Health Industry Advisor, llc

"Strategic Guidance in an Era of Unprecedented Change"

COVID-19 Dashboard

Issue # 62

Friday, May 29, 2020

Day's Highlights

"Strategic Guidance in an Era of Unprecedented Change"

Measure	Desired Change	Yesterday in the U.S.
Number of Tests	Increase	>452,000 tests on Thursday, most ever
Test-Positivity Rate	Decline	5.1% test-positive on Wednesday; 5.6% for past 7 days
Number of Cases	Plateau	New Cases down 9.6% week-over-week
Deaths % of Total Cases	Decline	5.8%
Number of Deaths / 1M Population	Plateau	312.2
Recoveries : Death	Increase	4.83

- The U.S. reported its highest daily test volume since the beginning of the pandemic (>450,000), with a test-positive rate of 5.1%. Even with this increased testing, there were 9.6% fewer new cases the past 7 days, compared to the same period a week ago
- Recoveries will surpass 500,000 today, even though several states are not keeping current with reporting (we estimate that recoveries should be closer to 1 M by this time)
- The key metric to watch is the rate of new daily infections (we use a trailing 7-day moving average, based on 1 million in population). The median rate of all 50 states dipped below 50 yesterday, as the virus spread continues to slow
- States with the highest current rate of new daily infections (in order): Illinois, Maryland, Delaware, Nebraska and Minnesota (a Mid-Atlantic/Midwest problem); states still experiencing increasing infection rates: Alabama, Arkansas, Mississippi, South Carolina, Virginia and Wisconsin (mostly, an SEC problem, for you college football fans)
- Wisconsin is a state to watch: on May 12 the state Supreme Court ruled the Governor's stay-home order unconstitutional. Since this court-ordered re-opening, new cases have been steadily increasing: The rate of new infections for May 1-8 was 55.8 per day per million; for May 22-28, 75.8. At the same time, Wisconsin's daily test volume increased from 3,859 on May 1-8 to 8,653 on May 22-28; its test-positive rate fell from 8.4% on May 1-8 to 5.1% on May 22-28. So, nearly 4,800 more tests each day only produced 120 more positives daily. From these data, it is unclear how much of the increase in recorded infections is due to the relaxed rules, and how much is due to better testing vigilance.
- Georgia and Florida, two other states being questioned for re-opening early, continue to report low infection and test-positive rates
- Internationally, Chile surpassed China in total cases and India surpassed Turkey. Total cases should exceed 6 million sometime this weekend

COUNTRY-BY-COUNTRY INFORMATION

Countries Included

- In Mid-March, we began tracking the twenty countries with the most coronavirus cases; in mid-April, we expanded it to the thirty countries with the most cases
- Since that time, 18 countries have moved ahead of South Korea in total cases
- We continue to track the 30 countries, which still account for 88.0% of the 5.9 million total cases worldwide; additionally, we now have visibility to all 215 countries that have at least 1 coronavirus case
- Case and death information is sourced from the worldometers.info and the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University and the New York Times, each of which are accessed daily; analysis by Health Industry Advisor LLC

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Country-by-Country

Comparative Statistics

"Strategic Guidance in an Era of Unprecedented Change"

As of May 28

Country	Total Cases	Rank	Cases per 1M Population	Rank2	Deaths	Rank3	Death Rate	Rank4	Deaths per 1 Million Population	Rank5	5-day Moving Average Case Growth Rate	Rank6	Tests per 1M Population	Rank7	New Daily Infections Per 1M Population (5-Day M.A.)	Rank8
USA	1,768,461	(1)	5,343	(3)	103,330	(1)	5.8%	(14)	312.2	(9)	1.2%	(13)	49,365	(10)	63.7	(5)
Austria	16,628	(29)	1,846	(23)	668	(26)	4.0%	(20)	74.2	(18)	0.2%	(28)	47,476	(11)	3.6	(25)
Belgium	57,849	(19)	4,991	(5)	9,388	(7)	16.2%	(1)	810.0	(1)	0.4%	(20)	70,678	(3)	19.9	(15)
Brazil	438,812	(2)	2,064	(20)	26,764	(6)	6.1%	(13)	125.9	(14)	4.8%	(2)	4,104	(25)	86.0	(3)
Canada	88,512	(13)	2,345	(16)	6,877	(11)	7.8%	(10)	182.2	(12)	1.1%	(14)	42,036	(14)	27.2	(10)
Chile	86,943	(14)	4,548	(6)	890	(24)	1.0%	(28)	46.6	(21)	5.9%	(1)	27,756	(16)	219.4	(1)
China	82,995	(15)	58	(30)	4,634	(14)	5.6%	(15)	3.2	(30)	0.0%	(30)		N/A	0.0	(30)
Ecuador	38,471	(21)	2,181	(18)	3,313	(19)	8.6%	(9)	187.8	(11)	1.2%	(12)	6,290	(24)	25.6	(11)
France	186,238	(7)	2,853	(13)	28,662	(4)	15.4%	(2)	439.1	(5)	0.4%	(18)	21,217	(20)	9.7	(20)
Germany	182,452	(8)	2,178	(19)	8,570	(9)	4.7%	(18)	102.3	(16)	0.3%	(22)	47,194	(12)	5.9	(23)
India	165,386	(9)	120	(29)	4,711	(13)	2.8%	(22)	3.4	(29)	4.7%	(3)	2,439	(26)	4.9	(24)
Iran	143,849	(11)	1,713	(24)	7,627	(10)	5.3%	(16)	90.8	(17)	1.5%	(9)	10,448	(23)	24.7	(12)
Ireland	24,841	(26)	5,031	(4)	1,639	(21)	6.6%	(11)	331.9	(8)	0.2%	(23)	66,049	(5)	13.0	(17)
Israel	16,872	(27)	1,949	(21)	284	(28)	1.7%	(26)	32.8	(22)	0.2%	(25)	60,724	(7)	3.1	(26)
Italy	231,732	(6)	3,833	(9)	33,142	(3)	14.3%	(3)	548.1	(4)	0.2%	(24)	60,909	(6)	8.8	(21)
Japan	16,683	(28)	132	(28)	867	(25)	5.2%	(17)	6.9	(25)	0.2%	(27)	2,223	(28)	0.3	(29)
Mexico	78,023	(17)	605	(25)	8,597	(8)	11.0%	(7)	66.7	(19)	4.5%	(4)	1,901	(29)	23.7	(13)
Netherlands	45,950	(20)	2,682	(14)	5,903	(12)	12.8%	(5)	344.5	(7)	0.4%	(19)	20,003	(21)	10.4	(19)
Pakistan	61,227	(18)	277	(26)	1,260	(23)	2.1%	(25)	5.7	(26)	3.1%	(6)	2,305	(27)	8.5	(22)
Peru	141,779	(12)	4,300	(7)	4,099	(18)	2.9%	(21)	124.3	(15)	4.1%	(5)	28,207	(15)	143.0	(2)
Portugal	31,596	(24)	3,099	(12)	1,369	(22)	4.3%	(19)	134.3	(13)	0.7%	(16)	76,349	(1)	23.6	(14)
Russia	379,051	(3)	2,528	(15)	4,142	(17)	1.1%	(27)	27.6	(23)	2.4%	(8)	66,479	(4)	58.6	(7)
Saudi Arabia	80,185	(16)	2,303	(17)	441	(27)	0.5%	(29)	12.7	(24)	2.7%	(7)	16,945	(22)	62.0	(6)
Singapore	33,249	(23)	5,684	(2)	23	(30)	0.1%	(30)	3.9	(28)	1.4%	(11)	22,171	(19)	83.9	(4)
South Korea	11,344	(30)	221	(27)	269	(29)	2.4%	(24)	5.2	(27)	0.3%	(21)	57,250	(9)	0.6	(28)
Spain	284,986	(4)	6,095	(1)	27,119	(5)	9.5%	(8)	580.0	(2)	0.2%	(26)	76,071	(2)	14.9	(16)
Sweden	35,727	(22)	3,538	(11)	4,266	(16)	11.9%	(6)	422.4	(6)	1.5%	(10)	23,659	(17)	50.3	(8)
Switzerland	30,796	(25)	3,596	(10)	1,919	(20)	6.2%	(12)	224.1	(10)	0.0%	(29)	44,610	(13)	1.7	(27)
Turkey	160,979	(10)	1,909	(22)	4,461	(15)	2.8%	(23)	52.9	(20)	0.7%	(17)	22,885	(18)	12.6	(18)
UK	269,127	(5)	3,964	(8)	37,837	(2)	14.1%	(4)	557.4	(3)	0.9%	(15)	57,743	(8)	38.3	(9)

Note: China does not report test volumes

VIRUS PROGRESSION BY COUNTRY

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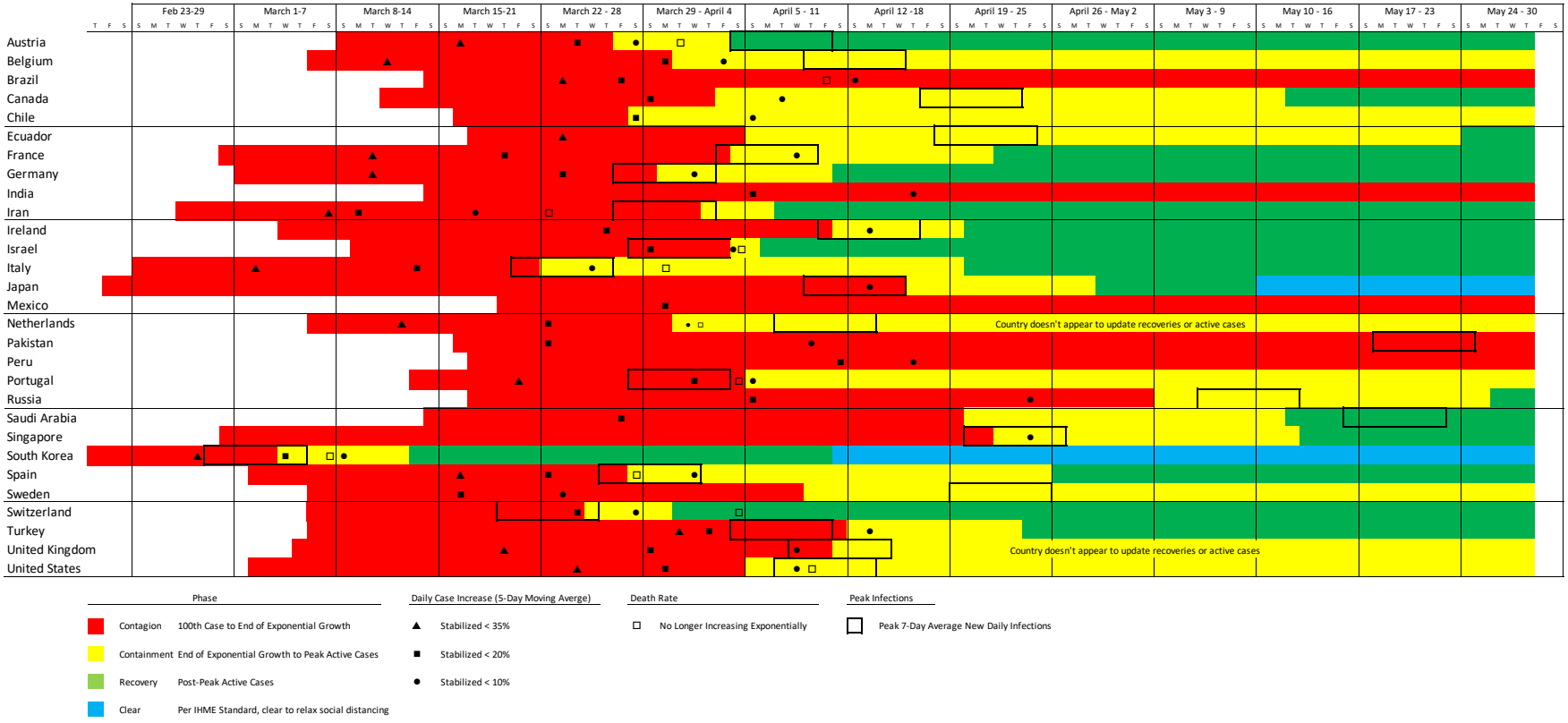
Country-by-Country

Virus Progression

"Strategic Guidance in an Era of Unprecedented Change"

This graphic illustrates when the country first recorded 100 total cases (start of the "contagion" phase); when growth stopped following an exponential pattern (start of the "containment" phase); and, when peak total cases were recorded (start of the "recovery" phase). It uses symbols to indicate when average daily case growth rates fell (and were sustained) below certain benchmarks, as well as when deaths stopped growing exponentially.



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"Strategic Guidance in an Era of Unprecedented Change"

Country-By-Country
Listing of Countries By Total Cases

Countries making large upward movements are highlighted

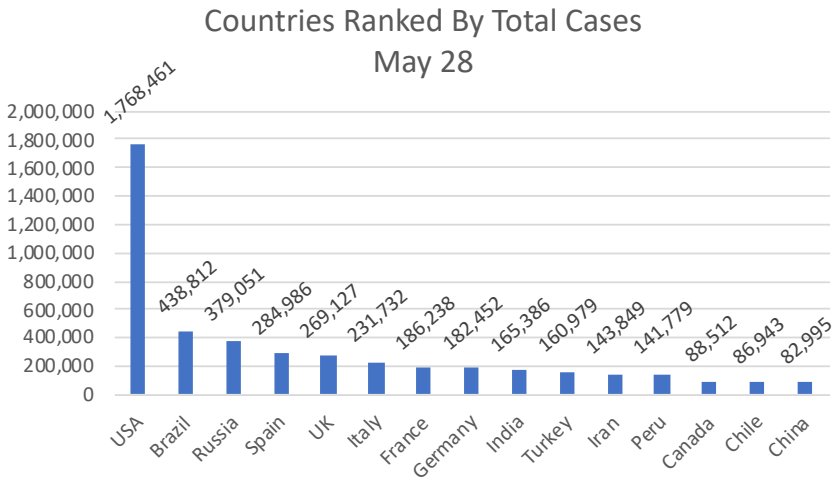
When we first expanded our tracking to 30 countries in mid-April, they represented the most countries with cases in the world. Since that time, Austria, Israel, Japan and South Korea have dropped in the rankings. These countries have moved up:

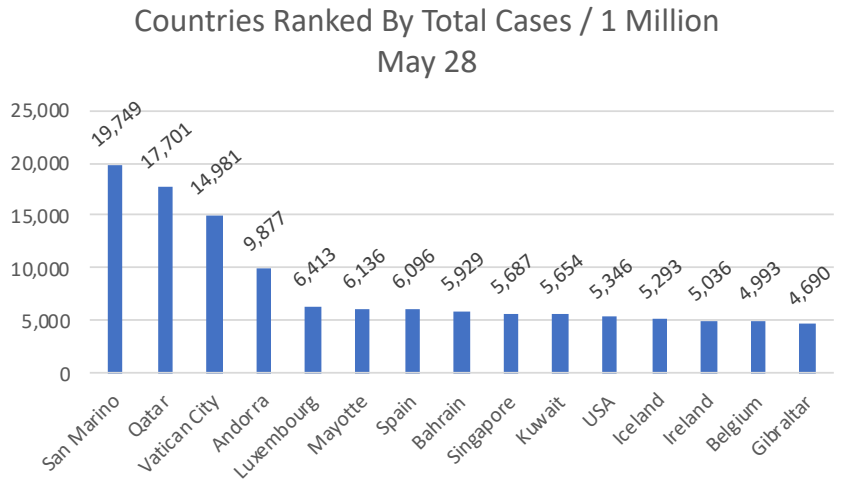
- **Afghanistan**
- **Argentina**
- **Bangladesh**
- **Belarus**
- **Columbia**
- **Denmark**
- **Dominican Republic**
- **Indonesia**
- **Kuwait**
- **Poland**
- **Qatar**
- **Panama**
- **Philippines**
- **Romania**
- **Serbia**
- **South Africa**
- **UAE**
- **Ukraine**

The original 30 still account for 88% of all cases worldwide.

