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Measure	Desired Change	Yesterday in the U.S.
No. of Tests	Increase	Up 4.0% (Cumulative)
Positive Test Rate	Decline	Down to 19.3% (from 19.5%)
No. of Cases	Plateau	Up 3.5%, rate continues to slow
% of Deaths Per Case	Decline	Steady at 5.3%
No. of Deaths / 1M Pop.	Plateau	Up to 112.6
Recoveries : Deaths	Increase (>1:1)	Steady at 1.75

We are tracking the 17 countries (and 20 of the top 23) with the most total coronavirus cases (India, Ireland and Peru - 17th, 18th and 19th in most cases, respectively, recently moved into this top group and, have not yet been included in our dataset). The 20 we are tracking represent 87.3% of all cases in the world. Additionally, we are tracking all fifty U.S. states, the District of Columbia and New York City.

Highlights from Sunday include:

- Recoveries were lower U.S. on Sunday (similar to last Sunday) at 2,900 - bringing the total number of persons having recovered from the virus to 71,187. For the week, recoveries of 38,553 were more than double last week (14,657). Given the World Health Organization's published guideline of expected recovery time, we continue to anticipate seeing an extended period of accelerating pace of recoveries.
- Total cases are more than 760,000 in the U.S., and 2.4 million globally. Still, case growth is slowing significantly across the U.S, except for Nebraska, North Dakota and South Dakota, which are experiencing double digit daily growth rates. Thirty four states now have daily growth rates of 5.5% or less.
- Idaho, Tennessee and Wyoming's active cases may have peaked on Thursday. Arkansas, Maine, Michigan, New Mexico, South Carolina, Texas and West Virginia reported their most active cases on Friday and then, fewer on both Saturday and Sunday. Washington's active cases on Saturday exceeded their previous high, recorded on April 11.
- South Dakota seems to have finally broken the exponential case growth trend in cases. Breaking this trend is a critical early step in containing the virus. Nebraska is the last remaining state to reach this milestone.
- New infections (cases) per 1 million population is the metric proposed by the Institute for Health Metrics and Evaluation (IHME) to determine an area's readiness to relax social distancing. Further, it may be one of the gating measures to be used in assessing whether states can begin to re-open. We introduce to this report this measure (on a 7-day moving average basis, to minimize weekend impacts on the data). Using this metric, only China and South Korea fall below IHME's threshold for relaxing social distancing (1 new infection per 1 million).

  New York has the highest rate among the U.S. states, at 395.7 - although this has already declined from a peak of 505.8 on April 10. Alaska, Hawaii and Montana are each under 10 per 1M. The U.S. in total is at 88.2, trending downward from its April 10 peak of 96.3.

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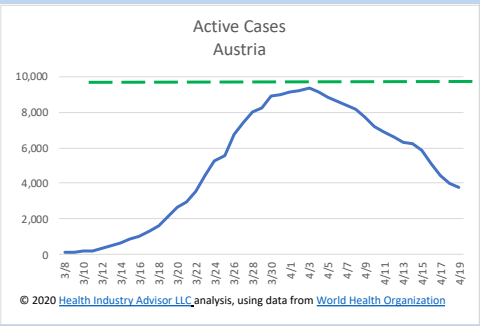
New Infection Rate Per Capita

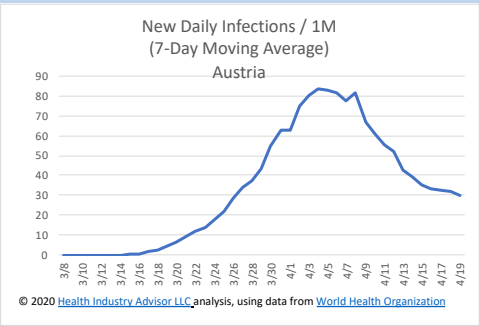
IHME Has Suggested A Standard of 1 New Infection Per 1M For Relaxing Social Distancing

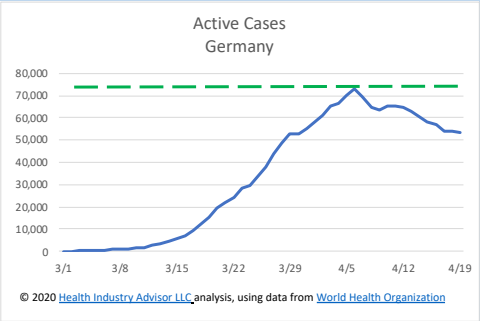
The Institute for Health Metrics and Evaluation (IHME) suggests that at 1 new infection per 1 million population "it may be possible to relax social distancing, assuming strategies for testing, contact tracing, isolation, and limitations on mass gathering are in place."

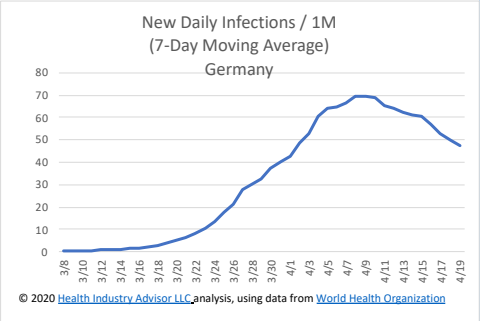
Several countries have already experienced peak in Active Cases and are progressing toward this the IHME standard for new infection rate; China and South Korea are already below the IHME standard.

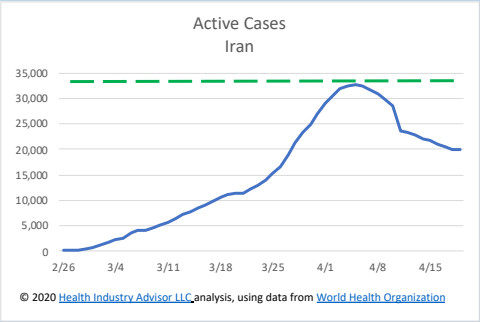
The following graphs depict Active Cases and New Daily Infections per 1Million (7-Day Moving Average) for those countries past peak Active Cases: Austria, Germany, Iran, Israel, South Korea and Switzerland (China not pictured):

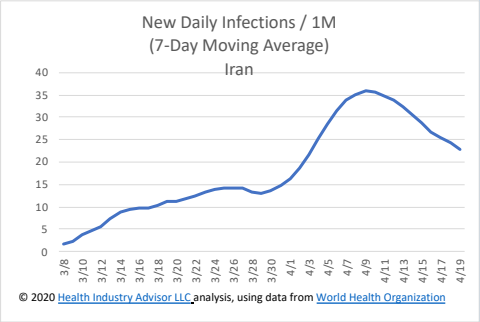












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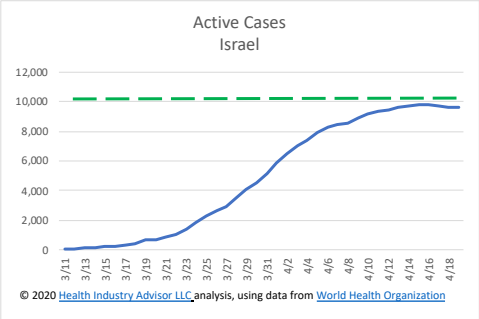

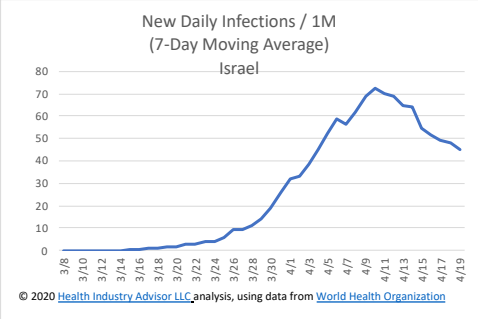

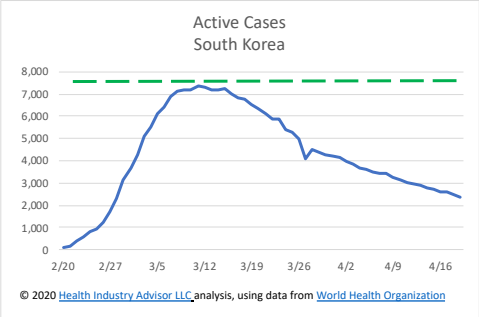

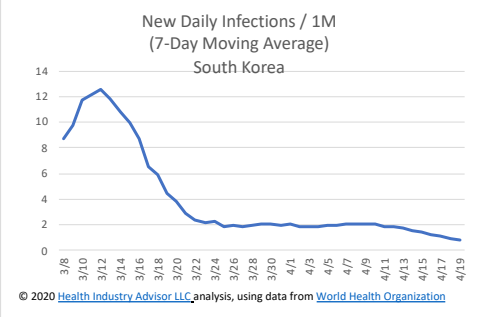

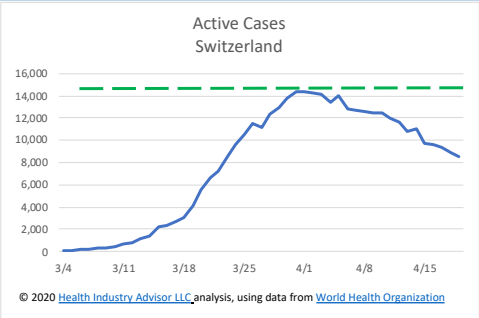

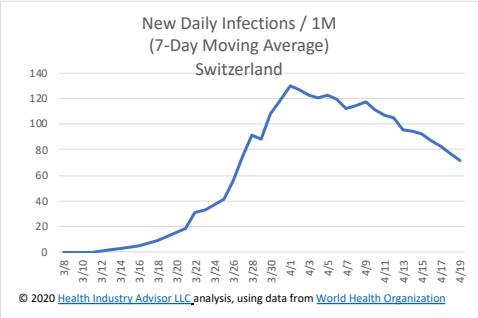

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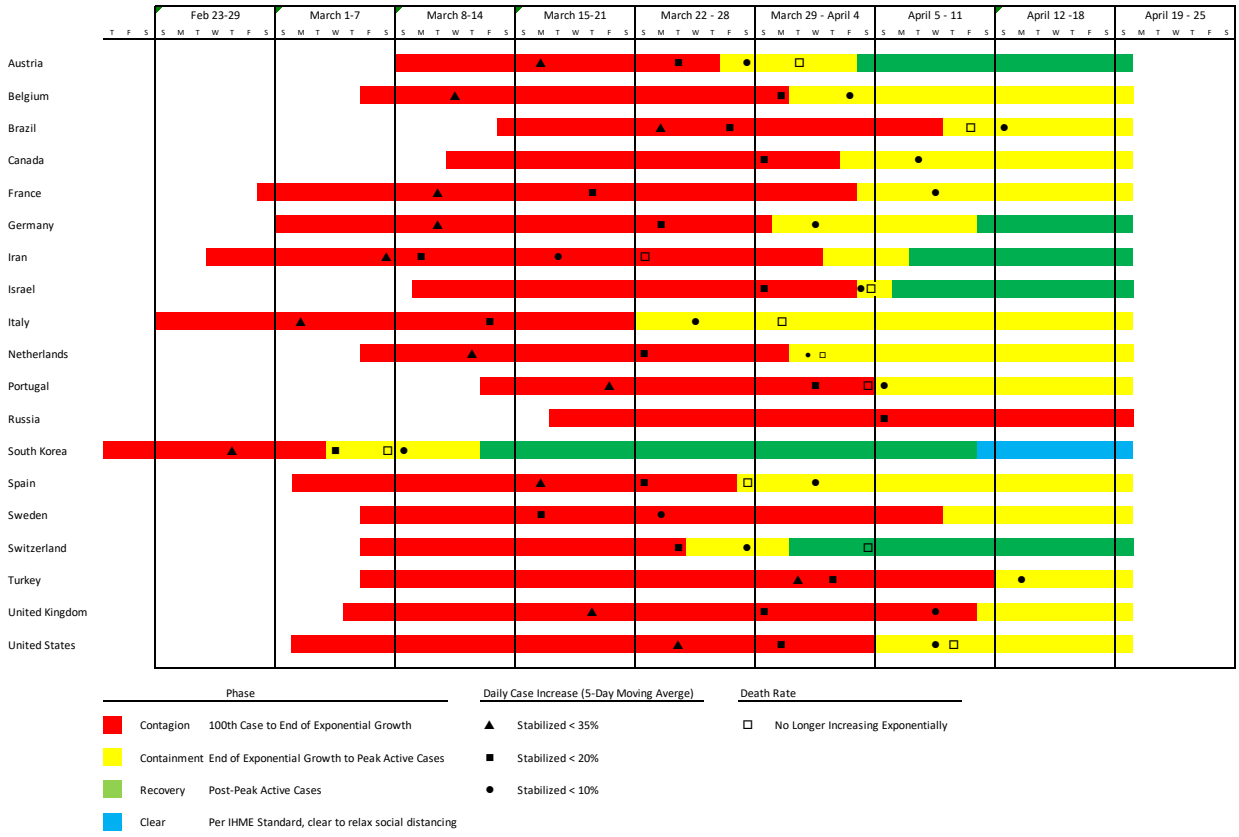
Virus Progression: Hardest Hit Countries

Hardest-Hit Countries Continue Progressing Toward Containment and Recovery; Only Russia Among These Countries Still Experiencing Exponential Growth; South Koreas Is Below IHME Standard for Relaxing Social Distancing

Austria, China (not pictured), Iran, Israel, South Korea and Switzerland are already in Recovery (past peak cases); only Russia is still experiencing exponential case growth.

