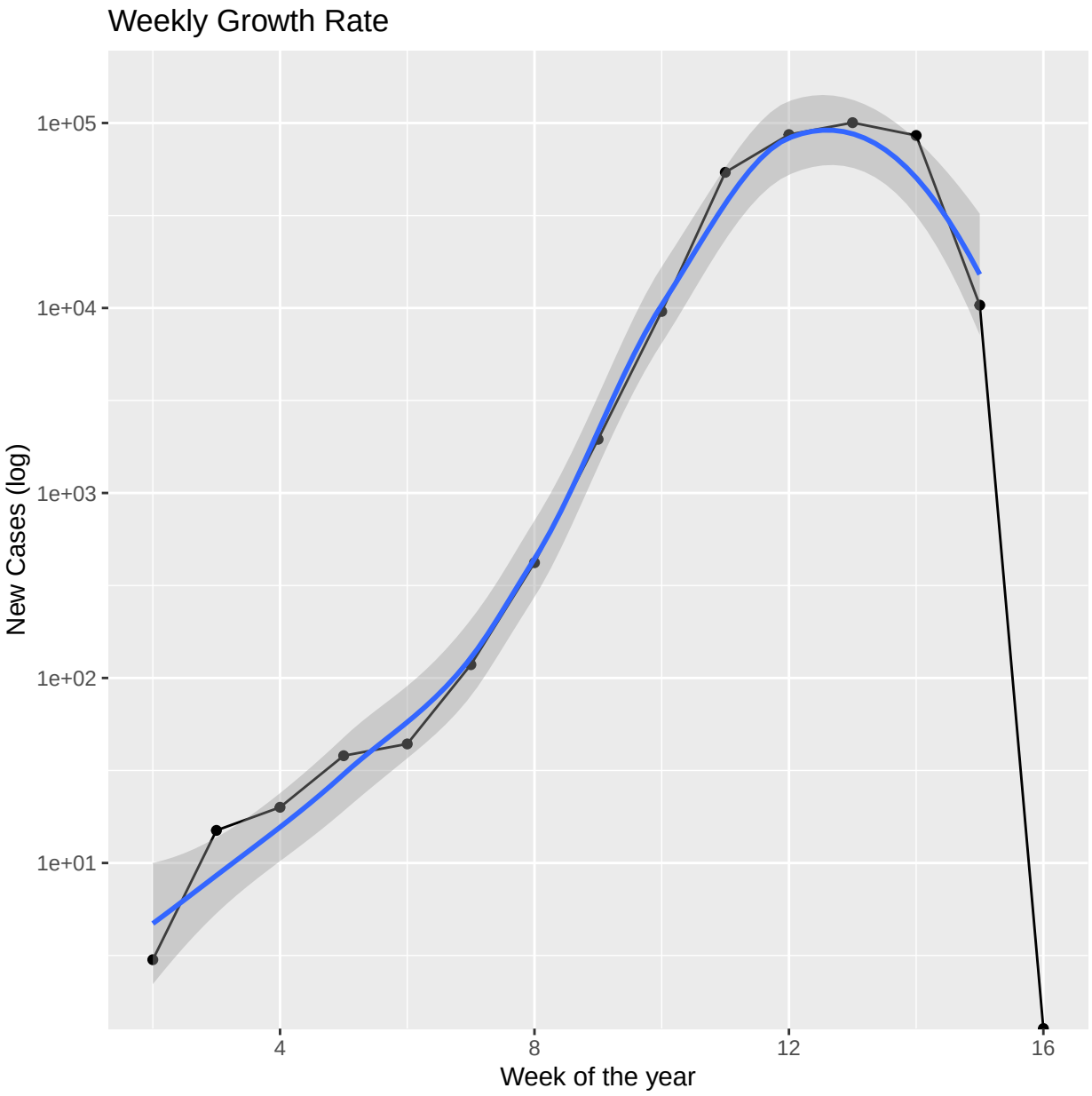


Figure 19: Another look at growth

Filtered to use only "complete data"