		Total Cases						
Rank	Country	28-May	Rank	Country	6-May	Rank	Country	27-Apr
1	USA	1,768,461	1	USA	1,263,092	1	USA	1,010,356
2	Brazil	438,812	2	Spain	253,682	2	Spain	229,422
3	Russia	379,051	3	Italy	214,457	3	Italy	199,414
4	Spain	284,986	4	UK	201,101	4	France	165,842
5	UK	269,127	5	France	174,191	5	Germany	158,758
6	Italy	231,732	6	Germany	168,162	6	UK	157,149
7	France	186,238	7	Russia	165,929	7	Turkey	112,261
8	Germany	182,452	8	Turkey	131,744	8	Iran	91,472
9	India	165,386	9	Brazil	126,611	9	Russia	87,147
10	Turkey	160,979	10	Iran	101,650	10	China	82,830
11	Iran	143,849	11	China	82,883	11	Brazil	66,501
12	Peru	141,779	12	Canada	63,496	12	Canada	48,500
13	Canada	88,512	13	Peru	54,817	13	Belgium	46,687
14	Chile	86,943	14	India	52,987	14	Netherlands	38,245
15	China	82,995	15	Belgium	50,781	15	India	29,451
16	Saudi Arabia	80,185	16	Netherlands	41,319	16	Switzerland	29,164
17	Mexico	78,023	17	Saudi Arabia	31,938	17	Peru	28,669
18	Pakistan	61,227	18	Switzerland	30,060	18	Portugal	24,070
19	Belgium	57,849	19	Ecuador	29,420	19	Ecuador	23,240
21	Netherlands	45,950	20	Portugal	26,182	20	Ireland	19,648
24	Ecuador	38,471	21	Mexico	26,025	21	Sweden	18,926
25	Sweden	35,727	22	Sweden	23,918	22	Saudi Arabia	18,811
26	Singapore	33,249	23	Pakistan	23,214	23	Israel	15,555
28	Portugal	31,596	24	Chile	23,048	24	Austria	15,274
29	Switzerland	30,796	25	Ireland	22,248	25	Mexico	14,677
32	Ireland	24,841	26	Singapore	20,198	26	Singapore	14,423
39	Israel	16,872	29	Israel	16,310	27	Pakistan	13,915
40	Japan	16,683	31	Austria	15,684	28	Chile	13,813
41	Austria	16,628	32	Japan	15,253	29	Japan	13,614
48	S. Korea	11,344	38	S. Korea	10,806	35	South Korea	10,738
	Others	710,164		Others	356,176		Others	263,943
	World	5,900,907			3,817,382		World	3,062,515
	30 countries' share	88.0%			90.7%			91.4%

Cases & Cases Per Capita





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Country-by-Country

Deaths Per Cases & Per Capita

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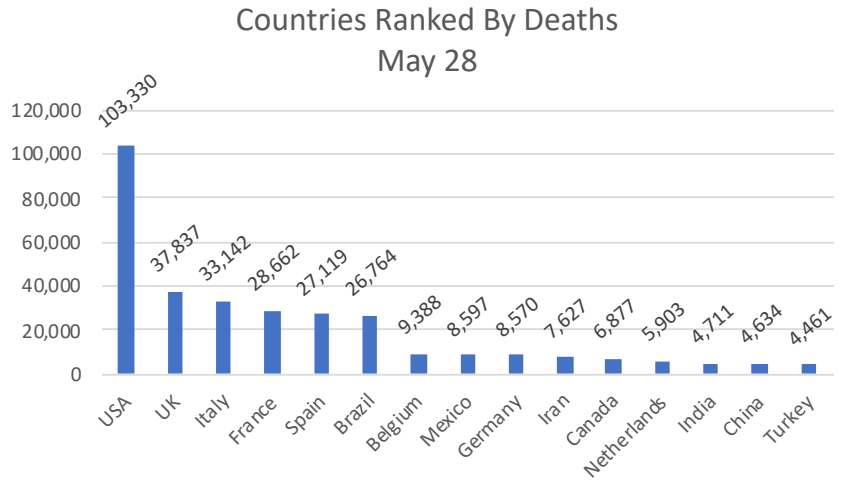
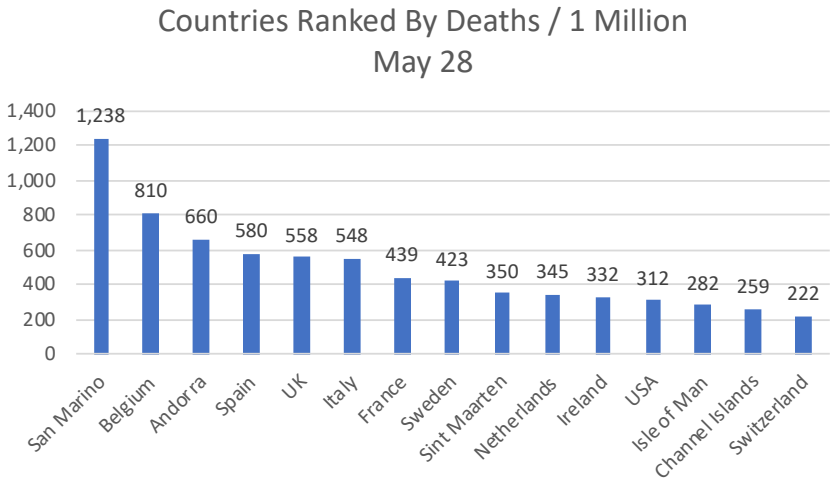




UNITED STATES & STATE-BY-STATE INFORMATION

Health Industry Advisor, llc

State-by-State

Comparative Statistics

"Strategic Guidance in an Era of Unprecedented Change"

As of May 28

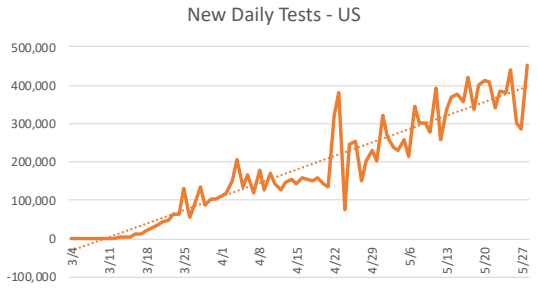
State	Total Cases	Rank	Cases per 1M Population	Rank2	Deaths	Rank3	Death Rate	Rank4	Deaths per 1 Million Population	Rank5	5-day Moving Average Case Growth Rate	Rank6	Tests per 1M Population Past 7 days	Rank7	New Daily Cases Per 1M Population (5-Day M.A.)	Rank8
Alabama	16,530	(25)	3,371.3	(23)	591	(25)	3.6%	(34)	120.5	(25)	3.2%	(1)	867	(33)	94.5	(12)
Alaska	425	(51)	581.0	(49)	10	(51)	2.4%	(43)	13.7	(50)	0.8%	(42)	1,645	(8)	4.5	(49)
Arizona	17,763	(23)	2,440.4	(36)	857	(21)	4.8%	(19)	117.7	(26)	2.1%	(9)	614	(43)	48.0	(27)
Arkansas	6,538	(38)	2,166.5	(37)	125	(40)	1.9%	(46)	41.4	(44)	2.5%	(5)	929	(29)	51.1	(26)
California	103,797	(4)	2,627.0	(33)	4,039	(7)	3.9%	(29)	102.2	(29)	2.3%	(7)	1,336	(13)	56.4	(24)
Colorado	25,121	(18)	4,362.2	(19)	1,421	(16)	5.7%	(10)	246.8	(14)	0.9%	(39)	682	(40)	47.9	(28)
Connecticut	41,559	(12)	11,656.6	(6)	3,826	(8)	9.2%	(2)	1,073.1	(3)	0.8%	(44)	1,313	(14)	94.2	(13)
Delaware	9,171	(33)	9,418.1	(7)	345	(33)	3.8%	(32)	354.3	(12)	1.1%	(34)	1,358	(11)	115.2	(8)
District Of Columbia	8,492	(35)	12,032.6	(5)	453	(29)	5.3%	(13)	641.9	(5)	1.3%	(31)	356	(50)	142.5	(3)
Florida	53,285	(9)	2,480.9	(34)	2,364	(11)	4.4%	(25)	110.1	(28)	1.2%	(32)	916	(31)	30.7	(41)
Georgia	45,266	(11)	4,263.4	(20)	1,973	(14)	4.4%	(26)	185.8	(16)	1.4%	(27)	497	(46)	61.9	(20)
Hawaii	647	(49)	457.0	(50)	17	(49)	2.6%	(42)	12.0	(51)	0.1%	(51)	473	(48)	0.0	(51)
Idaho	2,769	(43)	1,545.1	(45)	82	(43)	3.0%	(39)	45.8	(43)	1.1%	(35)	398	(49)	18.7	(45)
Illinois	115,833	(3)	9,141.0	(8)	5,186	(6)	4.5%	(23)	409.3	(10)	1.4%	(23)	1,781	(6)	148.2	(1)
Indiana	33,068	(16)	4,911.9	(16)	2,068	(13)	6.3%	(8)	307.2	(13)	1.4%	(28)	834	(35)	66.5	(19)
Iowa	18,586	(22)	5,890.8	(12)	506	(27)	2.7%	(40)	160.4	(20)	1.9%	(12)	1,194	(23)	109.4	(9)
Kansas	9,450	(31)	3,243.7	(25)	216	(37)	2.3%	(45)	74.1	(38)	1.1%	(33)	651	(42)	38.1	(35)
Kentucky	9,185	(32)	2,055.9	(41)	409	(31)	4.5%	(24)	91.5	(31)	1.4%	(26)	749	(36)	28.7	(42)
Louisiana	38,809	(14)	8,348.2	(9)	2,745	(9)	7.1%	(6)	590.5	(7)	0.9%	(40)	2,718	(1)	70.8	(18)
Maine	2,189	(45)	1,628.5	(42)	84	(42)	3.8%	(30)	62.5	(39)	1.7%	(18)	887	(32)	33.2	(39)
Maryland	49,709	(10)	8,222.2	(10)	2,428	(10)	4.9%	(18)	401.6	(11)	1.8%	(15)	1,291	(17)	146.0	(2)
Massachusetts	94,895	(5)	13,654.9	(4)	6,640	(3)	7.0%	(7)	955.5	(4)	0.7%	(45)	1,251	(19)	98.9	(11)
Michigan	56,014	(8)	5,608.8	(14)	5,372	(5)	9.6%	(1)	537.9	(8)	0.6%	(46)	711	(38)	35.8	(37)
Minnesota	22,947	(19)	4,068.9	(21)	977	(19)	4.3%	(28)	173.2	(18)	2.9%	(3)	1,308	(15)	120.2	(7)
Mississippi	14,372	(27)	4,829.1	(18)	693	(23)	4.8%	(20)	232.9	(15)	2.0%	(11)	1,465	(10)	103.2	(10)
Missouri	12,990	(29)	2,116.5	(38)	715	(22)	5.5%	(12)	116.5	(27)	1.7%	(17)	209	(51)	31.1	(40)
Montana	485	(50)	453.8	(51)	17	(49)	3.5%	(35)	15.9	(49)	0.2%	(50)	838	(34)	0.8	(50)
Nebraska	13,261	(28)	6,855.3	(11)	164	(38)	1.2%	(49)	84.8	(34)	2.0%	(10)	1,281	(18)	135.6	(4)
Nevada	8,208	(36)	2,664.8	(32)	410	(30)	5.0%	(17)	133.1	(24)	1.3%	(30)	1,707	(7)	44.2	(33)
New Hampshire	4,386	(41)	3,225.7	(26)	232	(36)	5.3%	(14)	170.6	(19)	1.4%	(25)	1,341	(12)	47.4	(29)
New Jersey	159,264	(2)	17,930.7	(2)	11,412	(2)	7.2%	(5)	1,284.8	(2)	0.6%	(47)	2,277	(4)	93.7	(14)
New Mexico	7,364	(37)	3,512.0	(22)	335	(34)	4.5%	(22)	159.8	(21)	1.6%	(19)	2,194	(5)	60.8	(22)
New York	376,309	(1)	19,344.0	(1)	29,653	(1)	7.9%	(3)	1,524.3	(1)	0.4%	(49)	2,363	(2)	73.1	(17)
North Carolina	25,720	(17)	2,452.3	(35)	867	(20)	3.4%	(36)	82.7	(35)	2.4%	(6)	1,152	(26)	61.3	(21)
North Dakota	2,481	(44)	3,255.6	(24)	57	(45)	2.3%	(44)	74.8	(37)	1.0%	(38)	1,308	(16)	47.2	(30)
Ohio	33,957	(15)	2,905.0	(29)	2,110	(12)	6.2%	(9)	180.5	(17)	1.5%	(21)	745	(37)	45.8	(32)
Oklahoma	6,270	(39)	1,584.5	(43)	326	(35)	5.2%	(15)	82.4	(36)	1.0%	(36)	1,185	(24)	21.3	(44)
Oregon	4,086	(42)	968.8	(48)	151	(39)	3.7%	(33)	35.8	(46)	1.0%	(37)	489	(47)	9.1	(47)
Pennsylvania	74,318	(6)	5,805.2	(13)	5,425	(4)	7.3%	(4)	423.8	(9)	0.9%	(41)	658	(41)	55.2	(25)
Rhode Island	14,494	(26)	13,681.8	(3)	677	(24)	4.7%	(21)	639.1	(6)	0.8%	(43)	2,292	(3)	124.5	(5)
South Carolina	10,788	(30)	2,095.3	(40)	470	(28)	4.4%	(27)	91.3	(32)	1.7%	(16)	1,221	(22)	39.1	(34)
South Dakota	4,793	(40)	5,417.9	(15)	54	(47)	1.1%	(51)	61.0	(40)	1.4%	(24)	1,247	(21)	87.7	(15)
Tennessee	21,679	(21)	3,172.6	(27)	356	(32)	1.6%	(48)	52.1	(42)	1.8%	(14)	1,158	(25)	56.8	(23)
Texas	60,790	(7)	2,096.5	(39)	1,623	(15)	2.7%	(41)	56.0	(41)	1.8%	(13)	507	(45)	35.9	(36)
Utah	8,921	(34)	2,782.6	(31)	106	(41)	1.2%	(50)	33.1	(47)	1.6%	(20)	919	(30)	46.7	(31)
Vermont	974	(47)	1,560.9	(44)	55	(46)	5.6%	(11)	88.1	(33)	0.4%	(48)	1,248	(20)	5.5	(48)
Virginia	41,401	(13)	4,850.4	(17)	1,338	(17)	3.2%	(38)	156.8	(22)	3.0%	(2)	1,150	(27)	121.6	(6)
Washington	21,821	(20)	2,865.6	(30)	1,105	(18)	5.1%	(16)	145.1	(23)	1.4%	(29)	710	(39)	33.7	(38)
West Virginia	1,935	(46)	1,082.7	(47)	74	(44)	3.8%	(31)	41.4	(45)	2.3%	(8)	573	(44)	26.5	(43)
Wisconsin	16,974	(24)	2,915.3	(28)	550	(26)	3.2%	(37)	94.5	(30)	2.7%	(4)	1,486	(9)	75.8	(16)
Wyoming	876	(48)	1,513.6	(46)	15	(50)	1.7%	(47)	25.9	(48)	1.5%	(22)	1,066	(28)	18.5	(46)
United States	1,768,461		5,342.7		103,330		5.8%		312.2		1.2%		1,116		63.7	

United States

Overall Statistics

"Strategic Guidance in an Era of Unprecedented Change"

With significantly increased testing, the US is now meeting the WHO standard of <10% test-positives. This suggests that asymptomatic cases are being captured and that we have a better view of true infection rates.
Further, new daily infections continue to decline; the death rate seems to have stabilized.



