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COVID-19 Dashboard

"Strategic Guidance in an Era of Unprecedented Change"

Issue #33: April 23

Measure	Desired Change	Yesterday in the U.S.
No. of Tests	Increase	Up 7.7% (Cumulative)
Positive Test Rate	Decline	Down to 18.5%
No. of Cases	Plateau	Up 3.7%, rate continues to slow
% of Deaths Per Case	Decline	Up slightly at 5.6%
No. of Deaths / 1M Pop.	Plateau	Up to 144.0
Recoveries : Deaths	Increase (>1:1)	Down to 1.76

Rationale for shading changes from yesterday: Number of new tests were more than 2x teach of the previous 8 days; positive % on new tests was low. After a large number of recoveries reported on Tuesday, these dropped significantly on Wednesday.

Highlights from Wednesday include:

- As critical as testing is to our ability to relax restrictions, the biggest news yesterday was a large number of new tests – 323,000 v. about 150,000 daily the past 8 days. California was the driver of this increased test volume. Interestingly, the positive % for these new tests was only 8.8%, versus ~19% for all prior tests.

  The U.S testing per capita remains, however, about ½ that of Switzerland, Italy and Germany.

- Despite the large increase in testing yesterday, Total Cases in the U.S. only increased by 3.7% - just higher than the previous day's growth of 3.3%.Total Cases are now just under 850,000; Active Cases (still infected) are now 717,008.

- The number of deaths on Wednesday were lower than on Tuesday (2,341 v. 2,804). Total U.S. deaths are now just under 48,000. Just more than 84,000 in the U.S. have recovered from the virus.

- Among the hardest-hit areas in the U.S, New York (and, particularly New York City) and Louisiana continue to show signs that the virus spread is slowing: Louisiana's new daily infection rate is less than 1/3 of what it was at its peak, which occurred during the first week of April; New York's, while still very high, is 1/3 lower than it was at its peak (April 4-10). New York City's new cases are ½ what they were in early April.

- Italy is continuing to show signs of beginning to recover from the virus spread: Active Cases declined for the third consecutive day.

- Countries that we haven't been tracking closely Denmark, Ireland and Singapore may be worth monitoring: Denmark is reporting 7,338 cases or, 1,366 per million in population; Ireland, 16,671 cases or 3,376 cases per million; and, Singapore, 10,141 cases or 1,733 cases per million.

  Others: Peru has 19,250 cases or, 584 cases per million; Saudi Arabia, 12,772 cases or, 367 cases per million. India has 21,797 cases yet, this only represents 16 cases per million; Japan has 11,950 cases yet, this represents only 94 cases per million.

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Reporting Schedule

We Have Initiated A New Reporting Schedule, In Order To Be More Meaningful and Informative

We have reached a point where it no longer makes sense to repeat the same information and graphics each day – frankly, the day-day-day changes are typically not significant. Furthermore, the volume of material is becoming unwieldly to both prepare and digest each day. So, we have established a new weekly schedule, with each day having a particular focus:

This week:

Day	Focus
Sunday-Wednesday	States ranked 1-30 in Total Cases
Today	States ranked 31 – 40, plus District of Columbia: Oklahoma, Delaware, Iowa, Minnesota, Oregon, New Mexico, Kansas, Arkansas, Idaho, South Dakota
Friday	States ranked 41 – 50: New Hampshire, Nebraska, Maine, West Virginia, Vermont, Hawaii, North Dakota, Montana, Wyoming and Alaska

Starting this weekend, and each week thereafter:

Day	Focus
Saturdays	International – top 20-25 countries in Total Cases
Sundays	United States – overall metrics; state-by-state comparisons
Mondays	States alphabetically: Alabama - Georgia, plus District of Columbia
Tuesdays	States alphabetically: Hawaii – Maryland
Wednesdays	States alphabetically: Massachusetts – New Jersey
Thursdays	States alphabetically: New Mexico – South Carolina
Fridays	States alphabetically: South Dakota - Wyoming

We will continue to provide the color-coded Virus Progression charts each day, so that the status of each country and state can be easily viewed each day. Also, we added a designation to these slides to designate the 7-day period during which each state hit its peak in new daily infections.

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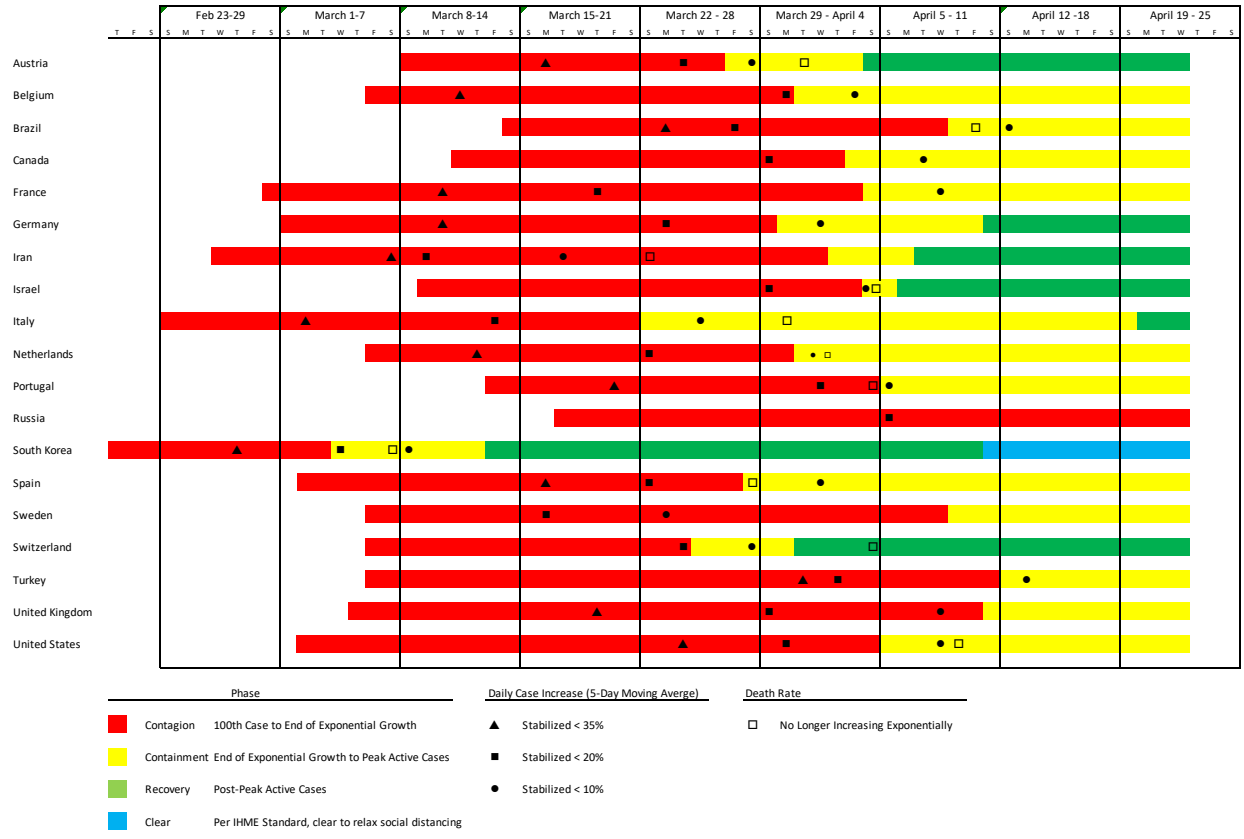
Virus Progression: Hardest Hit Countries

Italy, and Possibly Spain, Now Appear To Be Past the Peak in Active Cases

Italy now joins Austria, China (not pictured), Germany, Iran, Israel, South Korea and Switzerland in Recovery (past peak in Active Cases). Only Russia is still experiencing exponential case growth.

South Korea and China are below the threshold set by the Institute for Health Metrics and Evaluation (IHME) of 1 new daily infection per million in population.

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.



Information throughout the Dashboard is provided as a courtesy, based on data from the above-named sources. HIA has no responsibility for the accuracy and updating of any data. Sources: worldometers.info; covidtracking.com, https://covid19.healthdata.org/united-states-of-america, and nyc.gov. Graphics depict data as of the date in the header.

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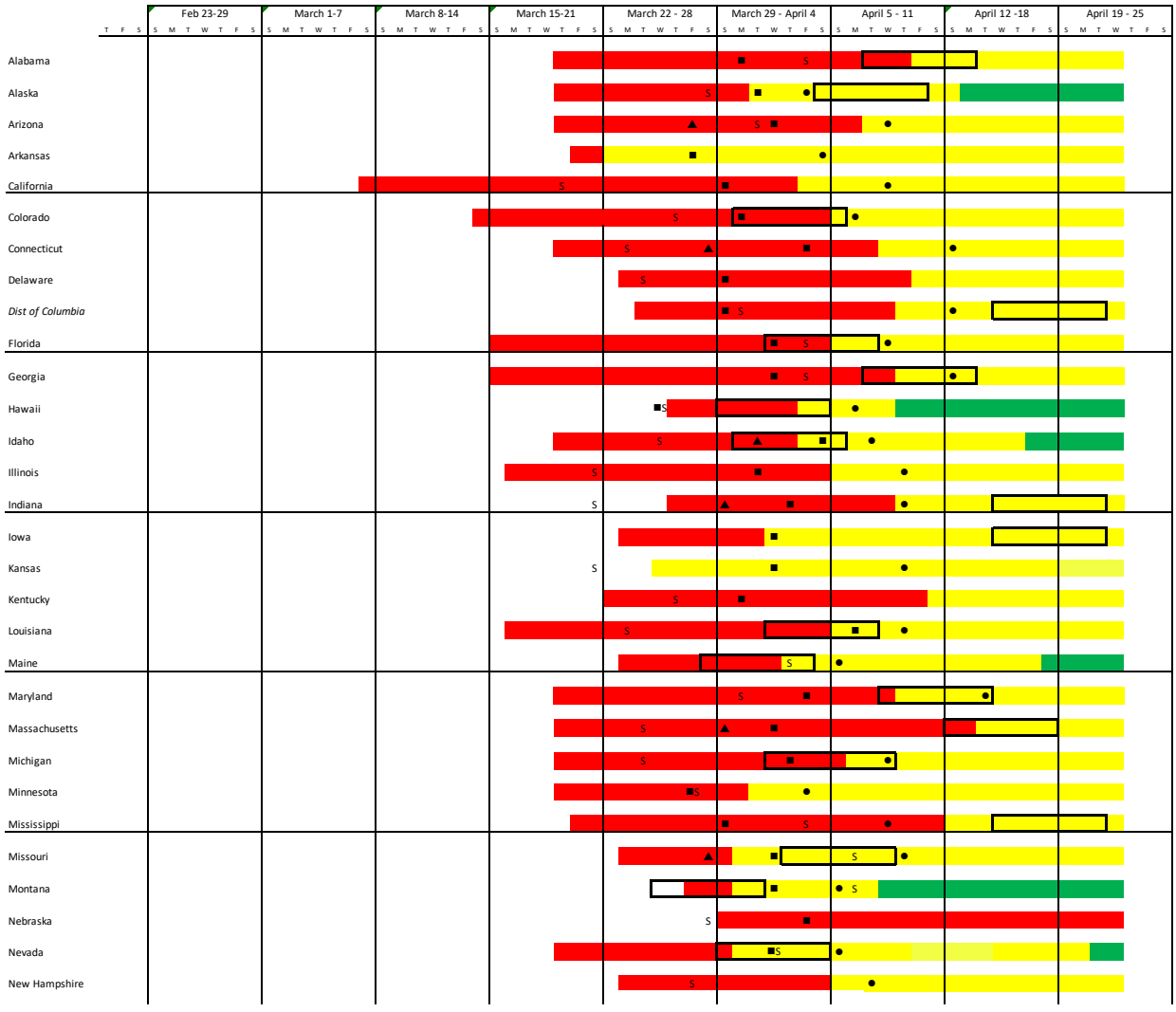
Virus Progression: US States, District of Columbia and New York City

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

Yesterday, we add a new notation for the 7-day period in which each state experienced its peak in New Daily Infections. This is designated by a heavy-lined box around the dates.

