Health Industry Advisor, llc

"Strategic Guidance in an Era of Unprecedented Change"

COVID-19 Dashboard

Issue # 58

Saturday, May 23, 2020

Day's Highlights

"Strategic Guidance in an Era of Unprecedented Change"

Measure	Desired Change	Yesterday in the U.S.
Number of Tests	Increase	~342,000 tests on Friday
Test-Positivity Rate	Decline	7.0% for the day; 5.9% for past 7 days
Number of Cases	Plateau	New Cases down14.1% day-over-day; 1.0% week-over-week
Deaths % of Total Cases	Decline	5.9%
Number of Deaths / 1M Population	Plateau	295
Recoveries : Death	Increase	34.13

- Test volume in the U.S. was down day-over-day (342,486 v. 409,083) but, still higher than the daily average from the prior week (330,078). Test-positives were 7.0% for the day and 5.9% for the past 7 days
- With the increased testing across the U.S., only Colorado, Delaware, Virginia and the District of Columbia are above the World Health Organization's suggested minimum 10% test-positive rate. This threshold was suggested as the minimum needed to provide reasonable assurance that actual prevalence of the virus spread was being identified
- Consistent with the lower test volume, new cases also were down day-over-day (24,192 v. 28,179). New cases are down 1.0% week-over-week.
- Eight states are still experiencing increasing new daily infections per capita - Alabama, California, Maine, Minnesota, North Carolina, North Dakota, Utah and Wisconsin. Of these, Minnesota (120.7) and North Dakota (104.2) are experiencing new daily infections per million population >100 over the past week
- In total, fewer than 5.5% of Large Central, Large Fringe, Medium Metro and Small Metro Areas are experiencing both increasing new daily infection rates and rates > 100 per million per day. These are fairly evenly distributed on a percentage basis across these groupings. (Further detail is provided below)
- With every state re-opening to some degree, we are monitoring testing and infection rates to determine if, when and how much impact re-opening has on renewed spread of the virus. Here, we focus on Florida, Georgia and Wisconsin. (Georgia was one of the last states to close and the first to re-open; Florida and Wisconsin have been criticized for the timing and extent of their re-openings.) Wisconsin has experienced two consecutive days with significant new infections. Test-positive and new infection rates, however, in all three states remain relatively low
- Another sign that the virus spread in the Southern Hemisphere is a concern: Brazil surpassed Russia yesterday and now has the second-most cases worldwide (and, its not that Russia's cases aren't continuing to grow); Chile is catching up with Saudi Arabia and, at current pace, could surpass them in total cases sometime next week

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, 14 countries have moved ahead of South Korea in total cases
- We continue to track the 30 countries, which still account for 88.8% of the more than 5 million total cases worldwide
- Case and death information is sourced from the worldometers.info, which is 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 22

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	1,645,094	(1)	4,970	(3)	97,647	(1)	5.9%	(14)	295.0	(9)	1.5%	(13)	42,050	(13)	69.4	(6)
Austria	16,436	(29)	1,825	(22)	635	(25)	3.9%	(20)	70.5	(18)	0.2%	(26)	43,383	(10)	5.2	(24)
Belgium	56,511	(18)	4,876	(5)	9,212	(7)	16.3%	(1)	794.8	(1)	0.4%	(18)	65,375	(2)	23.0	(14)
Brazil	330,890	(2)	1,557	(24)	21,048	(6)	6.4%	(12)	99.0	(15)	6.5%	(2)	3,462	(25)	75.7	(5)
Canada	82,480	(14)	2,185	(15)	6,250	(11)	7.6%	(10)	165.6	(12)	1.4%	(14)	37,267	(14)	29.8	(11)
Chile	61,857	(16)	3,236	(11)	630	(26)	1.0%	(27)	33.0	(21)	7.2%	(1)	23,148	(15)	166.8	(1)
China	82,971	(13)	58	(30)	4,634	(13)	5.6%	(15)	3.2	(29)	0.0%	(30)		N/A	0.0	(30)
Ecuador	35,828	(21)	2,031	(18)	3,056	(19)	8.5%	(9)	173.2	(11)	1.5%	(12)	5,923	(24)	35.3	(10)
France	182,219	(7)	2,792	(13)	28,289	(5)	15.5%	(2)	433.4	(5)	0.3%	(23)	21,218	(17)	5.9	(23)
Germany	179,713	(8)	2,145	(17)	8,352	(8)	4.6%	(18)	99.7	(14)	0.3%	(20)	42,923	(11)	6.8	(22)
India	124,794	(11)	90	(29)	3,726	(16)	3.0%	(21)	2.7	(30)	5.5%	(3)	1,973	(28)	4.0	(25)
Iran	131,652	(10)	1,567	(23)	7,300	(9)	5.5%	(16)	86.9	(17)	1.8%	(9)	9,108	(23)	25.5	(12)
Ireland	24,506	(26)	4,963	(4)	1,592	(21)	6.5%	(11)	322.4	(8)	0.3%	(21)	59,943	(4)	15.9	(17)
Israel	16,690	(27)	1,928	(20)	279	(28)	1.7%	(26)	32.2	(22)	0.1%	(28)	57,746	(5)	1.7	(27)
Italy	228,658	(6)	3,782	(6)	32,616	(3)	14.3%	(4)	539.4	(3)	0.3%	(24)	54,882	(7)	11.3	(19)
Japan	16,513	(28)	131	(28)	796	(24)	4.8%	(17)	6.3	(25)	0.3%	(25)	2,099	(26)	0.4	(28)
Mexico	59,567	(17)	462	(25)	6,510	(10)	10.9%	(7)	50.5	(20)	4.8%	(4)	1,567	(29)	18.8	(16)
Netherlands	44,888	(20)	2,620	(14)	5,788	(12)	12.9%	(5)	337.8	(7)	0.4%	(19)	18,315	(21)	10.1	(20)
Pakistan	50,694	(19)	229	(26)	1,067	(23)	2.1%	(25)	4.8	(27)	4.8%	(5)	2,024	(27)	8.7	(21)
Peru	111,698	(12)	3,388	(9)	3,244	(18)	2.9%	(22)	98.4	(16)	3.9%	(7)	22,798	(16)	117.9	(2)
Portugal	30,200	(25)	2,962	(12)	1,289	(22)	4.3%	(19)	126.4	(13)	0.8%	(16)	67,620	(1)	22.7	(15)
Russia	326,448	(3)	2,177	(16)	3,249	(17)	1.0%	(28)	21.7	(23)	3.0%	(8)	55,689	(6)	60.6	(7)
Saudi Arabia	67,719	(15)	1,945	(19)	364	(27)	0.5%	(29)	10.5	(24)	4.3%	(6)	15,652	(22)	76.1	(4)
Singapore	30,426	(24)	5,201	(2)	23	(30)	0.1%	(30)	3.9	(28)	1.6%	(11)	19,194	(20)	86.3	(3)
South Korea	11,142	(30)	217	(27)	264	(29)	2.4%	(24)	5.1	(26)	0.2%	(27)	50,367	(8)	0.3	(29)
Spain	281,904	(4)	6,029	(1)	28,628	(4)	10.2%	(8)	612.3	(2)	0.3%	(22)	64,977	(3)	23.0	(13)
Sweden	32,809	(22)	3,249	(10)	3,925	(15)	12.0%	(6)	388.6	(6)	1.7%	(10)	20,798	(19)	51.0	(8)
Switzerland	30,707	(23)	3,586	(8)	1,903	(20)	6.2%	(13)	222.2	(10)	0.1%	(29)	42,129	(12)	3.2	(26)
Turkey	154,500	(9)	1,832	(21)	4,276	(14)	2.8%	(23)	50.7	(19)	0.7%	(17)	20,982	(18)	13.6	(18)
UK	254,195	(5)	3,744	(7)	36,393	(2)	14.3%	(3)	536.1	(4)	0.8%	(15)	47,635	(9)	36.8	(9)

Note: China does not report test volumes

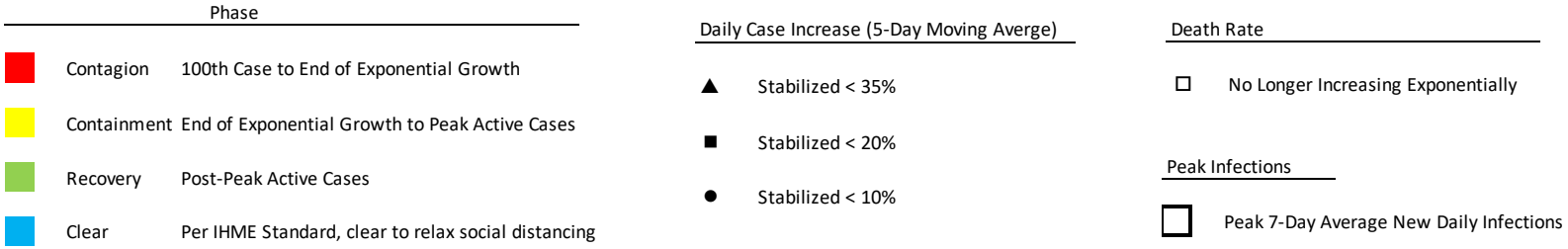
Country-by-Country

Virus Progression

"Strategic Guidance in an Era of Unprecedented Change"

This graphic on the following page 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.

Legend:



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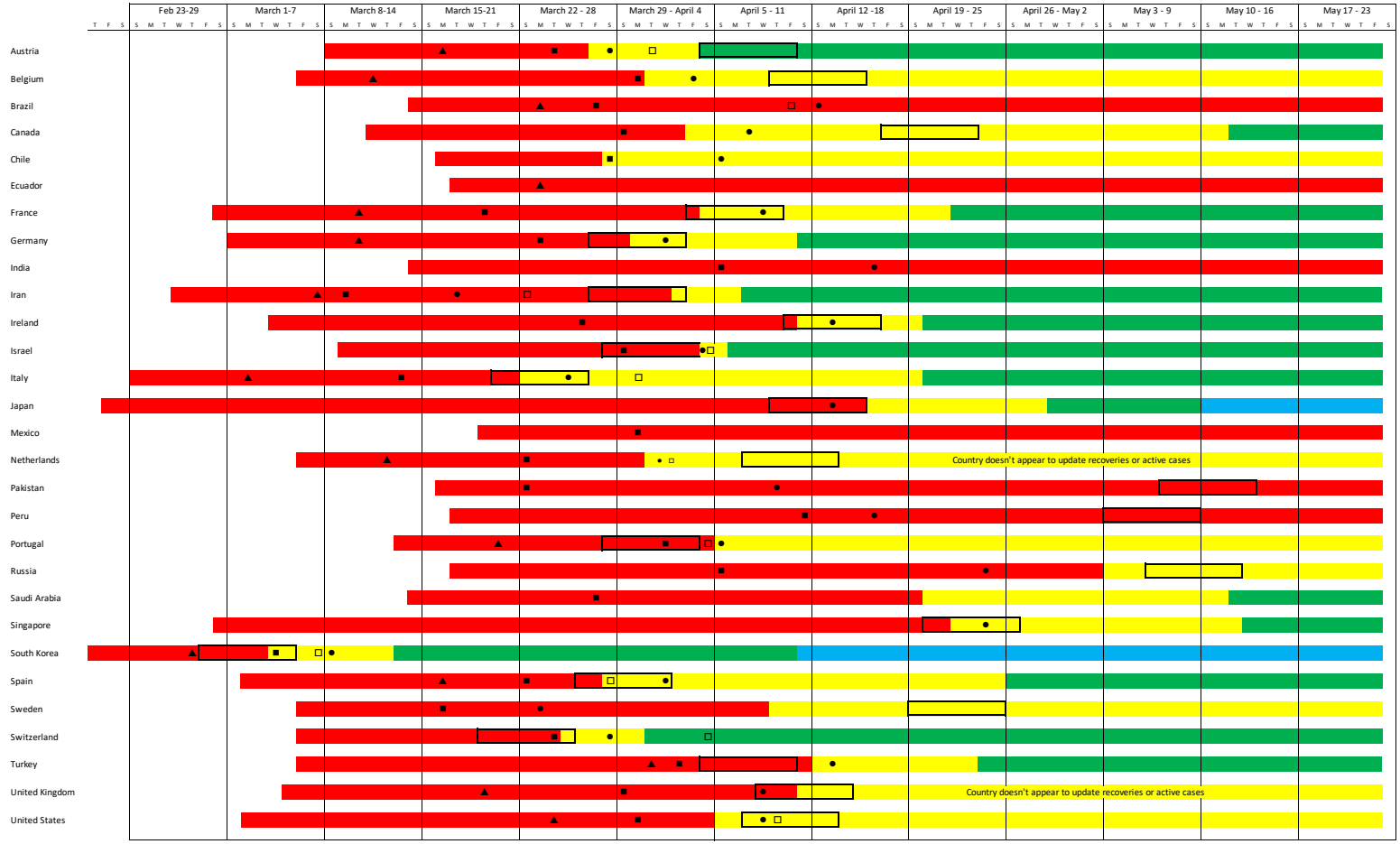
Country-by-Country

Virus Progression

"Strategic Guidance in an Era of Unprecedented Change"



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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:

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

The original 30 still account for 89% of all cases worldwide.

		Total Cases						
Rank	Country	21-May	Rank	Country	6-May	Rank	Country	27-Apr
1	USA	1,645,094	1	USA	1,263,092	1	USA	1,010,356
2	Brazil	330,890	2	Spain	253,682	2	Spain	229,422
3	Russia	326,448	3	Italy	214,457	3	Italy	199,414
4	Spain	281,904	4	UK	201,101	4	France	165,842
5	UK	254,195	5	France	174,191	5	Germany	158,758
6	Italy	228,658	6	Germany	168,162	6	UK	157,149
7	France	182,219	7	Russia	165,929	7	Turkey	112,261
8	Germany	179,713	8	Turkey	131,744	8	Iran	91,472
9	Turkey	154,500	9	Brazil	126,611	9	Russia	87,147
10	Iran	131,652	10	Iran	101,650	10	China	82,830
11	India	124,794	11	China	82,883	11	Brazil	66,501
12	Peru	111,698	12	Canada	63,496	12	Canada	48,500
13	China	82,971	13	Peru	54,817	13	Belgium	46,687
14	Canada	82,480	14	India	52,987	14	Netherlands	38,245
15	Saudi Arabia	67,719	15	Belgium	50,781	15	India	29,451
16	Chile	61,857	16	Netherlands	41,319	16	Switzerland	29,164
17	Mexico	59,567	17	Saudi Arabia	31,938	17	Peru	28,669
18	Belgium	56,511	18	Switzerland	30,060	18	Portugal	24,070
19	Pakistan	50,694	19	Ecuador	29,420	19	Ecuador	23,240
20	Netherlands	44,888	20	Portugal	26,182	20	Ireland	19,648
22	Ecuador	35,828	21	Mexico	26,025	21	Sweden	18,926
24	Sweden	32,809	22	Sweden	23,918	22	Saudi Arabia	18,811
25	Switzerland	30,707	23	Pakistan	23,214	23	Israel	15,555
26	Singapore	30,426	24	Chile	23,048	24	Austria	15,274
28	Portugal	30,200	25	Ireland	22,248	25	Mexico	14,677
30	Ireland	24,506	26	Singapore	20,198	26	Singapore	14,423
38	Israel	16,690	29	Israel	16,310	27	Pakistan	13,915
39	Japan	16,513	31	Austria	15,684	28	Chile	13,813
40	Austria	16,436	32	Japan	15,253	29	Japan	13,614
45	S. Korea	11,142	38	S. Korea	10,806	35	South Korea	10,738
	Others	594,498		Others	356,176		Others	263,943
	World	5,298,207			3,817,382		World	3,062,515
	30 countries' share	88.8%			90.7%			91.4%

