

Measure	Desired Change	Yesterday in the U.S.
No. of Tests	Increase	Up 8.5% (Cumulative)
Test-Positivity Rate	Decline	Down to 17.7%
No. of Cases	Plateau	Up to 4.4%
% of Deaths Per Case	Decline	Up slightly at 5.7%
No. of Deaths / 1M Pop.	Plateau	Up to 15.77
Recoveries : Deaths	Increase (>1:1)	Down to 1.71

Highlights from Thursday include:

- Testing in the U.S. was up for the second consecutive day, with 382,000 new tests, compared to 323,000 on Wednesday and to an average of 150,000 for the preceding 8 days. Michigan reported the largest increase in tests, with more than 10,000 yesterday, versus an average of 4,000 the previous 7 days.
- With the acceleration in testing the past 2 days, the U.S. testing rate is now 14,428 per 1 million in population. This still lags far behind countries such as Switzerland (27,182 per million), Italy (26,131 per million) and Germany (24,738 per million).
- Until Tuesday, the U.S. had both a low testing rate per capita and a high test-positivity rate, suggesting that the actual prevalence of infections was understated. The test-positivity rate for the new tests on Wednesday and Thursday, however, was 8.7%, down from the 19.2% for prior tests. The combination of much greater testing and a much lower test-positivity rate suggests we are getting closer but, not yet to the point, of observing the actual prevalence of the virus infection.

Interestingly, a New York study released yesterday found that 13.9% of its sampled population had the presence of antibodies - 10 times the 1.38% suggested by the number of confirmed cases. This would render the virus far more widespread yet, less deadly (death rate in New York of 0.75% versus 7.8%) than reported.

- With the large increase in testing yesterday, Total Cases in the U.S. only increased by 4.4% - versus the previous day's growth of 3.7%. Total Cases are now just under 900,000; Active Cases (still infected) are now 717,008.
- While New York has appropriately been the focus of much attention for the past several weeks, New Jersey may be of greater concern: it now has the highest new daily infections per capita and the highest test-positivity test rates over the past 7 days of any state. Connecticut is 2nd and 4th; New York is 4th and 3rd on these measures.
- Parts of Asia, Central and South America appear to be experiencing increasing spread of the virus: India is now 16th in the world in cases, adding 1,669 new cases yesterday; Peru is 18th, adding 1,664 new cases; Saudi Arabia is 23rd, adding 1,158 new cases; Singapore, 27th, adding 1,037 new cases; and, Mexico is 30th, with 1,043 new cases.

We will be adding these countries, along with Ireland, Japan, Chile, Ecuador, and Pakistan to our coverage tomorrow, giving us representation of the top 30 countries in total cases.

*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 unwieldy 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
Yesterday	States ranked 31 – 40, plus District of Columbia: Oklahoma, Delaware, Iowa, Minnesota, Oregon, New Mexico, Kansas, Arkansas, Idaho, South Dakota
Today	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 30 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.

Testing Considerations

Greater Testing Gives Better Insight to the Prevalence of the Virus Spread: New Jersey Facing Greatest Challenge in U.S Today

Inadequate testing in the U.S. has been a great concern since the beginning of the virus spread. While testing has increased significantly in the past 2 days, it remains far lower on a per capita basis than many leading countries.

Several states, however, in particular those hardest-hit by the virus have achieved testing levels at or above those of Switzerland, Italy and Germany. These include: Louisiana, Massachusetts, New Jersey, New York, Rhode Island and Utah, as well as the District of Columbia.

Comparing these states testing rates per capita, test-positivity rate (% of tests that are positive, on a 7-day moving average (MA) basis) and new daily infection rates (on a 7-day moving average (MA) basis):

	Tests/Capita	Positivity - 7 day MA	Inf Rate - 7 Day MA
Rhode Island	41,930	14.8%	326.1
New York	35,773	28.3%	311.2
Louisiana	30,828	19.2%	98.6
Massachusetts	28,070	25.5%	284.5
Utah	25,149	3.0%	41.4
District Of Columbia	22,572	26.7%	204.6
New Jersey	22,534	51.1%	397.4

Despite a reasonably high testing rate, New Jersey still reports a 51% net-positivity rate. Contrast this with Utah, with a comparable per-capita testing rate, showing a mere 3% net-positivity rate. Frankly, other than Utah, the test-positivity rates are too high to conclude that we fully understand the true prevalence of the virus spread in these states and municipality.

