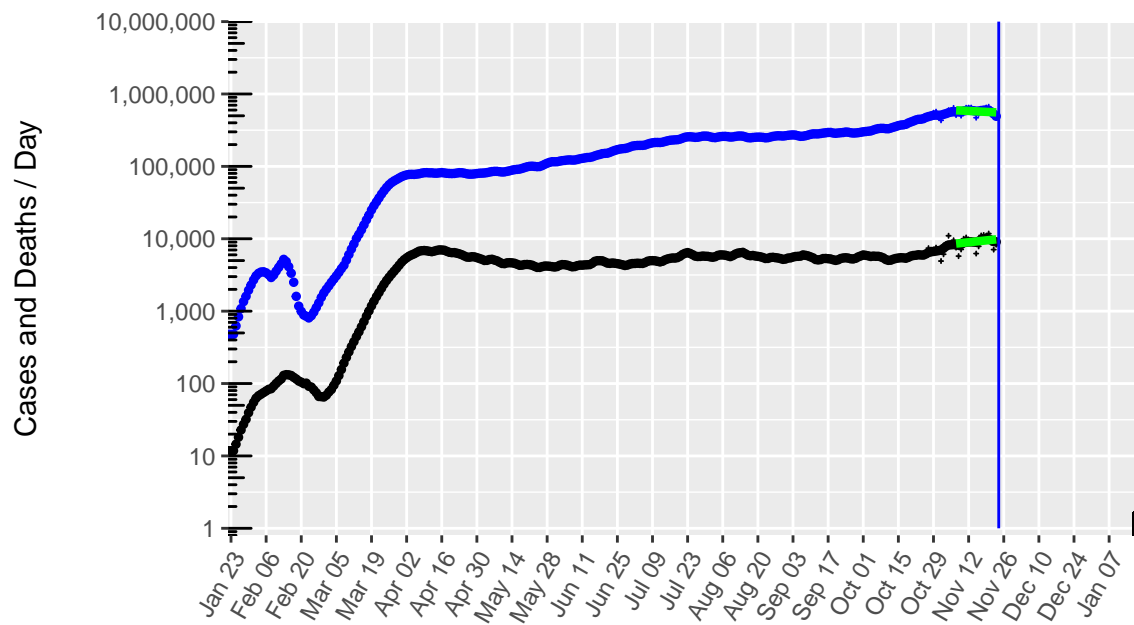
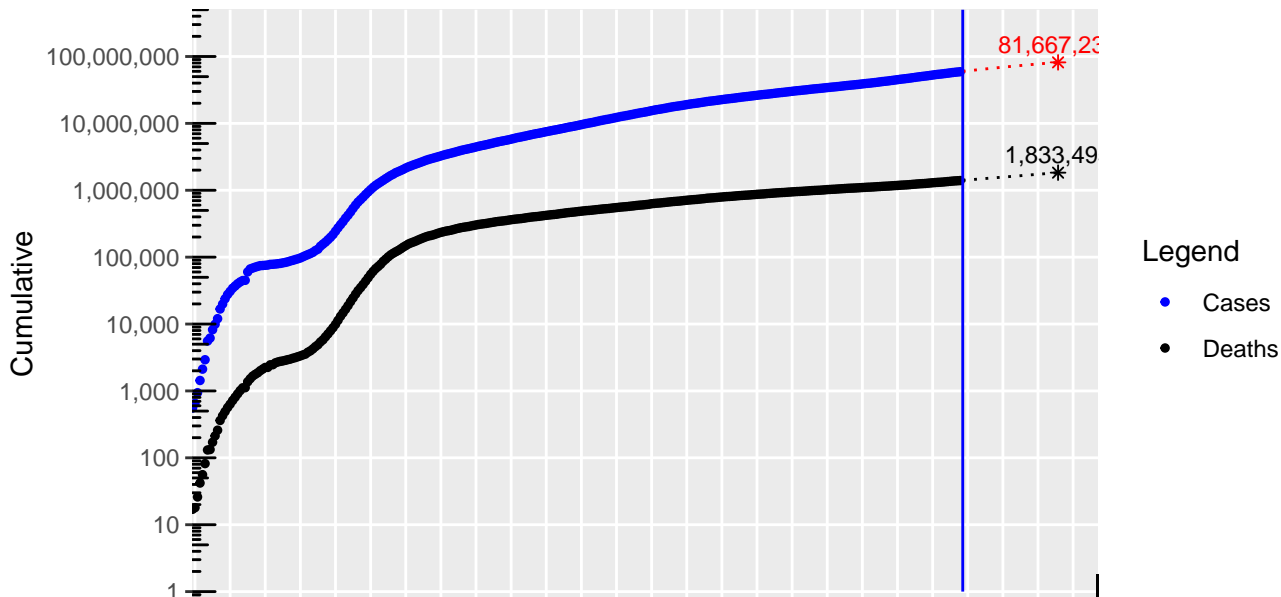
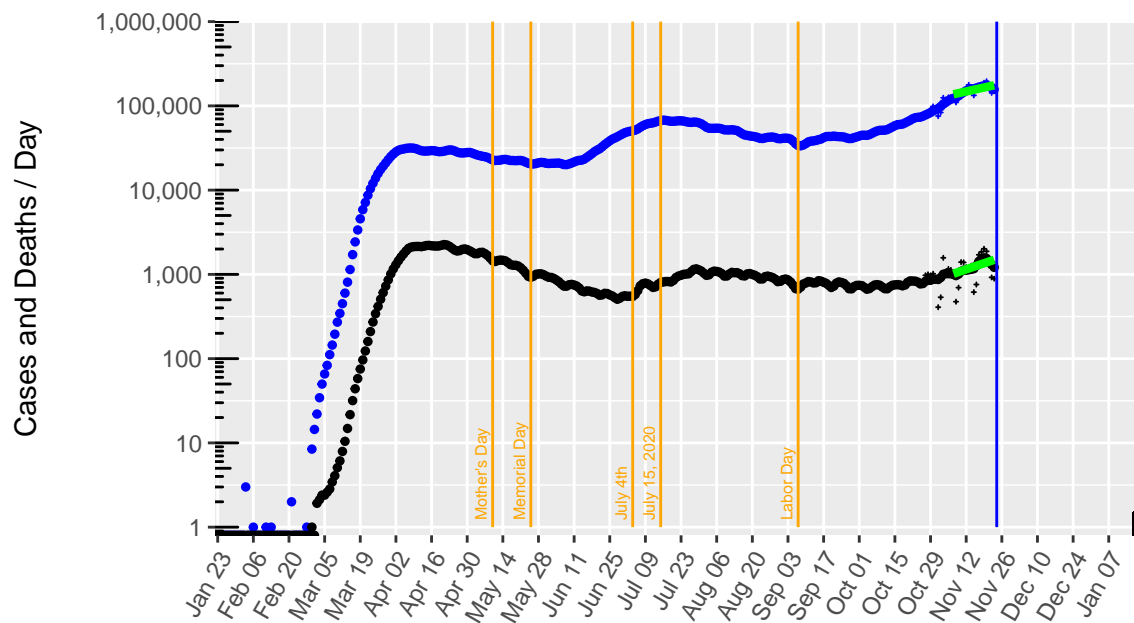
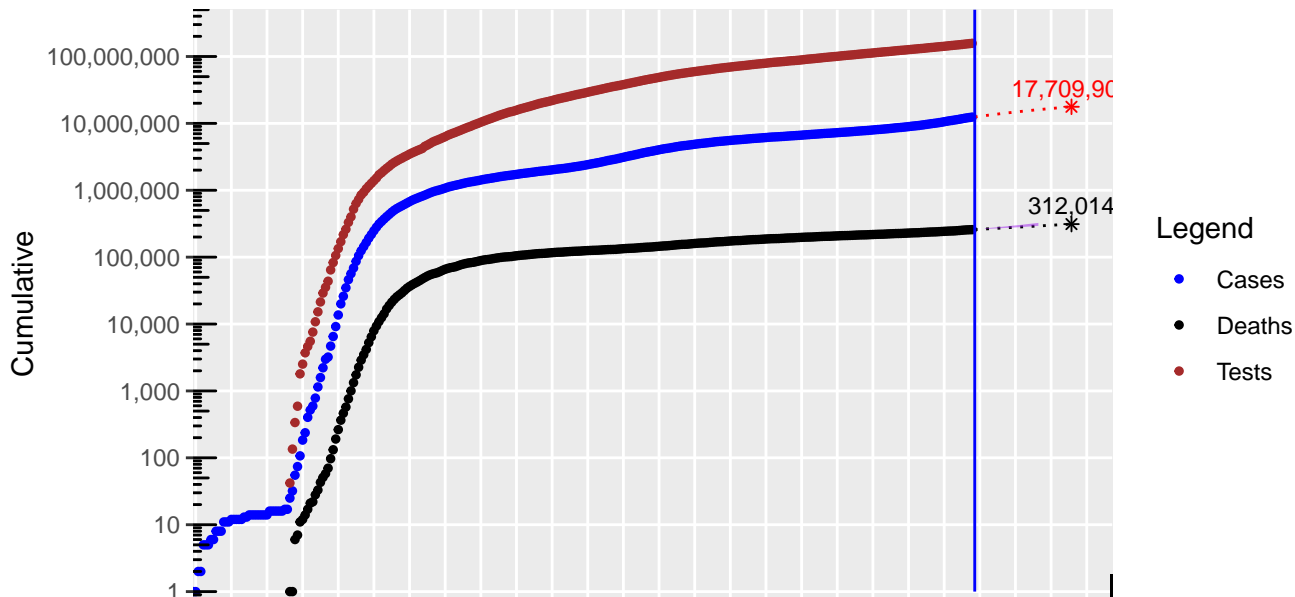


Worldwide projection as of 2020-11-24



— Case Mortality: 2.4% — Daily Change: -0.4% Cases, +0.9% Deaths (over 16 days)

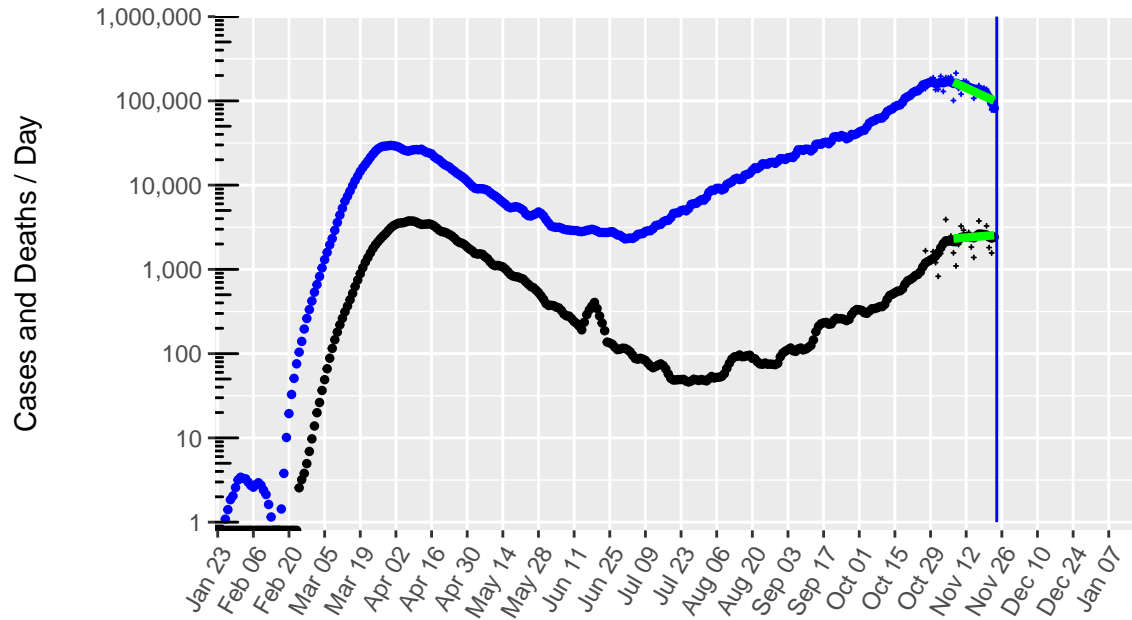
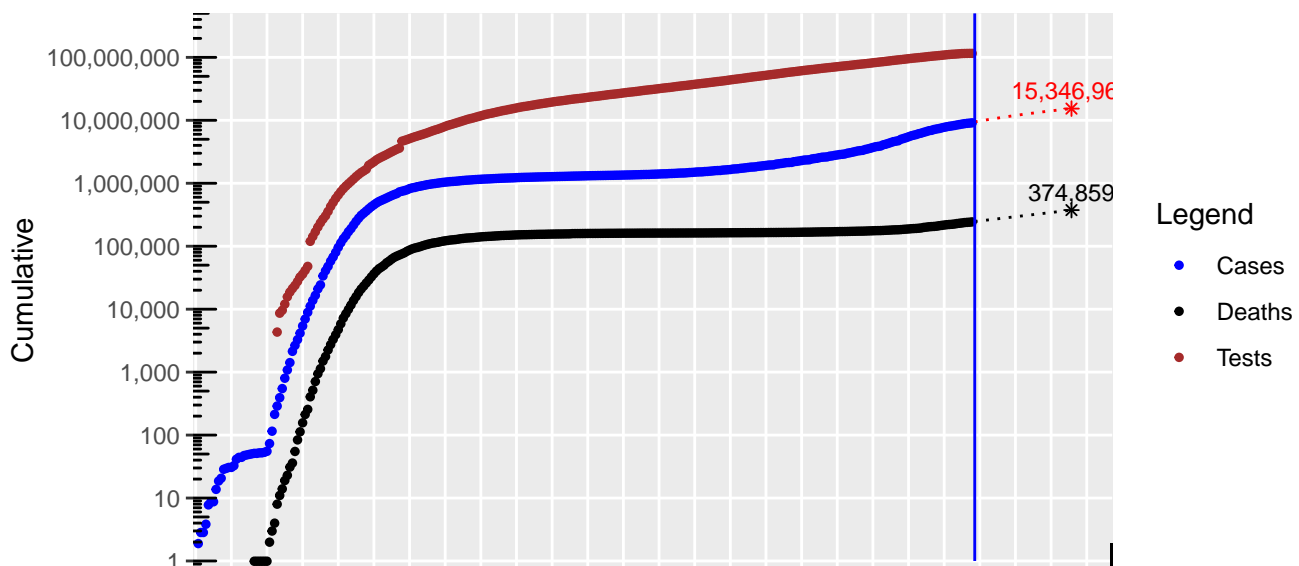
USA projection as of 2020-11-24



ts: 257,671 (889) — Case Mortality: 2.1% — Daily Change: +1.6% Cases, +2.5% Deaths (over 16 days)