The graphic illustrates in color 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.

Today we add a new stage to the chart - Clear – representing when the country's new infections per 1 million population falls below 1 - the threshold proposed by IHME for relaxing social distancing.



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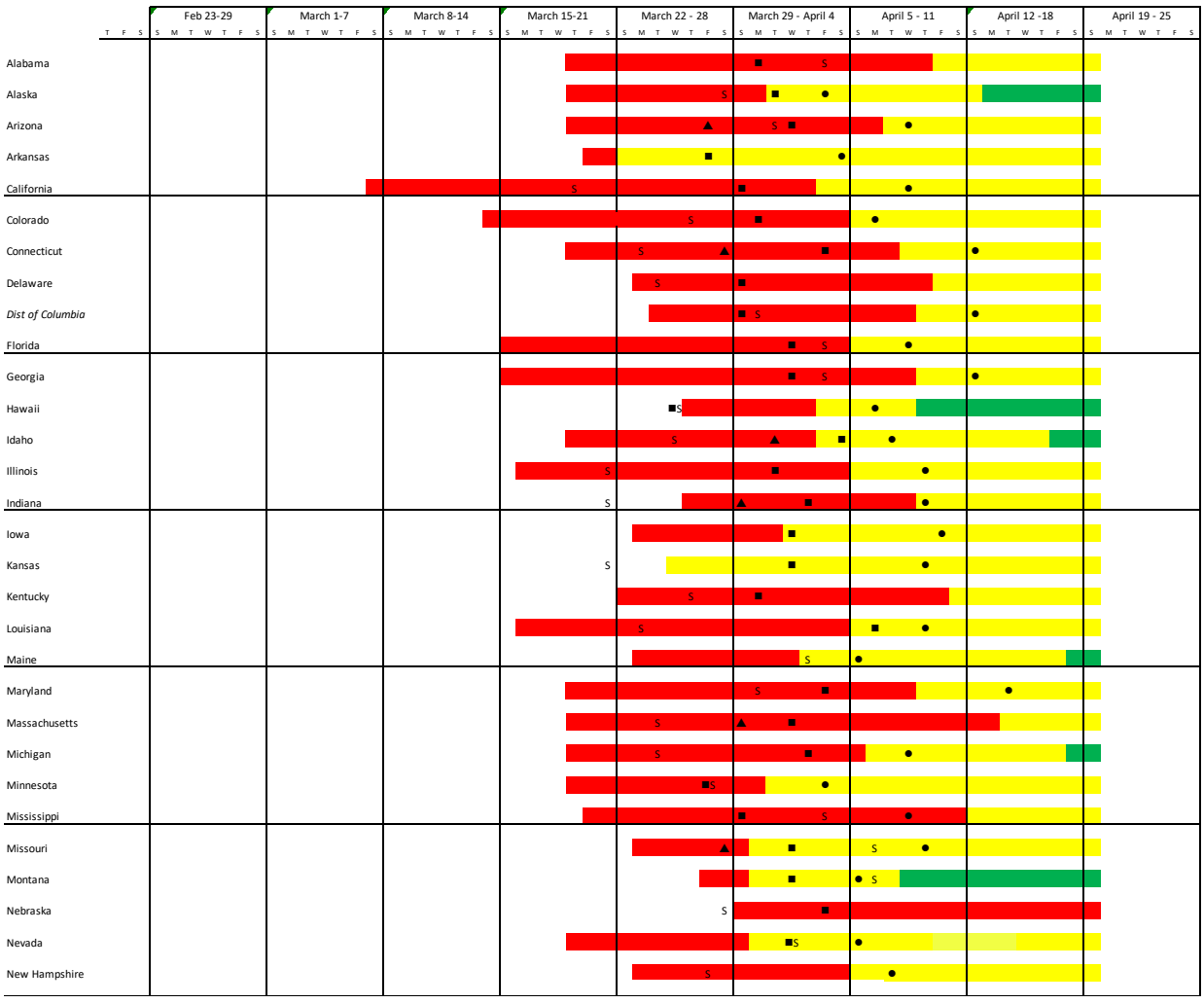
Virus Progression: US States, District of Columbia and New York City

The Majority of U.S. States are in Containment and Well on Their Way Toward Recovery

It now appears that South Dakota is no longer experiencing exponential case growth (shading changed from red to yellow). Only Nebraska has yet to demonstrably stop the exponential growth in cases. Maine, Michigan and Utah have gone two days since their previous peak in Active Cases. Iowa; Active Cases on Sunday surpassed their previous high mark.



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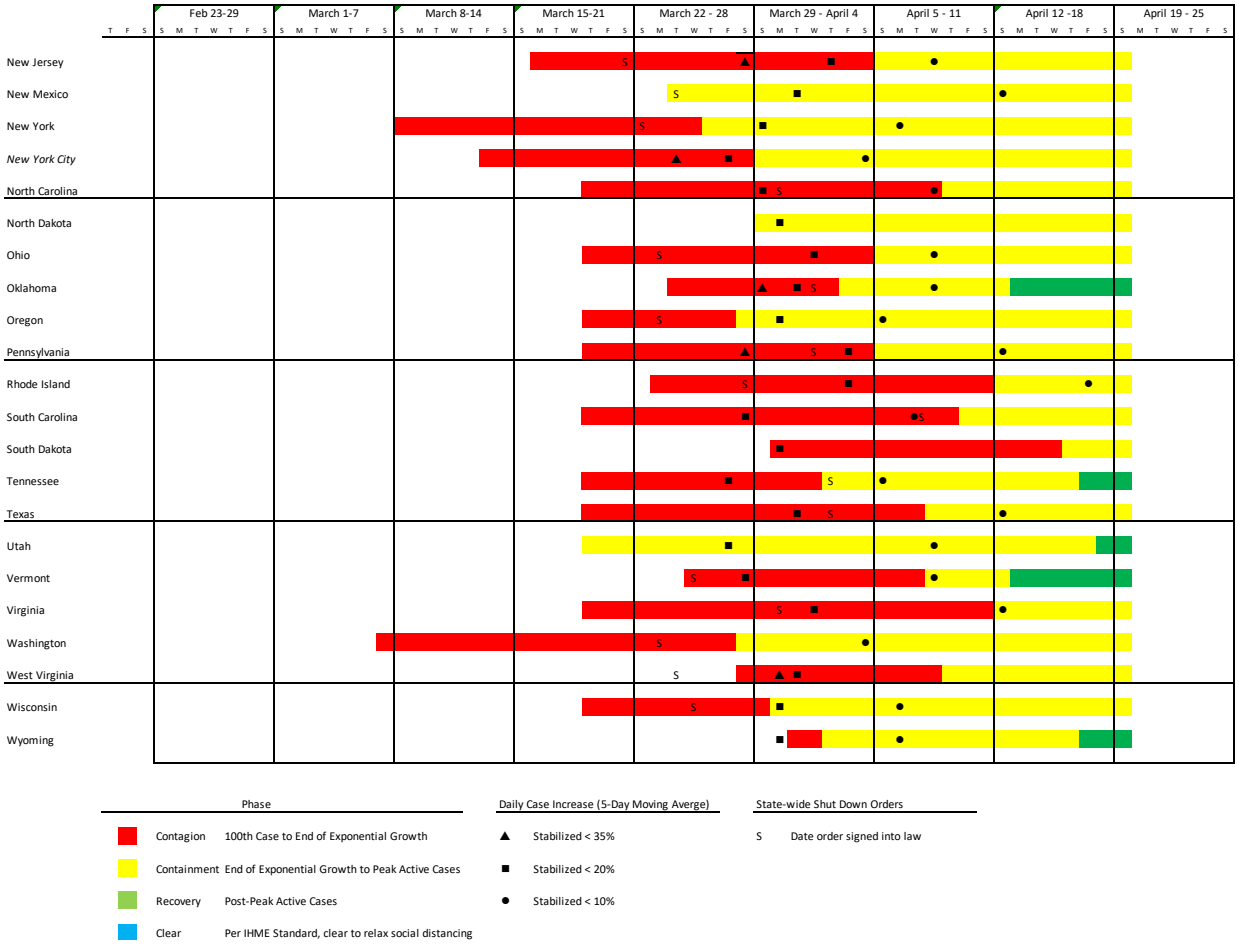

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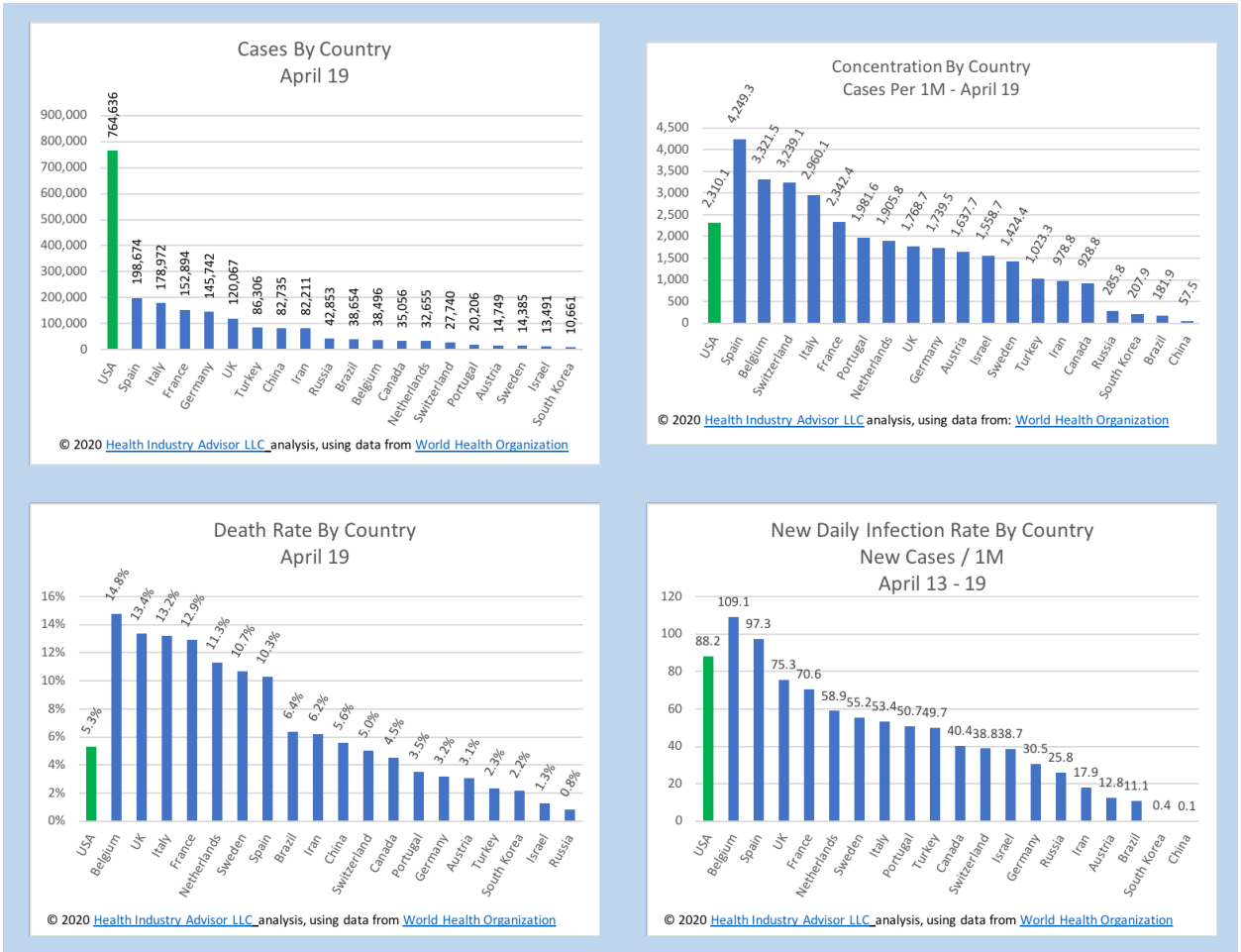
Global Statistics