Twelve states – Alaska, Hawaii, Idaho, Maine, Montana, Nevada, Oklahoma, South Carolina, South Dakota, Tennessee, Utah and Wyoming - may be past their peak in Active cases. Of these, Utah's peak may be a tenuous one, as it has not demonstrated a similar peak in new daily infections.



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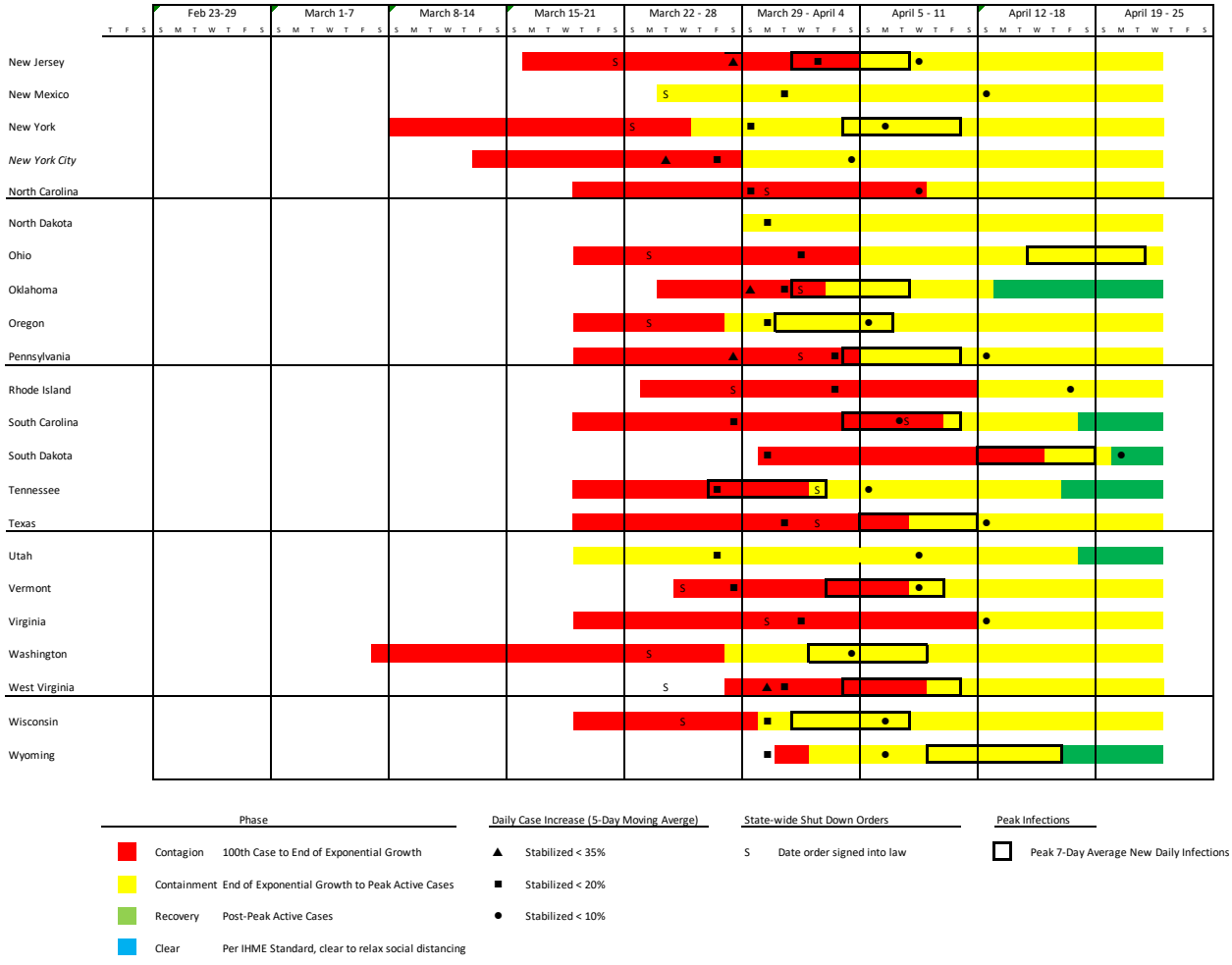

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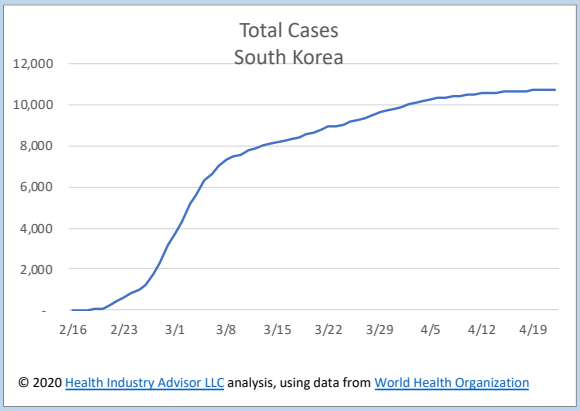
A Country or State's Progression From Onset to Recovery

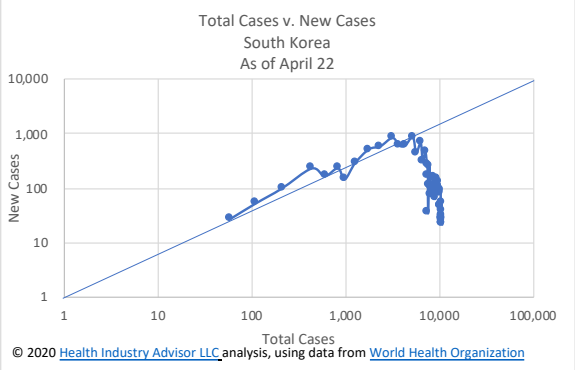
We Can Observe the Experiences of Other Countries to See the Progression From Onset of the Virus to Recovery

Following China's early experience, South Korea was the next country to chart the course from onset of the virus to recovery. Austria and Switzerland are now following a similar path. In the U.S. we can see similar pathways in the experiences of Louisiana and New York, two of the hardest-hit states.

Looking first at South Korea:

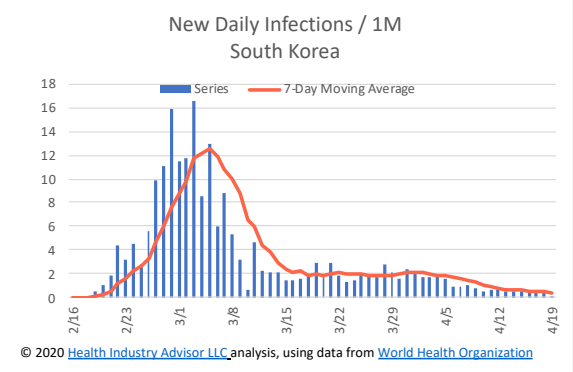
As seen in these first two graphs, cases grew exponentially, before hitting a plateau. The graph on the right would have been instructive in "predicting" this plateau, as the log-log plot of total and new cases began to fall off the diagonal line – indicating the end of exponential case growth – before cases plateaued. Note the downward direction of this plot line soon after exponential growth stopped.

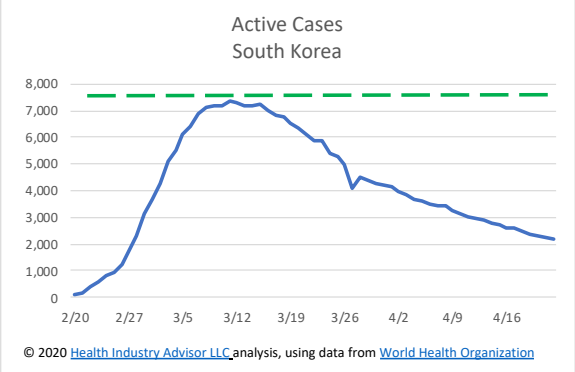




The end of exponential case growth corresponded with a peak in new daily infections (cases), as shown below:

Once the rate of new infections declined and infected persons began to recover (80-95% eventually recover, in 2-6 weeks), Active Cases peak and then taper off.





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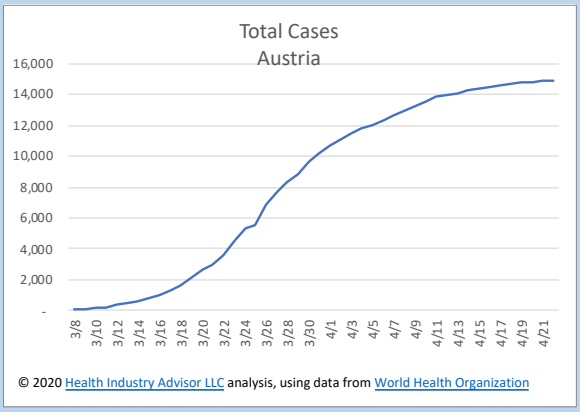
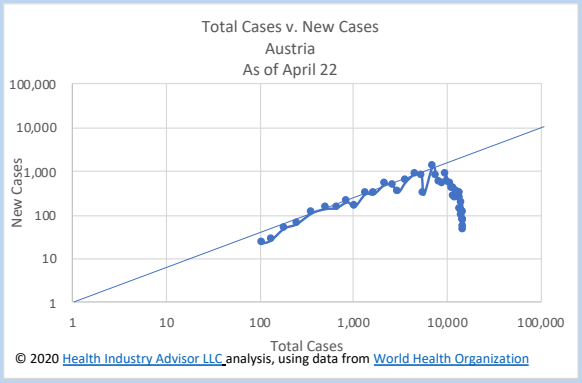
Next, observe Austria:

Austria's experience followed a similar pathway as South Korea's: The graph on the right would have been instructive in "predicting" this plateau, as the log-log plot of total and new cases began to fall off the diagonal line – indicating the end of exponential case growth – before cases plateaued. Again, note the downward direction of this plot line soon after exponential growth stopped.