Western Europe projection as of 2020-11-24

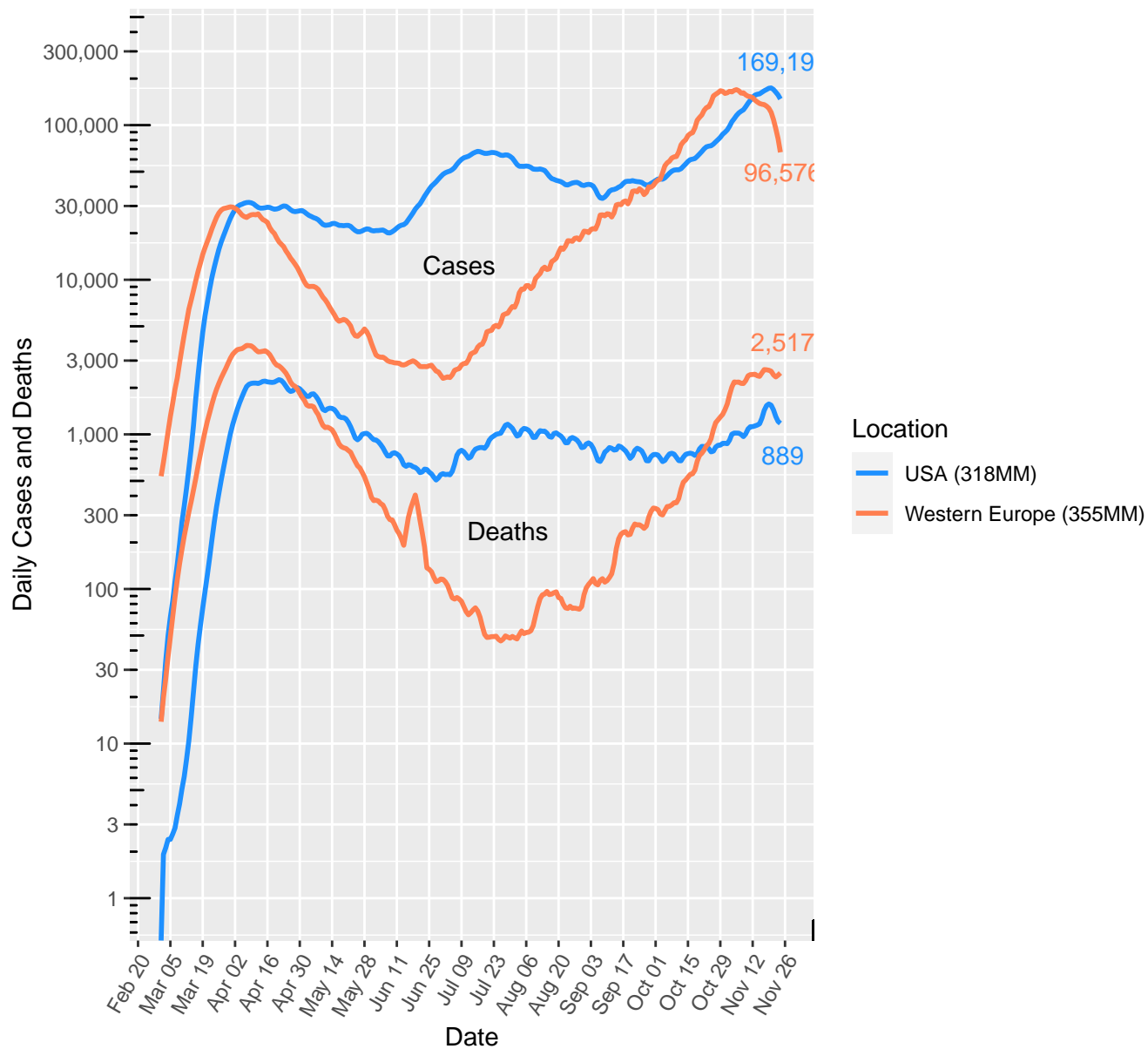
Belgium, France, Greece, Germany, Italy, Luxembourg, Netherlands, Portugal, Spain, and the UK (Population = 355MM)



243,347 (2,517) — Case Mortality: 2.7% — Daily Change: -3.3% Cases, +0.6% Deaths (over 16 days)

COVID-19 Cases & Deaths in the USA & Europe

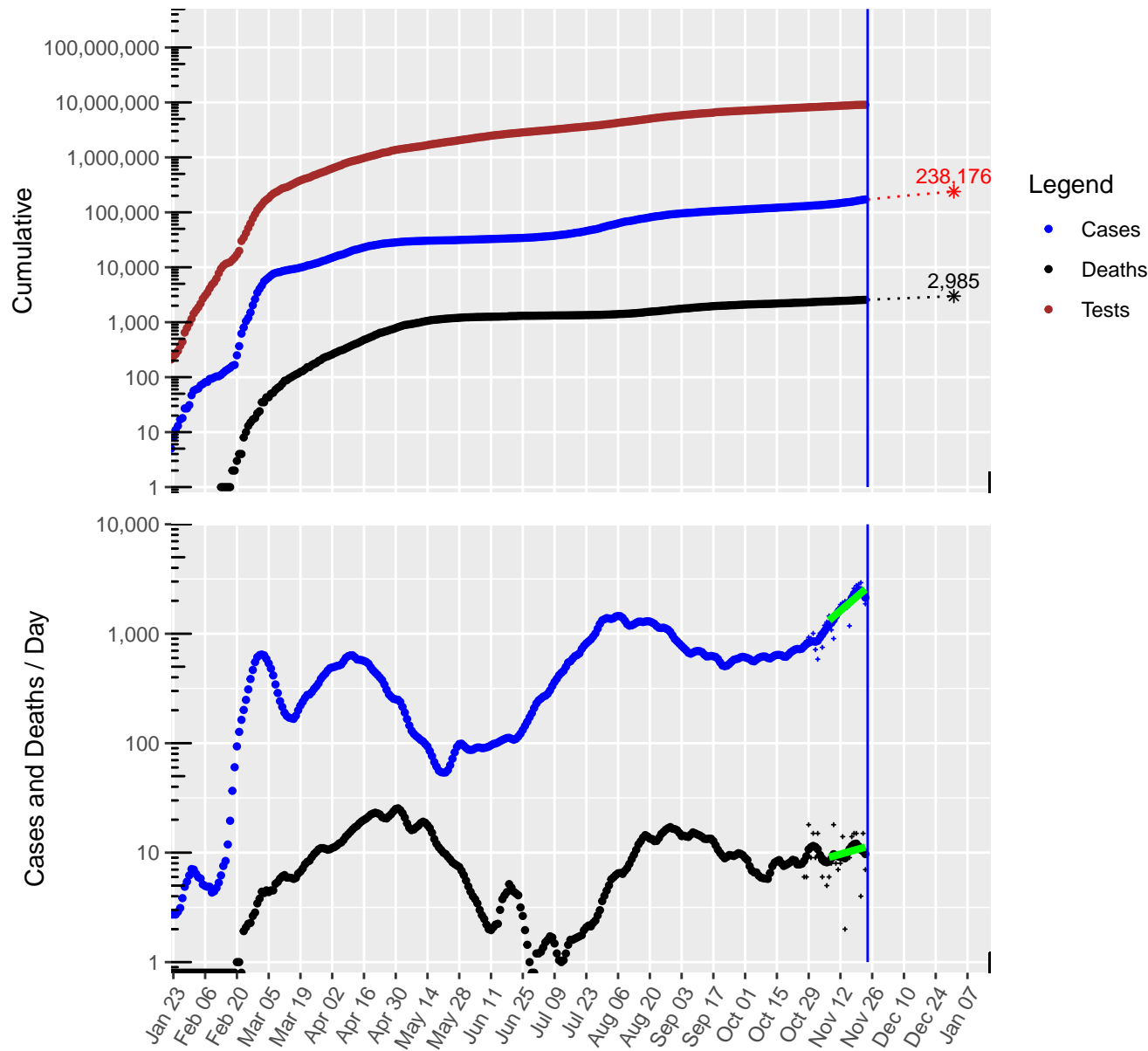
Log plot of 7 day average



Germany, Italy, Luxembourg, Netherlands, Portugal, Spain, and the UK (Population = 355MM)

Non-authoritarian Asian ensemble projection as of 2020-11-24

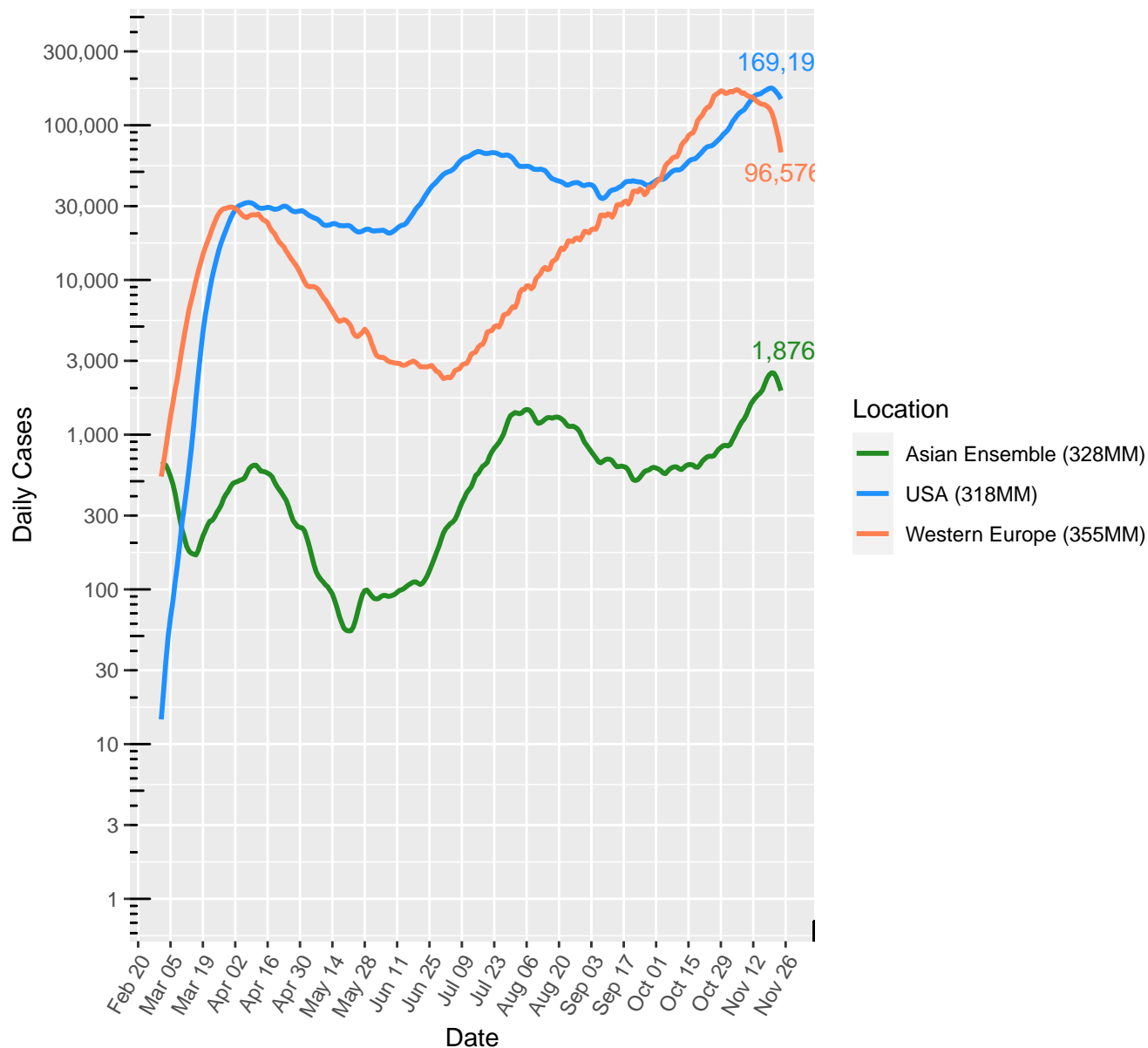
Japan, South Korea, Thailand, and Vietnam (Population = 328 MM)



Deaths: 2,554 (7) — Case Mortality: 1.5% — Daily Change: +4.2% Cases, +1.4% Deaths (over 16 days)

COVID-19 Cases in the USA, Western Europe, and the Asian Ensemble

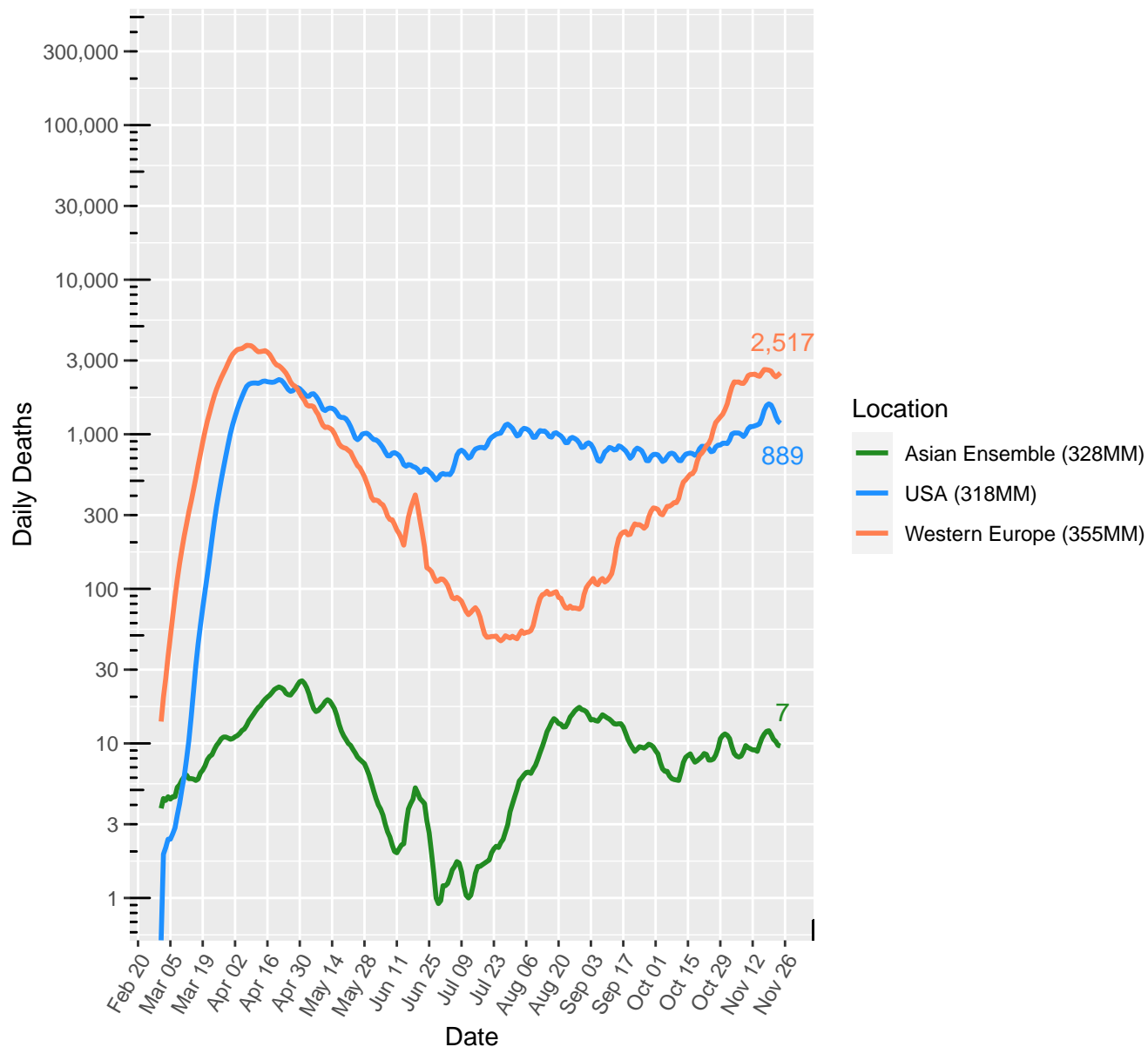
Log plot of 7 day average



Asian Ensemble: Japan, South Korea, Thailand, and Vietnam (Population = 328 MM)