The U.S Far Outpaces the World In Total Cases, is Now 6Th in Cases Per Capita (Falling Behind France Yesterday) and 11th in Death Rate. Case Growth is Falling In All of the Hardest-Hit Countries, Except Russia

Case growth continues to decline in most of the countries hardest-hit at during the first wave of virus spread. Russia continues to grow cases more quickly than most. India, Peru and Ireland are moving up the ranks of cases, now at 17th, 18th and 19th, respectively.

U.S. rankings against these countries, as of April 19:

Cases	Cases Per Capita	Death Rate	Tests Per Capita	Daily Infection Rate
1	6	11	11	3



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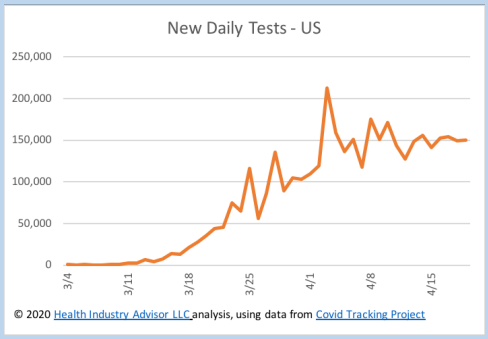
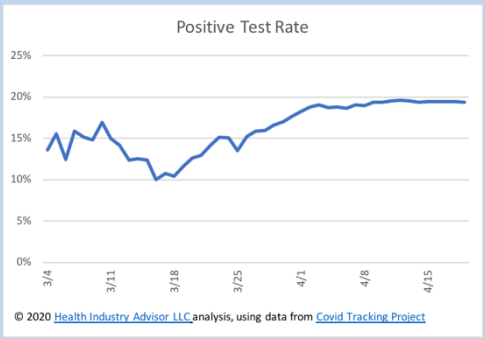
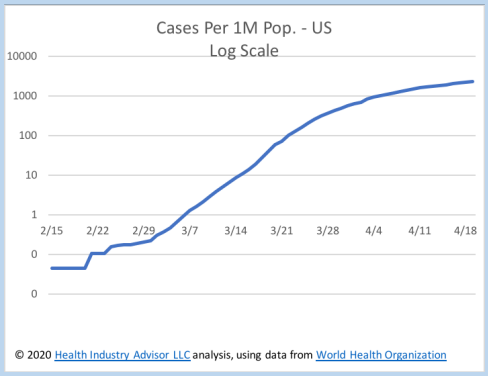
Cases and Death Rates in the U.S.

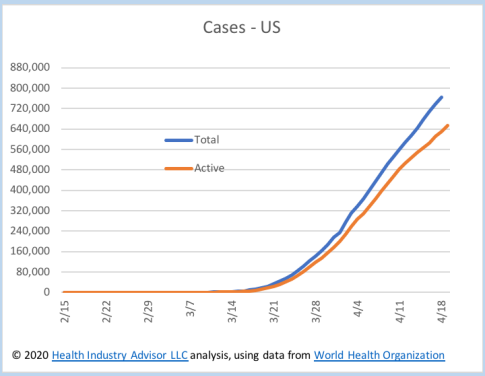
Case Growth, Testing and the Positive Test % Have Begun to Plateau in the U.S.; Recoveries Are Increasing, Resulting In Active Cases Starting to Fall off From Total Cases

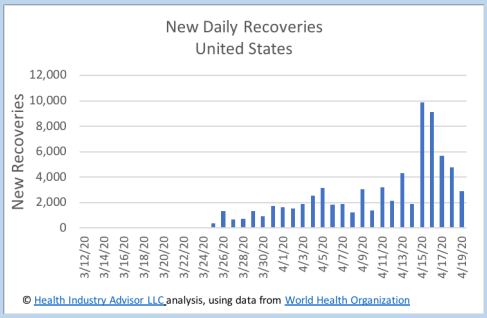
Cases in the U.S. are no longer growing at an expontential rate; active cases, however, have yet to peak. As infected persons begin to recover, active cases are beginning to separate from total cases.

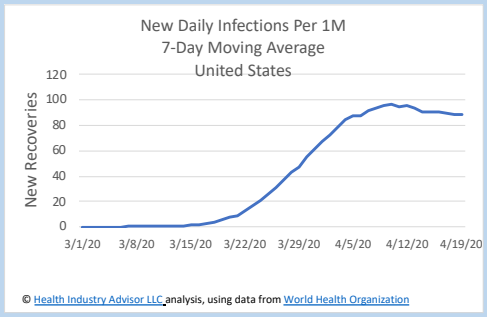












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Hardest-Hit States

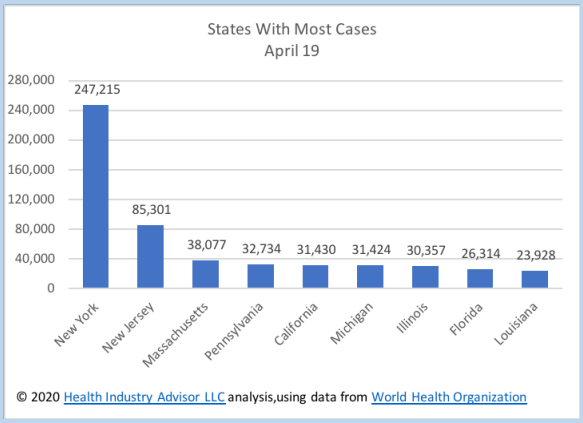
New York Has Experienced Far More Coronavirus Cases, and More Cases Per Capita Than Any State

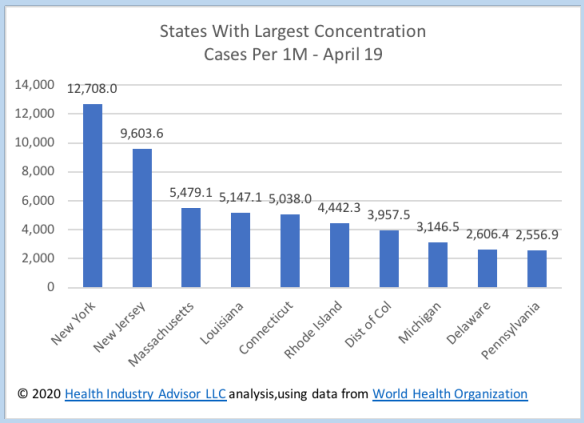
New York, which now has nearly 250,000 cases, represent 33.3% of all coronavirus cases in the U.S.; the top ten states account 74.1% of all cases and 81.0% of all deaths. New York by itself accounts for 45.1% of the deaths in the U.S.

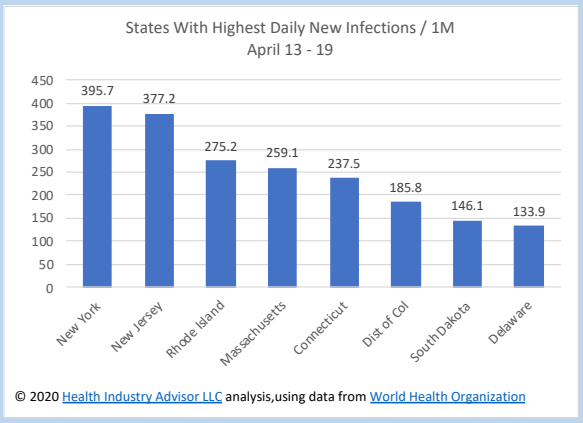
Cases per capita in New York, New Jersey, Louisiana Massachusetts, Connecticut and Rhode Island are greater than any of the hardest-hit countries in the world.

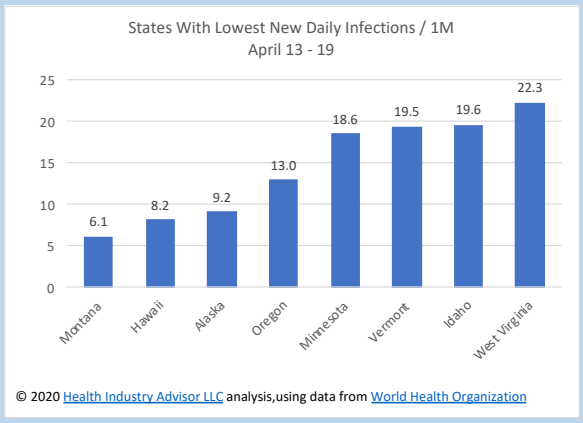
Michigan has the highest death rate (7.6%), followed by New York (7.4%), Connecticut (6.3%), and Minnesota (5.7%.).

New York and New Jersey have the highest rate of new daily infections; Montana, Hawaii and Alaska, the lowest.









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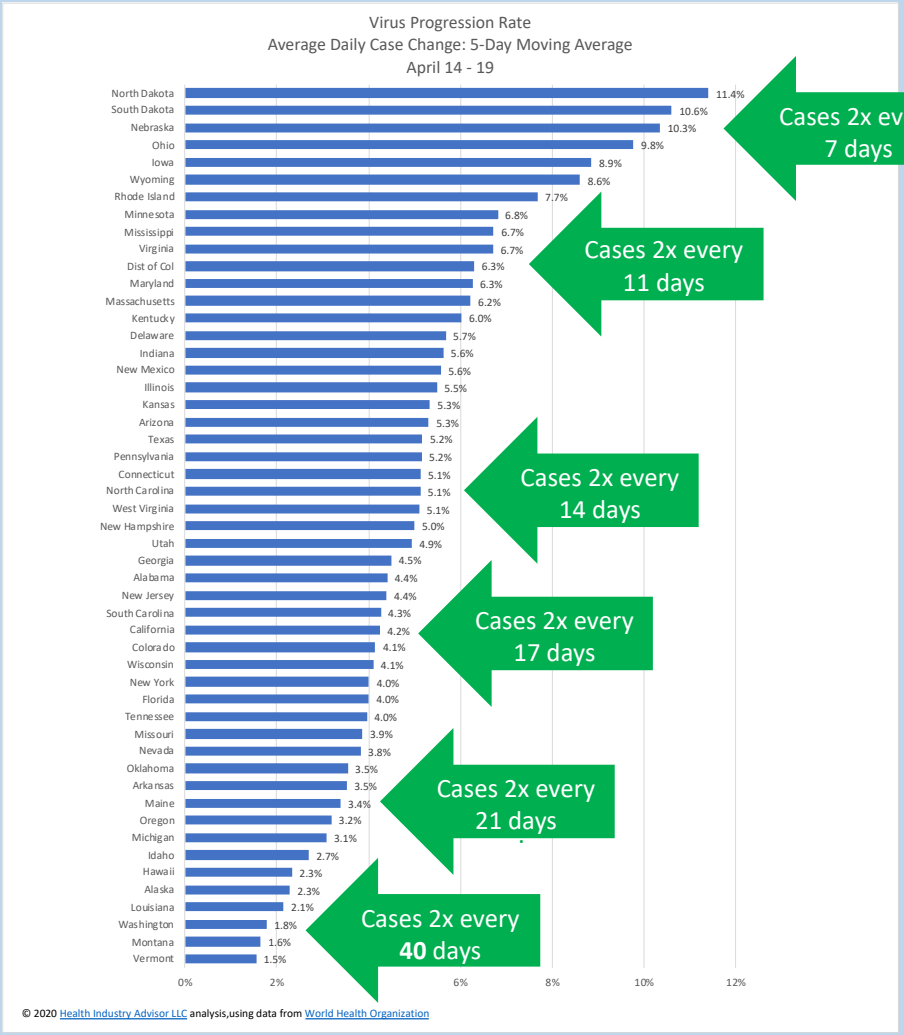
Daily Case Growth Rates By State

Case Growth Rates Continue to Fall Dramatically Across the U.S.

