Covid plots for family

April 08, 2020

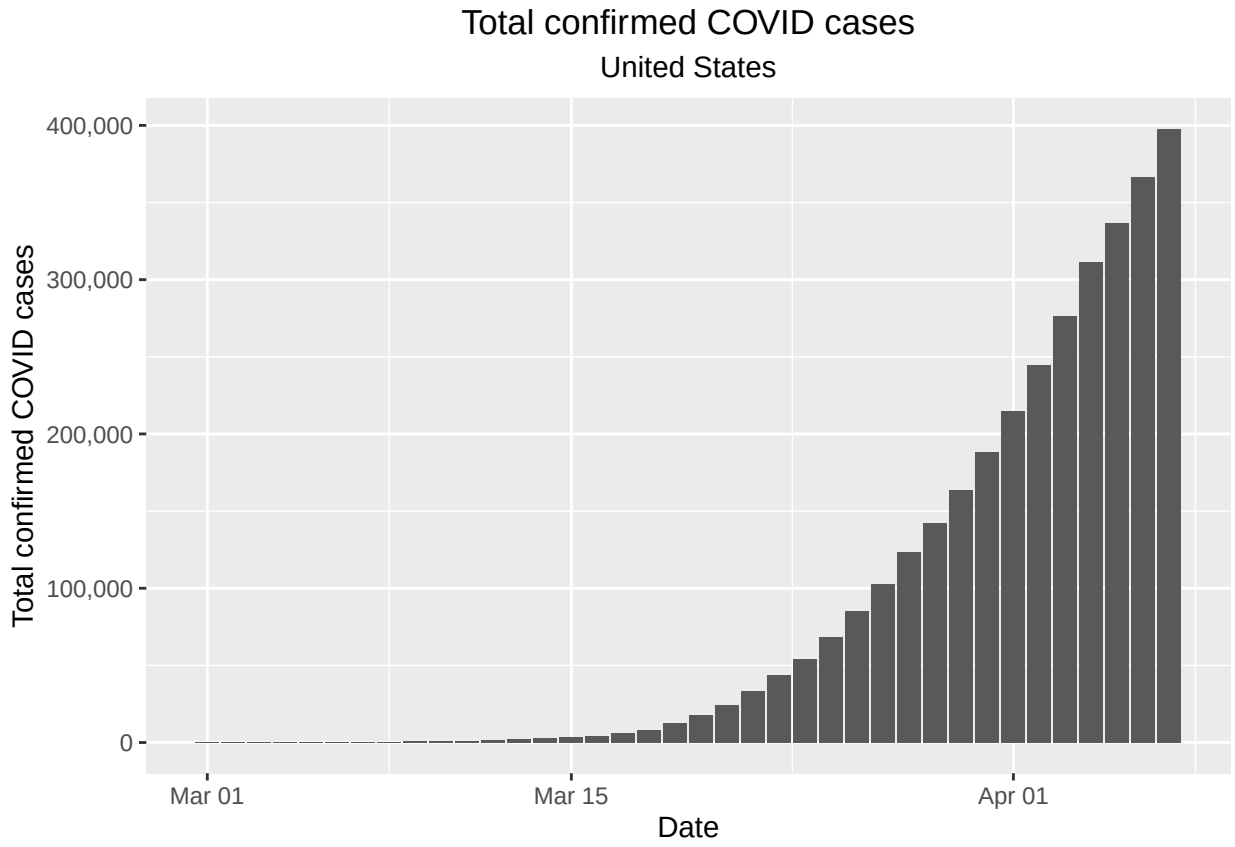
Contents

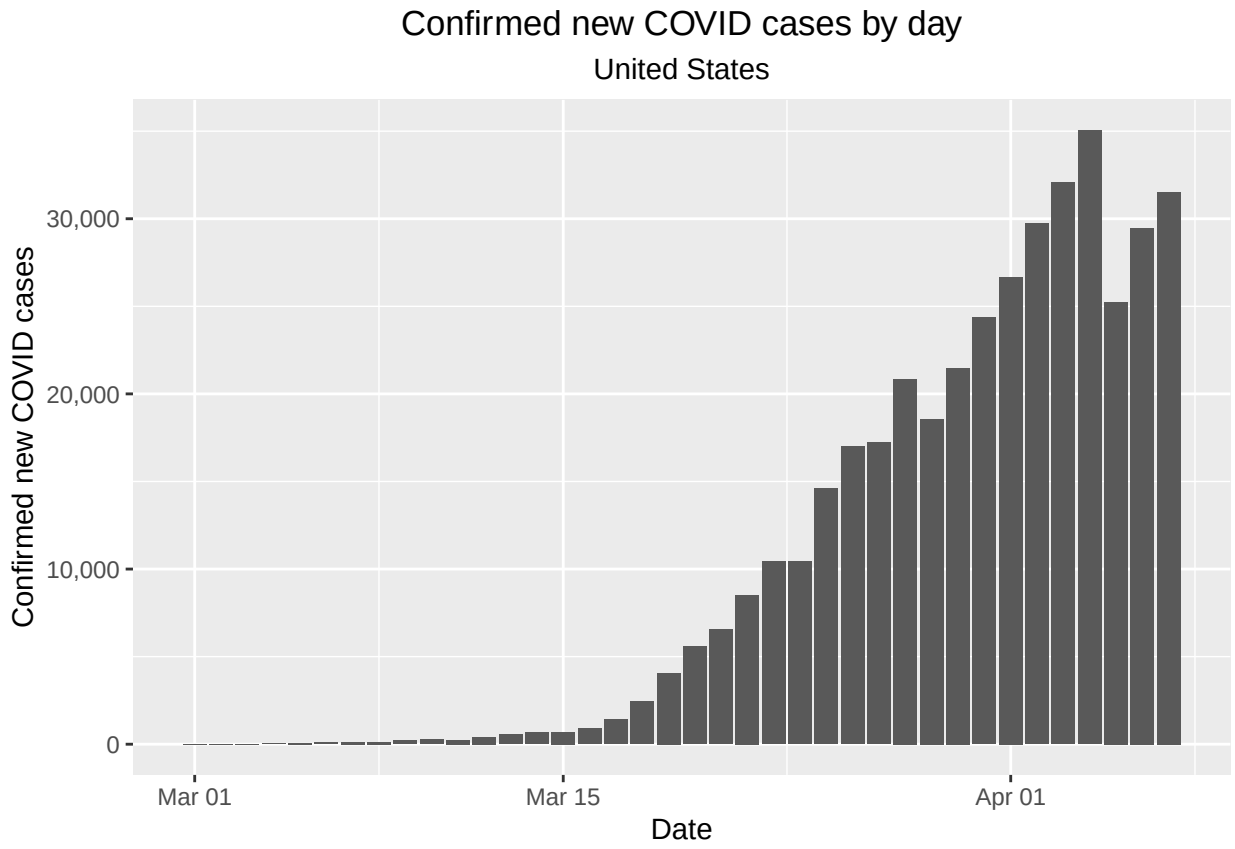
Background

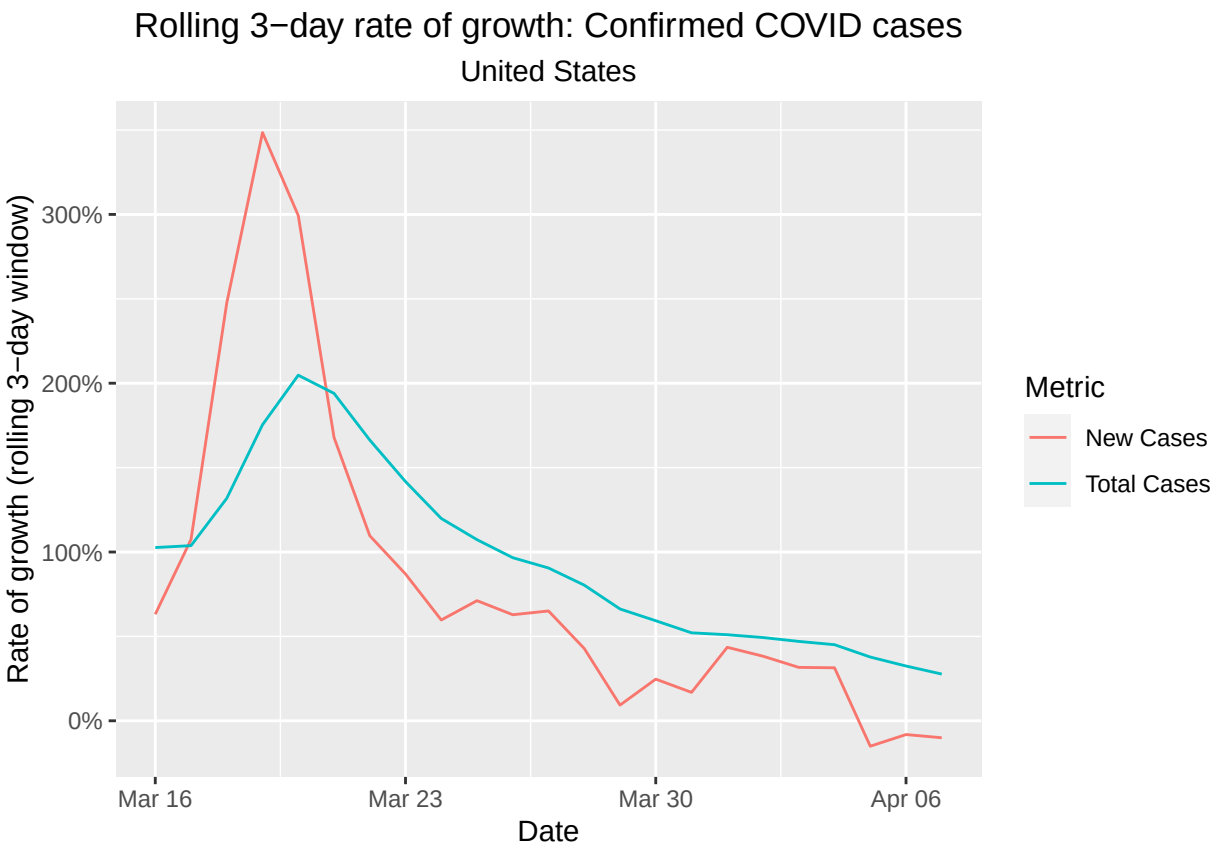
- This page shows COVID data broken down into regions that affect our family. It pulls from publicly available raw data from the NY Times, which is reported daily. It's on a one-day lag, so when you see this report, the most recent day included while be the day prior.
- The page is mostly organized by geography: It starts by showing data for all of the U.S., followed by our respective states, followed by our respective counties.
- Within each geophraphy, it shows several plots:
  - Total confirmed cases: This is the cumulative total of cases reported.
  - New confirmed cases: This is the number of new cases reported on each respective date.
  - Rolling 3-day case growth rate: This is the growth rate in both total cases and new over the previous 3 days, shown on a rolling basis for each respective date. For example, a 3-day growth rate of 100% for total cases means that total cases are doubling every 3 days. (This isn't shown at the county level because the sample size is too small.)
    - For total cases, the rate can't go below zero (because total cases can never go down), but we want it to get as close to zero as possible.
    - For new cases, the rate can go below zero because we'll eventually start to see less new cases each day consistently. When the new case growth rate is consistently below zero, it means we're on the other side of the "apex."nstance, if it is 100%, then that means total cases are doubling every 3 days.
  - Total deaths: This is the cumulative total of deaths reported
  - New deaths: This is the number of new deaths reported on each respective date
  - Rolling 3-day death growth rate: This is the same as described for total and new cases above, but for total and new deaths.
- Besides this data for each geography, it also includes some additional plots at the end:
  - It shows tables of both total cases and deaths *per million residents* for all states, and then a graph of trends of these numbers for the top 10 states (only using 10 in the graph so it's not too crowded). Showing the numbers per million helps normalize for the size of the states when looking at totals.
  - It then shows these same tables and plots for cases and deaths, but with new cases/deaths per million residents instead of total cases/deaths per million. This section uses a rolling 3-day average of new cases/deaths.
  - Finally, it shows the same rolling 3-day average of new cases per million residents, but broken out by states that have enacted stay-at-home orders and when the orders were enacted.

United States

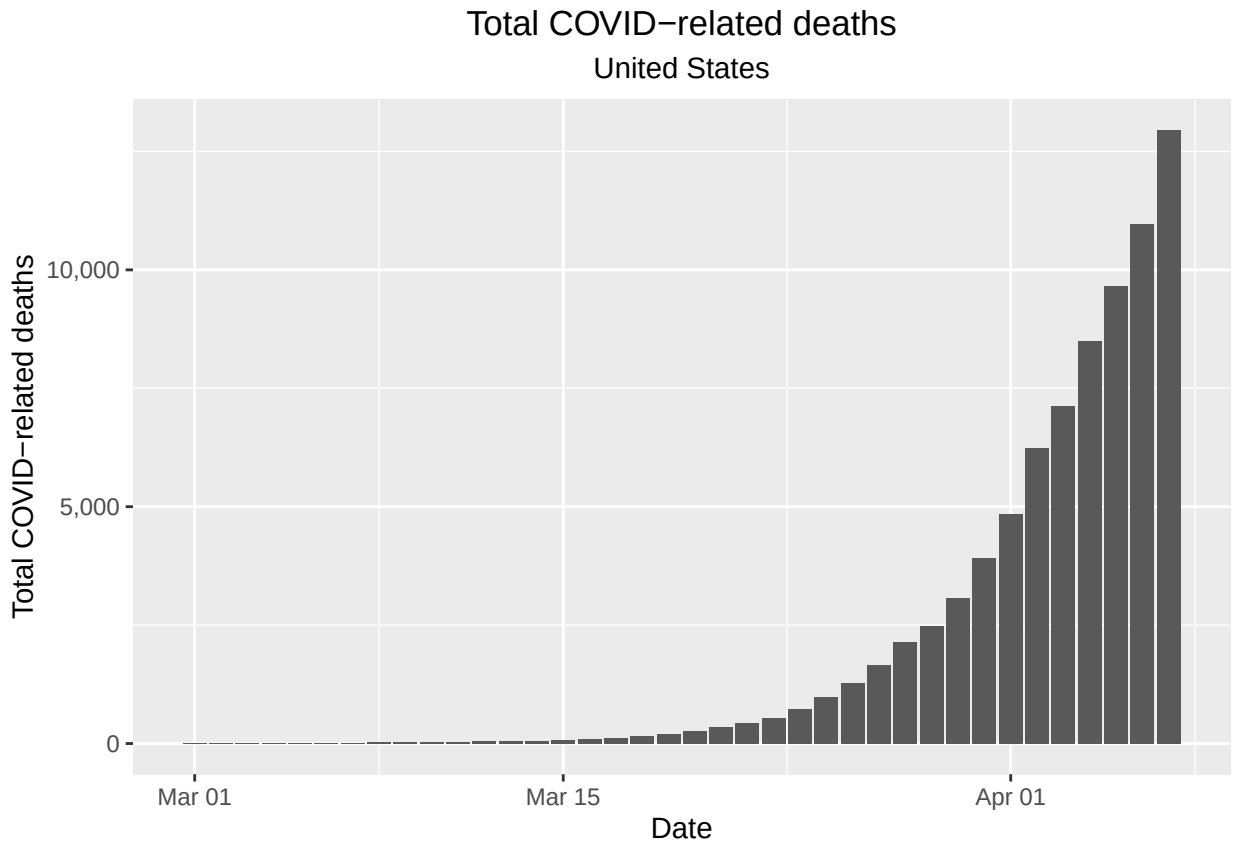
Confirmed cases

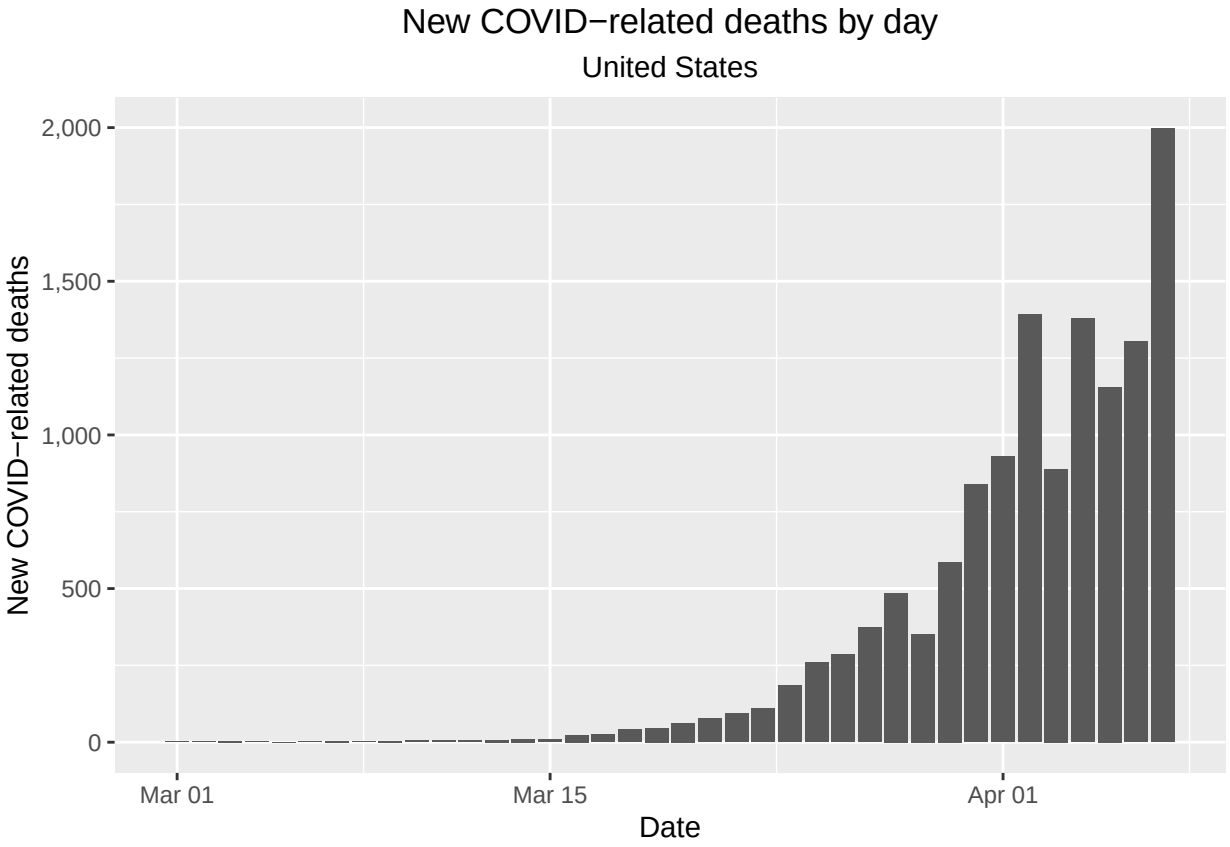


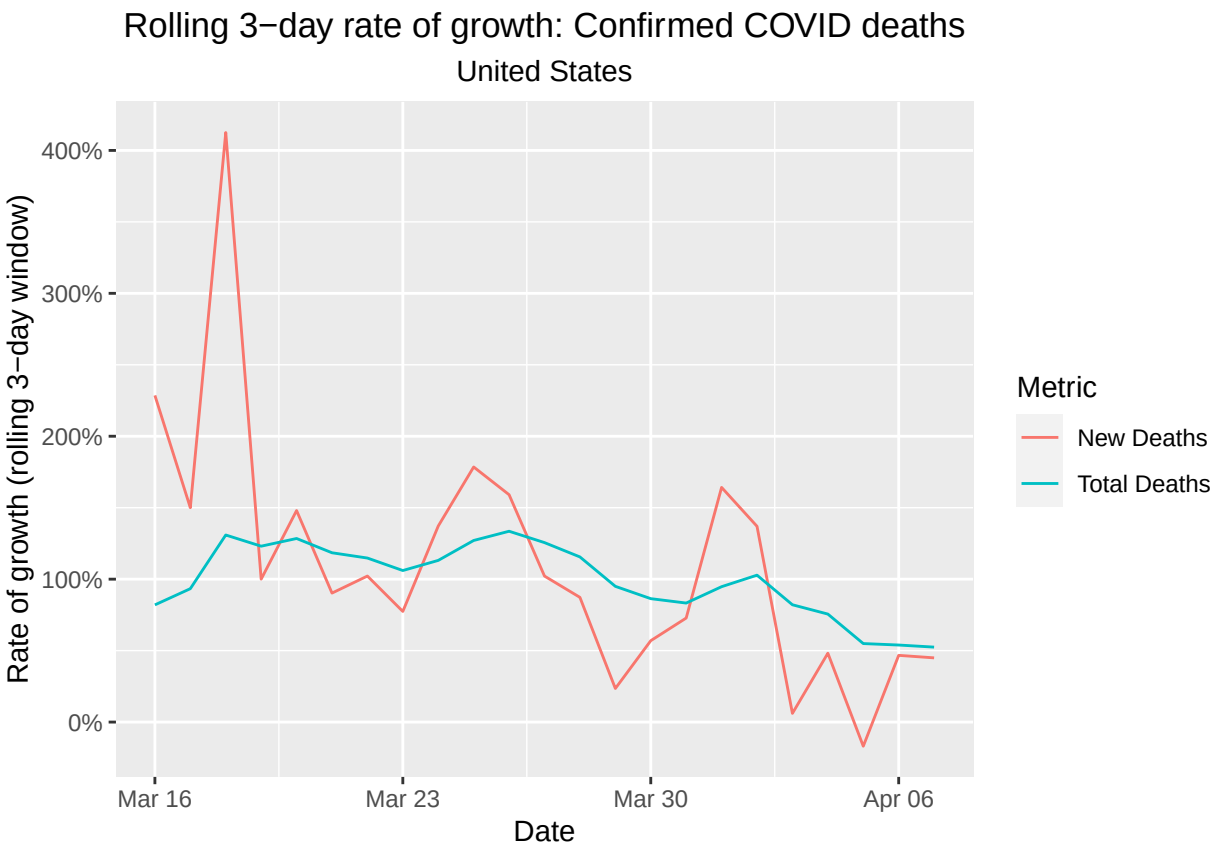

Confirmed new COVID cases by day
United States
Confirmed new COVID cases
30,000
20,000
10,000
0
Mar 01
Mar 15
Apr 01
Date


Rolling 3−day rate of growth: Confirmed COVID cases
United States
Rate of growth (rolling 3−day window)
300%
200%
100%
0%
Mar 16
Mar 23
Mar 30
Apr 06
Date
Metric
New Cases
Total Cases