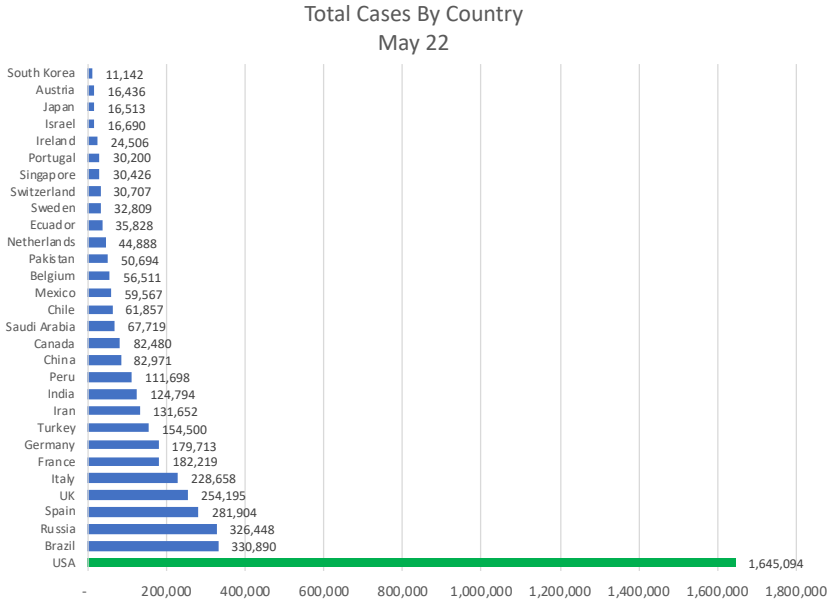
Country-by-Country

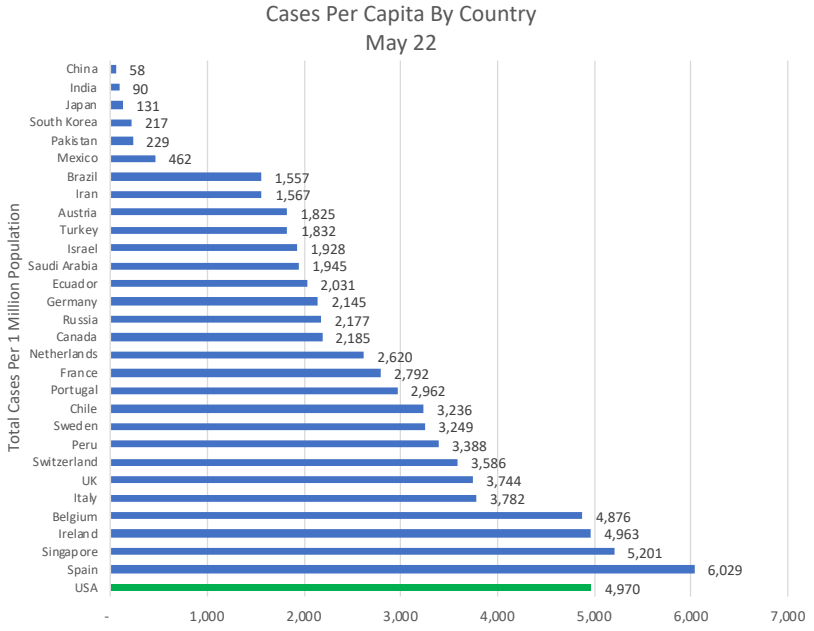
Cases & Cases Per Capita

"Strategic Guidance in an Era of Unprecedented Change"

Brazil, Chile, India, Mexico, Pakistan, Peru, Russia and Saudi Arabia are moving up in the ranks of most cases; Austria, Israel, Japan and South Korea are dropping

Cases per capita remain the highest in European countries, Singapore and the US.





Country-by-Country

Deaths Per Cases & Per Capita

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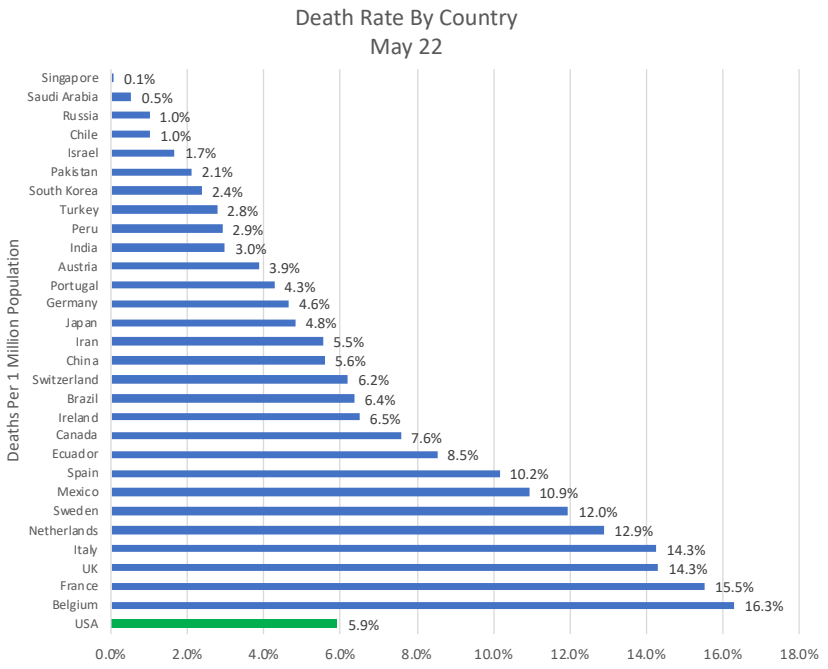
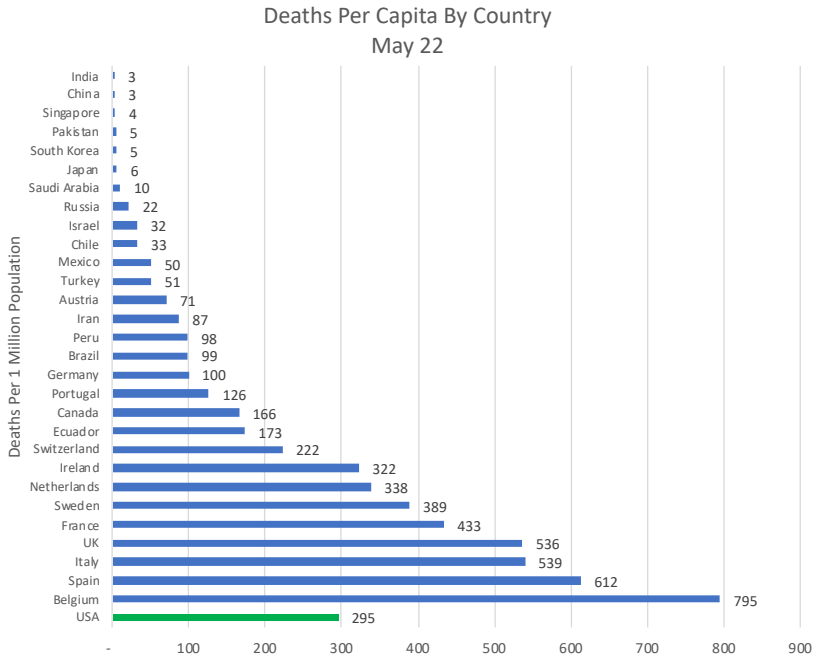
Death rates per case and per capita are the highest in Belgium, France, Italy and the UK. Rates in the US are in the middle of this group of countries





Country-by-Country

Tests Per Capita & Case Growth Rate

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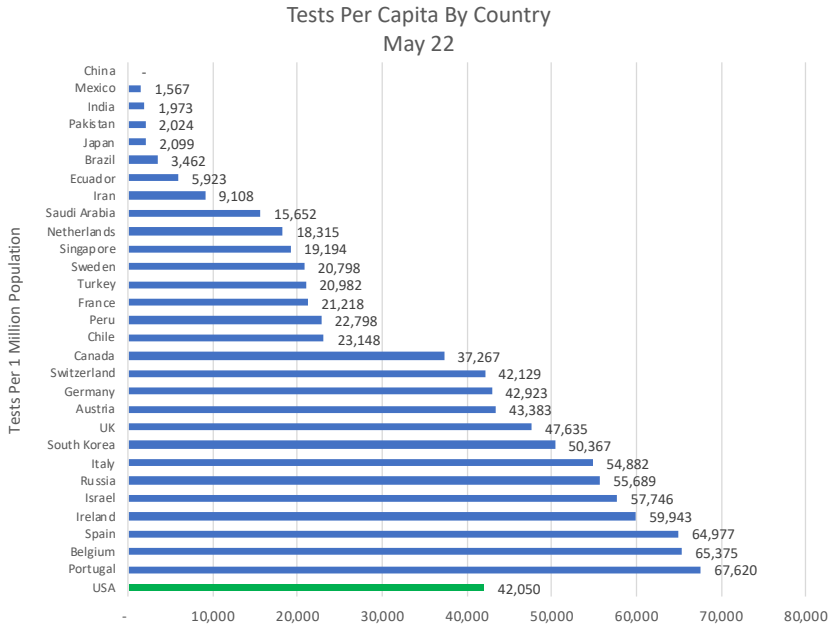
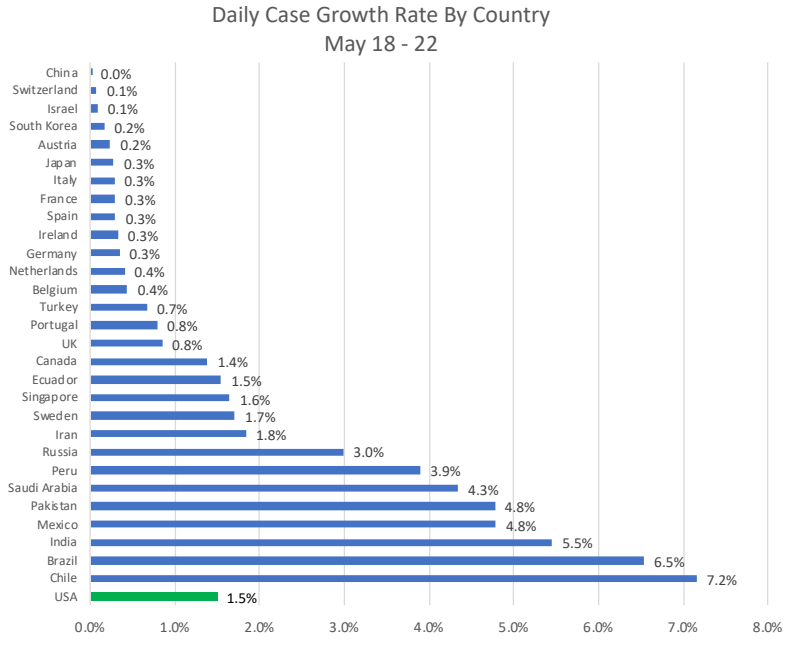
Testing per capita varies widely among these countries. The US, while ramping up testing over the past several weeks, still lags that of many European countries.

Case growth among the hardest-hit countries has fallen sharply over the past month; relatively high in Brazil, Chile, India, Mexico, Peru and Saudi Arabia





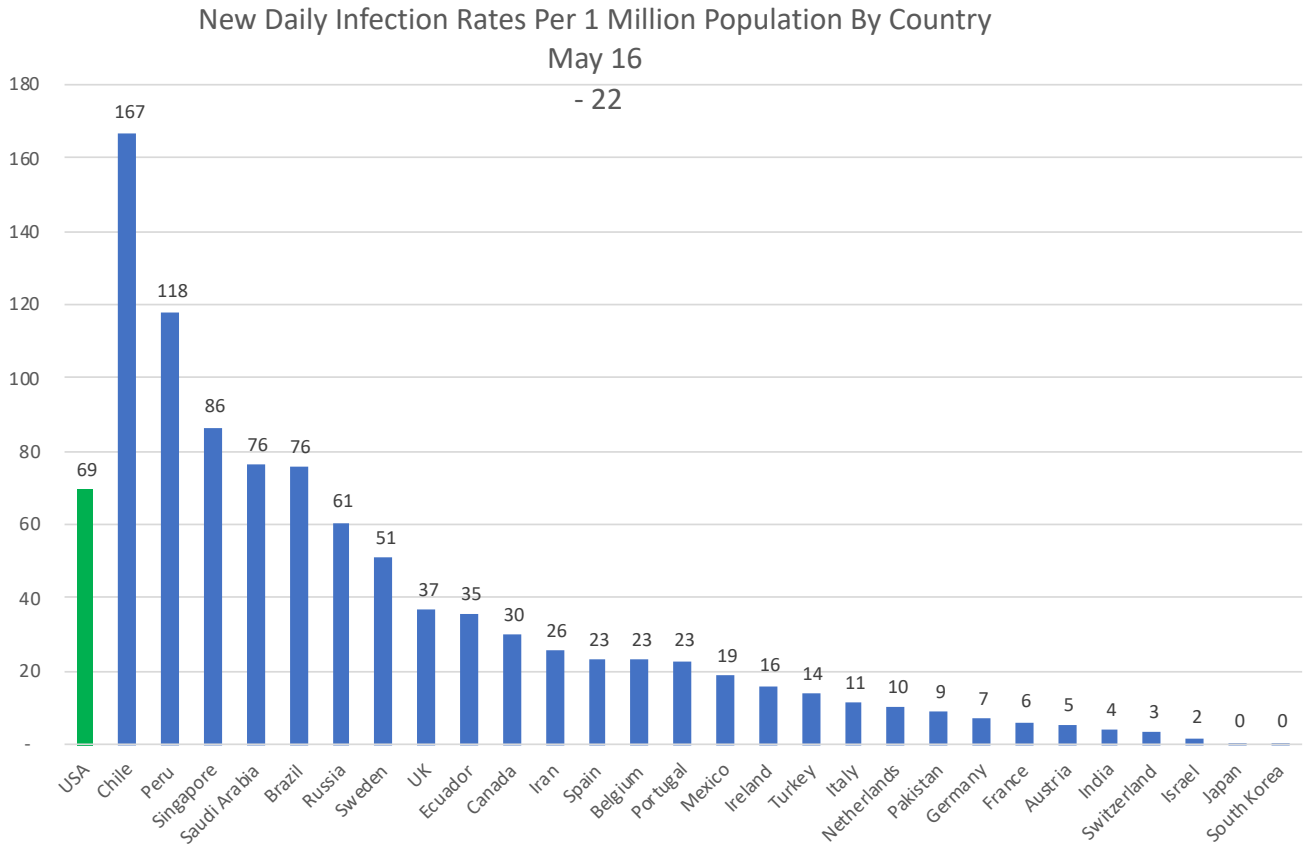
Country-by-Country

New Daily Infection Rate

"Strategic Guidance in an Era of Unprecedented Change"

New daily infection rates are declining in most of the hardest-hit countries. Singapore is high but, declining.

Even in countries with newly-emerging virus-spread - Brazil, India, Mexico and Saudi Arabia - infection rates appear relatively low. Chile and Peru are the exceptions.