South Dakota continues to show daily case increases (5-day moving average) of > 10%, and is joined now by North Dakota and Nebraska above this threshold. The rate is so low in Alaska, Hawaii, Louisiana, Montana, Vermont and Washington that it would take a month now for cases to double, in Idaho, Maine, Michigan, and Oregon, it would take about 3 weeks.

The rate for the U.S. overall is down to 4.5%. At that rate, cases double in just under 16 days.



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State-By State Statistics and Rankings.

New York Continues To Experience the Most Cases, Cases Per Capita and Deaths

This table provided statistics and ranking of each of the 50 states and the District of Columbia. Today, we added the New Daily Infection Rate per 1 Million Population statistic. This is to acknowledge its potential use in the gating criteria for re-opening states, as well as the IHME proposed standard for relaxing social distancing.

As of April 19

State	Total Cases	Rank	Cases per 1M Population	Rank	Deaths	Rank	Death Rate	Rank	5-day Moving Average Case Growth Rate	Rank	Tests per 1M Population	Rank	New Daily Cases Per 1M Population (5-Day M.A.)	Rank
Alabama	4,903	(23)	1,000.0	(25)	160	(23)	3.3%	(29)	4.4%	(29)	9,397	(32)	38.5	(28)
Alaska	319	(51)	436.1	(48)	9	(49)	2.8%	(36)	2.3%	(47)	13,398	(17)	9.2	(49)
Arizona	4,929	(22)	677.2	(38)	184	(22)	3.7%	(25)	5.3%	(20)	7,628	(45)	27.3	(37)
Arkansas	1,781	(39)	590.2	(45)	39	(40)	2.2%	(44)	3.5%	(41)	8,310	(38)	23.7	(42)
California	31,430	(5)	795.5	(33)	1,175	(8)	3.7%	(24)	4.2%	(32)	6,294	(50)	29.8	(33)
Colorado	9,730	(17)	1,689.6	(15)	422	(17)	4.3%	(15)	4.1%	(33)	8,352	(37)	60.2	(18)
Connecticut	17,962	(12)	5,038.0	(5)	1,127	(9)	6.3%	(3)	5.1%	(23)	16,685	(13)	237.5	(5)
Delaware	2,538	(34)	2,606.4	(9)	67	(36)	2.6%	(39)	5.7%	(15)	15,581	(14)	133.9	(8)
District Of Columbia	2,793	(32)	3,957.5	(7)	96	(32)	3.4%	(28)	6.3%	(11)	20,013	(7)	185.8	(6)
Florida	26,314	(8)	1,225.2	(20)	774	(10)	2.9%	(34)	4.0%	(36)	12,744	(20)	42.7	(24)
Georgia	18,157	(11)	1,710.1	(14)	681	(11)	3.8%	(23)	4.5%	(28)	7,762	(43)	75.4	(14)
Hawaii	580	(48)	409.6	(50)	10	(47)	1.7%	(47)	2.3%	(46)	17,195	(12)	8.2	(50)
Idaho	1,672	(40)	933.0	(28)	45	(38)	2.7%	(38)	2.7%	(45)	10,336	(30)	19.6	(45)
Illinois	30,357	(7)	2,395.6	(11)	1,290	(6)	4.2%	(16)	5.5%	(18)	11,178	(27)	107.2	(11)
Indiana	11,210	(16)	1,665.1	(16)	562	(13)	5.0%	(9)	5.6%	(16)	9,212	(33)	69.6	(16)
Iowa	2,902	(31)	919.8	(30)	75	(34)	2.6%	(40)	8.9%	(5)	7,837	(42)	59.5	(19)
Kansas	1,849	(37)	634.7	(43)	92	(33)	5.0%	(11)	5.3%	(19)	6,233	(51)	25.1	(38)
Kentucky	2,960	(30)	662.5	(40)	148	(28)	5.0%	(10)	6.0%	(14)	7,279	(47)	31.9	(32)
Louisiana	23,928	(9)	5,147.1	(4)	1,296	(5)	5.4%	(5)	2.1%	(48)	30,342	(3)	102.4	(12)
Maine	867	(45)	645.0	(42)	34	(42)	3.9%	(19)	3.4%	(42)	11,212	(26)	24.9	(39)
Maryland	12,830	(13)	2,122.2	(12)	486	(15)	3.8%	(21)	6.3%	(12)	11,309	(25)	108.8	(10)
Massachusetts	38,077	(3)	5,479.1	(3)	1,706	(4)	4.5%	(14)	6.2%	(13)	23,754	(4)	259.1	(4)
Michigan	31,424	(6)	3,146.5	(8)	2,391	(3)	7.6%	(1)	3.1%	(44)	11,429	(24)	97.1	(13)
Minnesota	2,356	(35)	417.8	(49)	134	(30)	5.7%	(4)	6.8%	(8)	8,271	(40)	18.6	(47)
Mississippi	4,274	(27)	1,436.1	(18)	159	(24)	3.7%	(26)	6.7%	(9)	13,071	(19)	71.7	(15)
Missouri	5,698	(21)	928.4	(29)	198	(20)	3.5%	(27)	3.9%	(38)	8,852	(35)	35.8	(30)
Montana	433	(49)	405.1	(51)	10	(47)	2.3%	(42)	1.6%	(50)	10,461	(29)	6.1	(51)
Nebraska	1,474	(42)	762.0	(35)	28	(43)	1.9%	(46)	10.3%	(3)	8,272	(39)	50.4	(22)
Nevada	3,725	(28)	1,209.4	(21)	155	(25)	4.2%	(17)	3.8%	(39)	13,213	(18)	41.2	(25)
New Hampshire	1,392	(43)	1,023.7	(23)	41	(39)	2.9%	(33)	5.0%	(26)	10,507	(28)	42.8	(23)
New Jersey	85,301	(2)	9,603.6	(2)	4,202	(2)	4.9%	(12)	4.4%	(30)	19,426	(8)	377.2	(2)
New Mexico	1,845	(38)	879.9	(31)	55	(37)	3.0%	(32)	5.6%	(17)	17,703	(11)	40.9	(26)
New York	247,215	(1)	12,708.0	(1)	18,298	(1)	7.4%	(2)	4.0%	(35)	31,478	(2)	395.7	(1)
North Carolina	6,589	(20)	628.2	(44)	192	(21)	2.9%	(35)	5.1%	(24)	7,756	(44)	27.3	(36)
North Dakota	585	(47)	767.7	(34)	10	(47)	1.7%	(48)	11.4%	(1)	18,120	(10)	51.9	(21)
Ohio	11,602	(15)	992.5	(26)	471	(16)	4.1%	(18)	9.8%	(4)	7,472	(46)	61.1	(17)
Oklahoma	2,599	(33)	656.8	(41)	140	(29)	5.4%	(6)	3.5%	(40)	9,070	(34)	22.7	(43)
Oregon	1,910	(36)	452.8	(47)	74	(35)	3.9%	(20)	3.2%	(43)	9,564	(31)	13.0	(48)
Pennsylvania	32,734	(4)	2,556.9	(10)	1,237	(7)	3.8%	(22)	5.2%	(22)	12,419	(22)	109.5	(9)
Rhode Island	4,706	(24)	4,442.3	(6)	150	(26)	3.2%	(31)	7.7%	(7)	32,840	(1)	275.2	(3)
South Carolina	4,377	(25)	850.1	(32)	120	(31)	2.7%	(37)	4.3%	(31)	8,168	(41)	29.4	(34)
South Dakota	1,635	(41)	1,848.2	(13)	7	(50)	0.4%	(51)	10.6%	(2)	13,956	(16)	146.1	(7)
Tennessee	7,070	(19)	1,034.7	(22)	148	(28)	2.1%	(45)	4.0%	(37)	14,599	(15)	36.8	(29)
Texas	19,317	(10)	666.2	(39)	499	(14)	2.6%	(41)	5.2%	(21)	6,552	(48)	28.0	(35)
Utah	3,069	(29)	957.3	(27)	27	(44)	0.9%	(49)	4.9%	(27)	20,870	(5)	34.1	(31)
Vermont	812	(46)	1,301.3	(19)	38	(41)	4.7%	(13)	1.5%	(51)	20,362	(6)	19.5	(46)
Virginia	8,537	(18)	1,000.2	(24)	277	(18)	3.2%	(30)	6.7%	(10)	6,505	(49)	54.6	(20)
Washington	11,790	(14)	1,548.3	(17)	634	(12)	5.4%	(7)	1.8%	(49)	18,604	(9)	23.9	(41)
West Virginia	890	(44)	498.0	(46)	20	(45)	2.2%	(43)	5.1%	(25)	11,850	(23)	22.3	(44)
Wisconsin	4,346	(26)	746.4	(36)	220	(19)	5.1%	(8)	4.1%	(34)	8,596	(36)	24.7	(40)
Wyoming	426	(50)	736.1	(37)	2	(51)	0.5%	(50)	8.6%	(6)	12,512	(21)	38.5	(27)
United States	763,832		2,326.6		40,553		5.3%		4.5%		11,666		86.9	

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Opening Up America Again
The President Released His Guidelines For Getting the Country Moving

On Thursday, April 16, 2020, President Trump released his guidelines for three phases of *Opening Up America Again*. Each state governor, however, retains the authority to determine how and when to open their states, based on the unique circumstances of their respective states.

The President outlined a staged approach, based on the state meeting certain "gating" criteria:

- Symptoms
  - Downward trajectory of influenza-like illness (ILI) reported within a 14-day period, and
  - Downward trajectory of COVID-19 syndromic cases reported within a 14-day period
- Cases
  - Downward trajectory of documented cases reported within a 14-day period, or
  - Downward trajectory of positive tests as a percent of total tests within a 14-day period (flat or increasing volume of tests)
- Hospitals
  - Treat all patients without crisis care, and
  - Robust testing program in place for at-risk healthcare workers, including emergency antibody testing

Whether these criteria will be applied is ultimately a state-by-state decision, and will be subject to other considerations (including political ones.) Therefore, no certainty can be provided as to how closely these state-by state decisions will follow the guidelines suggested.

These considerations notwithstanding, the following pages are intended to paint a picture of how closely each state is tracking toward the guidelines suggested by the President and the CDC.