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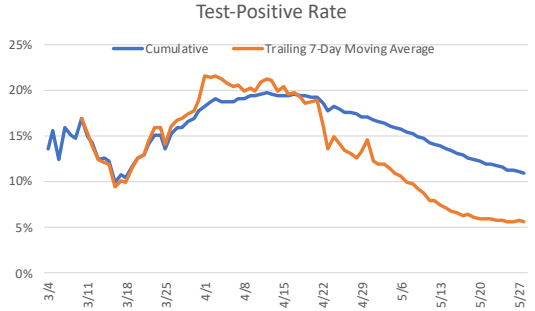

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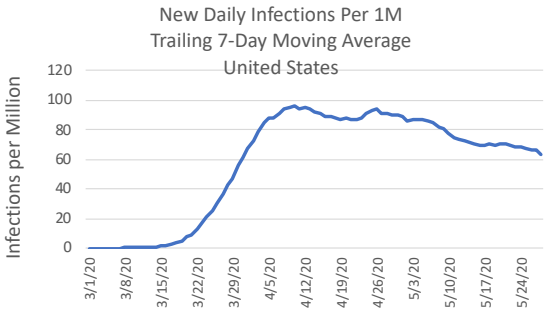

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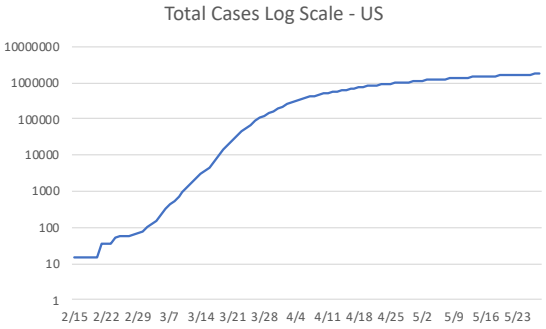

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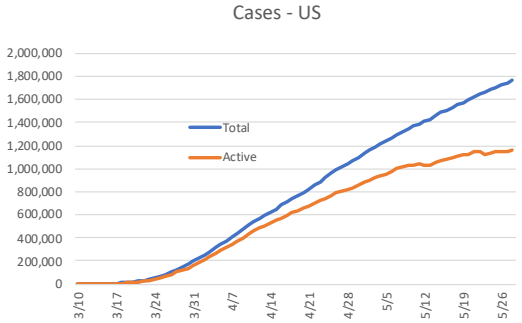

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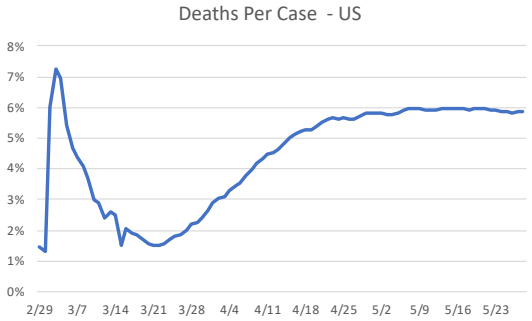

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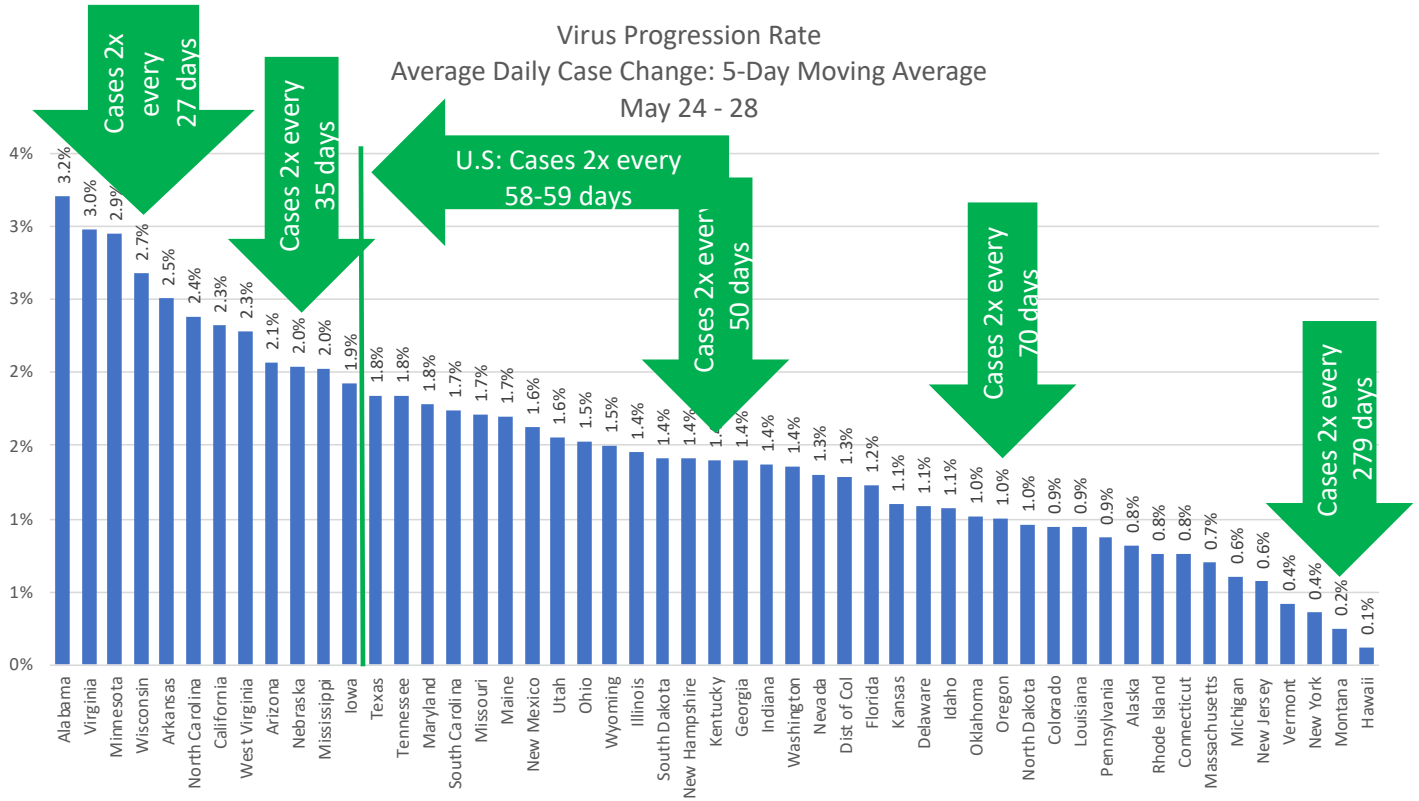
State-by-State

Average Daily Case Growth

"Strategic Guidance in an Era of Unprecedented Change"

Just 1 month ago, cases in every state were doubling every 1 – 3 weeks.
Now, they would take from 21 days to nearly 3 years to double



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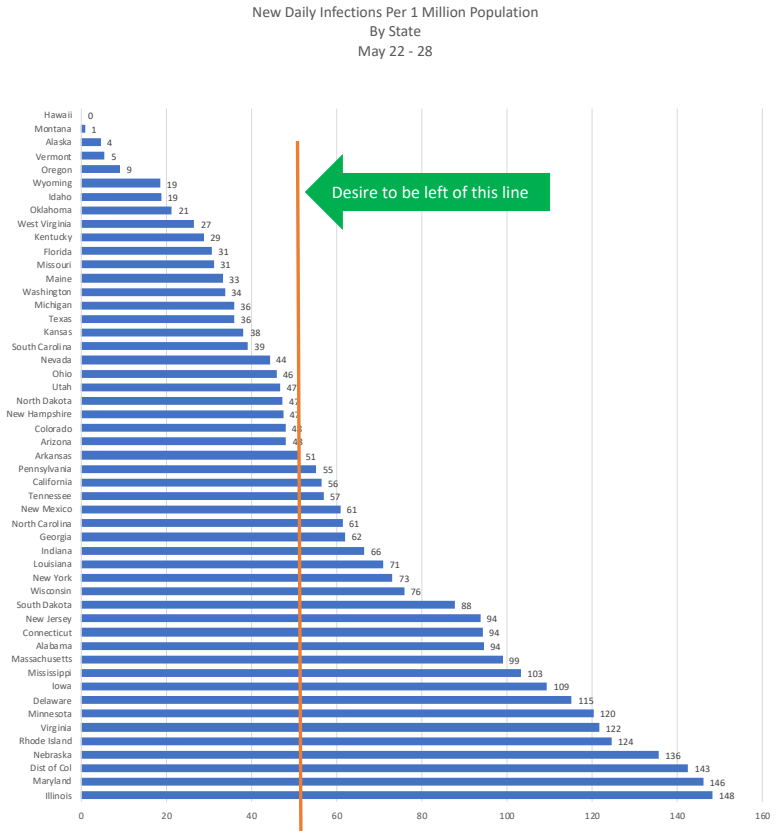
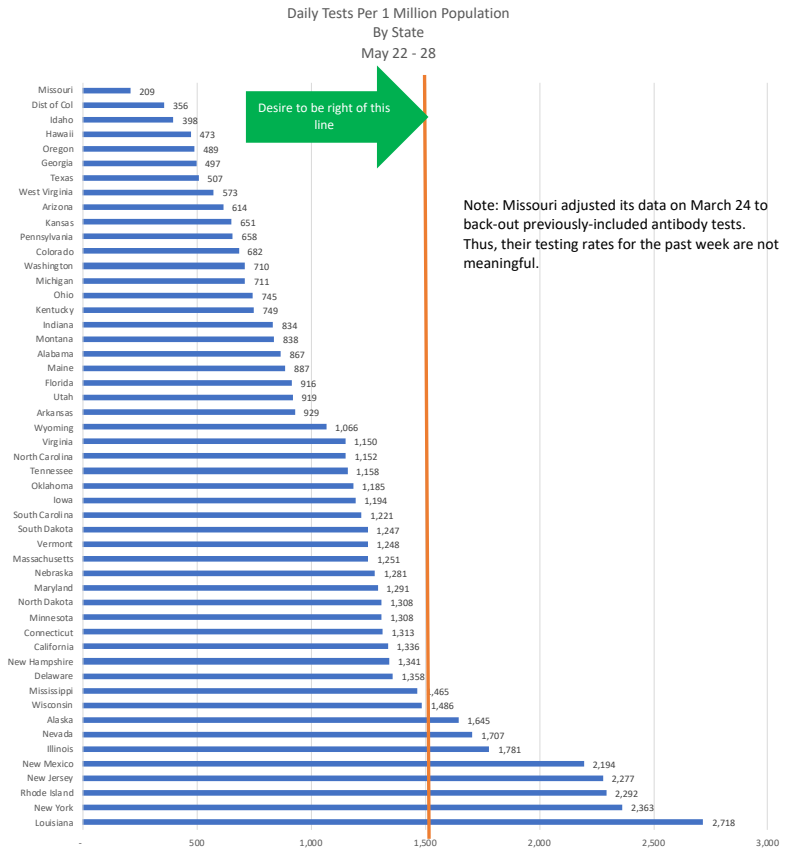
State-by-State

New Daily Infections & Tests Per Capita

"Strategic Guidance in an Era of Unprecedented Change"



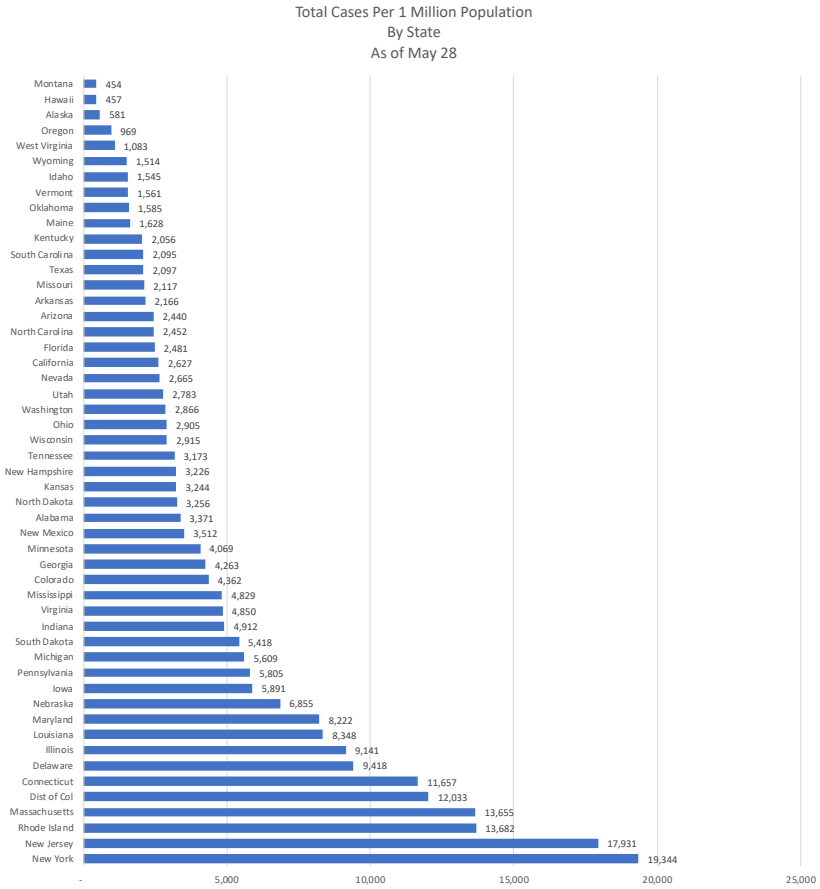


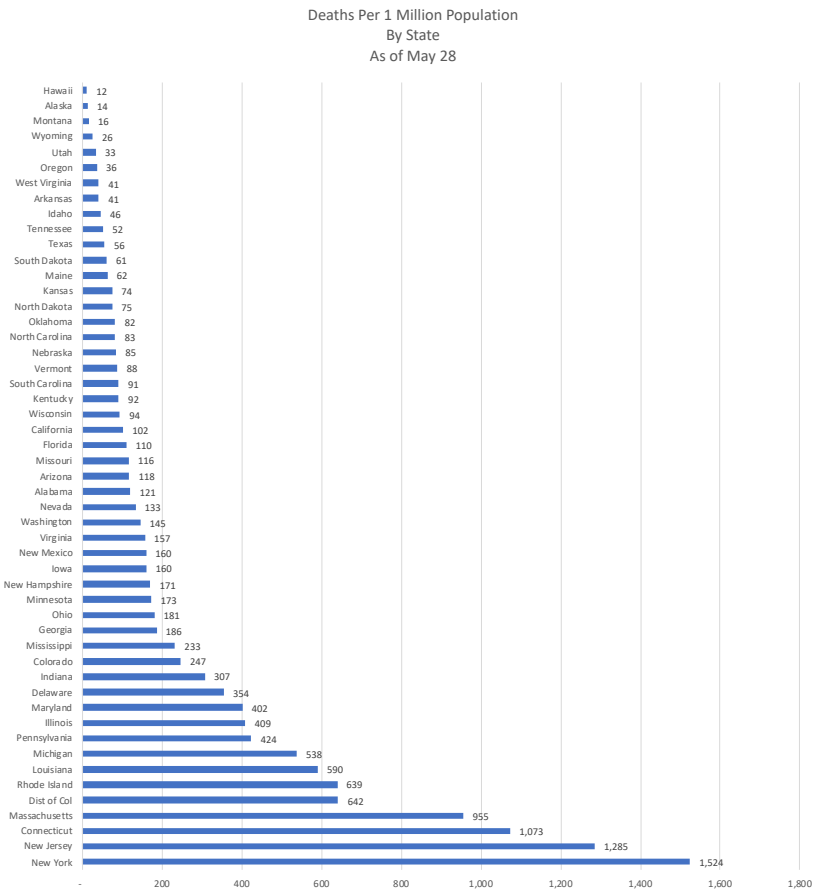
Note: Missouri adjusted its data on March 24 to back-out previously-included antibody tests. Thus, their testing rates for the past week are not meaningful.

State-by-State

Cases & Deaths Per Capita

"Strategic Guidance in an Era of Unprecedented Change"





State-by-State

Which States Are Performing Sufficient Tests?

"Strategic Guidance in an Era of Unprecedented Change"

The World Health Organization suggested that the test-positive rate should be 10% or lower, for testing to be sufficient to assess the true prevalence of the virus. All except 4 states and the District of Columbia met this guideline for the past week.

STATE-BY-STATE READINESS FOR RELAXING RESTRICTIONS

Readiness For Relaxing Restrictions

We recently modified the tests/capita metric in two ways: first, we changed to tests/capita past 2 weeks (v. cumulative); second, we adopted the Harvard based study of susceptible-infected-recovered model (SEIR) identification of a goal of 2.7% of population tested per week; and, a minimum of 1520 tests per 1 million population. This will serve as a more challenging standard.