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 22

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	13,670	(26)	2,788.0	(27)	541	(25)	4.0%	(31)	110.3	(26)	3.0%	(5)	924	(35)	66.9	(20)
Alaska	404	(51)	552.3	(49)	10	(51)	2.5%	(43)	13.7	(50)	0.4%	(49)	1,763	(8)	3.1	(49)
Arizona	15,608	(23)	2,144.3	(35)	775	(21)	5.0%	(19)	106.5	(27)	2.3%	(16)	667	(44)	47.9	(33)
Arkansas	5,612	(39)	1,859.6	(41)	113	(40)	2.0%	(46)	37.4	(45)	3.4%	(4)	1,019	(32)	54.4	(29)
California	90,588	(5)	2,292.7	(34)	3,688	(7)	4.1%	(30)	93.3	(29)	2.4%	(12)	1,203	(24)	49.8	(32)
Colorado	23,487	(17)	4,078.5	(19)	1,324	(16)	5.6%	(12)	229.9	(14)	1.4%	(38)	600	(48)	55.9	(26)
Connecticut	39,640	(12)	11,118.3	(6)	3,637	(8)	9.2%	(2)	1,020.1	(3)	1.2%	(42)	1,860	(5)	142.4	(8)
Delaware	8,529	(32)	8,758.8	(7)	322	(32)	3.8%	(34)	330.7	(12)	2.1%	(23)	1,571	(12)	169.6	(5)
District Of Columbia	7,893	(35)	11,183.9	(5)	418	(29)	5.3%	(14)	592.3	(5)	2.1%	(24)	1,752	(9)	206.9	(1)
Florida	49,451	(9)	2,302.4	(33)	2,190	(11)	4.4%	(25)	102.0	(28)	1.6%	(32)	1,508	(15)	35.3	(38)
Georgia	41,482	(11)	3,907.0	(20)	1,808	(14)	4.4%	(26)	170.3	(16)	1.9%	(27)	1,687	(10)	63.4	(23)
Hawaii	642	(49)	453.4	(50)	17	(48)	2.6%	(41)	12.0	(51)	0.1%	(51)	929	(34)	0.4	(51)
Idaho	2,595	(43)	1,448.1	(45)	79	(42)	3.0%	(39)	44.1	(43)	1.4%	(35)	387	(50)	16.4	(46)
Illinois	105,444	(3)	8,321.1	(8)	4,715	(6)	4.5%	(24)	372.1	(10)	2.3%	(17)	1,787	(7)	169.9	(4)
Indiana	30,409	(16)	4,516.9	(16)	1,941	(12)	6.4%	(8)	288.3	(13)	1.8%	(29)	915	(36)	79.7	(17)
Iowa	16,508	(22)	5,232.2	(14)	433	(27)	2.6%	(42)	137.2	(22)	2.4%	(14)	1,208	(23)	111.3	(11)
Kansas	9,024	(31)	3,097.5	(23)	207	(36)	2.3%	(44)	71.1	(37)	2.6%	(11)	728	(43)	55.8	(27)
Kentucky	8,426	(33)	1,886.0	(38)	391	(30)	4.6%	(21)	87.5	(30)	1.9%	(28)	1,438	(19)	31.4	(40)
Louisiana	36,925	(13)	7,942.9	(9)	2,668	(9)	7.2%	(4)	573.9	(6)	1.4%	(36)	1,801	(6)	94.9	(14)
Maine	1,948	(45)	1,449.2	(44)	76	(43)	3.9%	(32)	56.5	(39)	2.9%	(6)	1,456	(18)	36.7	(36)
Maryland	44,424	(10)	7,348.1	(10)	2,207	(10)	5.0%	(18)	365.1	(11)	2.7%	(9)	1,065	(30)	175.8	(3)
Massachusetts	90,889	(4)	13,078.5	(3)	6,228	(3)	6.9%	(7)	896.2	(4)	1.1%	(43)	1,562	(14)	153.5	(6)
Michigan	53,913	(8)	5,398.4	(13)	5,158	(4)	9.6%	(1)	516.5	(8)	1.1%	(44)	1,635	(11)	54.8	(28)
Minnesota	19,005	(21)	3,369.9	(21)	851	(19)	4.5%	(23)	150.9	(18)	3.9%	(2)	1,173	(25)	120.7	(10)
Mississippi	12,624	(27)	4,241.7	(17)	596	(23)	4.7%	(20)	200.3	(15)	2.2%	(18)	1,495	(16)	87.5	(16)
Missouri	11,852	(28)	1,931.1	(37)	681	(22)	5.7%	(10)	111.0	(25)	1.4%	(37)	896	(37)	26.0	(43)
Montana	479	(50)	448.2	(51)	16	(49)	3.3%	(37)	15.0	(49)	0.5%	(47)	861	(38)	1.7	(50)
Nebraska	11,662	(29)	6,028.7	(11)	147	(39)	1.3%	(49)	76.0	(35)	2.4%	(13)	1,566	(13)	139.6	(9)
Nevada	7,401	(36)	2,402.8	(32)	387	(31)	5.2%	(16)	125.6	(24)	1.5%	(34)	1,289	(21)	36.5	(37)
New Hampshire	4,014	(41)	2,952.1	(25)	204	(37)	5.1%	(17)	150.0	(19)	2.2%	(19)	1,312	(20)	57.8	(25)
New Jersey	154,349	(2)	17,377.4	(2)	10,986	(2)	7.1%	(6)	1,236.9	(2)	0.8%	(46)	1,485	(17)	142.5	(7)
New Mexico	6,625	(37)	3,159.5	(22)	302	(35)	4.6%	(22)	144.0	(20)	2.2%	(20)	2,260	(2)	65.6	(22)
New York	367,936	(1)	18,913.6	(1)	29,009	(1)	7.9%	(3)	1,491.2	(1)	0.4%	(48)	1,929	(4)	87.5	(15)
North Carolina	22,110	(18)	2,108.1	(36)	775	(21)	3.5%	(35)	73.9	(36)	3.5%	(3)	976	(33)	62.9	(24)
North Dakota	2,317	(44)	3,040.4	(24)	52	(46)	2.2%	(45)	68.2	(38)	4.0%	(1)	2,084	(3)	104.2	(13)
Ohio	30,865	(15)	2,640.5	(29)	1,879	(13)	6.1%	(9)	160.7	(17)	2.0%	(25)	753	(42)	47.7	(34)
Oklahoma	5,849	(38)	1,478.2	(43)	307	(34)	5.2%	(15)	77.6	(34)	2.0%	(26)	1,263	(22)	27.5	(41)
Oregon	3,864	(42)	916.1	(48)	147	(39)	3.8%	(33)	34.9	(46)	1.3%	(40)	621	(47)	10.9	(47)
Pennsylvania	70,331	(6)	5,493.8	(12)	5,061	(5)	7.2%	(5)	395.3	(9)	1.3%	(39)	660	(45)	67.7	(19)
Rhode Island	13,736	(25)	12,966.3	(4)	579	(24)	4.2%	(29)	546.6	(7)	1.6%	(33)	2,988	(1)	204.6	(2)
South Carolina	9,638	(30)	1,871.9	(40)	419	(28)	4.3%	(27)	81.4	(33)	1.8%	(30)	1,121	(27)	34.2	(39)
South Dakota	4,356	(40)	4,923.9	(15)	50	(47)	1.1%	(51)	56.5	(40)	1.8%	(31)	796	(40)	75.7	(18)
Tennessee	19,394	(20)	2,838.2	(26)	315	(33)	1.6%	(47)	46.1	(42)	2.2%	(21)	1,072	(29)	50.7	(31)
Texas	54,616	(7)	1,883.6	(39)	1,512	(15)	2.8%	(40)	52.1	(41)	2.3%	(15)	369	(51)	38.6	(35)
Utah	8,057	(34)	2,513.1	(30)	93	(41)	1.2%	(50)	29.0	(47)	2.2%	(22)	1,052	(31)	51.0	(30)
Vermont	952	(47)	1,525.7	(42)	54	(45)	5.7%	(11)	86.5	(31)	0.3%	(50)	579	(49)	4.3	(48)
Virginia	34,950	(14)	4,094.7	(18)	1,136	(17)	3.3%	(38)	133.1	(23)	2.8%	(7)	789	(41)	105.1	(12)
Washington	20,176	(19)	2,649.5	(28)	1,071	(18)	5.3%	(13)	140.6	(21)	0.9%	(45)	657	(46)	26.2	(42)
West Virginia	1,705	(46)	954.0	(47)	72	(44)	4.2%	(28)	40.3	(44)	2.7%	(10)	1,111	(28)	20.6	(45)
Wisconsin	14,396	(24)	2,472.5	(31)	496	(26)	3.4%	(36)	85.2	(32)	2.8%	(8)	1,147	(26)	66.5	(21)
Wyoming	803	(48)	1,387.5	(46)	12	(50)	1.5%	(48)	20.7	(48)	1.3%	(41)	840	(39)	21.5	(44)
United States	1,645,094		4,970.0		97,647		5.9%		295.0		1.5%		1,155		69.4	

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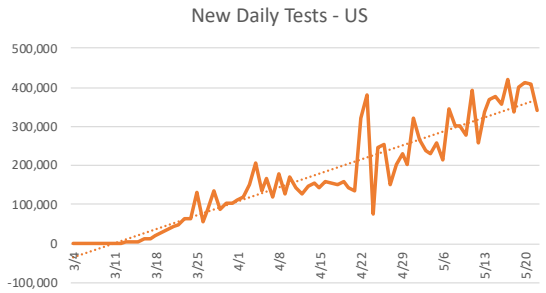
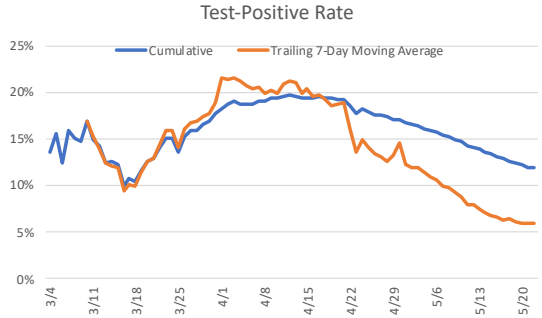
United States

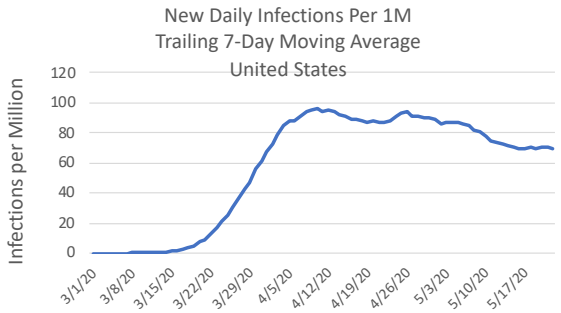
Overall Statistics

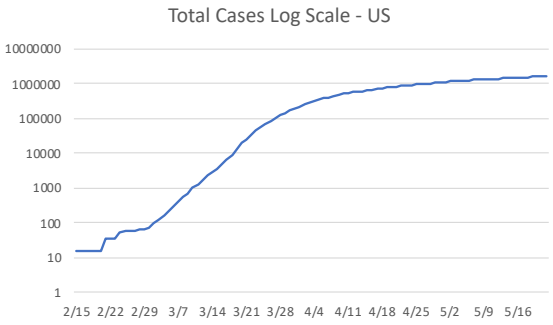
"Strategic Guidance in an Era of Unprecedented Change"

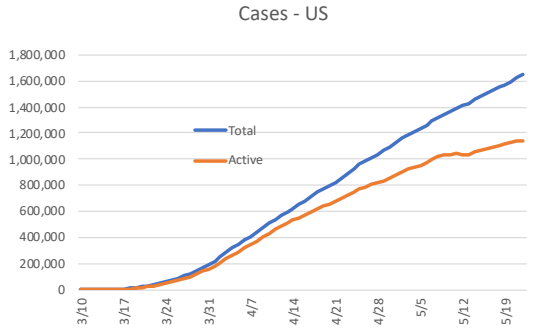
With significantly increased testing, the US is now meeting the WHO standard of <10% test-positives. This suggests that asymptomatic cases are being captured and that we have a better view of true infection rates.
Further, new daily infections continue to decline; the death rate seems to have stabilized.

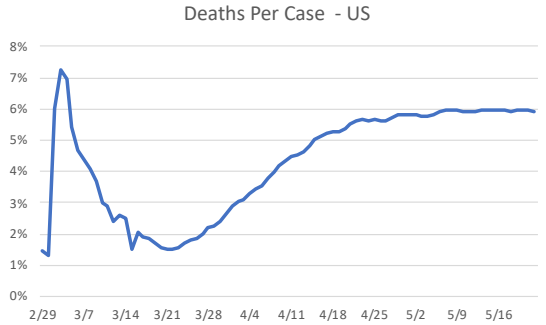












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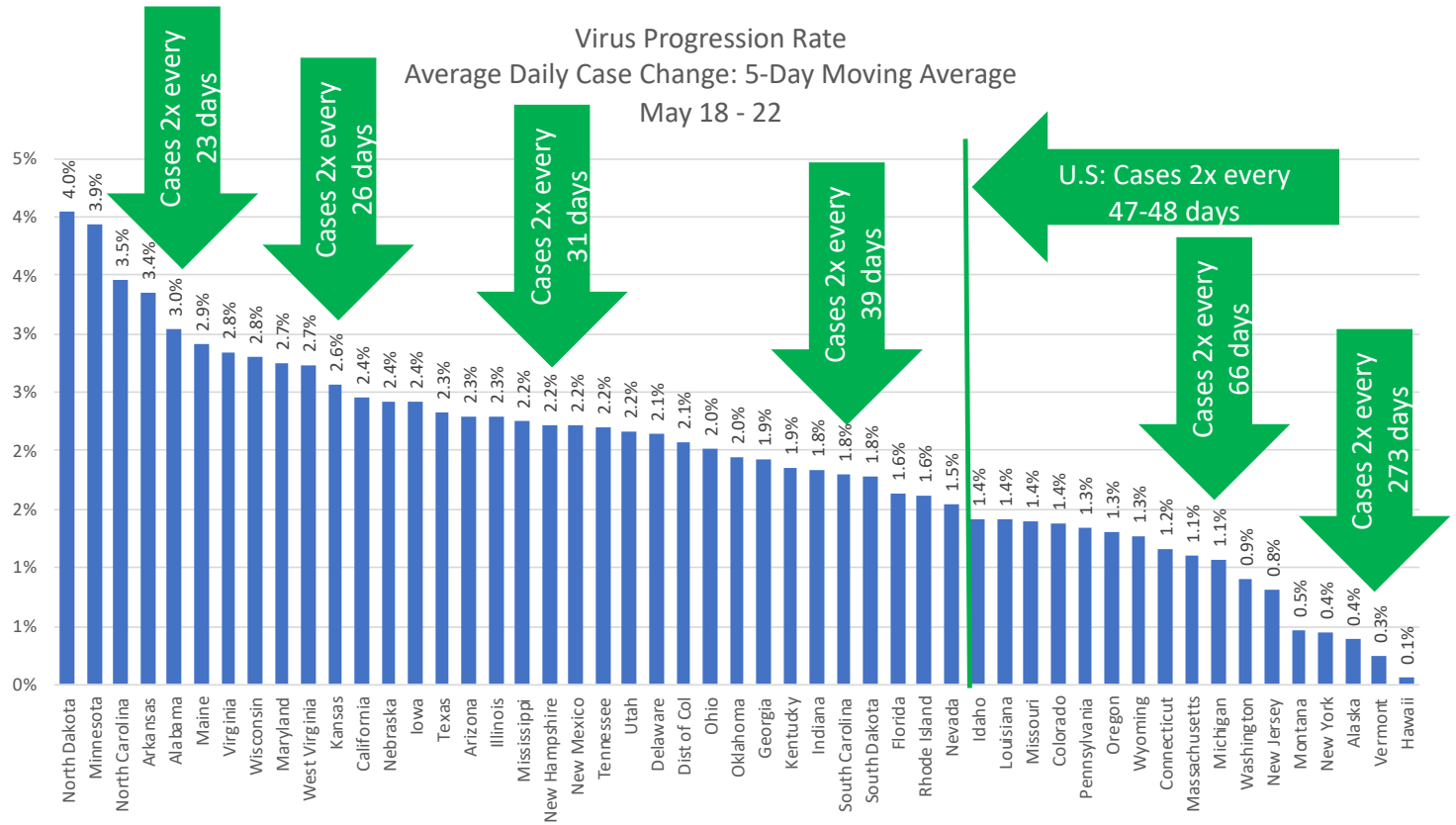
State-by-State

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 17 days to 3 years to double