(It should be noted: the test-positivity and new daily infection rates are declining in many of these states – they simply remain at high level.)

Contrast the measures above with those of the California and Washington. Ideally, California should significantly increase testing. Still the relatively low test-positivity rates and low (and declining) new infection rates in these states are encouraging.

	Tests/Capita	Positivity - 7 day MA	Inf Rate - 7 Day MA
Washington	20,142	6.8%	32.5
California	12,201	4.7%	42.1

We will provide a more thorough, state-by-state analysis in Sunday’s report.

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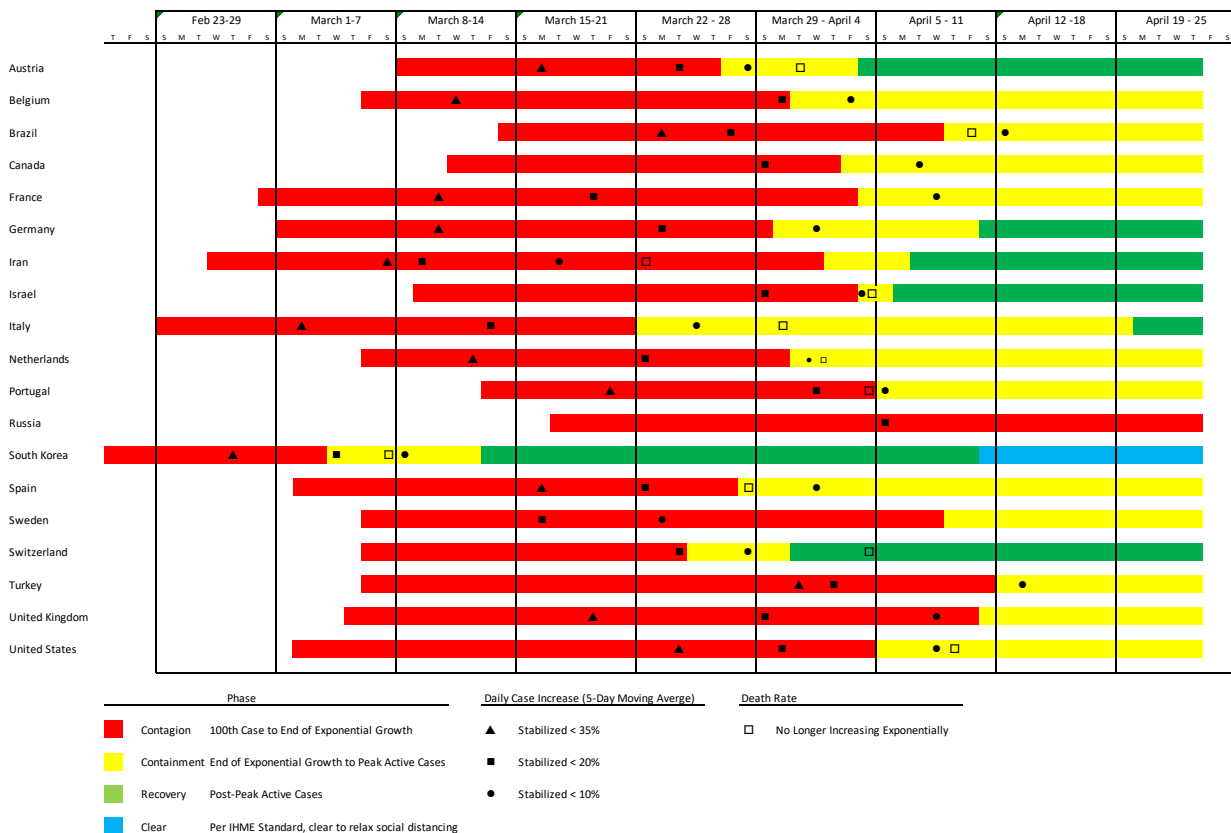
Virus Progression: Hardest Hit Countries

Italy Now Appears 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.

