COVID19 Time Series Analysis, Worldwide and U.S.

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Source data: 2019 Novel Coronavirus COVID-19 (2019-nCoV) Data Repository by Johns Hopkins CSSE; https://github.com/CSSEGISandData/COVID-19

Source code: https://github.com/opencedar/covid19

The visualizations in this document are heavily indebted to Edward Tufte and his use of sparklines—small, clutter-free time series lines—to show how many different panels or categories of data are changing through time; check out https://www.edwardtufte.com/bboard/q-and-a-fetch-msg?msg_id=0001OR.

Worldwide

Worldwide Summary

Sorted by total number of cases. Percent growth in total cases in the past seven days is last column.

Table 1: Worldwide Summary

Country_Region	days_100	conf	deaths	new_conf	conf_lag7	l7_rate
US	33	275586	7087	32133	101657	172%
Italy	41	119827	14681	4585	86498	40%
Spain	33	119199	11198	7134	65719	80%
Germany	34	91159	1275	6365	50871	80%
China	73	82511	3326	79	81897	0%
France	35	65202	6520	5273	33402	96%
Iran	38	53183	3294	2715	32332	64%
United Kingdom	24	38689	3611	4516	14745	164%
Turkey	16	20921	425	2786	5698	268%
Switzerland	30	19606	591	779	12928	52%
Belgium	29	16770	1143	1422	7284	132%
Netherlands	29	15821	1490	1033	8647	84%
Canada	24	12437	179	1153	4682	164%
Austria	27	11524	168	395	7657	52%
Korea, South	44	10062	174	86	9332	8%
Portugal	22	9886	246	852	4268	132%
Brazil	22	9056	359	1012	3417	164%
Israel	24	7428	40	571	3035	144%
Sweden	29	6131	358	563	3069	100%
Norway	29	5370	59	223	3755	44%
Australia	25	5330	28	214	3143	68%
Ireland	21	4273	120	424	2121	100%
Russia	18	4149	34	601	1036	300%
Czechia	22	4091	53	233	2279	80%
Denmark	25	3946	139	373	2200	80%
Chile	19	3737	22	333	1610	132%
Poland	21	3383	71	437	1389	144%
Ecuador	17	3368	145	205	1595	112%
Malaysia	26	3333	53	217	2161	56%

Country_Region	days_100	conf	deaths	new_conf	conf_lag7	l7_rate
Romania	21	3183	133	445	1292	148%
Philippines	21	3018	136	385	803	276%
Pakistan	19	2686	40	265	1373	96%
Japan	43	2617	63	122	1468	80%
Luxembourg	18	2612	31	125	1605	64%
India	21	2567	72	24	887	188%
Saudi Arabia	21	2039	25	154	1104	84%
Indonesia	20	1986	181	196	1046	88%
Thailand	20	1978	19	103	1136	76%
Finland	22	1615	20	97	1041	56%
Greece	22	1613	63	69	966	68%
Peru	18	1595	61	181	635	152%
Mexico	16	1510	50	132	585	160%
South Africa	17	1505	9	43	1170	28%
Dominican Republic	14	1488	68	108	581	156%
Serbia	16	1476	39	305	457	224%
Panama	16	1475	37	158	674	120%
Iceland	23	1364	4	45	890	52%
Colombia	16	1267	25	106	539	136%
Argentina	15	1265	39	132	589	116%
United Arab Emirates	17	1264	9	240	405	212%
Algeria	14	1171	105	185	409	188%
Singapore	35	1114	5	65	732	52%
Croatia	16	1079	8	68	586	84%
Qatar	24	1075	3	126	562	92%
Ukraine	10	1072	27	175	310	244%
World	24	1071612	58161	80766	580272	84%

Ln (Seven-Day-Moving-Average New Cases) Impact on Ln (New Cases)

In other words, elasticity. How does this elasticity change through time, from days since the 100th case?

An elasticity under 1 indicates that over a seven-day period, new cases are decreasing.

The black line shows the best curve fit for elasticity changing over time. All countries generally are moving to cap the rate of exponential growth. Countries above the line are doing worse than average, and those below the line are doing better than average. A rate below 1 indicates that new cases are declining over an average 7-day period.

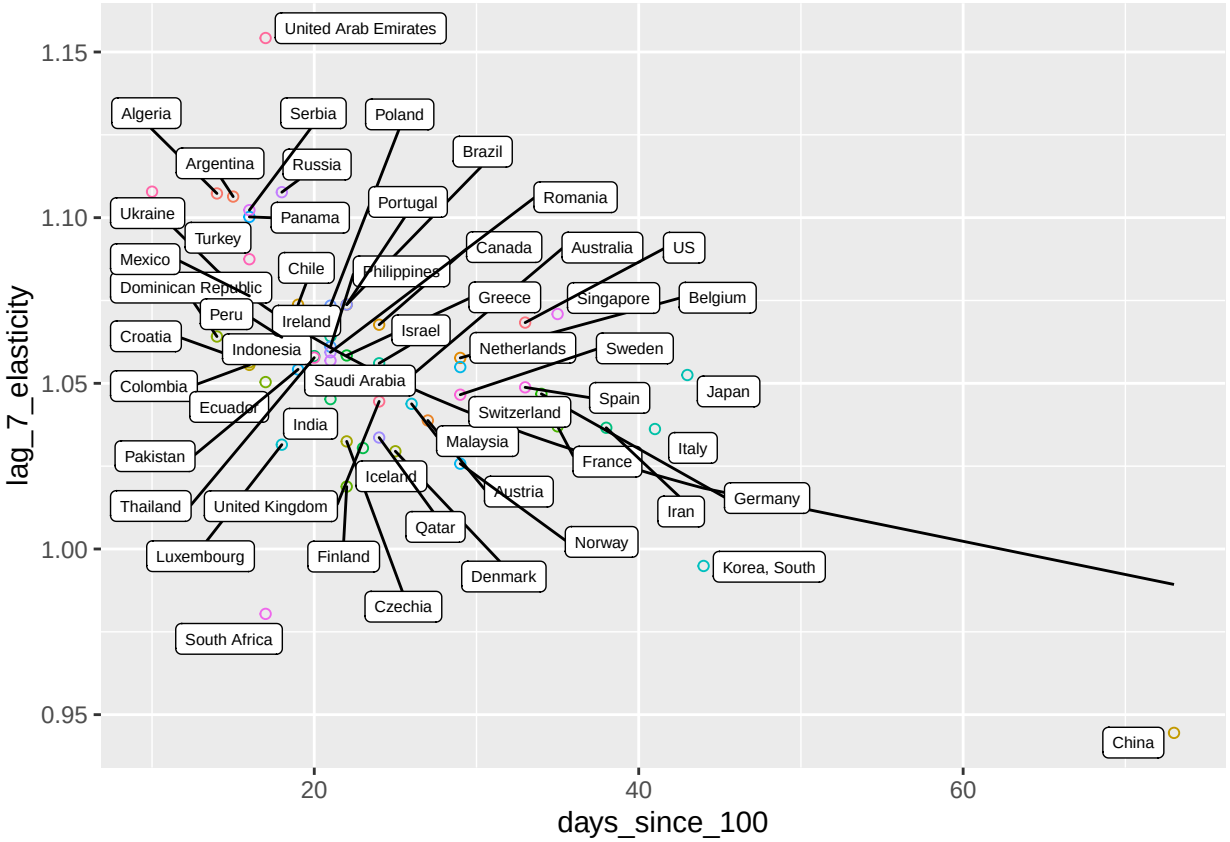


Table 2: Countries by Predicted vs. Actual Lag 7 New Case Elasticity on Today's Cases

country	days_since_100	lag_7_elasticity	prediction	residual
Ukraine	10	1.11	1.10	0.00
Dominican Republic	14	1.06	1.08	-0.02
Algeria	14	1.11	1.08	0.02
Argentina	15	1.11	1.08	0.03
Colombia	16	1.06	1.08	-0.02
Croatia	16	1.06	1.08	-0.02
Mexico	16	1.08	1.08	0.00
Turkey	16	1.09	1.08	0.01
Panama	16	1.10	1.08	0.02
Serbia	16	1.10	1.08	0.03
South Africa	17	0.98	1.07	-0.09
Ecuador	17	1.05	1.07	-0.02
United Arab Emirates	17	1.15	1.07	0.08
Luxembourg	18	1.03	1.07	-0.04
Peru	18	1.06	1.07	-0.01
Russia	18	1.11	1.07	0.04
Pakistan	19	1.05	1.07	-0.01
Chile	19	1.07	1.07	0.01
Thailand	20	1.06	1.06	-0.01
Indonesia	20	1.06	1.06	-0.01
India	21	1.05	1.06	-0.02
Saudi Arabia	21	1.06	1.06	0.00

country	days_since_100	lag_7_elasticity	prediction	residual
Romania	21	1.06	1.06	0.00
Philippines	21	1.06	1.06	0.00
Ireland	21	1.06	1.06	0.00
Poland	21	1.07	1.06	0.01
Finland	22	1.02	1.06	-0.04
Czechia	22	1.03	1.06	-0.03
Greece	22	1.06	1.06	0.00
Brazil	22	1.07	1.06	0.02
Portugal	22	1.07	1.06	0.02
Iceland	23	1.03	1.06	-0.03
Qatar	24	1.03	1.05	-0.02
United Kingdom	24	1.04	1.05	-0.01
Israel	24	1.06	1.05	0.00
Canada	24	1.07	1.05	0.01
Denmark	25	1.03	1.05	-0.02
Australia	25	1.05	1.05	0.00
Malaysia	26	1.04	1.05	0.00
Austria	27	1.04	1.05	-0.01
Norway	29	1.03	1.04	-0.02
Sweden	29	1.05	1.04	0.00
Netherlands	29	1.05	1.04	0.01
Belgium	29	1.06	1.04	0.02
Switzerland	30	1.04	1.04	0.00
Spain	33	1.05	1.03	0.01
US	33	1.07	1.03	0.03
Germany	34	1.05	1.03	0.01
France	35	1.04	1.03	0.01
Singapore	35	1.07	1.03	0.04
Iran	38	1.04	1.03	0.01
Italy	41	1.04	1.02	0.01
Japan	43	1.05	1.02	0.03
Korea, South	44	0.99	1.02	-0.02
China	73	0.94	0.99	-0.04