Remove dates on or after 4 April as this data may not be completely reported

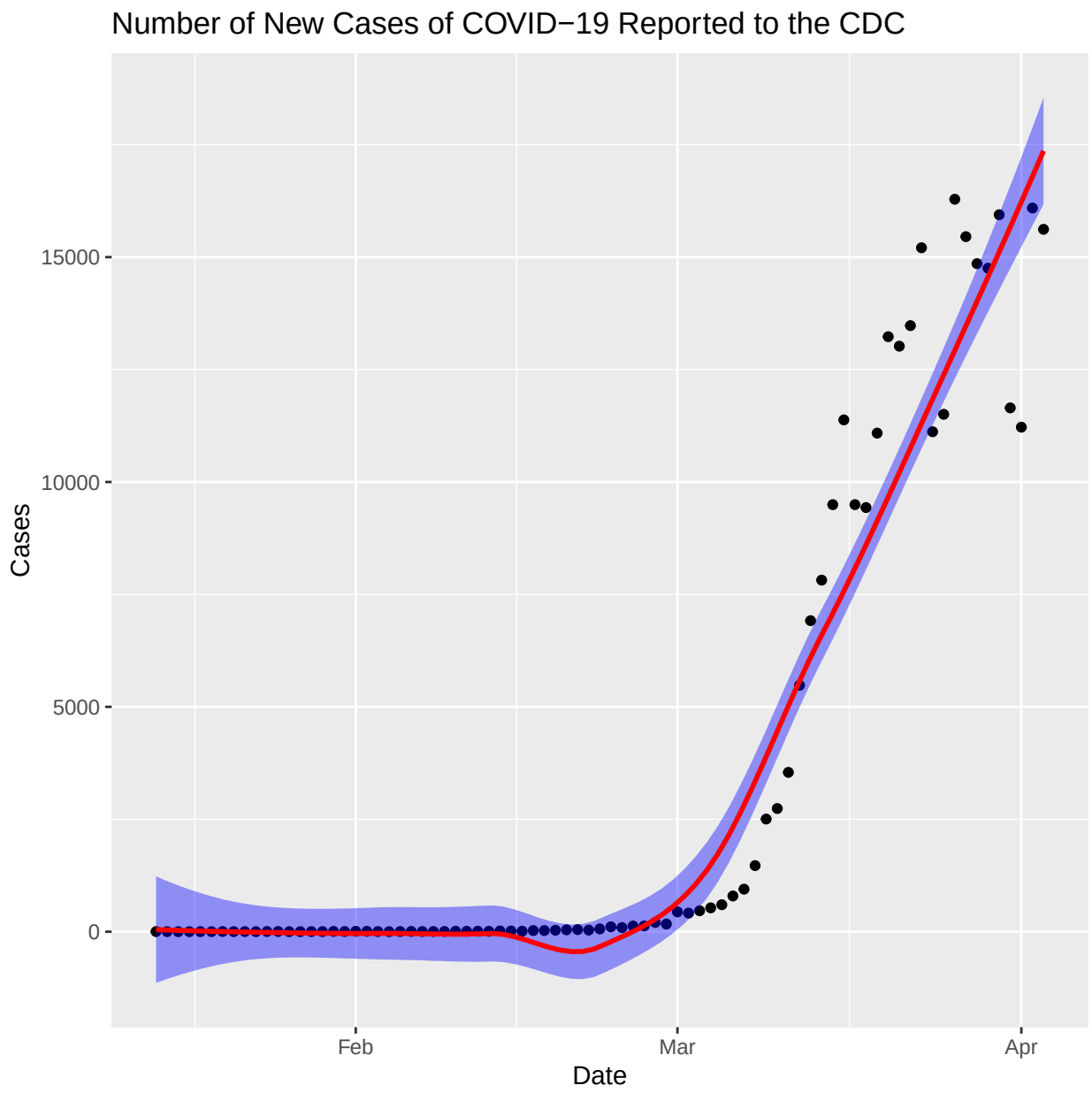


Figure 20: Epi curve 1