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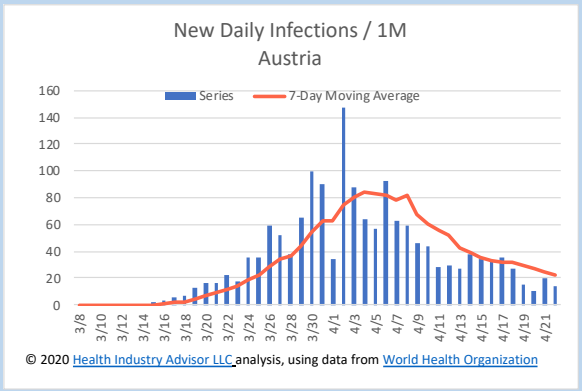
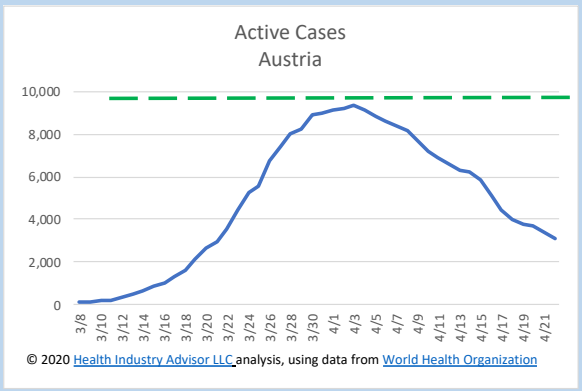
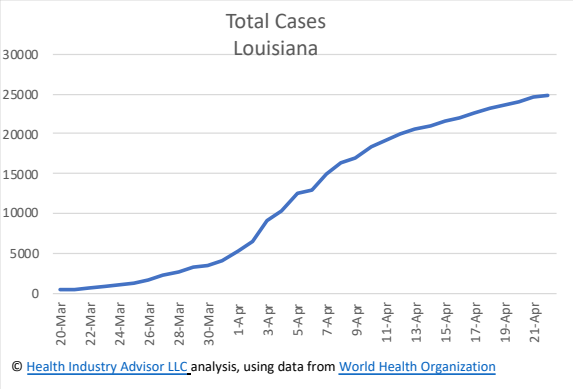


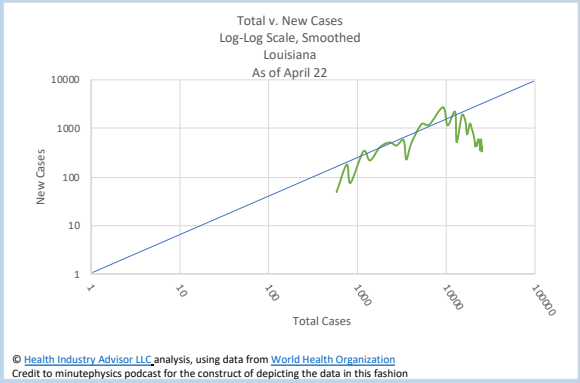
Once the rate of new infections declined and infected persons began to recover, Active Cases peak and then taper off.



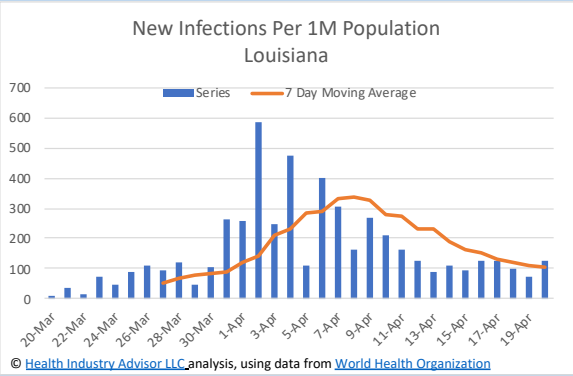
Now, let's observe how Louisiana is tracking on a similar path:

Clearly, Louisiana is tracking weeks behind Austria. Still, you can observe the same pattern in the first two graphs: Total Cases beginning to plateau after the plot line of Total Cases v. New Cases fell off the diagonal line.: In the near future, we expect to see the plot line in the graphic on the right continue to move (almost straight) downward.

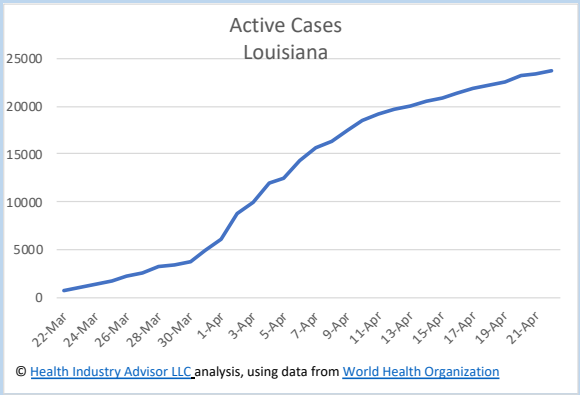




As with Austria, the end of exponential case growth corresponded with a peak in new daily infections (cases) in Louisiana, as shown below:

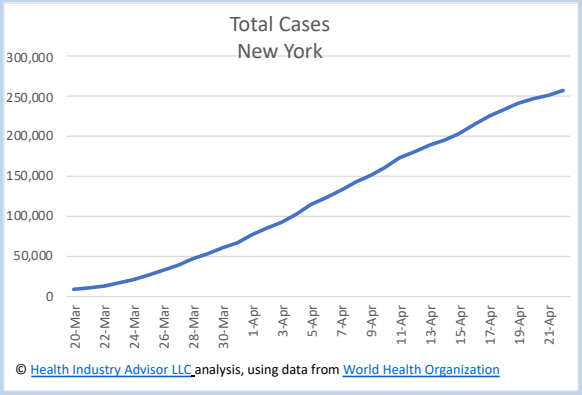


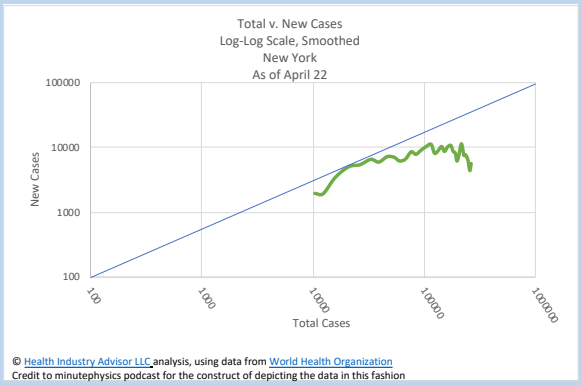
Now that the rate of new infections has declined, we next should anticipate that persons infected with the virus will begin to recover. At that point, Active Cases will peak and then taper off.



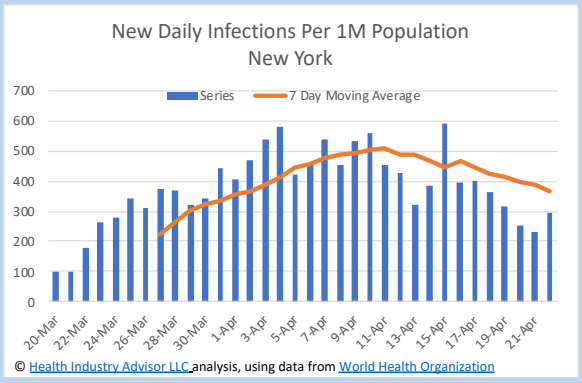
Let's observe New York next:

Although New York was hit earlier and harder than Louisiana, Louisiana has progressed more quickly toward recovery. Still, you can still observe the same pattern emerging for New York as we observed in Louisiana (as well as South Korea and Austria): As the plot line of Total Cases v. New Cases falls further off the diagonal line (on the right graphic), Total Cases are hinting at a coming plateau.

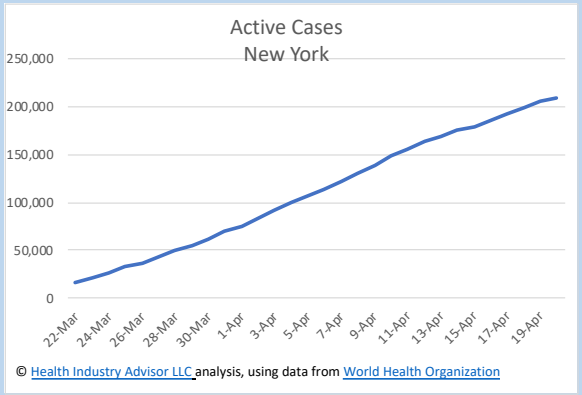




As expected, the end of exponential case growth corresponded with a peak in new daily infections (cases) in New Yok too, as shown below:



With the rate of new infections declining, we anticipate that persons infected with the virus will begin to recover. At that point, Active Cases will peak and then taper off.



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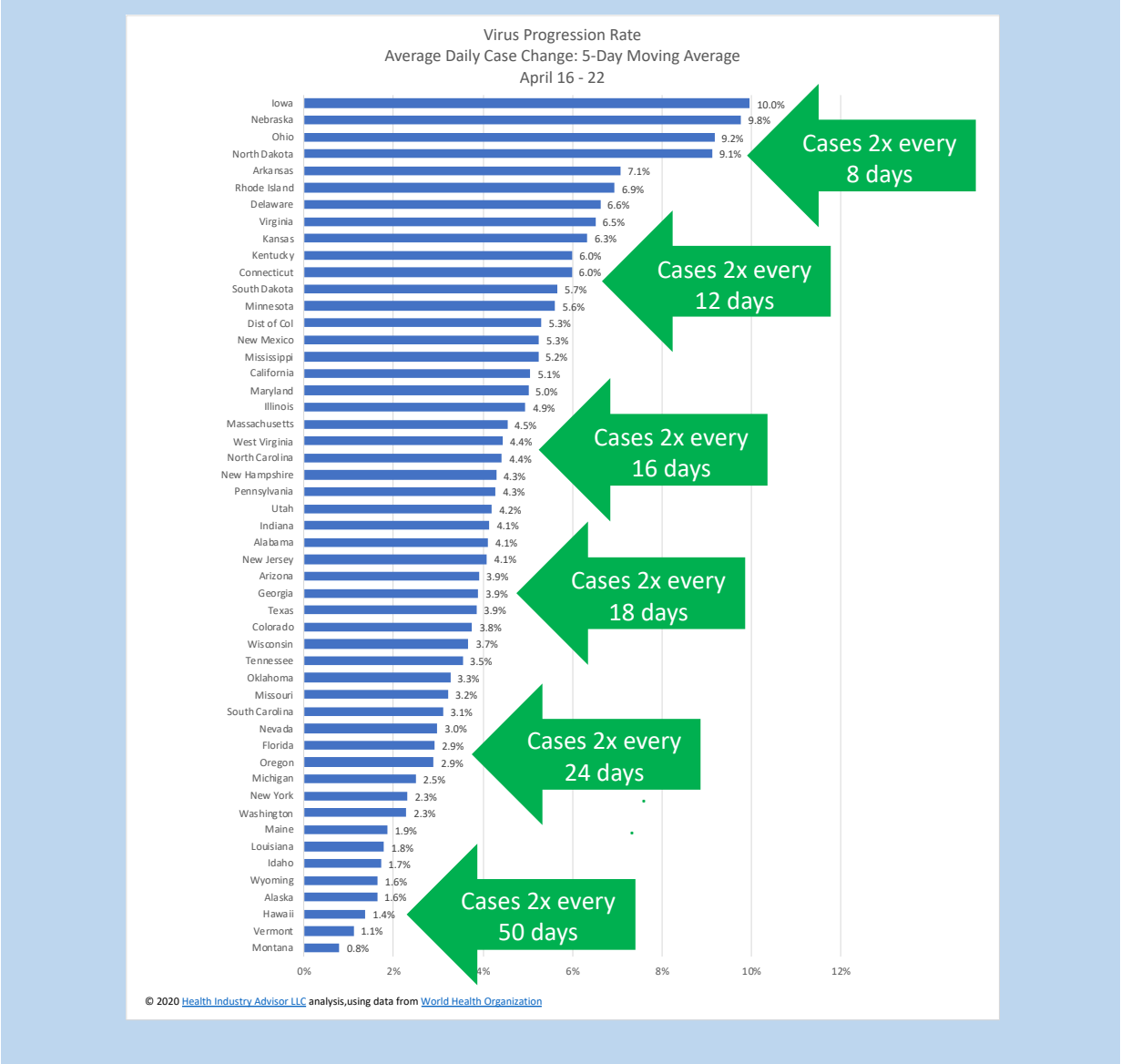
Daily Case Growth Rates By State

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

Iowa is now the lone state experiencing daily case growth > 10%.