Comparisons with averages

Table 3: Countries by Predicted vs. Actual Lag 7 New Case Elasticity on Today's Cases

country	days_since_100	lag_7_elasticity	prediction	ww_residual
Ukraine	10	1.11	1.10	0.00
Dominican Republic	14	1.06	1.08	-0.02
Algeria	14	1.11	1.08	0.02
Argentina	15	1.11	1.08	0.03
Colombia	16	1.06	1.08	-0.02
Croatia	16	1.06	1.08	-0.02
Mexico	16	1.08	1.08	0.00
Turkey	16	1.09	1.08	0.01
Panama	16	1.10	1.08	0.02
Serbia	16	1.10	1.08	0.03
South Africa	17	0.98	1.07	-0.09

country	days_since_100	lag_7_elasticity	prediction	ww_residual
Ecuador	17	1.05	1.07	-0.02
United Arab Emirates	17	1.15	1.07	0.08
Luxembourg	18	1.03	1.07	-0.04
Peru	18	1.06	1.07	-0.01
Russia	18	1.11	1.07	0.04
Pakistan	19	1.05	1.07	-0.01
Chile	19	1.07	1.07	0.01
Thailand	20	1.06	1.06	-0.01
Indonesia	20	1.06	1.06	-0.01
India	21	1.05	1.06	-0.02
Saudi Arabia	21	1.06	1.06	0.00
Romania	21	1.06	1.06	0.00
Philippines	21	1.06	1.06	0.00
Ireland	21	1.06	1.06	0.00
Poland	21	1.07	1.06	0.01
Finland	22	1.02	1.06	-0.04
Czechia	22	1.03	1.06	-0.03
Greece	22	1.06	1.06	0.00
Brazil	22	1.07	1.06	0.02
Portugal	22	1.07	1.06	0.02
Iceland	23	1.03	1.06	-0.03
Qatar	24	1.03	1.05	-0.02
United Kingdom	24	1.04	1.05	-0.01
Israel	24	1.06	1.05	0.00
Canada	24	1.07	1.05	0.01
Denmark	25	1.03	1.05	-0.02
Australia	25	1.05	1.05	0.00
Malaysia	26	1.04	1.05	0.00
Austria	27	1.04	1.05	-0.01
Norway	29	1.03	1.04	-0.02
Sweden	29	1.05	1.04	0.00
Netherlands	29	1.05	1.04	0.01
Belgium	29	1.06	1.04	0.02
Switzerland	30	1.04	1.04	0.00
Spain	33	1.05	1.03	0.01
US	33	1.07	1.03	0.03
Germany	34	1.05	1.03	0.01
France	35	1.04	1.03	0.01
Singapore	35	1.07	1.03	0.04
Iran	38	1.04	1.03	0.01
Italy	41	1.04	1.02	0.01
Japan	43	1.05	1.02	0.03
Korea, South	44	0.99	1.02	-0.02
China	73	0.94	0.99	-0.04

Forecast New Cases by Country

We estimate new cases by date, to see when countries will peak, based on the worldwide curve fit.

Table 4: Forecast Peak New Cases by Country

country	total_cases	peak_new_cases	date	population	perc_pop_infected
China	83,098	15,133	2020-02-13	1,378,665,000	0.0%
Qatar	4,266	238	2020-03-11	2,569,804	0.2%
Italy	252,113	6,557	2020-03-21	60,600,590	0.4%
Thailand	8,473	188	2020-03-22	68,863,514	0.0%
Switzerland	50,454	1,321	2020-03-23	8,372,098	0.6%
Saudi Arabia	9,912	205	2020-03-24	32,275,687	0.0%
Luxembourg	6,077	234	2020-03-25	582,972	1.0%
Spain	406,048	9,630	2020-03-25	46,443,959	0.9%
Austria	27,754	1,321	2020-03-26	8,747,358	0.3%
Malaysia	10,822	235	2020-03-26	31,187,265	0.0%
Norway	11,554	386	2020-03-27	5,232,929	0.2%
South Africa	2,448	243	2020-03-27	55,908,865	0.0%
Australia	17,581	497	2020-03-28	24,127,159	0.1%
Belgium	89,485	1,850	2020-03-28	11,348,159	0.8%
Finland	3,737	126	2020-03-28	5,495,096	0.1%
Dominican Republic	7,921	208	2020-03-31	10,648,791	0.1%
France	195,082	7,657	2020-03-31	66,896,109	0.3%
Philippines	22,591	538	2020-03-31	103,320,222	0.0%
Colombia	6,265	159	2020-04-01	48,653,419	0.0%
Croatia	4,514	96	2020-04-01	4,170,600	0.1%
Ecuador	13,897	508	2020-04-01	16,385,068	0.1%
India	12,932	601	2020-04-01	1,324,171,354	0.0%
Peru	10,646	258	2020-04-01	31,773,839	0.0%
Greece	7,356	129	2020-04-02	10,746,740	0.1%
Iceland	3,526	99	2020-04-02	334,252	1.1%
Japan	16,460	317	2020-04-02	126,994,511	0.0%
Pakistan	12,589	303	2020-04-02	193,203,476	0.0%
Sweden	26,882	621	2020-04-02	9,903,122	0.3%
Denmark	11,379	373	2020-04-03	5,731,118	0.2%
Indonesia	9,844	196	2020-04-03	261,115,456	0.0%
Romania	19,278	445	2020-04-03	19,705,301	0.1%
United Kingdom	152,983	4,516	2020-04-03	65,637,239	0.2%
Germany	327,592	6,940	2020-04-09	82,667,685	0.4%
Israel	39,298	801	2020-04-13	8,547,100	0.5%
Netherlands	70,880	1,307	2020-04-15	17,018,408	0.4%
Ireland	24,391	454	2020-04-16	4,773,095	0.5%
Mexico	12,445	209	2020-04-20	127,540,423	0.0%
Chile	31,008	545	2020-04-21	17,909,754	0.2%
Canada	113,807	2,180	2020-04-22	36,286,425	0.3%
Portugal	84,539	1,602	2020-04-22	10,324,611	0.8%
Poland	34,051	577	2020-04-23	37,948,016	0.1%
Brazil	112,808	2,066	2020-04-25	207,652,865	0.1%
Turkey	371,261	7,987	2020-04-26	79,512,426	0.5%
US	3,744,731	83,175	2020-04-26	323,127,513	1.2%
Ukraine	20,253	343	2020-04-29	45,004,645	0.0%
Singapore	9,420	102	2020-05-02	5,607,283	0.2%
Panama	26,537	403	2020-05-06	4,034,119	0.7%
Serbia	42,814	678	2020-05-08	7,057,412	0.6%
Algeria	38,389	582	2020-05-09	40,606,052	0.1%
Argentina	30,888	438	2020-05-12	43,847,430	0.1%

country	total_cases	peak_new_cases	date	population	perc_pop_infected
United Arab Emirates	867,061	31,334	2020-05-15	9,269,612	9.4%