We are producing a one-page summary of key measures for 5 states per day. Yesterday we begin with those states with the most total cases: in order – New York, New Jersey, Massachusetts, Pennsylvania and Michigan. Today, we add the next five in order of Total Cases: California, Illinois, Florida, Louisiana and Texas. We will add additional states each day until all are included.

On these pages, we show:

- Our Virus Progression chart for the state, indicating 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)
- Tests per day, and a 5-day moving average (given the provision for flat or increasing test volume)
- Positive test %, daily and 5-day moving average
- (New today, replacing New Cases per Day) New Daily Infections per 1 Million Population – this metric may be better aligned with the gating criteria; also, it is the metric proposed by IHME to determine when social distancing may be relaxed
- Active cases per day, to indicate how active infections are trending
- % of Visits for Influenza-Like Illness (ILI) from CDC.gov, indicating the trajectory of these illness per the criteria above
- Projected Hospital Resource Needs from Covid19.Health data.org, indicating how these needs are trending

Note: these measures are not necessarily those that will be used by the states, however, they could serve as useful proxies. **Still, no one should rely on any of the following for a determination of what actions each state will take, and when.**

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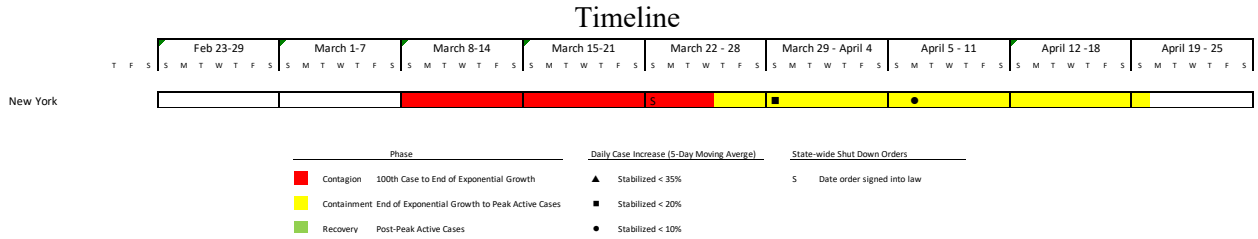
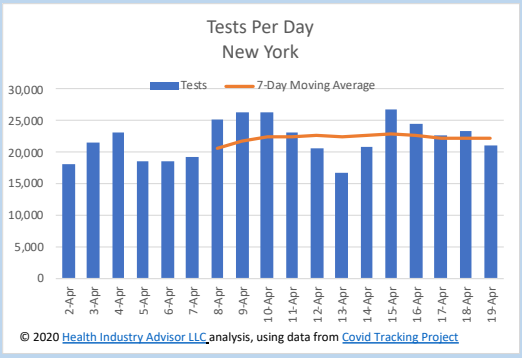
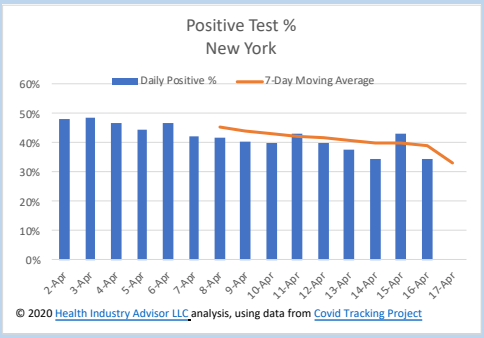
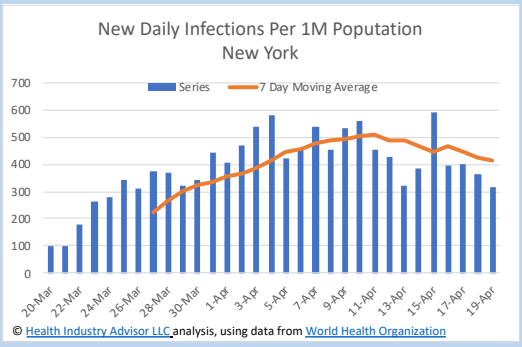
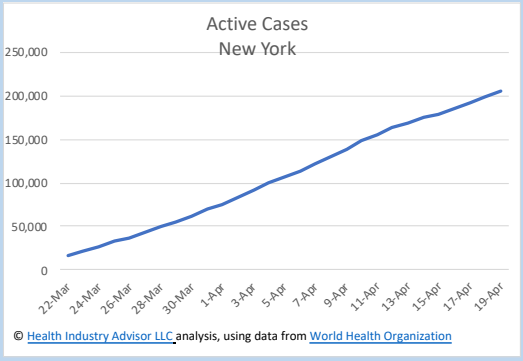
New York

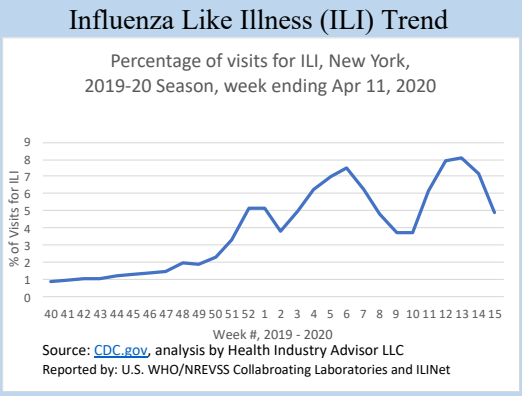


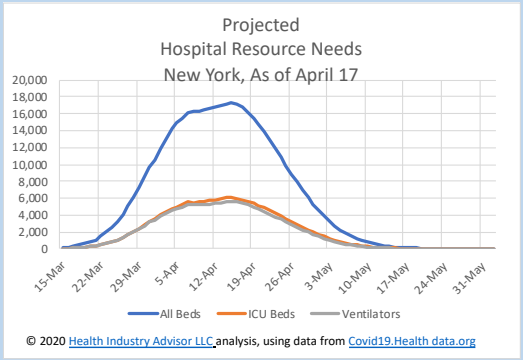












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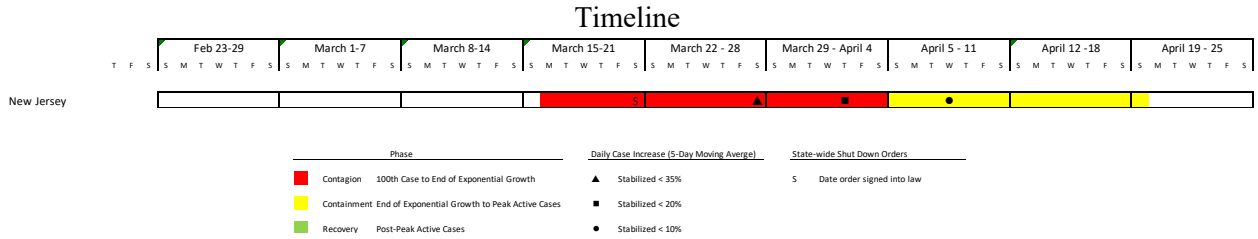
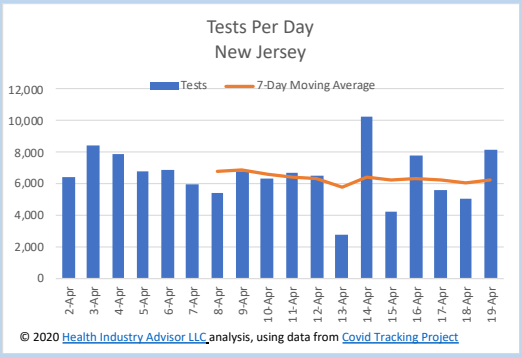
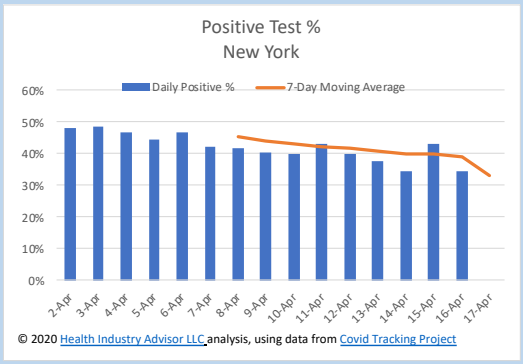
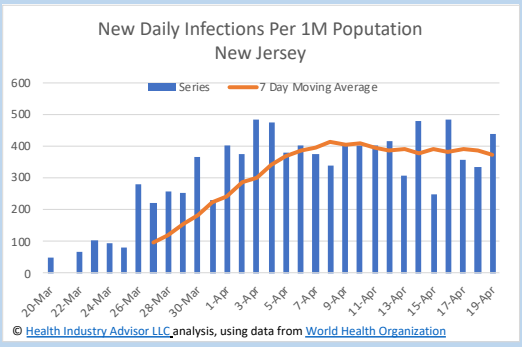
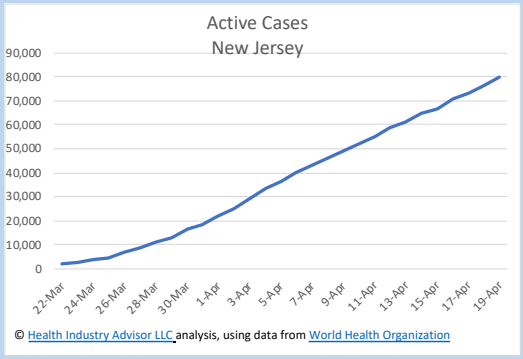
New Jersey