The rate is so low in Montana that it would now take nearly 3 months to double; in Vermont, 64 days; and, in Hawaii, 50 days. In New York, Maine, Louisiana, Idaho, Wyoming and Alaska, more than a month. For the U.S overall, it would take about 19-20 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.

As of April 22

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	5,592	(23)	1,140.5	(27)	197	(23)	3.5%	(30)	4.1%	(27)	9,947	(34)	39.4	(29)
Alaska	335	(51)	457.9	(49)	9	(50)	2.7%	(41)	1.6%	(48)	15,056	(17)	8.2	(49)
Arizona	5,459	(24)	750.0	(41)	229	(22)	4.2%	(22)	3.9%	(29)	8,148	(46)	29.4	(38)
Arkansas	2,392	(36)	792.6	(38)	44	(40)	1.8%	(48)	7.1%	(5)	10,513	(32)	37.5	(32)
California	37,343	(4)	945.1	(32)	1,419	(9)	3.8%	(26)	5.1%	(17)	7,666	(49)	38.0	(31)
Colorado	10,878	(17)	1,889.0	(15)	508	(17)	4.7%	(16)	3.8%	(32)	9,156	(38)	64.4	(19)
Connecticut	22,469	(10)	6,302.2	(3)	1,544	(7)	6.9%	(3)	6.0%	(11)	19,522	(12)	309.1	(4)
Delaware	3,200	(33)	3,286.2	(9)	89	(35)	2.8%	(40)	6.6%	(7)	17,433	(15)	174.0	(7)
District Of Columbia	3,206	(32)	4,542.7	(7)	127	(32)	4.0%	(24)	5.3%	(14)	22,647	(6)	204.2	(6)
Florida	28,576	(8)	1,330.5	(19)	927	(10)	3.2%	(32)	2.9%	(39)	14,102	(21)	40.3	(27)
Georgia	21,102	(12)	1,987.5	(14)	846	(11)	4.0%	(23)	3.9%	(30)	9,135	(39)	78.6	(15)
Hawaii	592	(48)	418.1	(50)	12	(48)	2.0%	(47)	1.4%	(49)	18,538	(13)	6.3	(50)
Idaho	1,802	(42)	1,005.5	(31)	54	(38)	3.0%	(38)	1.7%	(46)	10,719	(31)	17.1	(45)
Illinois	35,108	(6)	2,770.6	(11)	1,565	(6)	4.5%	(18)	4.9%	(19)	12,825	(25)	118.5	(8)
Indiana	12,438	(16)	1,847.5	(16)	661	(14)	5.3%	(9)	4.1%	(26)	10,466	(33)	73.9	(17)
Iowa	3,748	(29)	1,187.9	(24)	90	(34)	2.4%	(43)	10.0%	(1)	9,016	(41)	79.4	(14)
Kansas	2,317	(37)	795.3	(37)	111	(33)	4.8%	(14)	6.3%	(9)	6,567	(51)	40.4	(25)
Kentucky	3,373	(31)	755.0	(40)	185	(25)	5.5%	(8)	6.0%	(10)	8,125	(47)	34.6	(34)
Louisiana	25,258	(9)	5,433.2	(6)	1,473	(8)	5.8%	(6)	1.8%	(45)	30,378	(3)	101.6	(12)
Maine	907	(45)	674.7	(45)	39	(43)	4.3%	(20)	1.9%	(44)	13,273	(23)	14.6	(47)
Maryland	14,775	(13)	2,443.9	(12)	698	(12)	4.7%	(15)	5.0%	(18)	12,748	(26)	112.1	(10)
Massachusetts	42,944	(3)	6,179.4	(4)	2,182	(4)	5.1%	(11)	4.5%	(20)	26,421	(4)	267.8	(5)
Michigan	33,966	(7)	3,401.1	(8)	2,813	(3)	8.3%	(1)	2.5%	(41)	12,182	(27)	84.5	(13)
Minnesota	2,721	(35)	482.5	(48)	179	(27)	6.6%	(4)	5.6%	(13)	8,927	(42)	23.1	(42)
Mississippi	4,894	(25)	1,644.4	(17)	193	(24)	3.9%	(25)	5.2%	(16)	18,012	(14)	73.6	(18)
Missouri	6,188	(21)	1,008.2	(30)	232	(21)	3.7%	(28)	3.2%	(36)	9,517	(36)	30.1	(36)
Montana	439	(50)	410.7	(51)	14	(47)	3.2%	(34)	0.8%	(51)	11,119	(30)	4.7	(51)
Nebraska	1,813	(41)	937.2	(33)	42	(41)	2.3%	(44)	9.8%	(2)	9,132	(40)	63.6	(20)
Nevada	4,081	(28)	1,324.9	(20)	172	(28)	4.2%	(21)	3.0%	(38)	14,210	(20)	40.4	(26)
New Hampshire	1,588	(43)	1,167.9	(25)	48	(39)	3.0%	(36)	4.3%	(23)	11,917	(28)	47.2	(24)
New Jersey	95,865	(2)	10,792.9	(2)	5,063	(2)	5.3%	(10)	4.1%	(28)	21,594	(7)	399.4	(1)
New Mexico	2,210	(38)	1,054.0	(29)	71	(37)	3.2%	(33)	5.3%	(15)	19,705	(11)	49.5	(23)
New York	262,268	(1)	13,481.7	(1)	20,354	(1)	7.8%	(2)	2.3%	(42)	34,151	(2)	321.0	(2)
North Carolina	7,488	(20)	714.0	(44)	265	(19)	3.5%	(29)	4.4%	(22)	8,895	(43)	28.7	(39)
North Dakota	679	(47)	891.0	(35)	14	(47)	2.1%	(46)	9.1%	(4)	20,725	(9)	58.9	(22)
Ohio	14,117	(14)	1,207.7	(22)	610	(15)	4.3%	(19)	9.2%	(3)	8,418	(45)	77.3	(16)
Oklahoma	2,894	(34)	731.4	(43)	170	(29)	5.9%	(5)	3.3%	(35)	11,355	(29)	22.8	(43)
Oregon	2,059	(39)	488.2	(47)	78	(36)	3.8%	(27)	2.9%	(40)	9,810	(35)	13.4	(48)
Pennsylvania	36,892	(5)	2,881.7	(10)	1,713	(5)	4.6%	(17)	4.3%	(24)	13,443	(22)	113.1	(9)
Rhode Island	5,841	(22)	5,513.7	(5)	181	(26)	3.1%	(35)	6.9%	(6)	39,487	(1)	311.8	(3)
South Carolina	4,761	(27)	924.7	(34)	140	(31)	2.9%	(39)	3.1%	(37)	8,699	(44)	30.7	(35)
South Dakota	1,858	(40)	2,100.2	(13)	9	(50)	0.5%	(51)	5.7%	(12)	14,827	(18)	111.4	(11)
Tennessee	7,842	(19)	1,147.6	(26)	166	(30)	2.1%	(45)	3.5%	(34)	17,287	(16)	36.9	(33)
Texas	21,458	(11)	740.0	(42)	550	(16)	2.6%	(42)	3.9%	(31)	7,774	(48)	26.8	(41)
Utah	3,445	(30)	1,074.6	(28)	34	(44)	1.0%	(50)	4.2%	(25)	25,107	(5)	40.2	(28)
Vermont	823	(46)	1,318.9	(21)	40	(42)	4.9%	(13)	1.1%	(50)	21,540	(8)	14.7	(46)
Virginia	10,266	(18)	1,202.7	(23)	349	(18)	3.4%	(31)	6.5%	(8)	7,224	(50)	63.0	(21)
Washington	12,494	(15)	1,640.7	(18)	692	(13)	5.5%	(7)	2.3%	(43)	20,283	(10)	29.9	(37)
West Virginia	963	(44)	538.8	(46)	29	(45)	3.0%	(37)	4.4%	(21)	14,740	(19)	19.6	(44)
Wisconsin	4,845	(26)	832.1	(36)	246	(20)	5.1%	(12)	3.7%	(33)	9,405	(37)	27.6	(40)
Wyoming	447	(49)	772.3	(39)	6	(51)	1.3%	(49)	1.6%	(47)	13,102	(24)	39.2	(30)
United States	848,717		2,585.2		47,659		5.6%		4.2%		13,067		87.0	

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COVID-19 Dashboard

"Strategic Guidance in an Era of Unprecedented Change"

Issue #33: April 23

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. 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 selected states per day. We began with those states with the most Total Cases: in order – New York, New Jersey, Massachusetts, Pennsylvania and Michigan on Sunday; California, Illinois, Florida, Louisiana and Texas, Monday; and, Georgia, Connecticut, Maryland, Washington, Indiana, Ohio, Colorado, Virginia, Tennessee and North Carolina, Tuesday; and, Missouri, Alabama, Arizona, Rhode Island, South Carolina, Wisconsin, Mississippi, Nevada, Utah and Kentucky, yesterday.

Today, we add the next ten (plus the District of Columbia), in order of Total Cases - District of Columbia, Oklahoma, Delaware, Iowa, Minnesota, Oregon, New Mexico, Kansas, Arkansas, Idaho and South Dakota.

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 7-day moving average (given the provision for flat or increasing test volume)
- Positive test %, daily and 7-day moving average
- 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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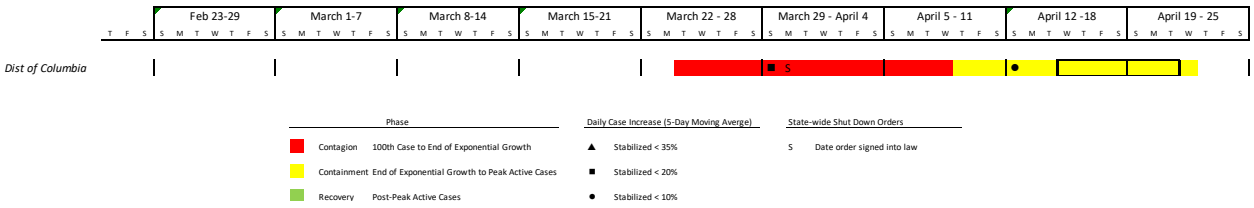
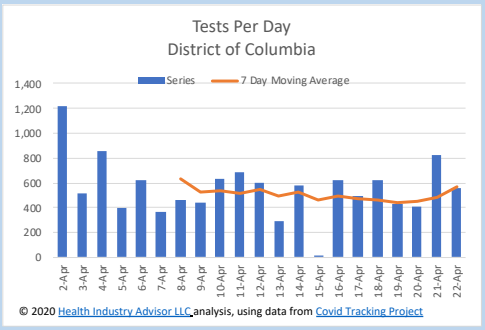
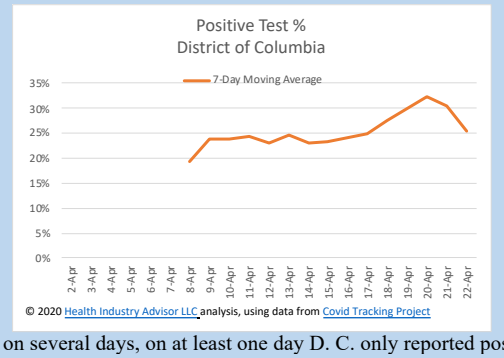
District of Columbia