Deaths

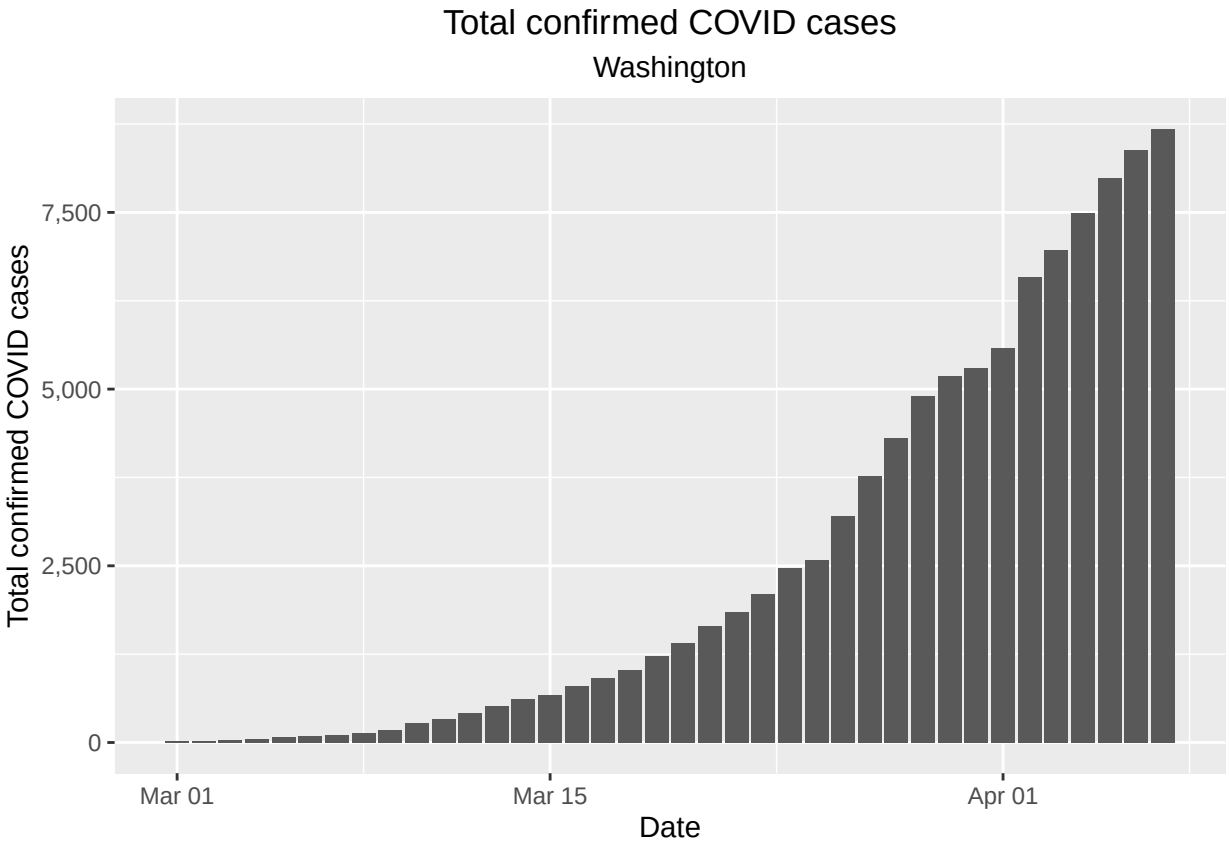

Total COVID−related deaths
United States
Total COVID−related deaths
10,000
5,000
0
Mar 01
Mar 15
Apr 01
Date

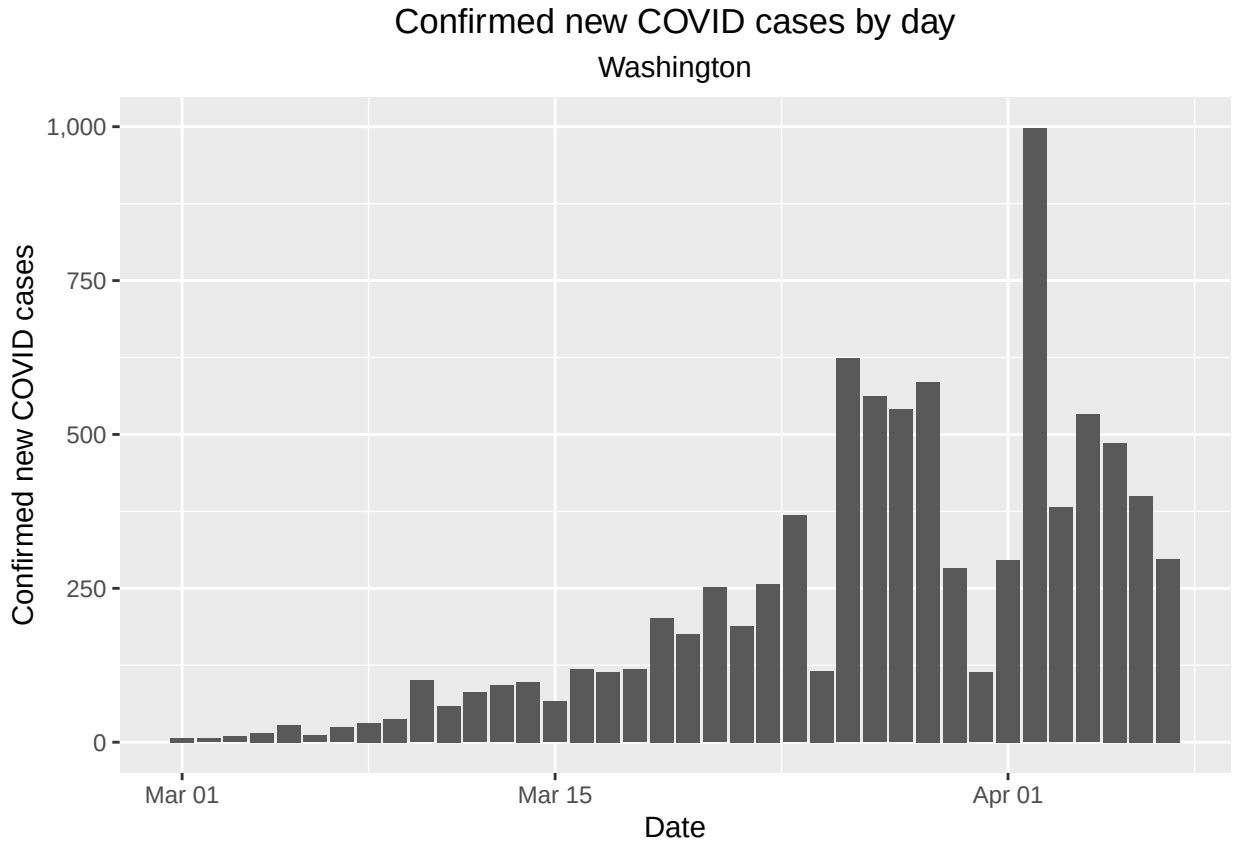

New COVID−related deaths by day
United States
New COVID−related deaths
2,000
1,500
1,000
500
0
Mar 01
Mar 15
Apr 01
Date

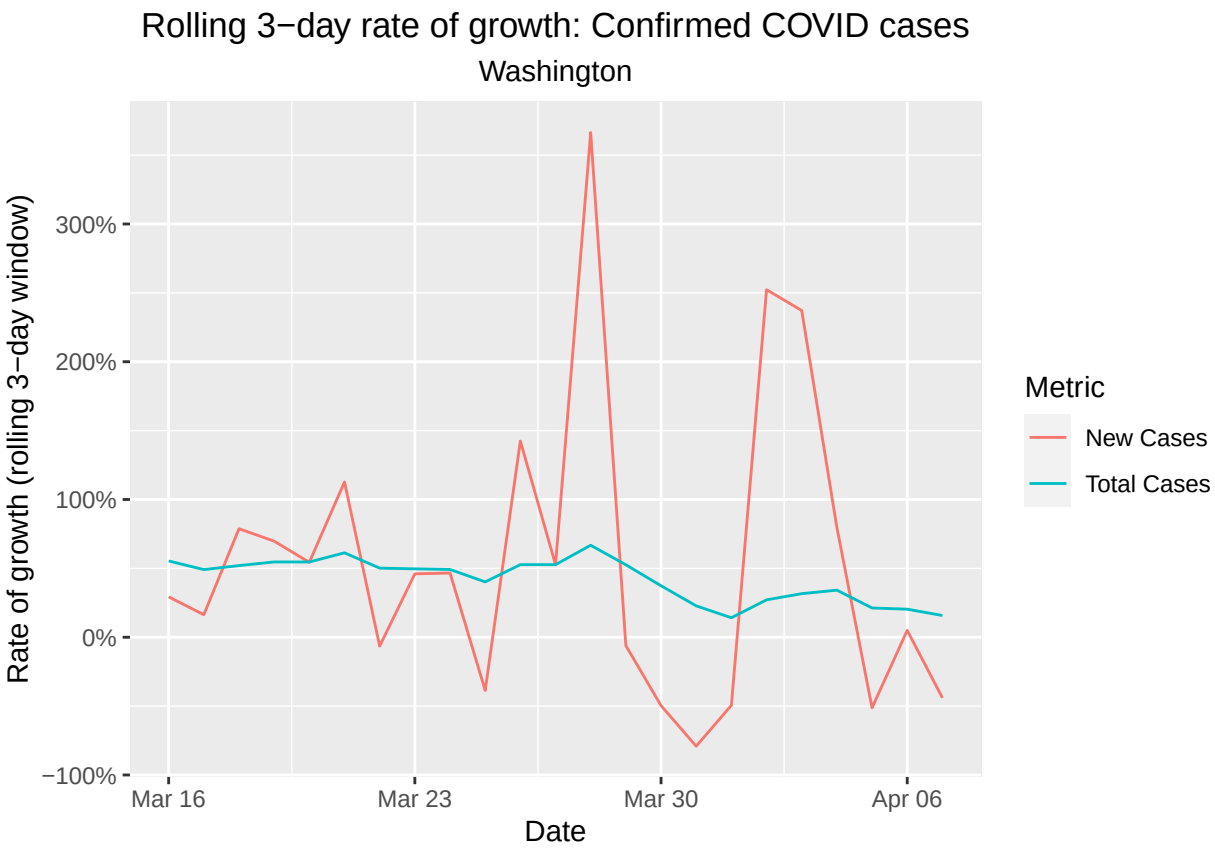

Rolling 3−day rate of growth: Confirmed COVID deaths
United States
Rate of growth (rolling 3−day window)
400%
300%
200%
100%
0%
Mar 16
Mar 23
Mar 30
Apr 06
Date
Metric
New Deaths
Total Deaths

Washington

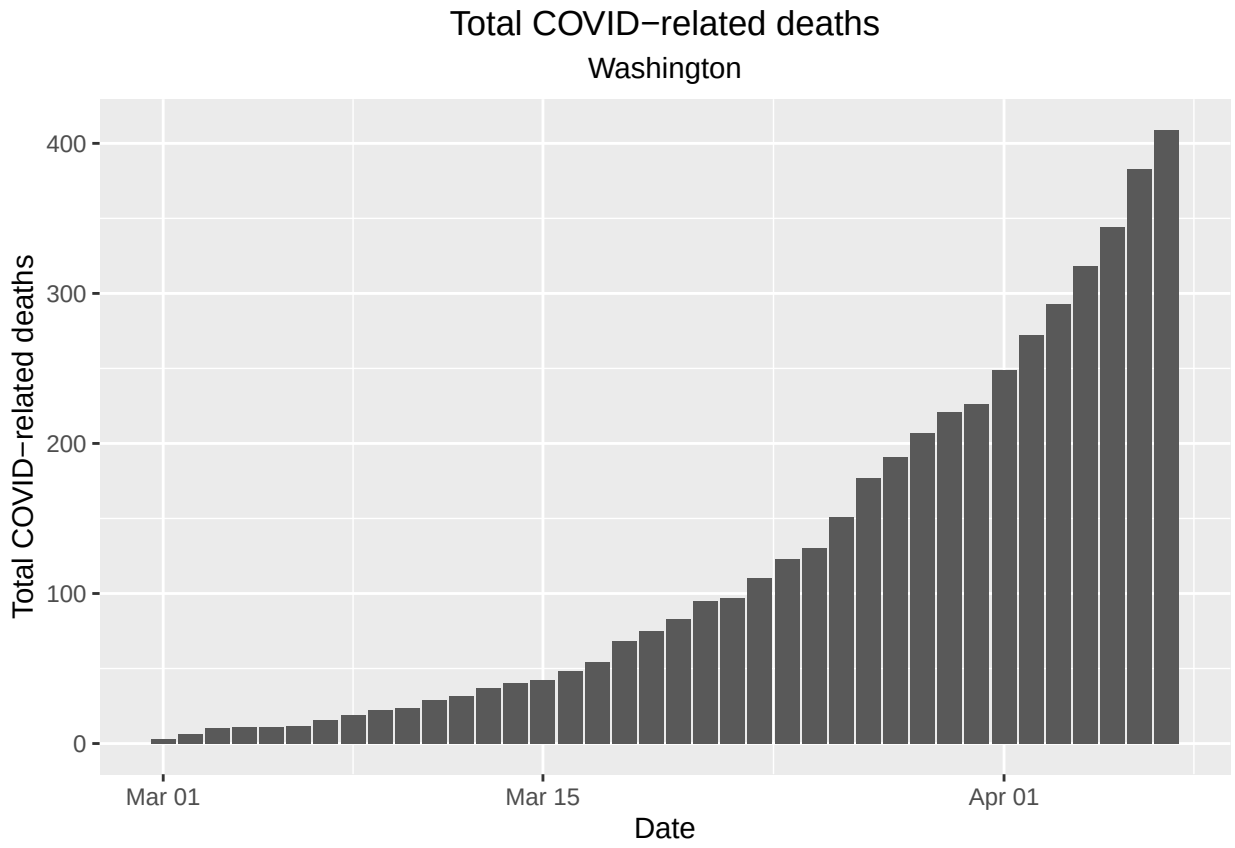
Confirmed cases

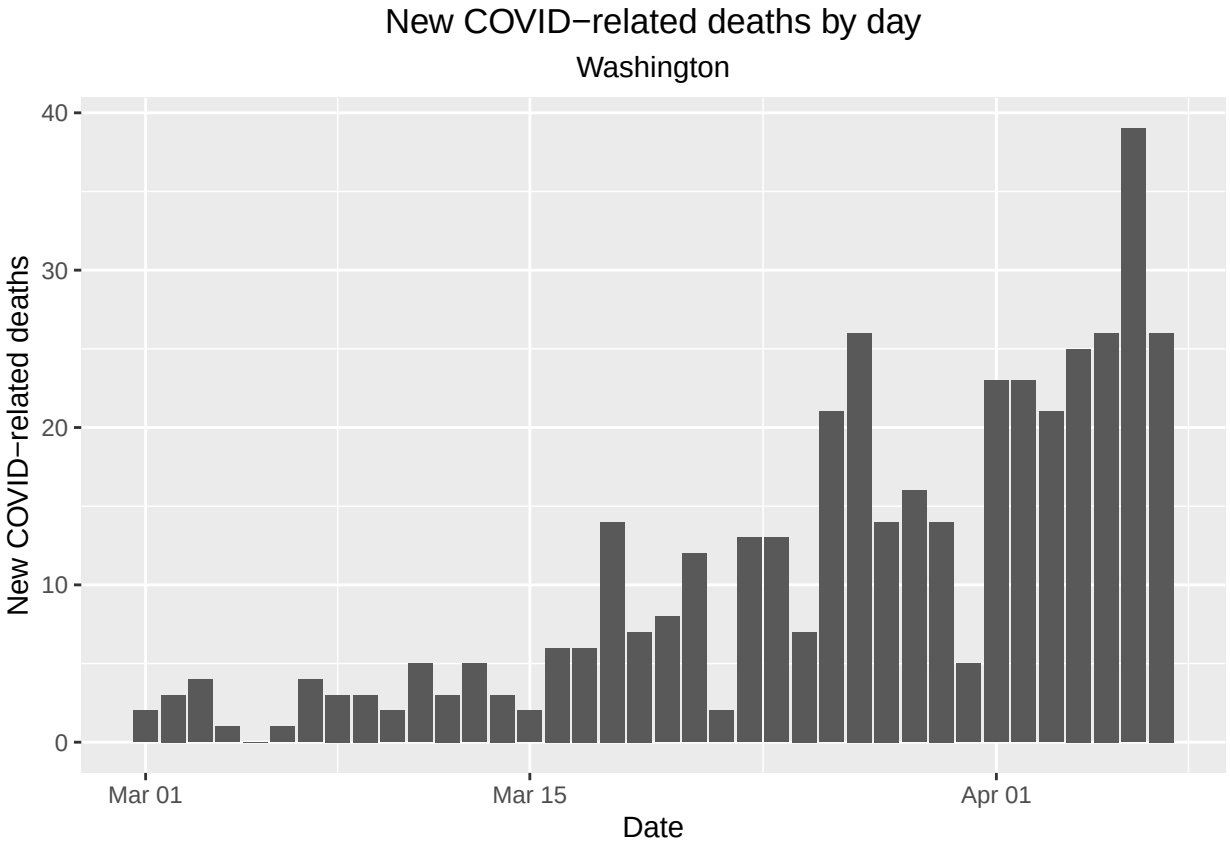


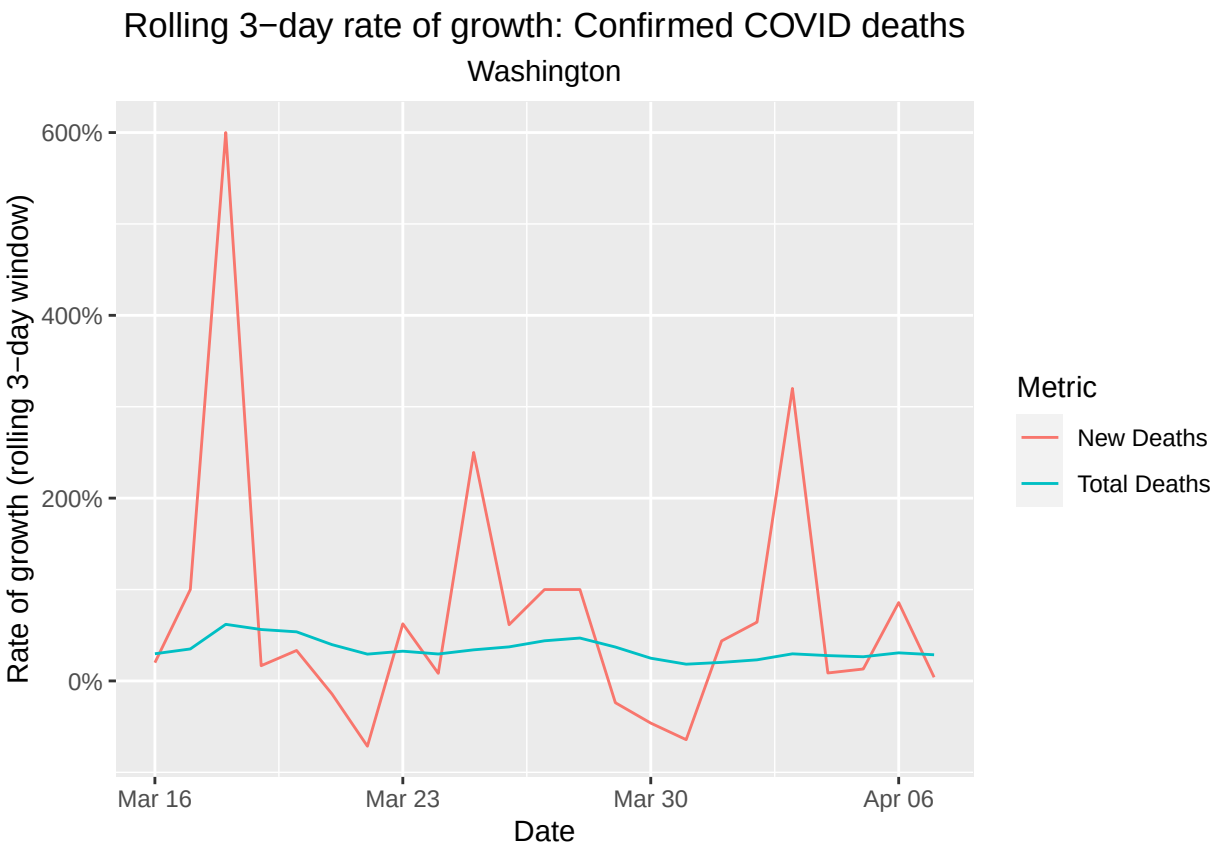

Confirmed new COVID cases by day
Washington
Confirmed new COVID cases
1,000
750
500
250
0
Mar 01
Mar 15
Apr 01
Date


Rolling 3−day rate of growth: Confirmed COVID cases
Washington
Rate of growth (rolling 3−day window)
300%
200%
100%
0%
−100%
Mar 16
Mar 23
Mar 30
Apr 06
Date
Metric
New Cases
Total Cases