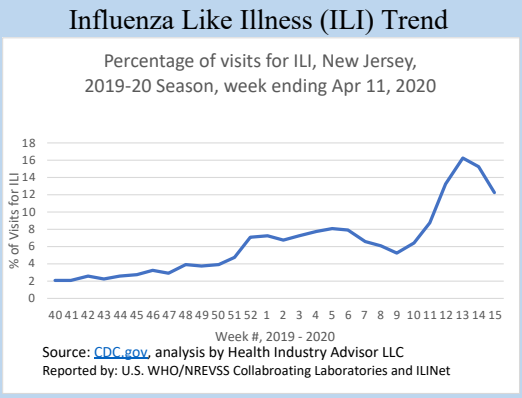


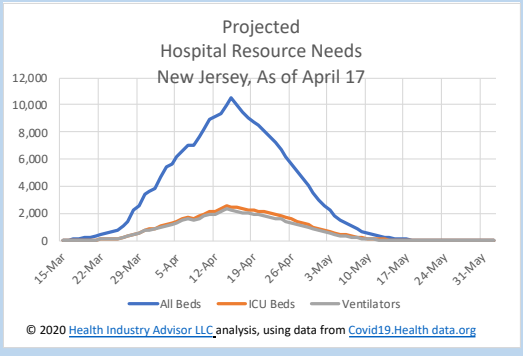












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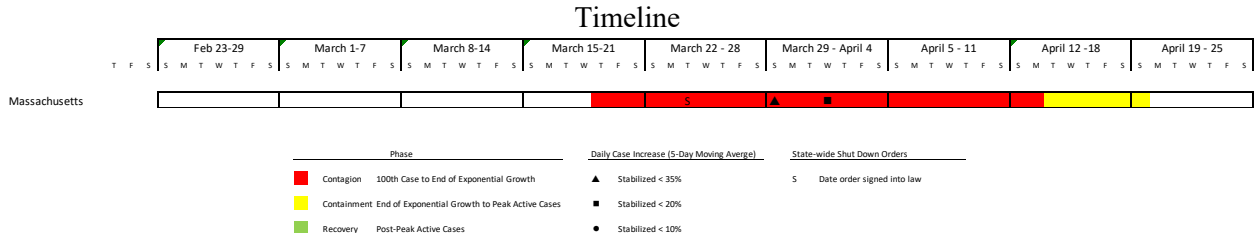
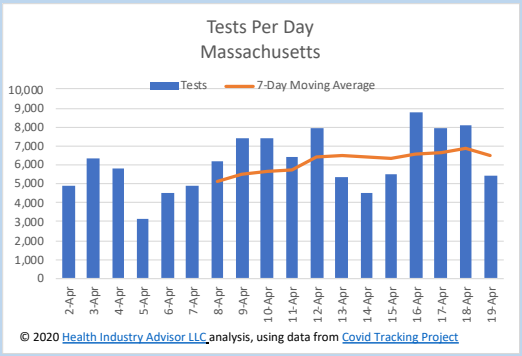
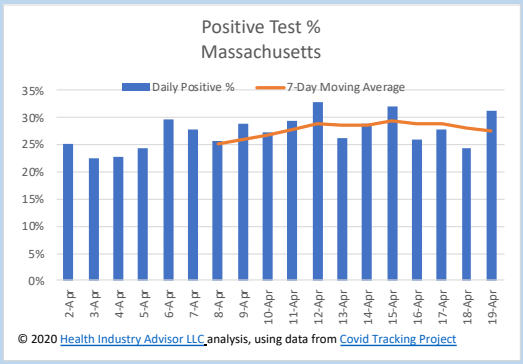
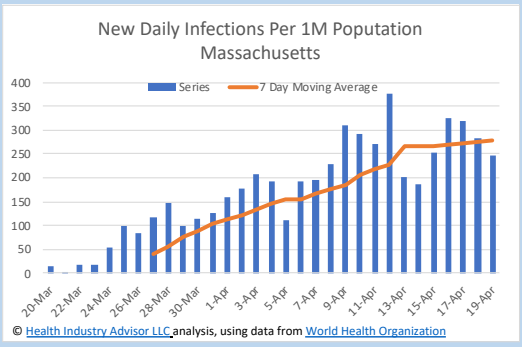
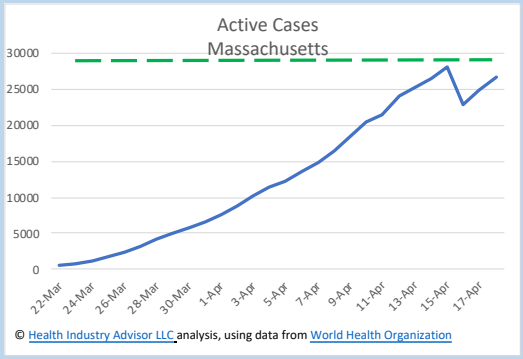
Massachusetts

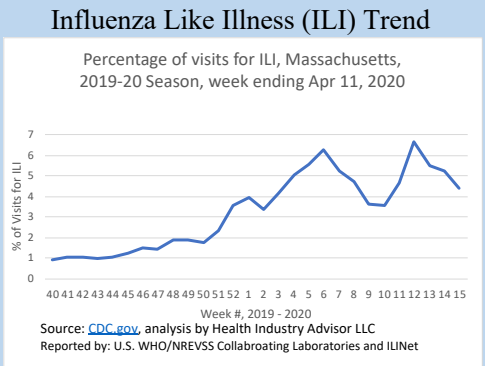


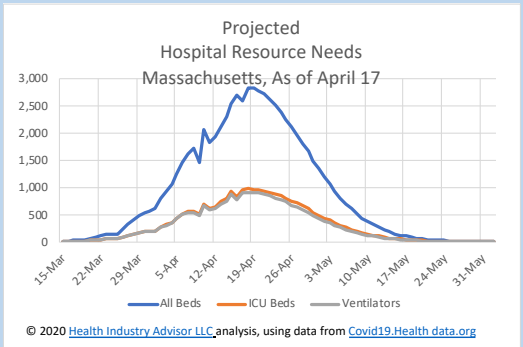












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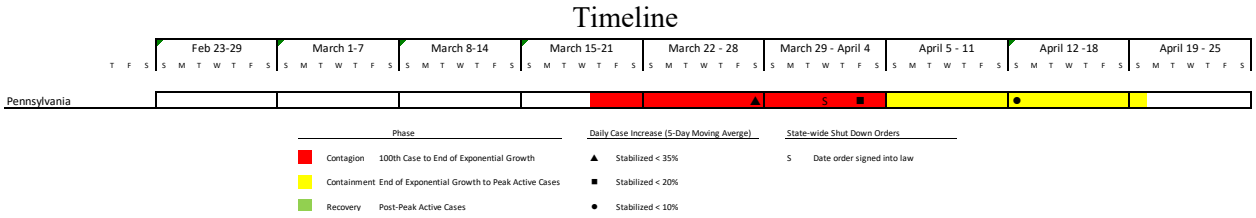
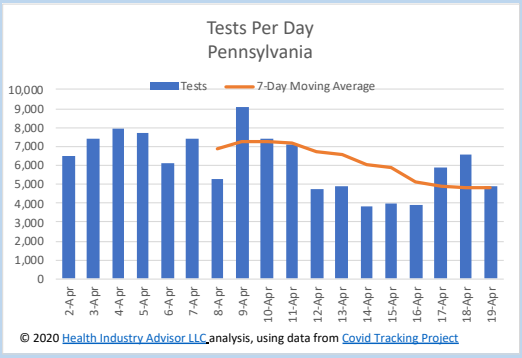
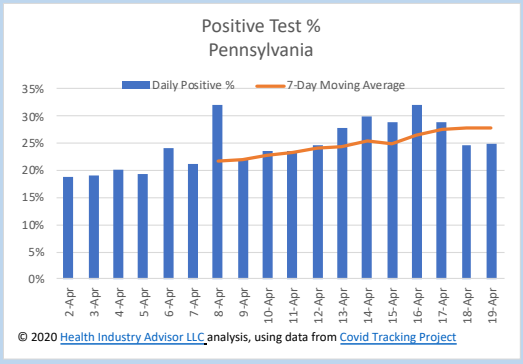
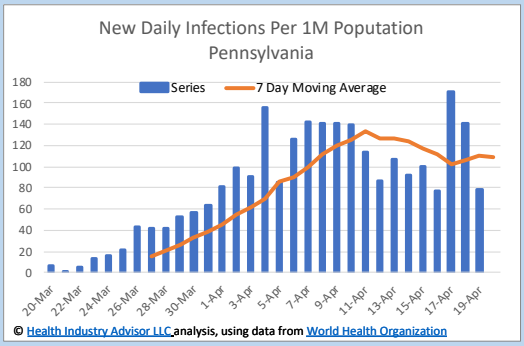
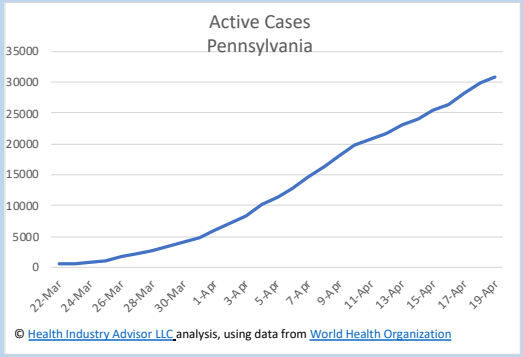
Pennsylvania



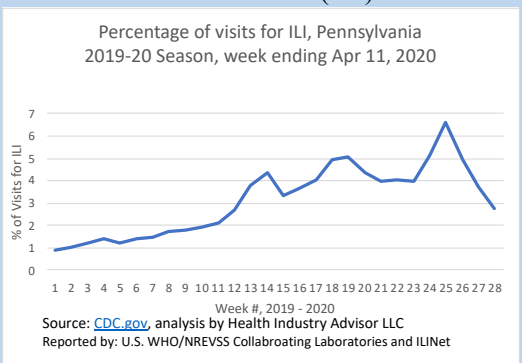


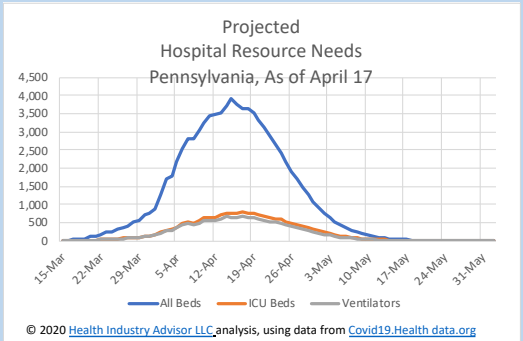






Influenza Like Illness (ILI) Trend





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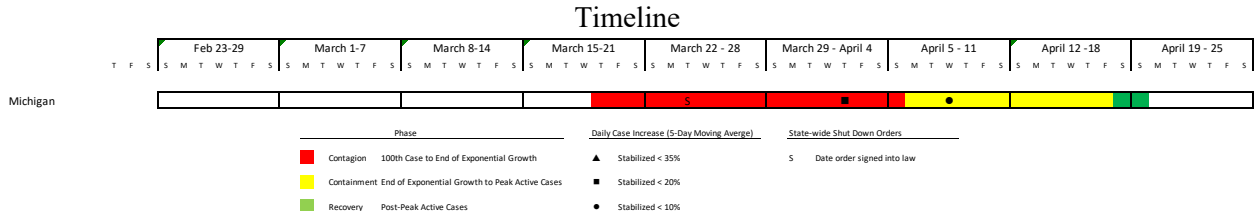
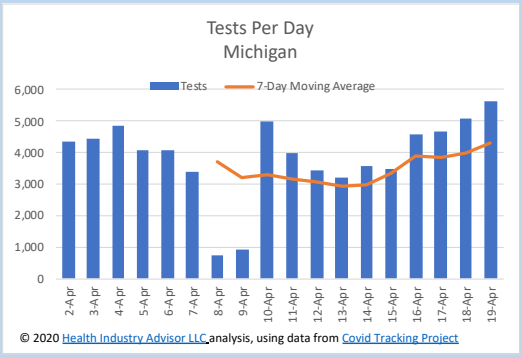
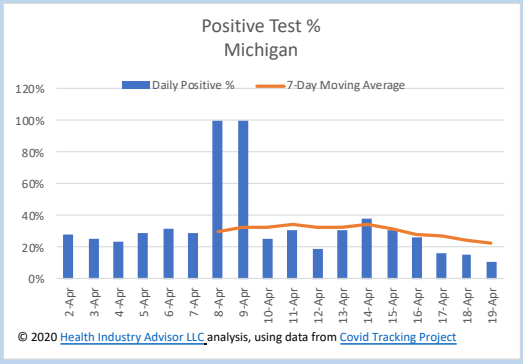
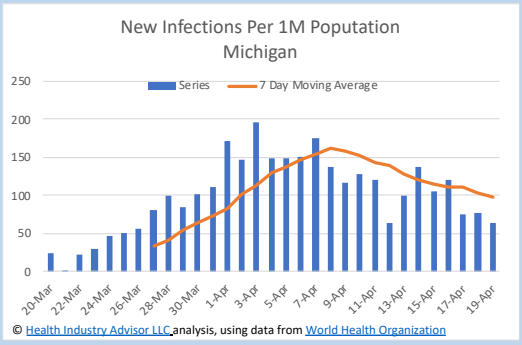
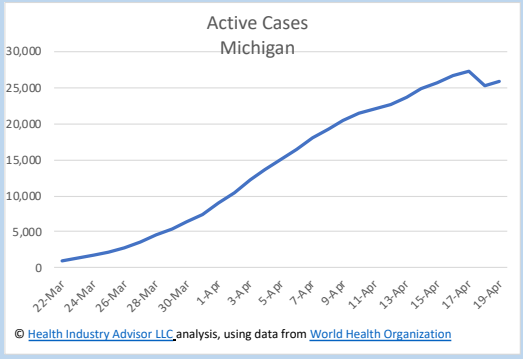
Michigan