Forecast New Cases WW Total

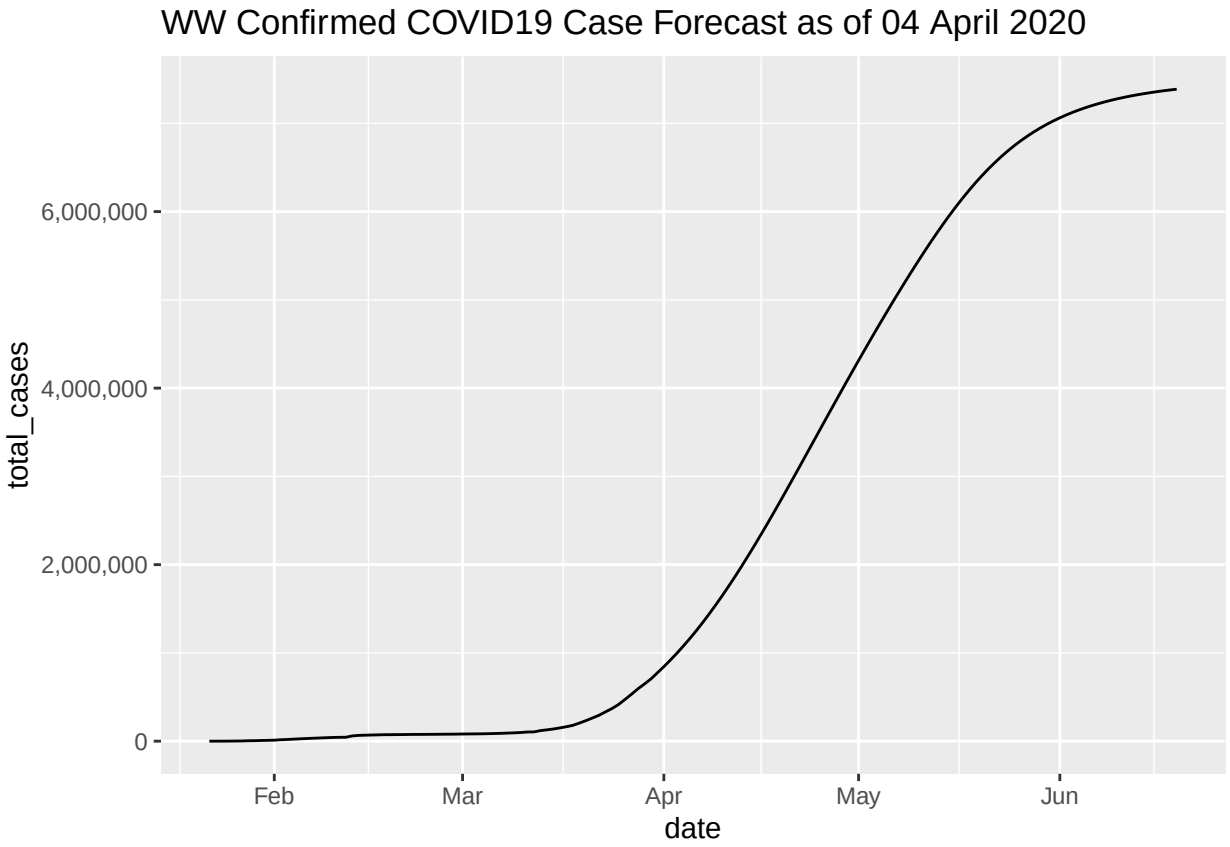
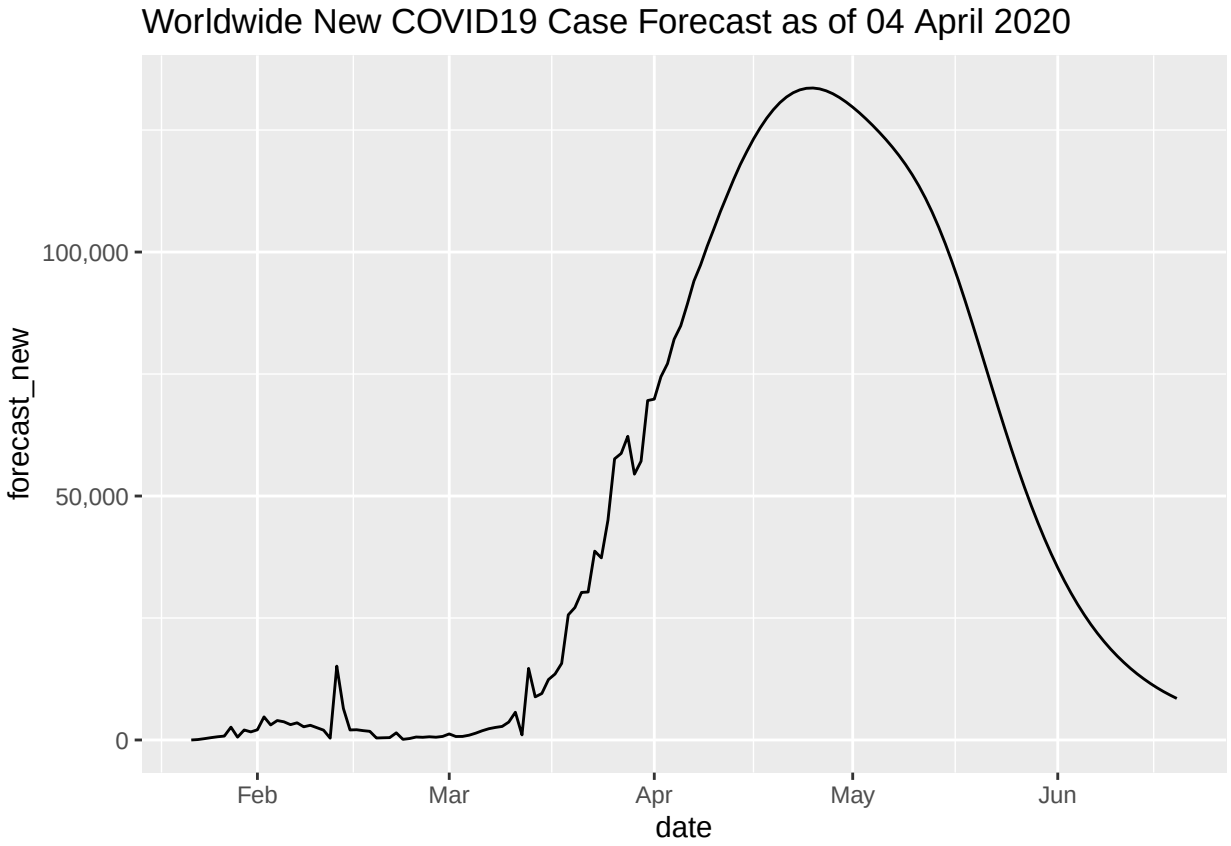


Table 5: Peak Daily New Cases Worldwide and Total on That Day

date	forecast_new	total_cases
2020-04-25	133,616	3,522,828


Worldwide New COVID19 Case Forecast as of 04 April 2020
forecast_new
100,000
50,000
0
Feb
Mar
Apr
May
Jun
date

Sparklines

Confirmed Cases

Deaths


Cumulative COVID19 Deaths Through 04 April 2020
deaths
Algeria
Argentina
Australia
Austria
Belgium
Brazil
Canada
Chile
China
Colombia
Croatia
Czechia
Denmark
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Finland
France
Germany
Greece
Iceland
India
Indonesia
Iran
Ireland
Israel
Italy
Japan
Korea, South
Luxembourg
Malaysia
Mexico
Netherlands
Norway
Pakistan
Panama
Peru
Philippines
Poland
Portugal
Qatar
Romania
Russia
Saudi Arabia
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15000
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Confirmed Growth Rate 5-Day Moving Average

Death Rate

U.S. Analysis

State Summary

Sorted by total number of cases. Percent growth in total cases in the past seven days is last column.

Table 6: State-by-State Summary

Province_State	days_100	conf	deaths	new_conf	conf_lag7	l7_rate
New York	27	102987	2935	10481	44876	128%
New Jersey	19	29895	646	4305	8825	240%
Michigan	16	12744	479	1953	3634	252%
California	26	12004	265	1231	4657	156%
Massachusetts	23	10402	192	1436	3240	220%
Louisiana	19	10297	370	1138	2744	276%
Florida	20	10268	170	1260	2900	256%
Illinois	19	8904	210	1209	3024	196%
Pennsylvania	18	8570	102	1302	2345	264%
Washington	28	6846	291	457	3477	96%
Georgia	19	5831	184	483	2000	192%
Texas	18	5734	100	665	1937	196%
Connecticut	16	4914	131	1090	1291	280%
Colorado	21	3742	97	400	1433	160%
Indiana	14	3437	102	399	979	252%
Ohio	16	3312	91	411	1137	192%

Province_State	days_100	conf	deaths	new_conf	conf_lag7	l7_rate
Tennessee	16	3067	41	222	1318	132%
Maryland	16	2758	43	427	775	256%
North Carolina	16	2251	27	274	887	152%
Virginia	15	2012	46	306	607	232%
Wisconsin	16	2012	51	264	926	116%
Arizona	14	1937	41	222	665	192%
Missouri	12	1864	25	7	666	180%
South Carolina	15	1700	34	146	542	212%
Nevada	15	1514	43	51	536	184%
Alabama	14	1495	38	262	587	156%
Mississippi	14	1358	29	181	579	136%
Utah	14	1255	7	163	472	164%
Oklahoma	11	990	38	109	322	208%
Oregon	15	899	22	73	416	116%
Idaho	9	891	9	115	205	336%
Minnesota	15	788	22	46	396	100%
Kentucky	13	770	34	0	301	156%
District of Columbia	13	757	15	104	271	180%
Rhode Island	12	711	14	54	203	252%
Arkansas	14	704	12	61	381	84%
Iowa	12	699	11	85	235	196%
Kansas	11	629	18	76	206	204%
New Mexico	11	534	10	146	136	292%
New Hampshire	12	479	5	163	158	204%
Delaware	11	450	14	57	163	176%
Maine	12	432	9	56	168	156%
Vermont	10	389	17	51	184	112%
Hawaii	8	319	3	63	106	200%
Puerto Rico	7	316	15	0	79	300%
Nebraska	6	279	6	33	82	240%
Montana	8	243	5	2	109	124%
West Virginia	6	237	2	21	76	212%
South Dakota	5	187	2	22	58	224%
North Dakota	5	173	3	14	68	156%
Wyoming	4	162	0	12	70	132%
Alaska	6	157	3	14	58	172%
US	14	275305	7079	32122	101510	172%

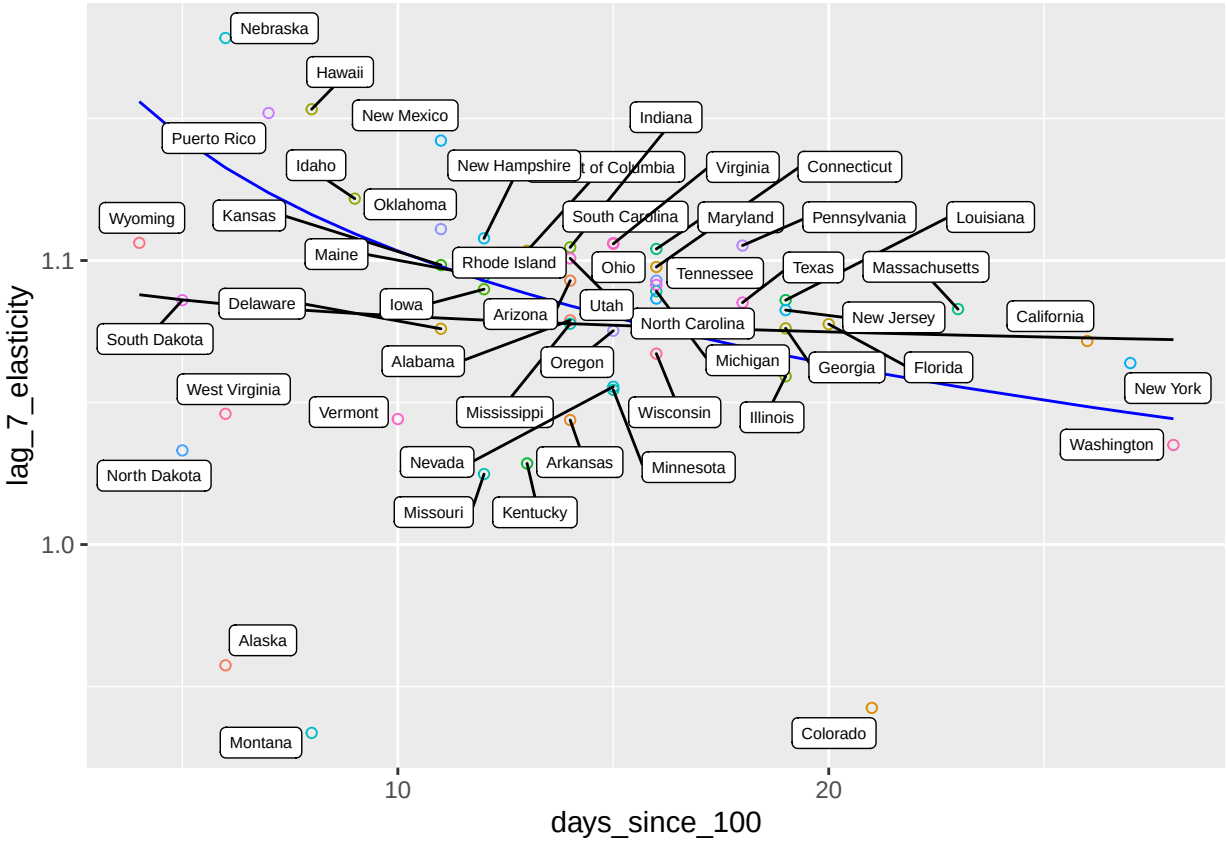
Ln (Seven-Day-Moving-Average New Cases) Impact on Ln (New Cases)

In other words, elasticity. How does this elasticity change through time, from days since the 50th case?