COVID-19 Deaths among the USA, Western Europe, and the Asian Ensemble

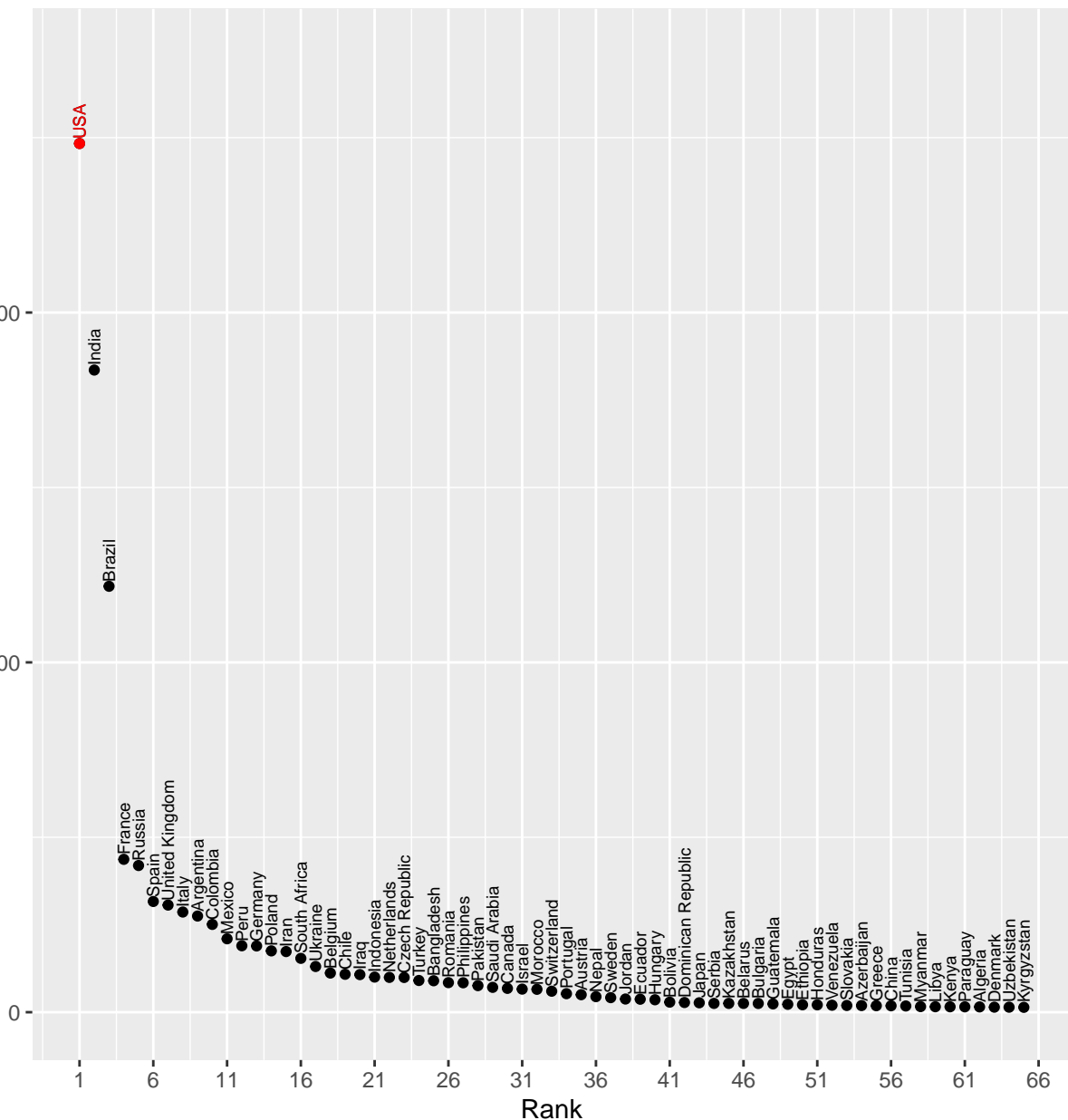
Log plot of 7 day average



Asian Ensemble: Japan, South Korea, Thailand, and Vietnam (Population = 328 MM)