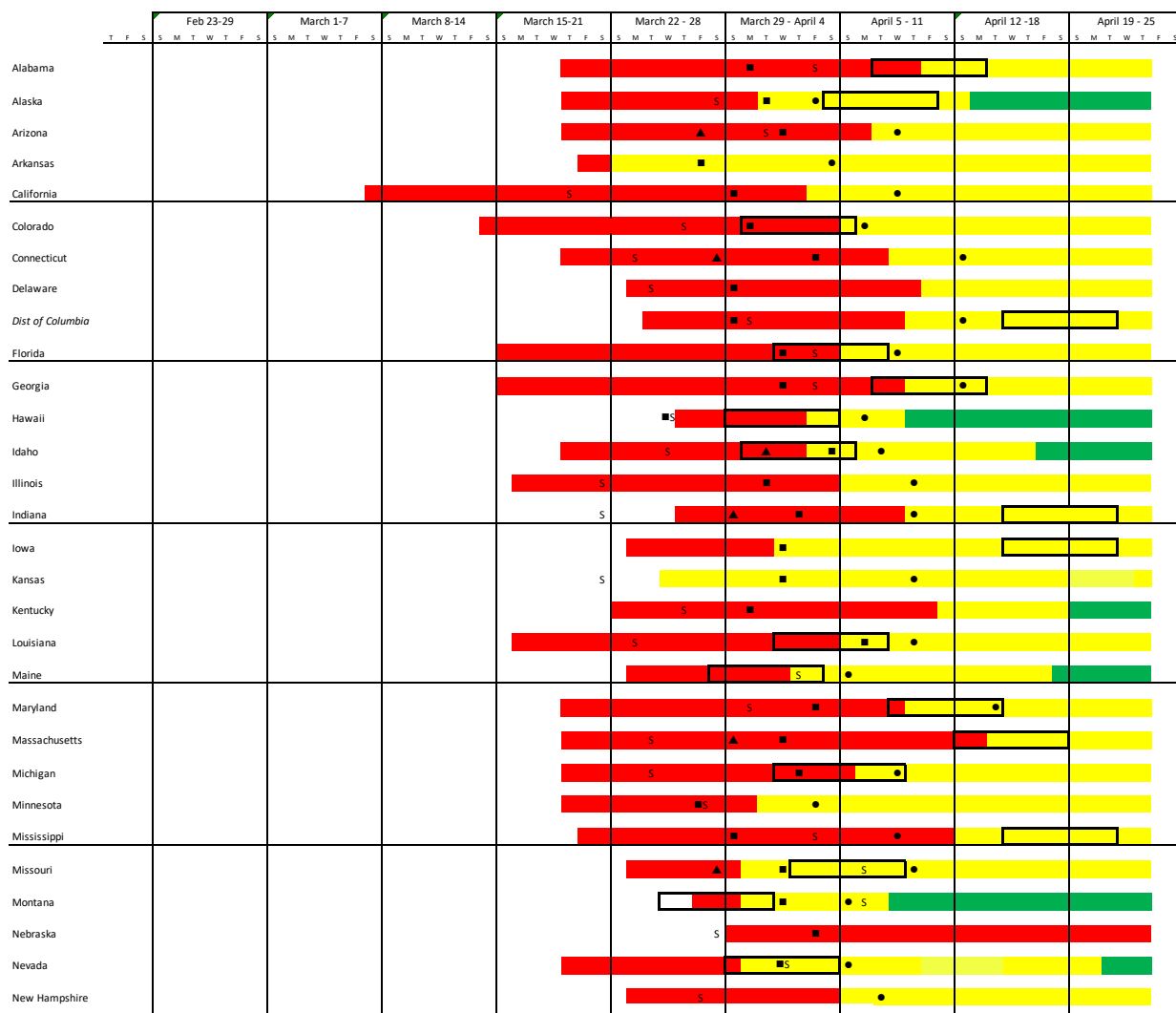
The graphic illustrates in color when the country first recorded 100 total cases (start of the "contagion" phase); when growth stopped following an exponential pattern (start of the "containment" phase); and when peak total cases were recorded (start of the "recovery" phase). It uses symbols to indicate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