An elasticity under 1 indicates that over a seven-day period, new cases are decreasing.

The black line is the best fit for elasticity for the states that have had 100 cases as they progress. Above the line: worse than average; below-the-line: better than average.

The blue line is the best fit for elasticity for countries across the world. It's apparent that the U.S. is not doing as well as the rest of the world in containing exponential growth–probably due to initial testing failures.



Comparisons with U.S. and worldwide averages

Some states are doing better than worldwide averages when taking into account days since 100th case. Most are doing worse.

Table 7: States by Predicted vs. Actual Lag 7 New Case Elasticity on Today's Cases

state	days_since_100	lag_7_elasticity	prediction_us	prediction_ww	us_residual	ww_residual
Wyoming	4	1.11	1.09	1.16	0.02	-0.05
North Dakota	5	1.03	1.09	1.14	-0.05	-0.11
South Dakota	5	1.09	1.09	1.14	0.00	-0.06
Alaska	6	0.96	1.08	1.13	-0.13	-0.18
West Virginia	6	1.05	1.08	1.13	-0.04	-0.09
Nebraska	6	1.18	1.08	1.13	0.09	0.05
Puerto Rico	7	1.15	1.08	1.12	0.07	0.03
Montana	8	0.93	1.08	1.12	-0.15	-0.18
Hawaii	8	1.15	1.08	1.12	0.07	0.04
Idaho	9	1.12	1.08	1.11	0.04	0.01
Vermont	10	1.04	1.08	1.10	-0.04	-0.06
Delaware	11	1.08	1.08	1.10	0.00	-0.02
Kansas	11	1.10	1.08	1.10	0.02	0.00
Oklahoma	11	1.11	1.08	1.10	0.03	0.01
New Mexico	11	1.14	1.08	1.10	0.06	0.04
Missouri	12	1.02	1.08	1.09	-0.05	-0.07
Iowa	12	1.09	1.08	1.09	0.01	0.00
Maine	12	1.09	1.08	1.09	0.02	0.00

state	days_since_100	lag_7_elasticity	prediction_us	prediction_ww	us_residual	ww_residual
Rhode Island	12	1.10	1.08	1.09	0.02	0.00
New Hampshire	12	1.11	1.08	1.09	0.03	0.01
Kentucky	13	1.03	1.08	1.09	-0.05	-0.06
District of Columbia	13	1.10	1.08	1.09	0.03	0.02
Arkansas	14	1.04	1.08	1.08	-0.03	-0.04
Mississippi	14	1.08	1.08	1.08	0.00	-0.01
Alabama	14	1.08	1.08	1.08	0.00	-0.01
Arizona	14	1.09	1.08	1.08	0.02	0.01
Utah	14	1.10	1.08	1.08	0.02	0.02
Indiana	14	1.10	1.08	1.08	0.03	0.02
Minnesota	15	1.05	1.08	1.08	-0.02	-0.03
Nevada	15	1.06	1.08	1.08	-0.02	-0.02
Oregon	15	1.08	1.08	1.08	0.00	0.00
Virginia	15	1.11	1.08	1.08	0.03	0.03
South Carolina	15	1.11	1.08	1.08	0.03	0.03
Wisconsin	16	1.07	1.08	1.08	-0.01	-0.01
North Carolina	16	1.09	1.08	1.08	0.01	0.01
Michigan	16	1.09	1.08	1.08	0.01	0.01
Tennessee	16	1.09	1.08	1.08	0.01	0.02
Ohio	16	1.09	1.08	1.08	0.02	0.02
Connecticut	16	1.10	1.08	1.08	0.02	0.02
Maryland	16	1.10	1.08	1.08	0.03	0.03
Texas	18	1.09	1.08	1.07	0.01	0.02
Pennsylvania	18	1.11	1.08	1.07	0.03	0.04
Illinois	19	1.06	1.08	1.07	-0.02	-0.01
Georgia	19	1.08	1.08	1.07	0.00	0.01
New Jersey	19	1.08	1.08	1.07	0.01	0.02
Louisiana	19	1.09	1.08	1.07	0.01	0.02
Florida	20	1.08	1.07	1.06	0.00	0.01
Colorado	21	0.94	1.07	1.06	-0.13	-0.12
Massachusetts	23	1.08	1.07	1.06	0.01	0.03
California	26	1.07	1.07	1.05	0.00	0.02
New York	27	1.06	1.07	1.05	-0.01	0.02
Washington	28	1.04	1.07	1.04	-0.04	-0.01

Forecast New Cases by State

We estimate new cases by date, to see when states will peak, based on the worldwide curve fit. The reasoning is that testing rates increasing wildly recently in the U.S. have falsely inflated elasticity.

Table 8: Forecast Peak New Cases by State

state	total_cases	total_deaths	peak_new_cases	peak_new_deaths	max_new_date	max_death
Arkansas	3,012	120	61	2	2020-03-25	2020
Nevada	8,404	336	294	12	2020-03-29	2020
Minnesota	3,940	157	73	3	2020-03-30	2020
Colorado	6,240	249	655	26	2020-03-31	2020
Kentucky	2,745	110	149	6	2020-03-31	2020
Missouri	5,834	233	306	12	2020-03-31	2020
Montana	566	23	33	1	2020-04-02	2020
Washington	25,641	1,025	781	31	2020-04-02	2020
Vermont	1,660	66	51	2	2020-04-03	2020

state	total_cases	total_deaths	peak_new_cases	peak_new_deaths	max_new_date	max_death
Delaware	3,671	147	60	2	2020-04-17	2020
Illinois	68,654	2,746	1,452	58	2020-04-17	2020
New York	650,592	26,023	17,065	683	2020-04-17	2020
Wisconsin	16,019	641	284	11	2020-04-20	2020
New Jersey	372,594	14,904	10,493	420	2020-04-21	2020
Mississippi	13,541	541	230	9	2020-04-22	2020
Oregon	8,059	322	122	5	2020-04-22	2020
Alabama	17,099	684	295	12	2020-04-24	2020
Louisiana	186,225	7,449	4,791	192	2020-04-24	2020
Iowa	9,764	390	152	6	2020-04-27	2020
Michigan	270,472	10,819	6,548	262	2020-04-27	2020
Georgia	93,635	3,745	1,770	71	2020-04-28	2020
Maine	6,248	250	88	4	2020-04-28	2020
Connecticut	134,163	5,366	3,160	126	2020-04-29	2020
Kansas	10,734	429	163	7	2020-04-29	2020
Massachusetts	221,192	8,847	4,997	200	2020-04-29	2020
Rhode Island	12,032	481	197	8	2020-04-29	2020
Florida	219,959	8,798	4,380	175	2020-04-30	2020
District of Columbia	16,133	645	277	11	2020-05-02	2020
Arizona	43,372	1,735	737	29	2020-05-03	2020
North Carolina	45,093	1,803	745	30	2020-05-03	2020
California	267,947	10,717	4,734	189	2020-05-05	2020
Idaho	36,344	1,454	691	28	2020-05-05	2020
Pennsylvania	595,250	23,810	15,871	635	2020-05-05	2020
Tennessee	64,326	2,573	1,100	44	2020-05-05	2020
Texas	160,439	6,417	2,873	115	2020-05-06	2020
Indiana	151,709	6,068	3,119	125	2020-05-07	2020
Ohio	102,901	4,116	1,811	72	2020-05-07	2020
New Hampshire	13,520	540	197	8	2020-05-08	2020
Utah	33,763	1,350	545	22	2020-05-08	2020
Oklahoma	36,719	1,468	607	24	2020-05-09	2020
Maryland	152,634	6,105	3,052	122	2020-05-10	2020
South Carolina	89,100	3,564	1,583	63	2020-05-13	2020
Virginia	127,958	5,118	2,279	91	2020-05-14	2020
New Mexico	97,014	3,880	2,031	81	2020-05-21	2020
Hawaii	41,134	1,645	685	27	2020-05-26	2020