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State-by-State

New Daily Infections & Tests Per Capita

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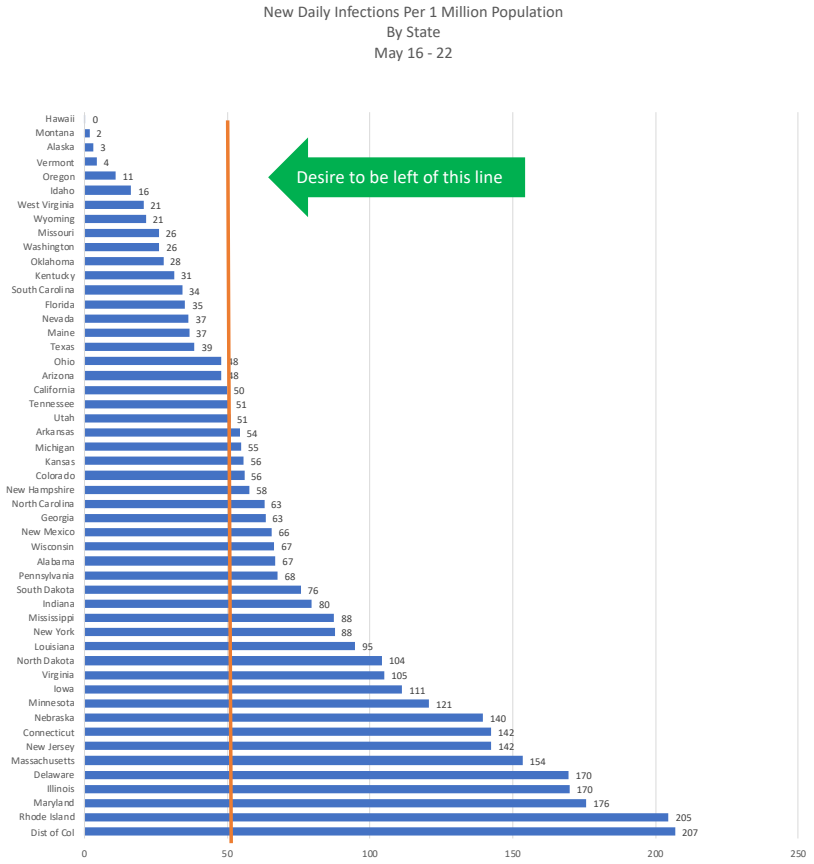

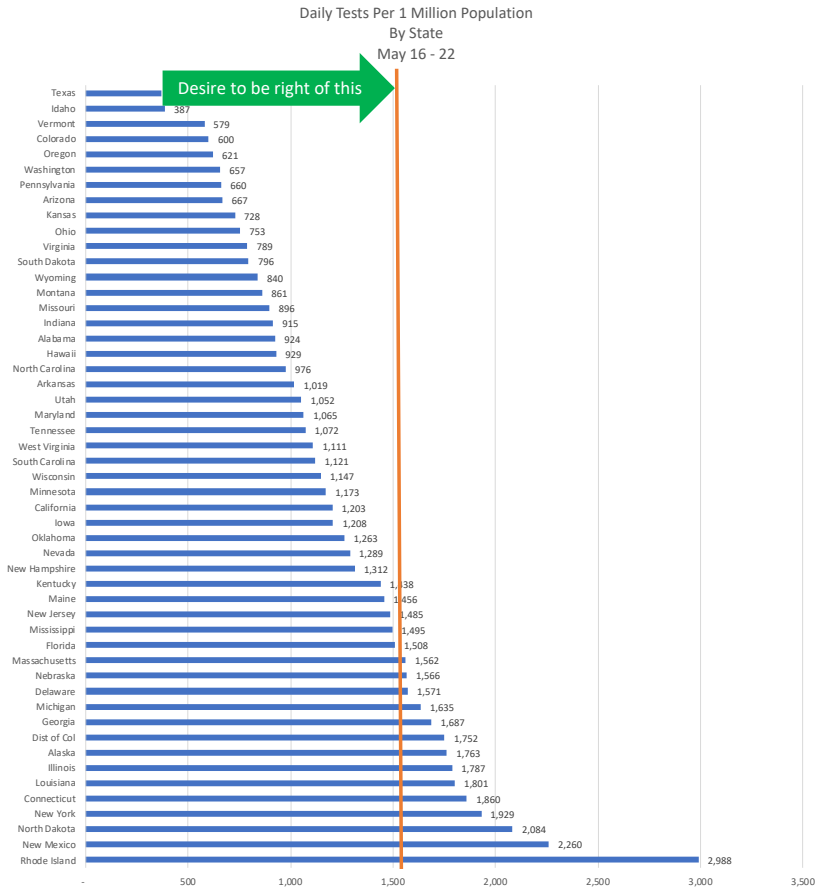

State-by-State

Cases & Deaths Per Capita

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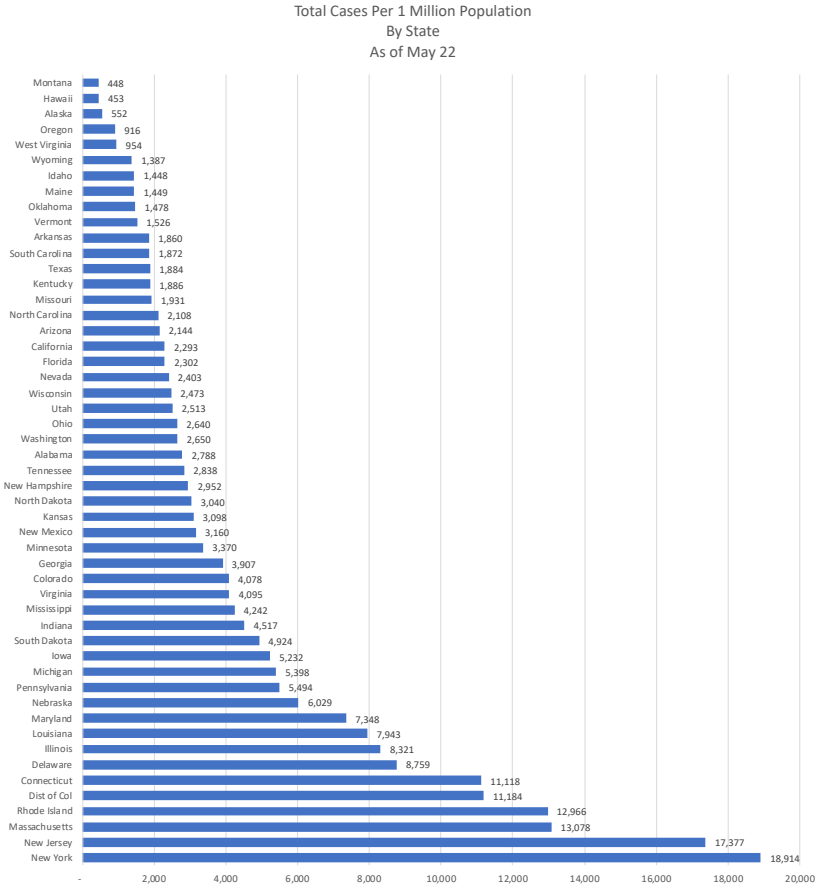
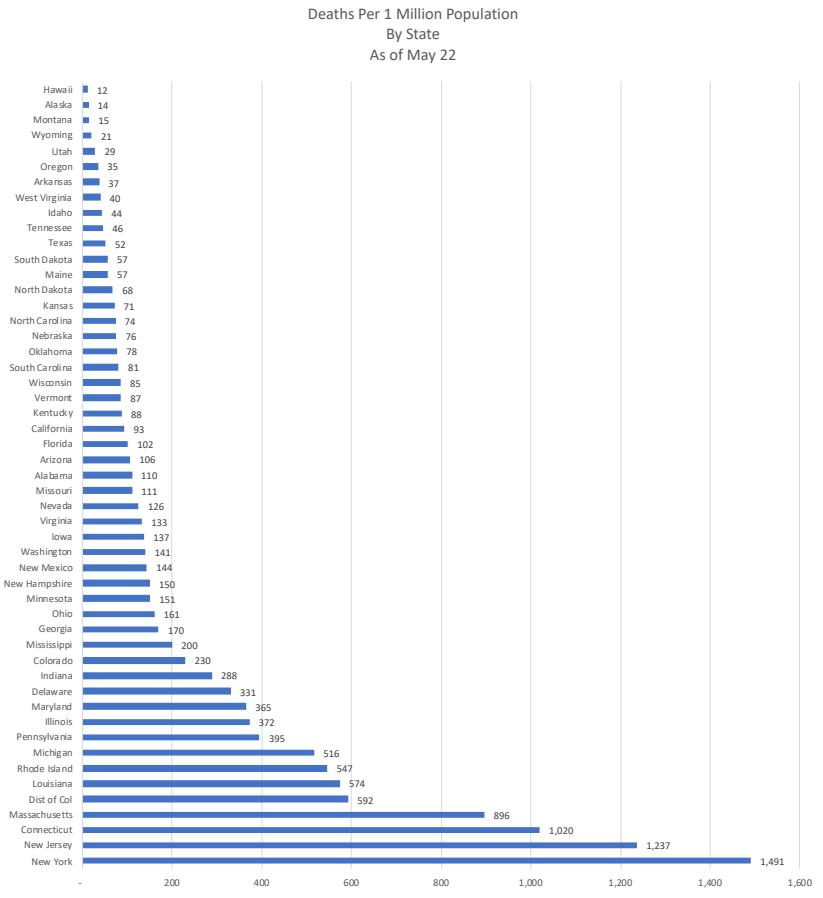


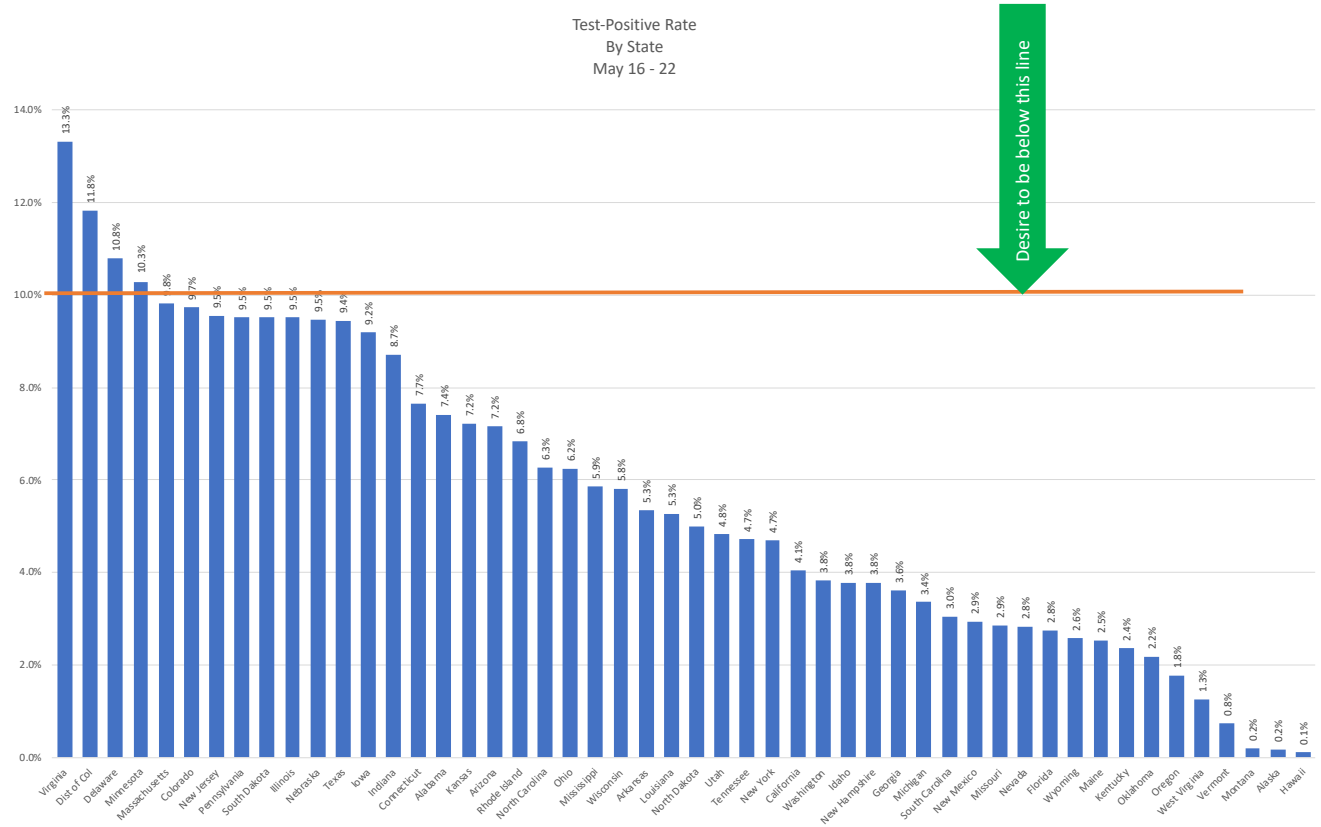


State-by-State

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 3 states and the District of Columbia effectively met this guideline for the past week.



MONITORING THE IMPACT OF RELAXING RESTRICTIONS

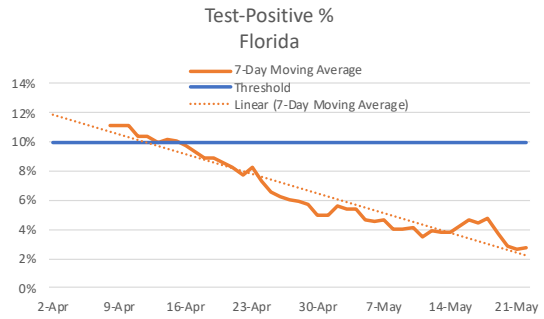
State-By-State

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 has experienced two consecutive days with significant new infections. Test-positive and new infection rates, however, in all three states remain relatively low.