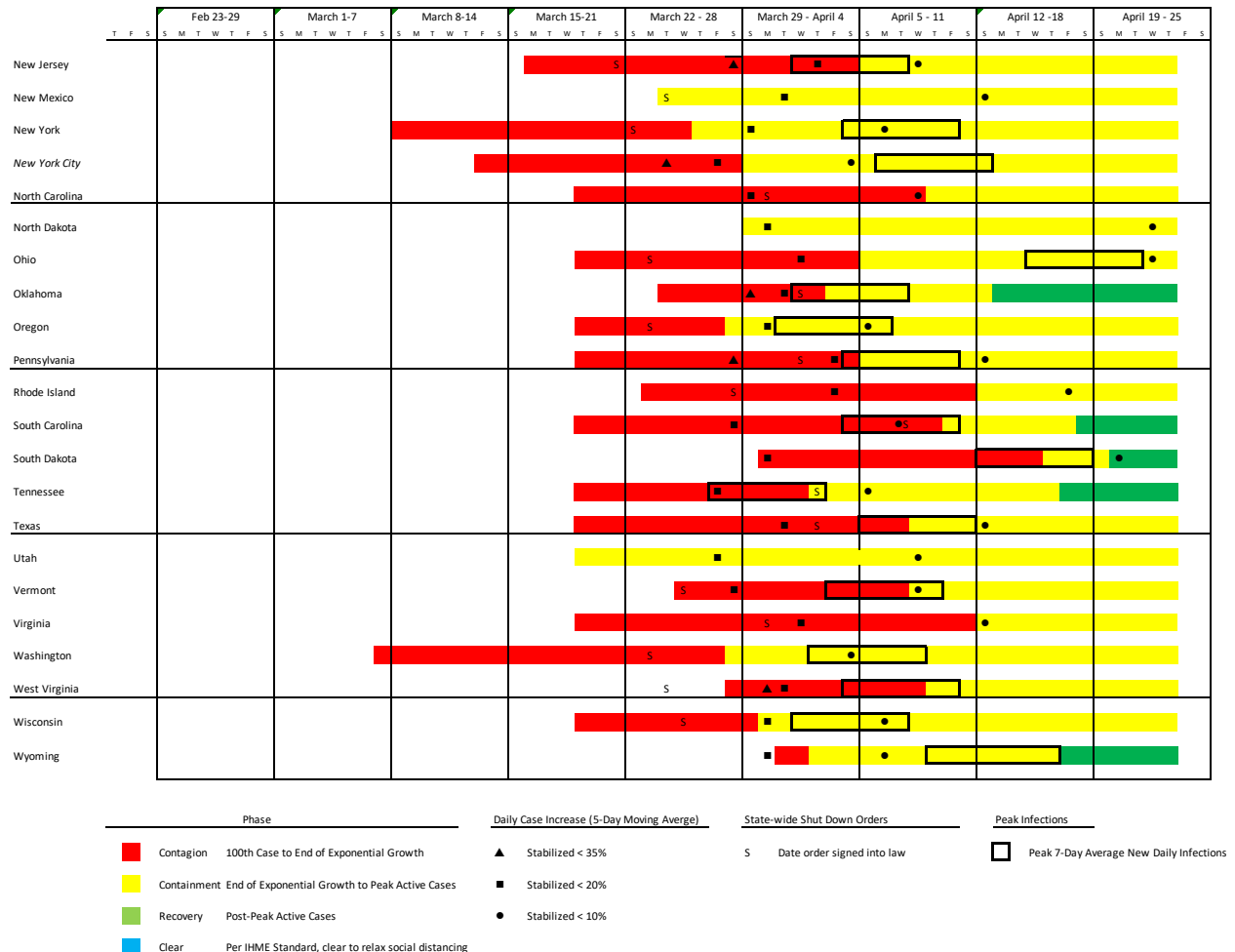
Virus Progression: US States, District of Columbia and New York City

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

Kentucky now has moved several days past its peak in Active Cases. Utah, however, exceeded its previous peak yesterday. (We mentioned here yesterday that Utah's peak was a tenuous one, as it has not demonstrated a similar peak in new daily infections.) This still leaves twelve states – Alaska, Hawaii, Idaho, Kentucky, Maine, Montana, Nevada, Oklahoma, South Carolina, South Dakota, Tennessee, and Wyoming - that may be past their peak in Active cases.