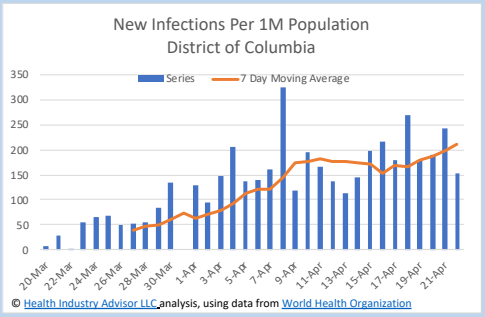
Timeline

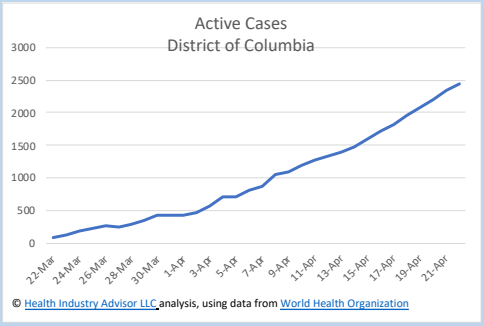


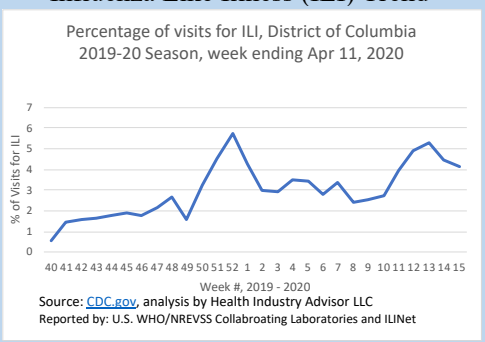


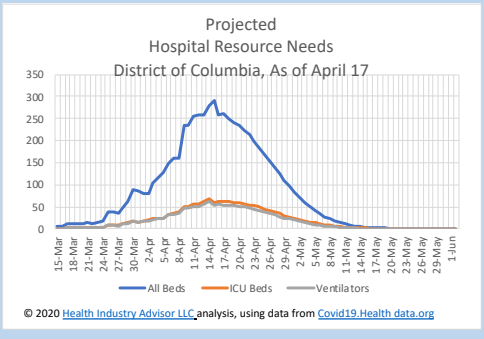


Note: on several days, on at least one day D. C. only reported positive tests. Thus, day-by-day bars are omitted for better readability.









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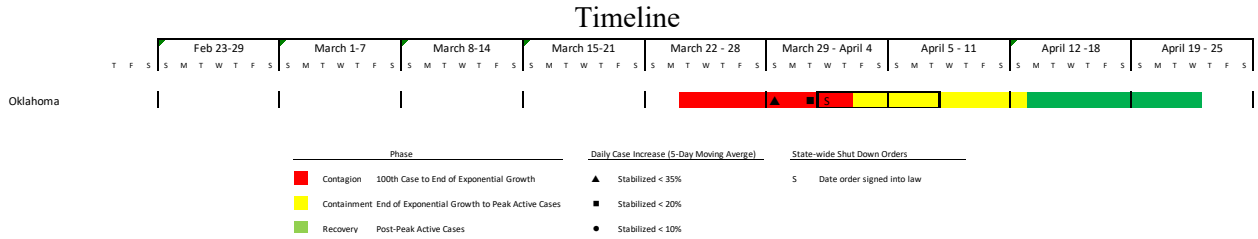
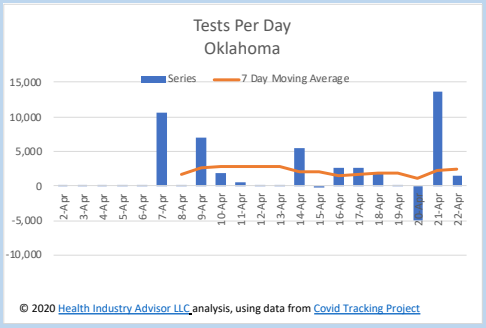
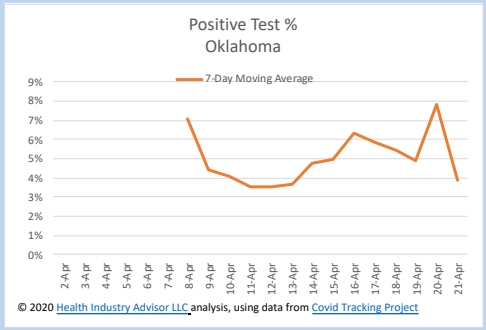
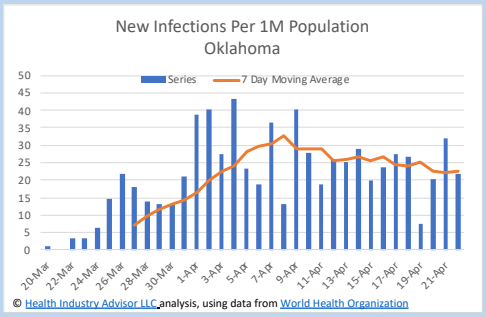
Oklahoma

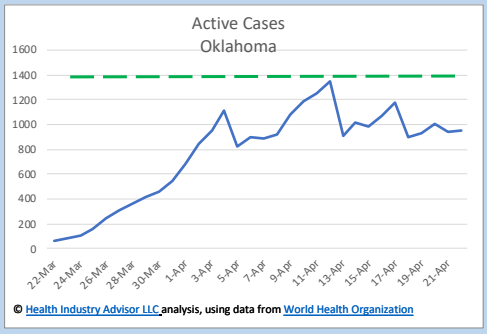


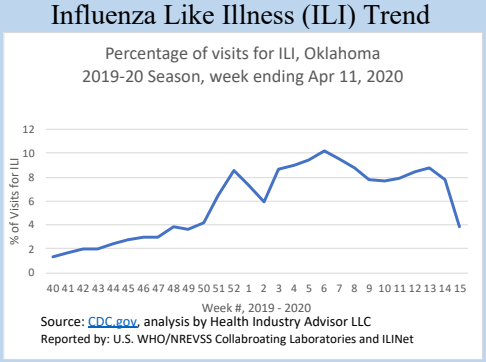


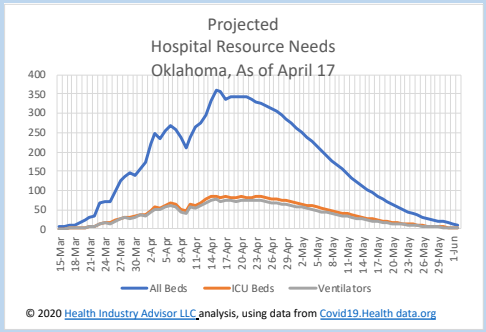


Note: on several days, Oklahoma only reported positive tests. Thus, day-by-day bars are omitted for better readability.









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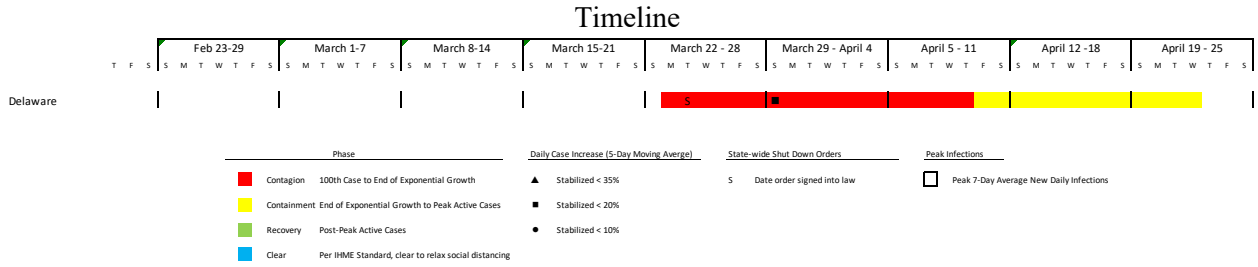
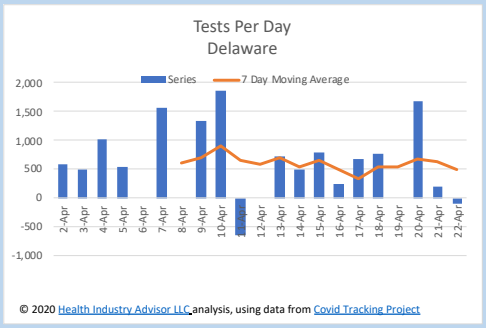
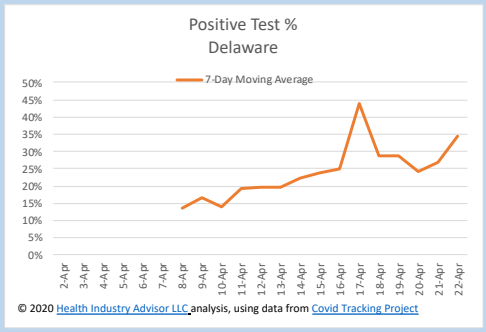
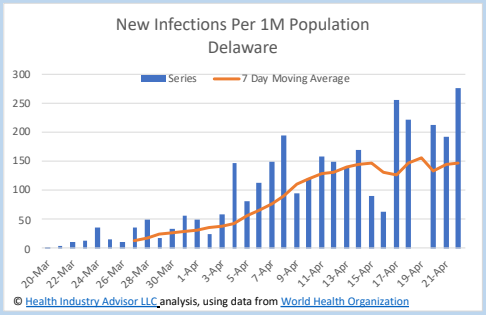
Delaware

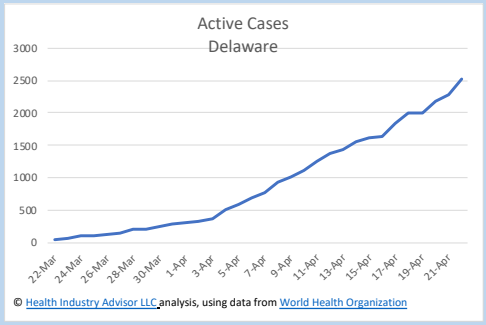


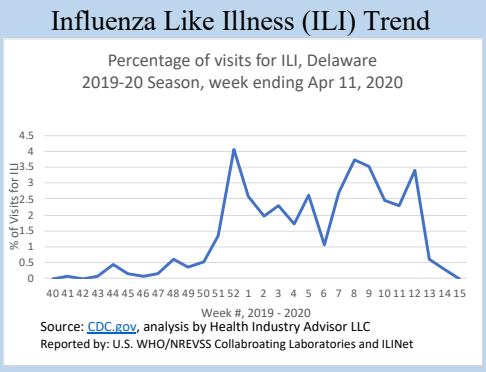


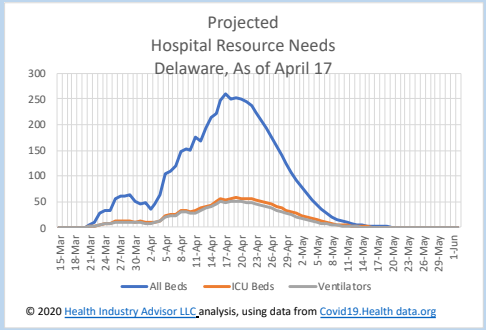


Note: on several days, Delaware reported few tests. Thus, day-by-day bars are omitted for better readability.