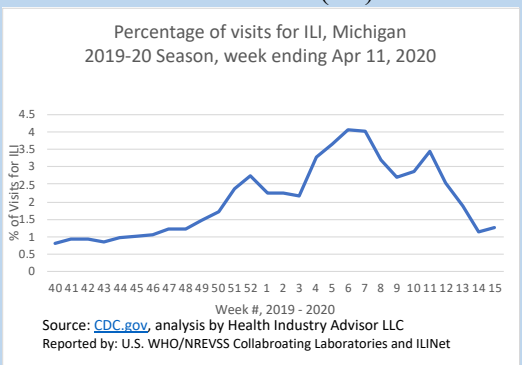


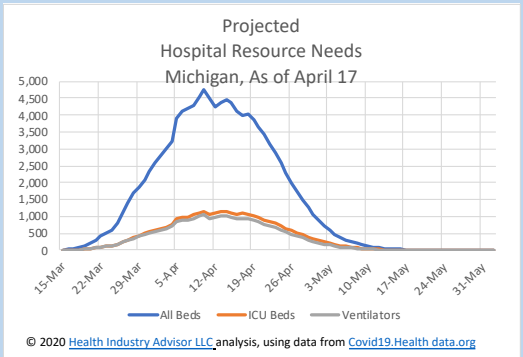






Influenza Like Illness (ILI) Trend





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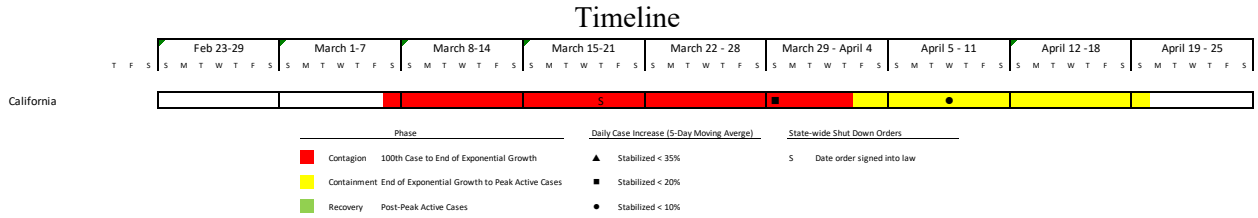
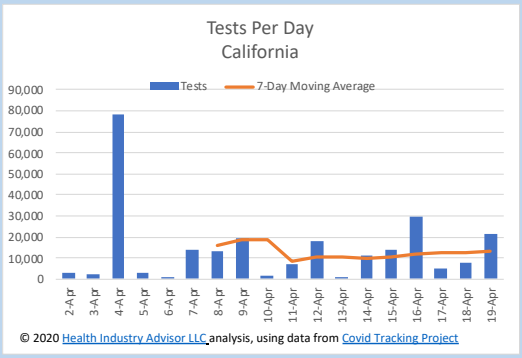
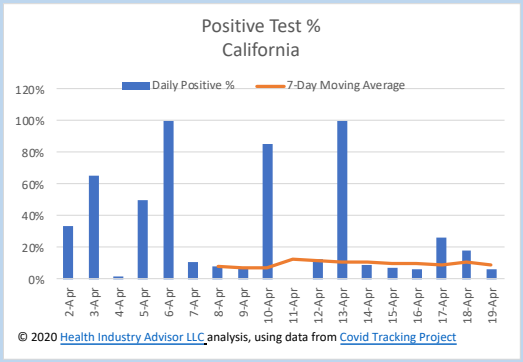
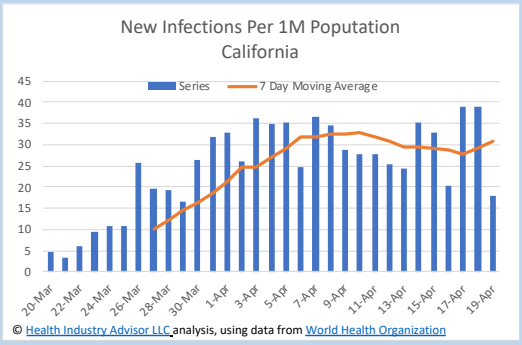
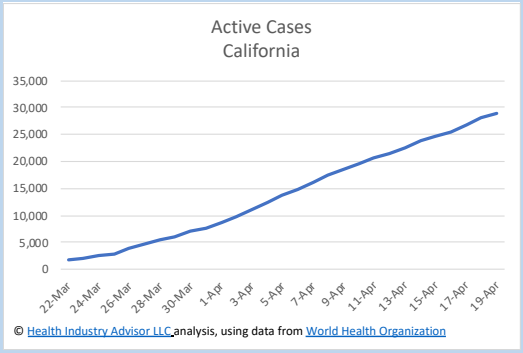
California

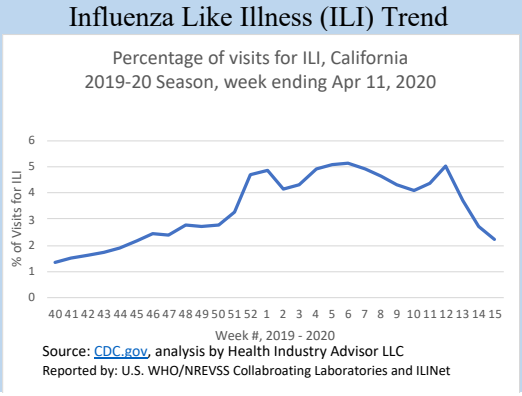


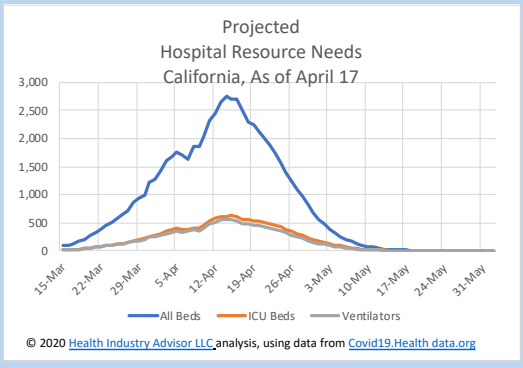












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COVID-19 Dashboard

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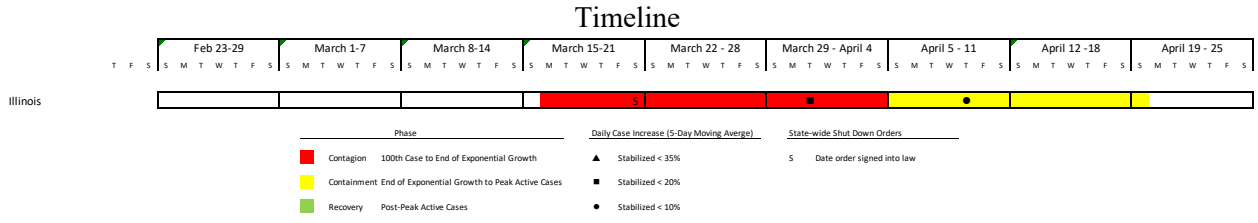
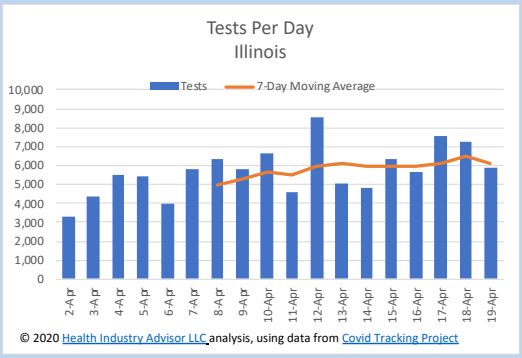
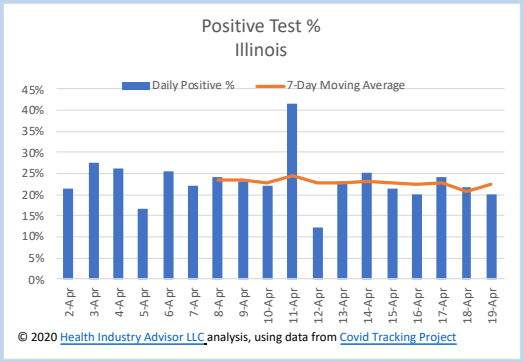
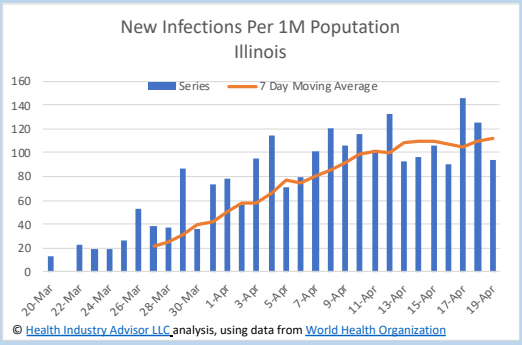
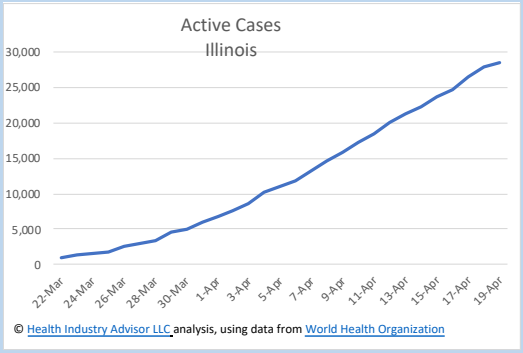
Illinois

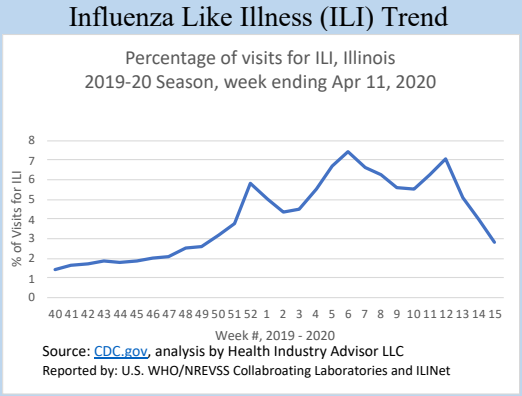


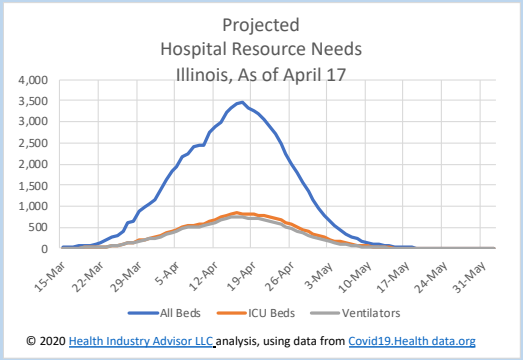












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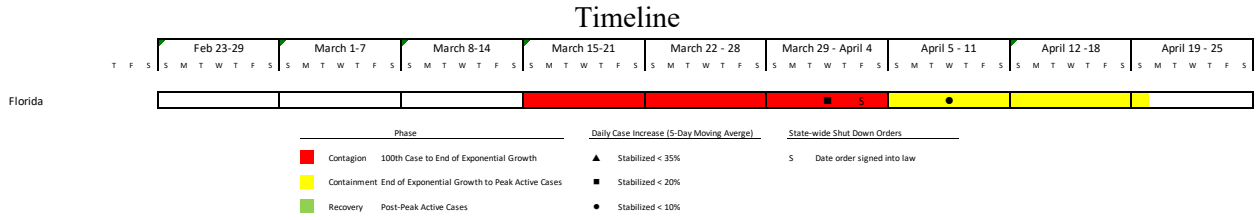
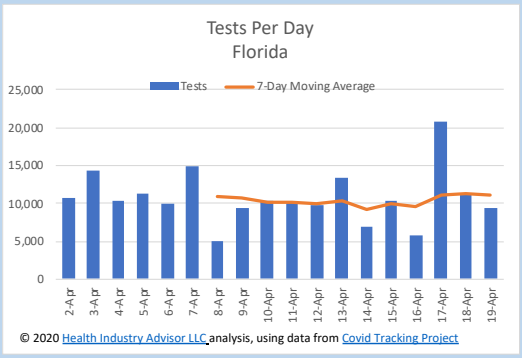
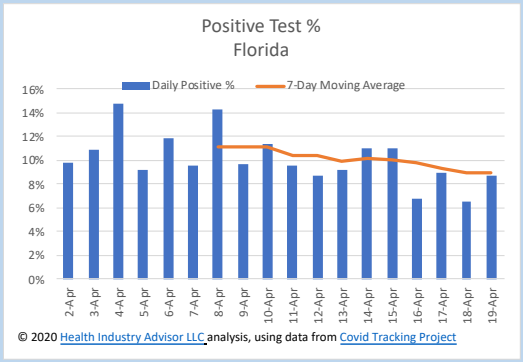
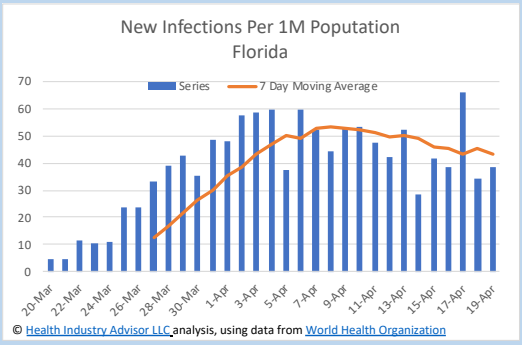
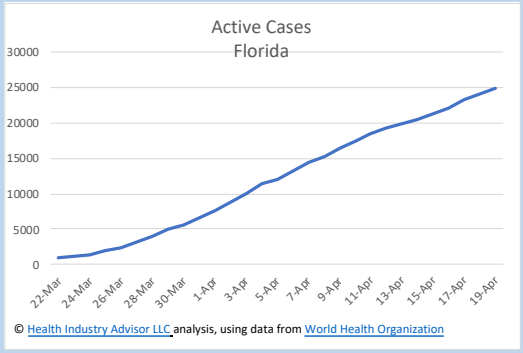
Florida