Worldwide cases

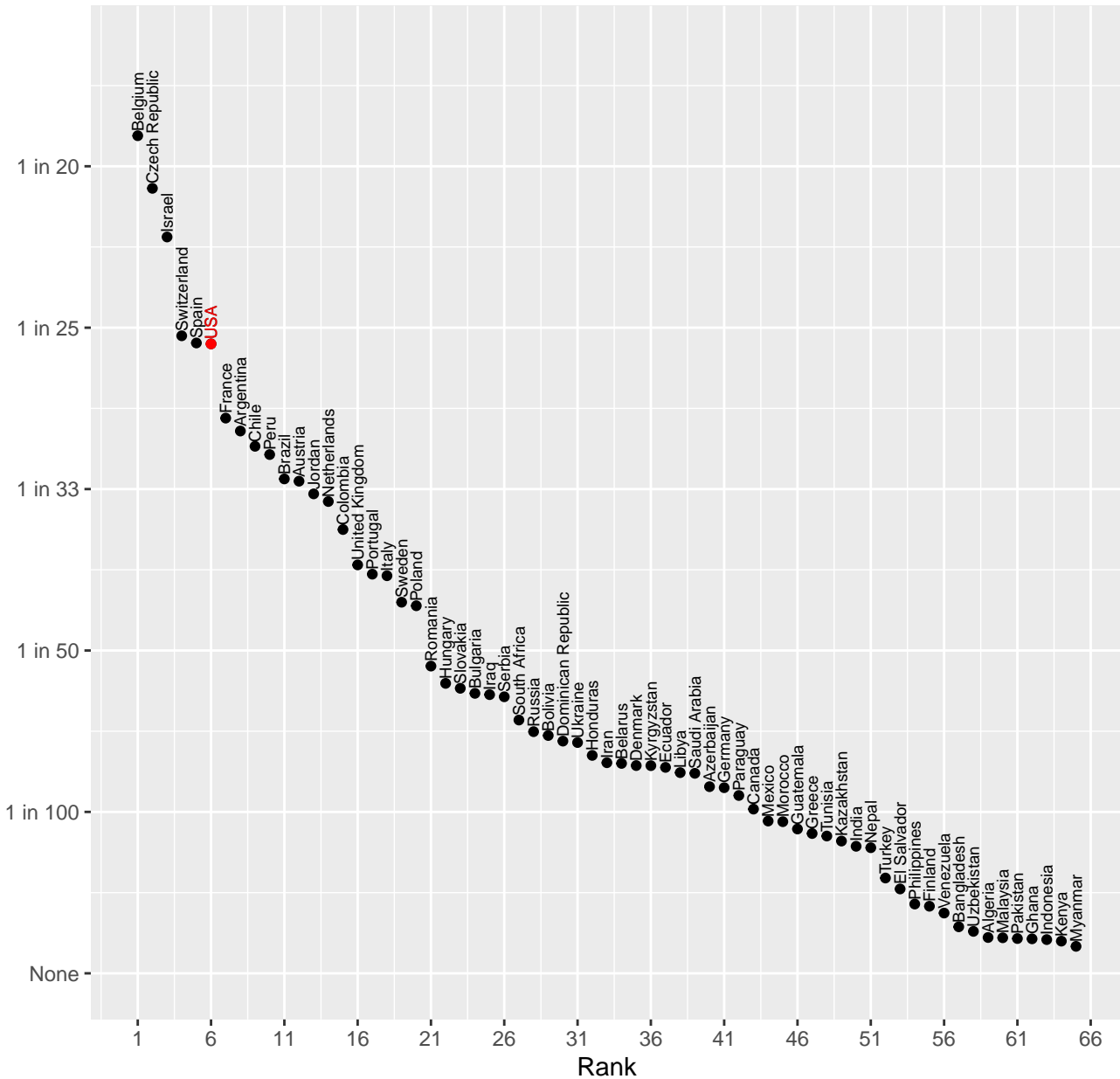
Total cases to date



Excludes countries with population < 5,000,000

Worldwide cases

Total cases to date



Average new cases over past 7 days

Average cases / day

1 in 1,000

1 in 1,250

1 in 1,667

1 in 2,500

1 in 5,000

None

1

6

11

16

21

26

31

36

41

46

51

56

61

66

Rank

Excludes countries with population < 5,000,000

Jordan

Switzerland

Serbia

Austria

Portugal

Italy

USA

Poland

Hungary

Bulgaria

Czech Republic

Sweden

Spain

Romania

United Kingdom

France

South Korea

Netherlands

Azerbaijan

Ukraine

Belgium

Slovakia

Greece

Germany

Denmark

Iran

Argentina

Russia

Canada

Colombia

Belarus

Brazil

Morocco

Israel

Tunisia

Paraguay

Libya

Chile

Iraq

Kyrgyzstan

Dominican Republic

Turkey

Peru

Finland

Nepal

Ecuador

Mexico

South Africa

Malaysia

Kazakhstan

Guatemala

India

Honduras

Algeria

Myanmar

Kenya

El Salvador

Sri Lanka

Indonesia

Philippines

Japan

Pakistan

Bangladesh

Venezuela

Angola

Bolivia

Worldwide deaths

Total deaths to date

200,000

100,000

0

Rank

Excludes countries with population < 5,000,000

1

6

11

16

21

26

31

36

41

46

51

56

61

66

USA

Brazil

India

Mexico

United Kingdom

Italy

France

Iran

Spain

Argentina

Russia

Peru

Colombia

South Africa

Indonesia

Belgium

Chile

Germany

Poland

Ecuador

Turkey

Iraq

Canada

Ukraine

Romania

Netherlands

Bolivia

Philippines

Pakistan

Czech Republic

Egypt

Bangladesh

Sweden

Saudi Arabia

Morocco

China

Switzerland

Guatemala

Portugal

Hungary

Bulgaria

Honduras

Tunisia

Israel

Austria

Dominican Republic

Jordan

Algeria

Japan

Kazakhstan

Myanmar

Greece

Afghanistan

Paraguay

Ethiopia

Kenya

Nepal

Kyrgyzstan

Serbia

Sudan

Nigeria

Azerbaijan

Belarus

Libya

El Salvador

Worldwide deaths

Total deaths to date

Rank

Excludes countries with population < 5,000,000

1 in 667

1 in 1,000

1 in 2,000

None

1

6

11

16

21

26

31

36

41

46

51

56

61

66

Belgium

Peru

Spain

Mexico

United Kingdom

Bolivia

Chile

Ecuador

Argentina

Italy

Brazil

USA

Colombia

France

Czech Republic

Sweden

Iran

Switzerland

Netherlands

Romania

South Africa

Bulgaria

Hungary

Israel

Iraq

Portugal

Honduras

Jordan

Poland

Canada

Guatemala

Austria

Tunisia

Russia

Ukraine

Dominican Republic

Paraguay

Kyrgyzstan

Saudi Arabia

Germany

Libya

Serbia

Turkey

Greece

Morocco

El Salvador

Azerbaijan

Denmark

Slovakia

Slovenia

Kazakhstan

India

Belarus

Philippines

Egypt

Finland

Algeria

Indonesia

Afghanistan

Nepal

Sudan

Pakistan

Australia

Bangladesh

Myanmar

Kenya

Average daily deaths over past 7 days

Average deaths / day

1 in 50,000

1 in 66,667

1 in 100,000

1 in 200,000

None

1

6

11

16

21

26

31

36

41

46

51

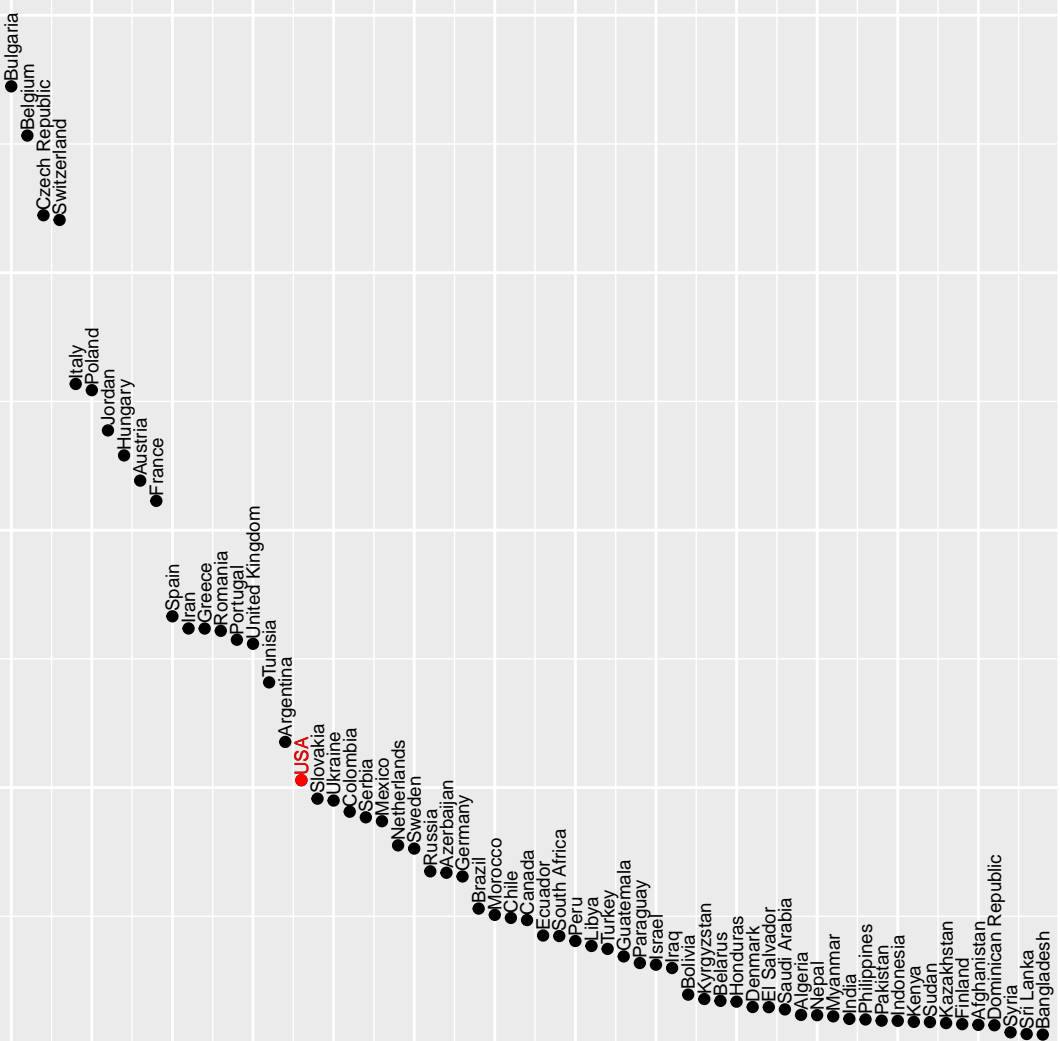
56

61

66

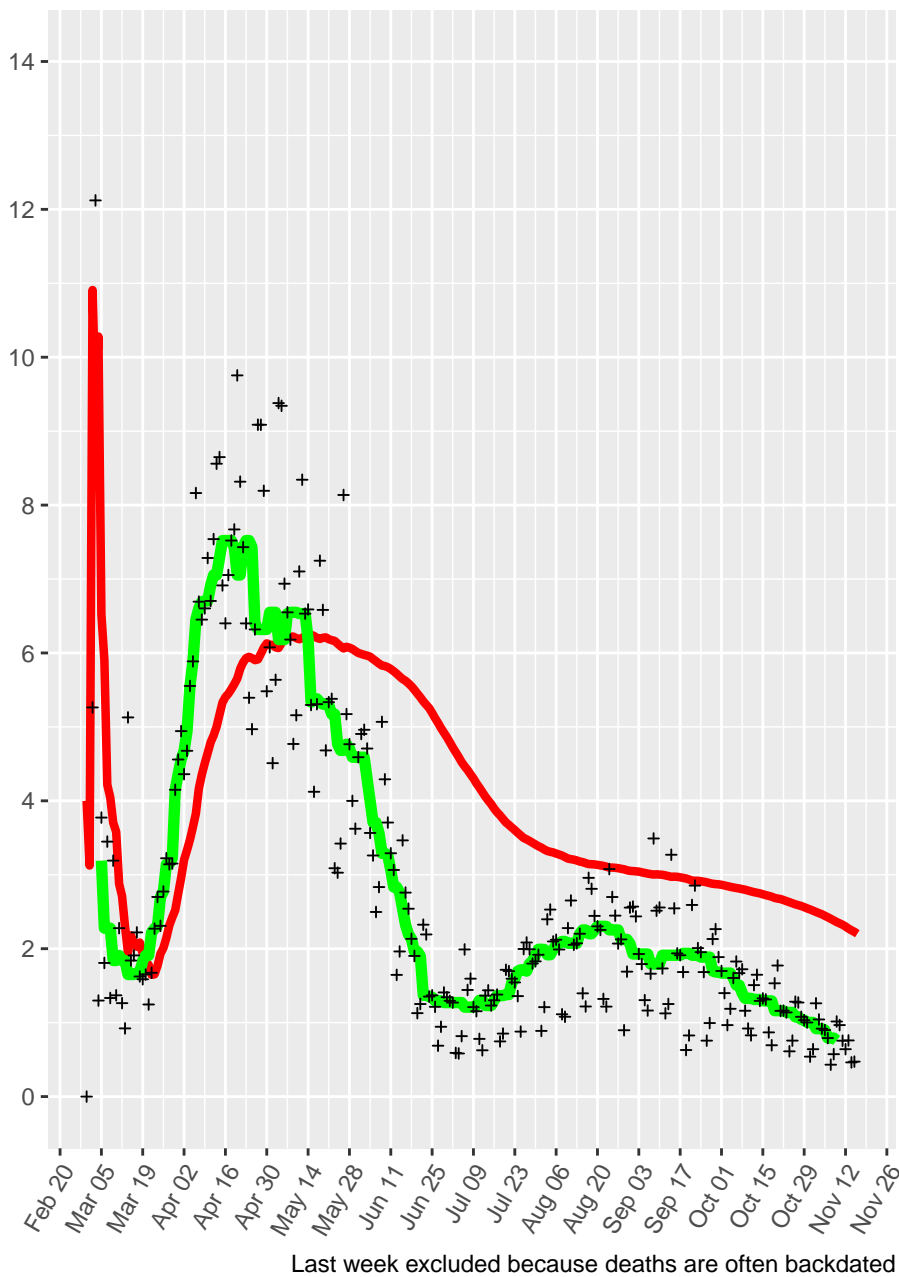
Rank

Excludes countries with population < 5,000,000



Daily vs. Cumulative US Case Rate Mortality

US Case Rate Mortality

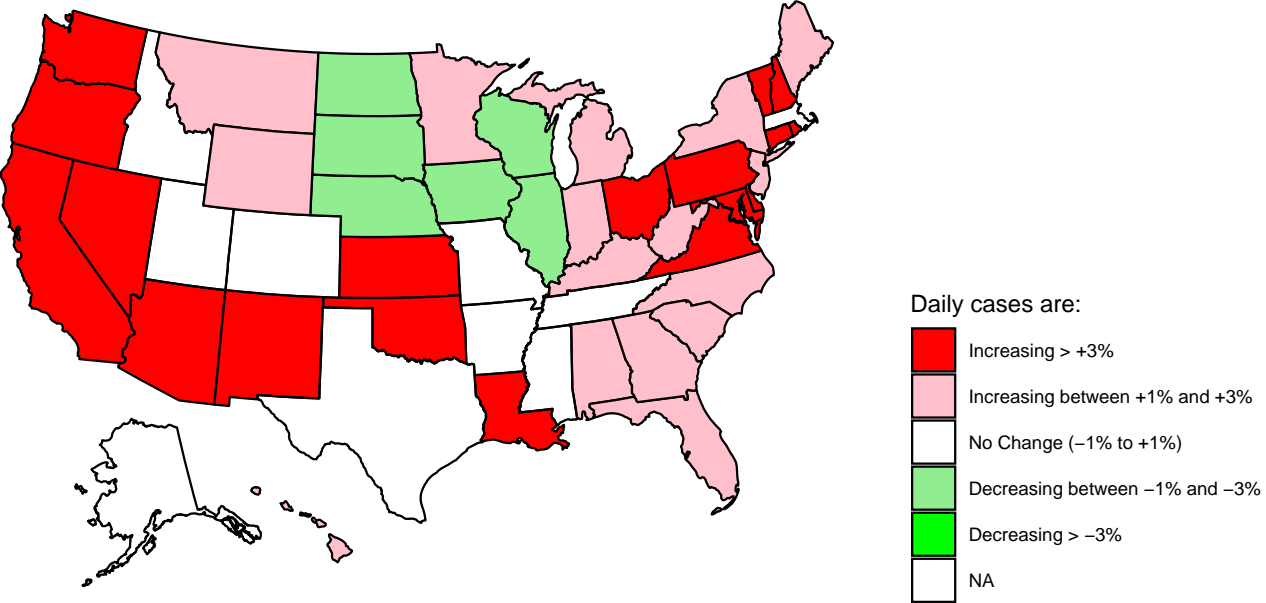


Mortality Type:

- 13 day rolling median
- Cumulative
- Daily Raw

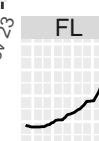
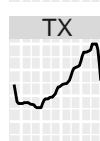
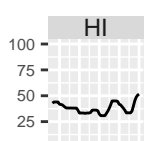
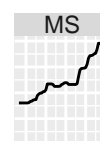
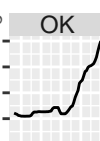
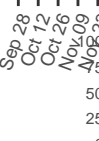
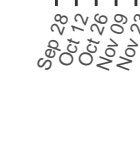
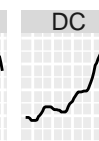
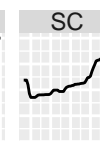
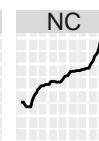
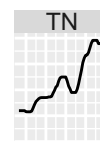
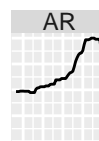
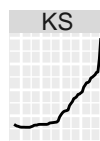
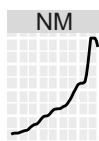
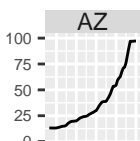
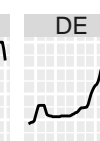
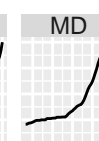
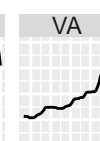
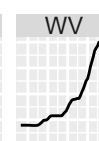
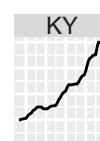
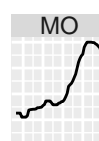
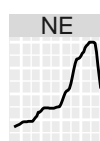
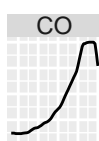
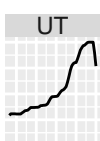
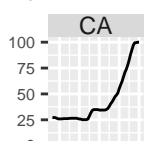
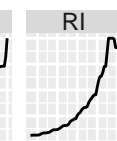
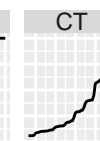
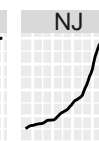
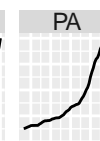
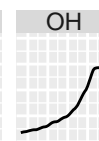
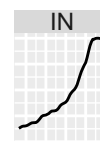
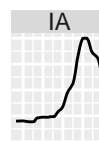
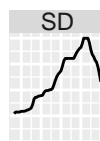
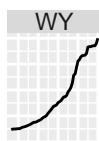
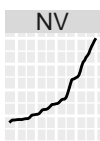
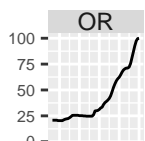
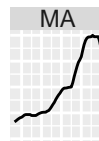
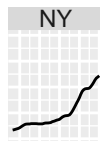
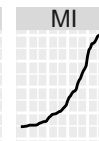
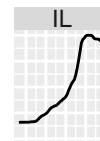
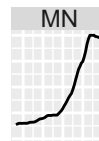
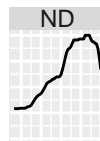
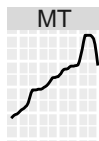
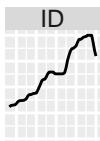
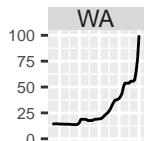
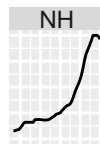
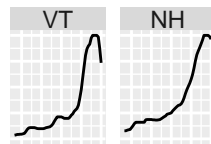
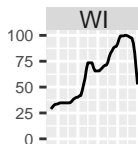
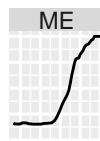
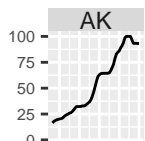
Last week excluded because deaths are often backdated

Change in daily cases over 16 days as of 2020-11-24



Daily Cases as a Percent of Peak Cases

Percent of Peak



Sep 28
Oct 12
Oct 26
Nov 09
Nov 23

Sep 28
Oct 12
Oct 26
Nov 09
Nov 23

Sep 28
Oct 12
Oct 26
Nov 09
Nov 23

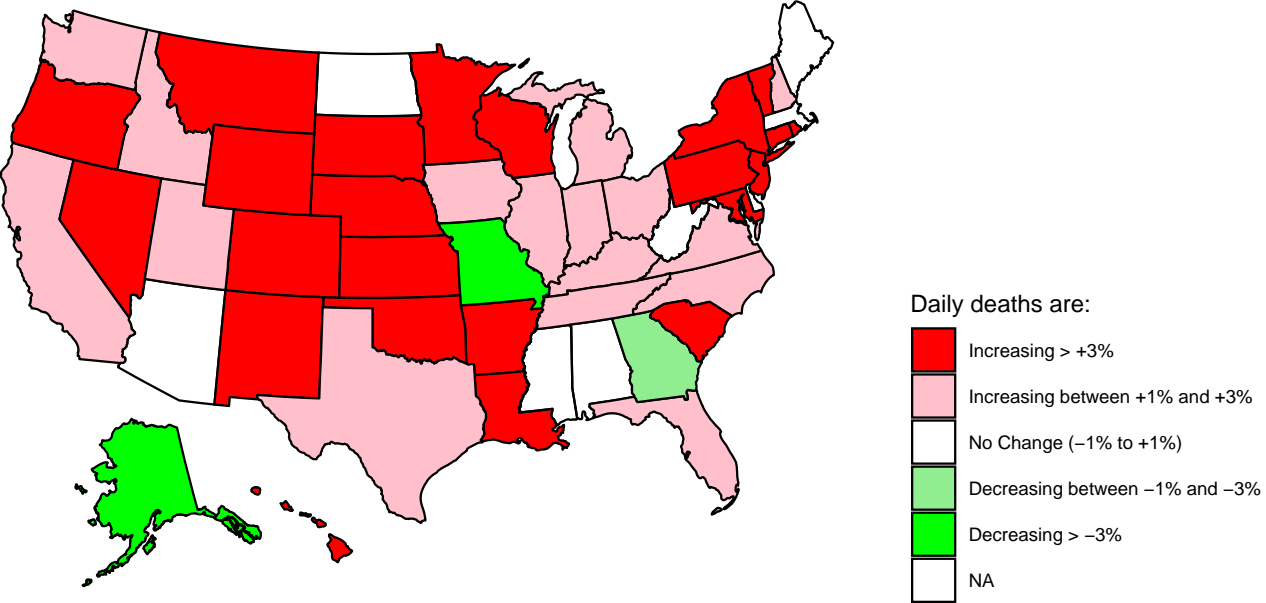
Sep 28
Oct 12
Oct 26
Nov 09
Nov 23

Sep 28
Oct 12
Oct 26
Nov 09
Nov 23

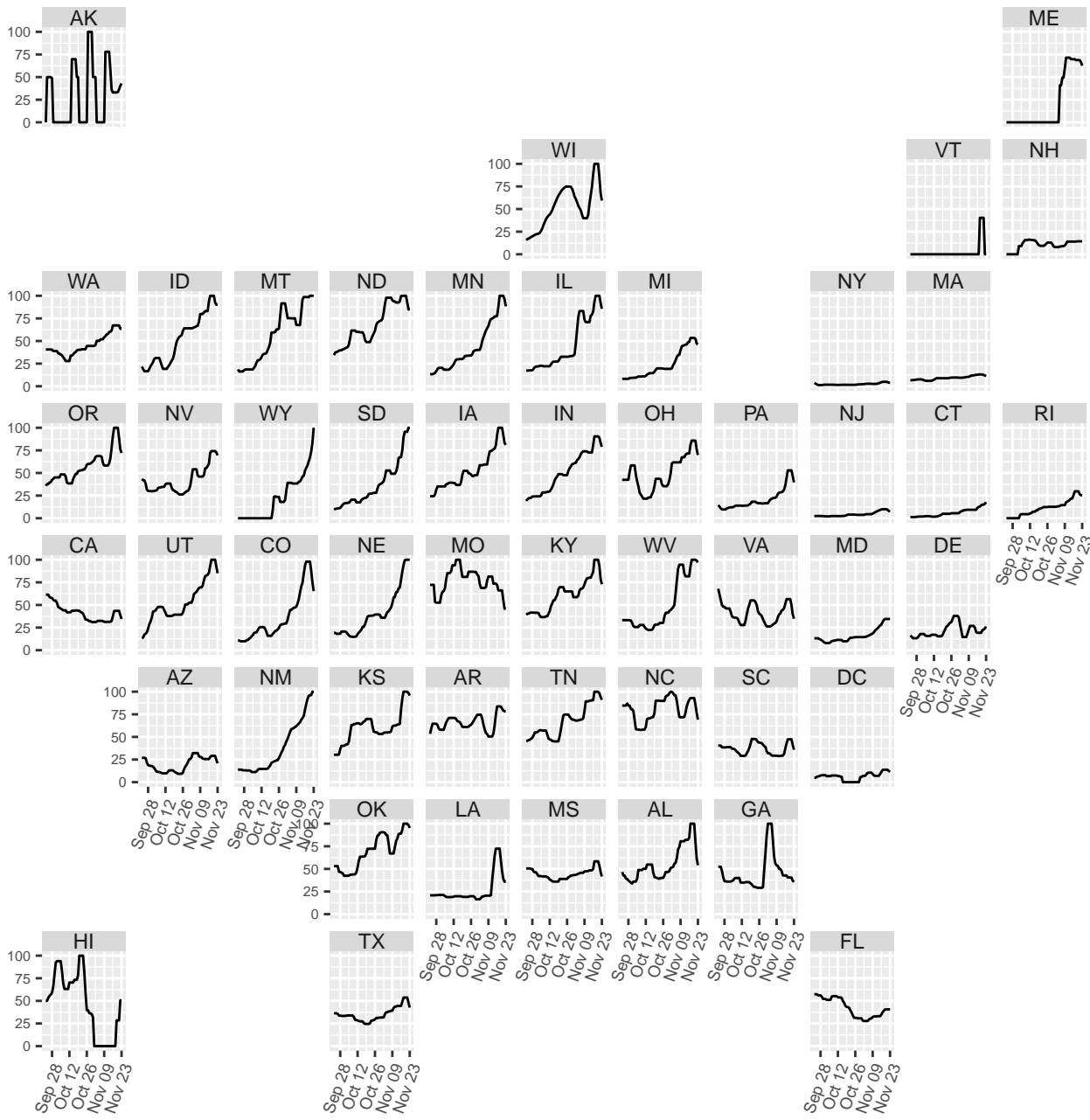
Sep 28
Oct 12
Oct 26
Nov 09
Nov 23

Sep 28
Oct 12
Oct 26
Nov 09
Nov 23

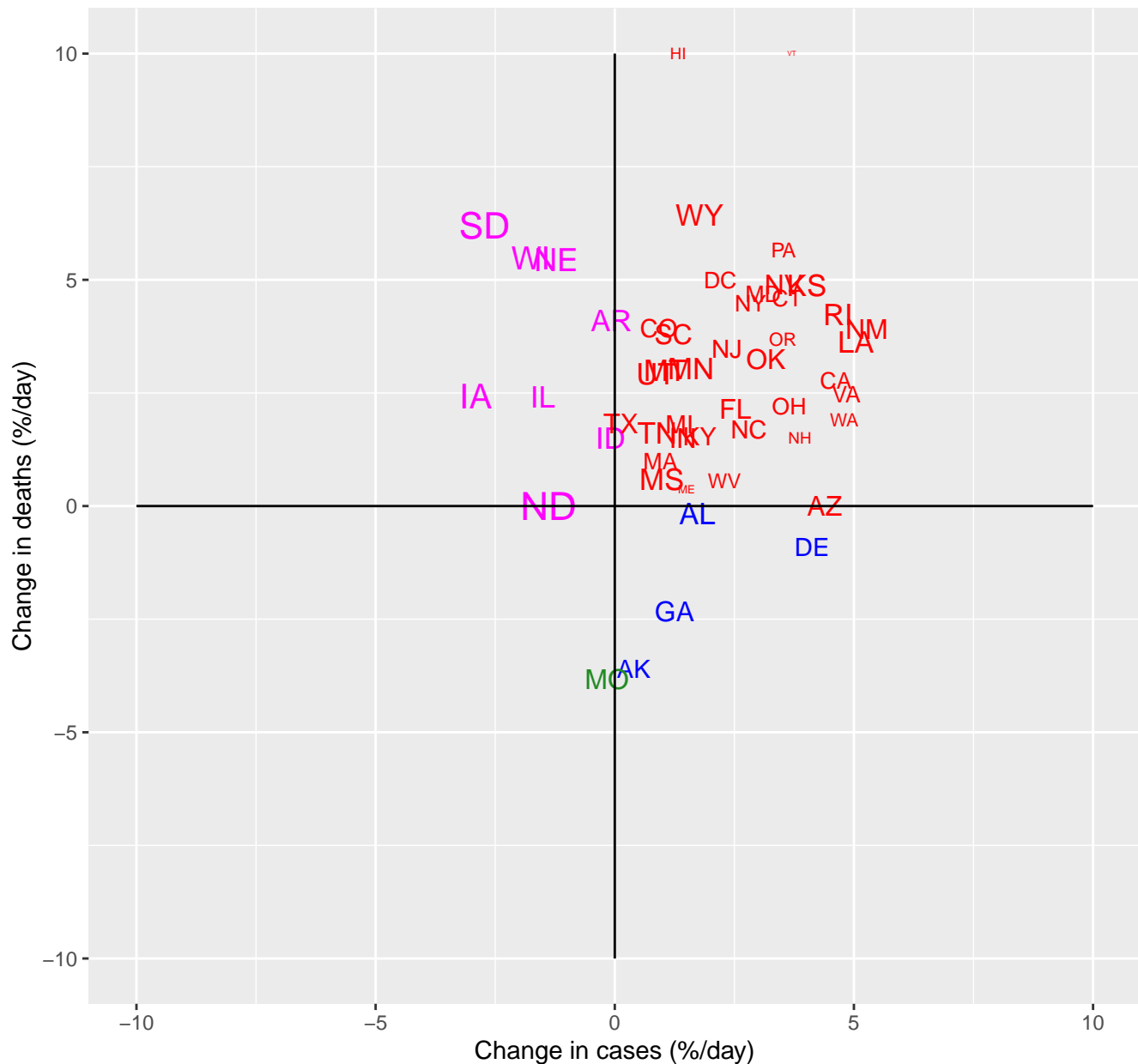
Change in daily deaths over 16 days as of 2020-11-24