Using WHO data for US

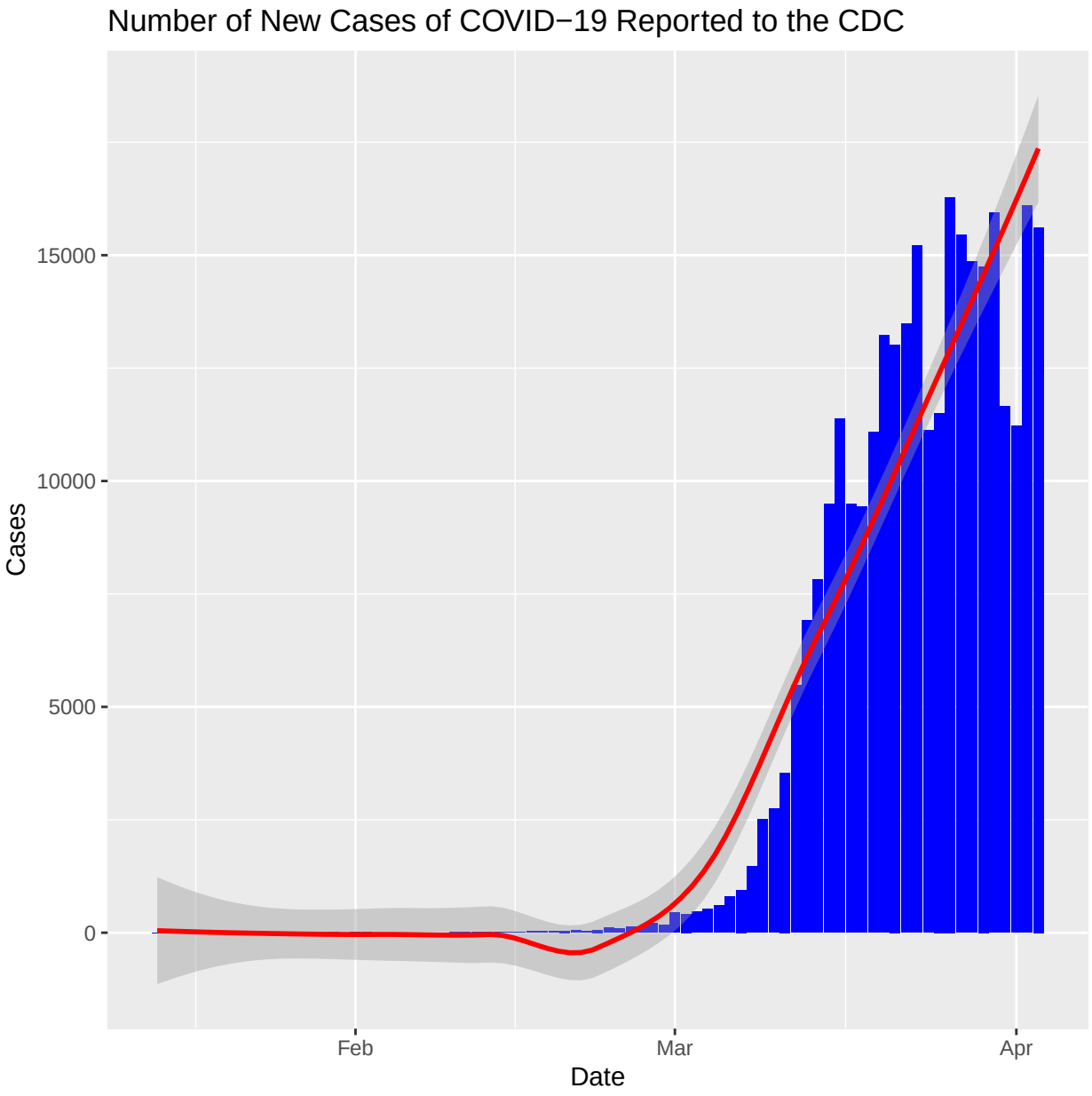


Figure 21: Epi curve 2, traditional

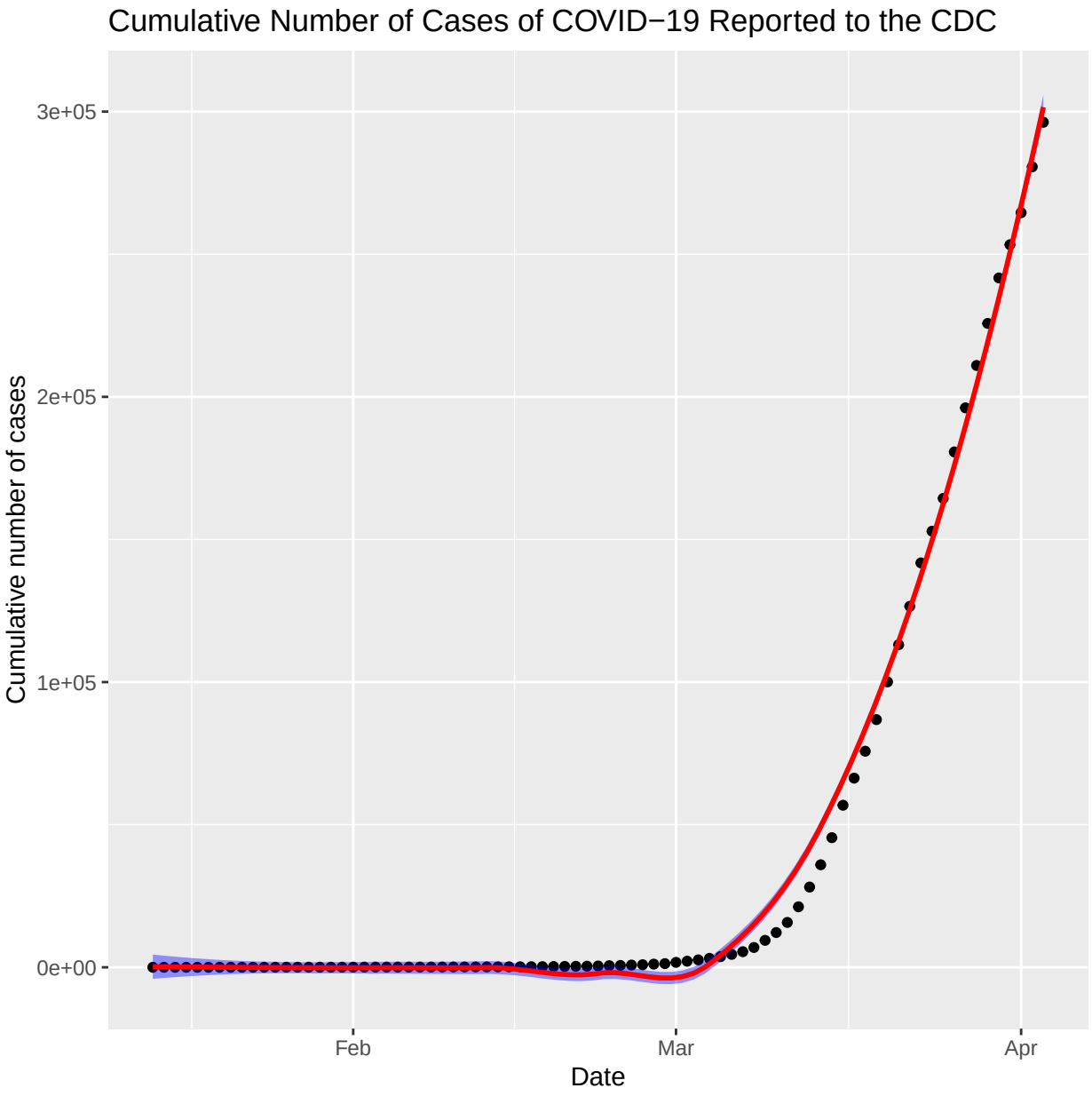