Deaths

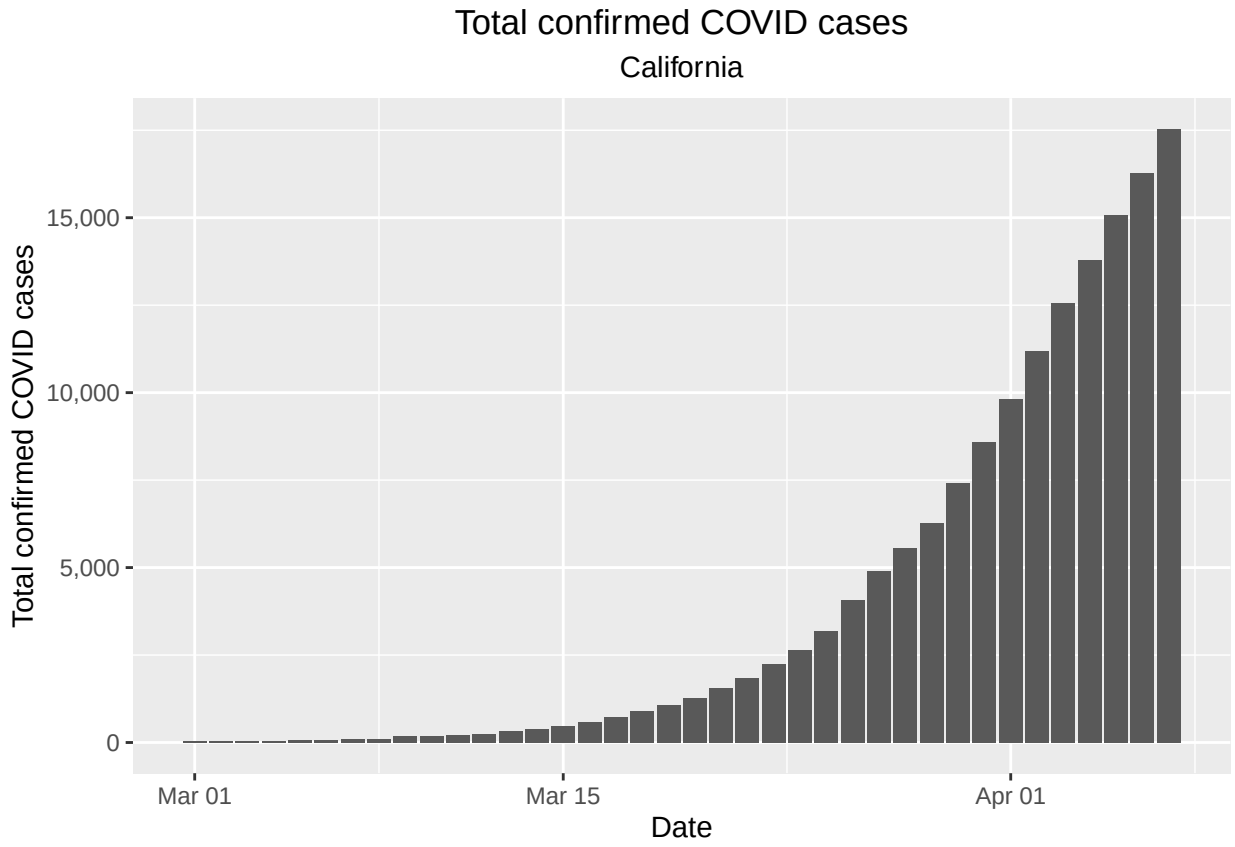

Total COVID−related deaths
Washington
Total COVID−related deaths
400
300
200
100
0
Mar 01
Mar 15
Apr 01
Date

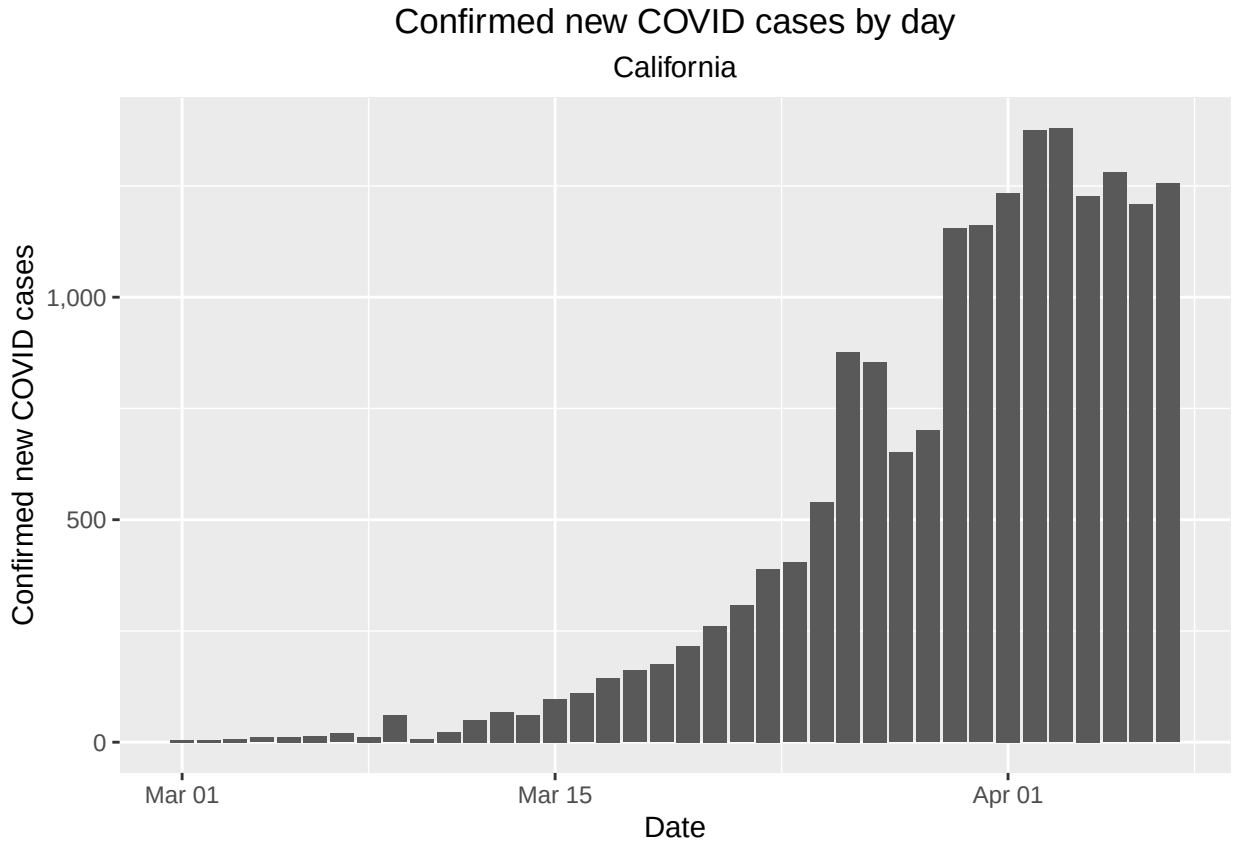

New COVID−related deaths by day
Washington
New COVID−related deaths
40
30
20
10
0
Mar 01
Mar 15
Apr 01
Date

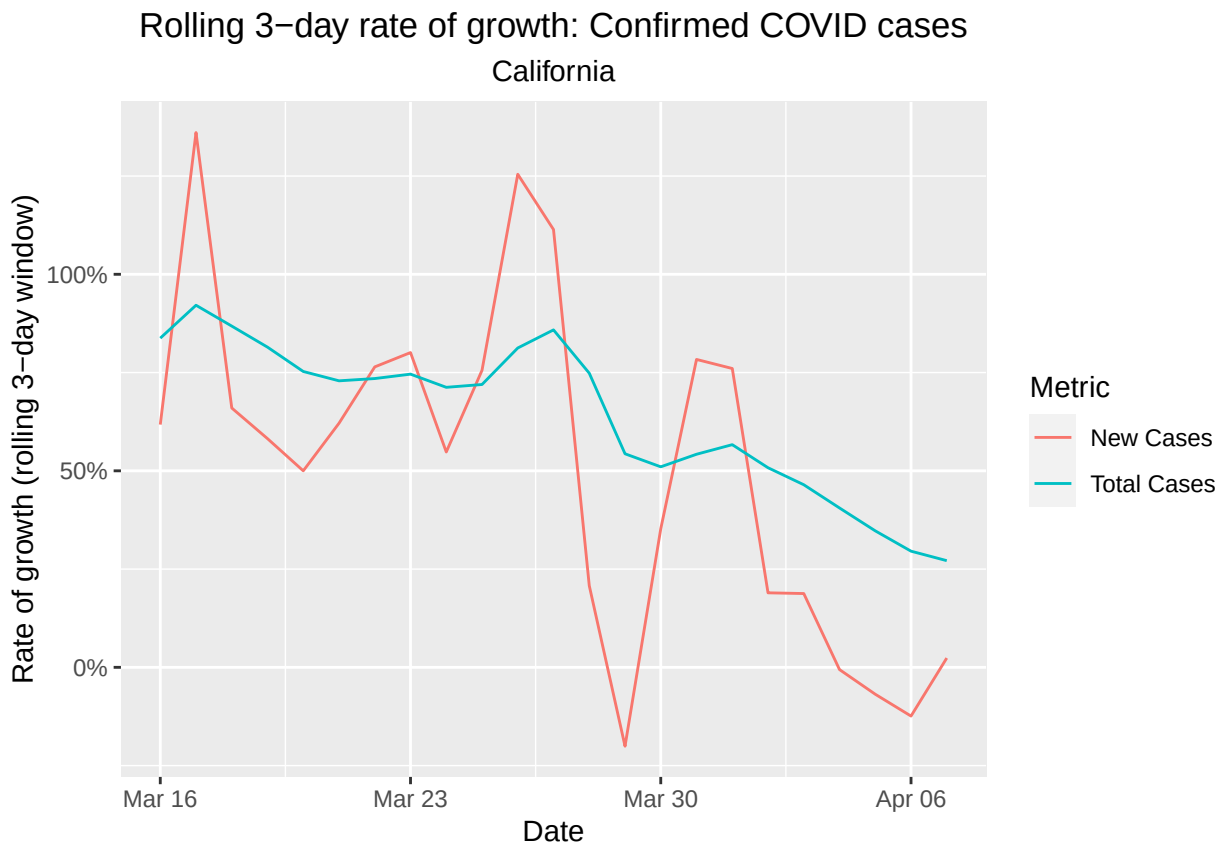

Rolling 3−day rate of growth: Confirmed COVID deaths
Washington
Rate of growth (rolling 3−day window)
600%
400%
200%
0%
Mar 16
Mar 23
Mar 30
Apr 06
Date
Metric
New Deaths
Total Deaths

California

Confirmed cases

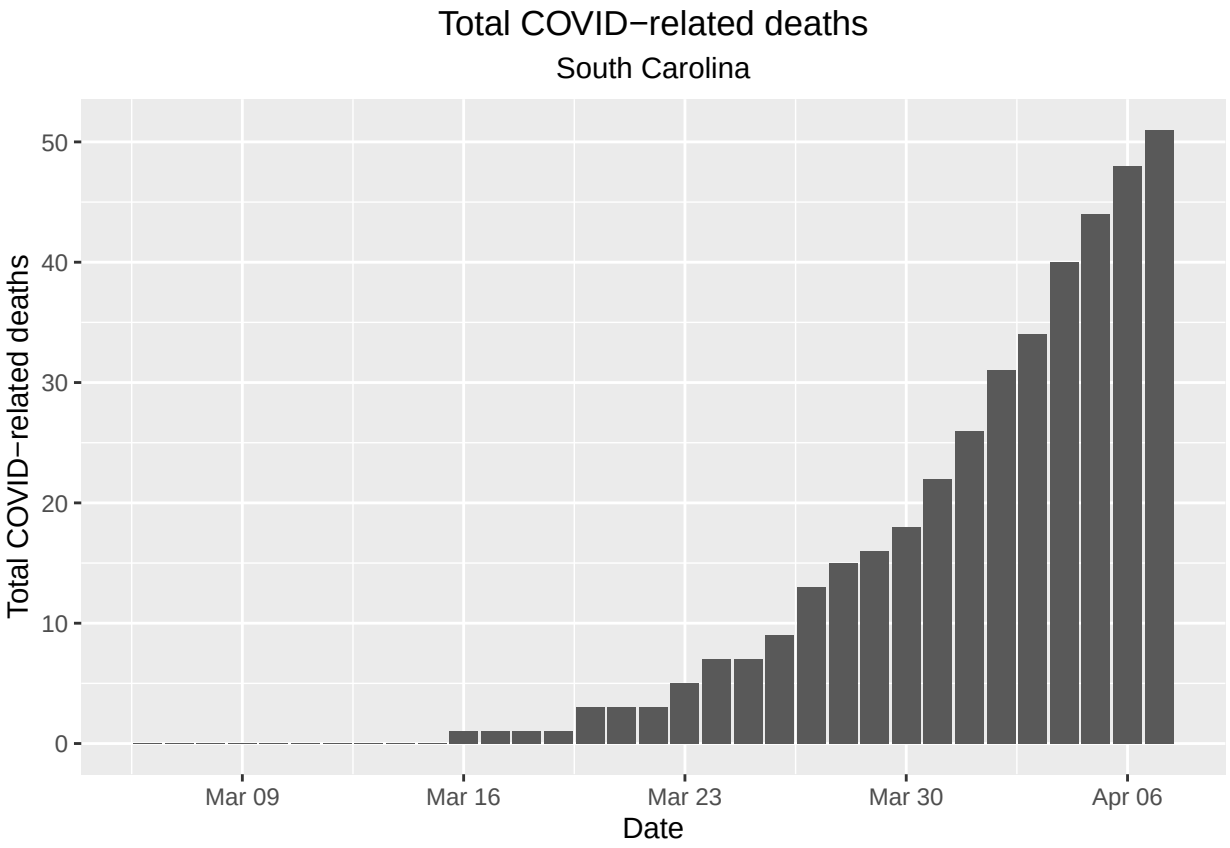


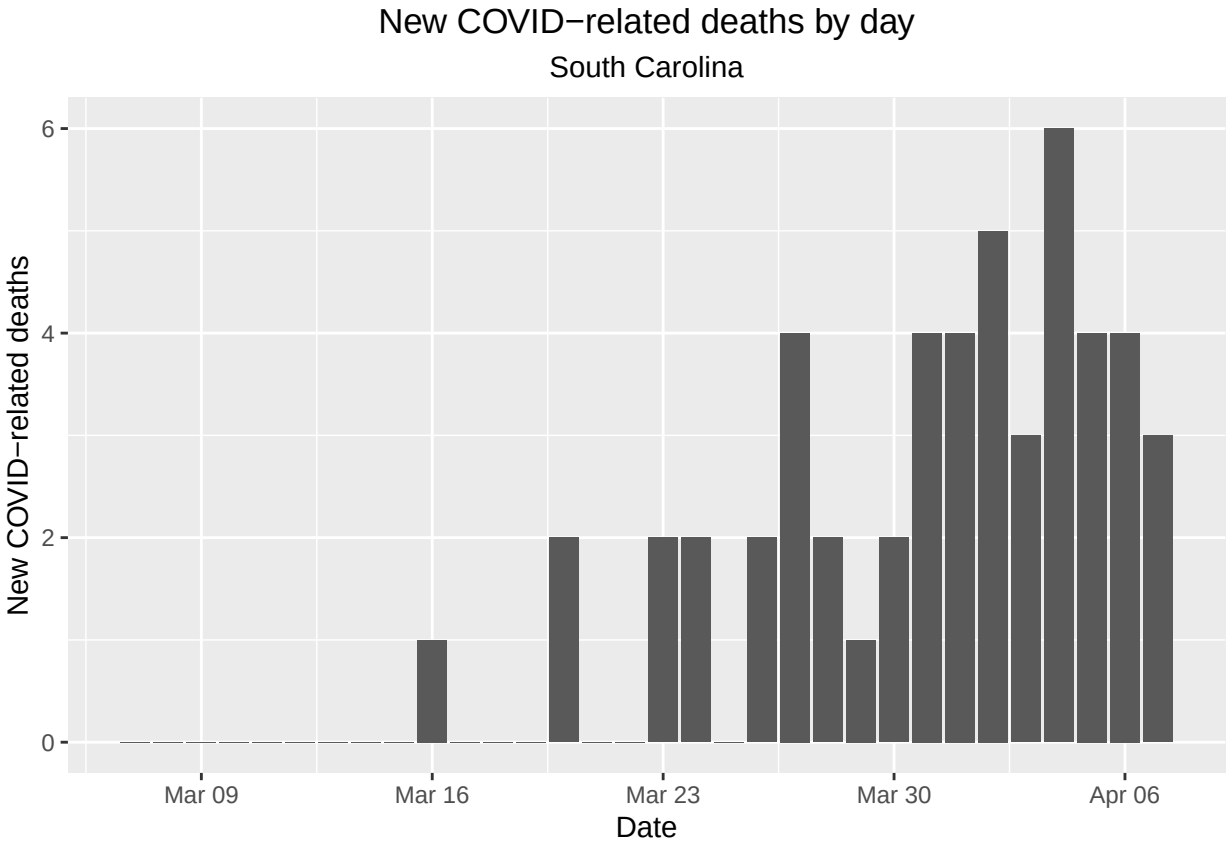

Confirmed new COVID cases by day
California
Confirmed new COVID cases
1,000
500
0
Mar 01
Mar 15
Apr 01
Date

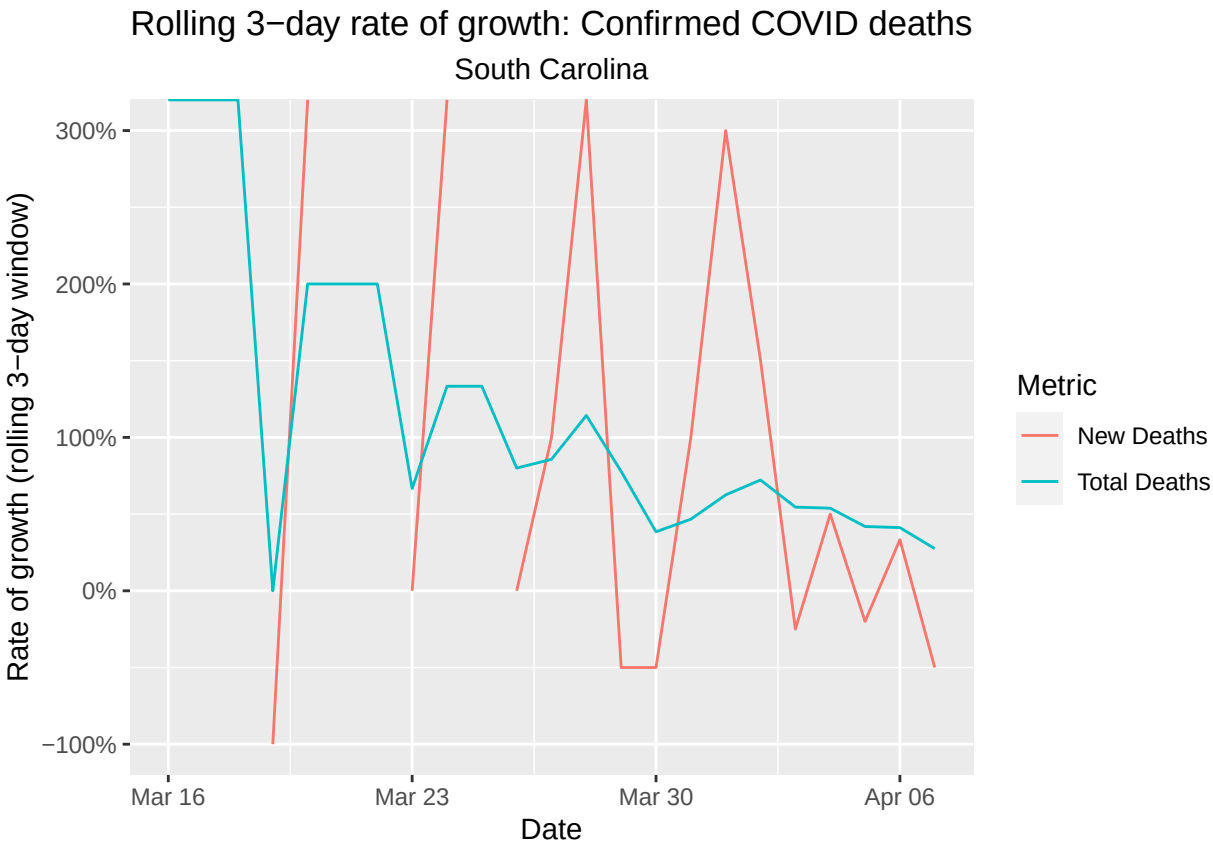



```
### Deaths

![](/Users/leland/covid19/outputs/covid_plots_fam_files/figure-latex/unnamed-chunk-19-1.pdf)<!-- -->

![](/Users/leland/covid19/outputs/covid_plots_fam_files/figure-latex/unnamed-chunk-20-1.pdf)<!-- -->

![](/Users/leland/covid19/outputs/covid_plots_fam_files/figure-latex/unnamed-chunk-21-1.pdf)<!-- -->

## South Carolina

### Confirmed cases

![](/Users/leland/covid19/outputs/covid_plots_fam_files/figure-latex/unnamed-chunk-22-1.pdf)<!-- -->

![](/Users/leland/covid19/outputs/covid_plots_fam_files/figure-latex/unnamed-chunk-23-1.pdf)<!-- -->

![](/Users/leland/covid19/outputs/covid_plots_fam_files/figure-latex/unnamed-chunk-24-1.pdf)<!-- -->
```

Deaths

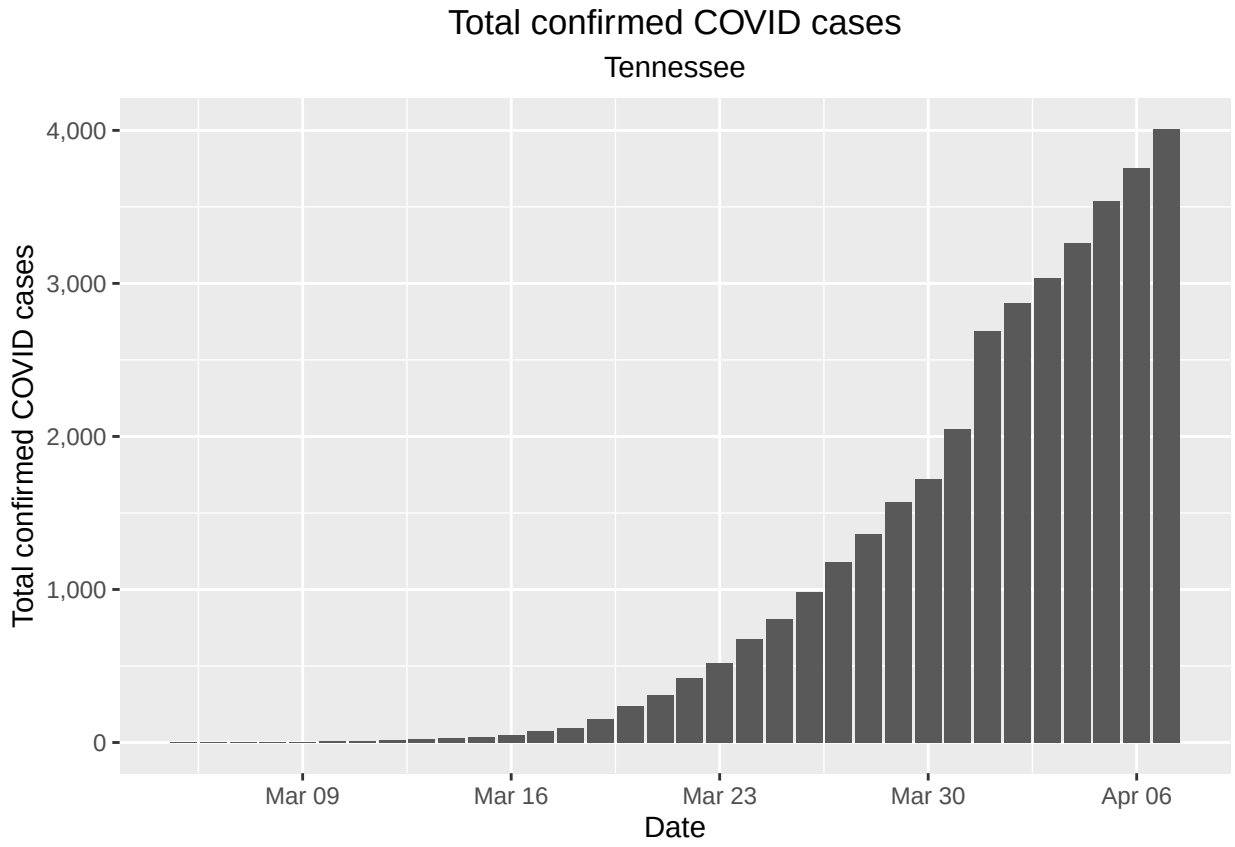

Total COVID−related deaths
South Carolina
Total COVID−related deaths
50
40
30
20
10
0
Mar 09
Mar 16
Mar 23
Mar 30
Apr 06
Date