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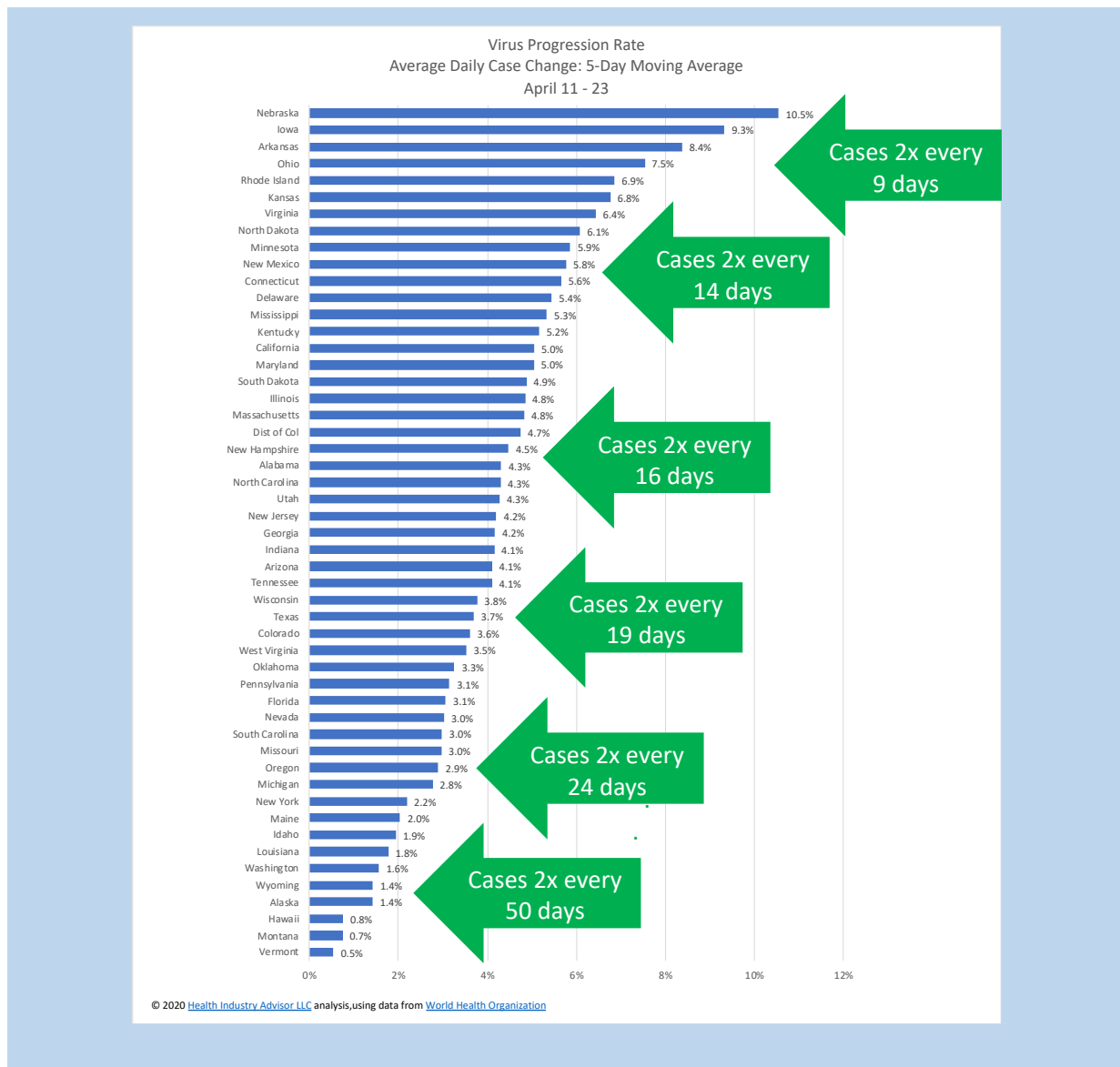