Figure 22: Cumulative cases

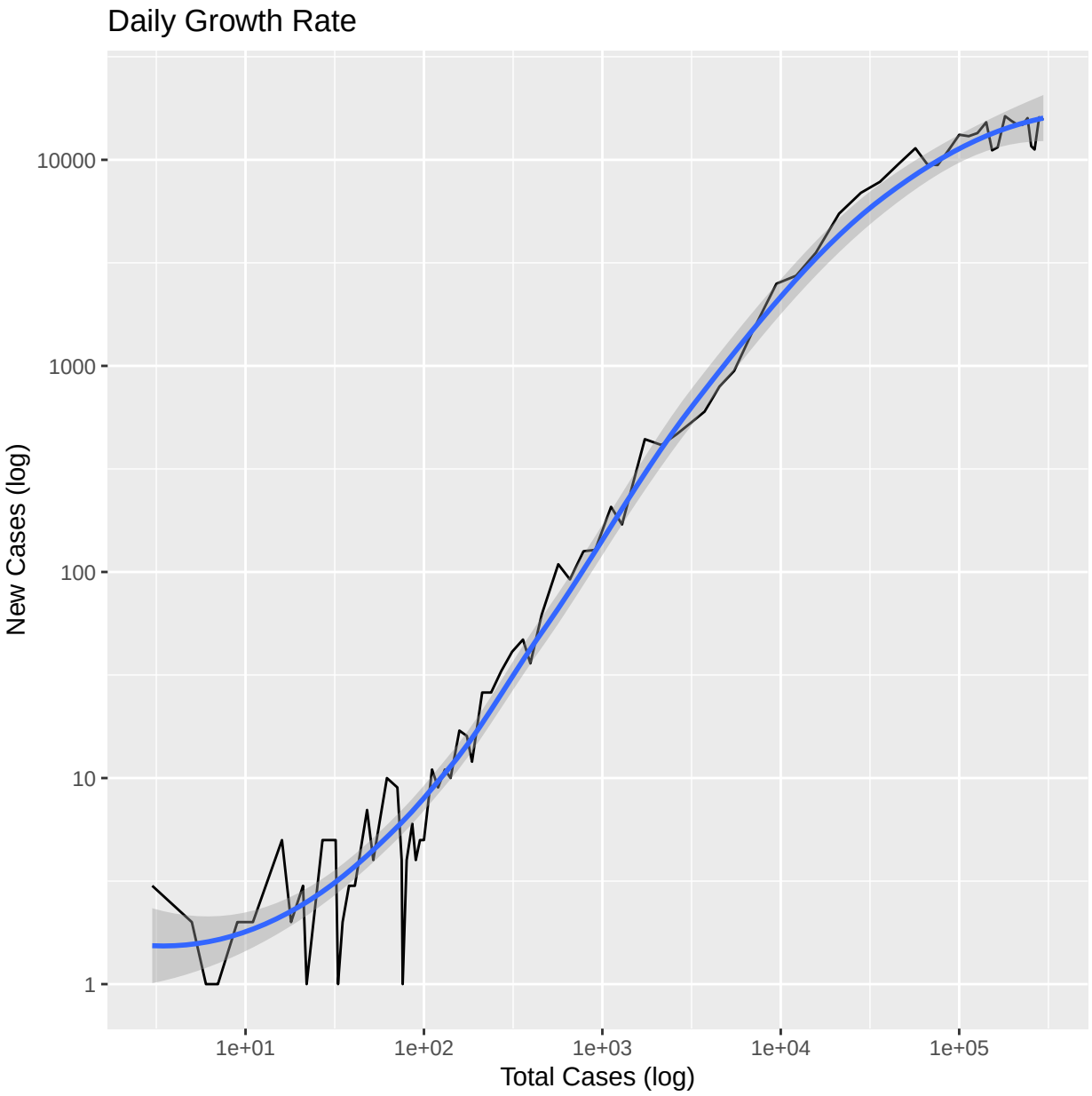


Figure 23: Growth Rate

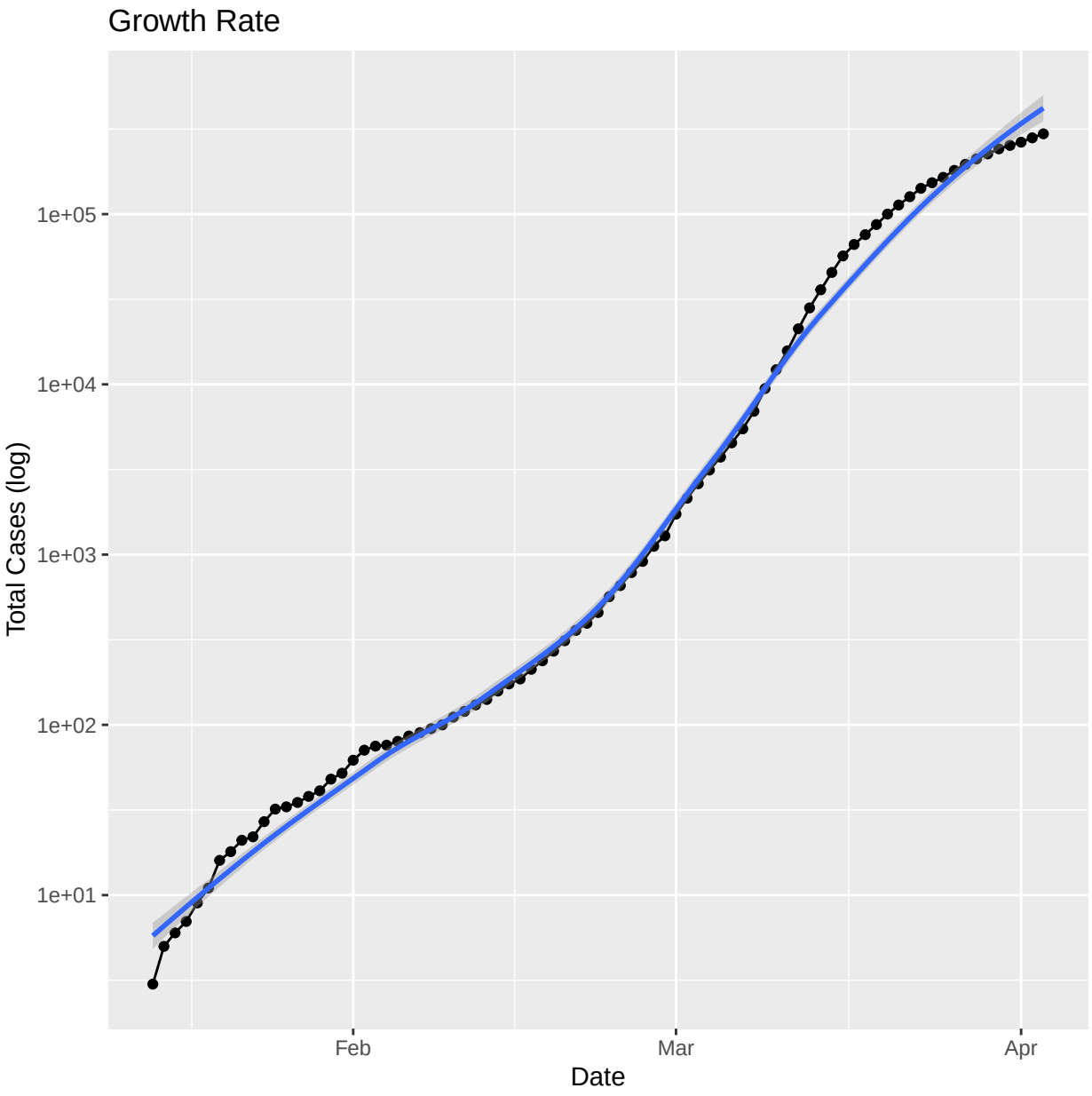


Figure 24: Another look at growth