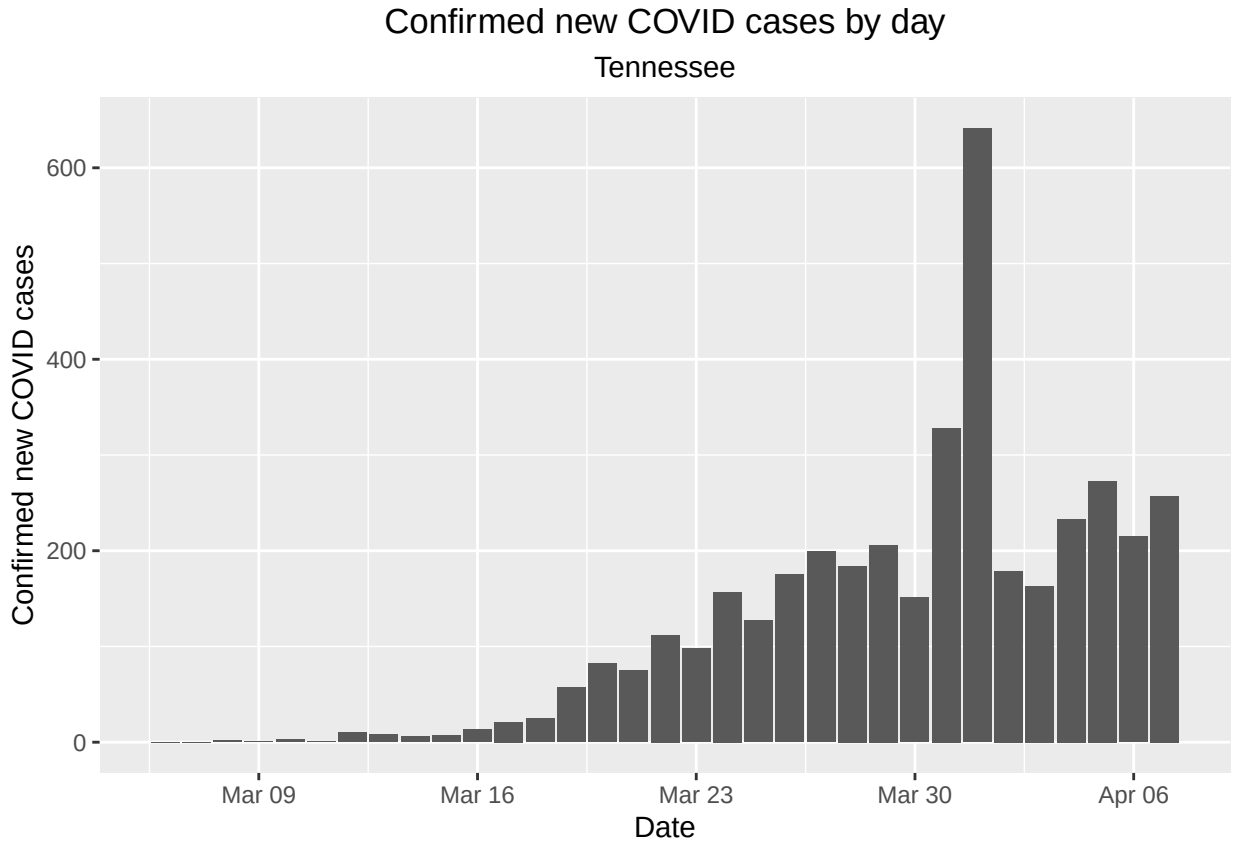

New COVID−related deaths by day
South Carolina
New COVID−related deaths
6
4
2
0
Mar 09
Mar 16
Mar 23
Mar 30
Apr 06
Date

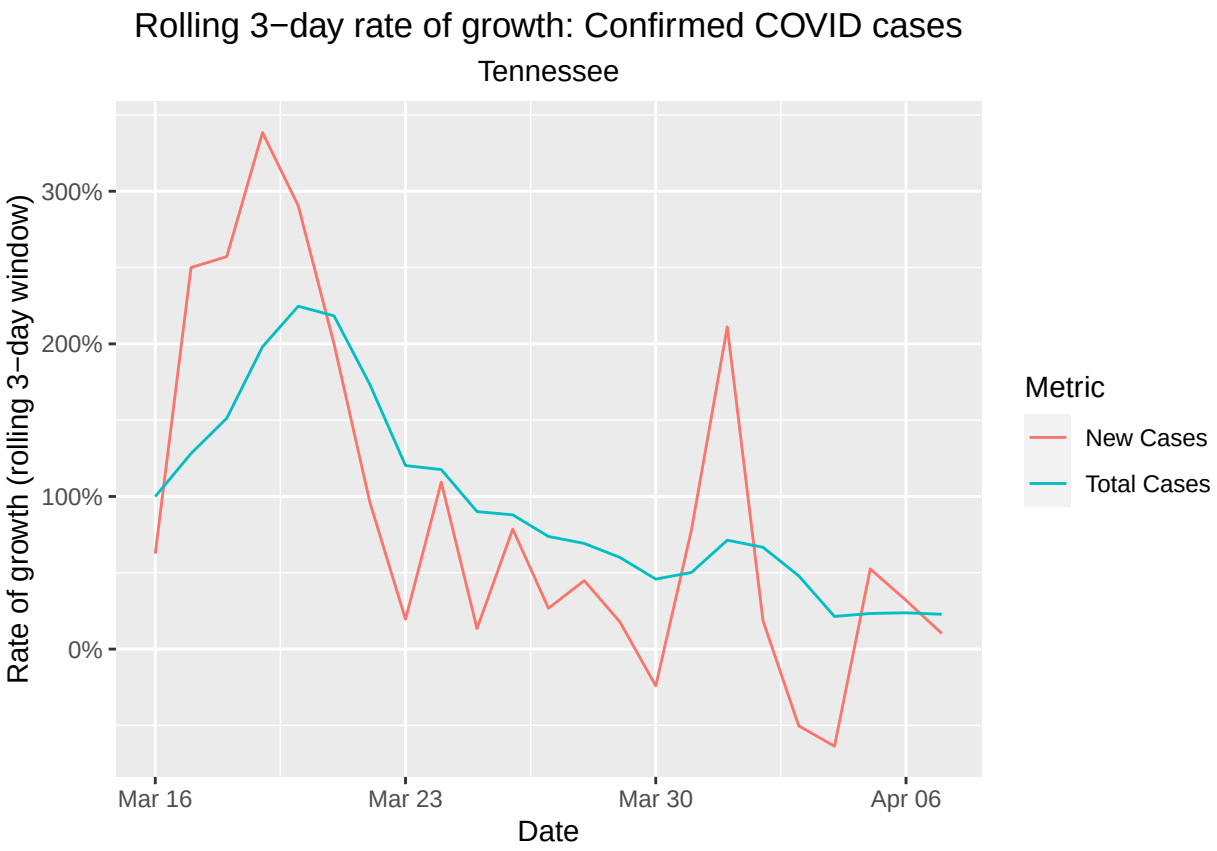

Rolling 3−day rate of growth: Confirmed COVID deaths
South Carolina
Rate of growth (rolling 3−day window)
300%
200%
100%
0%
−100%
Mar 16
Mar 23
Mar 30
Apr 06
Date
Metric
New Deaths
Total Deaths

Tennessee

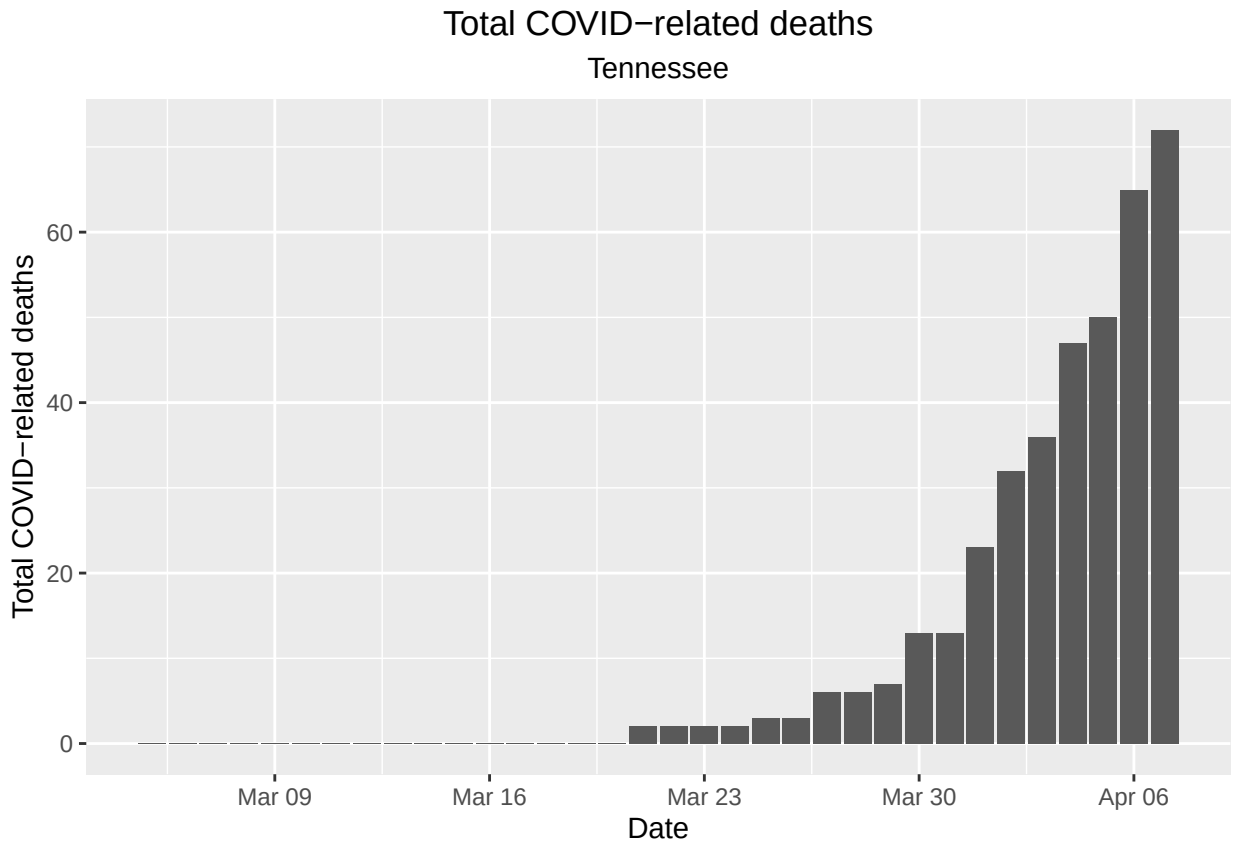
Confirmed cases

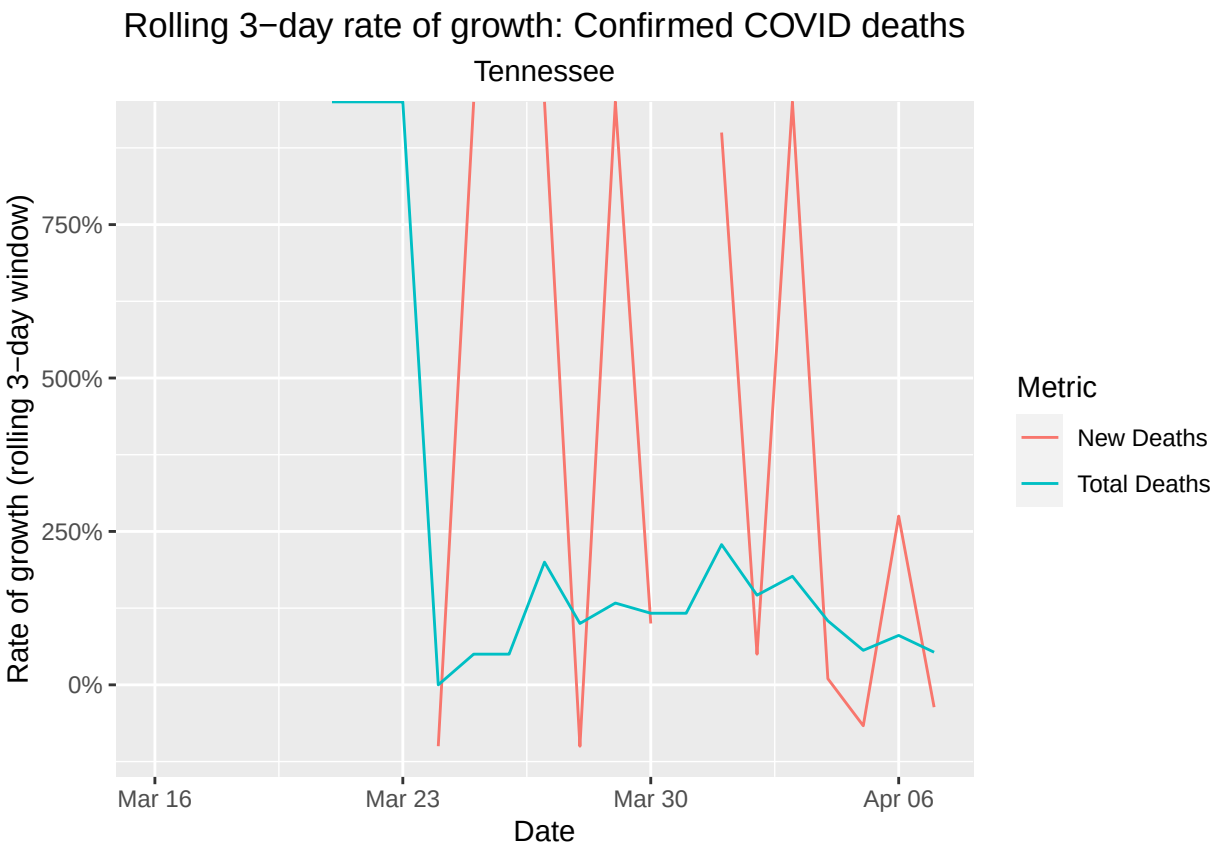



Confirmed new COVID cases by day
Tennessee
Confirmed new COVID cases
600
400
200
0
Mar 09
Mar 16
Mar 23
Mar 30
Apr 06
Date


Rolling 3−day rate of growth: Confirmed COVID cases
Tennessee
Rate of growth (rolling 3−day window)
300%
200%
100%
0%
Mar 16
Mar 23
Mar 30
Apr 06
Date
Metric
New Cases
Total Cases

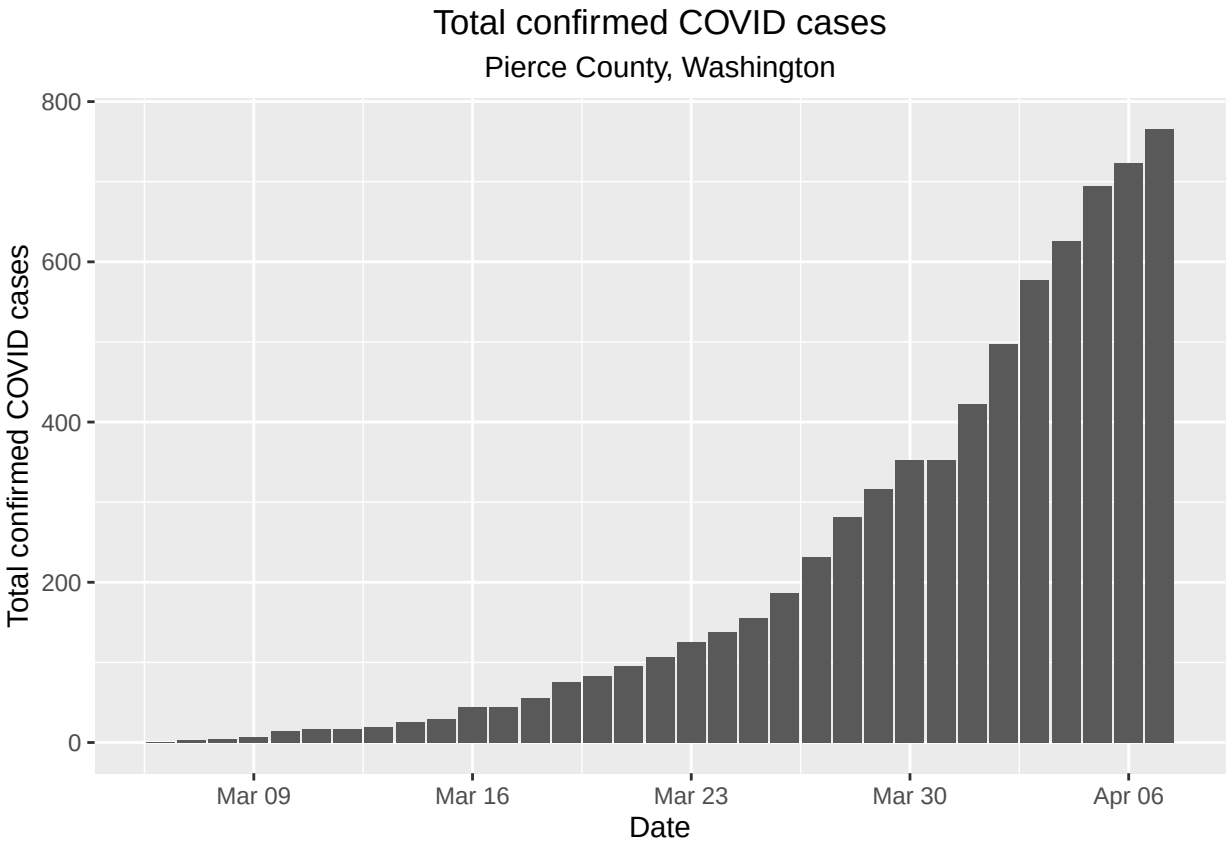
Deaths

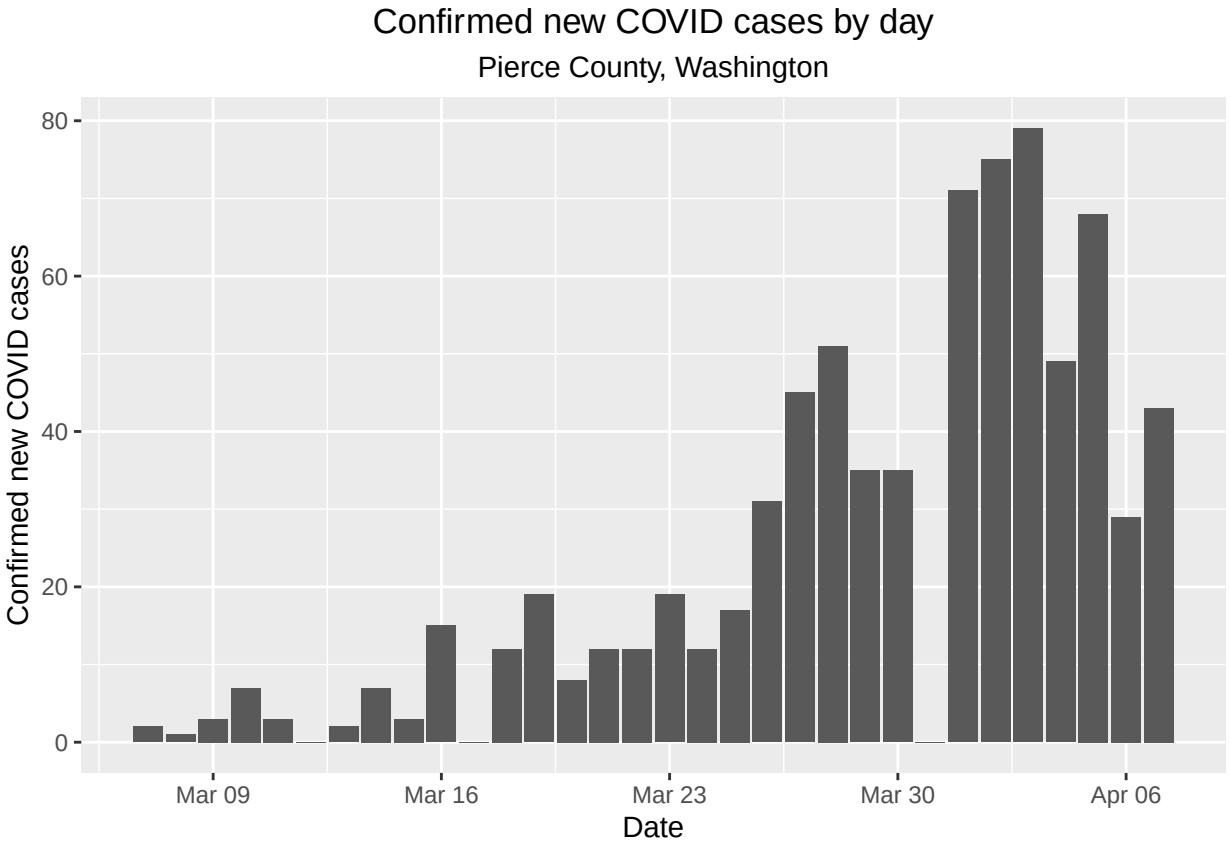

Total COVID−related deaths
Tennessee
Total COVID−related deaths
60
40
20
0
Mar 09
Mar 16
Mar 23
Mar 30
Apr 06
Date