Forecast New Cases U.S. Total

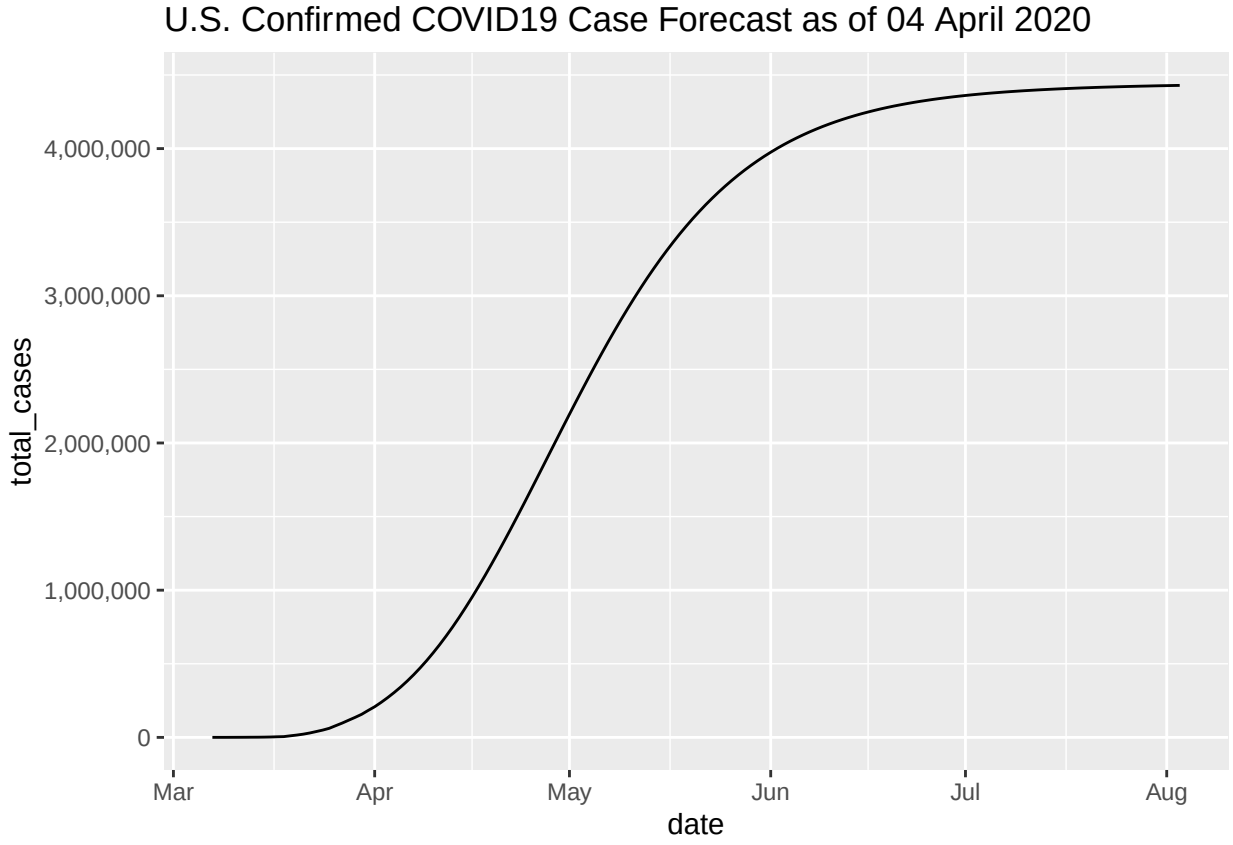


Table 9: Peak Daily New Cases in U.S. and Total on That Day

date	forecast_new	deaths_new	total_cases	total_deaths
2020-04-28	87,068	3435.12	1,935,226	66989.4

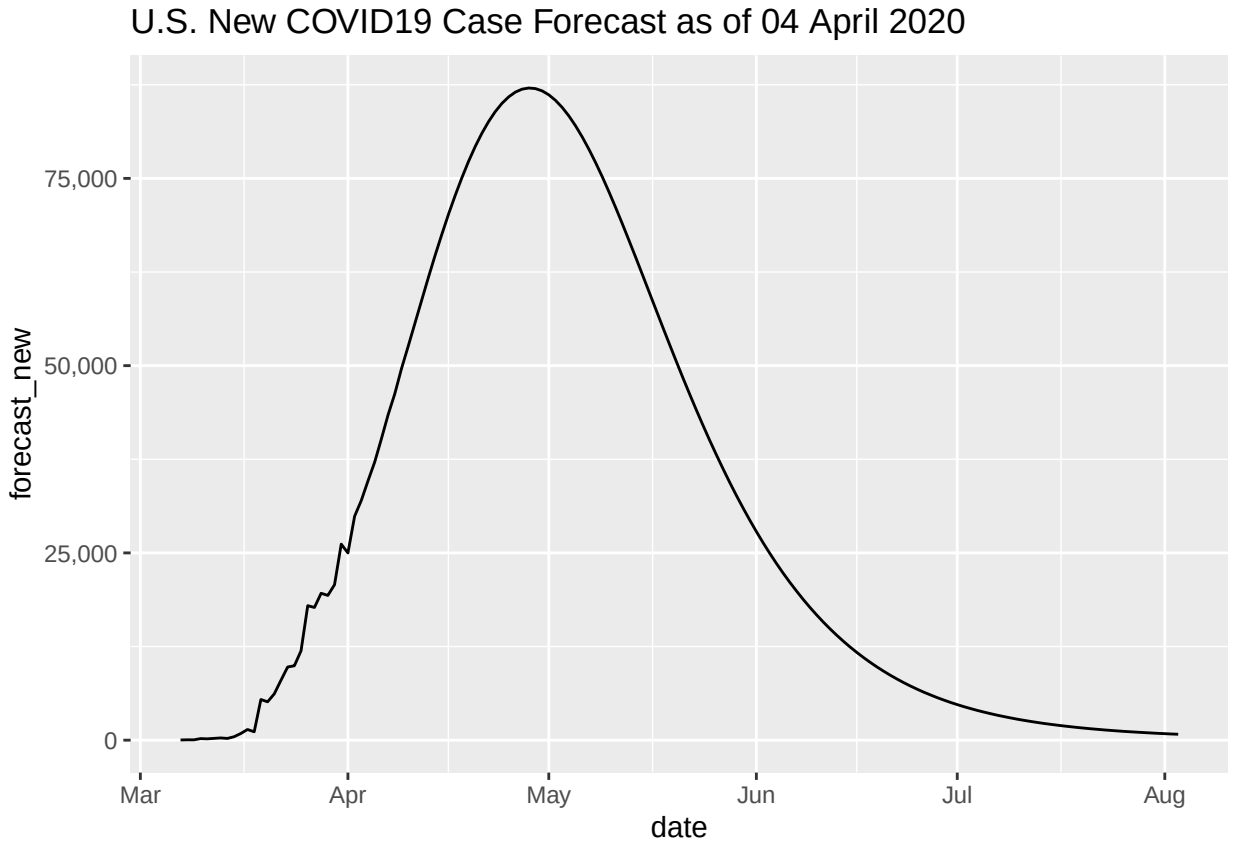
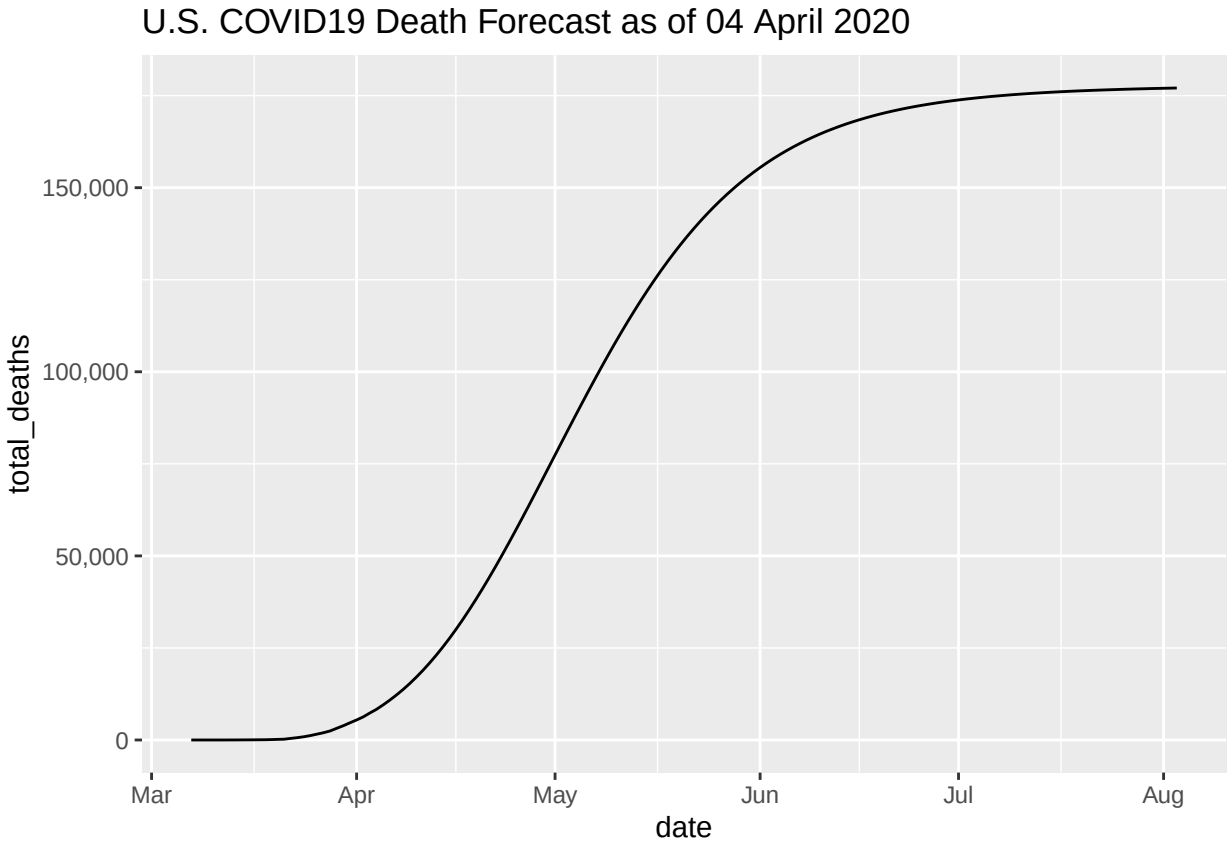