Figure 25: weekly growth rate

Figure 26: Another look at growth

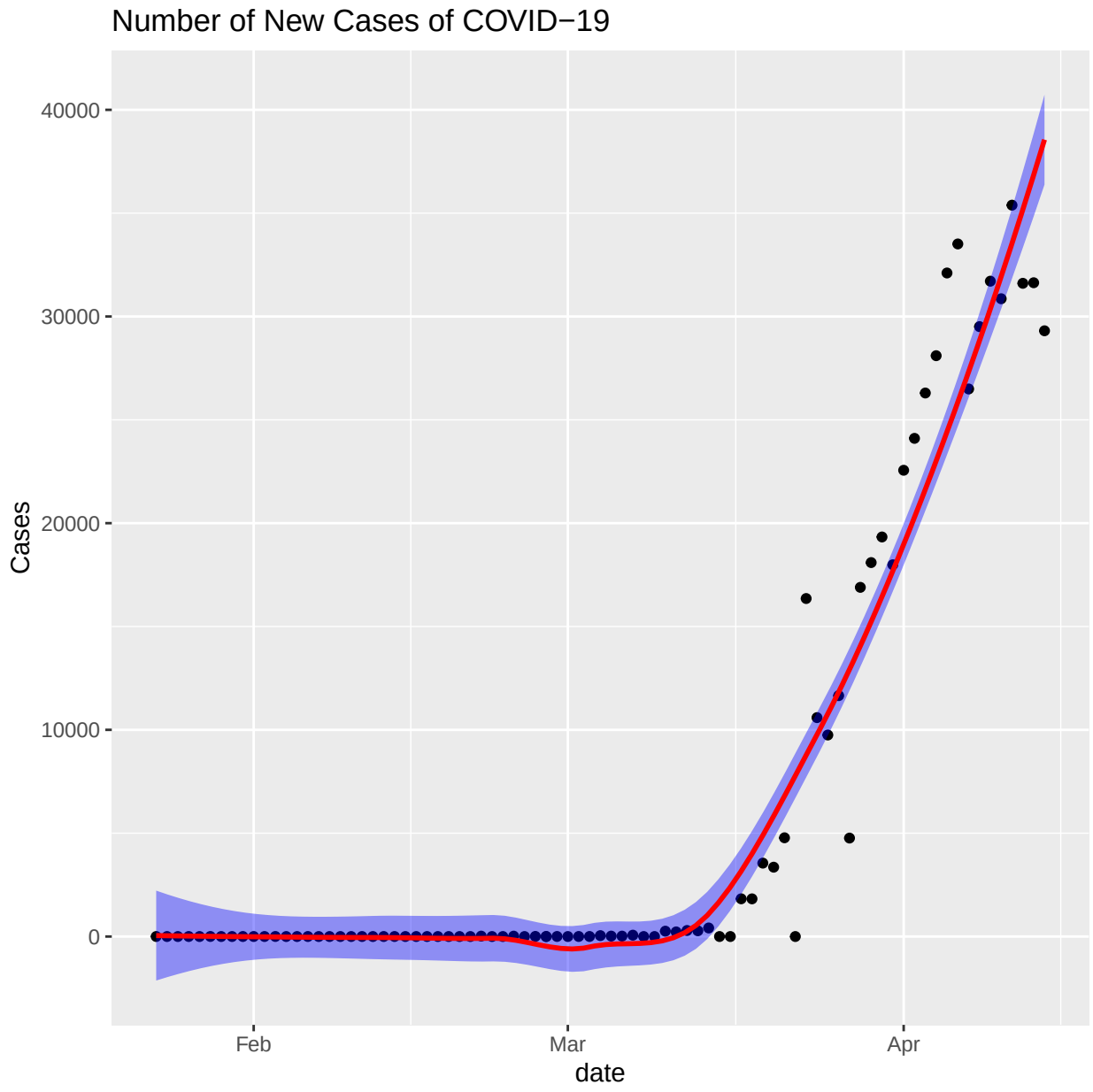


Figure 27: Epi curve 1