- We recently introduced a scorecard to provide a snapshot of each state's readiness for relaxing restrictions on businesses and individuals.
- To portray readiness we have incorporated the following measures into to the scorecard, (along with the rationale for the scoring within each measure):
  - Tests/Capita – last 14 days; indicates testing robustness; grading quintiles based on Harvard study using susceptible-infected-recovered model (SEIR) 2.7% of population tested per week, 1%, 0.7%, 0.35%, all others
    - Direction – whether test volume increased/stayed level, or decreased the past 2 weeks v. prior two weeks
  - Test-Positive Rate – indicates whether testing is identifying sufficient numbers of non-infected persons; grading based on comparison to best reported in the world (South Korea, Australia, New Zealand), next group of countries (Canada, Germany, Denmark), then, next 3 levels set to differentiate among states
    - Direction – whether test positive rate increased/stayed level, or past 2 weeks v. prior two weeks
  - New Infections / 1 Million – indicates how quickly the virus is spreading; grading based on: rate proposed by IHME for ending social distancing, top ten, top 20, top 25 among the countries we track, then all others
    - Direction – whether new infection per capita rate increased/stayed level, or past 2 weeks v. prior two weeks
  - Influenza-Like Illness – Using CDC-reported data, indicates whether the state's visits for influenza the past week were above or below CDC baseline for the state's region
    - Direction – whether the % visits for influenza the last 3 weeks increased or decreased the past 3 weeks v. the prior 3 weeks
  - Hospital Resources – using IHME projections, whether the state is pre- or post- peak projected hospital resource needs due to the virus; and the 5 of peak resources projected to be needed today. Grading based on current need at <45% of peak, 45-60%, 60-75%, 75-85%, and all others.
- On the following pages, we portray state-by-state readiness on various dates.
- **These scorecards are for informational purposes only. The measures and grading used are not based on any scientific standard and should not be considered a substitute for public health considerations or other clinical or economic judgement. States may elect to move faster or slower than the scorecard might otherwise indicate.**

State-By-State

Readiness For Relaxing Restrictions

Highlights:

- Progress has been made in several states, on both testing volumes and test-positive rates
  - Most states are still testing far below the minimum 152 daily tests per 1 million population cited in a recent NY Times article; and the higher standard of 2.7% of the population tested weekly (386 daily per 1 million, as suggested by a recent Kaiser Family Foundation article. Both articles referenced Harvard researchers as the source of these metrics
  - Test-positive rates in many states, however, are below or close to the 10% threshold suggested by Dr. Maria Van Kerkhove of the World Health Organization, as indicative of sufficient testing to have reasonable visibility to true infection rates
- As we have progressed past the peak flu season in many states, that "constraint" on re-opening is diminishing
- With the relaxing of restrictions in many states, the Institute for Health Metrics and Evaluation's (IHME) projections of these states' hospital resources needs have increased significantly in the past week. Note: these metrics consider hospital resource needs, however, they do not consider capacity

State-By-State

Relative "Readiness" For Relaxing Restrictions

"Strategic Guidance in an Era of Unprecedented Change"

Change over past week

May 28

State	Tests / Capita #	Tests / Capita Direction	Test-Positive Rate #	Test-Positive Rate Direction	New Infections / 1 Million #	New Infections / 1 Million Direction	Influenza-Like Illness Baseline	Influenza-Like Illness Direction	Hospital Resources
Alabama		✓		✓		✗	✓	✓	
Alaska		✓		✓		✗	✓	✓	
Arizona		✓		✓		✓	✓	✓	
Arkansas		✓		✓		✗	✓	✗	
California		✓		✓		✗	✓	✓	
Colorado		✓		✓		✓	✓	✓	
Connecticut		✓		✓		✓	✓	✓	
Delaware		✓		✓		✓	✓	✓	
District Of Co		✓		✓		✓	✗	✓	
Florida		✓		✓		✗	✗	!	
Georgia		✓		✓		✓	✓	✓	
Hawaii		✓		✓		✓	✓	✓	
Idaho		✓		✓		✗	✗	✗	
Illinois		✓		✓		✓	✓	✓	
Indiana		✓		✓		✓	✓	✓	
Iowa		✓		✓		✓	✓	✓	
Kansas		✓		✓		✓	✓	✓	
Kentucky		✓		✓		✓	✓	✓	
Louisiana		✓		✓		✓	✓	✓	
Maine		✓		✗		✗	✓	✓	
Maryland		✓		✓		✓	✗	✓	
Massachusett		✓		✓		✓	✓	✓	
Michigan		✓		✓		✓	✓	✓	
Minnesota		✓		✗		✗	✗	✓	
Mississippi		✓		✓		✓	✓	✓	
Missouri		✓		✓		✓	✓	✓	
Montana		✓		✓		✗	✓	✓	
Nebraska		✓		✓		✓	✓	✓	
Nevada		✓		✓		✗	✓	✓	
New Hampsh		✓		✓		✓	✓	✓	
New Jersey		✓		✓		✓	✓	✓	
New Mexico		✓		✓		✓	✓	✓	
New York		✓		✓		✓	✓	✓	
North Carolin		✓		✓		✗	✓	✓	
North Dakota		✓		✗		✗	✓	✓	
Ohio		✓		✓		✓	✓	✓	
Oklahoma		✓		✓		✓	✓	✓	
Oregon		✓		✓		✓	✓	✓	
Pennsylvania		✓		✓		✓	✓	✓	
Rhode Island		✓		✓		✓	✓	✓	
South Carolin		✓		✓		✗	✓	✓	
South Dakota		✓		✓		✓	✓	✗	
Tennessee		✓		✓		✓	✓	✓	
Texas		✓		✓		✓	✓	✓	
Utah		✓		✗		✓	✓	✓	
Vermont		✓		✓		✓	✓	✗	
Virginia		✓		✓		✗	✓	✓	
Washington		✓		✓		✓	✓	✓	
West Virginia		✓		✓		✗	✓	✓	
Wisconsin		✓		✓		✗	✗	✗	
Wyoming		✓		✓		✗	✓	✓	

May 21

State	Tests / Capita #	Tests / Capita Direction	Test-Positive Rate #	Test-Positive Rate Direction	New Infections / 1 Million #	New Infections / 1 Million Direction	Influenza-Like Illness Baseline	Influenza-Like Illness Direction	Hospital Resources
Alabama		✓		✓		✗	✓	✓	
Alaska		✓		✓		✓	✓	✓	
Arizona		✓		✓		✗	✓	✓	
Arkansas		✓		✓		✗	✓	✓	
California		✓		✓		✗	✓	✓	
Colorado		✓		✓		✓	✓	✓	
Connecticut		✓		✓		✓	✗	✓	
Delaware		✓		✓		✓	✓	✗	
District Of Co		✓		✓		✓	✓	✓	
Florida		✓		✓		✓	✗	!	
Georgia		✓		✓		✓	✓	✓	
Hawaii		✓		✓		✓	✓	✓	
Idaho		✓		✓		✓	✓	✓	
Illinois		✓		✓		✓	✓	✓	
Indiana		✓		✓		✓	✓	✓	
Iowa		✓		✓		✓	✓	✗	
Kansas		✓		✓		✓	✓	✓	
Kentucky		✓		✓		✓	✗	✗	
Louisiana		✓		✓		✗	✗	✓	
Maine		✓		✗		✗	✓	✓	
Maryland		✓		✗		✓	✓	✓	
Massachusett		✓		✓		✓	✓	✓	
Michigan		✓		✓		✓	✓	✓	
Minnesota		✓		✓		✗	✗	✓	
Mississippi		✓		✓		✓	✓	✓	
Missouri		✓		✓		✓	✓	✓	
Montana		✓		✓		✓	✓	✓	
Nebraska		✓		✓		✗	✓	✓	
Nevada		✓		✓		✓	✓	✓	
New Hampsh		✓		✓		✓	✓	✓	
New Jersey		✓		✓		✗	✓	✓	
New Mexico		✓		✓		✓	✓	✓	
New York		✓		✓		✓	✓	✓	
North Carolin		✓		✓		✗	✓	✓	
North Dakota		✓		✓		✗	✓	✓	
Ohio		✓		✓		✗	✓	✗	
Oklahoma		✓		✓		✓	✓	✓	
Oregon		✓		✓		✓	✓	✓	
Pennsylvania		✓		✓		✗	✓	✓	
Rhode Island		✓		✓		✗	✓	✗	
South Carolin		✓		✓		✓	✓	✓	
South Dakota		✓		✓		✗	✓	✓	
Tennessee		✓		✓		✓	✓	✓	
Texas		✓		✓		✗	✓	✓	
Utah		✓		✓		✓	✓	✓	
Vermont		✓		✓		✓	✓	✓	
Virginia		✓		✓		✗	✗	✓	
Washington		✓		✓		✓	✓	✓	
West Virginia		✓		✓		✓	✗	✗	
Wisconsin		✓		✓		✗	✗	✓	
Wyoming		✓		✓		✓	✗	✗	

Legend and sources provided on 2nd following page

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State-By-State

Relative "Readiness" For Relaxing Restrictions

"Strategic Guidance in an Era of Unprecedented Change"

Progress over past month

May 28

State	Tests / Capita		Test-Positive Rate		New Infections / 1 Million		Influenza-Like Illness		Hospital Resources
	#	Direction	#	Direction	#	Direction	Baseline	Direction	
Alabama		✓		✓		✗	✓	✓	
Alaska		✓		✓		✗	✓	✓	
Arizona		✓		✓		✓	✓	✓	
Arkansas		✓		✓		✗	✓	✗	
California		✓		✓		✗	✓	✓	
Colorado		✓		✓		✓	✓	✓	
Connecticut		✓		✓		✓	✓	✓	
Delaware		✓		✓		✓	✓	✓	
District Of Co		✓		✓		✓	✗	✓	
Florida		✓		✓		✗	✗	!	
Georgia		✓		✓		✓	✓	✓	
Hawaii		✓		✓		✓	✓	✓	
Idaho		✓		✓		✗	✗	✗	
Illinois		✓		✓		✓	✓	✓	
Indiana		✓		✓		✓	✓	✓	
Iowa		✓		✓		✓	✓	✓	
Kansas		✓		✓		✓	✓	✓	
Kentucky		✓		✓		✓	✓	✓	
Louisiana		✓		✓		✓	✓	✓	
Maine		✓		✗		✗	✓	✓	
Maryland		✓		✓		✓	✗	✓	
Massachusett		✓		✓		✓	✓	✓	
Michigan		✓		✓		✓	✓	✓	
Minnesota		✓		✗		✗	✗	✓	
Mississippi		✓		✓		✓	✓	✓	
Missouri		✓		✓		✓	✓	✓	
Montana		✓		✓		✗	✓	✓	
Nebraska		✓		✓		✓	✓	✓	
Nevada		✓		✓		✗	✓	✓	
New Hampsh		✓		✓		✓	✓	✓	
New Jersey		✓		✓		✓	✓	✓	
New Mexico		✓		✓		✓	✓	✓	
New York		✓		✓		✓	✓	✓	
North Carolin		✓		✓		✗	✓	✓	
North Dakota		✓		✗		✗	✓	✓	
Ohio		✓		✓		✓	✓	✓	
Oklahoma		✓		✓		✓	✓	✓	
Oregon		✓		✓		✓	✓	✓	
Pennsylvania		✓		✓		✓	✓	✓	
Rhode Island		✓		✓		✓	✓	✓	
South Carolin		✓		✓		✗	✓	✓	
South Dakota		✓		✓		✓	✓	✗	
Tennessee		✓		✓		✓	✓	✓	
Texas		✓		✓		✓	✓	✓	
Utah		✓		✗		✓	✓	✓	
Vermont		✓		✓		✓	✓	✗	
Virginia		✓		✓		✗	✓	✓	
Washington		✓		✓		✓	✓	✓	
West Virginia		✓		✓		✗	✓	✓	
Wisconsin		✓		✓		✗	✗	✗	
Wyoming		✓		✓		✗	✓	✓	

April 30

State	Tests / Capita		Test-Positive Rate		New Infections / 1 Million		Influenza-Like Illness		Hospital Resources
	#	Direction	#	Direction	#	Direction	Baseline	Direction	
Alabama		✓		✓		✓	✗	✓	
Alaska		✓		✓		✓	✗	✓	
Arizona		✓		✓		✗	✗	✓	
Arkansas		✓		✓		✗	✗	✓	
California		✓		✓		✗	✗	✓	
Colorado		✓		✗		✓	✗	✓	
Connecticut		✓		✓		✗	✗	✓	
Delaware		✓		✗		✗	✗	✓	
District Of Columbia		✓		✓		✗	✗	✓	
Florida		✓		✓		✓	✗	✓	
Georgia		✓		✓		✓	✗	✓	
Hawaii		✗		✗		✓	✗	✓	
Idaho		✓		✗		✓	✗	✓	
Illinois		✓		✓		✗	✗	✓	
Indiana		✓		✓		✗	✗	✓	
Iowa		✓		✓		✗	✗	✓	
Kansas		✓		✓		✓	✗	✓	
Kentucky		✓		✓		✓	✗	✓	
Louisiana		✗		✗		✓	✗	✓	
Maine		✗		✗		✓	✗	✓	
Maryland		✓		✓		✗	✗	✓	
Massachusetts		✓		✓		✗	✗	✓	
Michigan		✓		✓		✓	✗	✓	
Minnesota		✓		✓		✓	✗	✓	
Mississippi		✗		✓		✗	✗	✓	
Missouri		✓		✓		✓	✗	✓	
Montana		✗		✗		✓	✓	✓	
Nebraska		✓		✓		✗	✗	✓	
Nevada		✗		✗		✓	✗	✓	
New Hampshire		✓		✓		✓	✗	✓	
New Jersey		✓		✓		✗	✗	✓	
New Mexico		✓		✓		✗	✗	✓	
New York		✓		✓		✗	✓	✓	
North Carolina		✓		✓		✓	✗	✓	
North Dakota		✓		✓		✓	✗	✓	
Ohio		✓		✓		✓	✗	✓	
Oklahoma		✗		✓		✓	✓	✓	
Oregon		✓		✗		✓	✗	✓	
Pennsylvania		✗		✓		✓	✓	✓	
Rhode Island		✓		✓		✗	✗	✓	
South Carolina		✓		✓		✓	✗	✓	
South Dakota		✓		✓		✓	✗	✓	
Tennessee		✓		✓		✓	✗	✓	
Texas		✓		✓		✓	✗	✓	
Utah		✓		✓		✓	✗	✓	
Vermont		✗		✗		✓	✗	✓	
Virginia		✓		✓		✗	✗	✓	
Washington		✓		✗		✓	✗	✓	
West Virginia		✓		✓		✓	✗	✓	
Wisconsin		✓		✓		✓	✗	✓	
Wyoming		✗		✗		✓	✗	✓	

Legend and sources provided on following page

State-By-State

Relative "Readiness" For Relaxing Restrictions

"Strategic Guidance in an Era of Unprecedented Change"

Legend:

	Tests per Capita	Direction	Test-Positive Rate	Direction	New Daliy Infection Rate	Direction	Baseline	Direction	Hospital Resources
	per 1M				per 1M				
Time period	Average last 2 weeks	last 14 days v prior 2 weeks	last 7 days	last 14 days v prior 2 weeks	last 7 days	last 14 days v prior 2 weeks	CDC Baseline by region	last 14 days v prior 2 weeks	As of 4/26
	>3,850		<=2%		<10				<45% of Peak
	1520 - 3,850		2-10%		10-50				45-60% of Peak
	1,501 - 3,850		10-14%		50-100				60-75% of Peak
	501 - 1,500		14-18%		100-150				75-85% of peak
	<750		>18%		>150				>85% of Peak or Pre-Peak
✓		Up		Down		Down by 40%	Below Baseline	Down	
!						Down by 10%		N/A	
✗		Down		Up		Down <10% or Up	Above Baseline	Up	

Sources:

Influenza guidelines and data from Centers fo Disease Control (https://gis.cdc.gov/grasp/fluview/fluportaldashboard.html), accessed April 30 - May 24, 2020
Test data from Covid Tracking Project (https://covidtracking.com/), accessed March 21-May 29, 2020
Hospital resource Need projections from Institure for Health Metrics and Evaluation (), accessed April 30- May 24, 2020
Infection rate data from worldometer.info, accessed March 21-May 29, 2020

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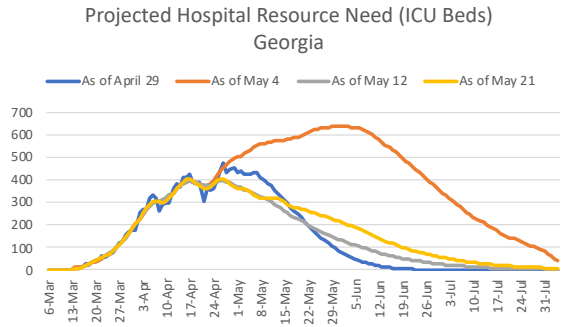
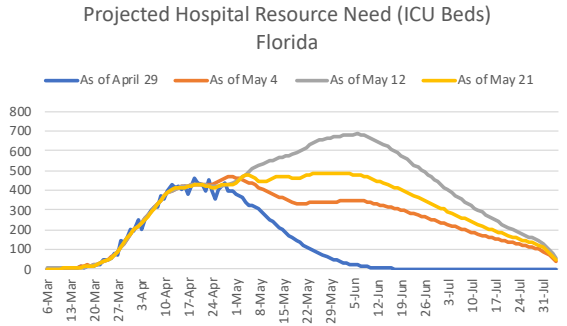
Impact of Relaxing Social Distancing

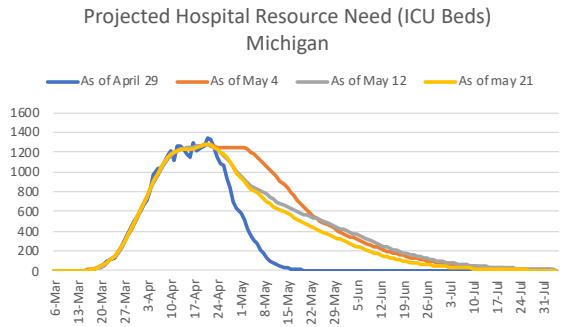
IHME's Hospital Resource Need Projections Are Sensitive to Relaxing Restrictions

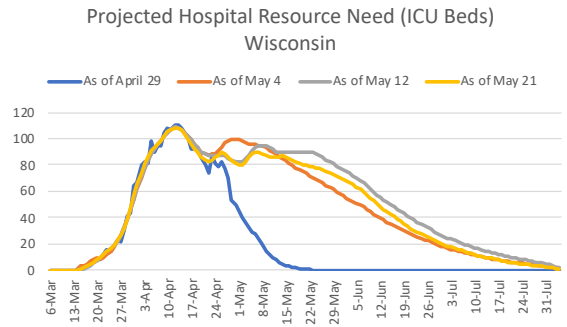
"Strategic Guidance in an Era of Unprecedented Change"

The Institute for Health Metrics and Evaluation (IHME) regularly updates projections of hospital resource needs. Comparing their projections from April 29, May 2, 12 and 21 indicates how much relaxing restrictions factors into these projections. Consider how much the projections changed in May:









Note: ICU beds were selected as representative of the three metrics that IHME uses: total beds, ICU beds and ventilators. HIA does not vouch for the accuracy of these projections; in our limited experience, they seem to over-state actual needs.