Table 10: Peak Daily Deaths in U.S. and Total on That Day

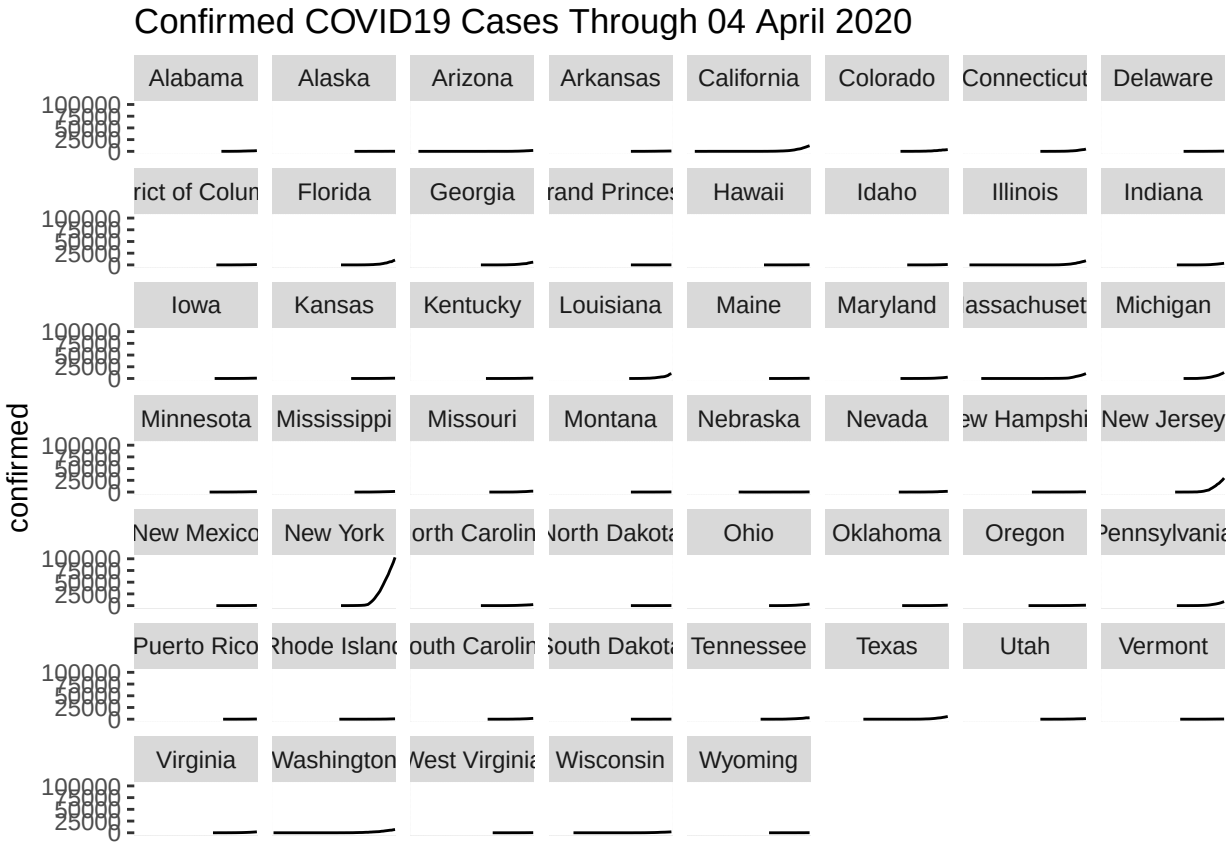
date	forecast_new	deaths_new	total_cases	total_deaths
2020-05-01	86158	3,483	2,195,061	77409.04



Sparklines

We only look at states with more than one hundred cases today. For moving average growth rates, we only look at states with deaths and recoveries over 25.

Confirmed Cases



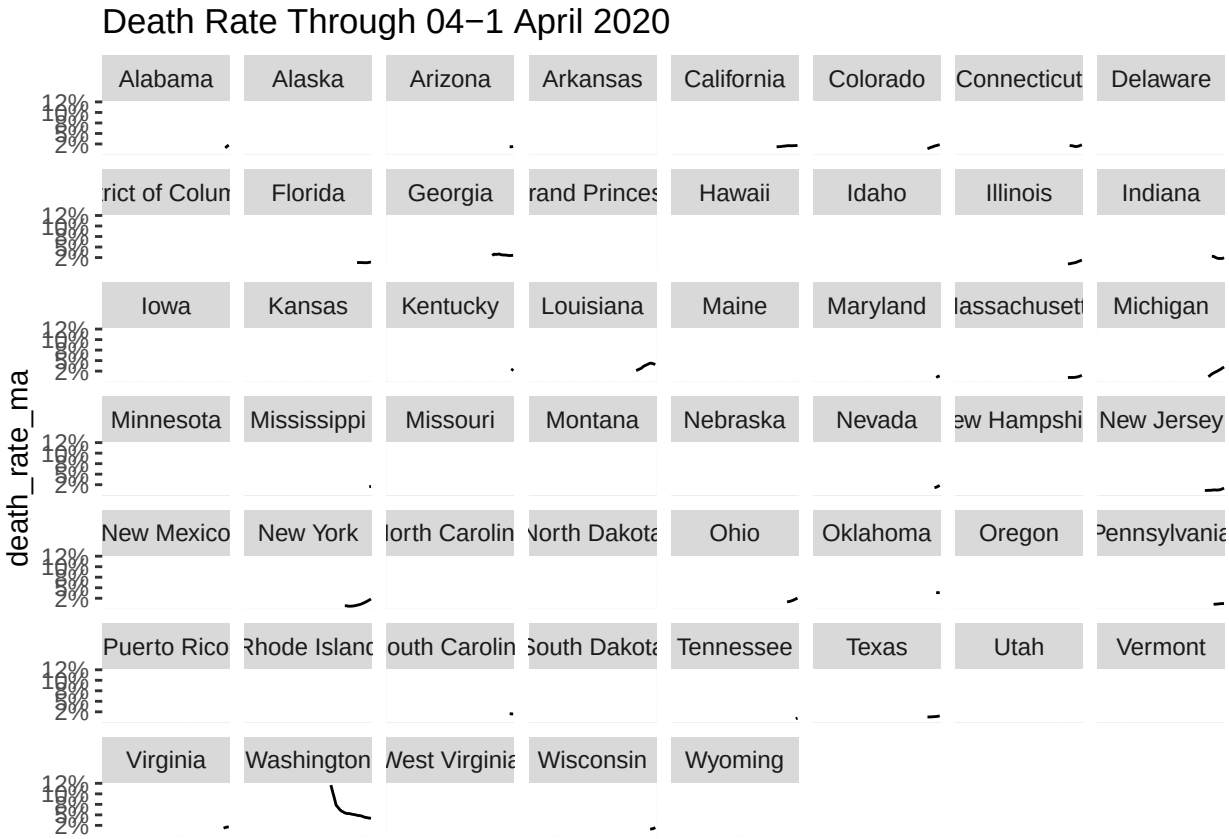
Deaths


Cumulative COVID19 Deaths Through 04 April 2020
deaths
Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
rict of Colun
Florida
Georgia
rand Princes
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
lassachusett
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
ew Hampshi
New Jersey
New Mexico
New York
lorth Carolin
North Dakota
Ohio
Oklahoma
Oregon
Pennsylvania
Puerto Rico
Rhode Island
outh Carolin
South Dakota
Tennessee
Texas
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming
3000
2000
1000
0

Confirmed Growth Rate 5-Day Moving Average

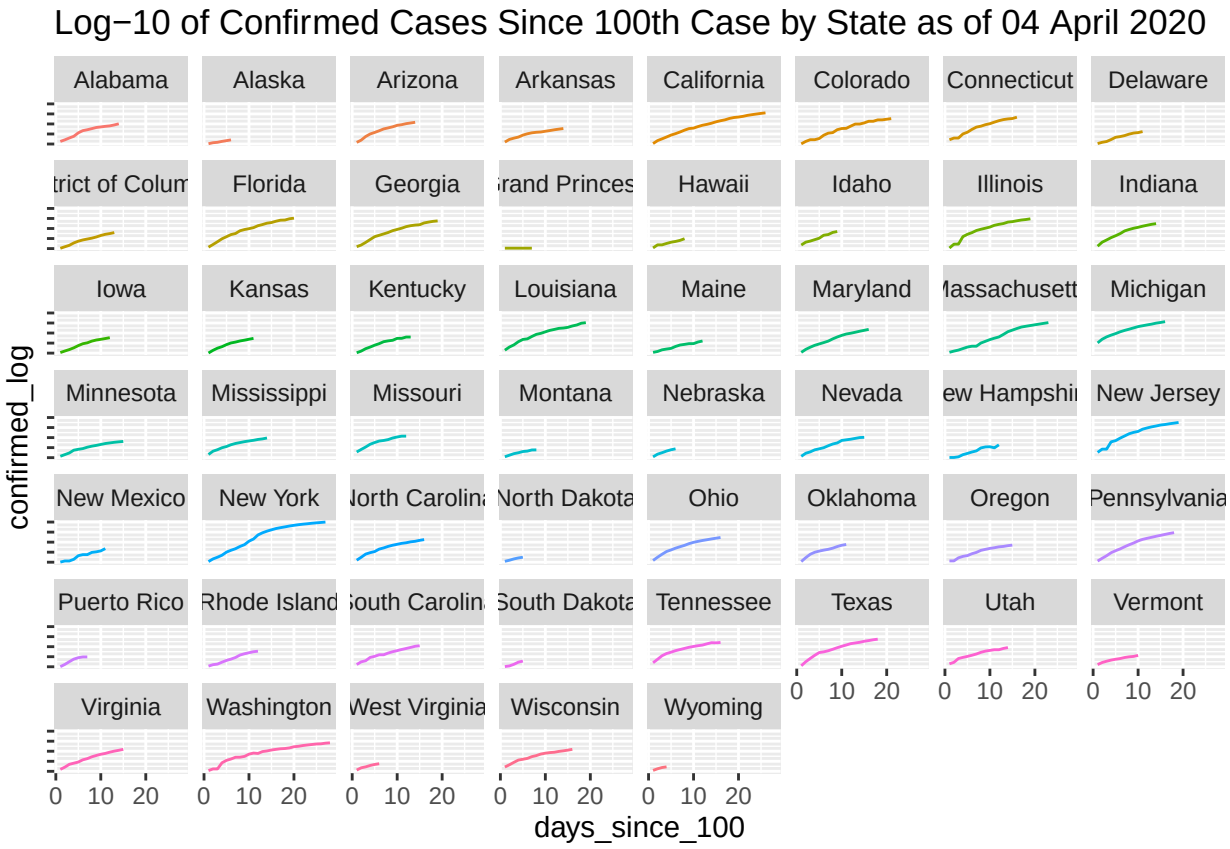
Death Rate 5-Day Moving Average

Only states with >25 deaths are shown


Death Rate Through 04−1 April 2020
death_rate_ma
Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
rict of Colun
Florida
Georgia
rand Princes
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
lassachusett
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
ew Hampshi
New Jersey
New Mexico
New York
lorth Carolin
North Dakota
Ohio
Oklahoma
Oregon
Pennsylvania
Puerto Rico
Rhode Island
outh Carolin
South Dakota
Tennessee
Texas
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming
12%
10%
8%
6%
4%
2%