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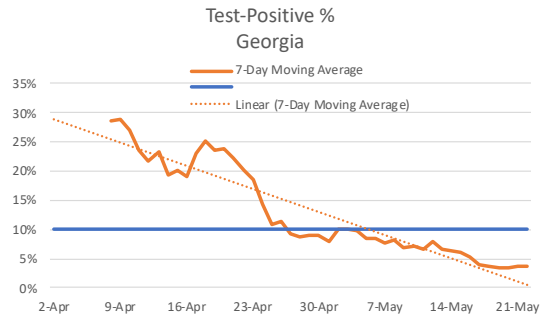

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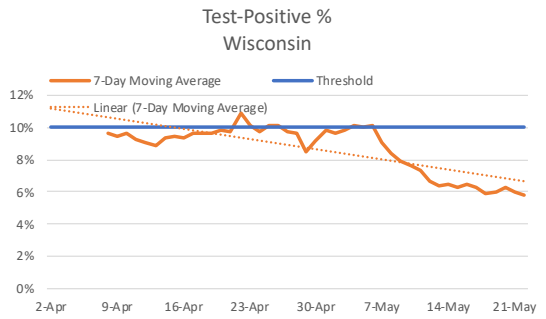

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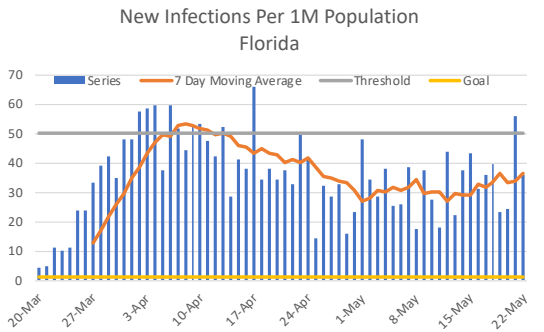

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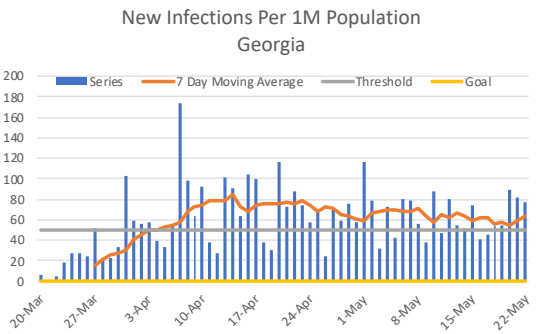
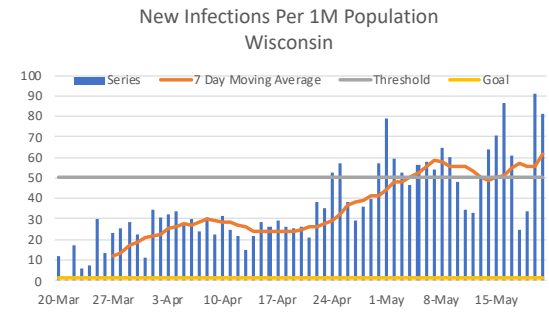


© Health Industry Advisor LLC analysis, using data from World Health Organization



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VIRUS PROGRESSION: ROADMAP TO RECOVERY

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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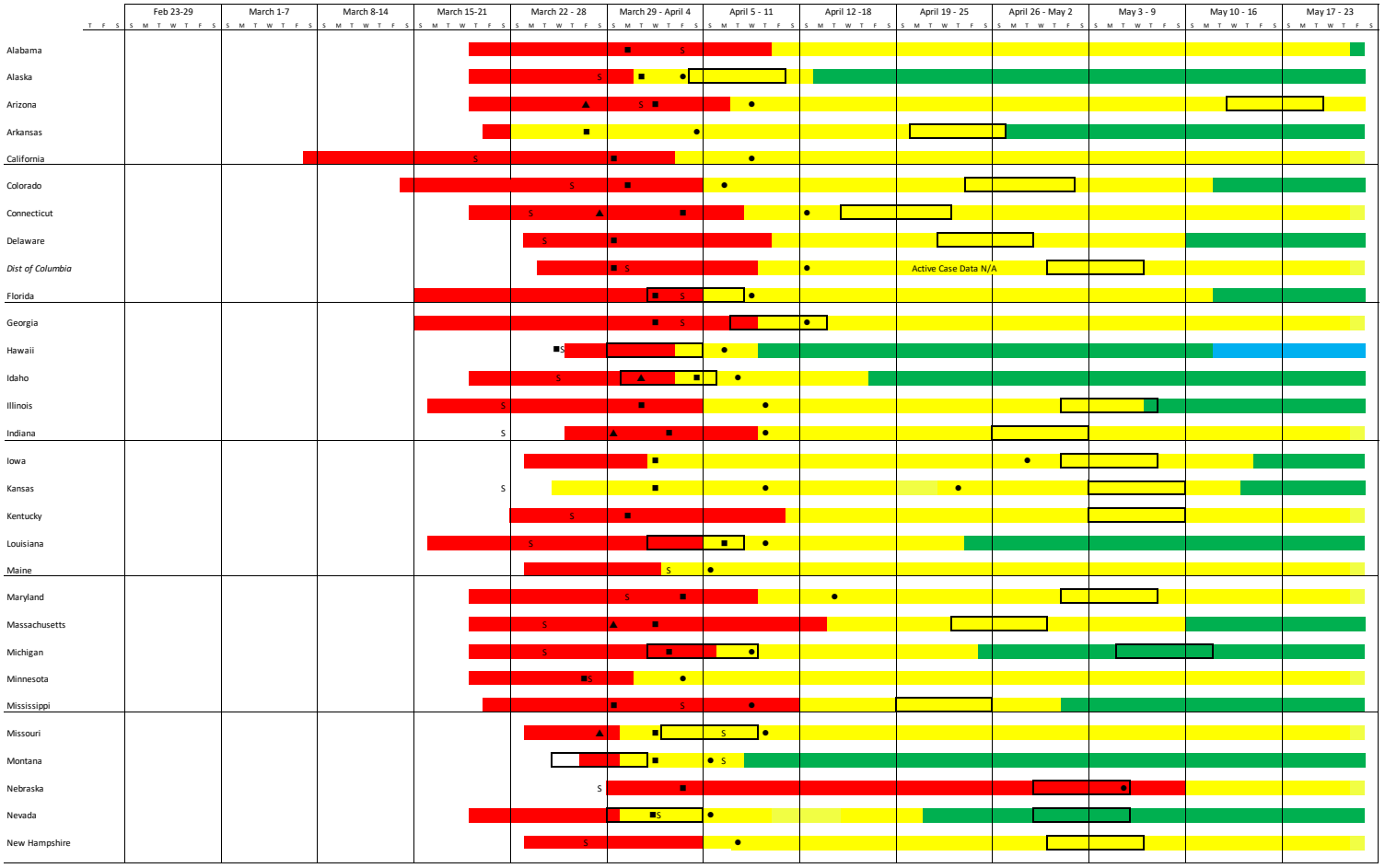

Legend on following page

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State-by-State

Virus Progression – *2 of 2*

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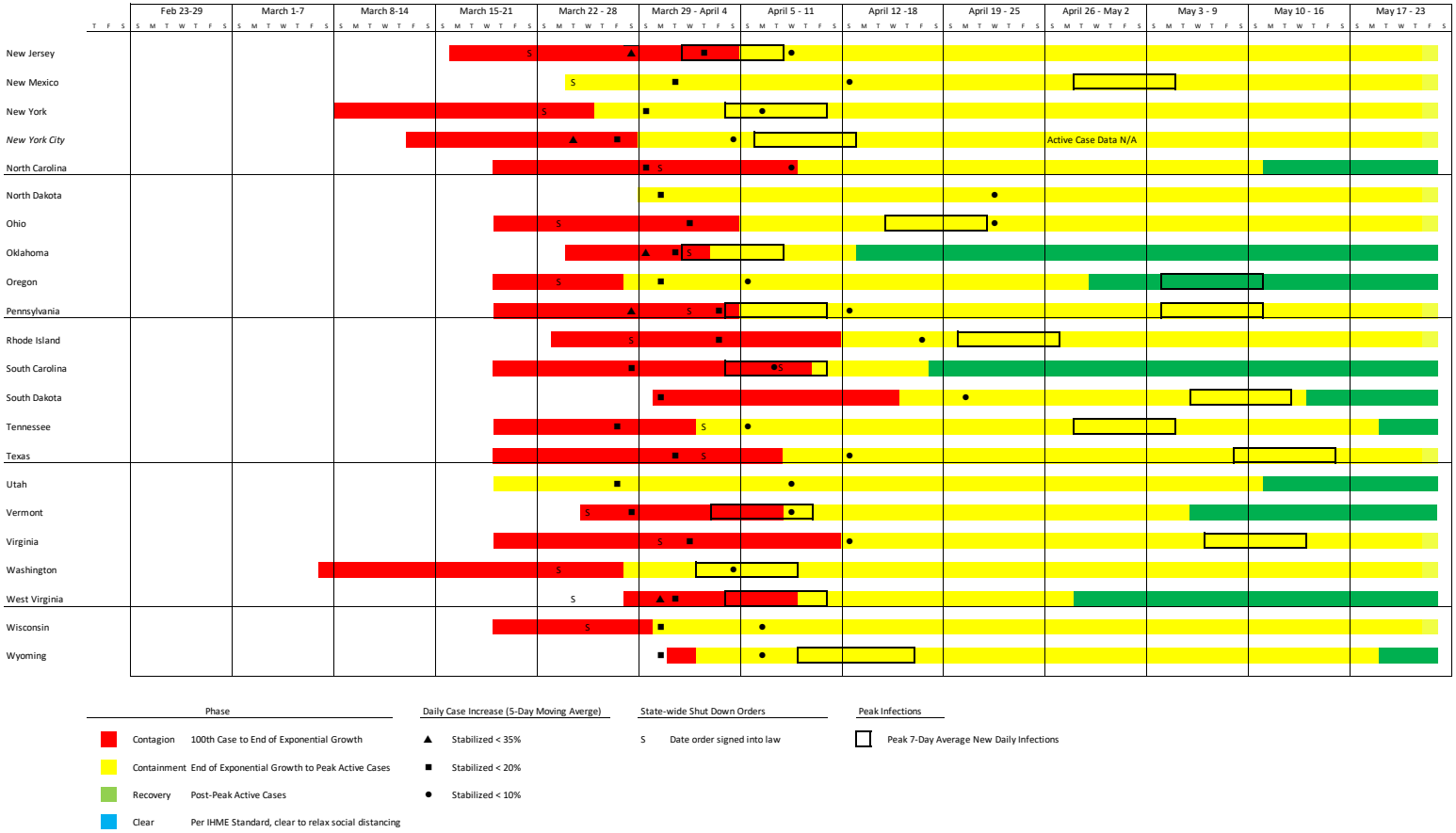

UNDER-REPORTED RECOVERIES? POSSIBLE LAG IN STATE REPORTING

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United States

Recoveries

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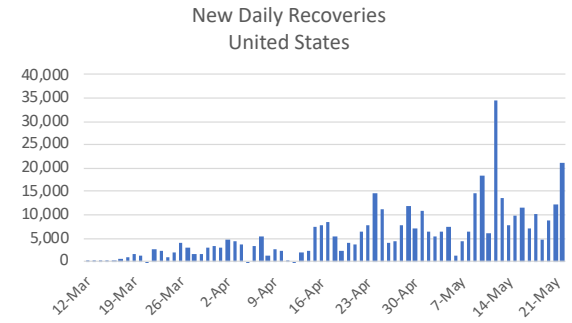

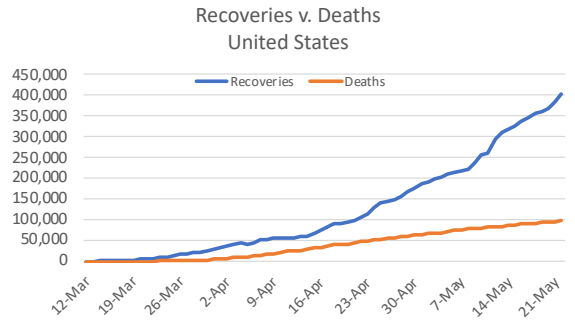

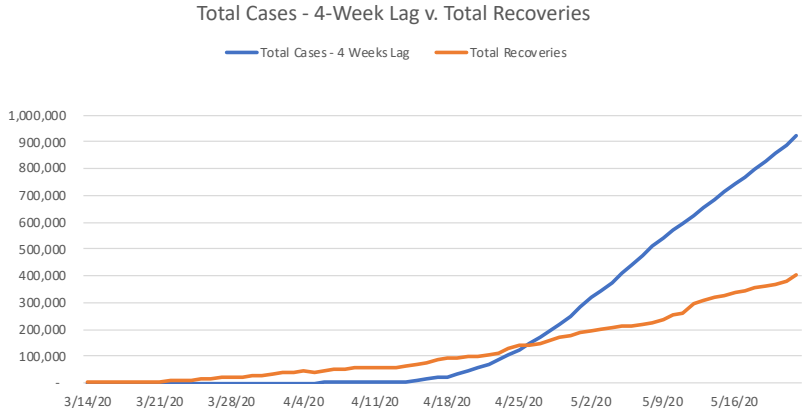

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Recoveries

Reporting of Recoveries Seems to Be Lagging

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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 ~340-430k

State	Recoveries	Expected Recoveries Low	High
Alabama	7,951	4,821	5,423
Alaska	356	271	305
Arizona	70	4,836	5,441
Arkansas	4,029	2,248	2,529
California	17,010	32,650	36,731
Colorado	1,491	9,805	11,030
Connecticut	6,264	19,137	21,529
Delaware	4,296	2,754	3,098
District Of Columbia	1,069	2,822	3,175
Florida	7,638	24,426	27,480
Georgia	697	17,993	20,242
Hawaii	585	481	541
Idaho	1,379	1,496	1,683
Illinois	3,353	31,726	35,692
Indiana	1,954	10,944	12,312
Iowa	9,161	3,556	4,001
Kansas	2,855	2,364	2,660
Kentucky	3,069	3,023	3,401
Louisiana	26,249	20,912	23,526
Maine	1,192	772	869
Maryland	3,243	13,293	14,954
Massachusetts	32,549	40,775	45,872
Michigan	28,234	29,313	32,977
Minnesota	12,696	2,548	2,867
Mississippi	7,681	4,347	4,891
Missouri	2,965	5,355	6,025

State	Recoveries	Expected Recoveries Low	High
Montana	441	355	400
Nebraska	349	1,937	2,179
Nevada	5,039	3,518	3,958
New Hampshire	2,082	1,376	1,548
New Jersey	9,299	81,757	91,976
New Mexico	2,149	2,017	2,269
New York	63,360	221,956	249,701
North Carolina	11,637	6,600	7,425
North Dakota	1,405	598	673
Ohio	5,334	12,135	13,652
Oklahoma	4,533	2,497	2,809
Oregon	1,894	1,742	1,959
Pennsylvania	7,371	32,119	36,134
Rhode Island	1,084	5,359	6,029
South Carolina	6,043	4,056	4,563
South Dakota	3,267	1,632	1,836
Tennessee	12,566	6,981	7,853
Texas	32,277	18,536	20,853
Utah	4,596	3,026	3,404
Vermont	834	662	744
Virginia	4,963	9,275	10,435
Washington	5,353	10,541	11,858
West Virginia	977	808	909
Wisconsin	8,349	4,285	4,820
Wyoming	551	378	426
	-	-	-
United States	403,201	740,186	832,709

* - 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

U.S. COUNTY-BY-COUNTY INFORMATION

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U.S. County-By-County

Case and Death Information By County and Cities Not In A County

- On the following pages, case and death information[1] is presented by county/municipality in the United States
  - New York case and death information are reported on a combined basis for Bronx, Kings, New York, Queens and Richmond counties
  - Cities that are not otherwise part of a county are listed separately
- Counties are grouped according to the 2013 Rural/Urban classification from Center for Disease Control, "NCHS Urban-Rural Classification Scheme for Counties"[3]:
  - **Large Central Metro Areas** – Located in MSA of 1 million population that: 1) contain the entire population of the largest principal city of the MSA, or 2) are completely contained within the largest principal city of the MSA, or 3) contain at least 250,000 residents of any principal city in the MSA
  - **Large Fringe Metro Areas** – Located in in MSA of 1 million or more population
  - **Medium Metro Areas** – Located in in MSA of 250,000-999,999 population
  - **Small Metro Areas** – Located in MSAs of less than 250,000 population
  - **Micropolitan Areas** – Located in micropolitan statistical area
  - **Non-Core Areas** - not in micropolitan statistical areas data access website
- Population information is the 2019 official estimate from the US Census Bureau[2]

1. Data from The New York Times, based on reports from state and local health agencies. Accessed May 10-20, 2020
2. "Annual Estimates of the Resident Population for Counties in the United States: April 1, 2010 to July 1, 2019 (CO-EST2019-ANNRES)",Source: U.S. Census Bureau, Population Division, Release Date: March 2020. Accessed May 12, 2020
3. Urban-Rural Classification of counties from CDC's "NCHS Urban-Rural Classification Scheme for Counties". Accessed May 19, 2020

County-By-County

Counties/Municipalities Still Experiencing Increasing New Infection Rates

- Among Large Central Metro Areas, only four counties and one independent municipality are still experiencing increasing new daily infection rates:
  - Orange, CA
  - Hennepin, MN
  - Ramsey, MN
  - City of Richmond, VA
  - Milwaukee, WI
- On the following page, we present graphs depicting the trend in new daily infection rates for each of these areas.