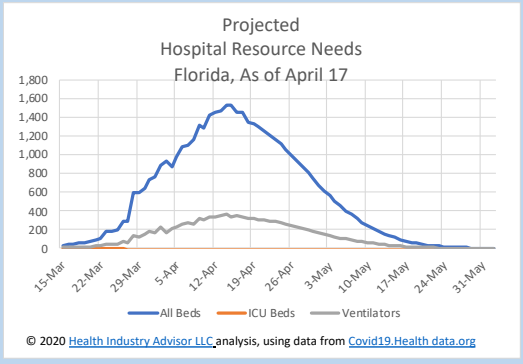








Influenza Like Illness (ILI) Trend -
Information for Florida is not available



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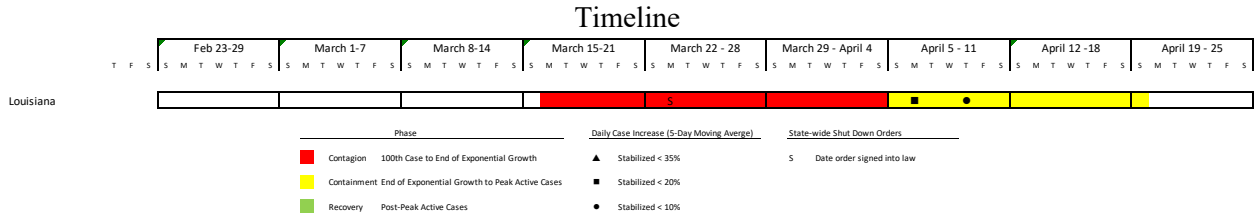
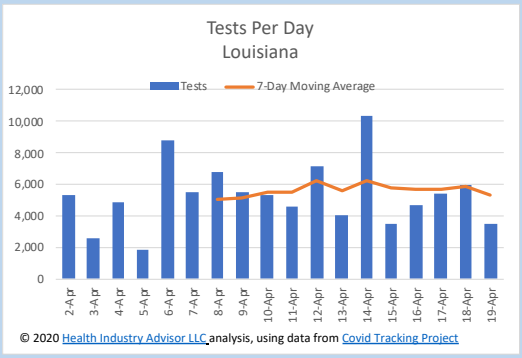
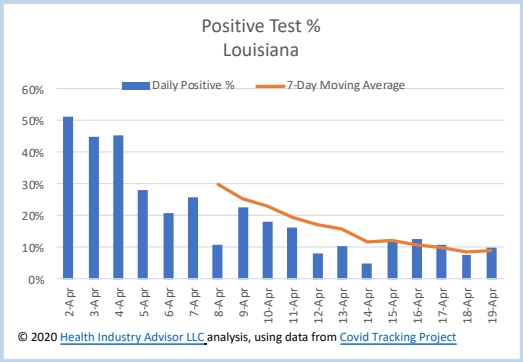
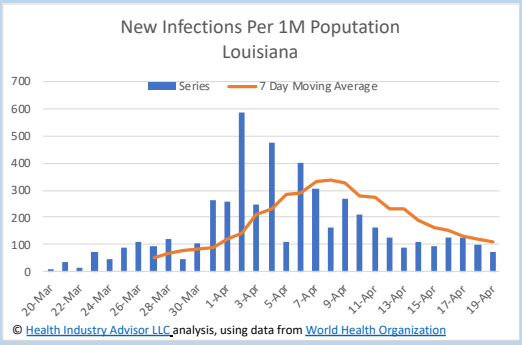
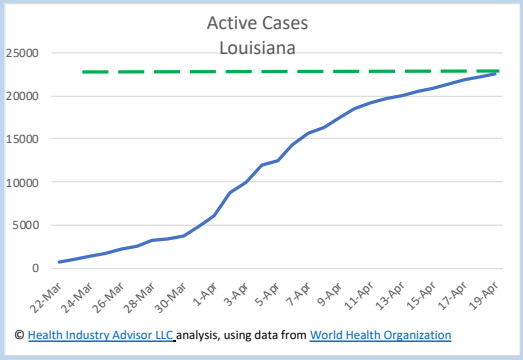
Louisiana

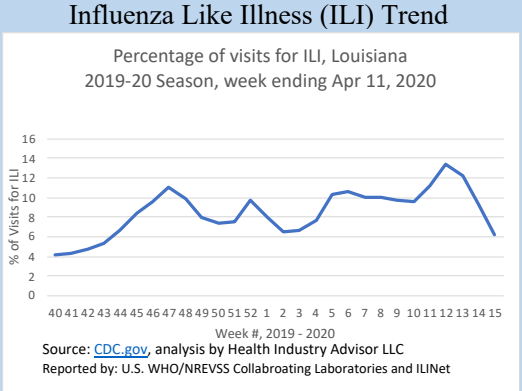


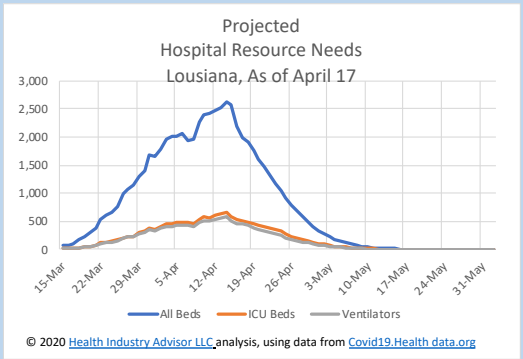












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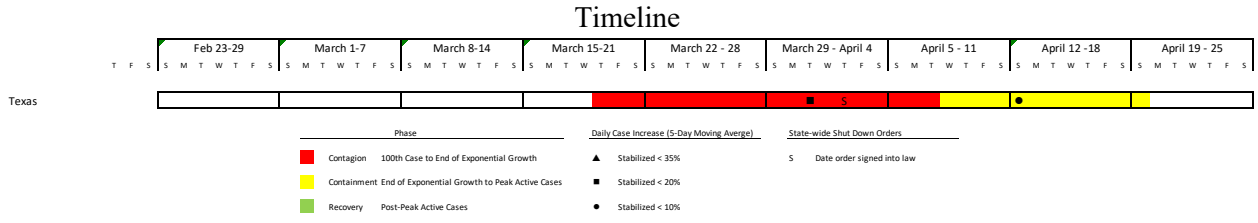
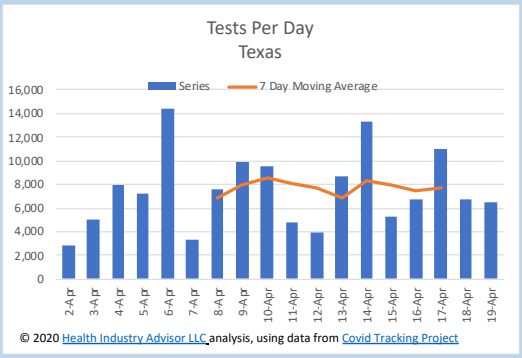
Texas





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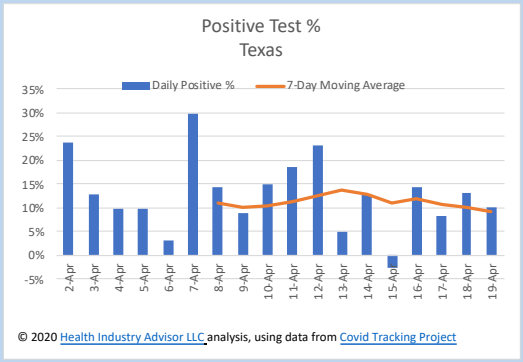

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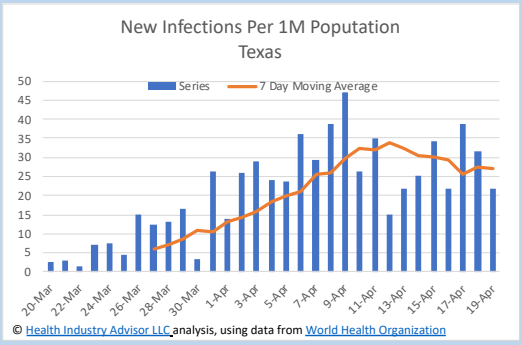

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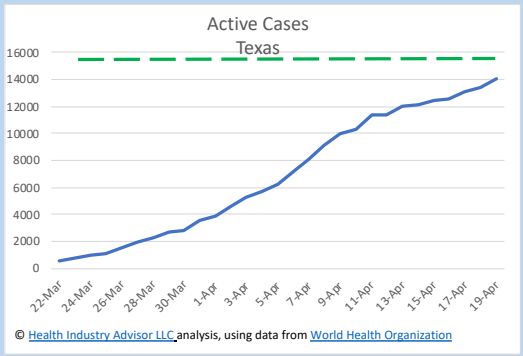

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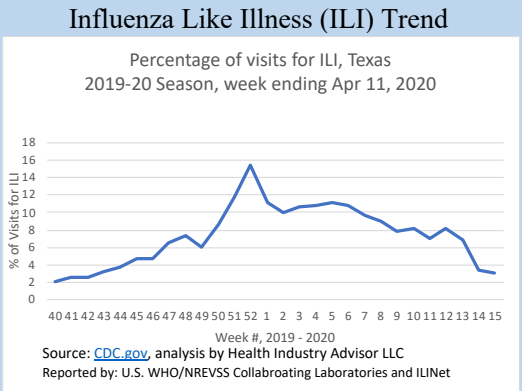
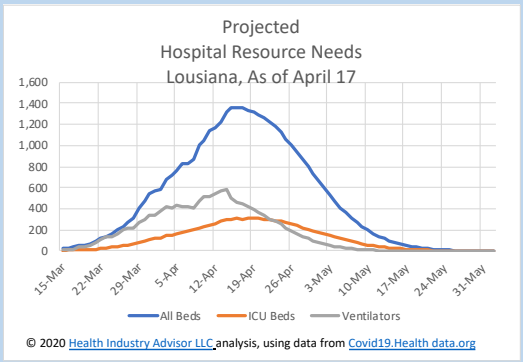


Source: CDC.gov, analysis by Health Industry Advisor LLC
Reported by: U.S. WHO/NREVSS Collaboroating Laboratories and ILINet



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