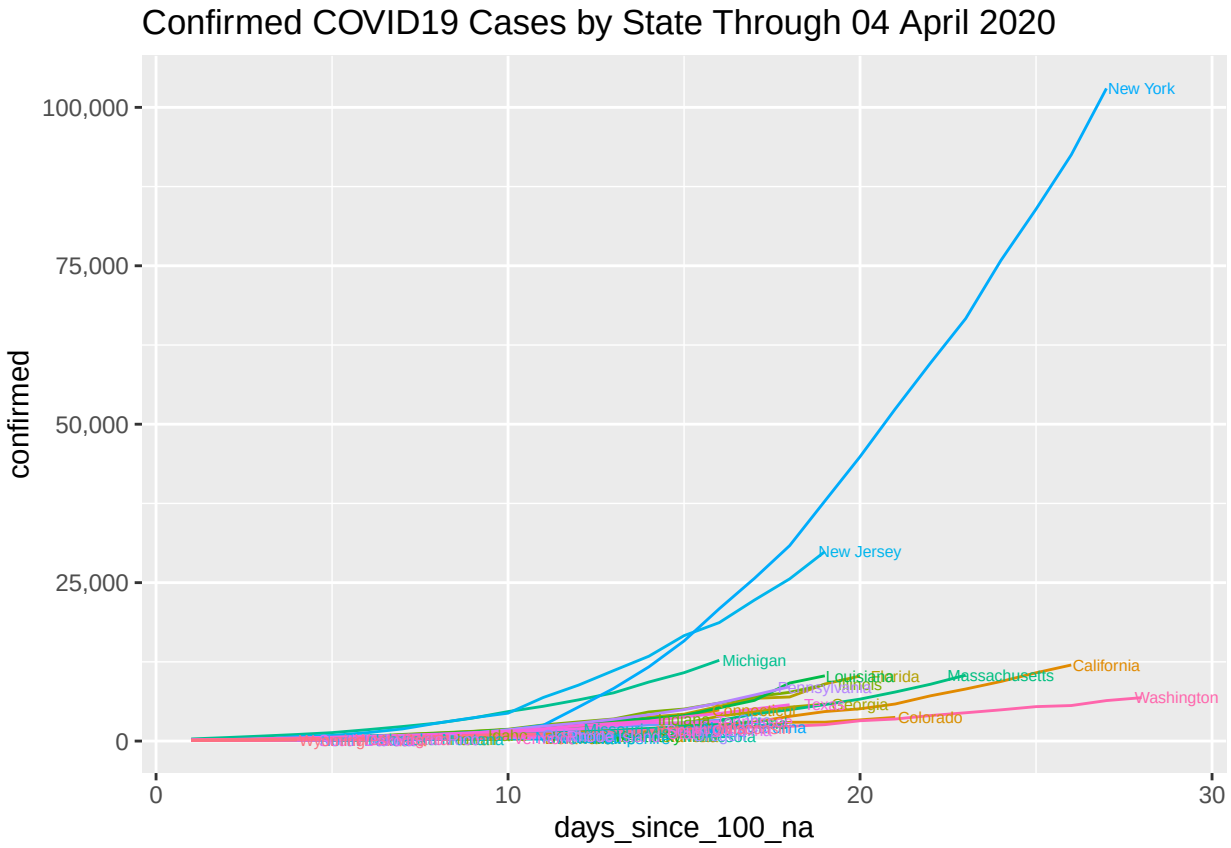
Log / Time for States After 100th Case

Log-10 by States: Confirmed Cases by Day After 50th Confirmed Case

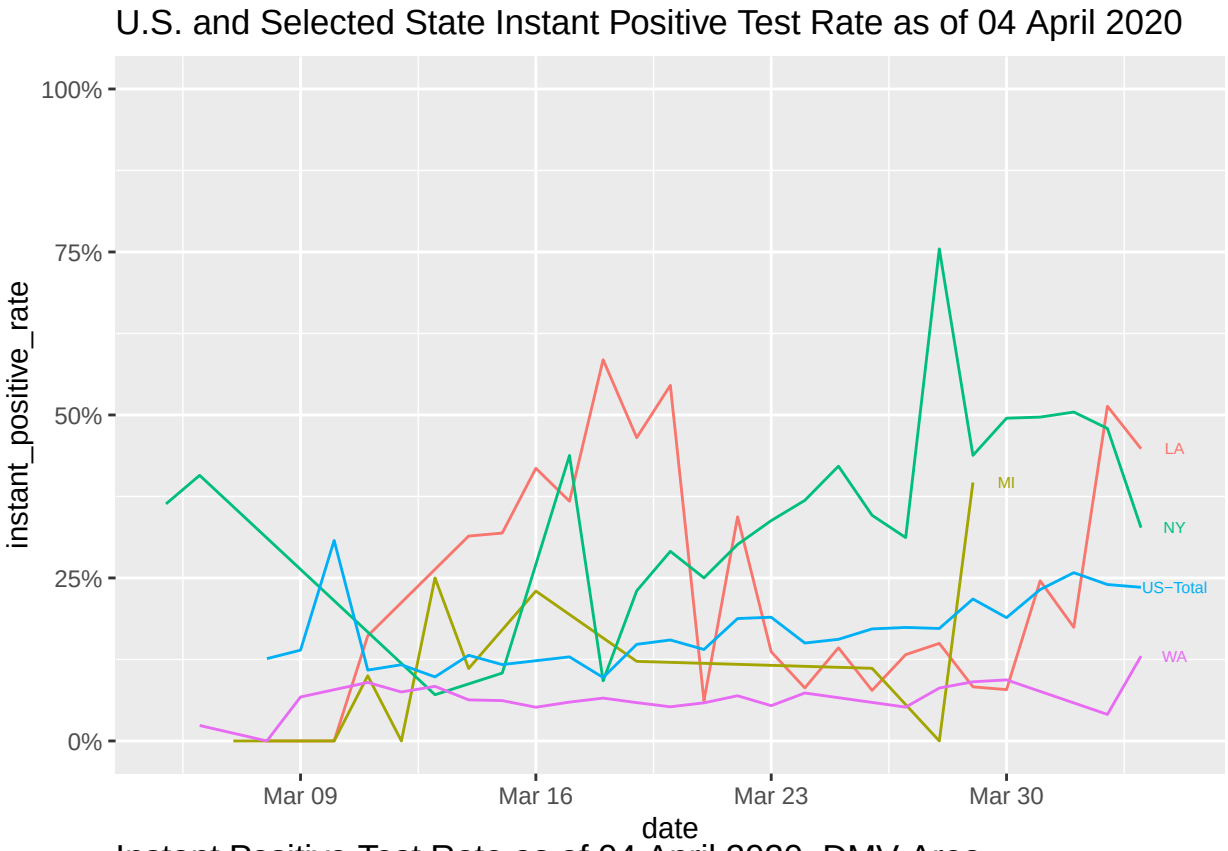


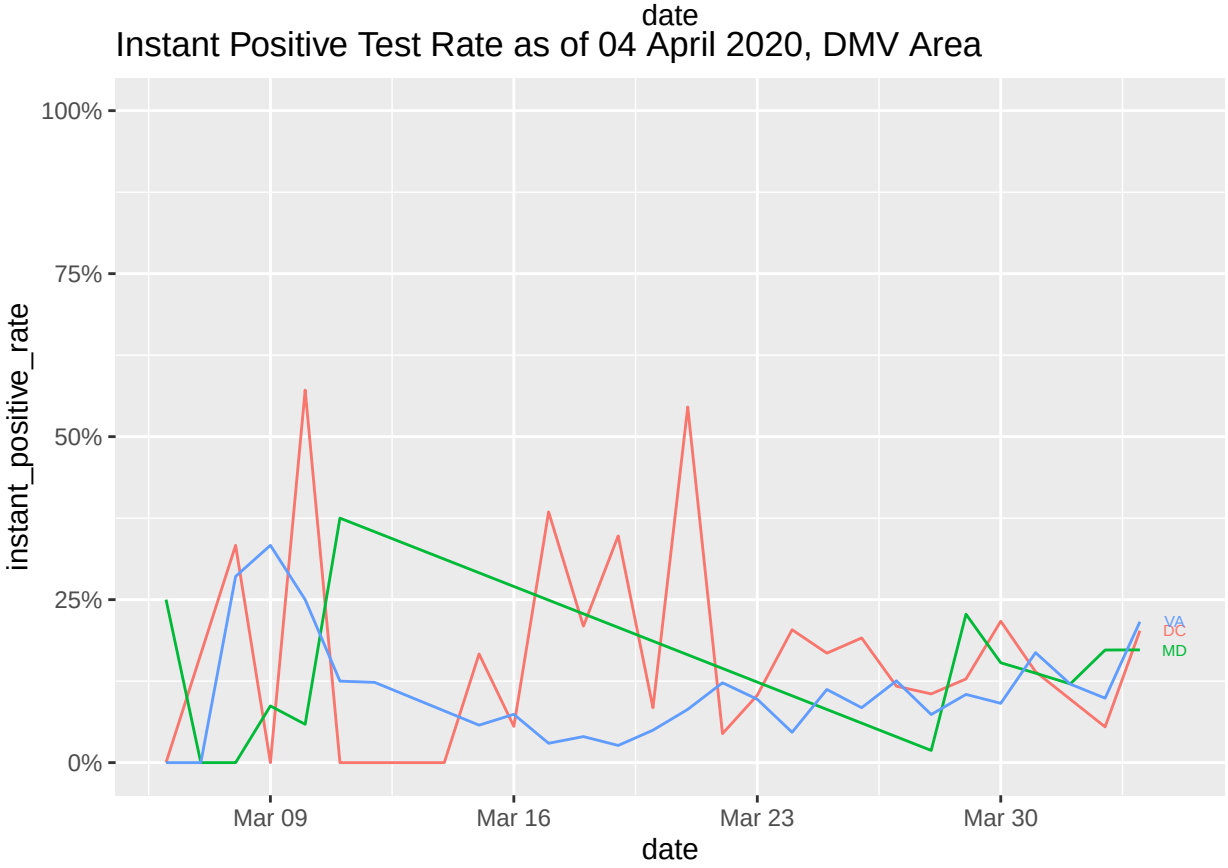
Zero at Fifty Cases

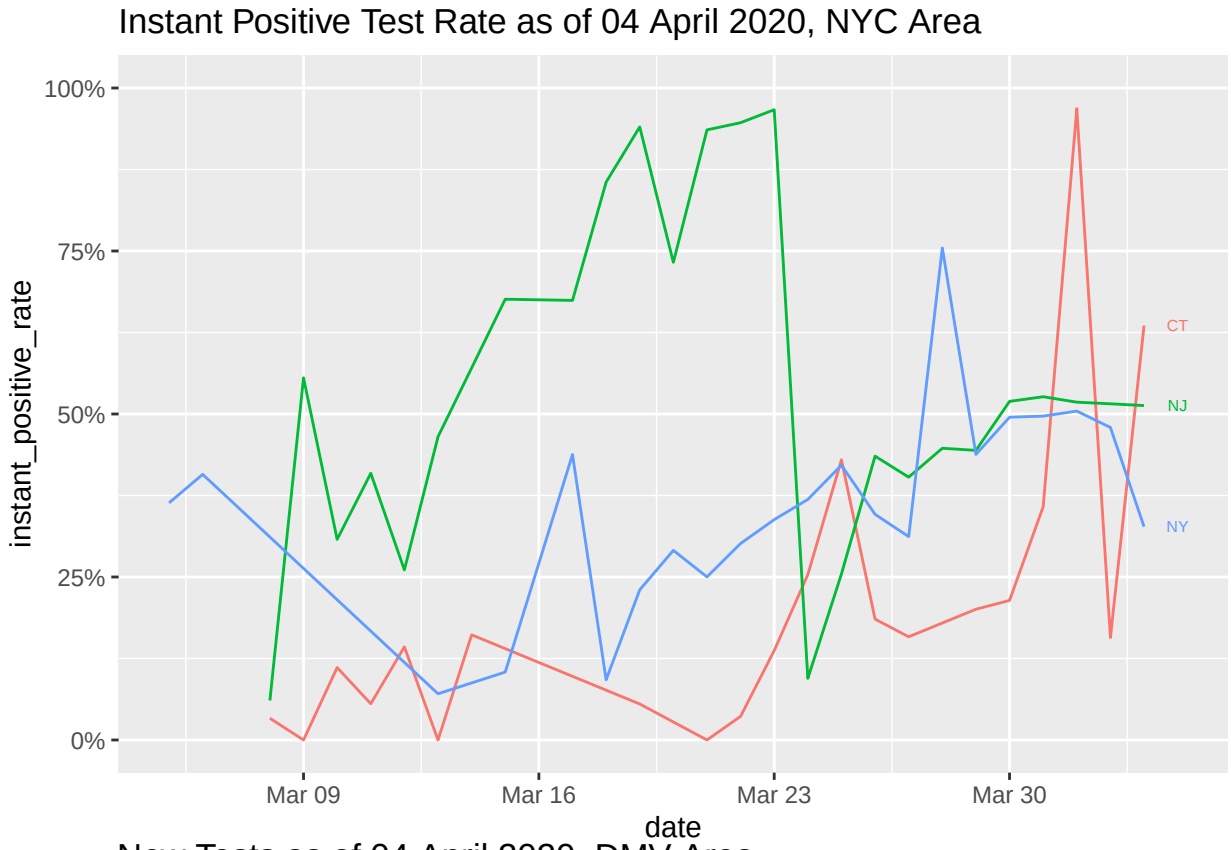
Confirmed Cases

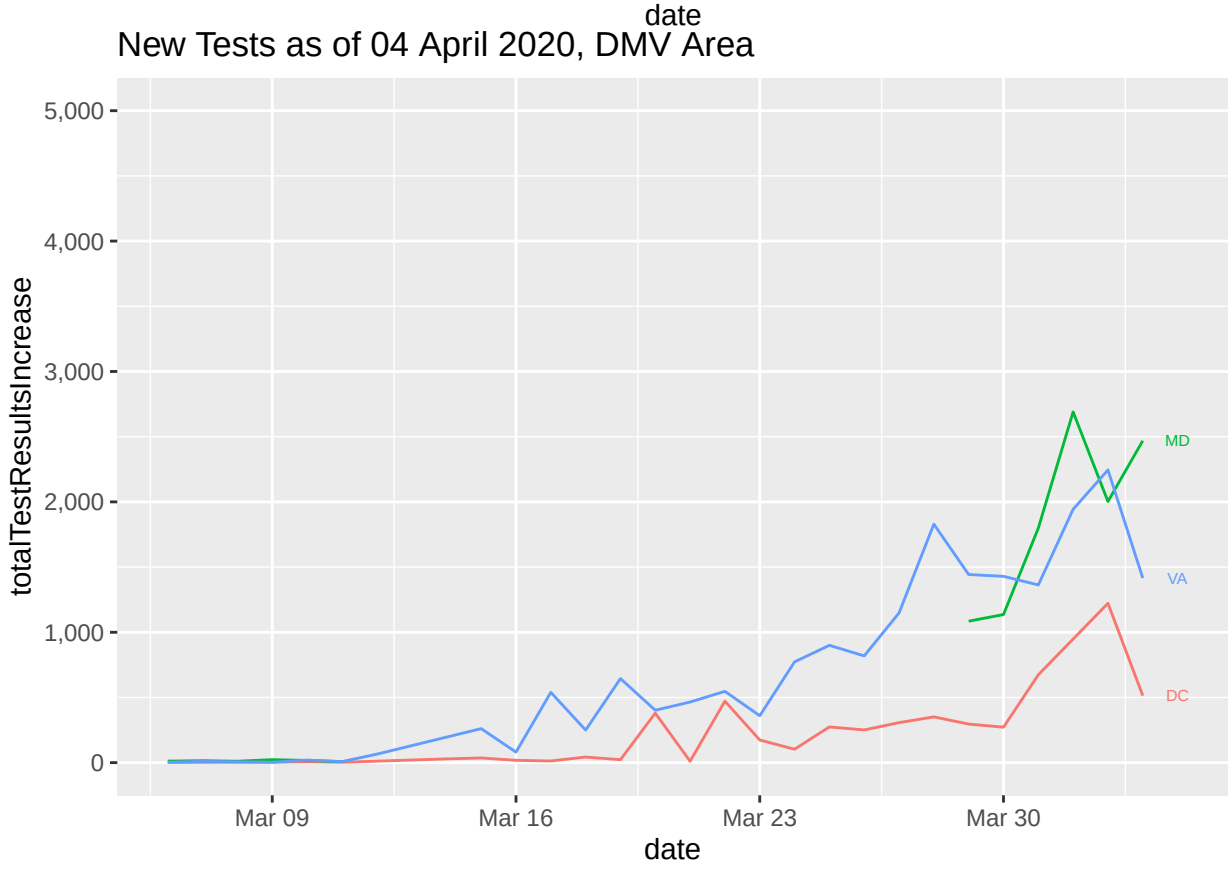


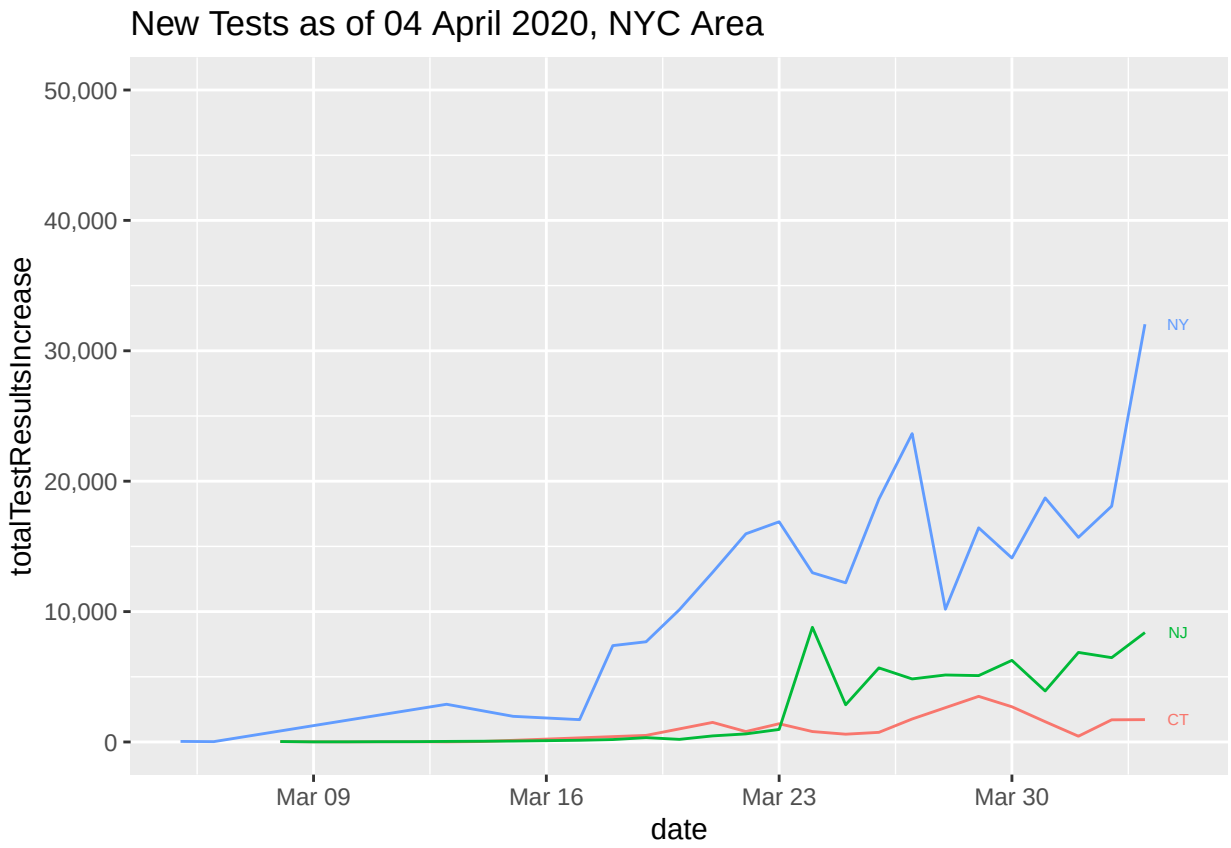
Testing Data






Instant Positive Test Rate as of 04 April 2020, NYC Area
100%
75%
50%
25%
0%
instant_positive_rate
Mar 09
Mar 16
Mar 23
Mar 30
date
CT
NJ
NY


New Tests as of 04 April 2020, DMV Area
5,000
4,000
3,000
2,000
1,000
0
totalTestResultsIncrease
Mar 09
Mar 16
Mar 23
Mar 30
date
MD
VA
DC


New Tests as of 04 April 2020, NYC Area
totalTestResultsIncrease
50,000
40,000
30,000
20,000
10,000
0
Mar 09
Mar 16
Mar 23
Mar 30
date
NY
NJ
CT