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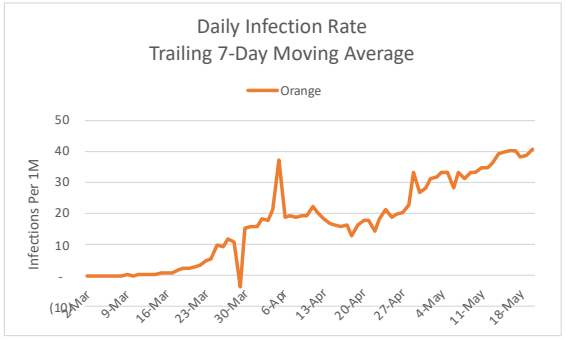
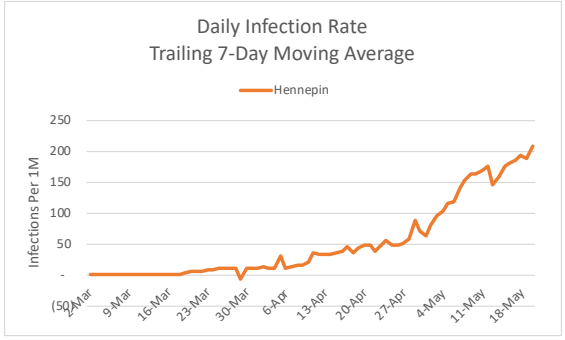
County-By-County

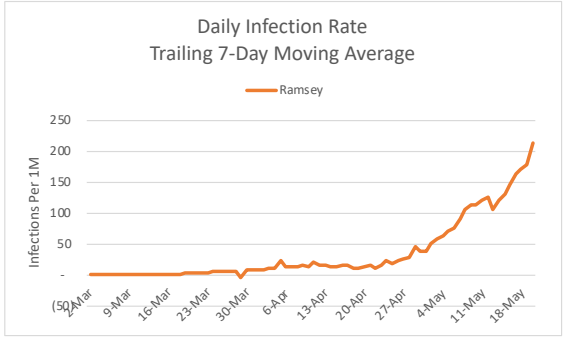
Counties/Municipalities Still Experiencing Increasing New Infection Rates

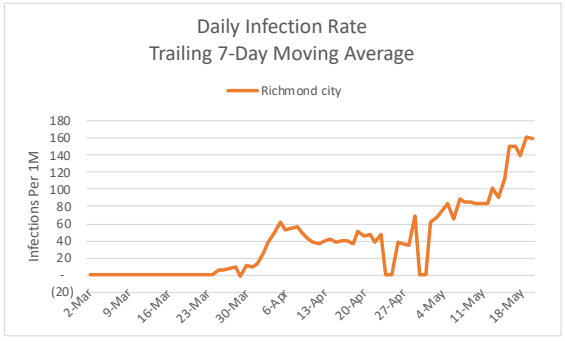
"Strategic Guidance in an Era of Unprecedented Change"

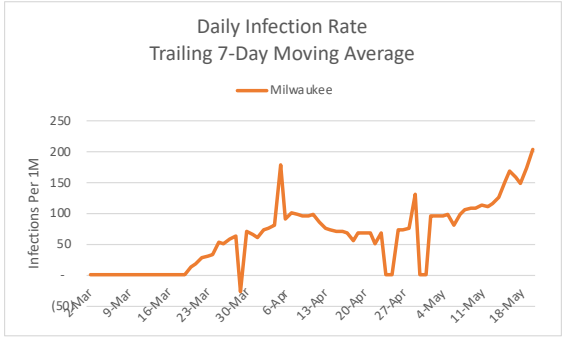
Large Central Metro Areas











County-By-County

Counties/Municipalities Still Experiencing Increasing New Infection Rates

- Among Large Fringe Metro Areas, 48 counties and independent municipalities are still experiencing increasing new daily infection rates:
- On the following 3 pages, we present graphs depicting the trend in new daily infection rates for the 18 of these 48 areas for which these rates >100 per per day million population for the past week:

County	State
Sussex	Virginia
Manassas Park city	Virginia
Culpeper	Virginia
Montgomery	Maryland
Tolland	Connecticut
Hunterdon	New Jersey
Fredericksburg city	Virginia
Anoka	Minnesota
Macon	Tennessee
Dakota	Minnesota
Petersburg city	Virginia
Walker	Alabama
Scott	Minnesota
Niagara	New York
New Castle	Delaware
Robertson	Tennessee
Loudoun	Virginia
Hopewell city	Virginia

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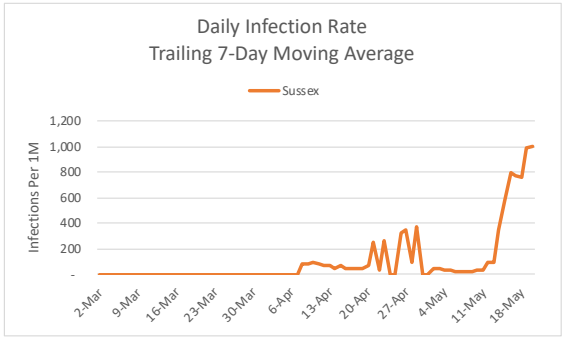
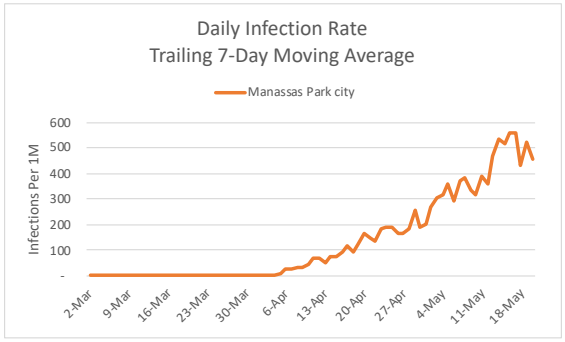
County-By-County

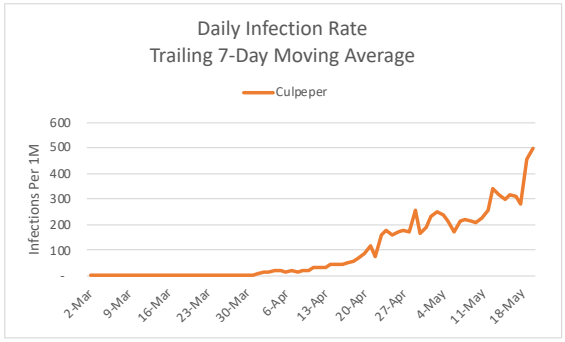
Counties/Municipalities Still Experiencing Increasing New Infection Rates

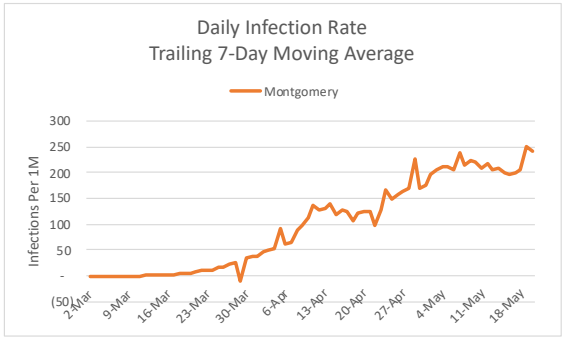
"Strategic Guidance in an Era of Unprecedented Change"

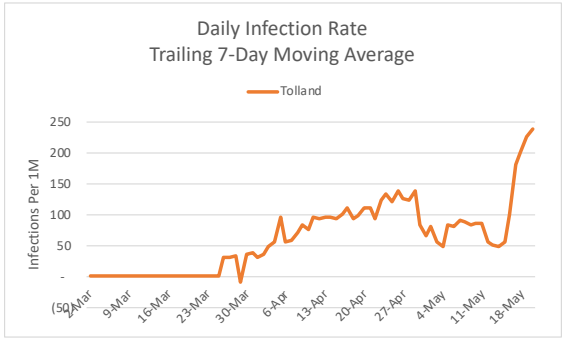
Large Fringe Metro Areas Ranked By Recent New Infection Rate 1 of 3

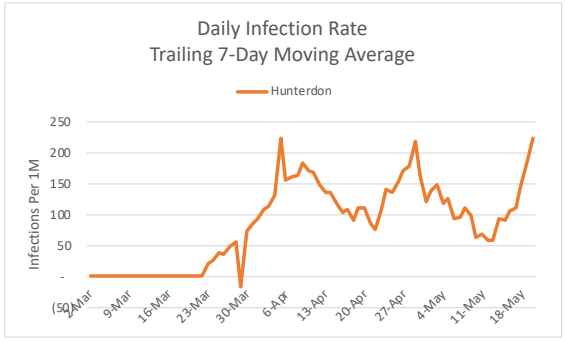












Includes only areas with new daily infection rates >100 per day per million population for past week

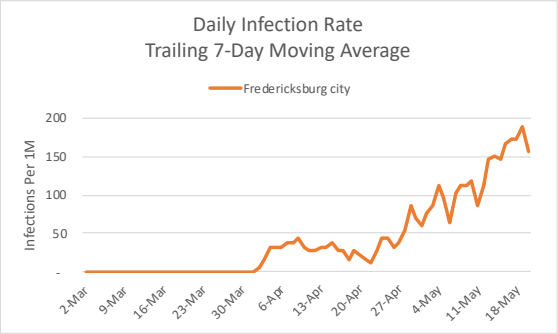
Health Industry Advisor, llc

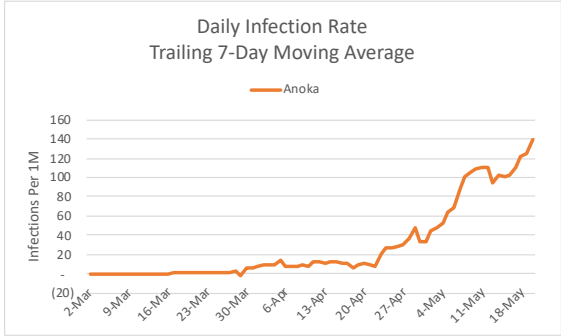
County-By-County

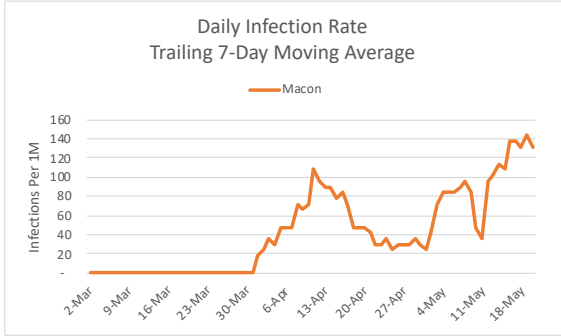
Counties/Municipalities Still Experiencing Increasing New Infection Rates

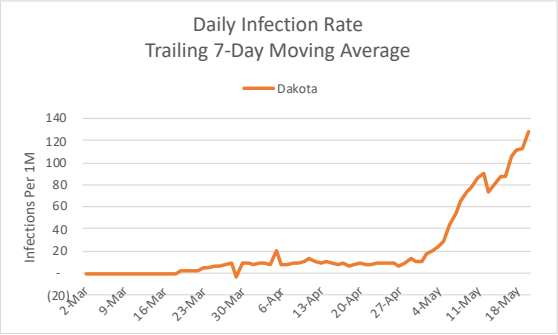
"Strategic Guidance in an Era of Unprecedented Change"

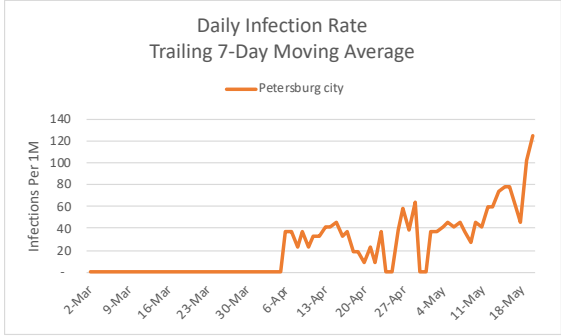
Large Fringe Metro Areas Ranked By Recent New Infection Rate 2 of 3

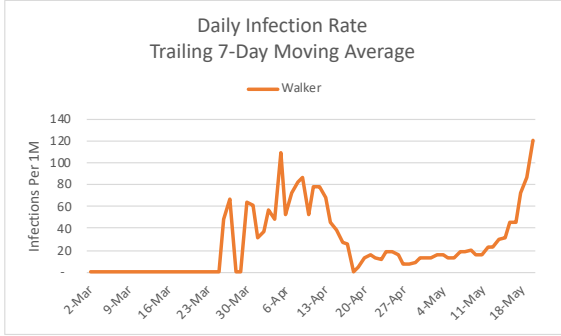












Includes only areas with new daily infection rates >100 per day per million population for past week

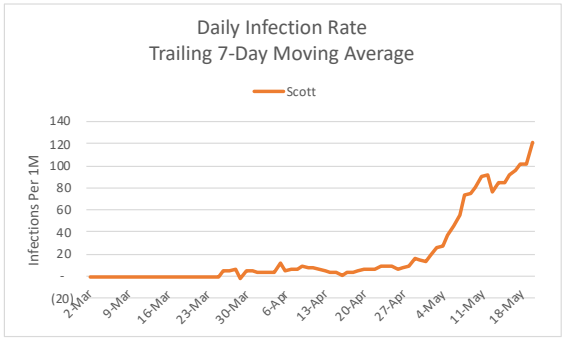
Health Industry Advisor, llc

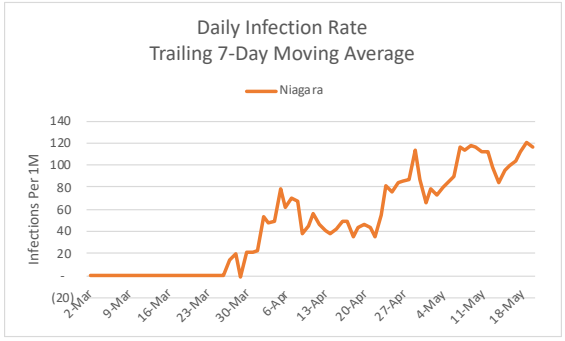
County-By-County

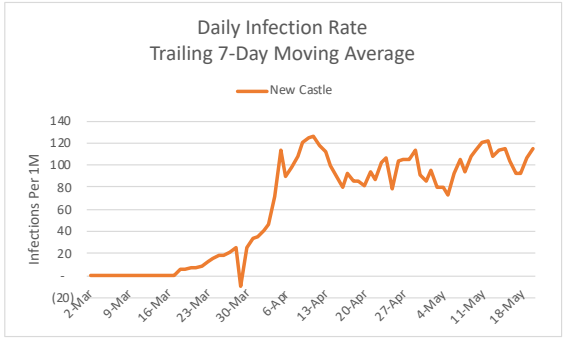
Counties/Municipalities Still Experiencing Increasing New Infection Rates

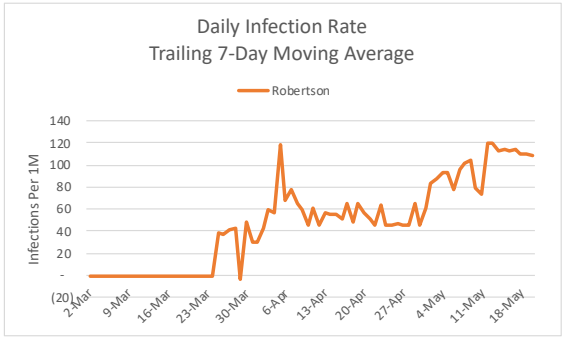
"Strategic Guidance in an Era of Unprecedented Change"

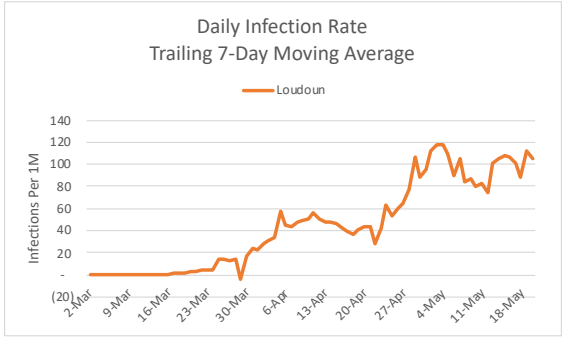
Large Fringe Metro Areas Ranked By Recent New Infection Rate 3 of 3