Daily Deaths as a Percent of Peak Deaths



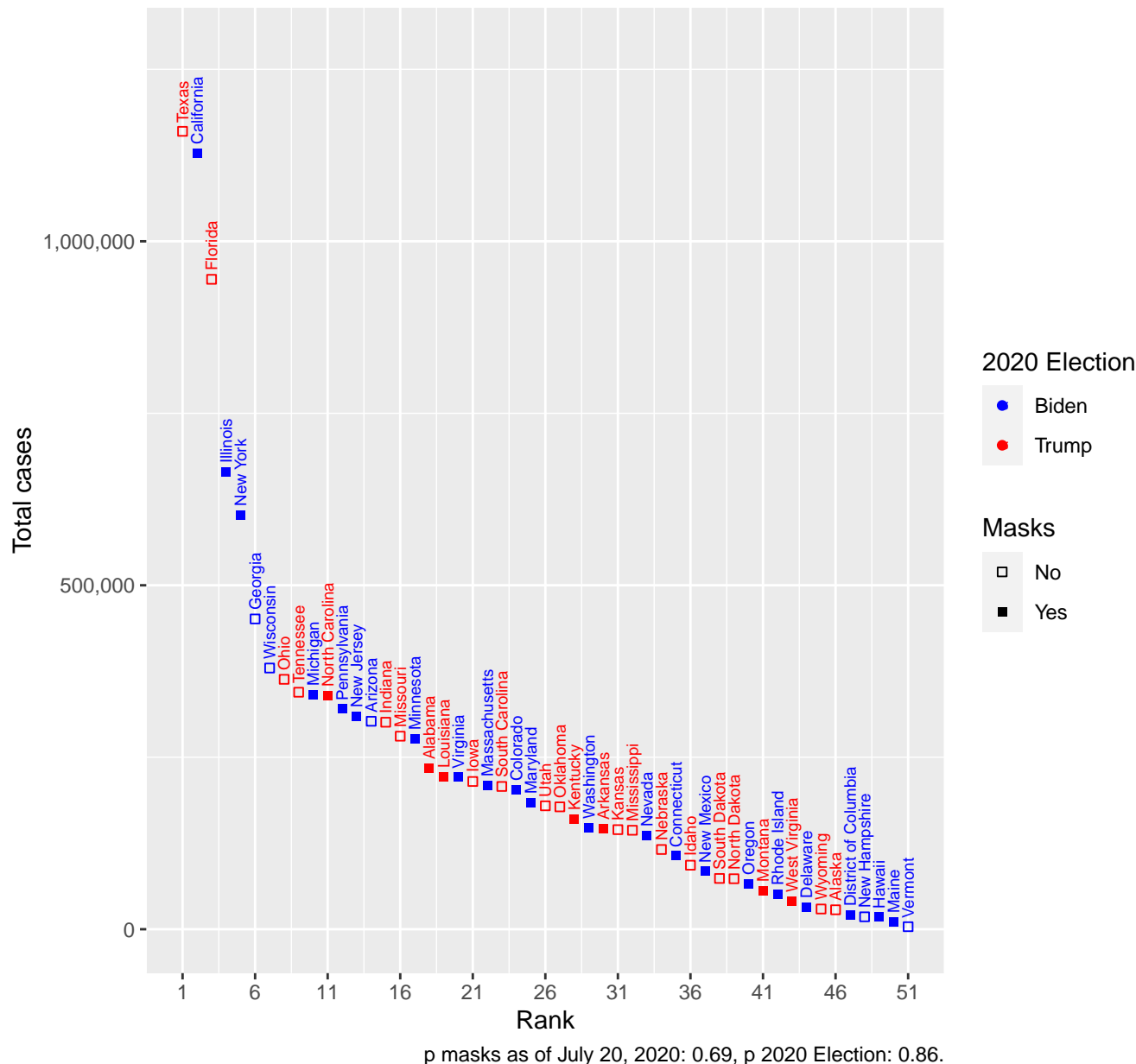
Change in cases vs. change in deaths over last 16 days as of 2020-11-24



Size is proportional total cases per capita

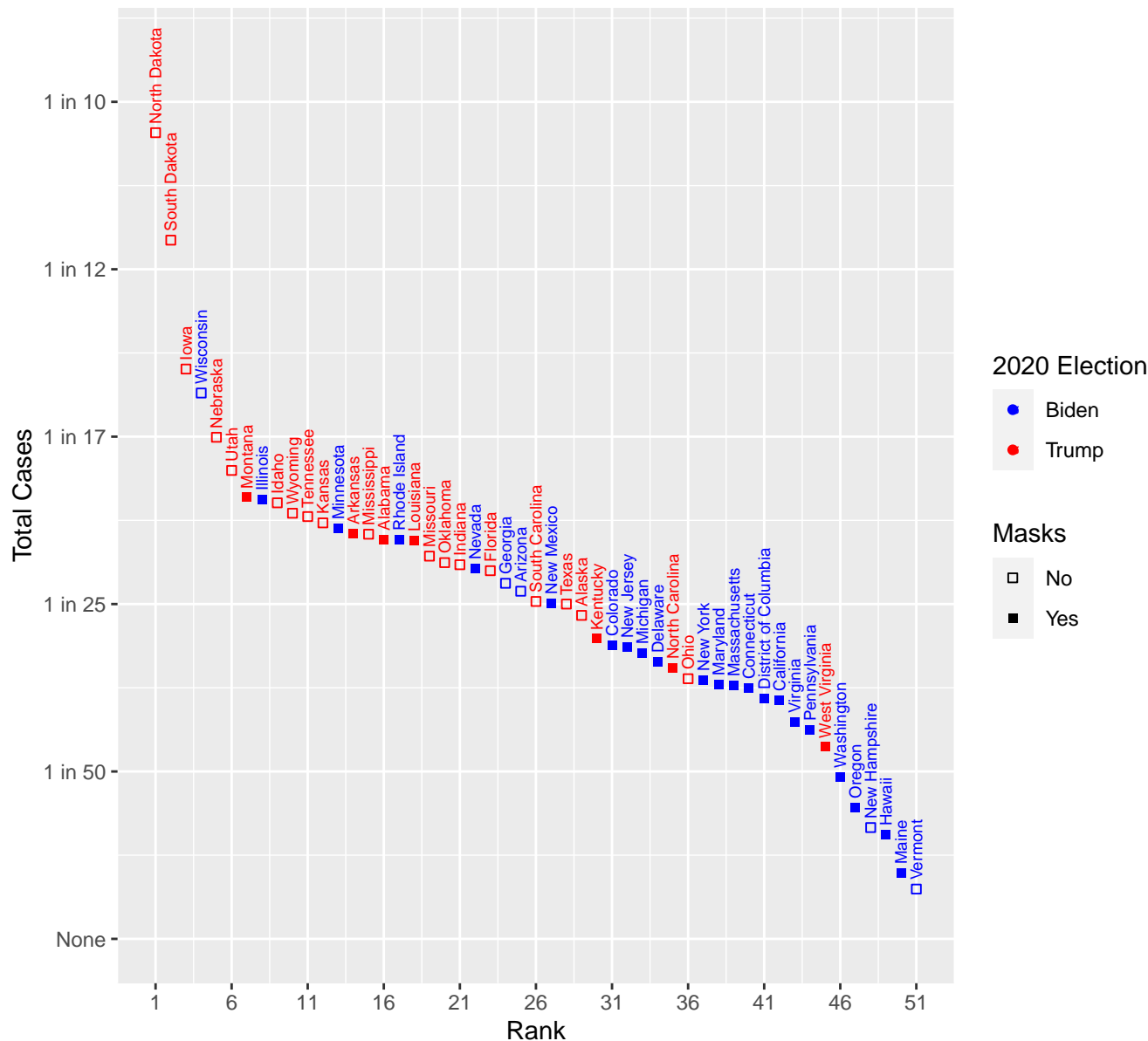
Total US COVID-19 Cases

Mask mandate is from July 20th. Political lean is based on election results.



Total US COVID-19 Cases

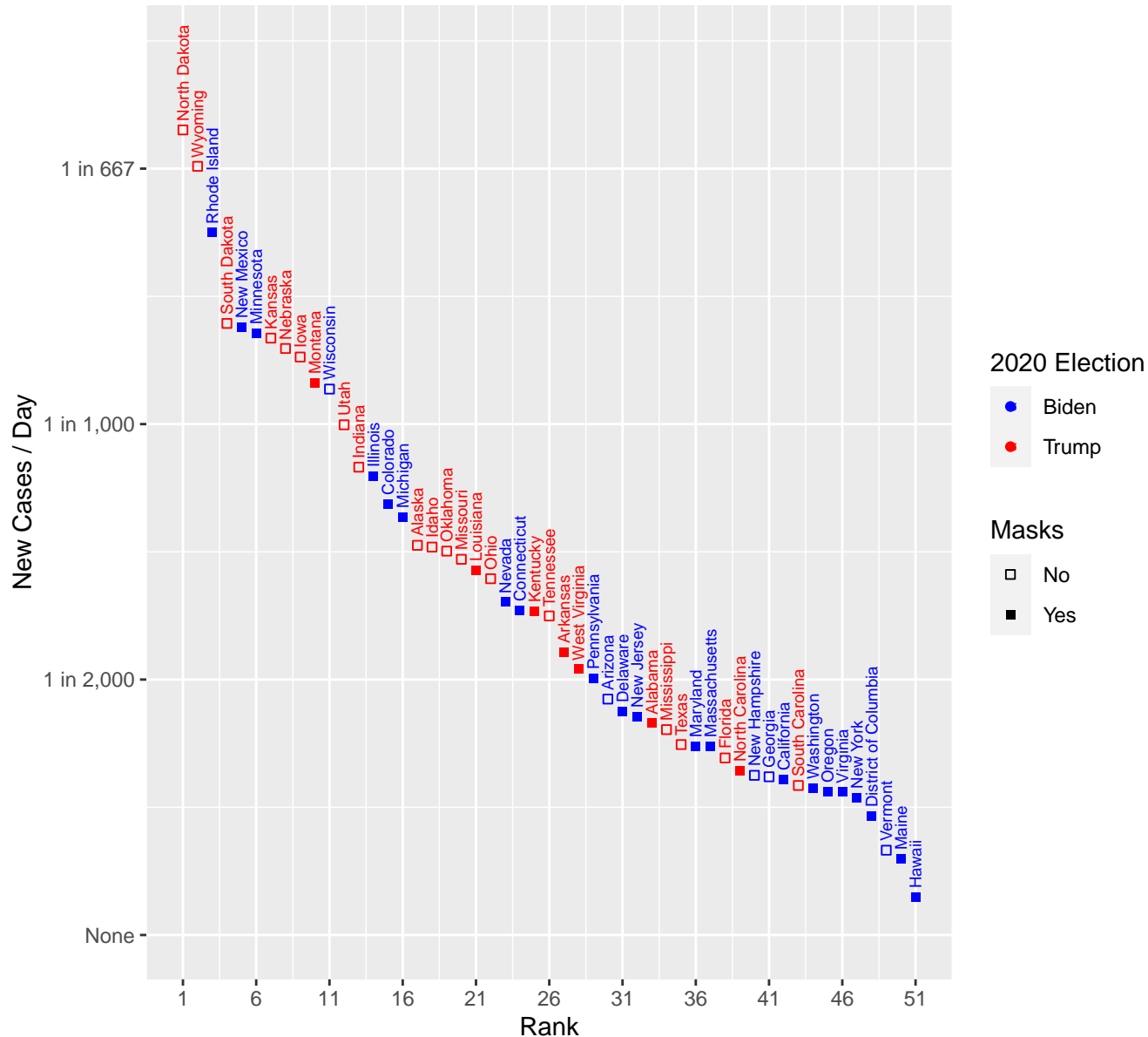
Mask mandate is from July 20th. Political lean is based on election results.



p masks as of July 20, 2020: 0.001, p 2020 Election: 0.00004.