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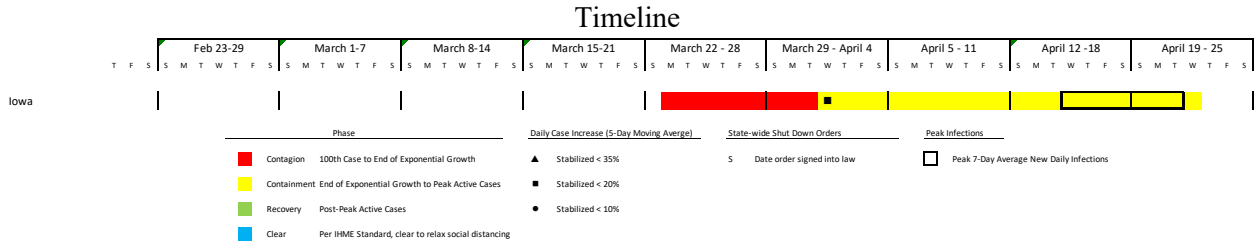
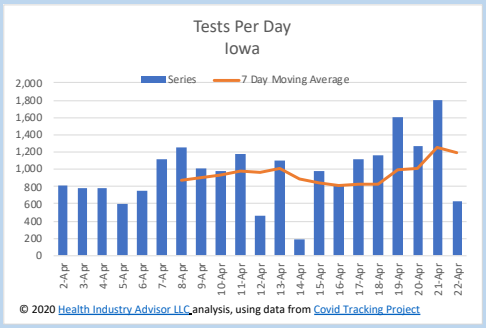
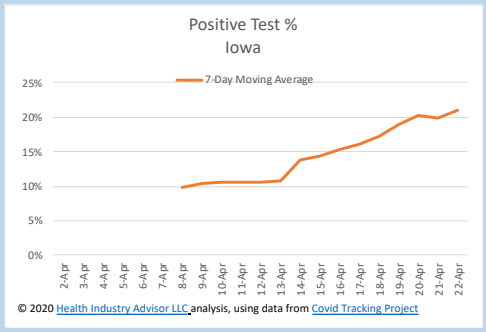
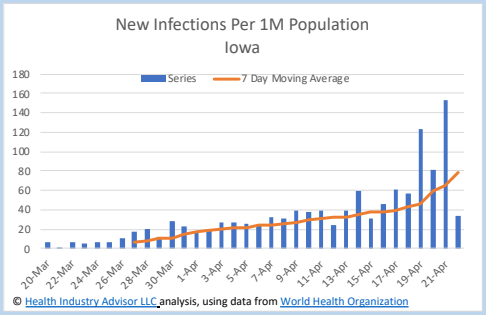
Iowa

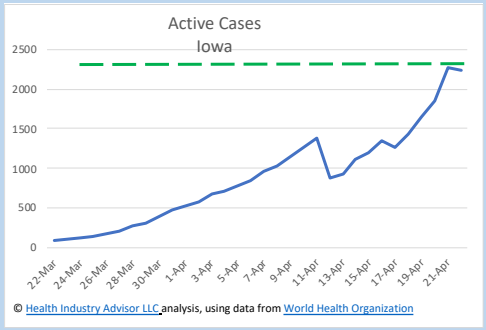




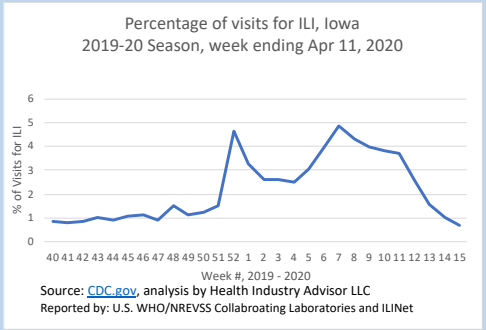


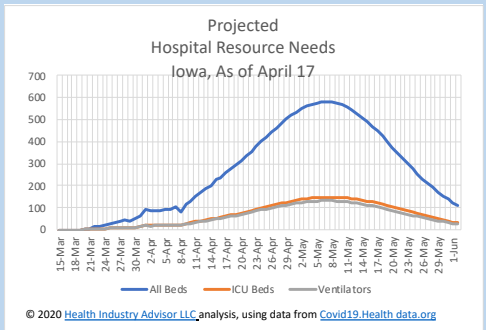
Note: on at least one day2, Iowa only reported positive tests. Thus, day-by-day bars are omitted for better readability.





Influenza Like Illness (ILI) Trend





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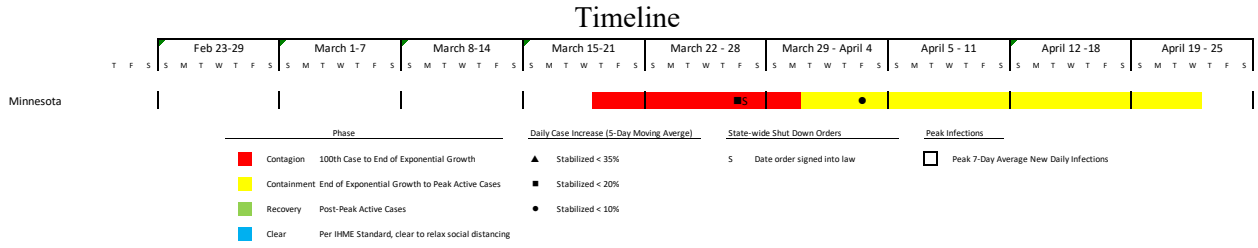
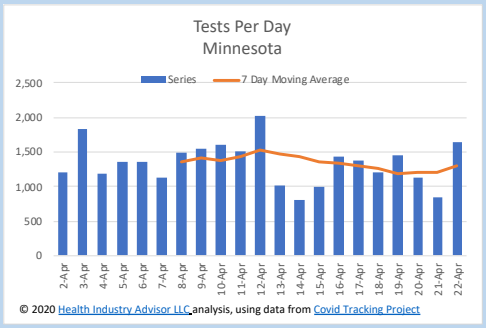
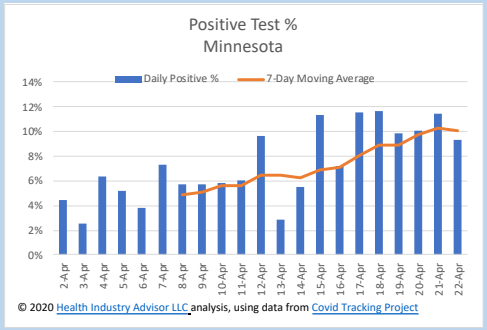
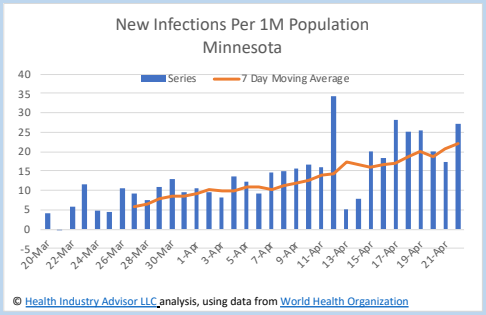
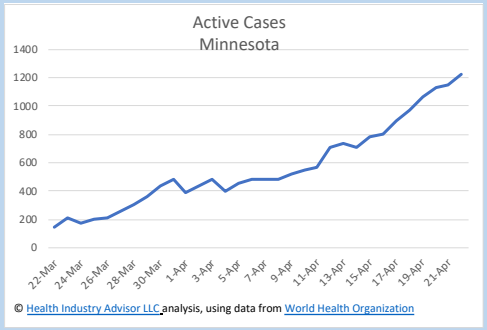
Minnesota



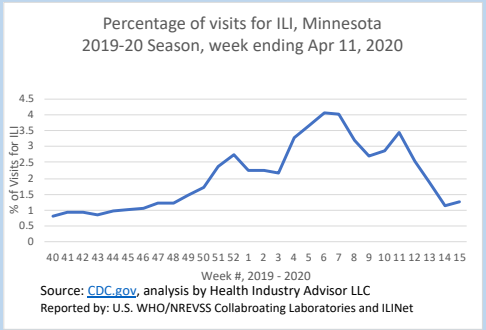


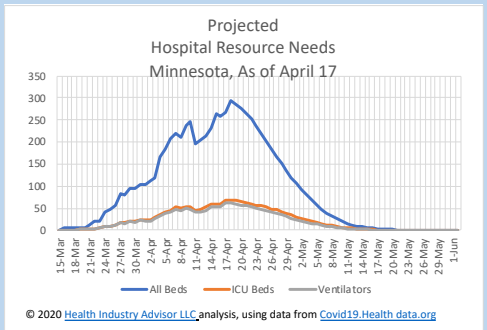






Influenza Like Illness (ILI) Trend





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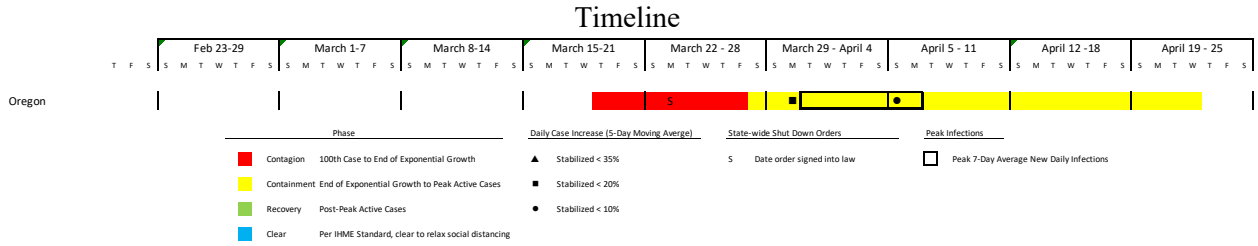
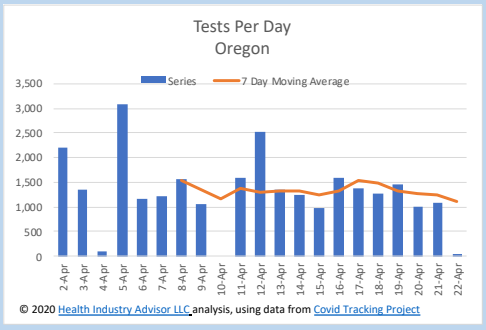
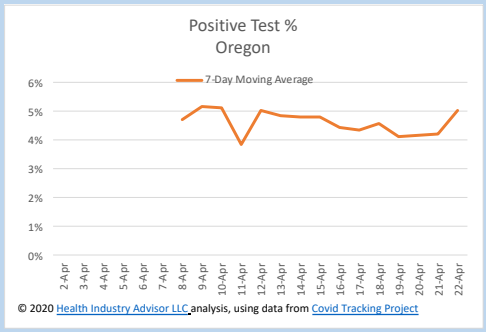
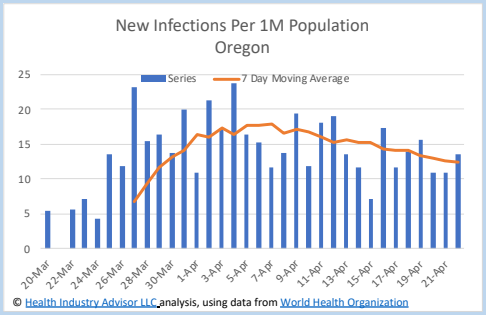
Oregon

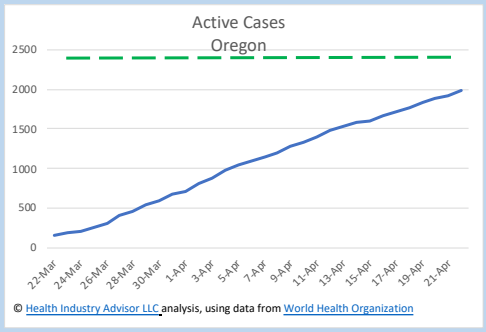


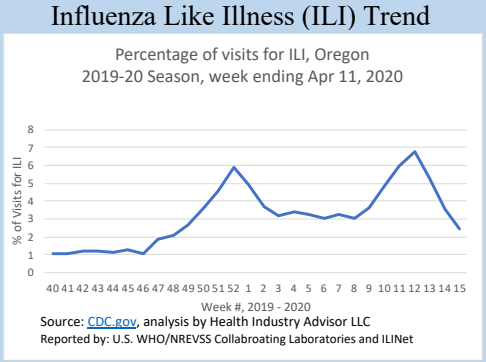


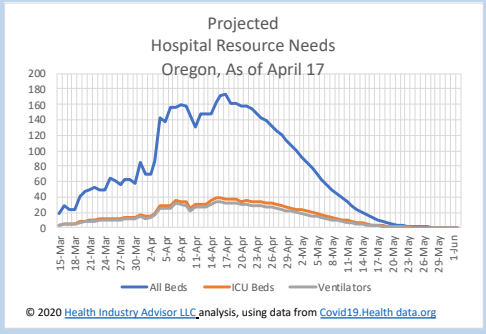


Note: on several days, Oregon reported few tests. Thus, day-by-day bars are omitted for better readability.