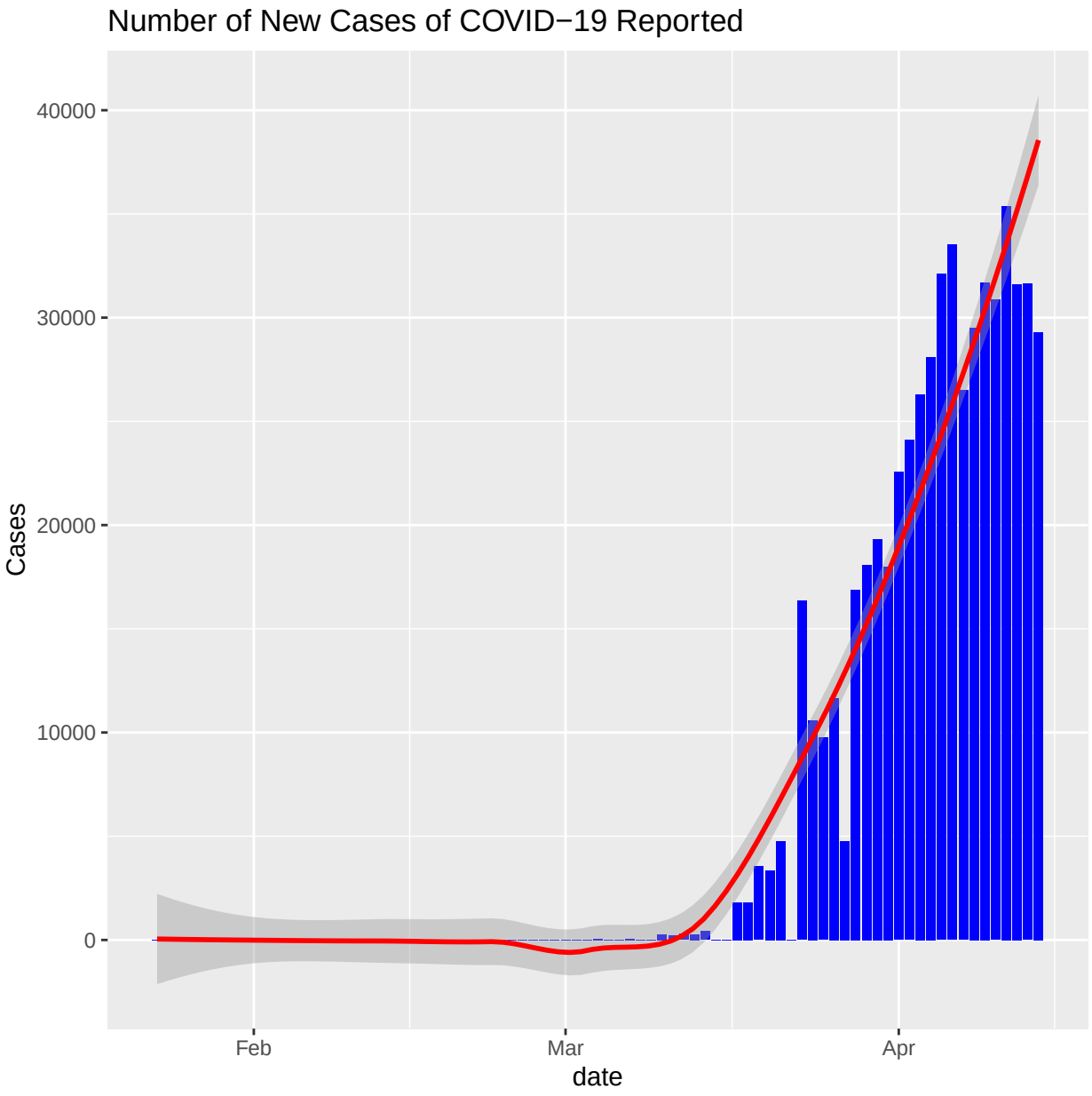


Figure 28: Epi curve 2, traditional

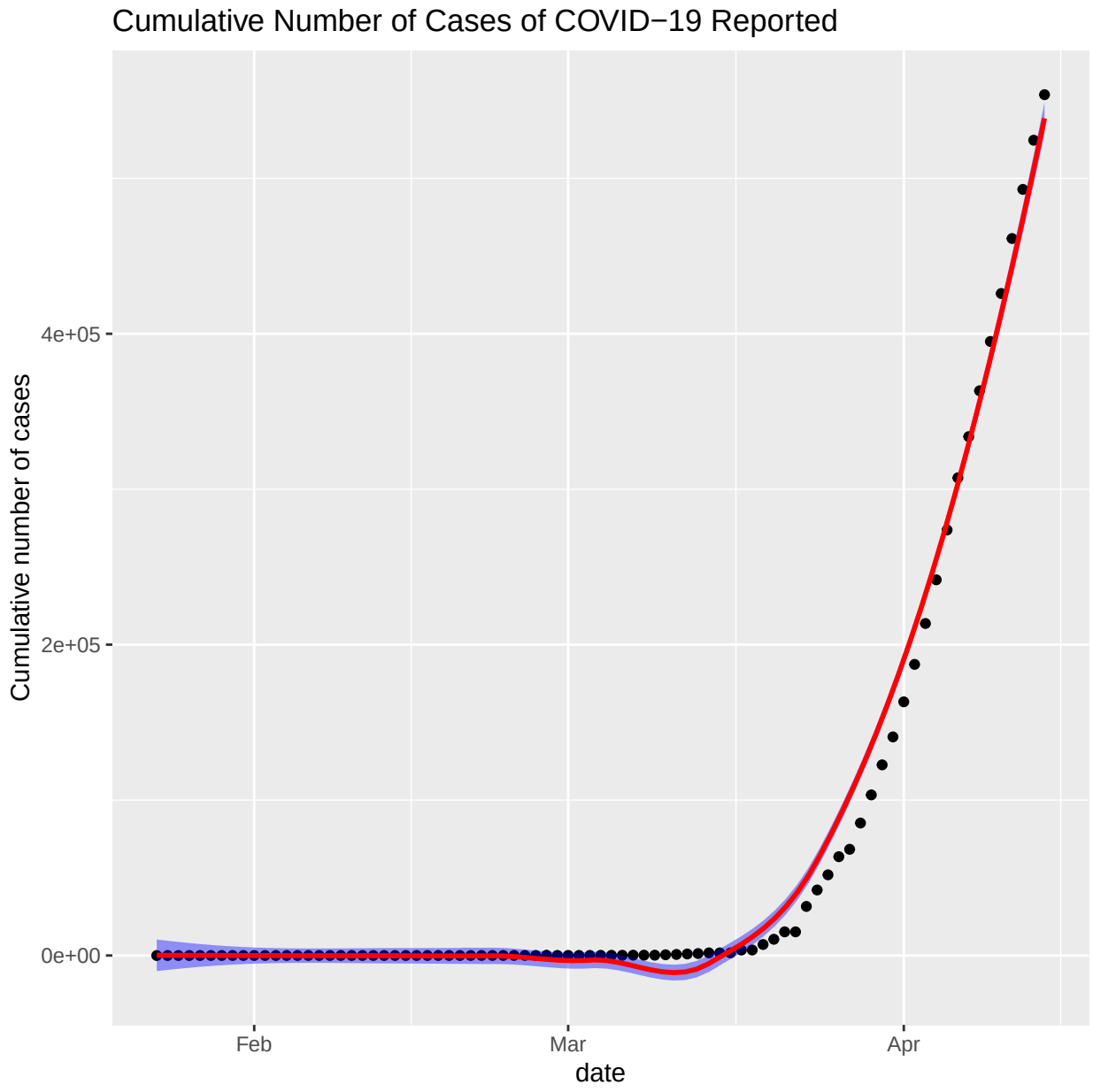


Figure 29: Cumulative cases