Rolling 3−day rate of growth: Confirmed COVID deaths
Tennessee
Rate of growth (rolling 3−day window)
750%
500%
250%
0%
Mar 16
Mar 23
Mar 30
Apr 06
Date
Metric
New Deaths
Total Deaths

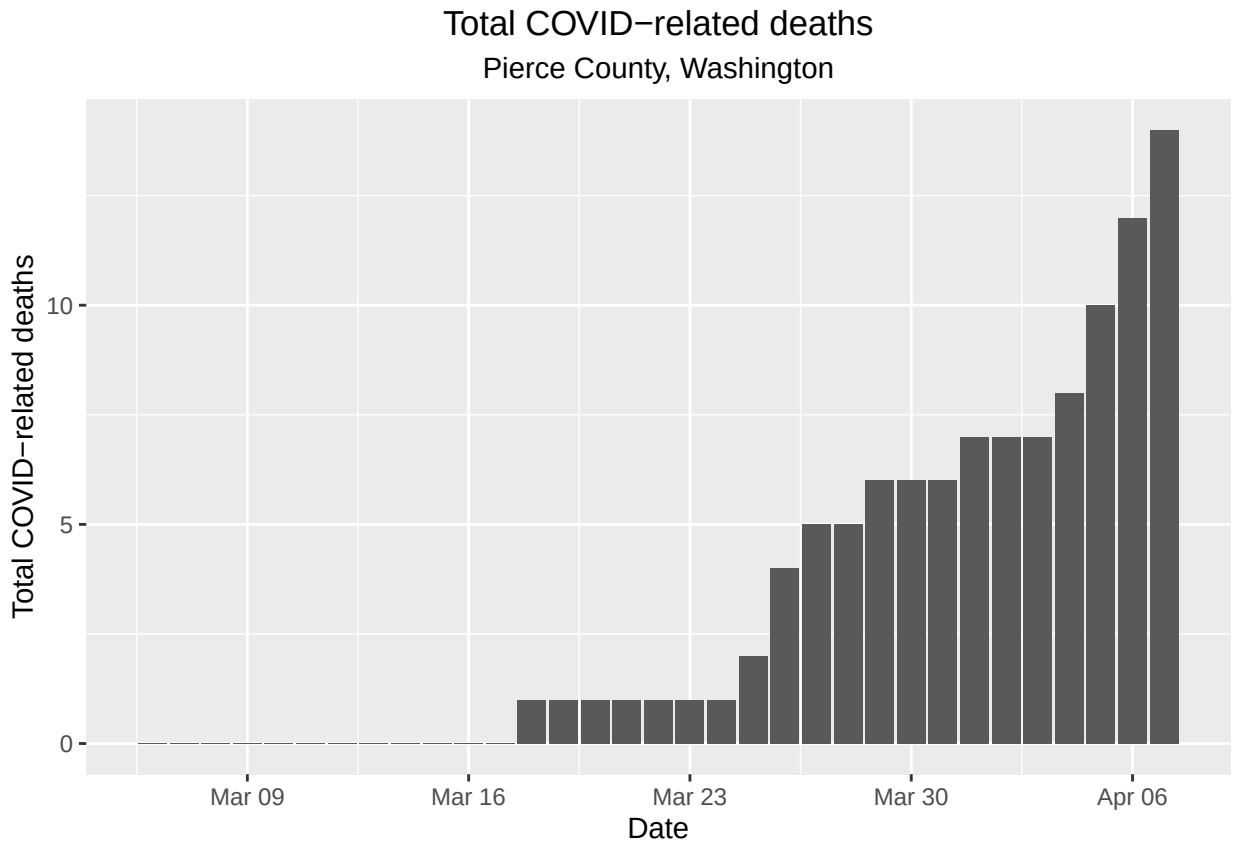
Pierce County, Washington

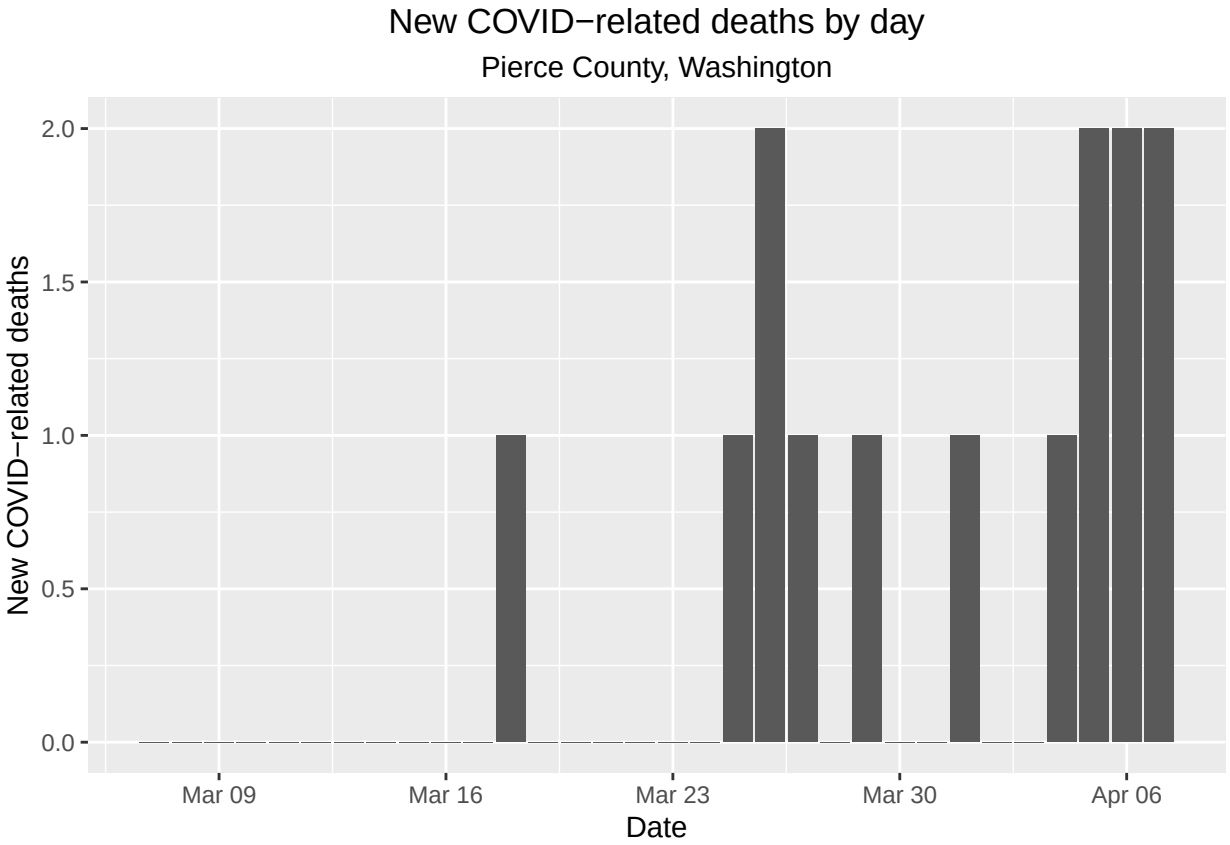
Confirmed cases




Confirmed new COVID cases by day
Pierce County, Washington
Confirmed new COVID cases
80
60
40
20
0
Mar 09
Mar 16
Mar 23
Mar 30
Apr 06
Date

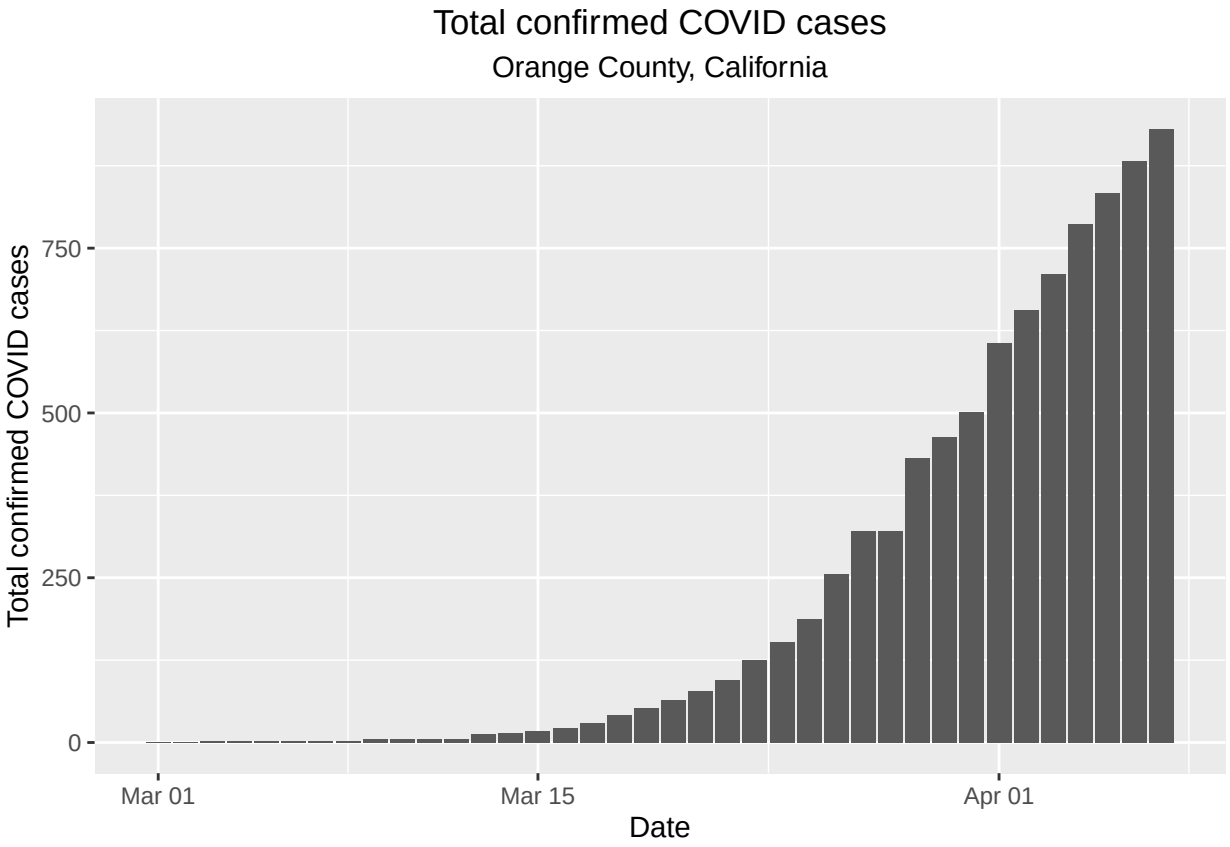
Deaths

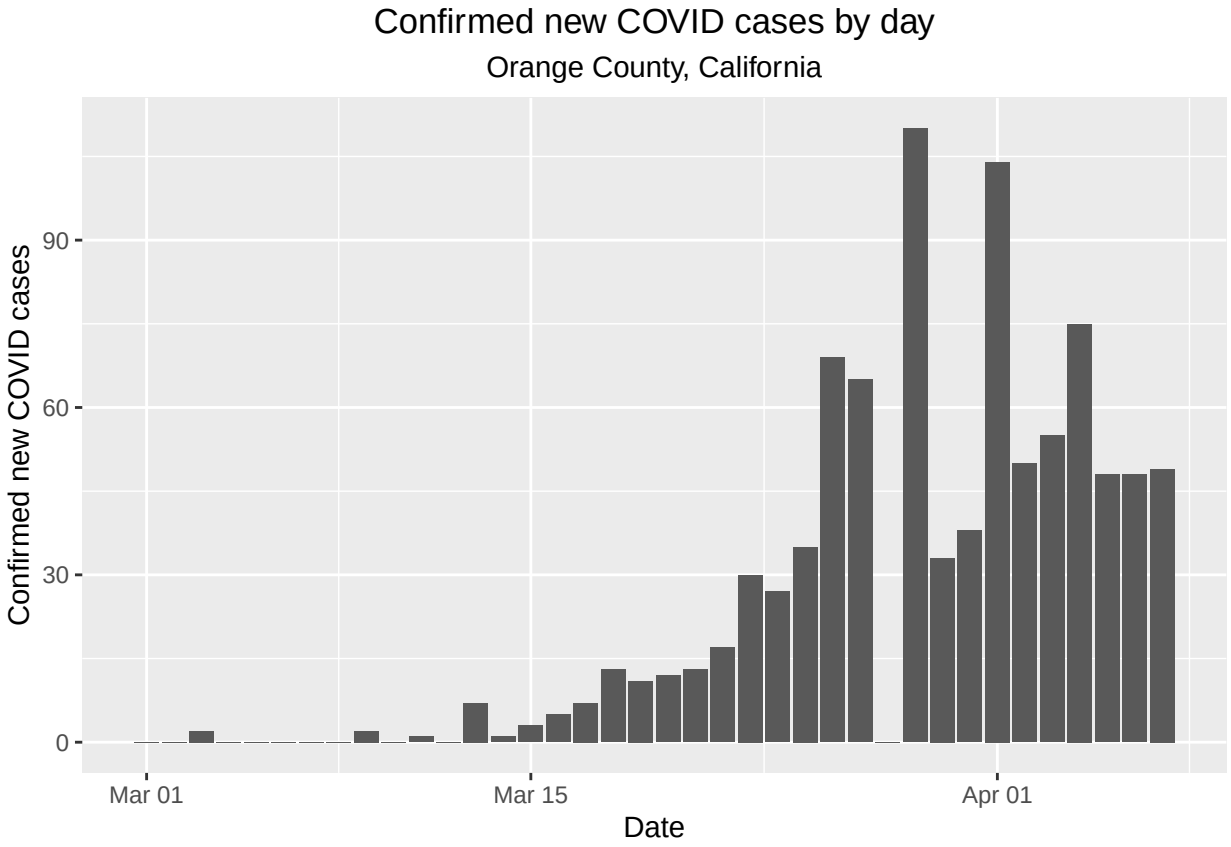

Total COVID−related deaths
Pierce County, Washington
Total COVID−related deaths
10
5
0
Mar 09
Mar 16
Mar 23
Mar 30
Apr 06
Date


New COVID−related deaths by day
Pierce County, Washington
New COVID−related deaths
2.0
1.5
1.0
0.5
0.0
Mar 09
Mar 16
Mar 23
Mar 30
Apr 06
Date

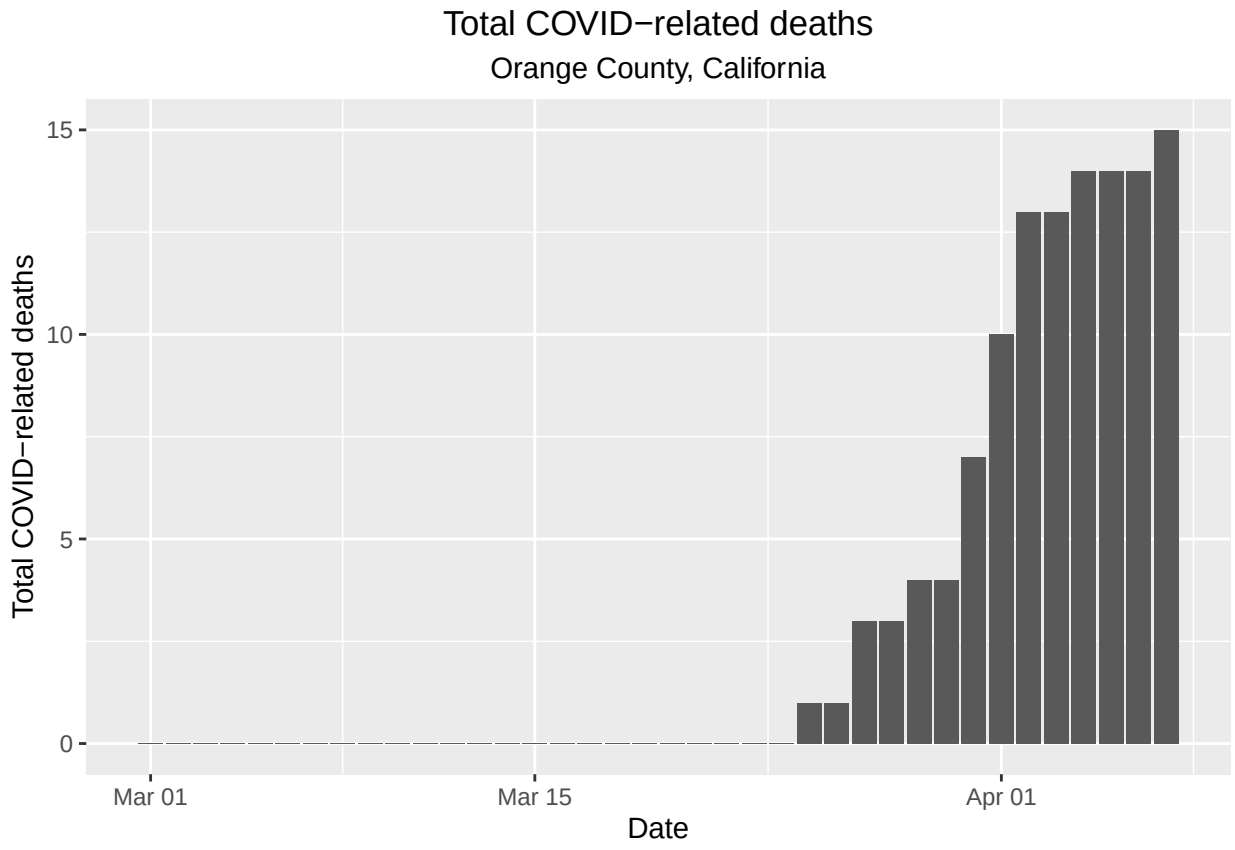
Orange County, California

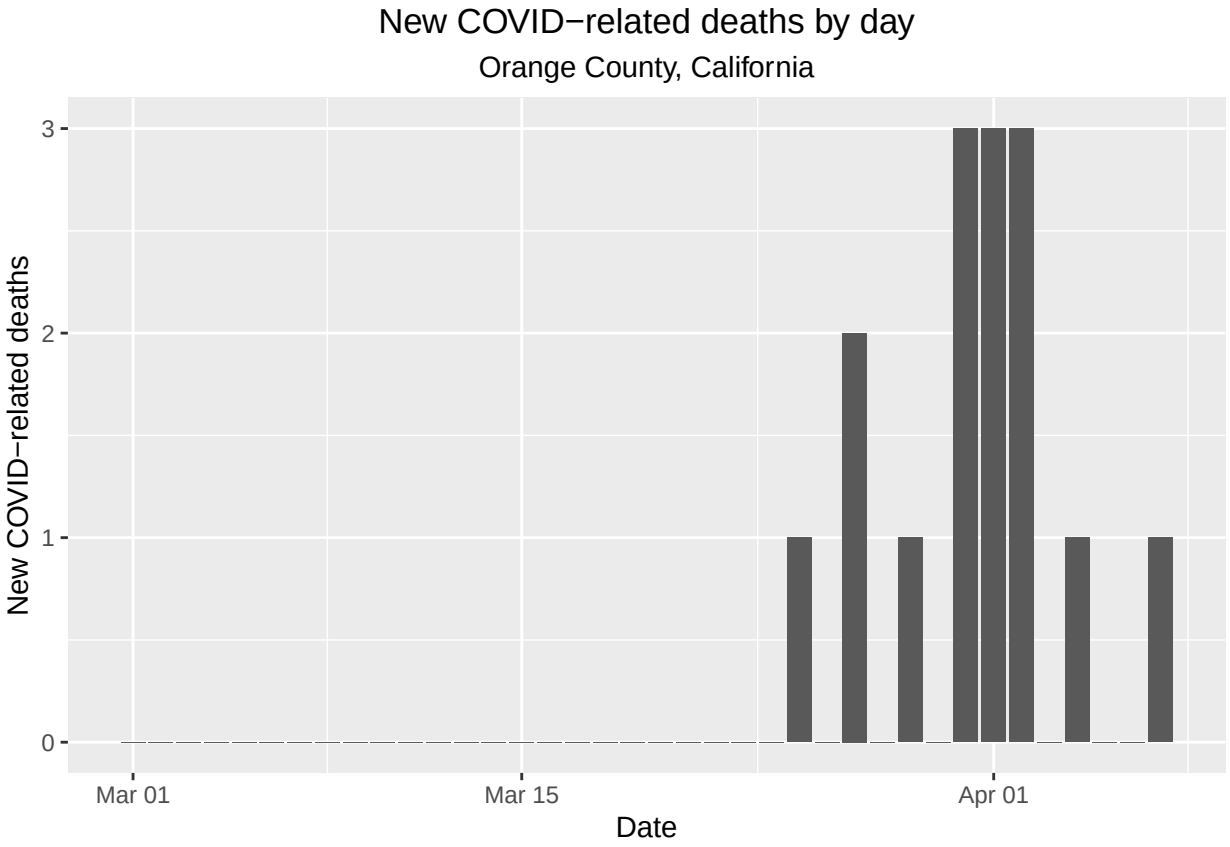
Confirmed cases




Confirmed new COVID cases by day
Orange County, California
Confirmed new COVID cases
90
60
30
0
Mar 01
Mar 15
Apr 01
Date