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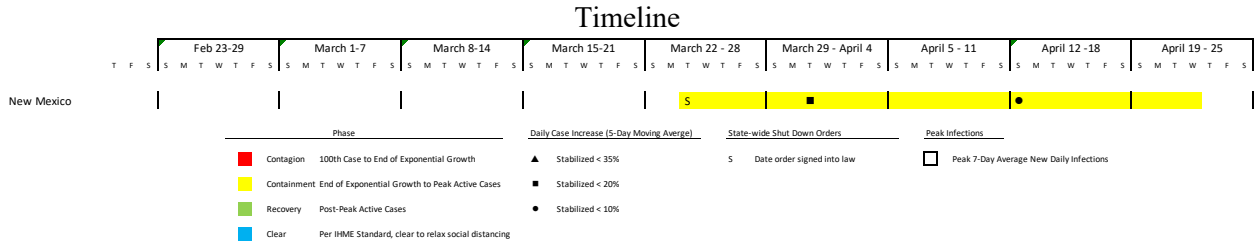
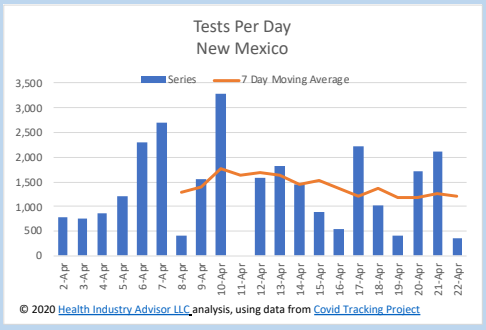
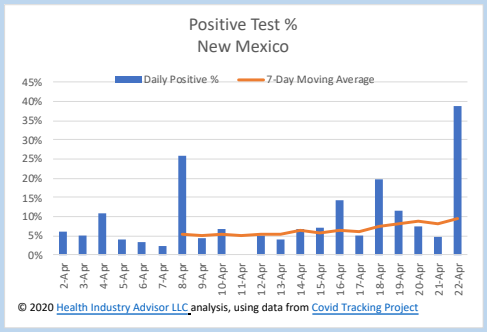
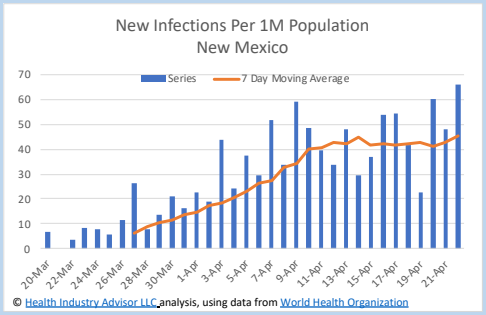
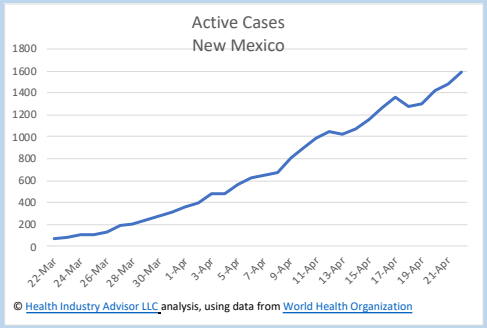
New Mexico

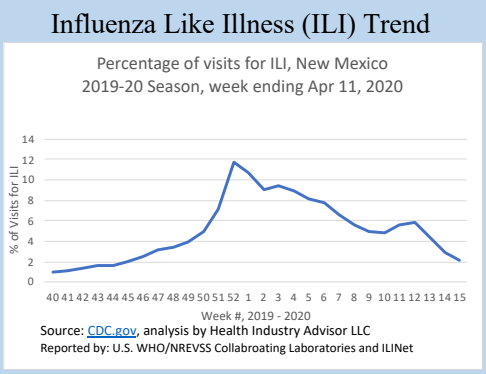


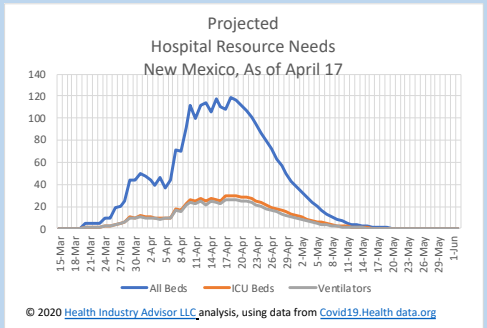












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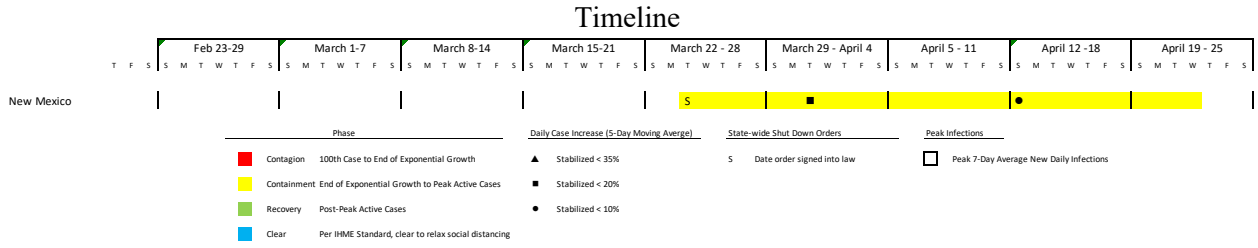
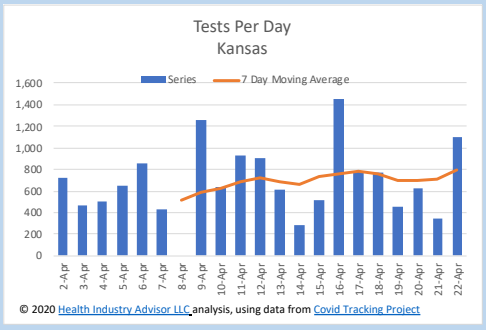
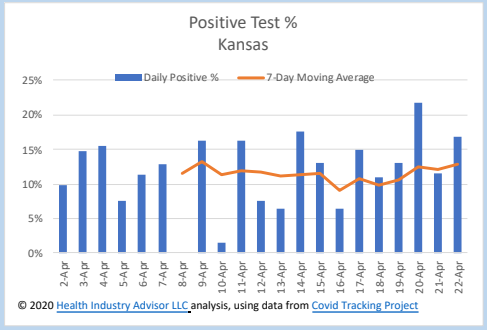
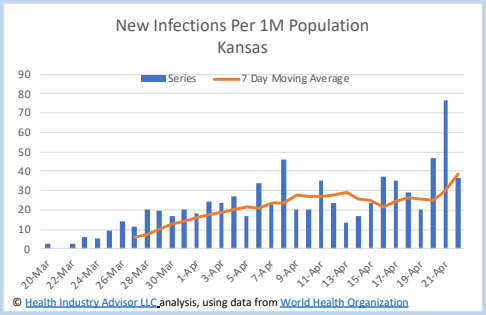
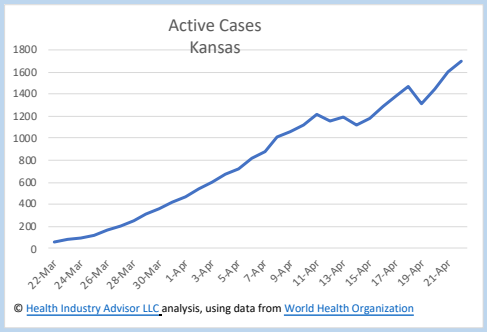
Kansas

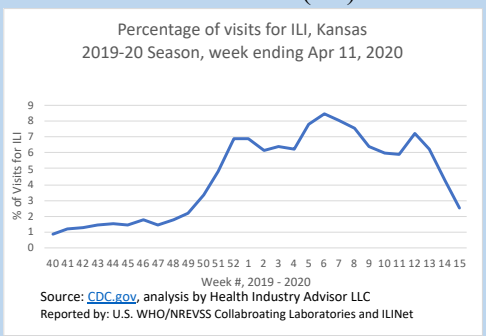


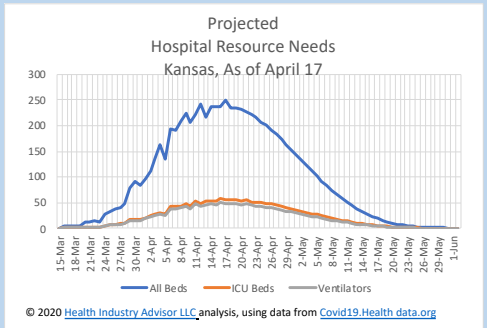












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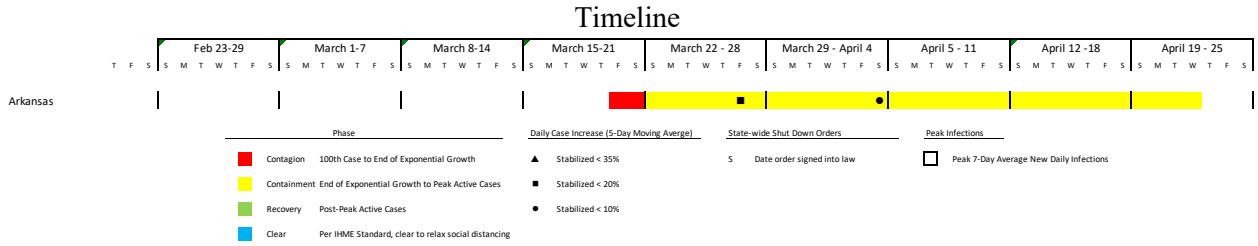
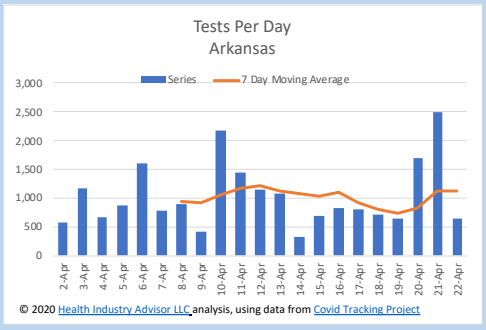
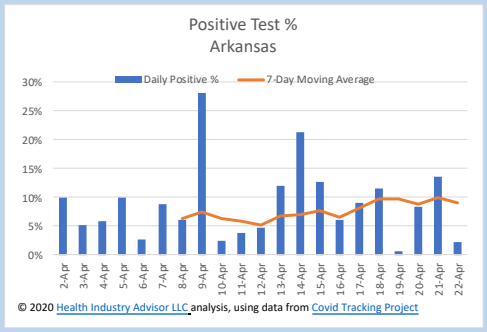
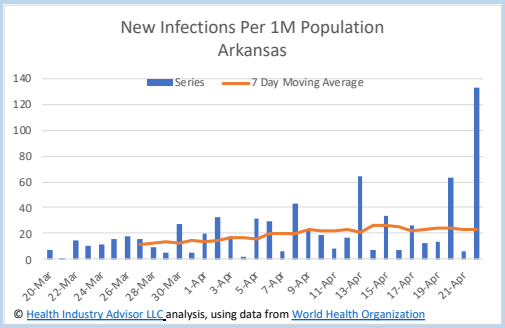
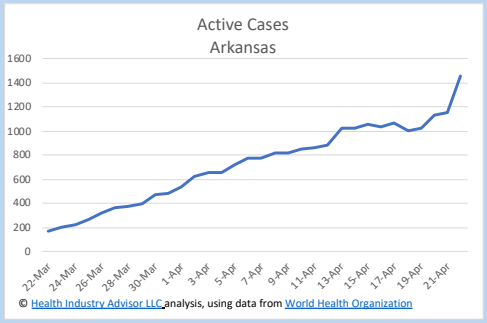
Arkansas