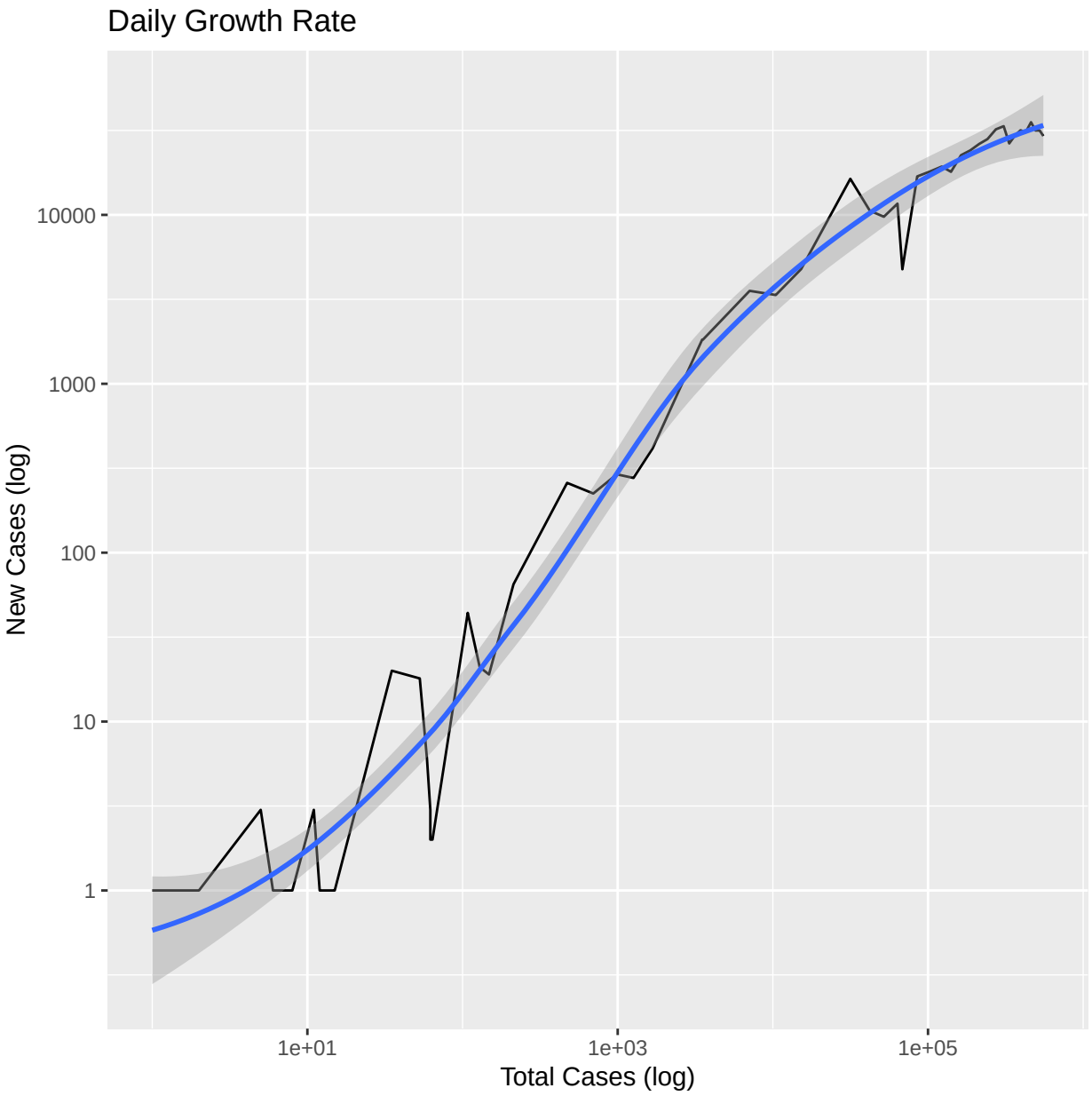


Figure 30: Growth Rate

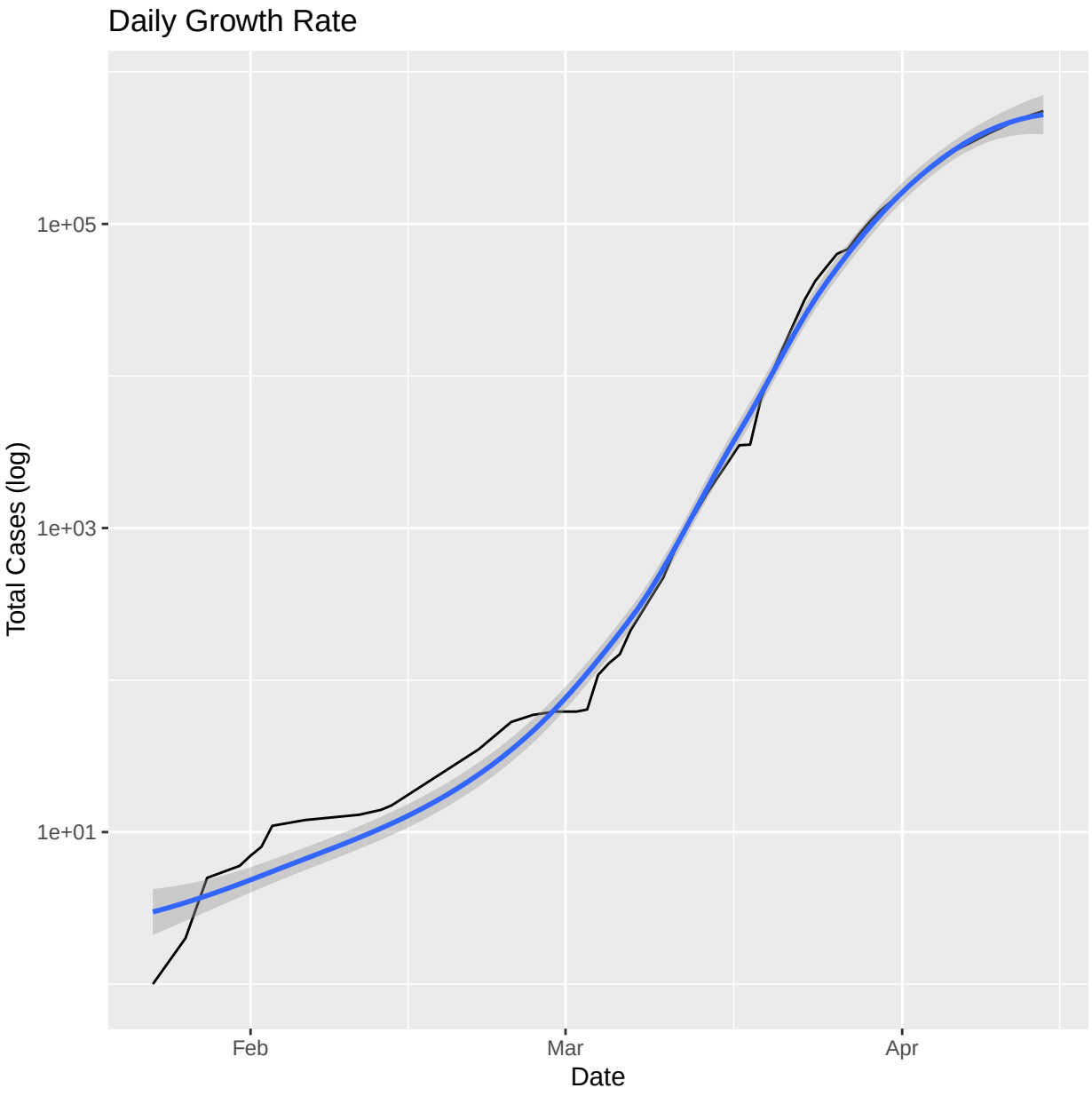


Figure 31: Another look at growth