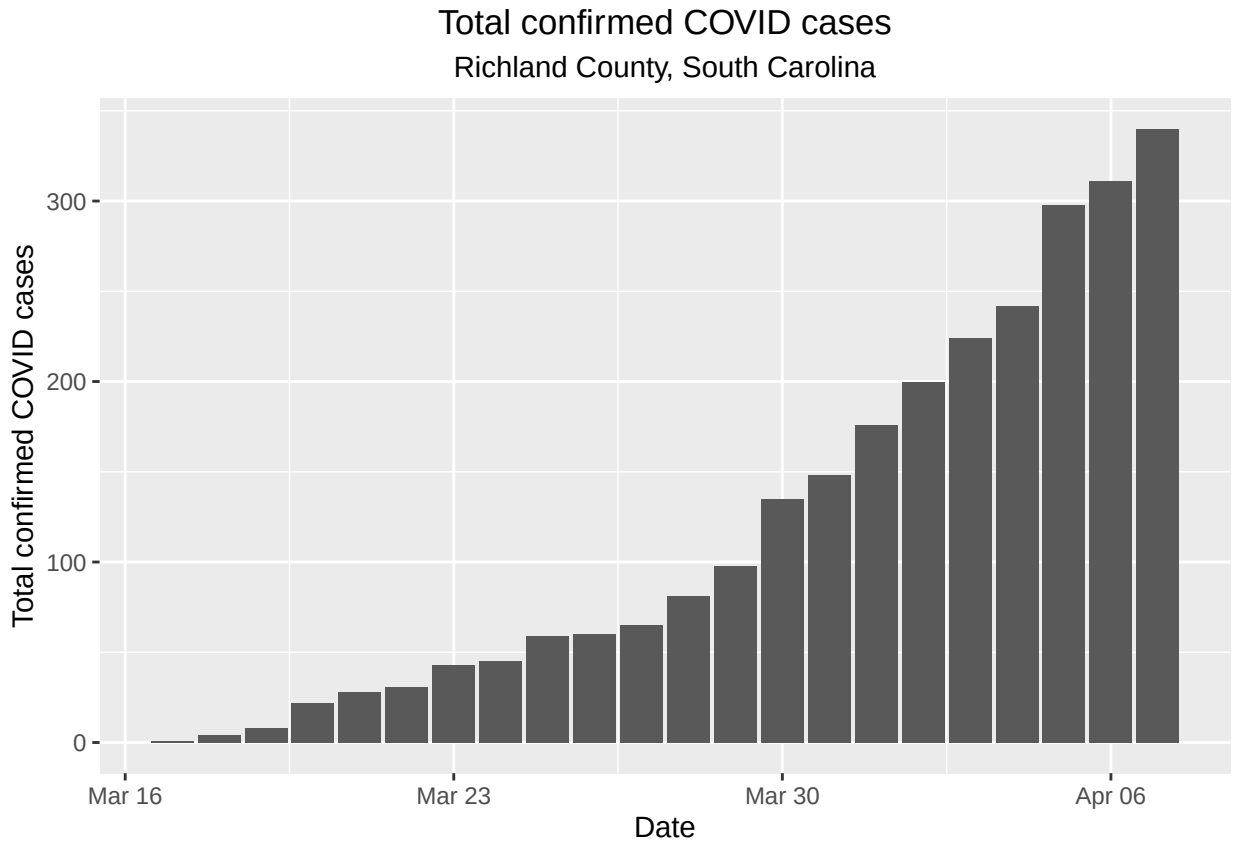
Deaths

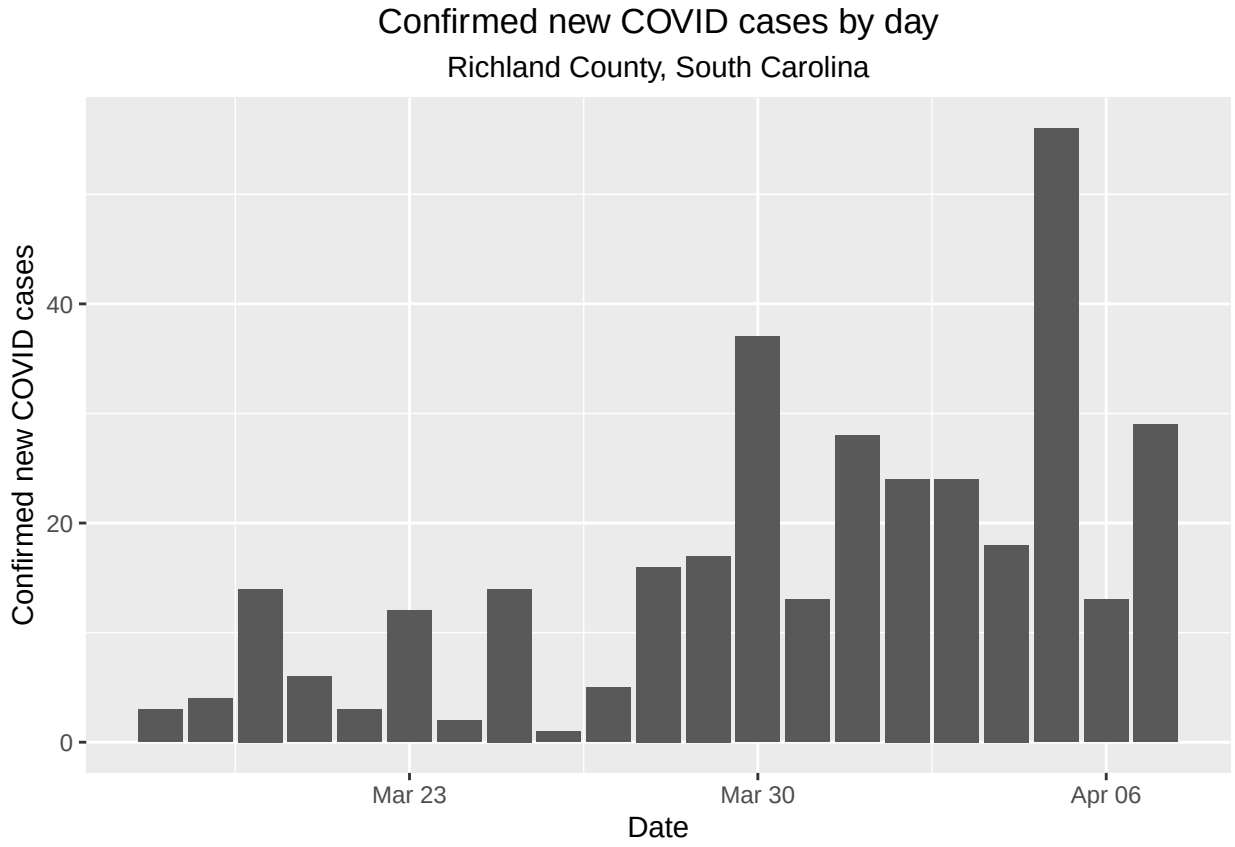

Total COVID−related deaths
Orange County, California
Total COVID−related deaths
15
10
5
0
Mar 01
Mar 15
Apr 01
Date


New COVID−related deaths by day
Orange County, California
New COVID−related deaths
3
2
1
0
Mar 01
Mar 15
Apr 01
Date

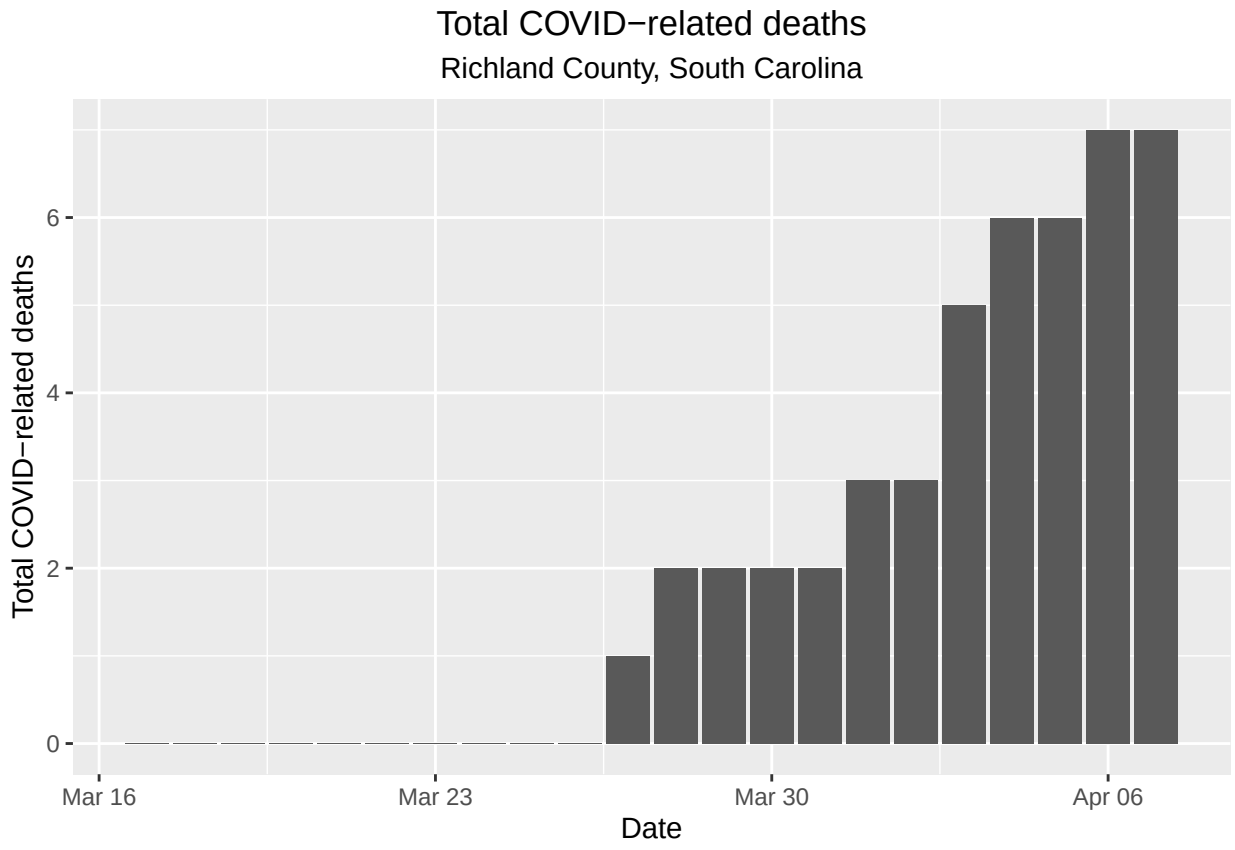
Richland County, South Carolina

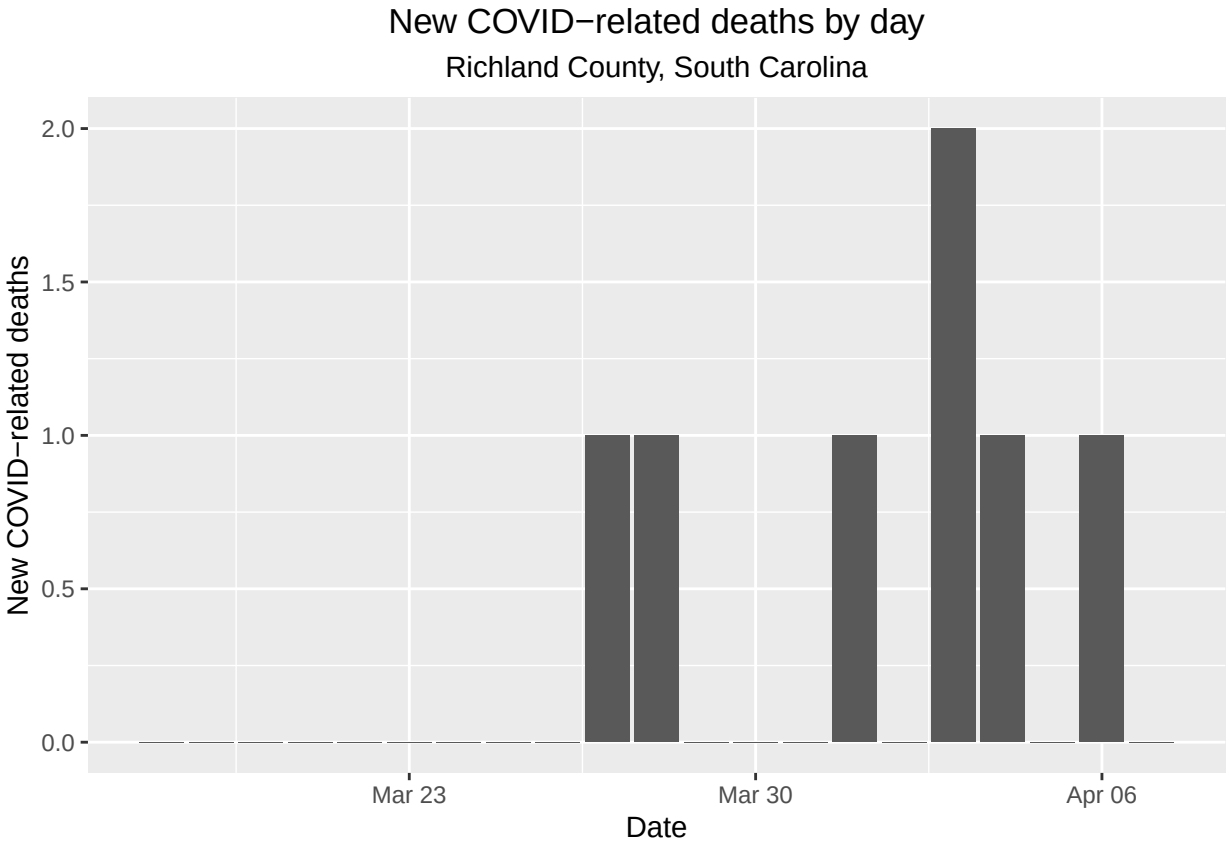
Confirmed cases




Confirmed new COVID cases by day
Richland County, South Carolina
Confirmed new COVID cases
40
20
0
Mar 23
Mar 30
Apr 06
Date

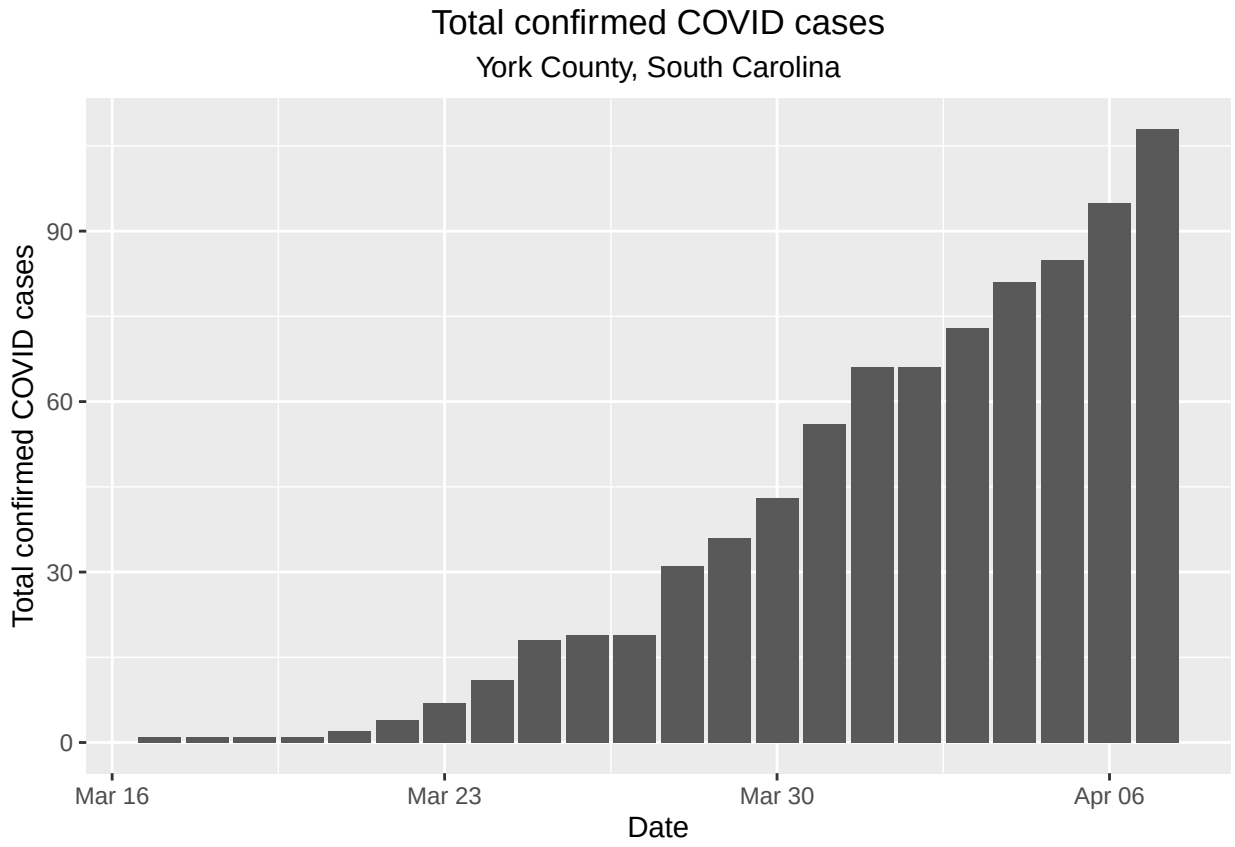
Deaths

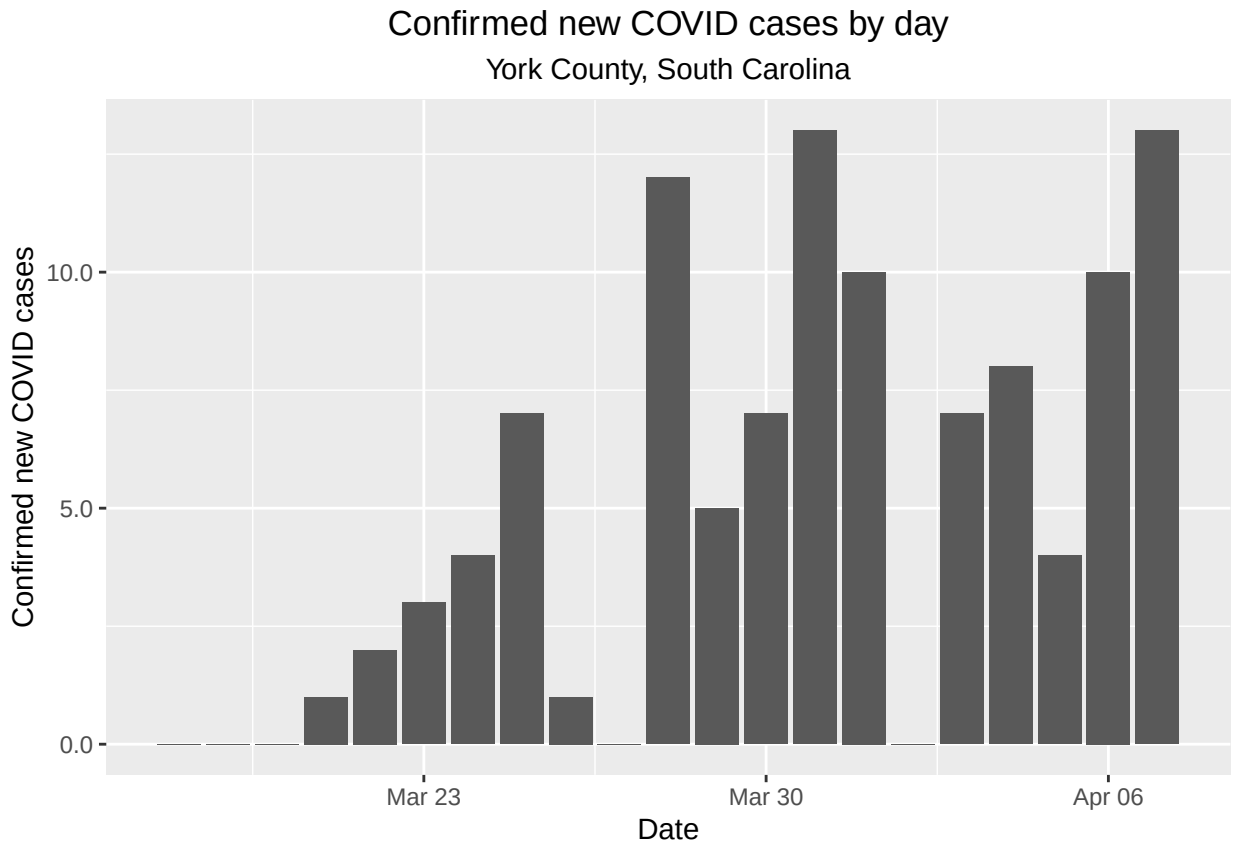

Total COVID−related deaths
Richland County, South Carolina
Total COVID−related deaths
6
4
2
0
Mar 16
Mar 23
Mar 30
Apr 06
Date


New COVID−related deaths by day
Richland County, South Carolina
New COVID−related deaths
2.0
1.5
1.0
0.5
0.0
Mar 23
Mar 30
Apr 06
Date