Average US COVID-19 cases over the past 7 days

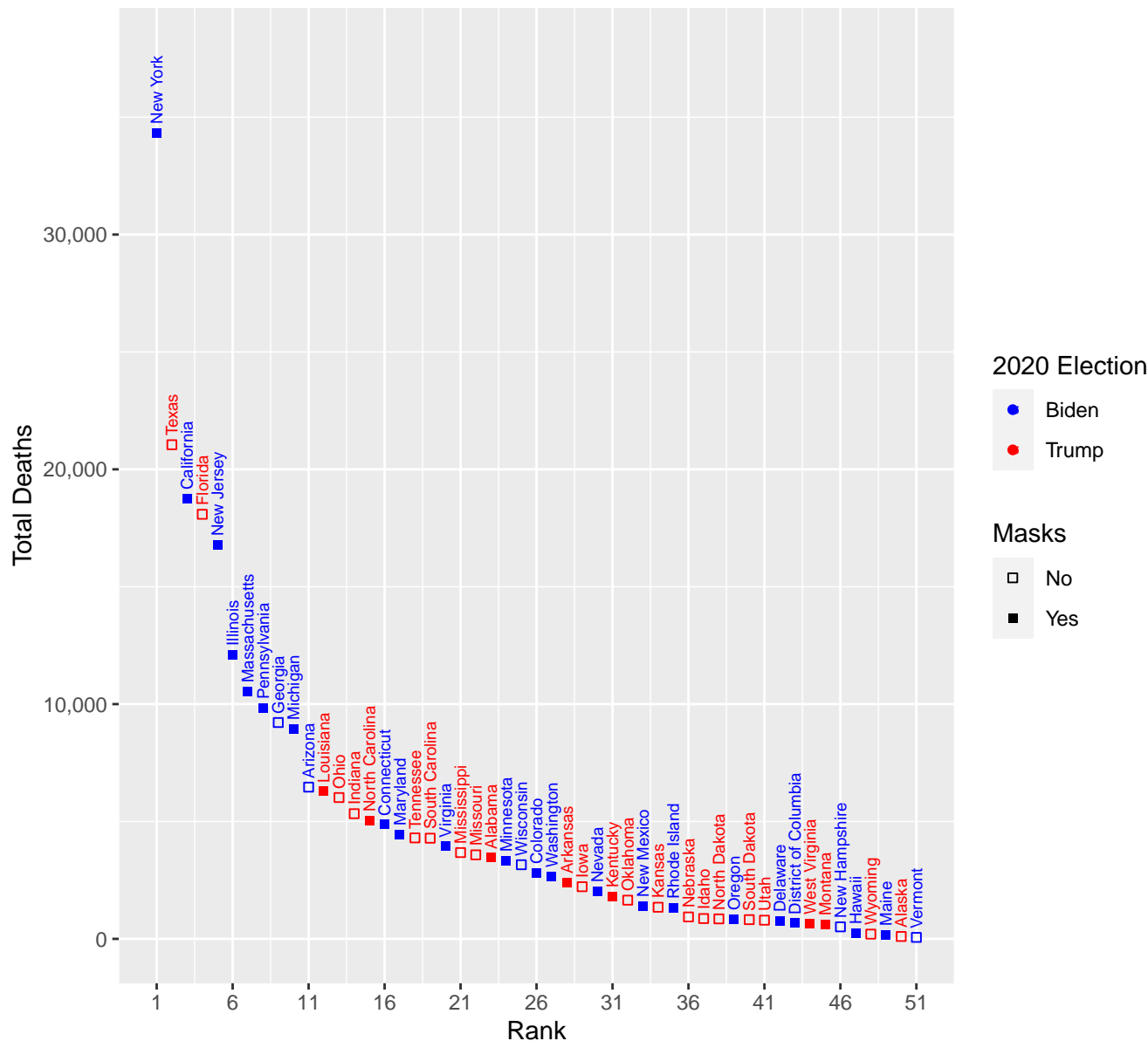
Mask mandate is from July 20th. Political lean is based on election results.



p masks as of July 20, 2020: 0.062, p 2020 Election: 0.0083.

Total US COVID-19 Deaths

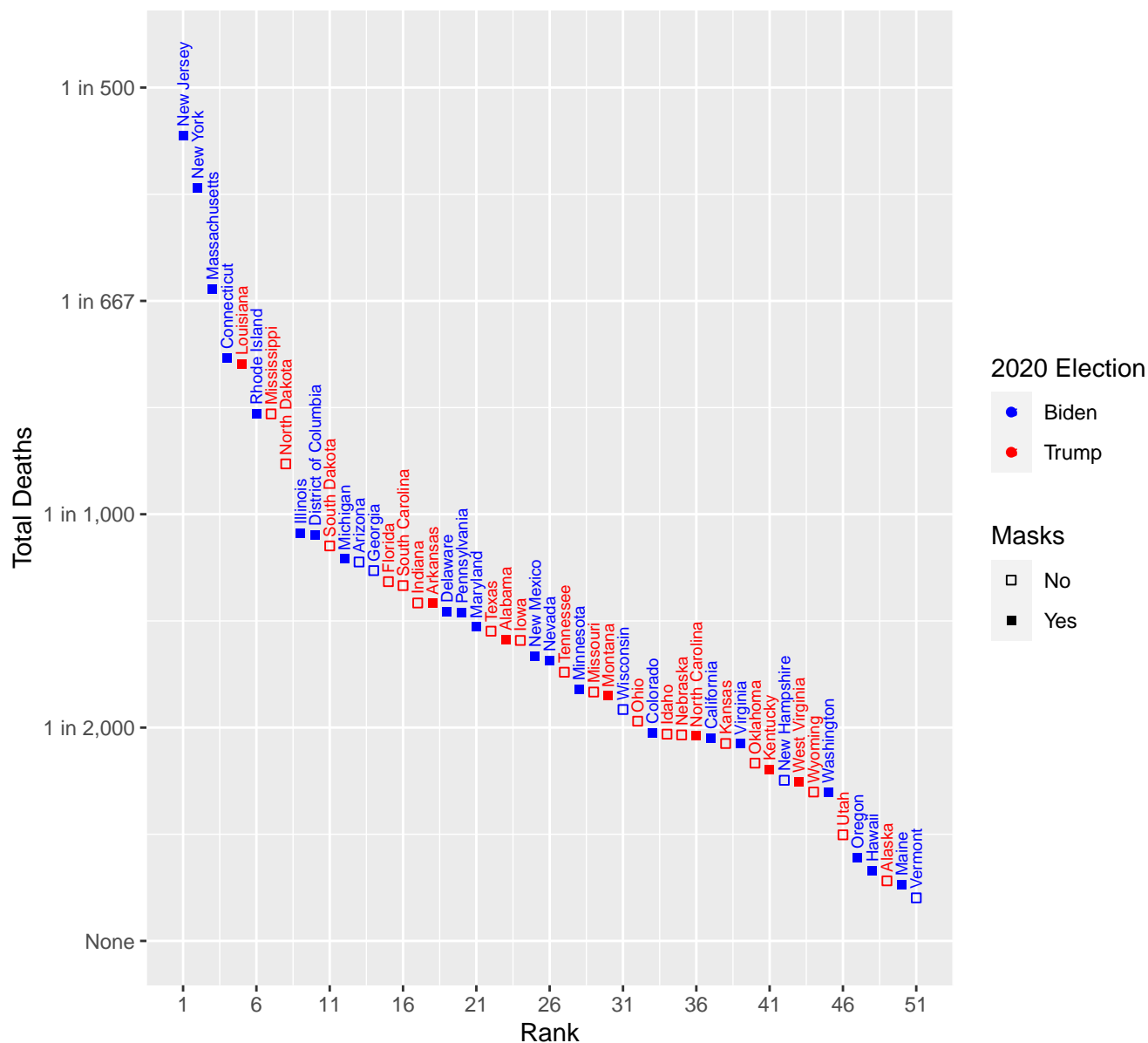
Mask mandate is from July 20th. Political lean is based on election results.



p masks as of July 20, 2020: 0.44, p 2020 Election: 0.39.

Total US COVID-19 Deaths

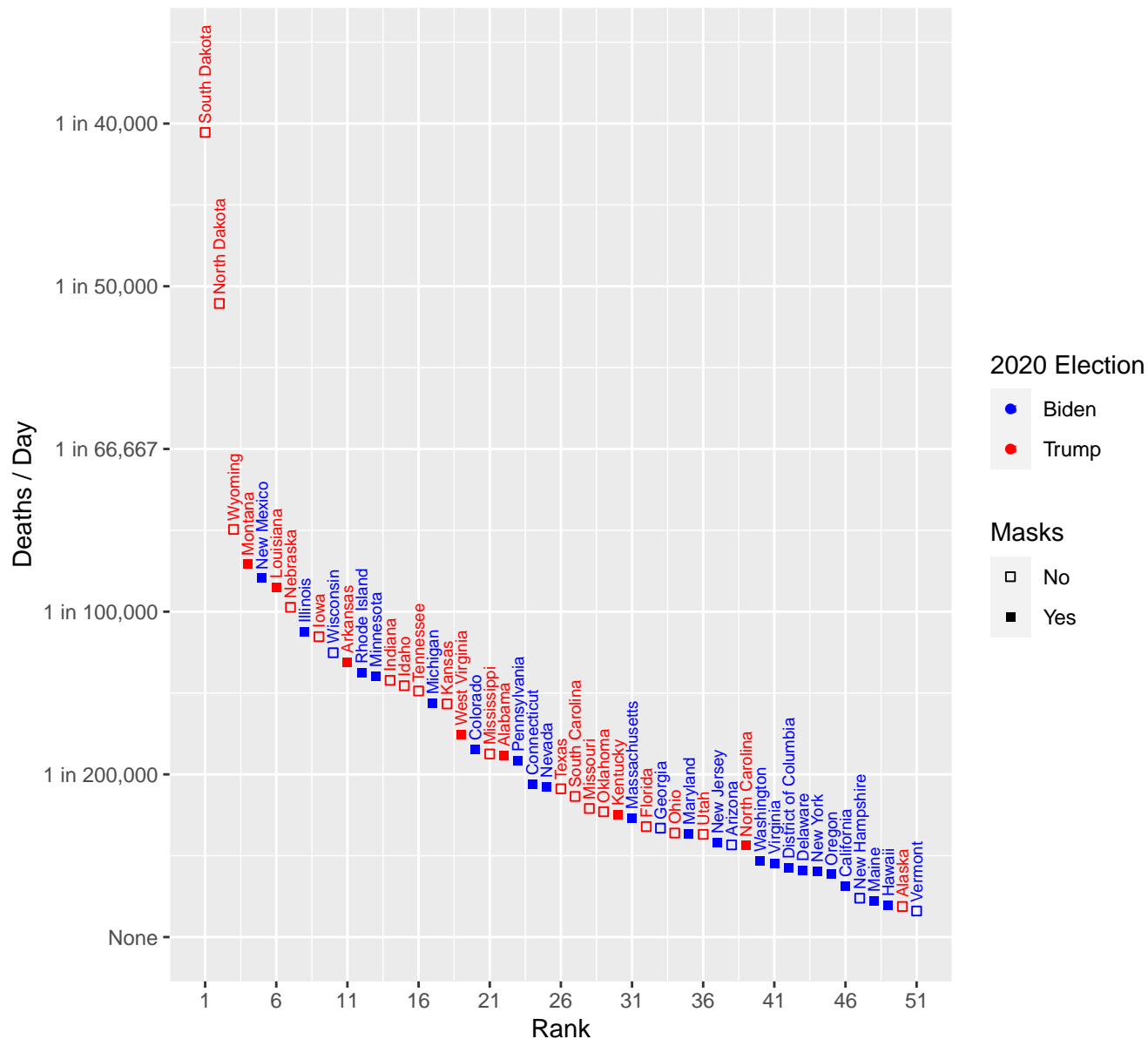
Mask mandate is from July 20th. Political lean is based on election results.



p masks as of July 20, 2020: 0.38, p 2020 Election: 0.46.

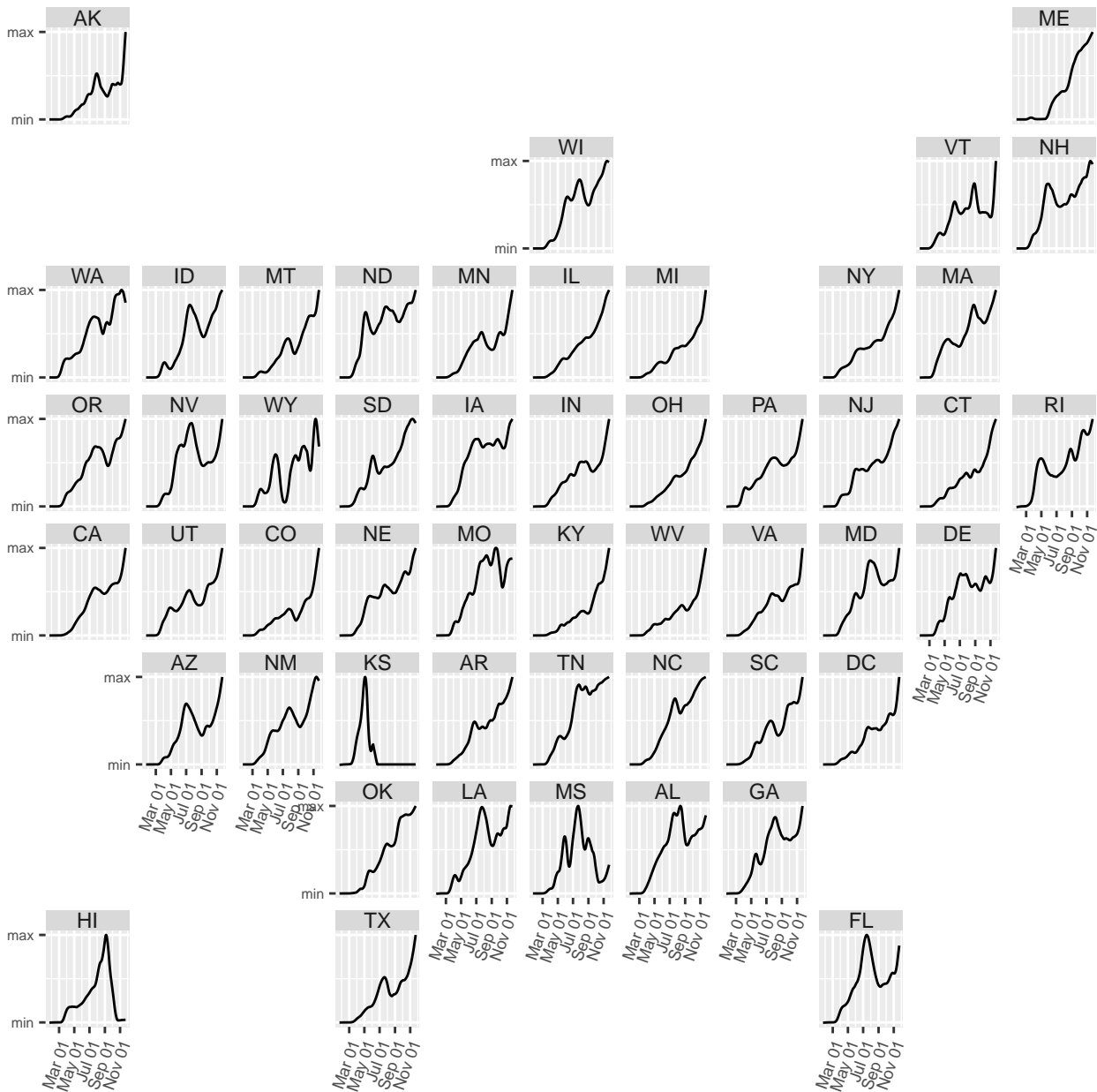
Average US COVID-19 deaths over the past 7 days

Mask mandate is from July 20th. Political lean is based on election results.



p masks as of July 20, 2020: 0.34, p 2020 Election: 0.0039.