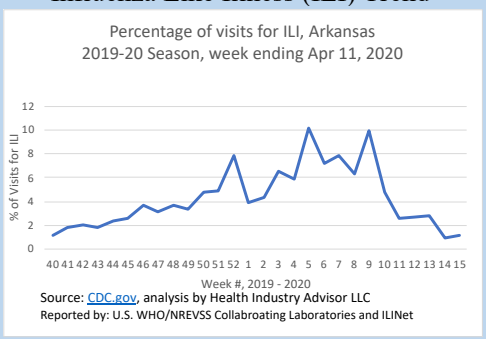


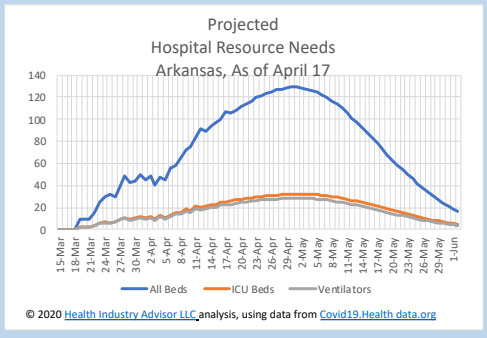












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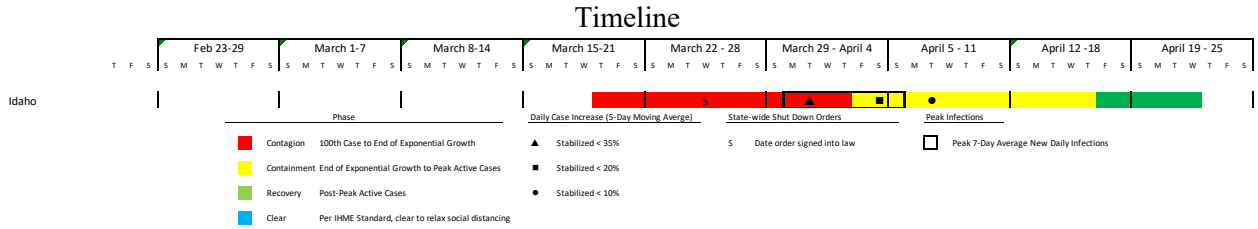
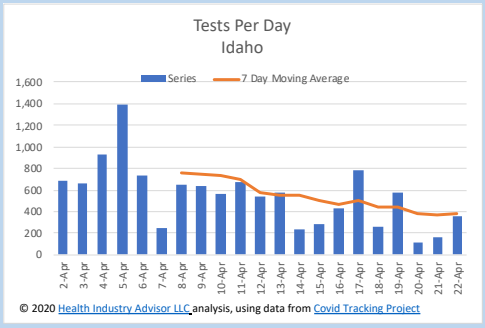
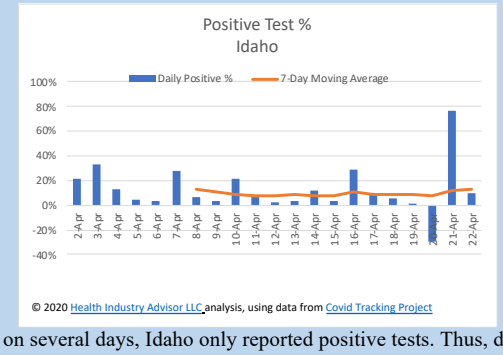
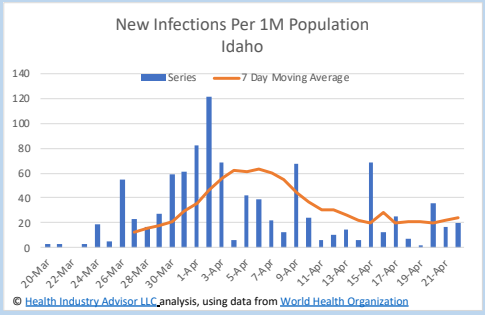
Idaho

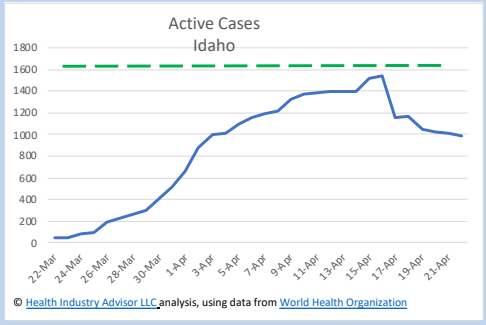


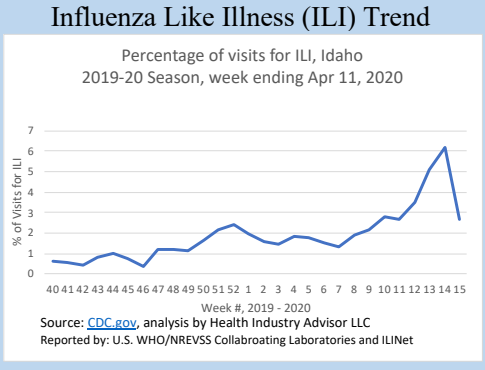


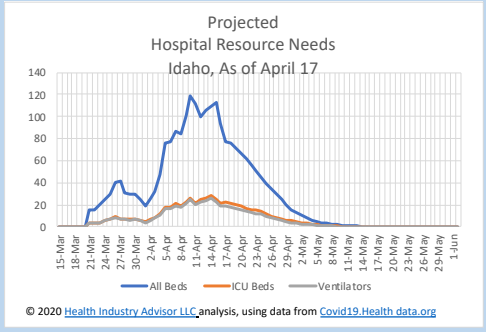


Note: on several days, Idaho only reported positive tests. Thus, day-by-day bars are omitted for better readability.









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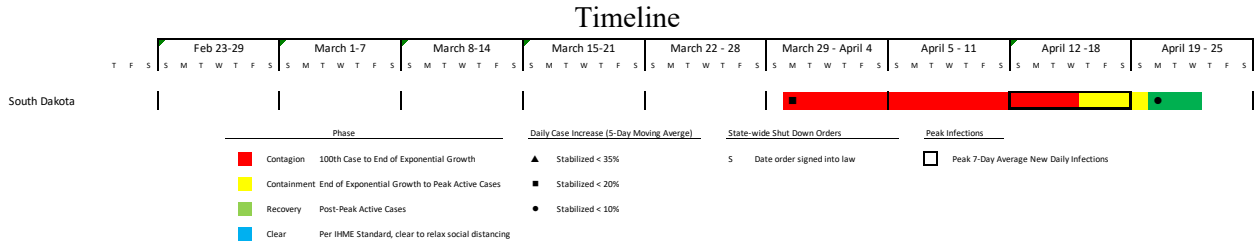
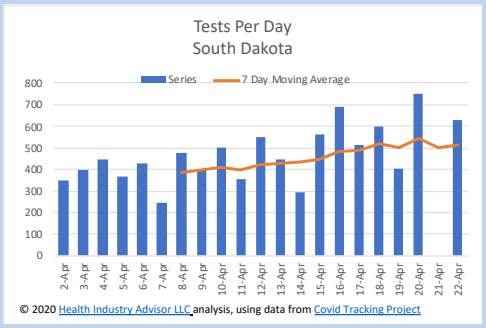
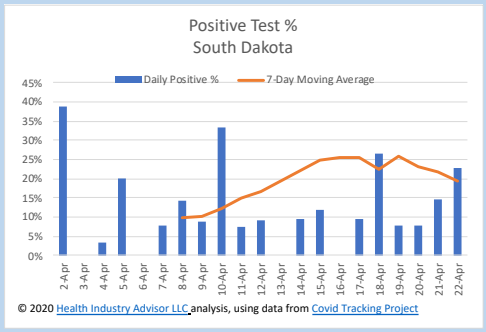
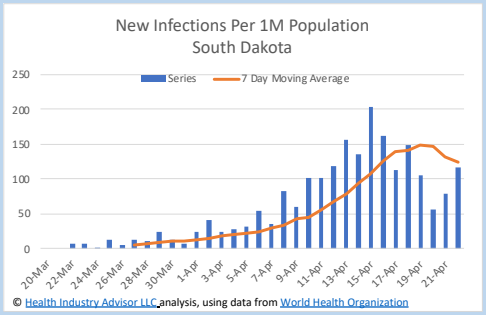
South Dakota

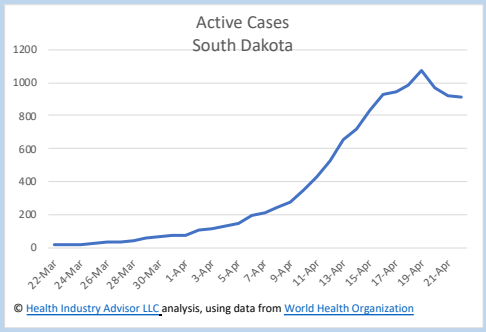


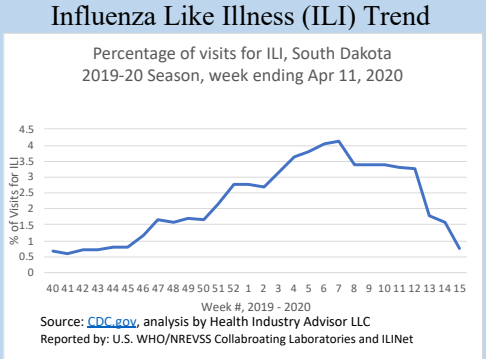


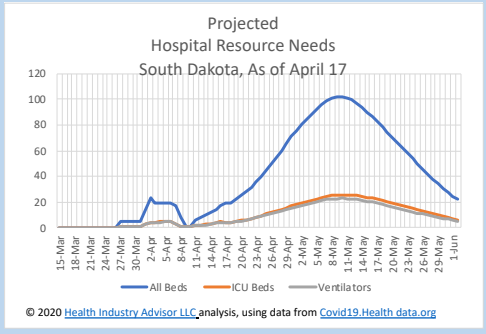


Note: on one days, South Dakota did not report test data. Thus, day-by-day bars are omitted for better readability.









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