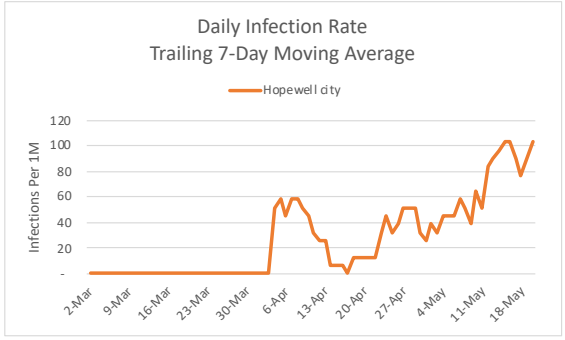












Includes only areas with new daily infection rates >100 per day per million population for past week

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"Strategic Guidance in an Era of Unprecedented Change"

County-By-County

Counties/Municipalities Still Experiencing Increasing New Infection Rates

- Among Medium Metro Areas, 55 counties and independent municipalities are still experiencing increasing new daily infection rates
- On the following 3 pages, we present graphs depicting the trend in new daily infection rates for the 17 of these 55 areas for which these rates >100 per per day million population for the past week:

County	State
Lowndes	Alabama
Fairfield	South Carolina
Acadia	Louisiana
Saluda	South Carolina
East Baton Rouge	Louisiana
Douglas	Nebraska
Montgomery	Alabama
Yadkin	North Carolina
Loudon	Tennessee
Martin	Florida
Elmore	Alabama
Worcester	Maryland
Forsyth	North Carolina
Autauga	Alabama
Warren	Iowa
Onondaga	New York
Burke	North Carolina

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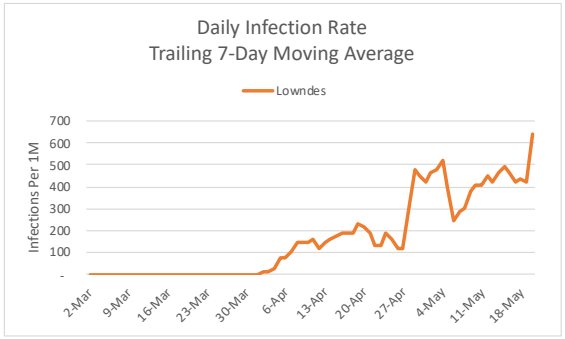
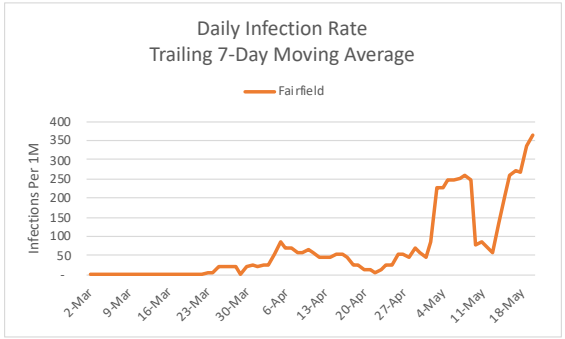
County-By-County

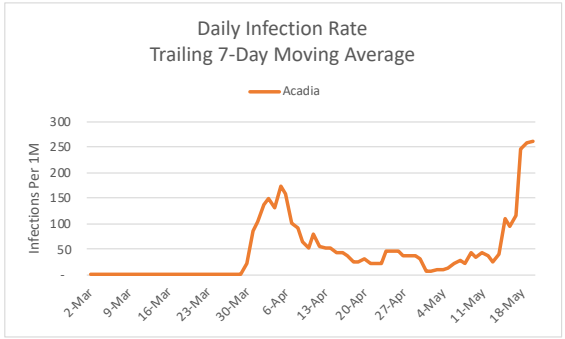
Counties/Municipalities Still Experiencing Increasing New Infection Rates

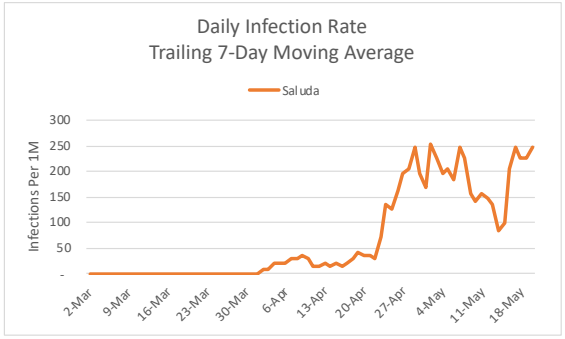
"Strategic Guidance in an Era of Unprecedented Change"

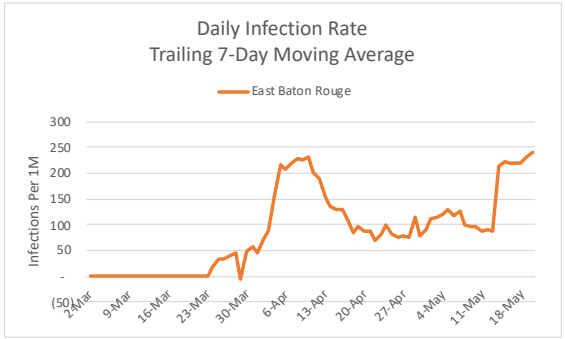
Medium Metro Areas
Ranked By Recent New Infection Rate
1 of 3

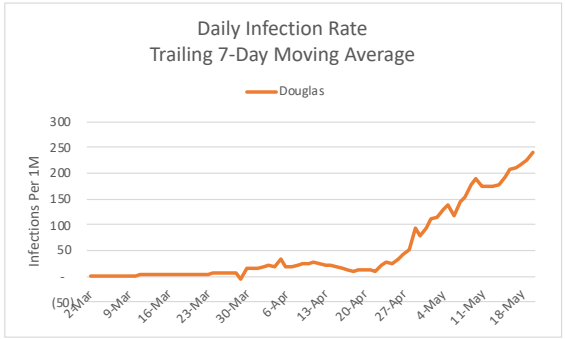












Includes only areas with new daily infection rates >100 per day per million population for past week

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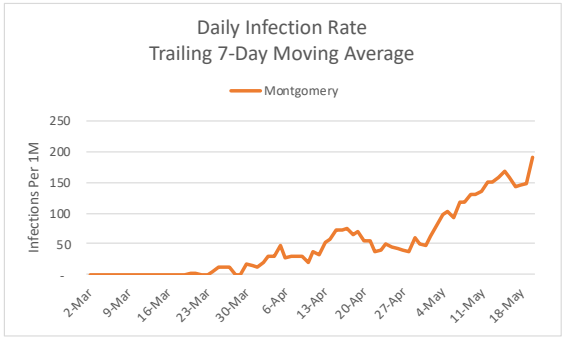
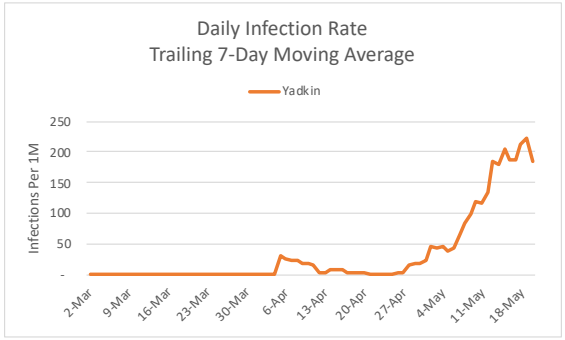
County-By-County

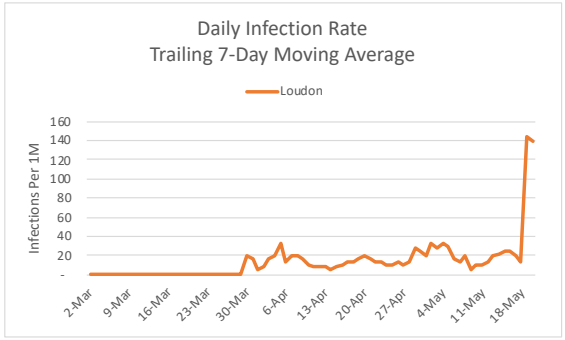
Counties/Municipalities Still Experiencing Increasing New Infection Rates

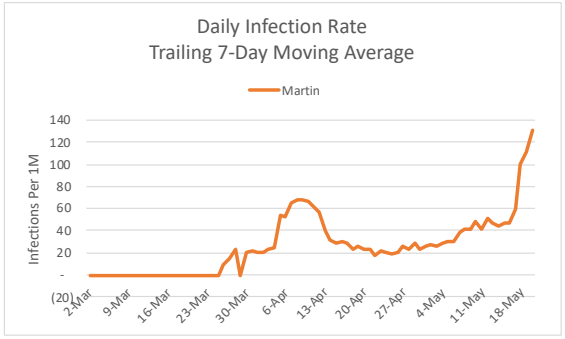
"Strategic Guidance in an Era of Unprecedented Change"

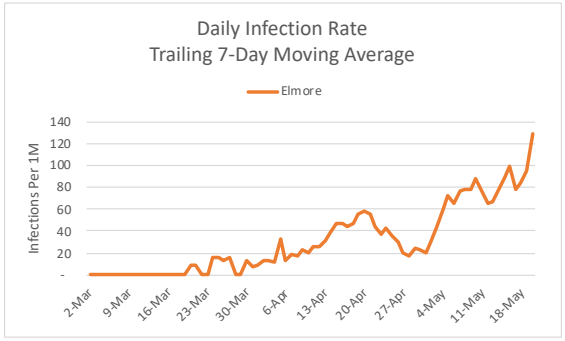
Medium Metro Areas
Ranked By Recent New Infection Rate
2 of 3

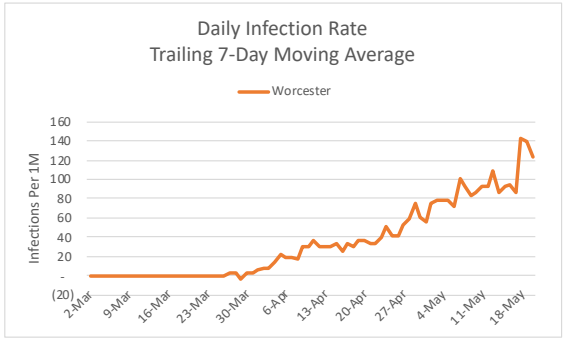












Includes only areas with new daily infection rates >100 per day per million population for past week

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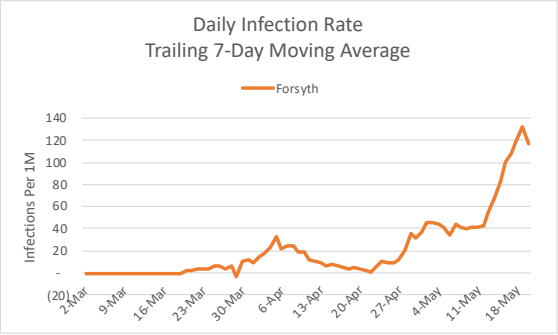
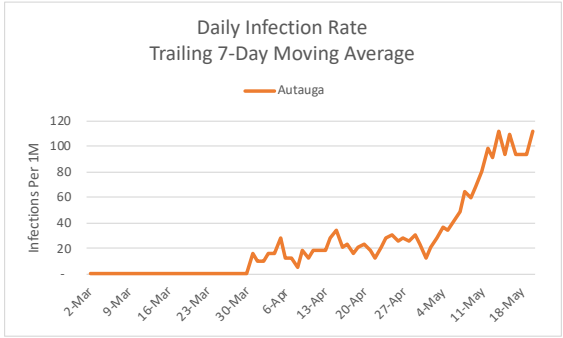
County-By-County

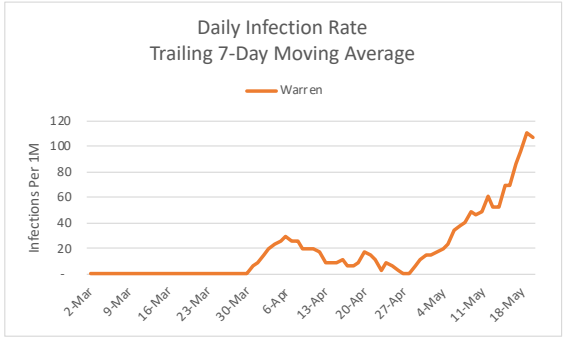
Counties/Municipalities Still Experiencing Increasing New Infection Rates

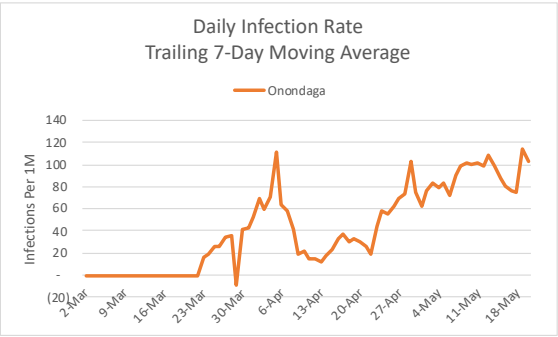
"Strategic Guidance in an Era of Unprecedented Change"

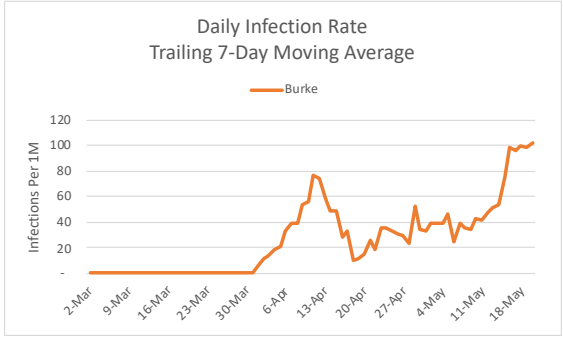
Medium Metro Areas
Ranked By Recent New Infection Rate
3 of 3











Includes only areas with new daily infection rates >100 per day per million population for past week

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"Strategic Guidance in an Era of Unprecedented Change"

County-By-County

Counties/Municipalities Still Experiencing Increasing New Infection Rates

- Among Small Metro Areas, 63 counties and independent municipalities are still experiencing increasing new daily infection rates
- On the following 4 pages, we present graphs depicting the trend in new daily infection rates for the 24 of these 55 areas for which these rates >100 per per day million population for the past week:

County	State
Echols	Georgia
Monroe	Georgia
Hale	Alabama
Imperial	California
Cass	North Dakota
Racine	Wisconsin
Jackson	Kansas
Howard	Nebraska
Coconino	Arizona
Winchester city	Virginia
Elkhart	Indiana
Yuma	Arizona
Rapides	Louisiana
Brantley	Georgia
Henry	Alabama
Darlington	South Carolina
Morton	North Dakota
Craven	North Carolina
Champaign	Illinois
Androscoggin	Maine
St. Mary's	Maryland
Lamar	Mississippi
Bowie	Texas
Olmsted	Minnesota

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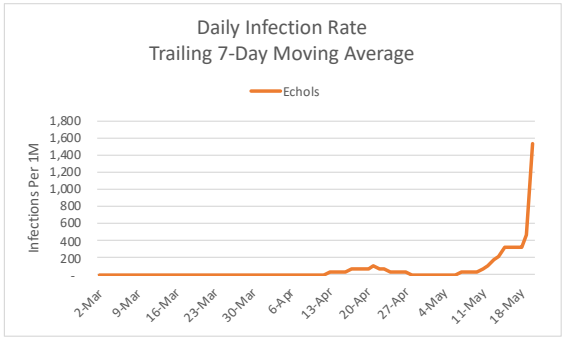
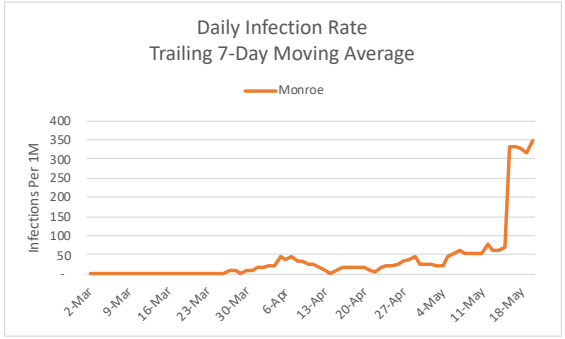
County-By-County