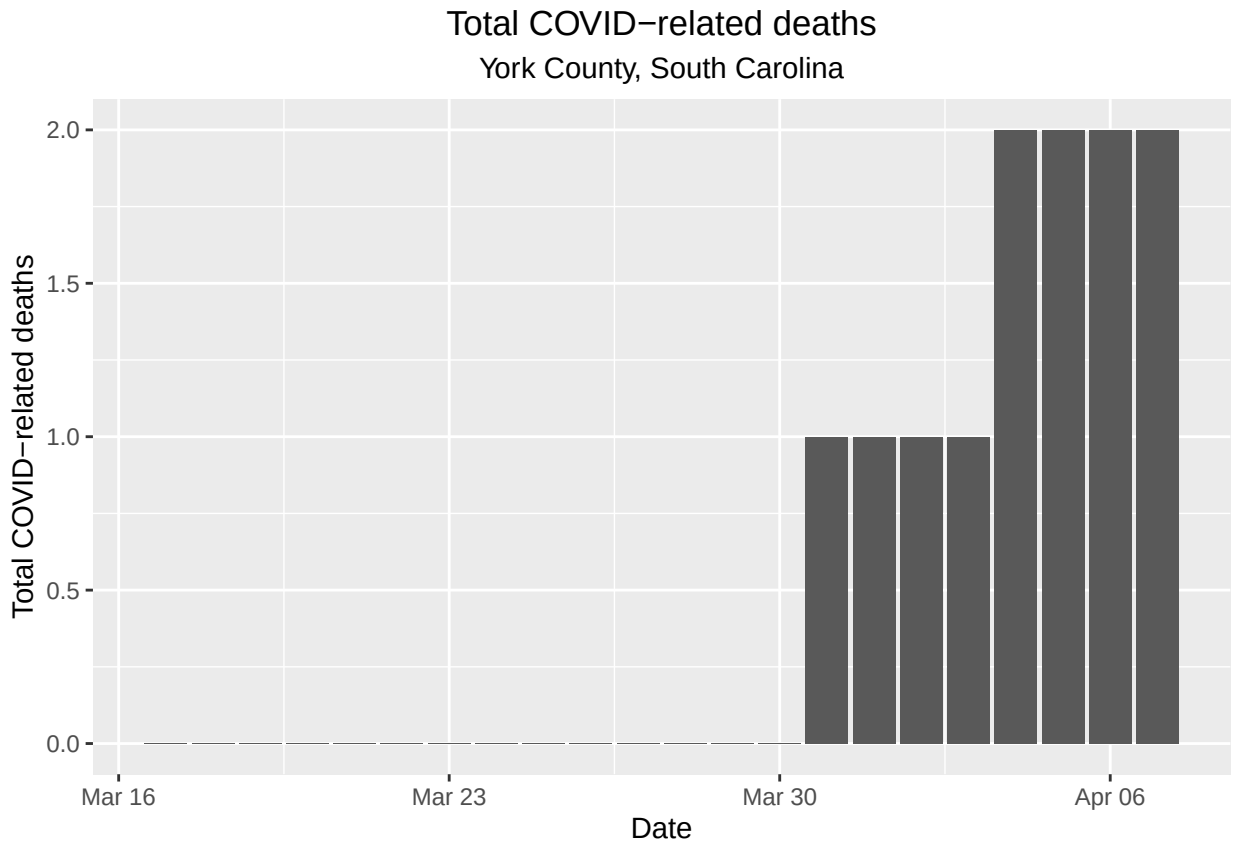
York County, South Carolina

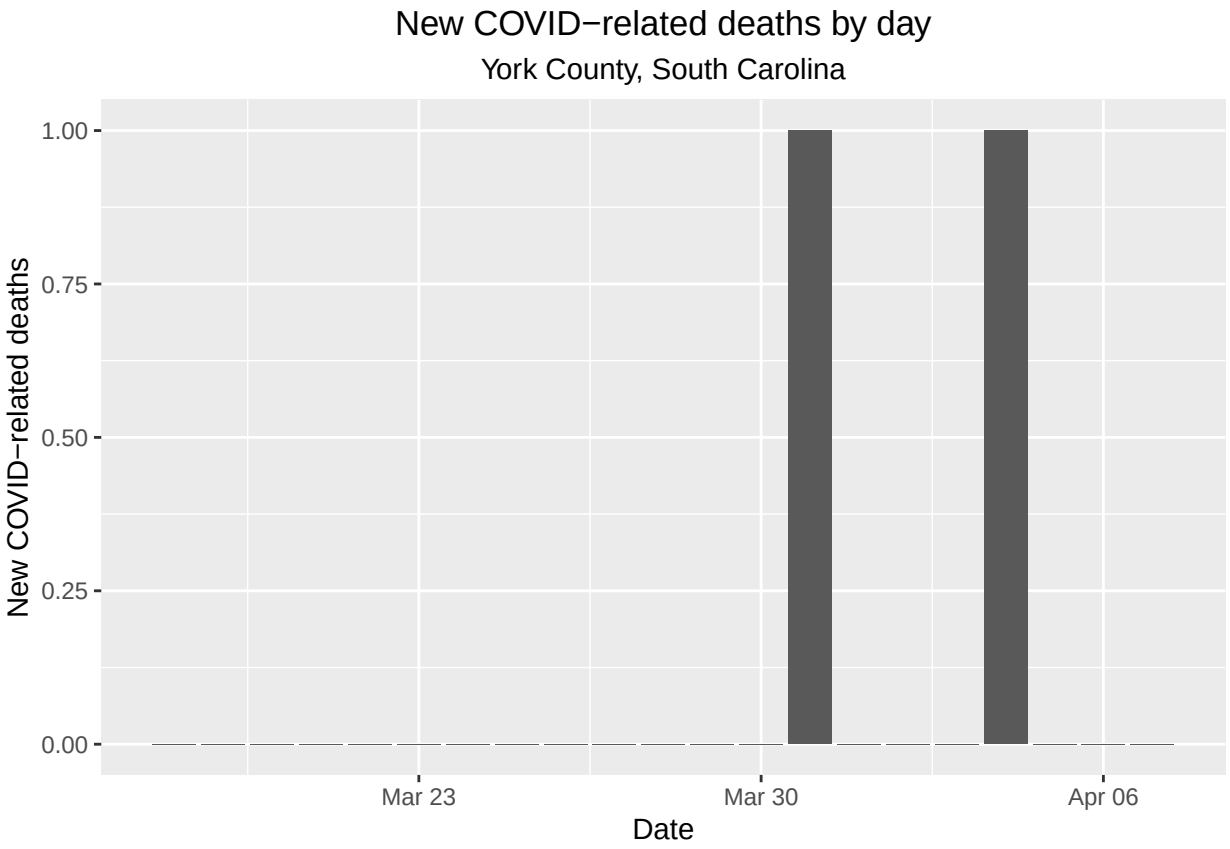
Confirmed cases




Confirmed new COVID cases by day
York County, South Carolina
Confirmed new COVID cases
10.0
5.0
0.0
Mar 23
Mar 30
Apr 06
Date

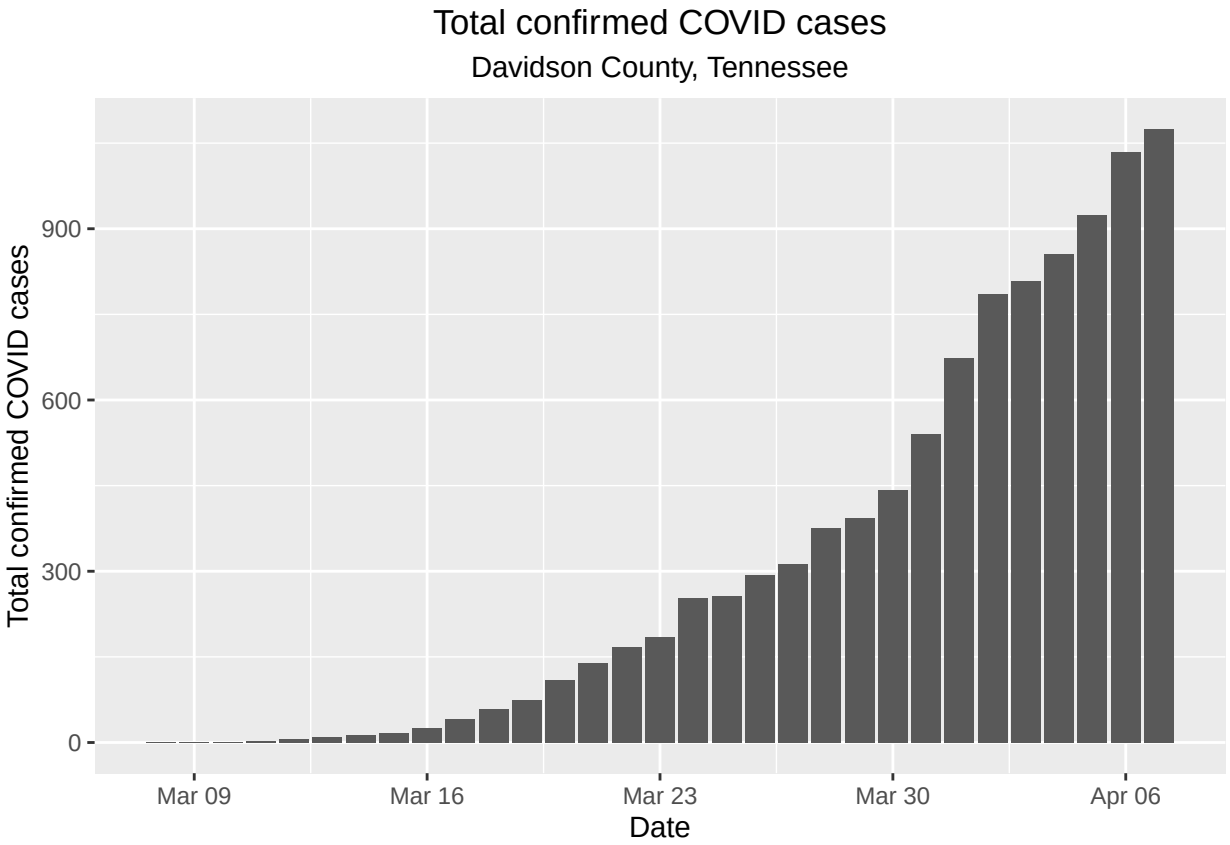
Deaths

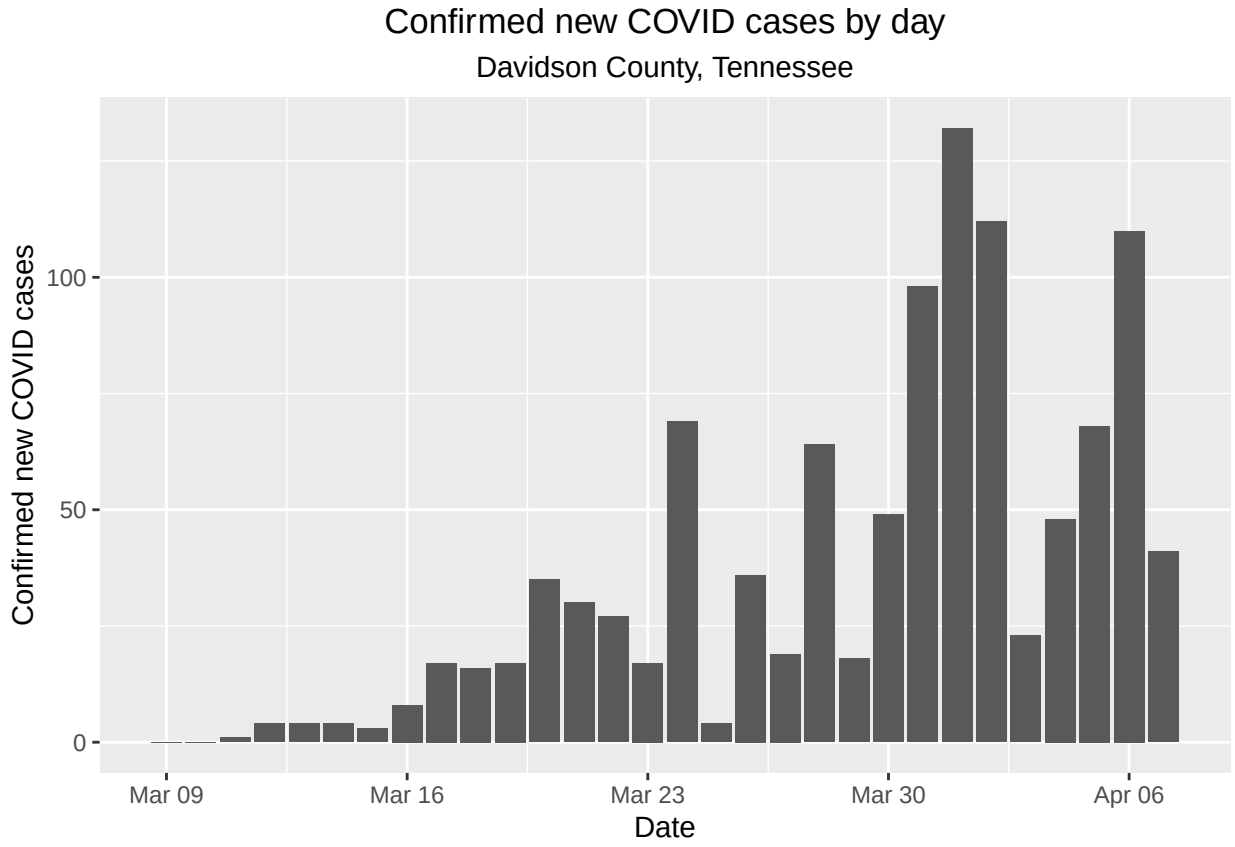

Total COVID−related deaths
York County, South Carolina
Total COVID−related deaths
2.0
1.5
1.0
0.5
0.0
Mar 16
Mar 23
Mar 30
Apr 06
Date


New COVID−related deaths by day
York County, South Carolina
New COVID−related deaths
1.00
0.75
0.50
0.25
0.00
Mar 23
Mar 30
Apr 06
Date

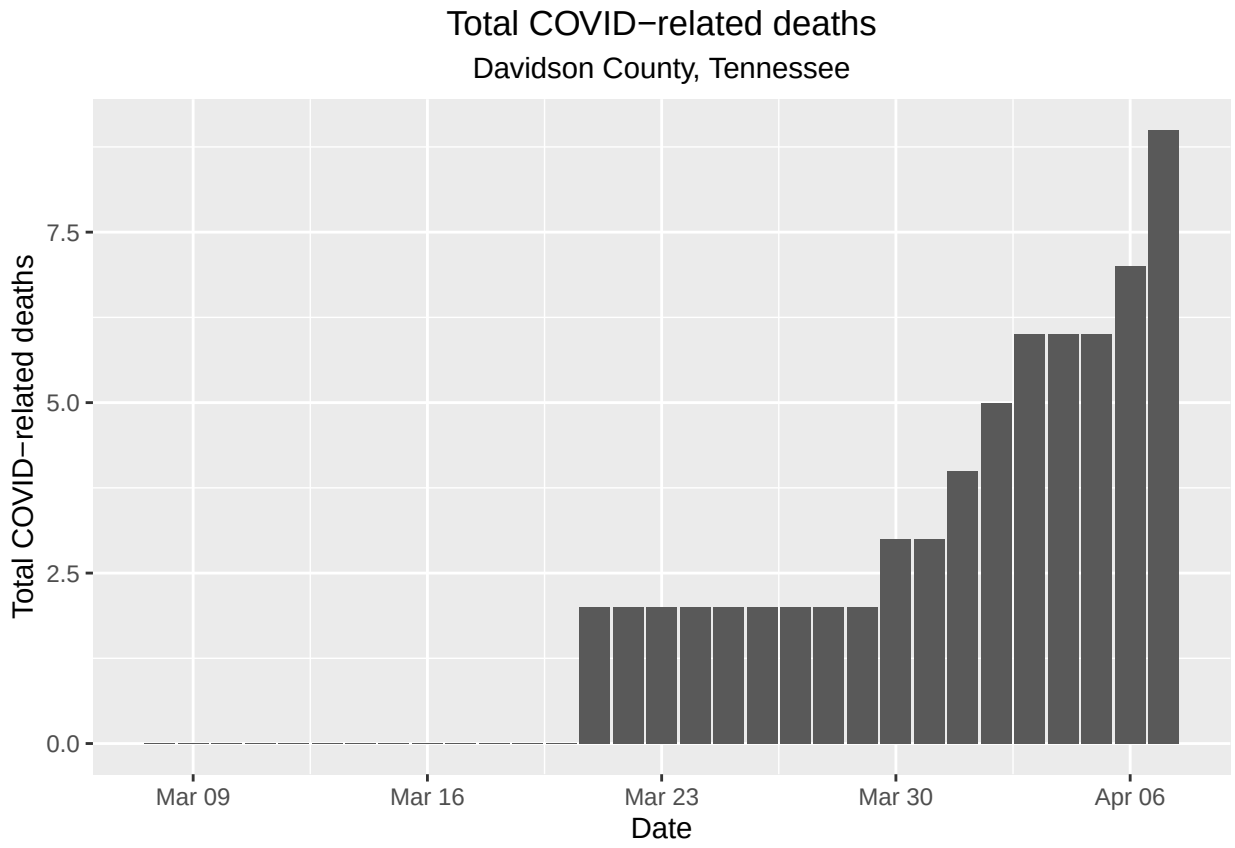
Davidson County, Tennessee

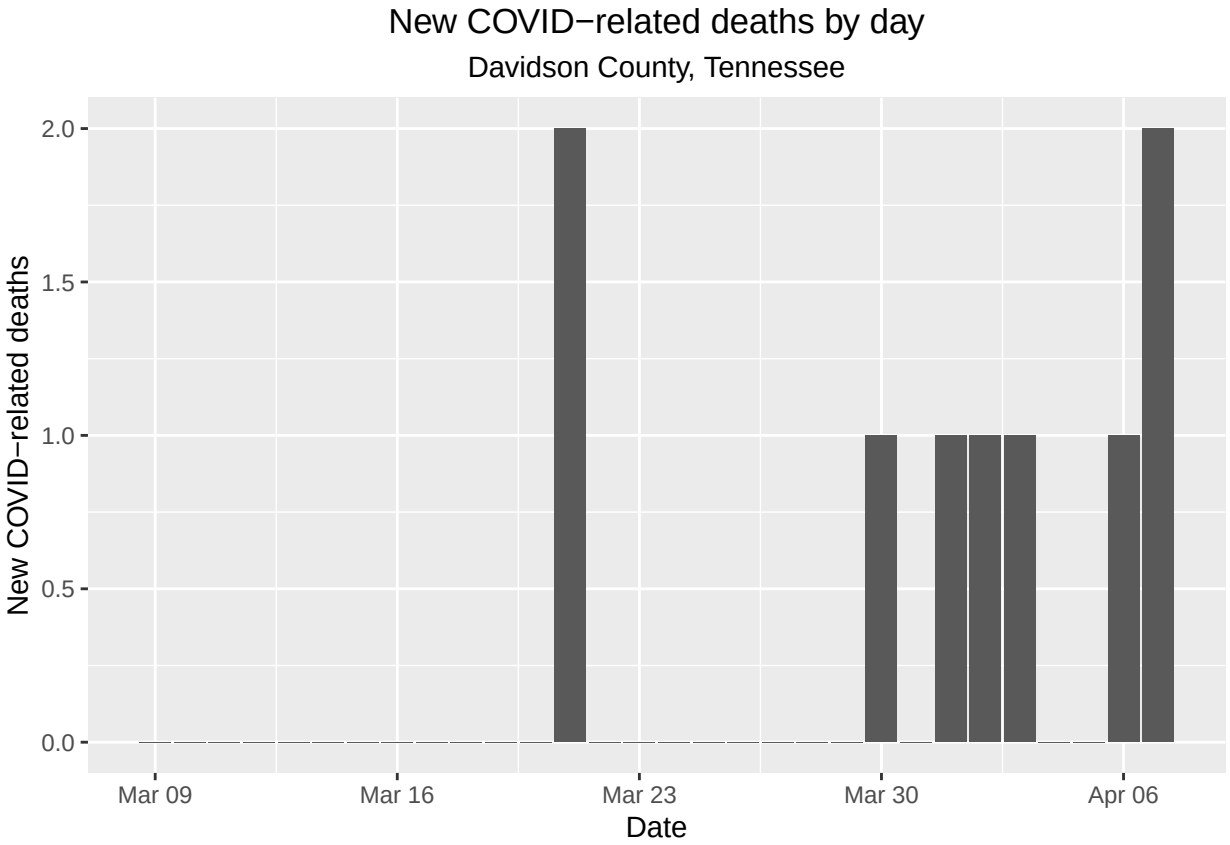
Confirmed cases




Confirmed new COVID cases by day
Davidson County, Tennessee
Confirmed new COVID cases
100
50
0
Mar 09
Mar 16
Mar 23
Mar 30
Apr 06
Date

Deaths


Total COVID−related deaths
Davidson County, Tennessee
Total COVID−related deaths
7.5
5.0
2.5
0.0
Mar 09
Mar 16
Mar 23
Mar 30
Apr 06
Date



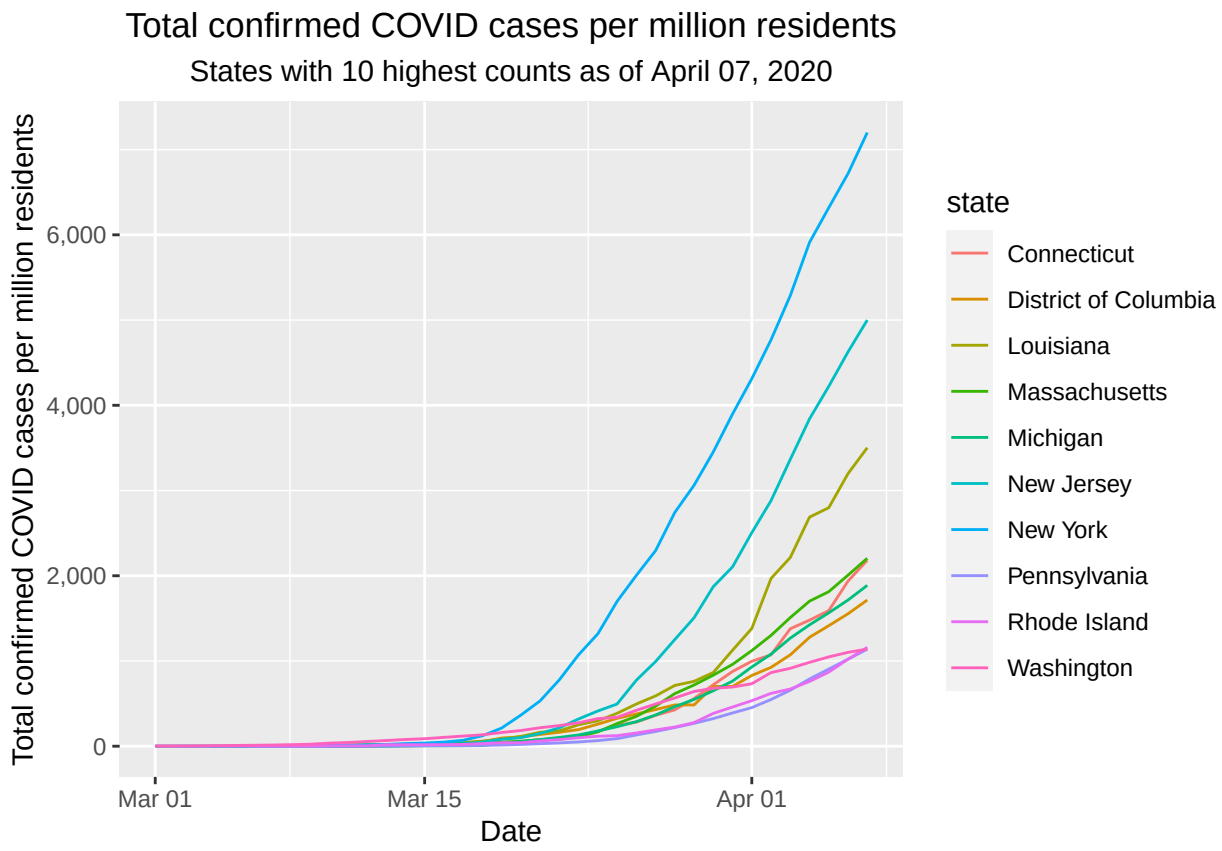
Compare state data based on population

Total confirmed cases

Table of total confirmed cases per million residents (all 50 states)

```
##                         state casesPerMillion
##  1:                  New York          7,200
##  2:                New Jersey          5,000
##  3:                 Louisiana          3,502
##  4:             Massachusetts          2,205
##  5:               Connecticut          2,182
##  6:                  Michigan          1,887
##  7:     District of Columbia          1,715
##  8:              Rhode Island          1,160
##  9:                Washington          1,140
## 10:              Pennsylvania          1,139
## 11:                  Illinois          1,069
## 12:                  Delaware            953
## 13:                  Colorado            942
## 14:                   Vermont            921
## 15:                   Georgia            862
## 16:                   Indiana            818
## 17:                  Maryland            722
## 18:                   Florida            686
```

```
## 19:                   Nevada            682
## 20:                    Idaho            677
## 21:              Mississippi            643
## 22:                Tennessee            587
## 23:            New Hampshire            549
## 24:                     Utah            546
## 25:                 Missouri            494
## 26:           South Carolina            469
## 27:                  Alabama            448
## 28:               California            443
## 29:                Wisconsin            442
## 30:                     Ohio            409
## 31:                 Virginia            390
## 32:                    Maine            386
## 33:                  Wyoming            381
## 34:               New Mexico            378
## 35:                 Oklahoma            372
## 36:             South Dakota            361
## 37:                  Arizona            353
## 38:                     Iowa            332
## 39:                 Arkansas            330
## 40:                   Kansas            310
## 41:             North Dakota            310
## 42:                    Texas            309
## 43:           North Carolina            307
## 44:                  Montana            298
## 45:                   Alaska            288
## 46:                   Hawaii            288
## 47:                 Kentucky            288
## 48:                   Oregon            280
## 49:                 Nebraska            253
## 50:            West Virginia            229
## 51:                Minnesota            189
## 52:              Puerto Rico            179
## 53:                     Guam           <NA>
## 54: Northern Mariana Islands           <NA>
## 55:           Virgin Islands           <NA>
##                       state casesPerMillion
```