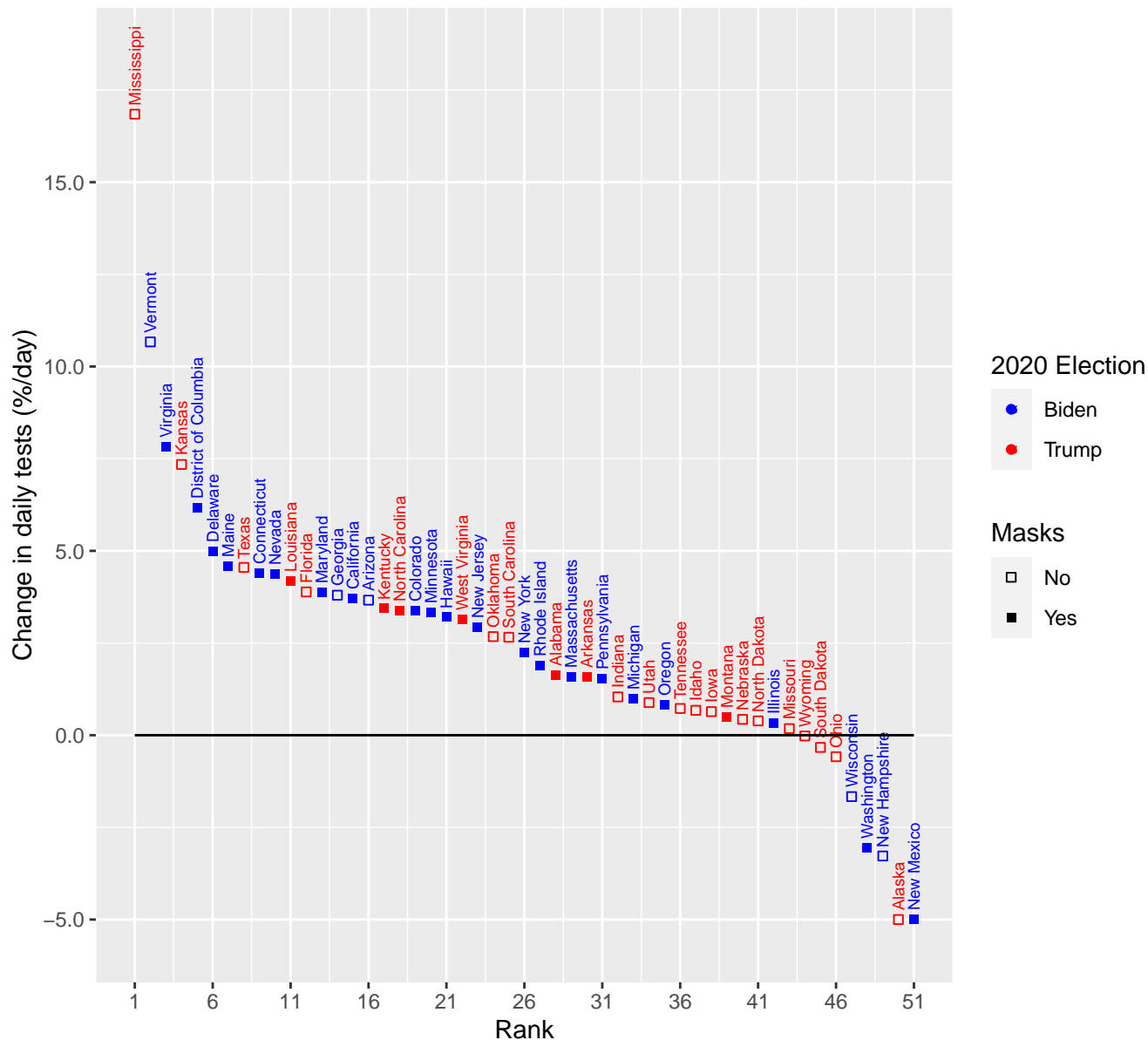
Daily testing trends from min to max



Line = Friedman's supersmoother

Change in daily tests over past 16 days

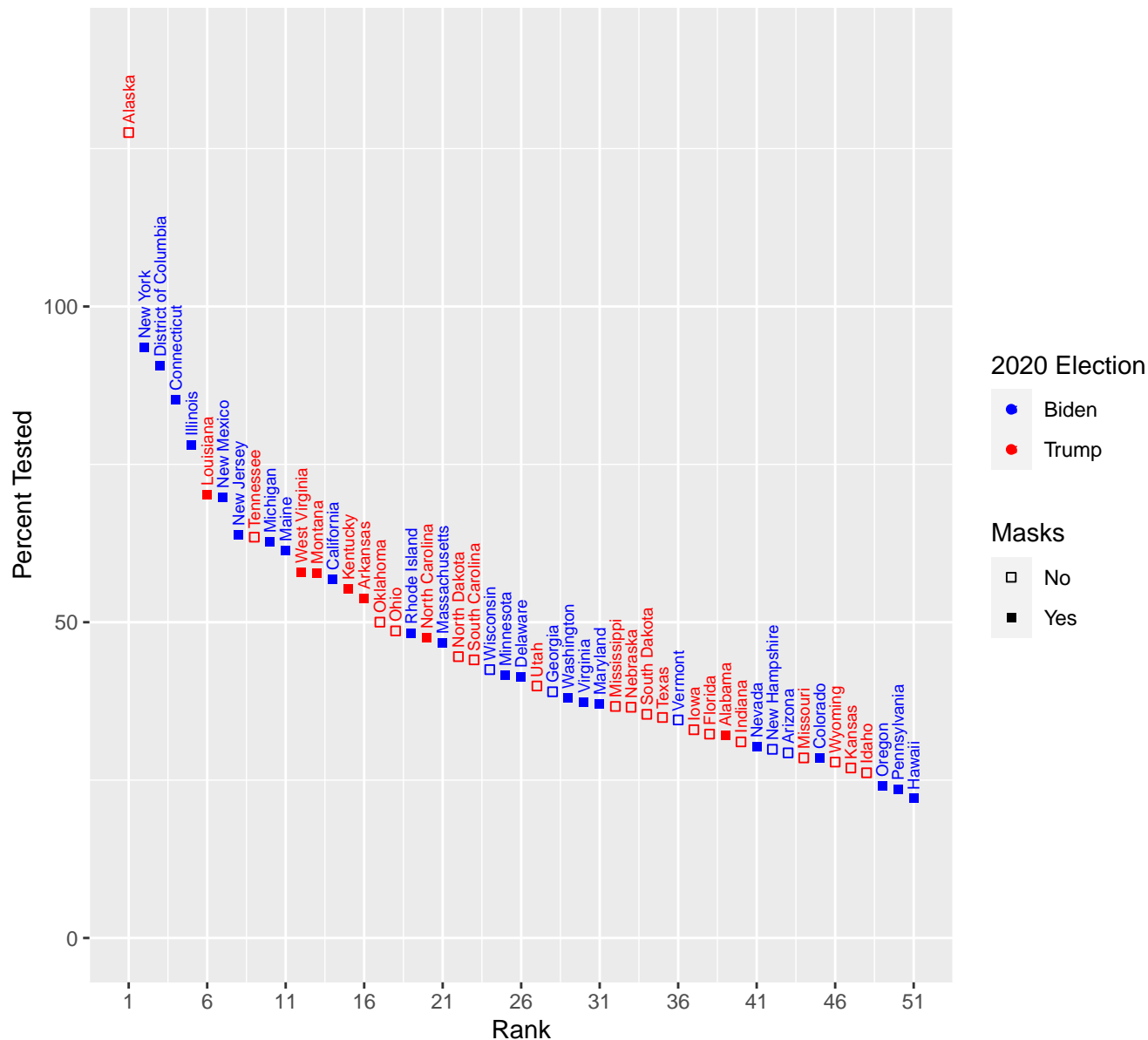
Mask mandate is from July 20th. Political lean is based on election results.



p masks as of July 20, 2020: 0.09, p 2020 Election: 0.16.

Percent Tested

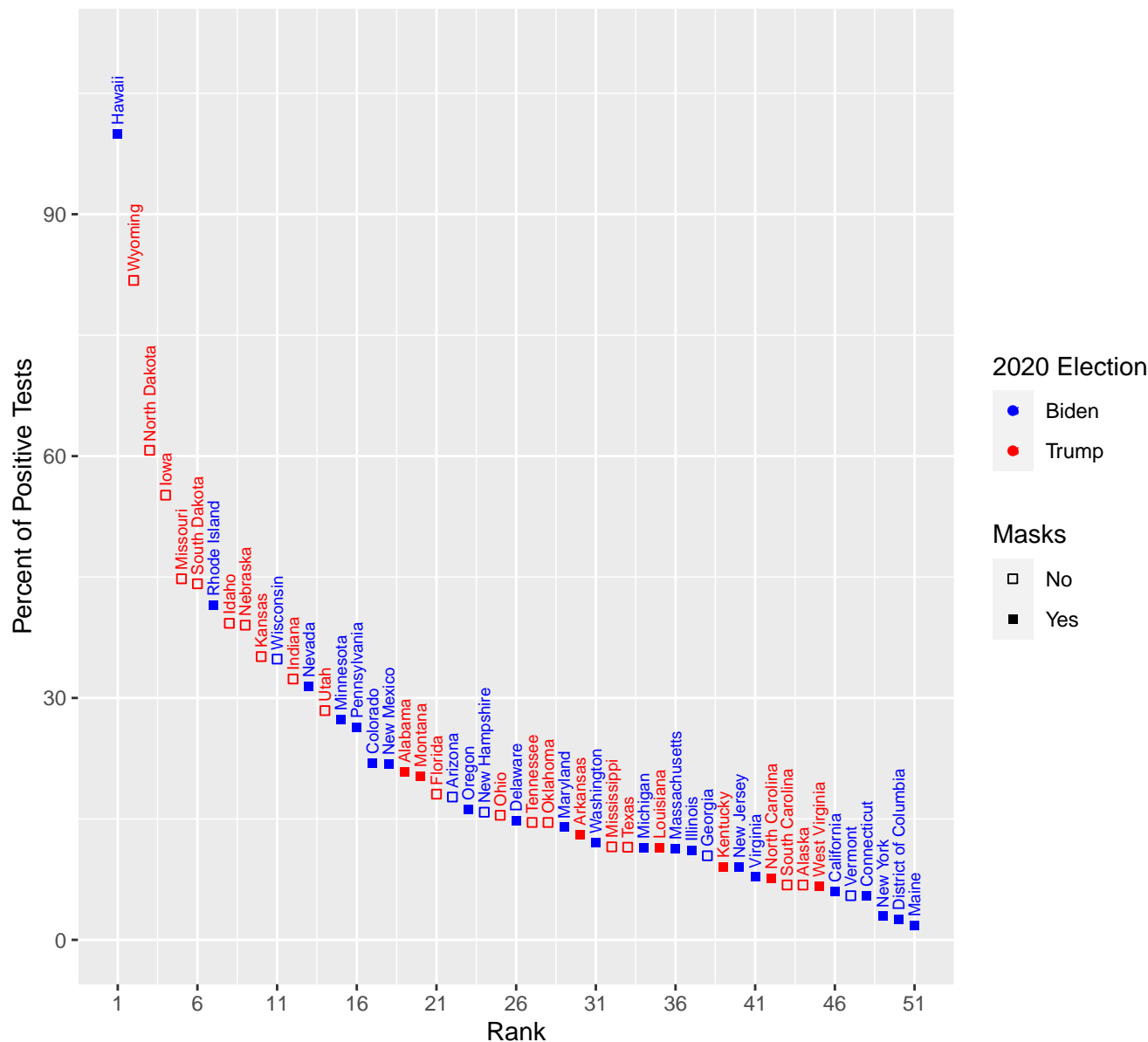
Mask mandate is from July 20th. Political lean is based on election results.



p masks as of July 20, 2020: 0.017, p 2020 Election: 0.69.

Percent of Positive COVID Tests

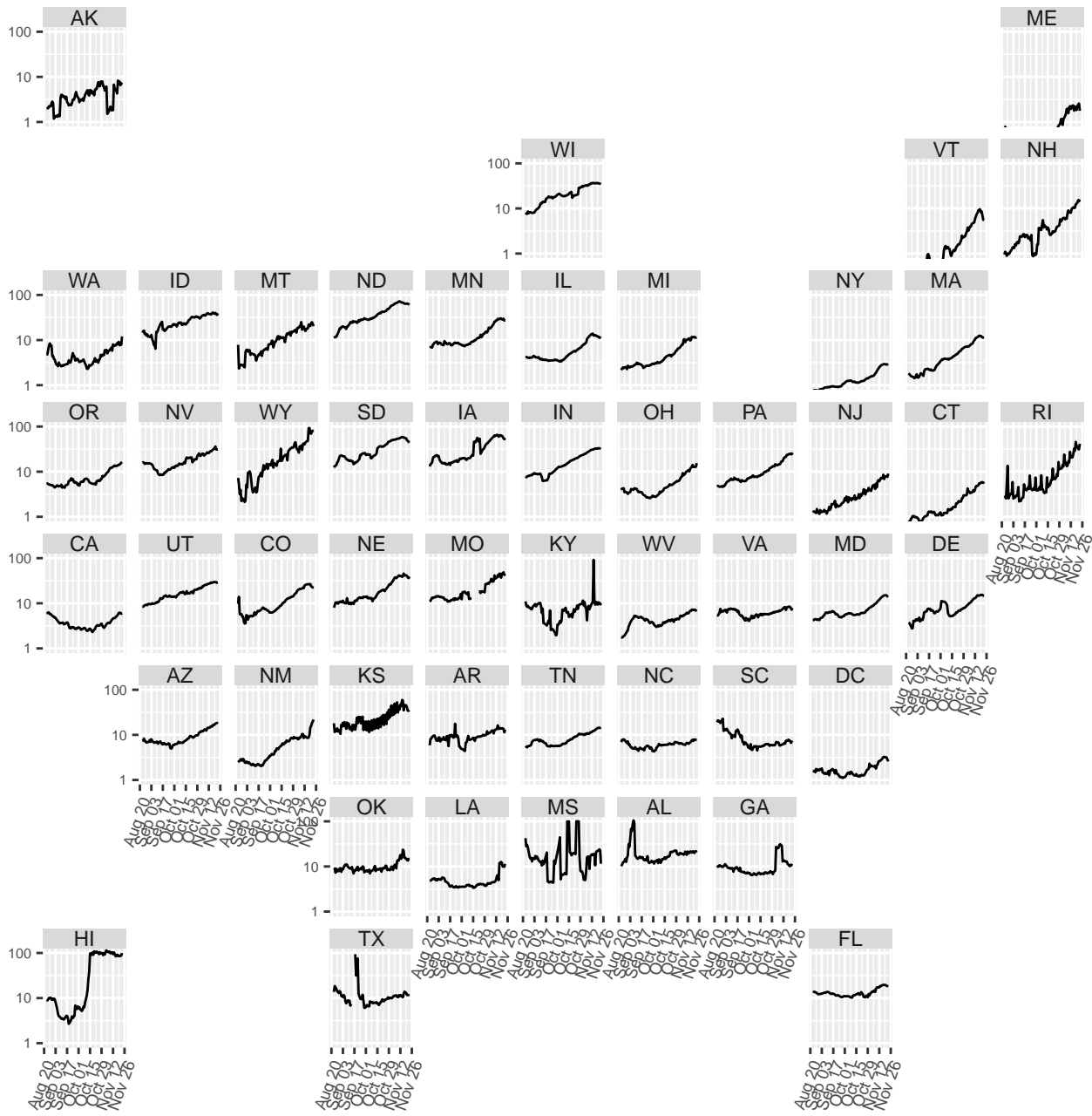
Mask mandate is from July 20th. Political lean is based on election results.



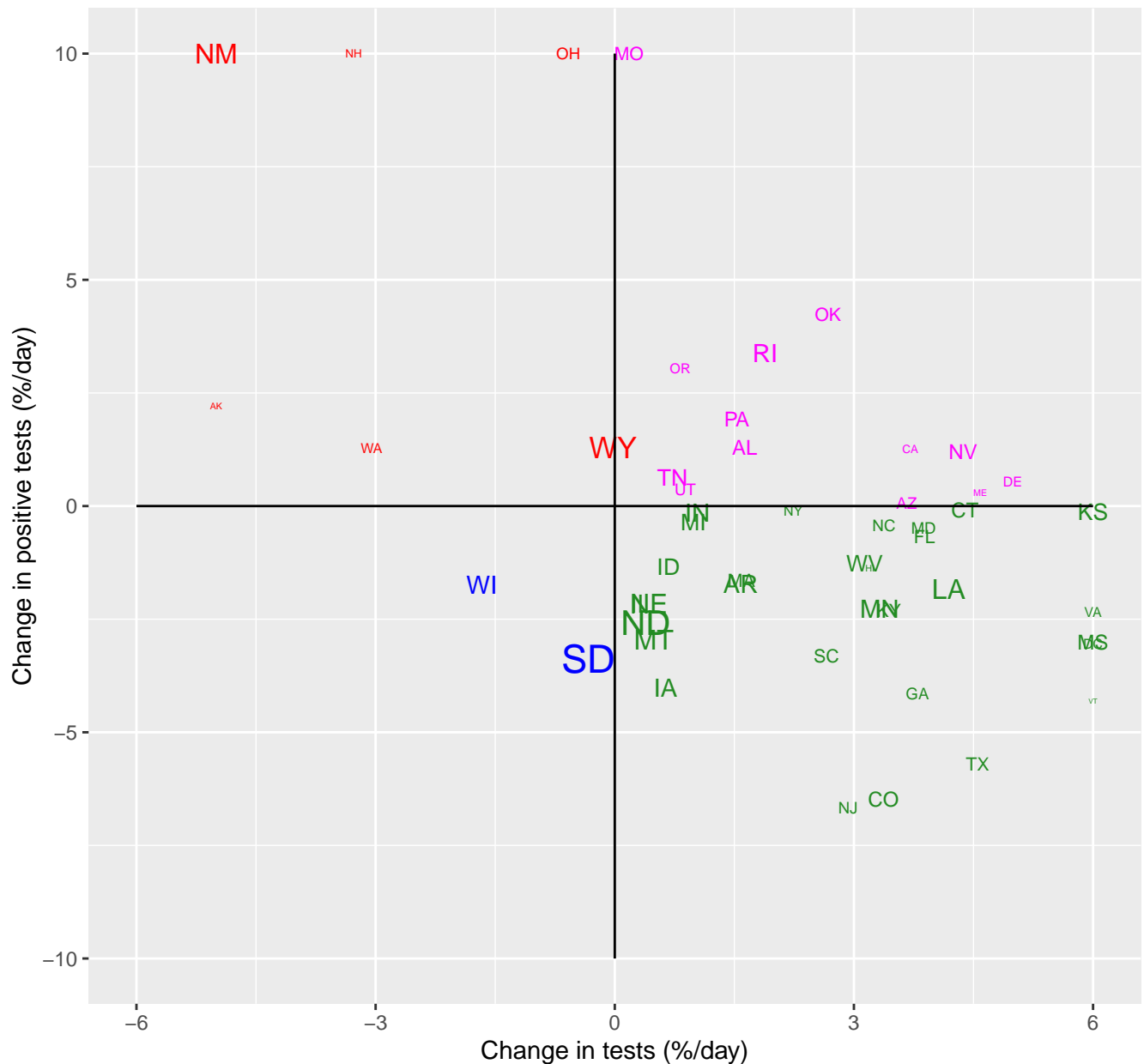
p masks as of July 20, 2020: 0.013, p 2020 Election: 0.078.