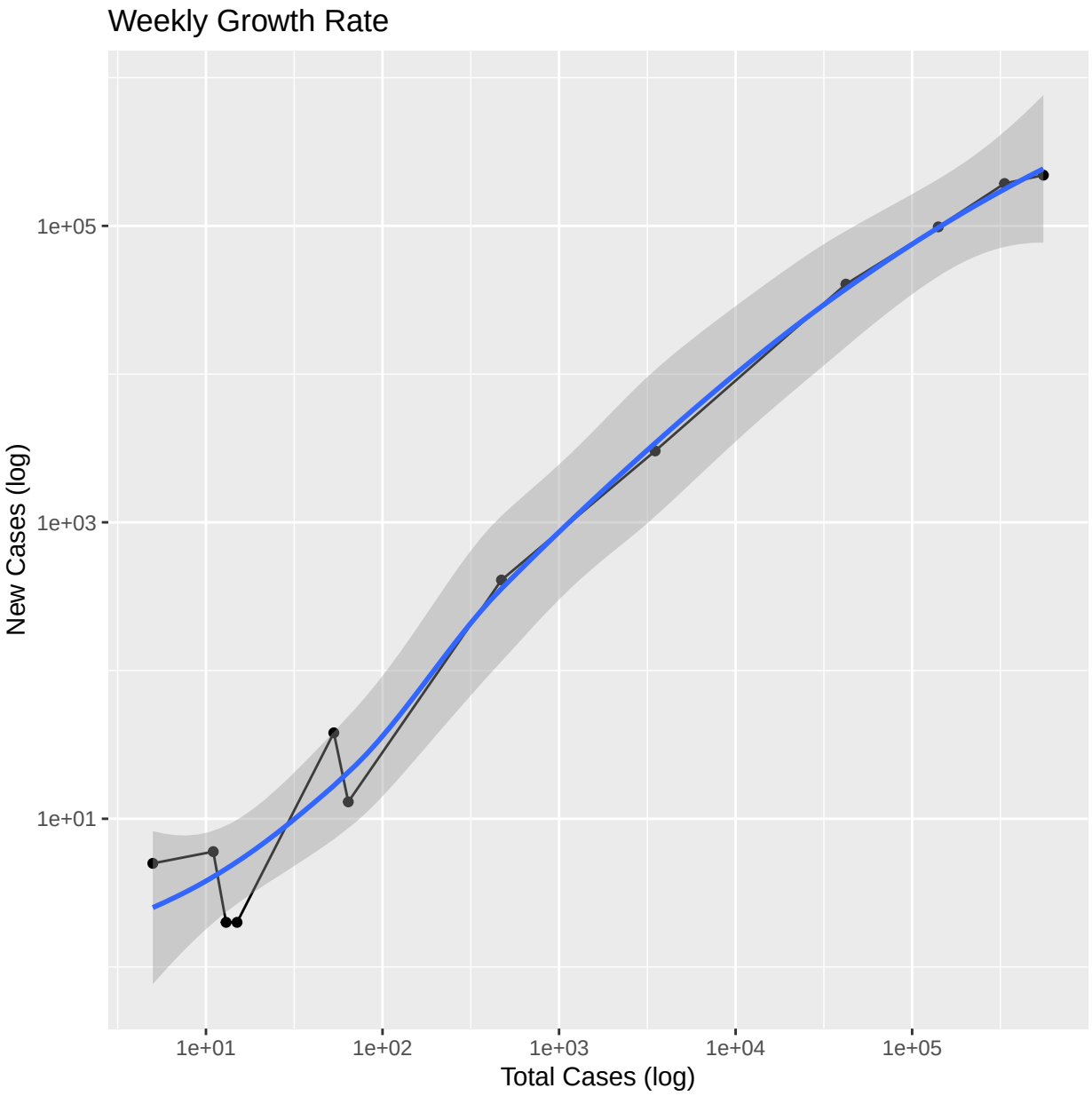


Figure 32: stable weekly growth rate

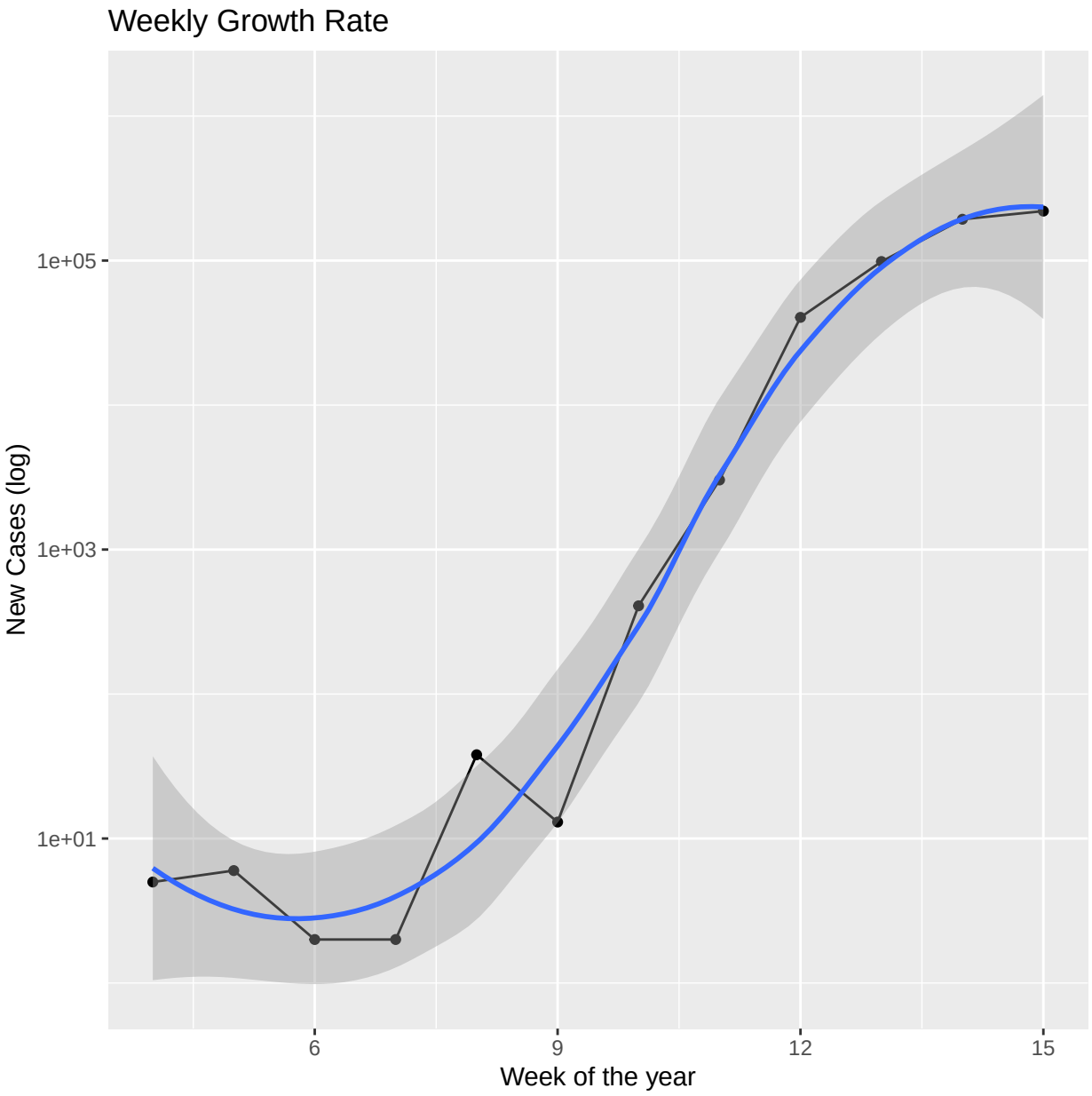


Figure 33: Another look at growth