MONITORING THE IMPACT OF RELAXING RESTRICTIONS

State-By-State

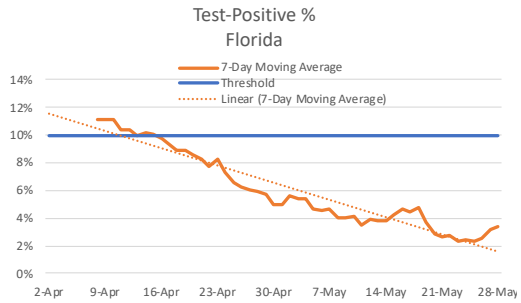
Impact of Relaxing Restrictions

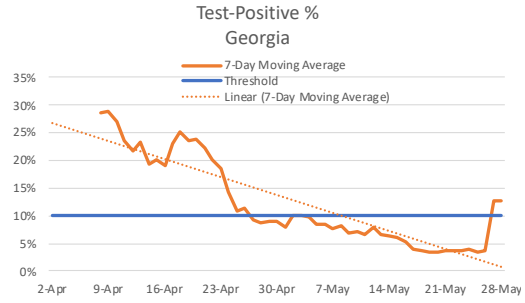
"Strategic Guidance in an Era of Unprecedented Change"

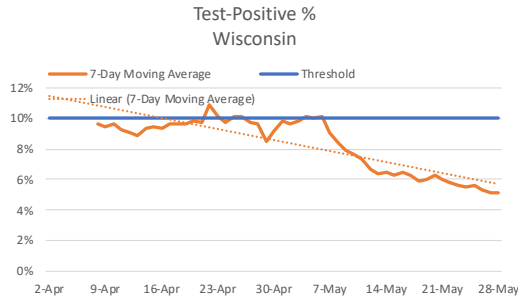
With several states re-opening, we are monitoring testing and infection rates to determine if, when and how much impact relaxation has on renewed spread of the virus. Here, we focus on Florida, Georgia and Wisconsin

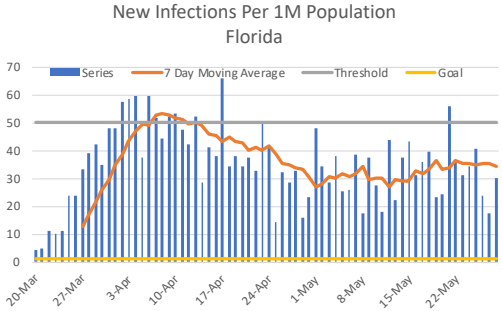
Wisconsin's infection rate – on a 7-day moving average basis - has been increasing since the Governor's executive orders were ruled unconstitutional. Its testing rate also increased significantly, and its test-positive rate has fallen during this time. Thus, it is unclear how much of the case increase is due to increased testing v. increased infection.

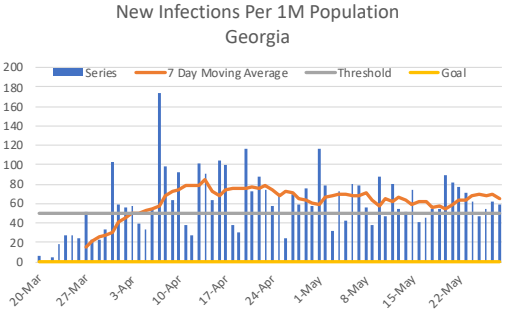
Test-positive and new infection rates in remain relatively low in Georgia and Florida (Georgia's data skewed in past 2 days by removal of serology tests.)

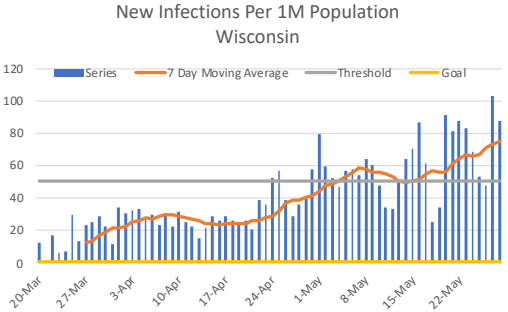












VIRUS PROGRESSION: ROADMAP TO RECOVERY

State-by-State

Virus Progression

The graphic on the following two pages illustrates when the state first recorded 100 total cases (start of the "contagion" phase); when growth stopped following an exponential pattern (start of the "containment" phase); and, when peak total cases were recorded (start of the "recovery" phase). It uses symbols to indicate when average daily case growth rates fell (and were sustained) below certain benchmarks, as well as when deaths stopped growing exponentially.

A state is not shaded green until active cases appear to have peaked.

State-by-State

Virus Progression – *1 of 2*

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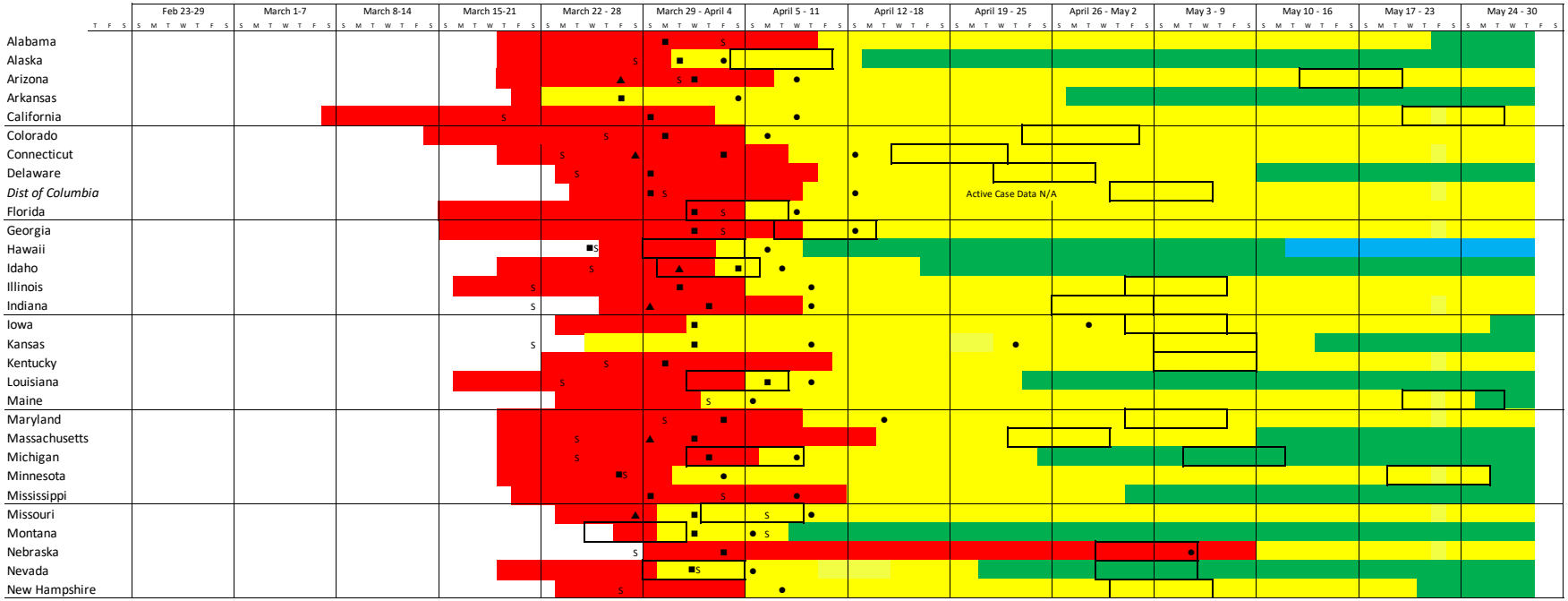
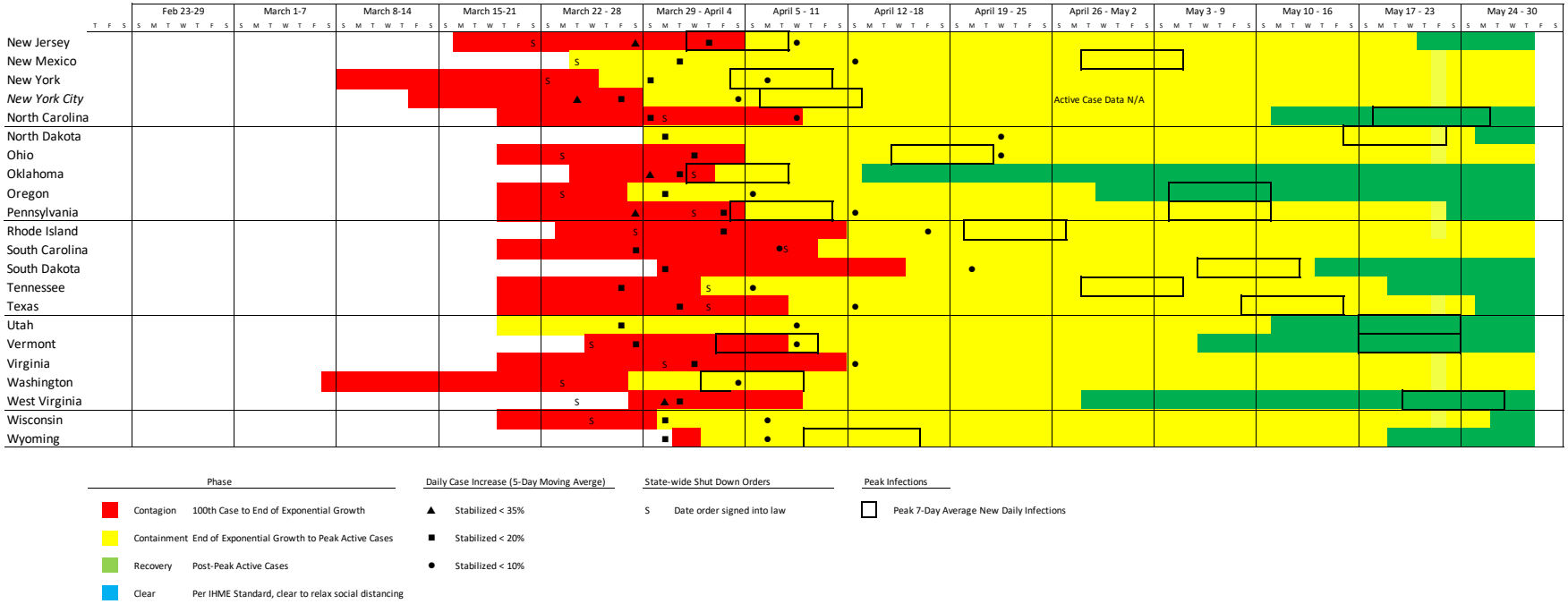


Legend on following page

Virus Progression – *2 of 2*

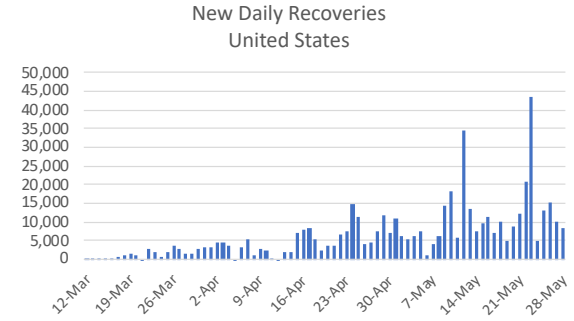


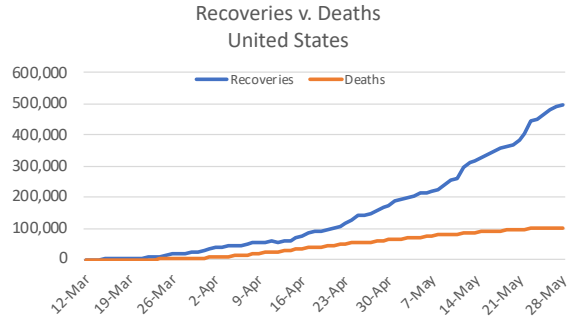
UNDER-REPORTED RECOVERIES? POSSIBLE LAG IN STATE REPORTING

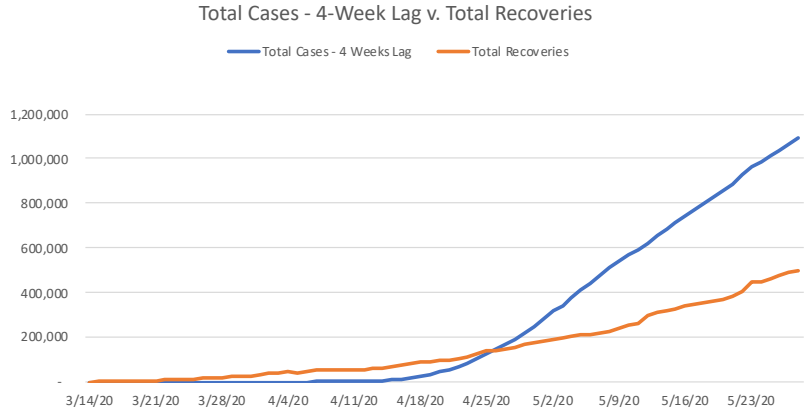
United States

Recoveries

"Strategic Guidance in an Era of Unprecedented Change"







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Recoveries

Reporting of Recoveries Seems to Be Lagging

"Strategic Guidance in an Era of Unprecedented Change"

Which states seem to be lagging in reporting?

At this point, we should be expecting far more recoveries in the U.S.

Comparing the reported recoveries to Total Cases 4 weeks ago*, this shortfall is ~377-490k

State	Recoveries	Expected Recoveries Low	Expected Recoveries High
Alabama	9,355	5,654	6,361
Alaska	366	284	320
Arizona	70	6,118	6,883
Arkansas	4,583	2,625	2,953
California	22,540	40,103	45,116
Colorado	1,722	12,227	13,756
Connecticut	7,511	22,160	24,930
Delaware	4,909	3,787	4,261
District Of Columbia	1,080	3,458	3,891
Florida	8,662	26,952	30,321
Georgia	697	21,011	23,638
Hawaii	604	494	556
Idaho	2,195	1,612	1,814
Illinois	3,615	42,334	47,626
Indiana	2,778	14,268	16,052
Iowa	10,526	5,716	6,431
Kansas	4,019	3,442	3,872
Kentucky	3,124	3,766	4,237
Louisiana	28,700	22,401	25,201
Maine	1,402	876	986
Maryland	3,401	17,394	19,568
Massachusetts	32,549	49,764	55,985
Michigan	33,168	33,103	37,241
Minnesota	16,655	4,109	4,622
Mississippi	9,401	5,452	6,134
Missouri	3,047	6,213	6,989
Montana	445	362	408
Nebraska	349	3,425	3,853
Nevada	5,852	3,998	4,498
New Hampshire	2,730	1,717	1,931
New Jersey	15,185	94,922	106,787
New Mexico	2,684	2,729	3,070
New York	65,689	248,671	279,755
North Carolina	14,954	8,604	9,680
North Dakota	1,793	854	960
Ohio	6,019	14,422	16,224
Oklahoma	5,236	2,894	3,256
Oregon	1,894	2,008	2,259
Pennsylvania	44,827	38,399	43,199
Rhode Island	1,084	6,897	7,759
South Carolina	6,043	4,876	5,486
South Dakota	3,698	1,959	2,204
Tennessee	13,916	8,588	9,662
Texas	38,908	22,764	25,610
Utah	5,346	3,738	4,205
Vermont	855	693	779
Virginia	5,472	12,677	14,261
Washington	6,021	11,462	12,894
West Virginia	1,232	900	1,013
Wisconsin	10,384	5,483	6,169
Wyoming	634	447	503
United States	498,725	876,015	985,517

* - 4 weeks is the presumed time from infection-onset to recovery referenced by many states

Low = 80% of Total Cases 4 week ago
High = 90% of Total Cases 4 week ago

- States seemingly up-to-date with reporting recoveries
- States only reporting~ 1/2 expected recoveries
- States well-behind in reporting recoveries

STATE TEST, INFECTION AND CASE TRENDS

Test, New Daily Infection and Active Case Trends

On Mondays, Wednesday and Fridays we provide graphics relevant to judging how far a state (or the District of Columbia) has progressed against the virus. Seventeen states (or, sixteen and D.C.) are provided at a time. Today, we provide:

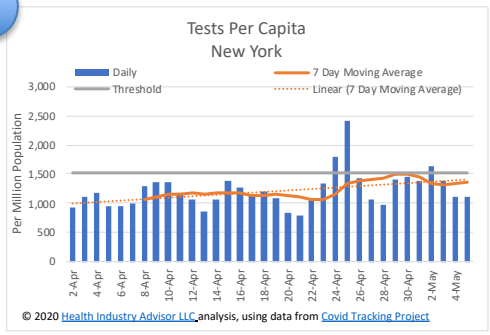
- North Dakota
- Ohio
- Oklahoma
- Oregon
- Pennsylvania
- Rhode Island
- South Carolina
- South Dakota
- Tennessee
- Texas
- Utah
- Vermont
- Virginia
- Washington
- West Virginia
- Wisconsin
- Wyoming

Test, New Daily Infection and Active Case Trends

How to "read" these charts:

- Chart 1 – Desire to see tests per capita:
  - Above the threshold
  - Increasing or stable
- Chart 2 - Desire to see Test-Positive %:
  - Below the threshold
  - Declining or stable
- Chart 3 - Desire to see New Infections Per Capita:
  - Below the threshold
  - Declining or stable
- Chart 4 - Desire to see Active Cases:
  - Declining

1



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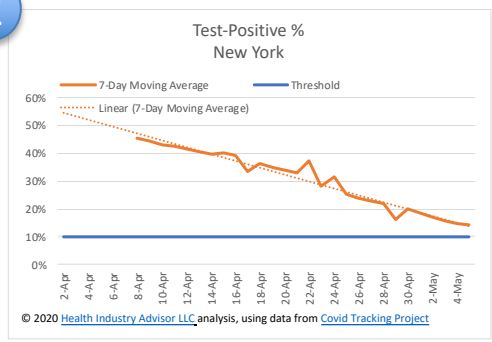

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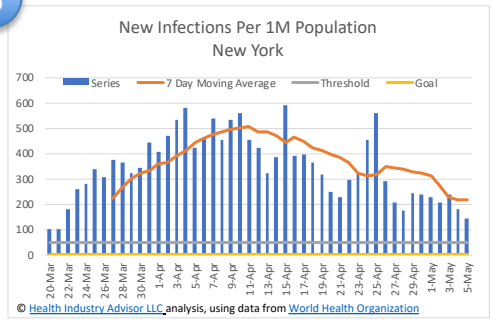

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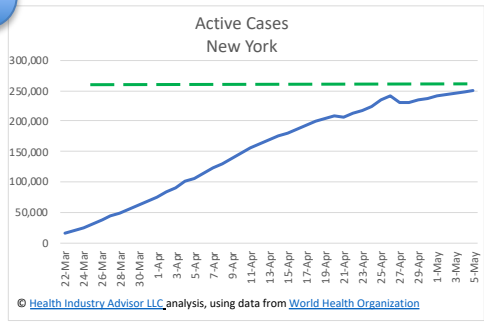
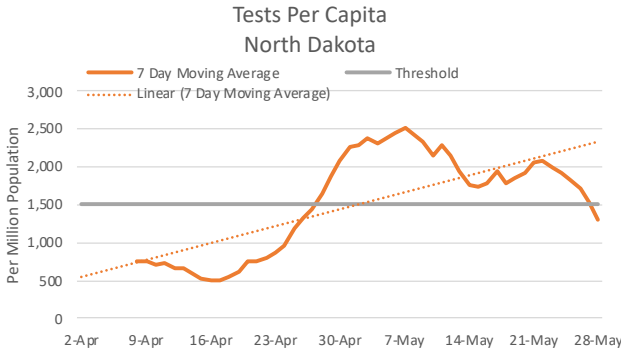
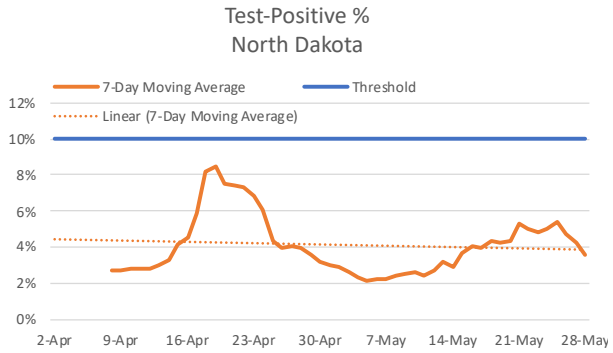
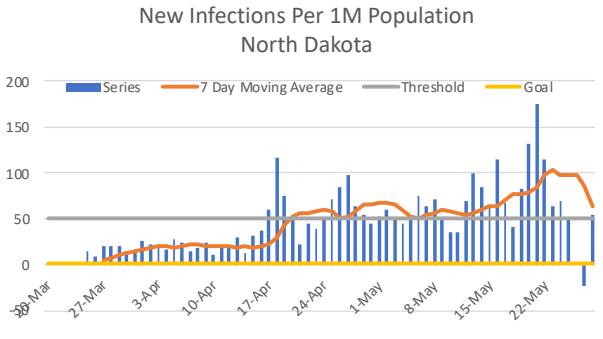
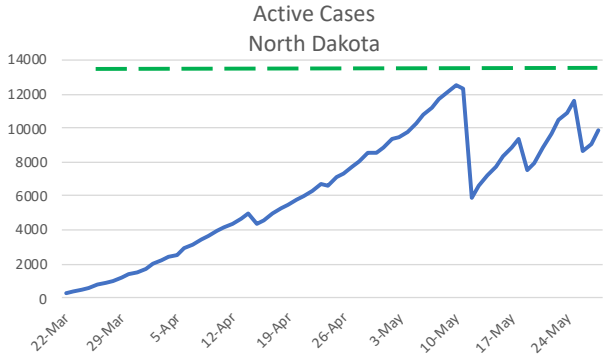


Test, New Daily Infection and Active Case Trends

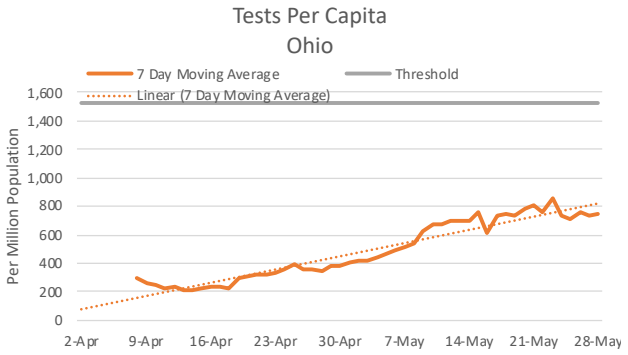


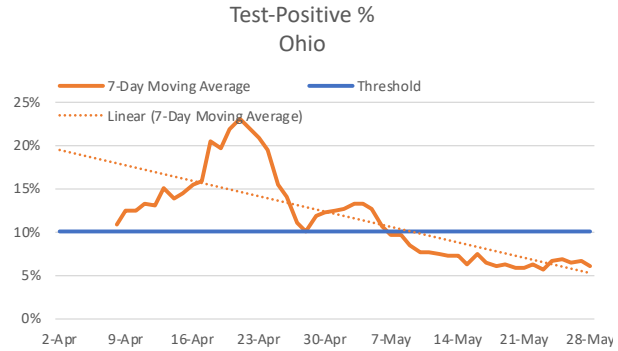


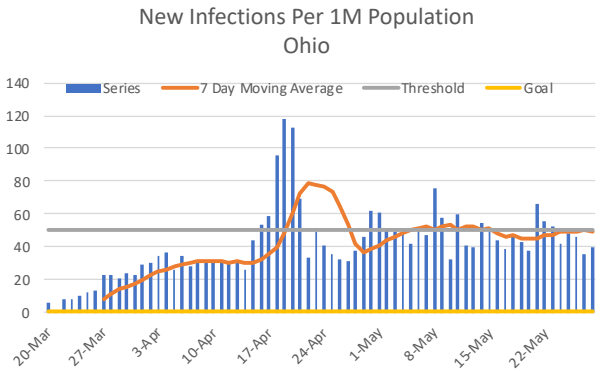


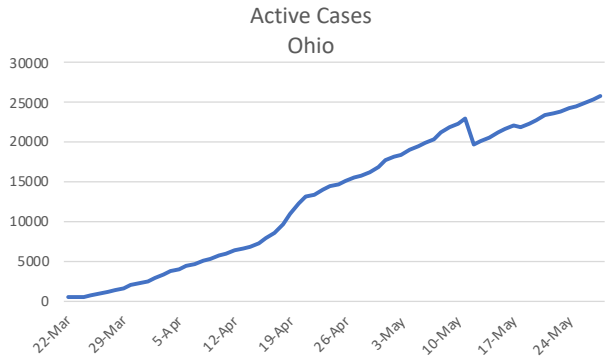


Test, New Daily Infection and Active Case Trends









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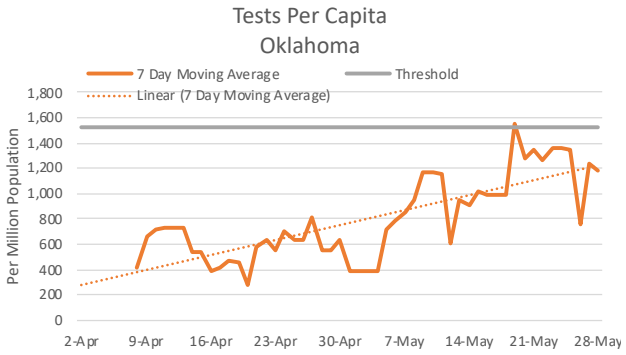
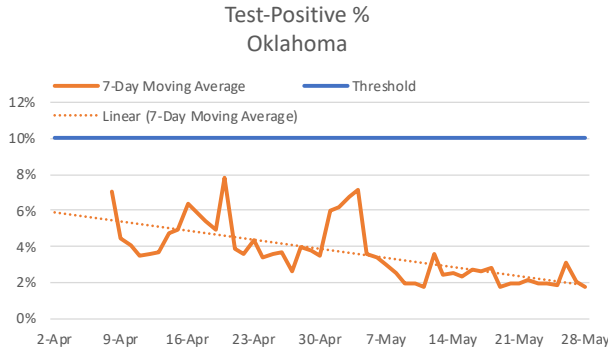
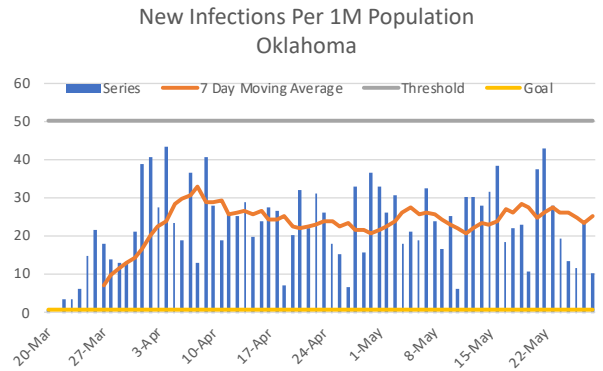
State-by-State

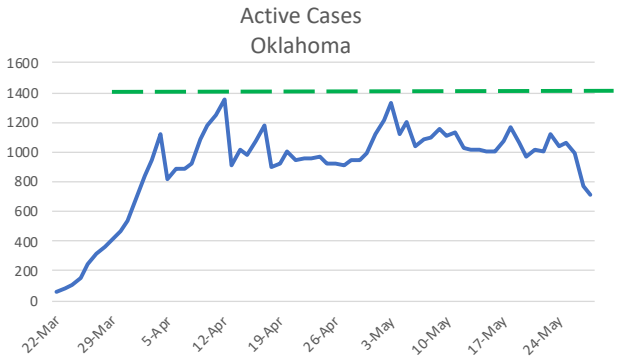
Test, New Daily Infection and Active Case Trends

"Strategic Guidance in an Era of Unprecedented Change"