Percent Positive Trends

Percent Positive (log scale)

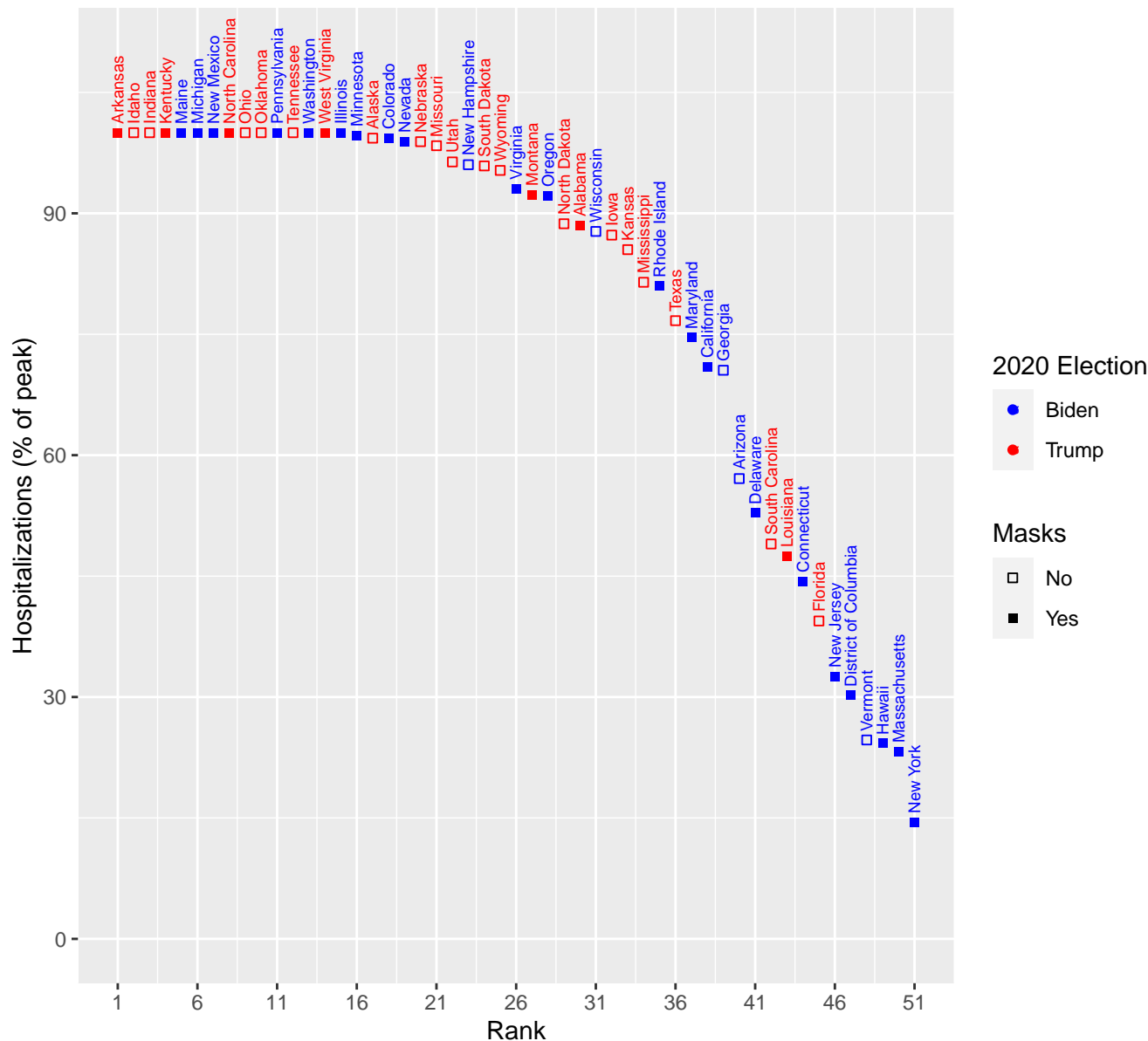


Change in tests vs. change in positive tests over last 14 days as of 2020-11-24



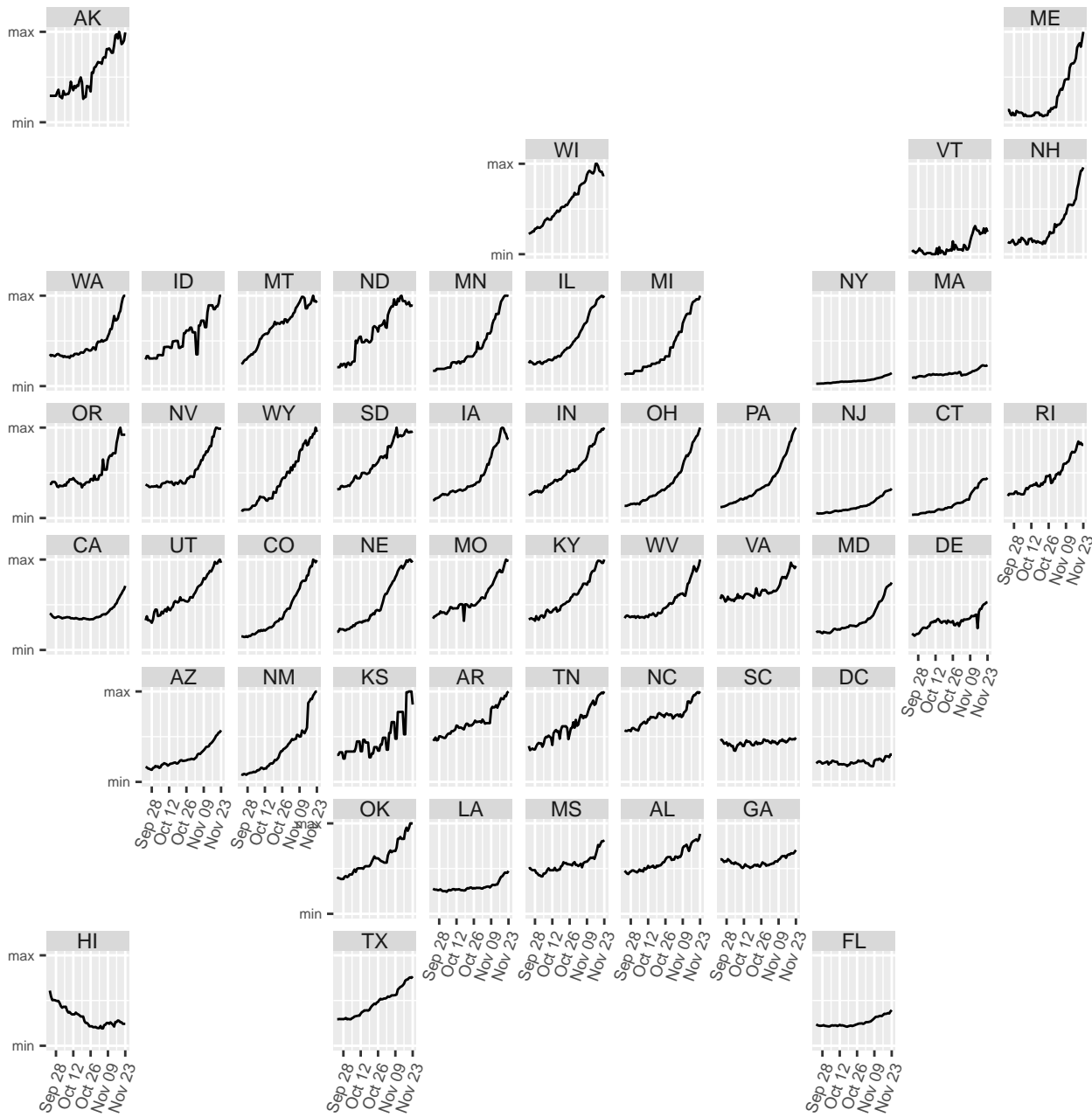
Current hospitalizations as a percent of peak since February

Mask mandate is from July 20th. Political lean is based on election results.



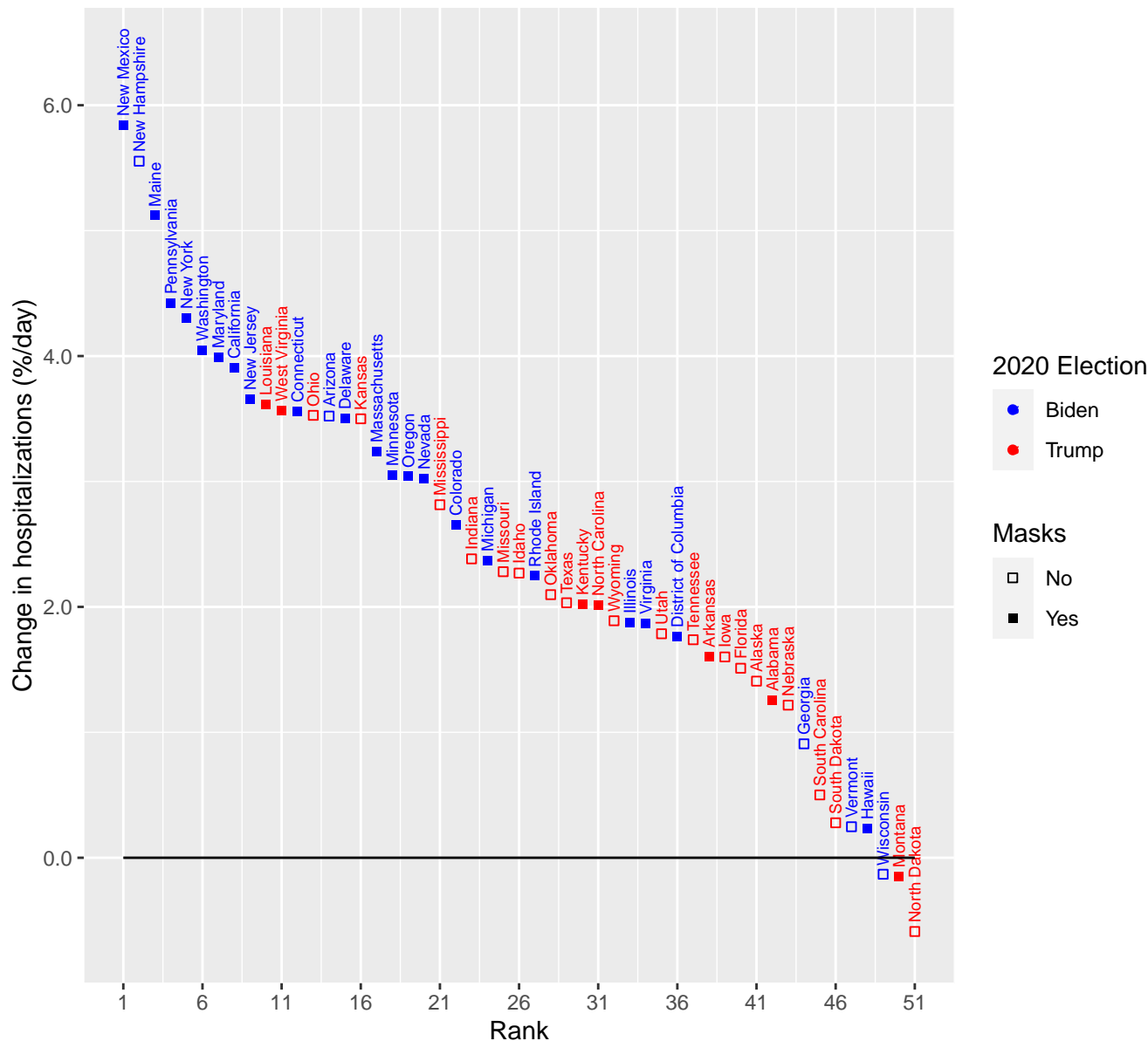
p masks as of July 20, 2020: 0.99, p 2020 Election: 0.044.

Hospitalizations trends from min to max



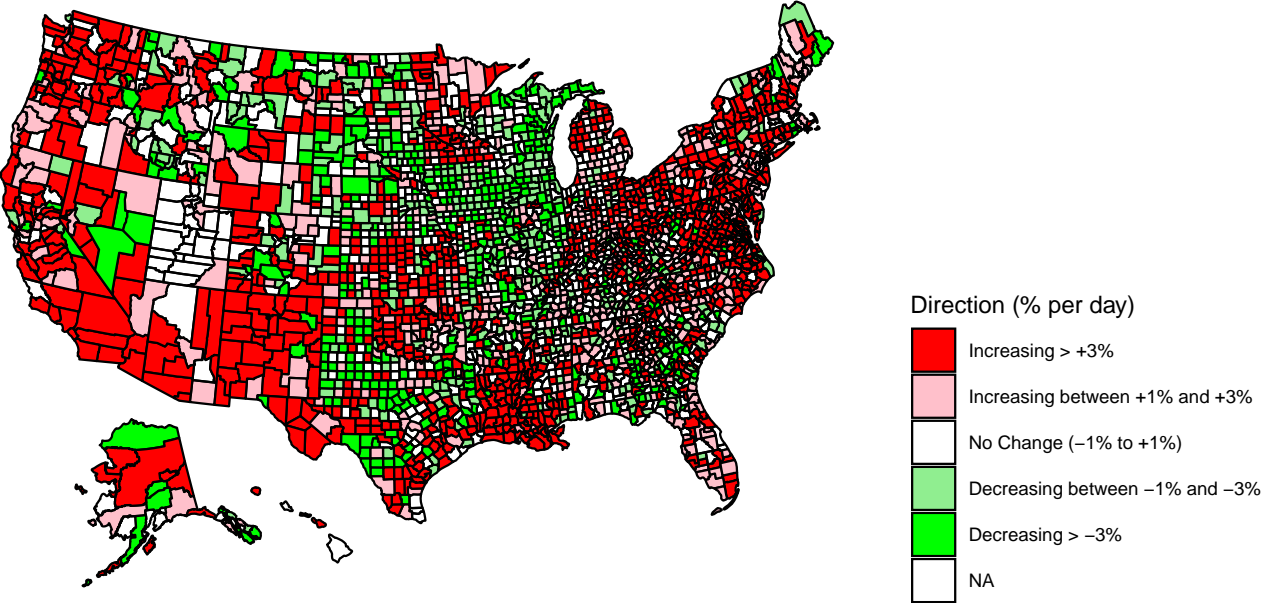
Change in hospitalizations over past 14 days

Mask mandate is from July 20th. Political lean is based on election results.



p masks as of July 20, 2020: 0.0046, p 2020 Election: 0.0037.

Case trends over 16 days as of 2020-11-24



NA = Inadequate data

Death trends over 16 days as of 2020-11-24