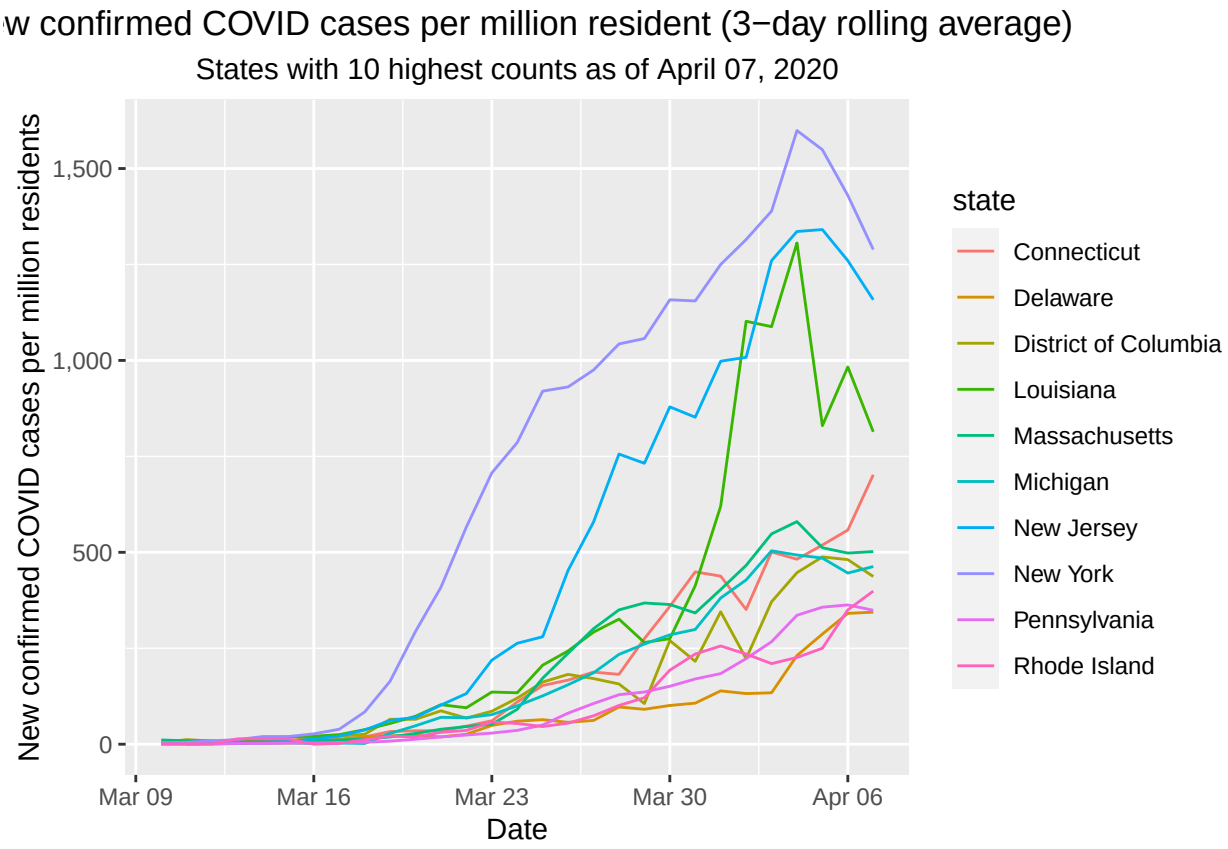


New confirmed cases

Table of new cases per million residents: rolling 3-day average (all 50 states)

```
##                       state casesNewPerMillion
##  1:                New York             1,289
##  2:              New Jersey             1,158
##  3:               Louisiana               814
##  4:             Connecticut               702
##  5:           Massachusetts               502
##  6:                Michigan               463
##  7:    District of Columbia               437
##  8:            Rhode Island               399
##  9:            Pennsylvania               349
## 10:                Delaware               344
## 11:                 Georgia               261
## 12:                Illinois               251
## 13:                 Indiana               230
## 14:                Maryland               206
## 15:                 Vermont               182
## 16:              Washington               155
## 17:             Mississippi               154
## 18:                 Florida               149
## 19:                Colorado               148
## 20:            South Dakota               122
```

```
## 21:                  Missouri                121
## 22:                New Mexico                119
## 23:                   Alabama                115
## 24:                    Nevada                111
## 25:                 Tennessee                109
## 26:                  Virginia                108
## 27:                      Utah                101
## 28:            South Carolina                 97
## 29:                California                 94
## 30:             New Hampshire                 92
## 31:                      Ohio                 89
## 32:                  Arkansas                 84
## 33:                      Iowa                 83
## 34:                  Kentucky                 83
## 35:                     Texas                 83
## 36:                 Wisconsin                 80
## 37:                  Oklahoma                 79
## 38:                  Nebraska                 78
## 39:            North Carolina                 77
## 40:                   Arizona                 76
## 41:                     Idaho                 74
## 42:             West Virginia                 72
## 43:                    Kansas                 70
## 44:              North Dakota                 66
## 45:                   Wyoming                 58
## 46:                    Alaska                 57
## 47:                     Maine                 46
## 48:                    Oregon                 43
## 49:                    Hawaii                 41
## 50:               Puerto Rico                 37
## 51:                 Minnesota                 36
## 52:                   Montana                 35
## 53:                      Guam               <NA>
## 54: Northern Mariana Islands               <NA>
## 55:            Virgin Islands               <NA>
##                         state casesNewPerMillion
```

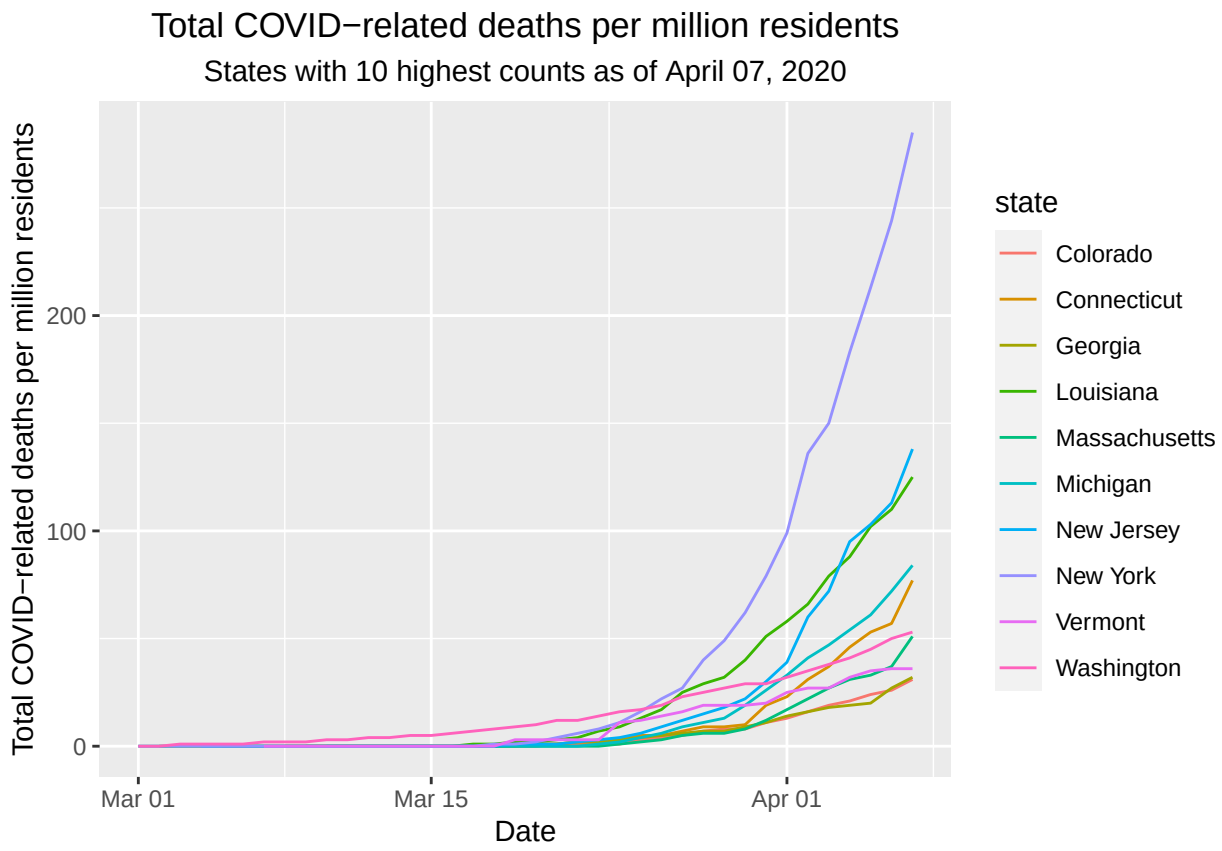


Total deaths

Table of total deaths per million residents (all 50 states)

```
##                        state deathsPerMillion
##  1:                New York              285
##  2:              New Jersey              138
##  3:               Louisiana              125
##  4:                Michigan               84
##  5:             Connecticut               77
##  6:              Washington               53
##  7:           Massachusetts               51
##  8:                 Vermont               36
##  9:                 Georgia               32
## 10:                Colorado               31
## 11:    District of Columbia               31
## 12:                Illinois               30
## 13:            Rhode Island               28
## 14:                 Indiana               25
## 15:             Mississippi               19
## 16:                  Nevada               19
## 17:            Pennsylvania               18
## 18:                Maryland               17
## 19:                Delaware               16
## 20:                Oklahoma               16
```

```
## 21:                Wisconsin              16
## 22:                 Kentucky              14
## 23:                     Ohio              14
## 24:                  Alabama              13
## 25:                  Florida              13
## 26:                 Missouri              12
## 27:               California              11
## 28:                  Arizona              10
## 29:                   Kansas              10
## 30:                Tennessee              10
## 31:            New Hampshire               9
## 32:           South Carolina               9
## 33:                    Idaho               8
## 34:                     Iowa               8
## 35:                    Maine               8
## 36:                 Virginia               8
## 37:                   Oregon               7
## 38:              Puerto Rico               7
## 39:                Minnesota               6
## 40:                 Nebraska               6
## 41:               New Mexico               6
## 42:             South Dakota               6
## 43:                    Texas               6
## 44:                   Alaska               5
## 45:                 Arkansas               5
## 46:                  Montana               5
## 47:             North Dakota               5
## 48:           North Carolina               4
## 49:                     Utah               4
## 50:                   Hawaii               3
## 51:            West Virginia               2
## 52:                  Wyoming               0
## 53:                     Guam            <NA>
## 54: Northern Mariana Islands            <NA>
## 55:           Virgin Islands            <NA>
##                        state deathsPerMillion
```

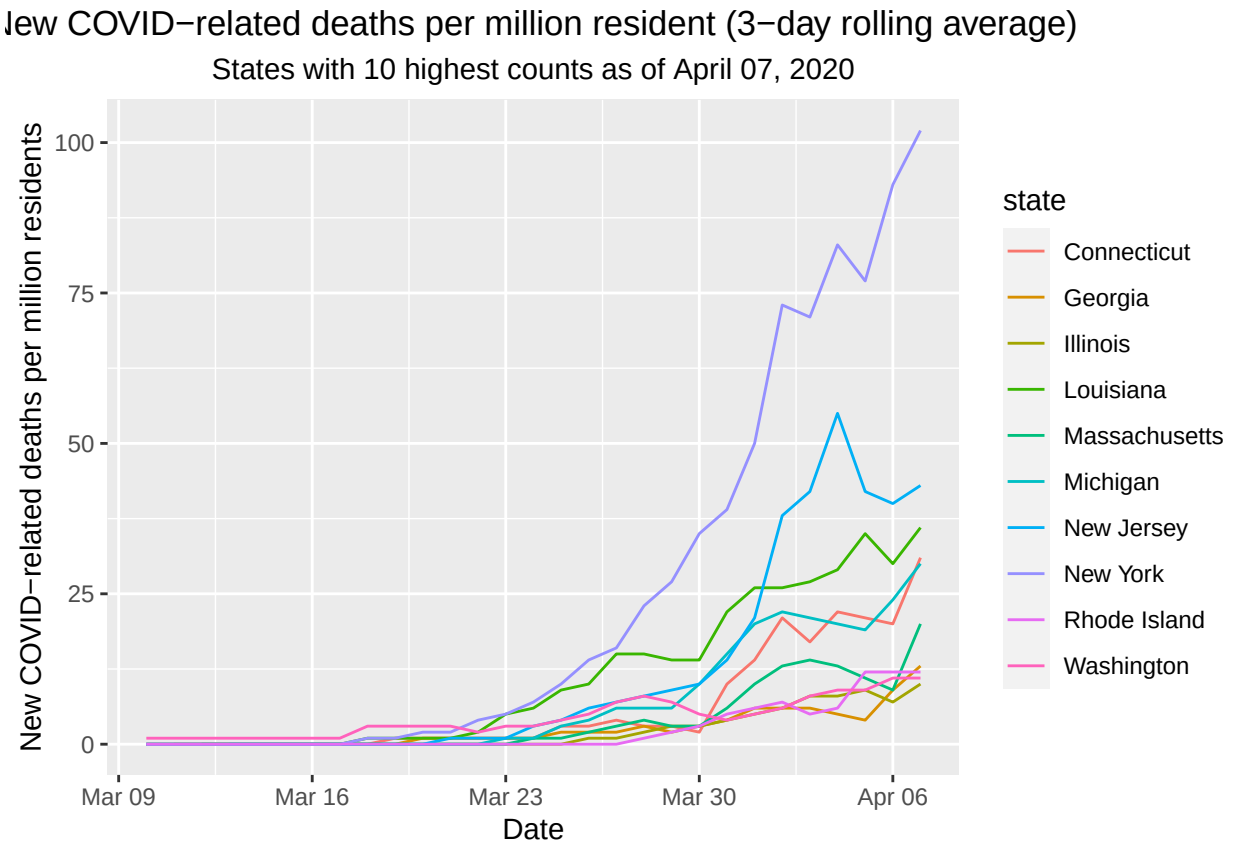


New deaths

Table of new deaths per million residents: rolling 3-day average (all 50 states)

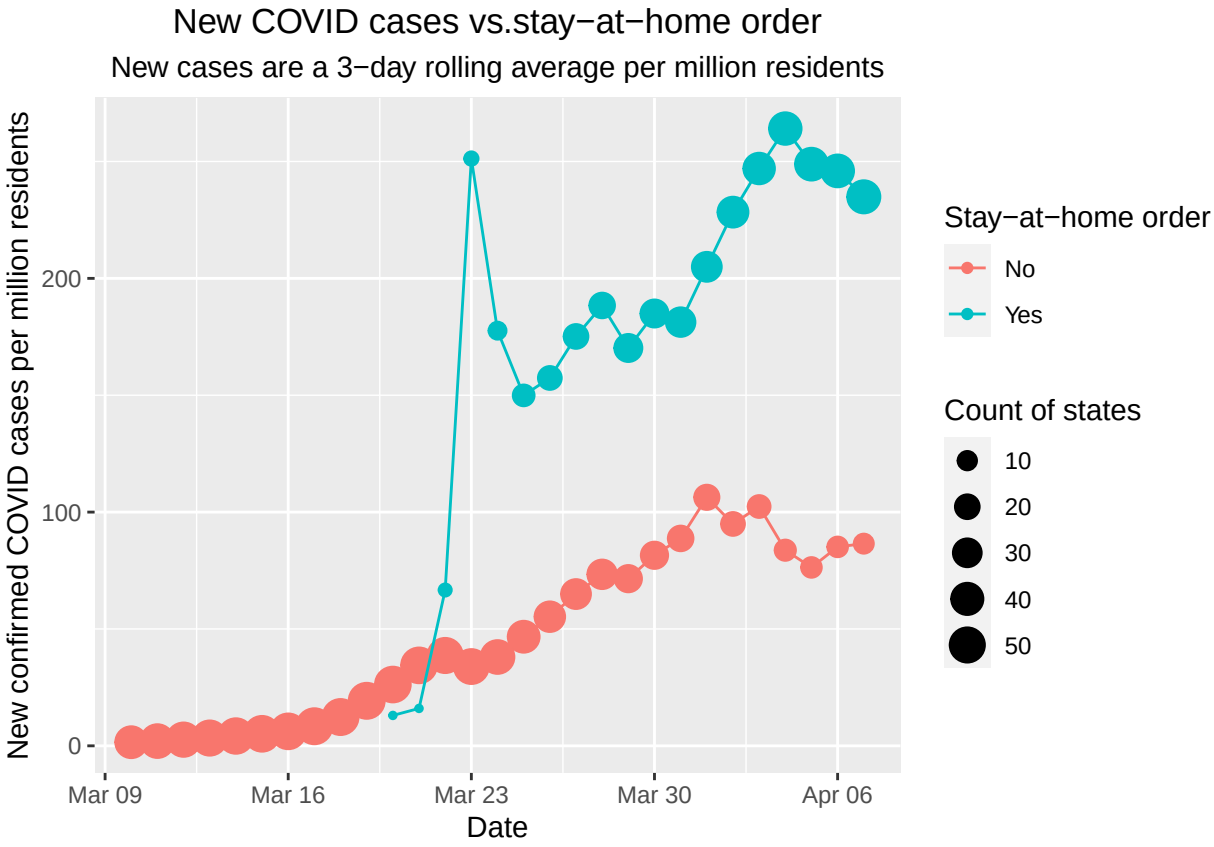
```
##                    state deathsNewPerMillion
##  1:             New York                102
##  2:           New Jersey                 43
##  3:            Louisiana                 36
##  4:          Connecticut                 31
##  5:             Michigan                 30
##  6:        Massachusetts                 20
##  7:              Georgia                 13
##  8:         Rhode Island                 12
##  9:           Washington                 11
## 10:             Illinois                 10
## 11:             Colorado                  9
## 12:              Indiana                  8
## 13:             Maryland                  8
## 14:          Mississippi                  8
## 15:         Pennsylvania                  7
## 16:             Oklahoma                  6
## 17:             Kentucky                  5
## 18:             Missouri                  5
## 19:                 Ohio                  5
## 20:            Wisconsin                  5
```

```
## 21:                  Alabama                  4
## 22:                  Florida                  4
## 23:                     Iowa                  4
## 24:                   Nevada                  4
## 25:             South Dakota                  4
## 26:                  Vermont                  4
## 27:                  Arizona                  3
## 28:               California                  3
## 29:                   Kansas                  3
## 30:                Tennessee                  3
## 31:                 Delaware                  2
## 32:                    Idaho                  2
## 33:                 Nebraska                  2
## 34:            New Hampshire                  2
## 35:           South Carolina                  2
## 36:                   Alaska                  1
## 37:                 Arkansas                  1
## 38:     District of Columbia                  1
## 39:                   Hawaii                  1
## 40:                    Maine                  1
## 41:                Minnesota                  1
## 42:           North Carolina                  1
## 43:             North Dakota                  1
## 44:                   Oregon                  1
## 45:              Puerto Rico                  1
## 46:                    Texas                  1
## 47:                     Utah                  1
## 48:                 Virginia                  1
## 49:            West Virginia                  1
## 50:                  Montana                  0
## 51:               New Mexico                  0
## 52:                  Wyoming                  0
## 53:                     Guam               <NA>
## 54: Northern Mariana Islands               <NA>
## 55:           Virgin Islands               <NA>
##                        state deathsNewPerMillion
```



Compare new cases based on stay-at-home orders

- The section is a work in progress – I'll probably change and add plots over the coming days.
- I'm trying to see what effect stay-at-home orders have on spread. It's inherentely messy because some states have localized orders but not orders for their full state and because states implemented the orders at different times.
- The current plot shows the rolling 3-day average of new cases per million residents, averaged across 2 groups of states – those with a state-wide stay-at-home order in effect and those without. The size of the dots reflect the number of states in each group for each given day (so the dots are getting bigger for the group with orders over time, as more states implement those orders).
- So far, this view doesn't show if these orders are "working" or not. Instead, the biggest takeaway from the current plot is that the states that implemented orders are reacting to having worse spread, which is why the case rate is so much higher at the start for them. As a state decides it has a problem and implements an order, it joins the grouping of states with orders and drives the rate up for that group.
- Over time (if the policies work), what we'd expect is that the line for the group with orders flattens a bit, but we'll see. It also may become moot if all states issue orders.
- The next plot I want to add will show rate of spread based on how long an order has been in effect, but still thinking about how to do this. Mostly, I'm trying to decide what the right baseline is to compare against.


New COVID cases vs.stay−at−home order
New cases are a 3−day rolling average per million residents
New confirmed COVID cases per million residents
200
100
0
Mar 09
Mar 16
Mar 23
Mar 30
Apr 06
Date
Stay−at−home order
No
Yes
Count of states
10
20
30
40
50