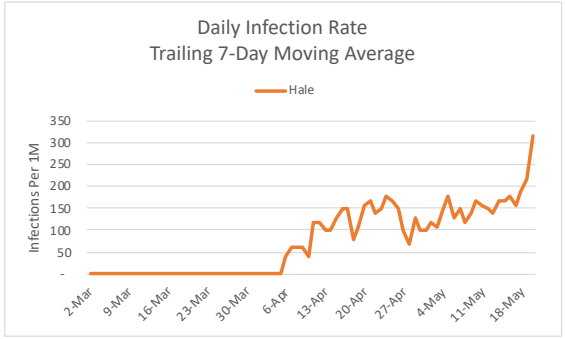
Counties/Municipalities Still Experiencing Increasing New Infection Rates

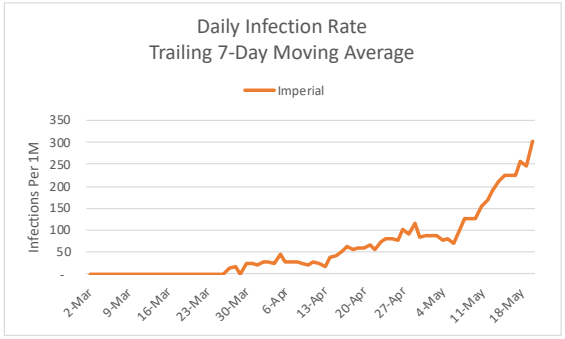
"Strategic Guidance in an Era of Unprecedented Change"

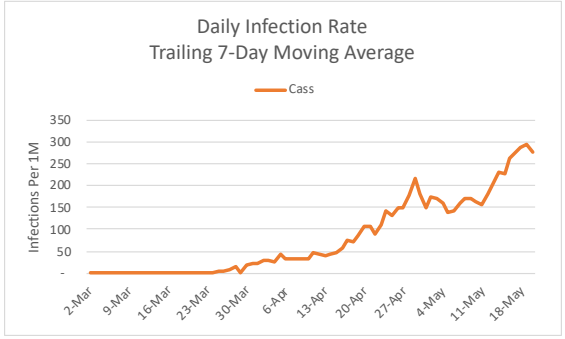
Small Metro Areas
Ranked By Recent New Infection Rate
1 of 4

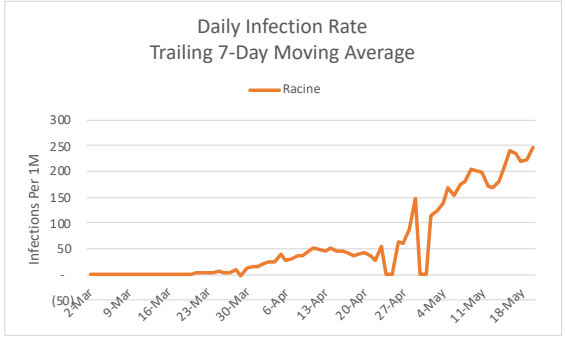












Includes only areas with new daily infection rates >100 per day per million population for past week

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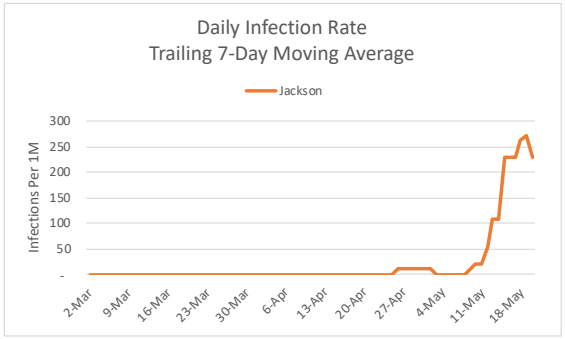
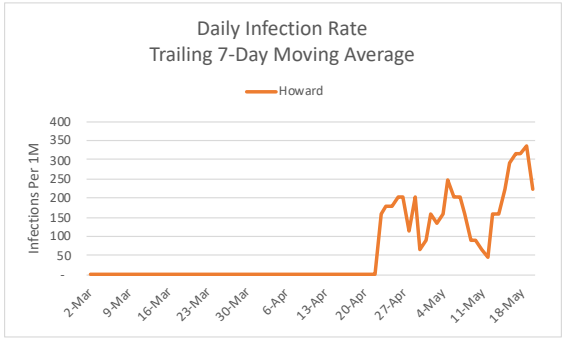
County-By-County

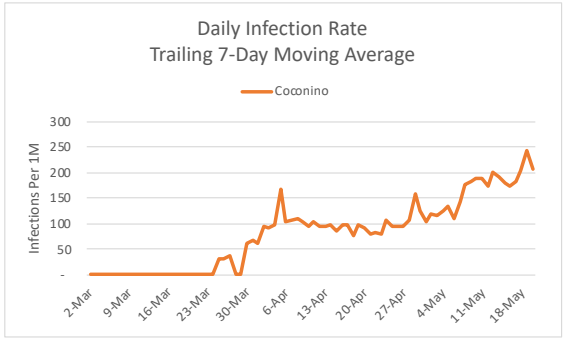
Counties/Municipalities Still Experiencing Increasing New Infection Rates

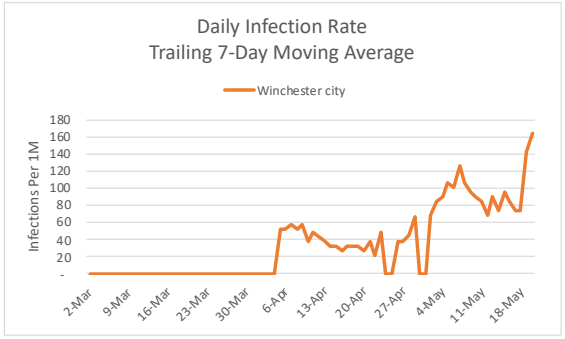
"Strategic Guidance in an Era of Unprecedented Change"

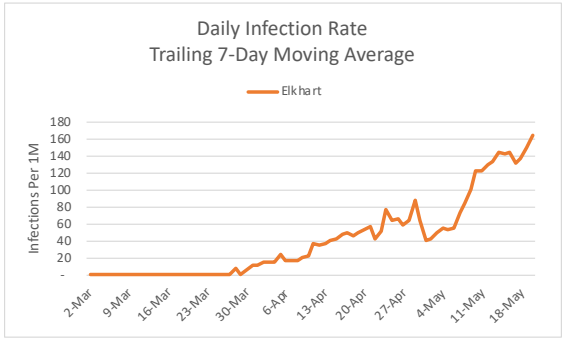
Small Metro Areas
Ranked By Recent New Infection Rate
2 of 4

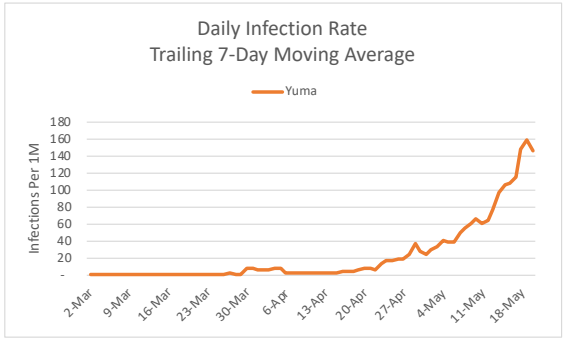












Includes only areas with new daily infection rates >100 per day per million population for past week

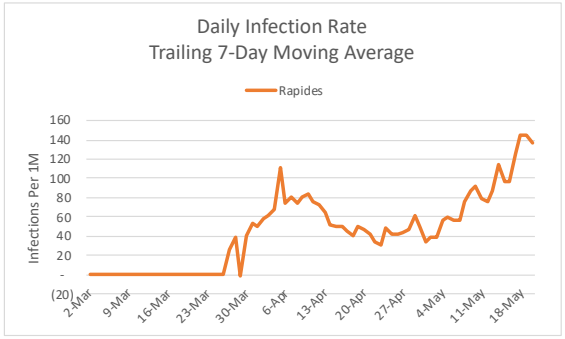
Health Industry Advisor, llc

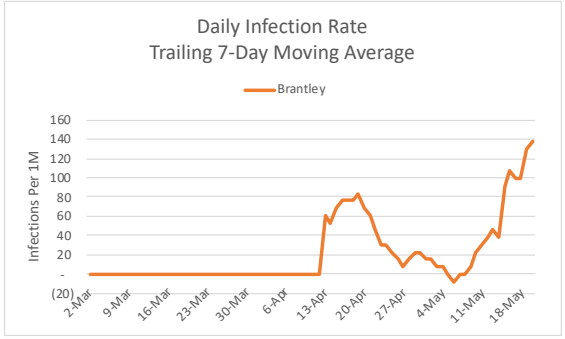
County-By-County

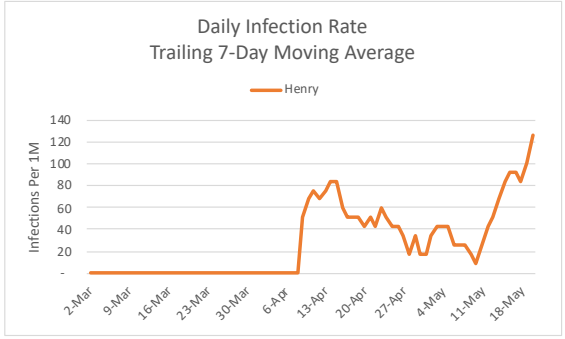
Counties/Municipalities Still Experiencing Increasing New Infection Rates

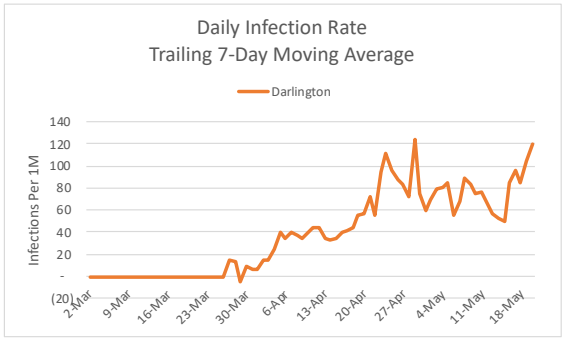
"Strategic Guidance in an Era of Unprecedented Change"

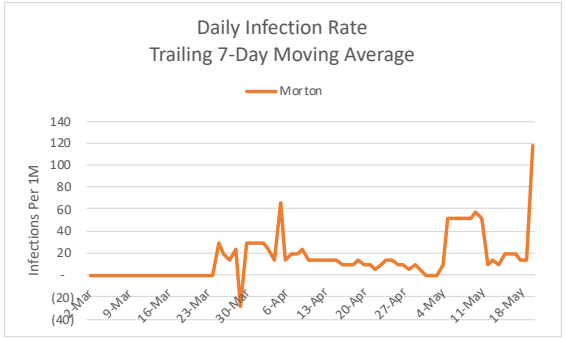
Small Metro Areas
Ranked By Recent New Infection Rate
3 of 4

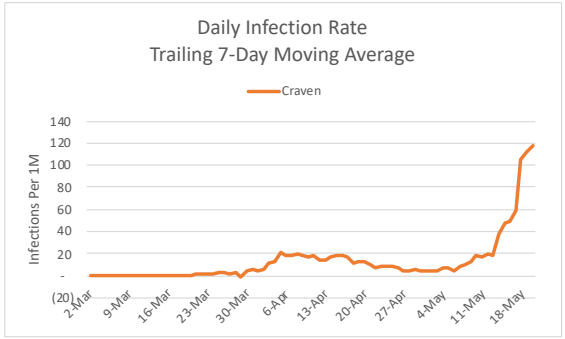












Includes only areas with new daily infection rates >100 per day per million population for past week

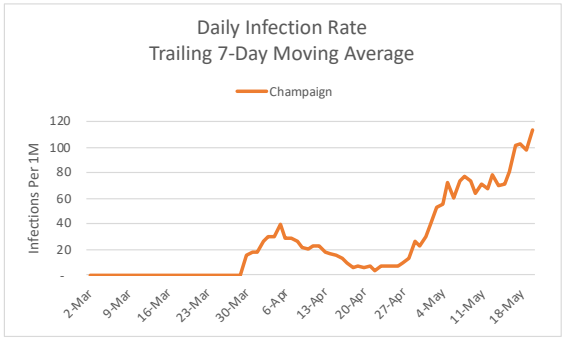
Health Industry Advisor, llc

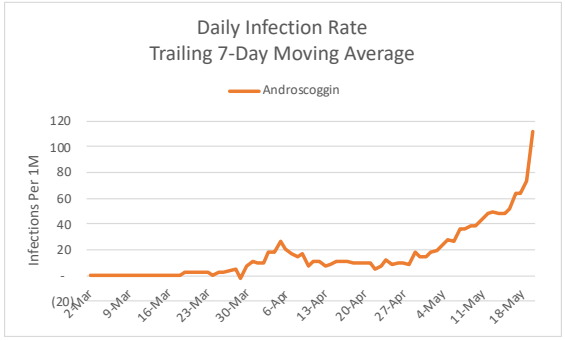
County-By-County

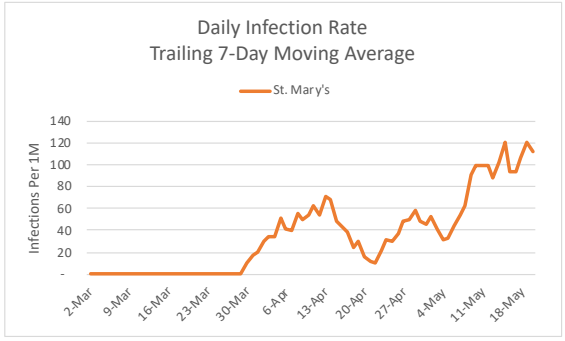
Counties/Municipalities Still Experiencing Increasing New Infection Rates

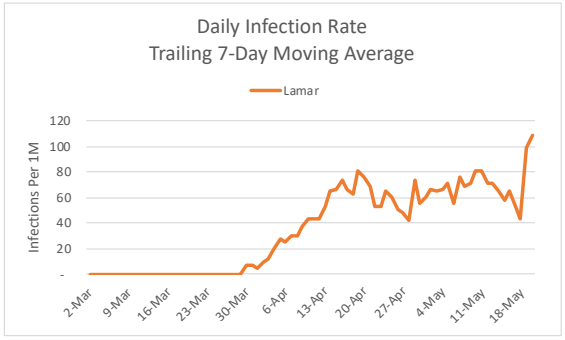
"Strategic Guidance in an Era of Unprecedented Change"

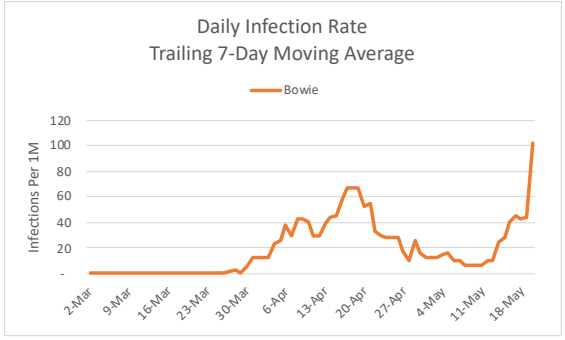
Small Metro Areas
Ranked By Recent New Infection Rate
4 of 4

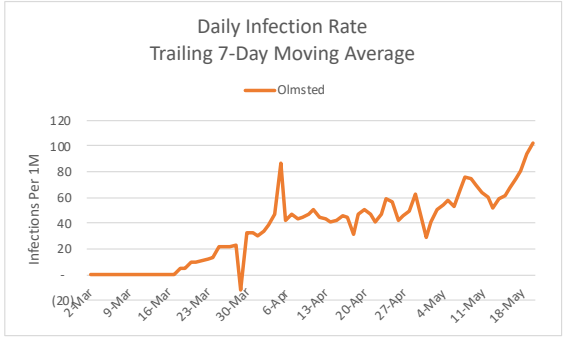












Includes only areas with new daily infection rates >100 per day per million population for past week