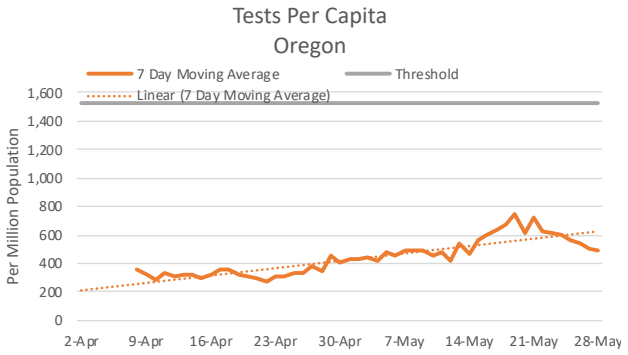


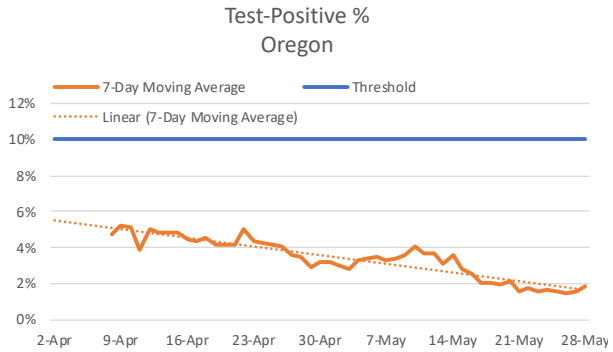


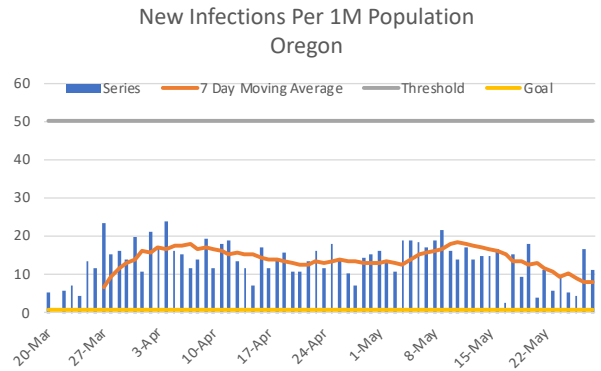


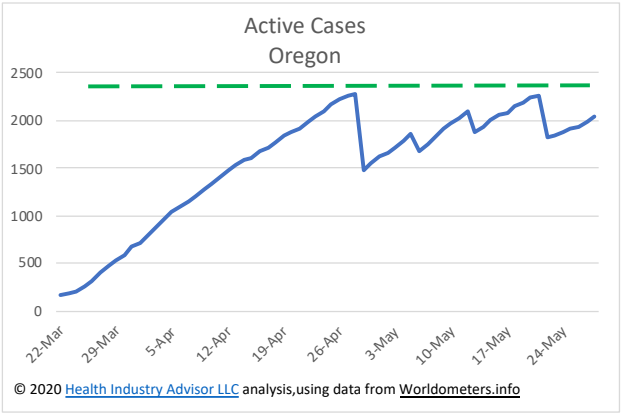


Test, New Daily Infection and Active Case Trends

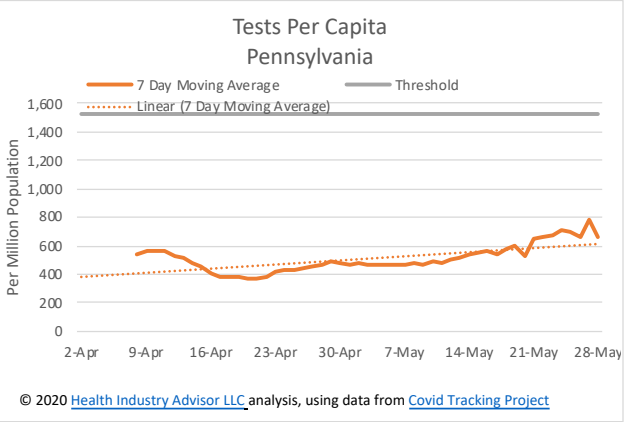


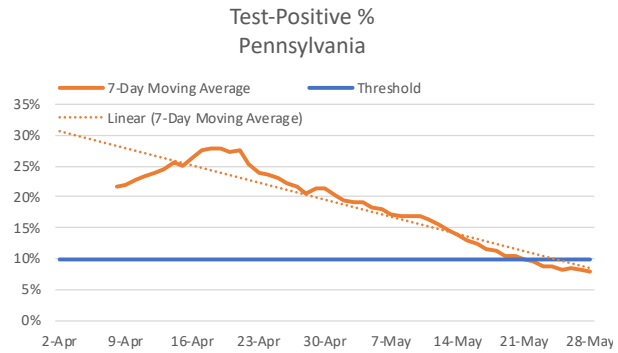


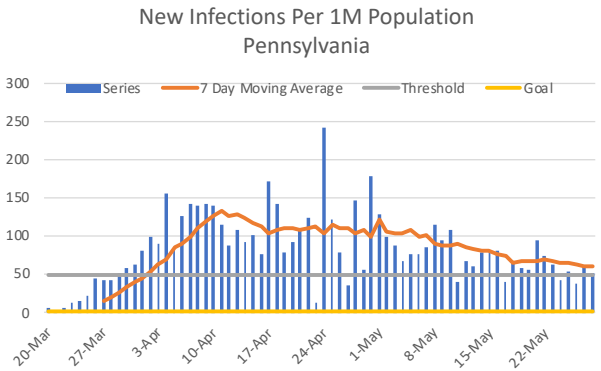


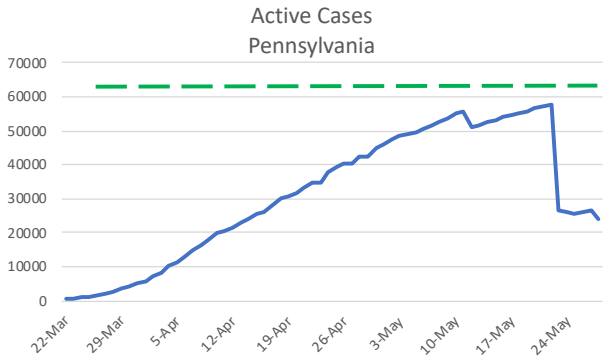


Test, New Daily Infection and Active Case Trends





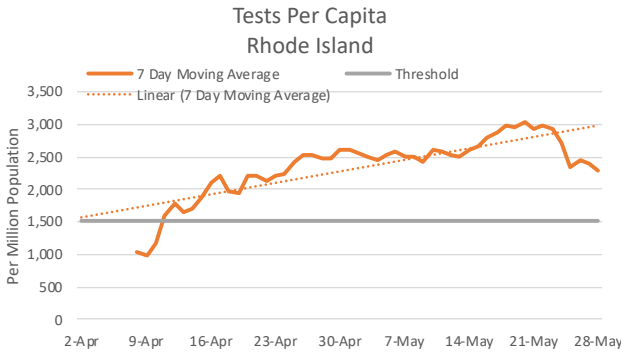


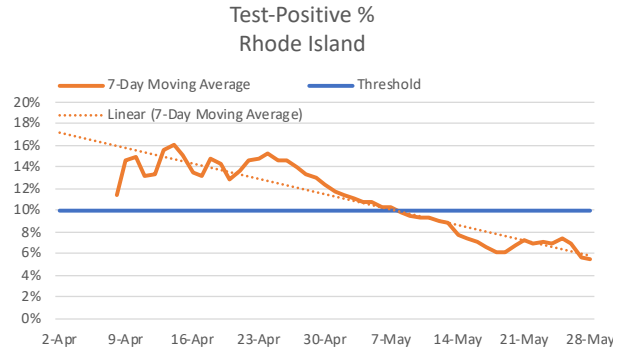


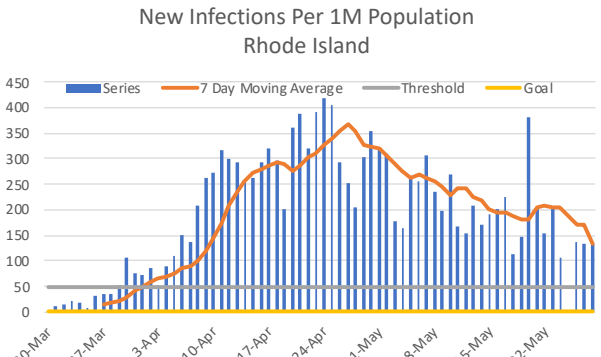
State-by-State

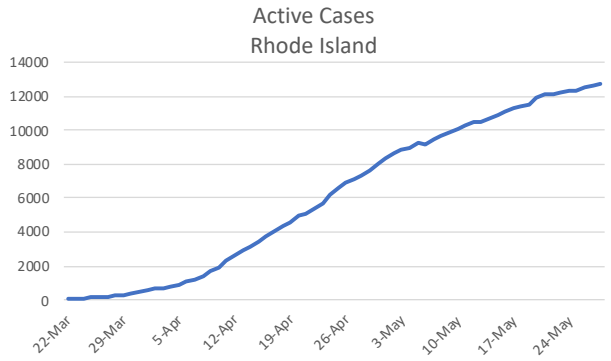
Test, New Daily Infection and Active Case Trends

"Strategic Guidance in an Era of Unprecedented Change"





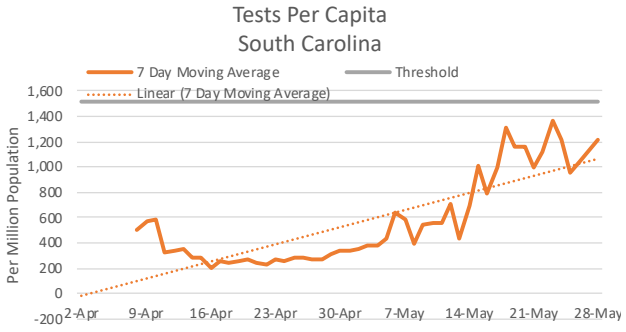


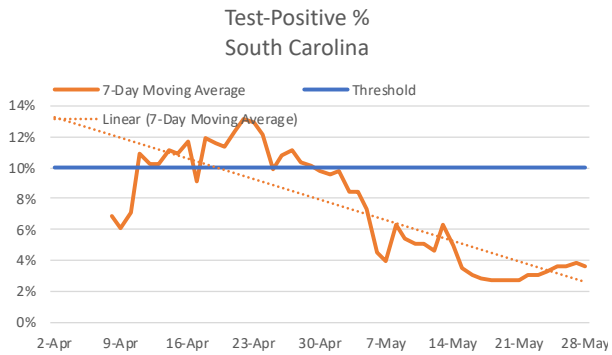


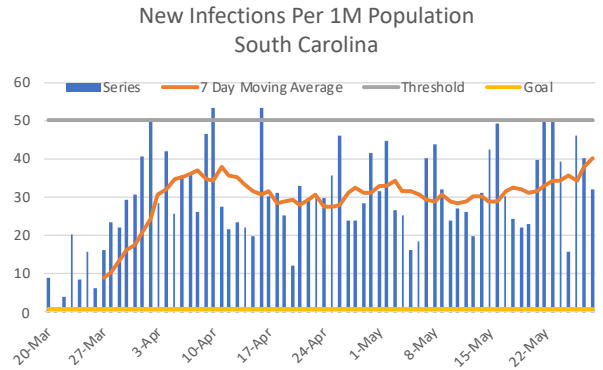
State-by-State

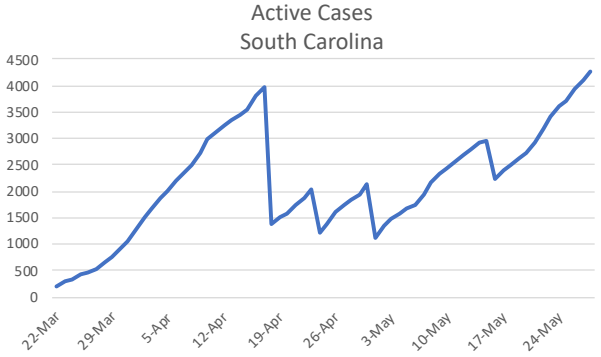
Test, New Daily Infection and Active Case Trends

"Strategic Guidance in an Era of Unprecedented Change"

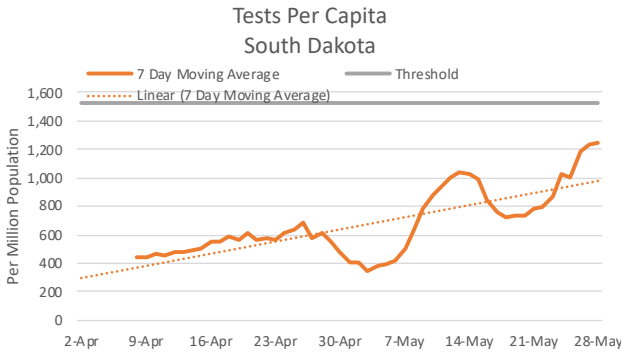


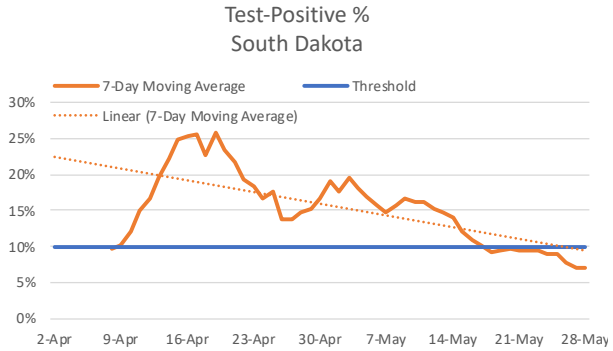


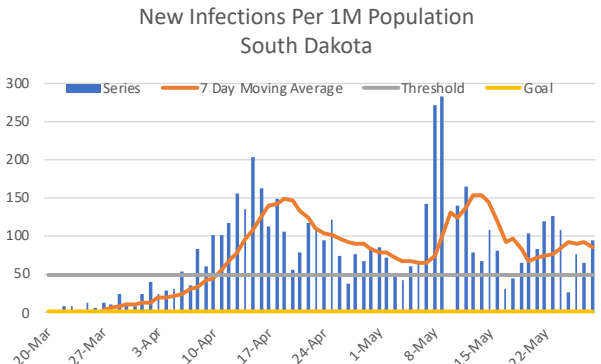


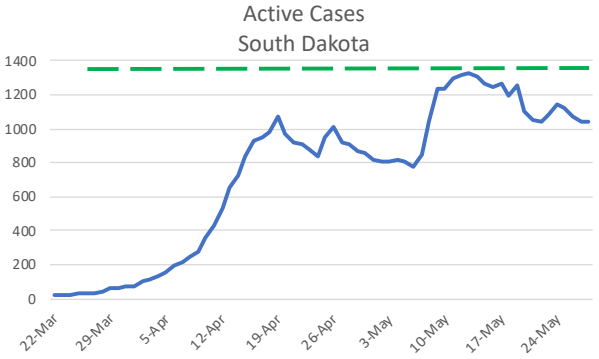


Test, New Daily Infection and Active Case Trends





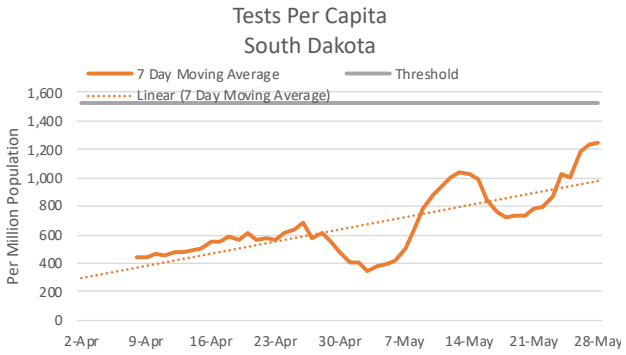


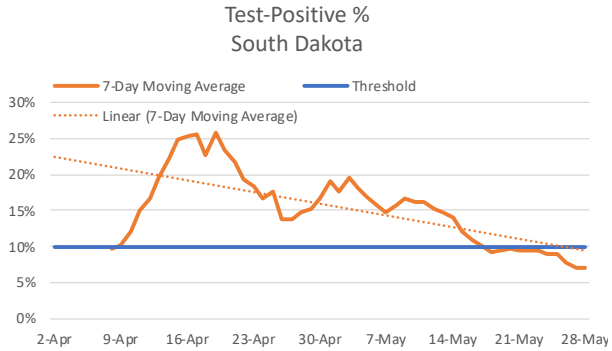


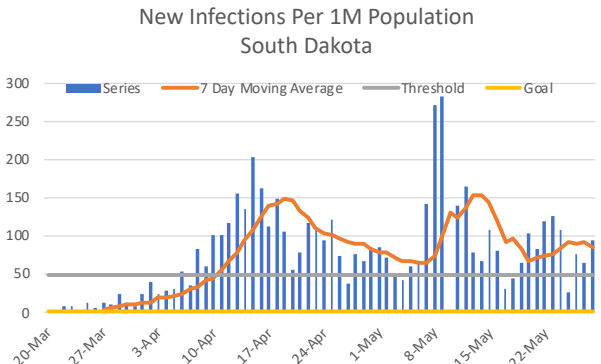
State-by-State

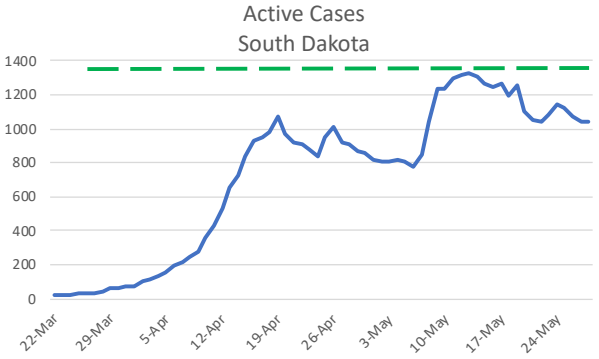
Test, New Daily Infection and Active Case Trends

"Strategic Guidance in an Era of Unprecedented Change"

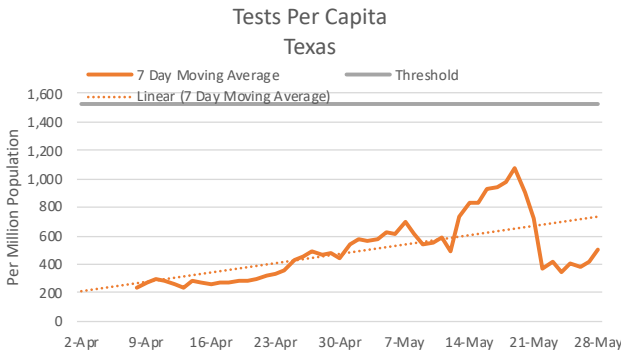


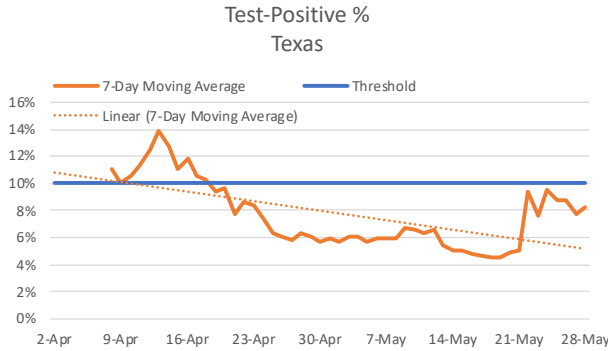


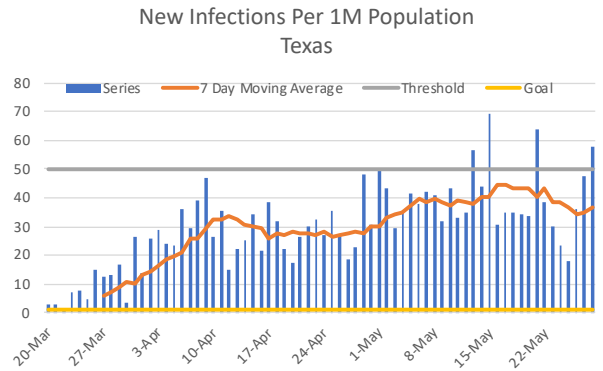


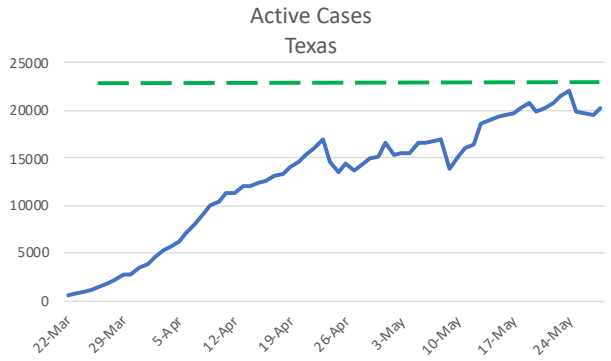


Test, New Daily Infection and Active Case Trends





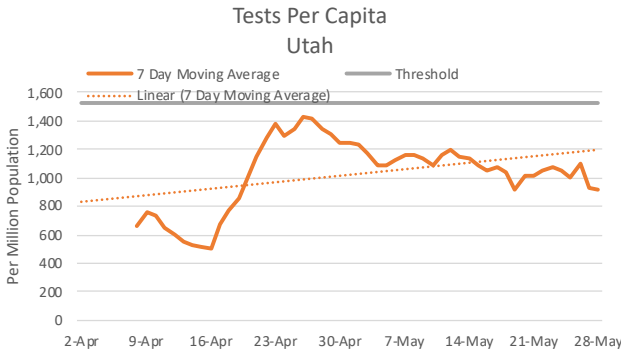


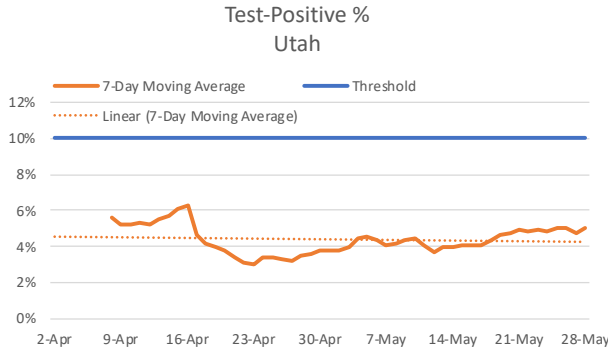


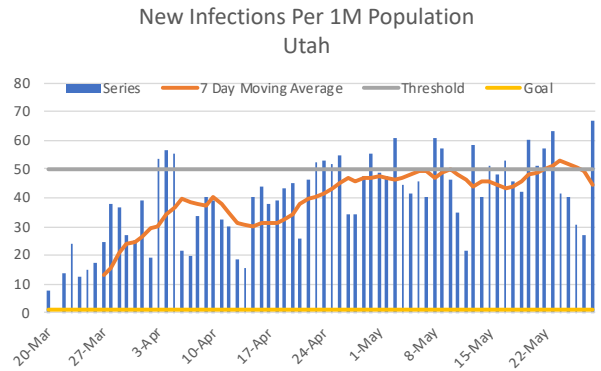
State-by-State

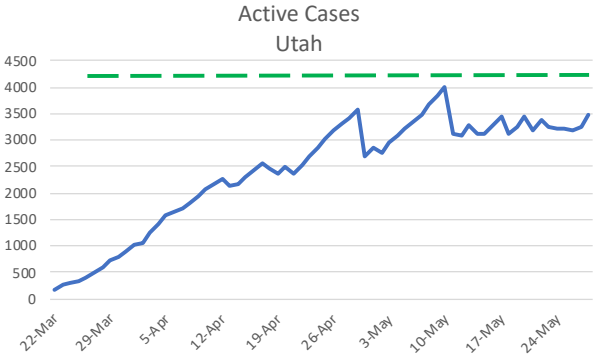
Test, New Daily Infection and Active Case Trends

"Strategic Guidance in an Era of Unprecedented Change"









Test, New Daily Infection and Active Case Trends

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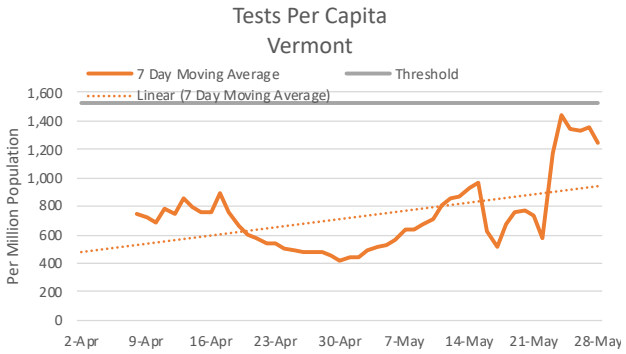

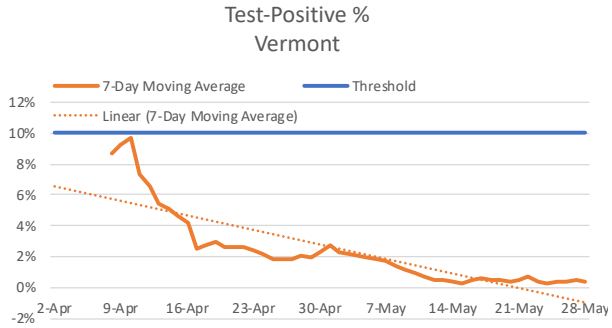

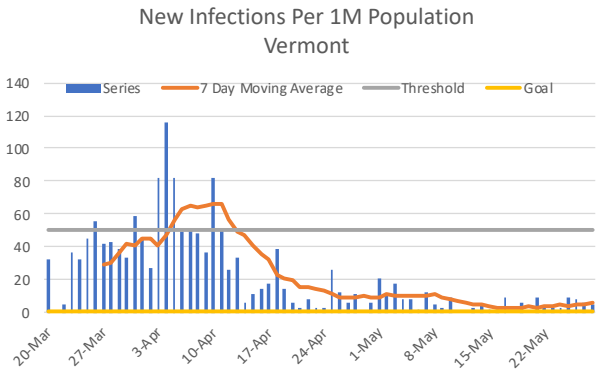

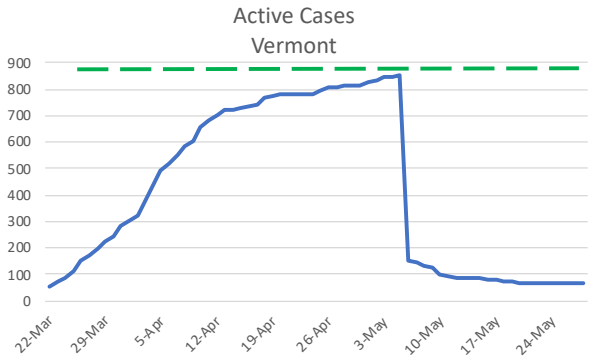

State-by-State

Test, New Daily Infection and Active Case Trends

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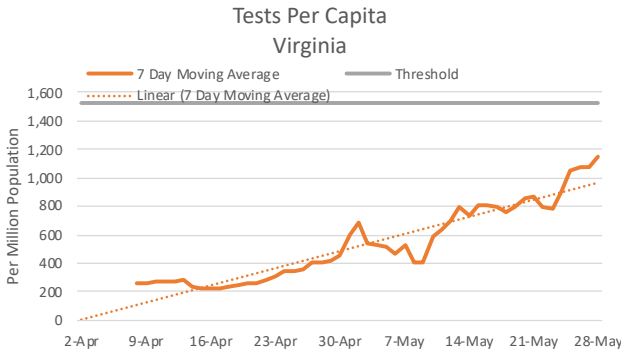

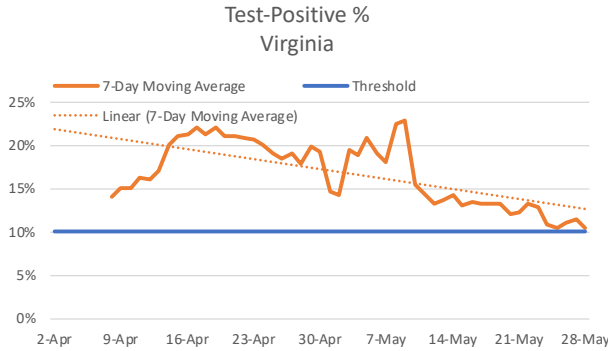

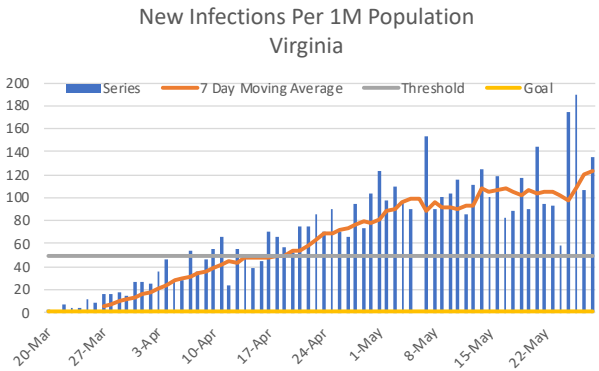

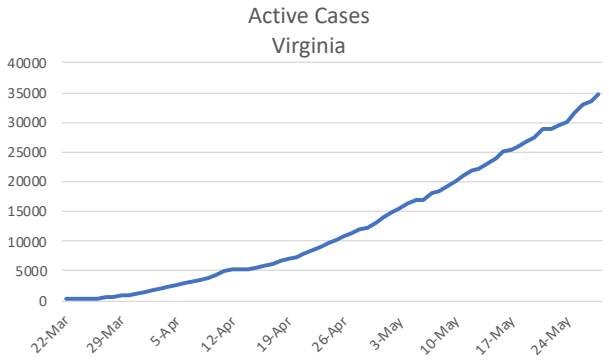

State-by-State

Test, New Daily Infection and Active Case Trends

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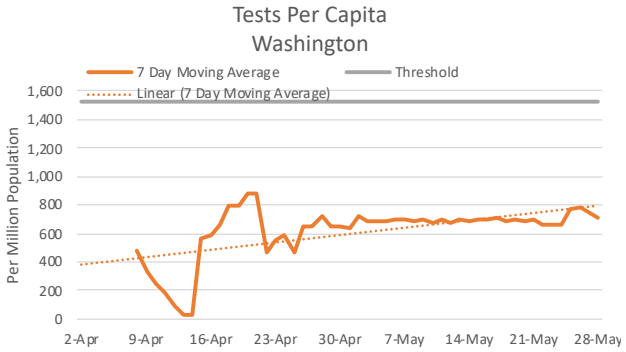

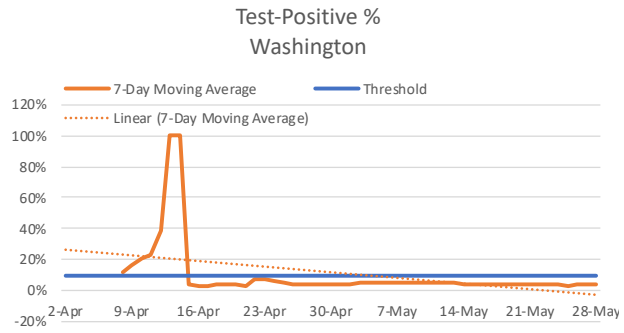

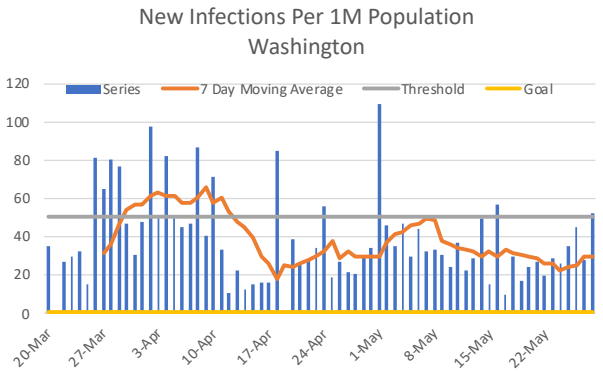

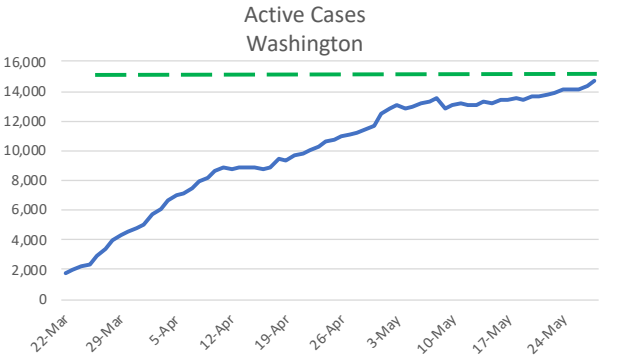

State-by-State

Test, New Daily Infection and Active Case Trends

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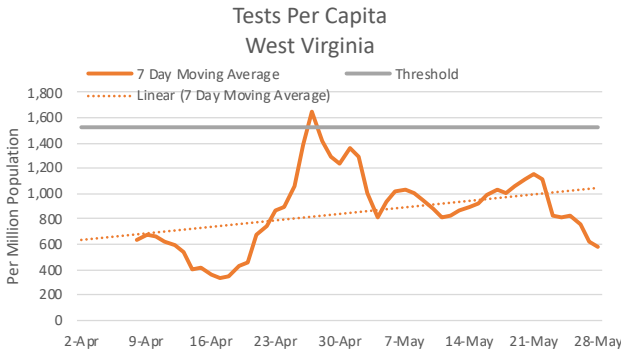

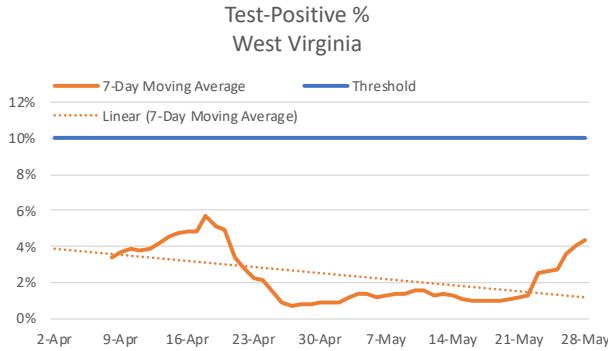

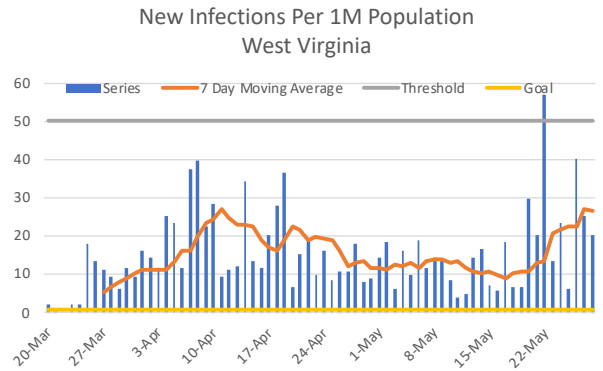

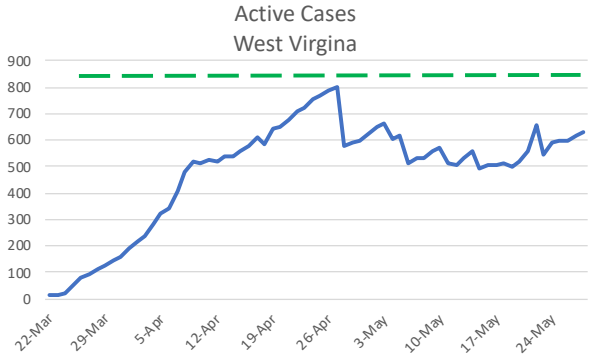

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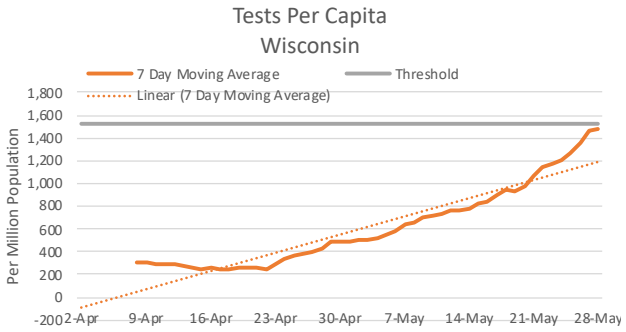

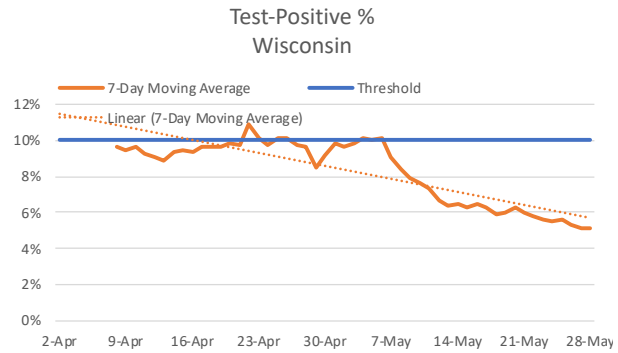

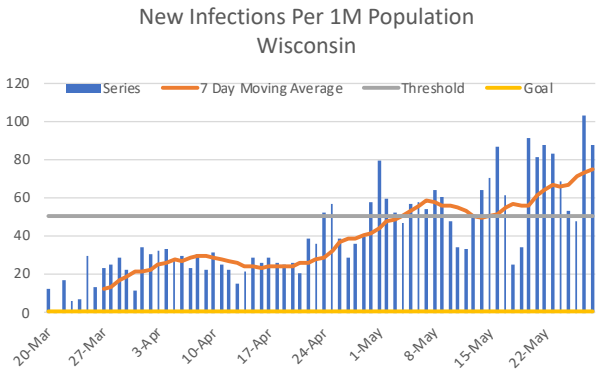

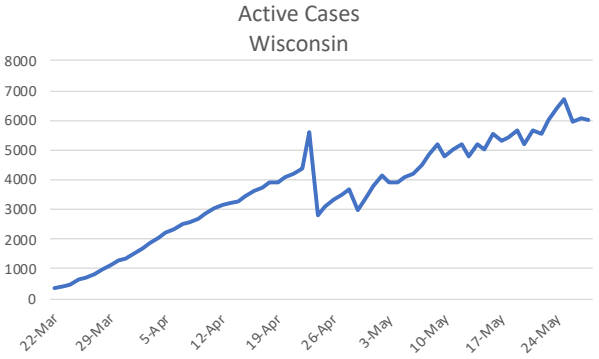

Test, New Daily Infection and Active Case Trends