Daily Case Growth Rates By State

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

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

The case growth rate is so low in Vermont that it would now take 128 days for cases to double. In 18 states, it would take more than 3 weeks; in 36 states plus the District of Columbia, more than 2 weeks. For the U.S. overall, it would take about 19 days.



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 23

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	5,832	(23)	1,189.4	(27)	201	(24)	3.4%	(30)	4.3%	(22)	10,821	(35)	41.6	(30)
Alaska	337	(51)	460.7	(49)	9	(50)	2.7%	(41)	1.4%	(48)	15,535	(19)	7.2	(49)
Arizona	5,769	(24)	792.6	(39)	249	(21)	4.3%	(22)	4.1%	(28)	8,450	(48)	30.1	(36)
Arkansas	2,599	(36)	861.2	(37)	45	(41)	1.7%	(48)	8.4%	(3)	11,553	(31)	46.3	(25)
California	39,288	(4)	994.3	(33)	1,523	(9)	3.9%	(27)	5.0%	(15)	12,314	(28)	42.1	(27)
Colorado	11,262	(17)	1,955.6	(15)	552	(17)	4.9%	(14)	3.6%	(32)	9,460	(43)	64.2	(21)
Connecticut	23,100	(10)	6,479.1	(4)	1,639	(7)	7.1%	(3)	5.6%	(11)	19,963	(12)	289.1	(4)
Delaware	3,308	(33)	3,397.1	(9)	92	(35)	2.8%	(40)	5.4%	(12)	17,812	(16)	180.9	(7)
District Of Columbia	3,361	(32)	4,762.3	(7)	139	(32)	4.1%	(23)	4.7%	(20)	23,273	(6)	204.6	(6)
Florida	29,648	(8)	1,380.4	(19)	987	(10)	3.3%	(32)	3.1%	(36)	14,712	(20)	42.0	(28)
Georgia	21,883	(12)	2,061.0	(14)	881	(11)	4.0%	(24)	4.2%	(26)	9,814	(38)	74.2	(18)
Hawaii	596	(48)	420.9	(50)	12	(48)	2.0%	(47)	0.8%	(49)	18,538	(13)	5.5	(50)
Idaho	1,836	(42)	1,024.5	(32)	54	(38)	2.9%	(39)	1.9%	(44)	11,311	(33)	18.1	(44)
Illinois	36,934	(6)	2,914.7	(10)	1,688	(5)	4.6%	(17)	4.8%	(18)	13,518	(22)	126.3	(8)
Indiana	13,039	(15)	1,936.8	(16)	706	(14)	5.4%	(10)	4.1%	(27)	10,854	(34)	74.2	(17)
Iowa	3,924	(29)	1,243.7	(24)	96	(34)	2.4%	(43)	9.3%	(2)	9,341	(44)	80.7	(14)
Kansas	2,482	(37)	852.0	(38)	112	(33)	4.5%	(19)	6.8%	(6)	7,025	(51)	43.1	(26)
Kentucky	3,481	(31)	779.2	(41)	191	(26)	5.5%	(8)	5.2%	(14)	9,649	(41)	33.6	(33)
Louisiana	25,739	(9)	5,536.7	(6)	1,599	(8)	6.2%	(5)	1.8%	(45)	30,418	(3)	98.6	(12)
Maine	937	(45)	697.1	(45)	44	(42)	4.7%	(16)	2.0%	(43)	13,296	(25)	15.0	(45)
Maryland	15,737	(13)	2,603.0	(12)	748	(12)	4.8%	(15)	5.0%	(16)	13,342	(24)	117.0	(9)
Massachusetts	46,023	(3)	6,622.5	(3)	2,360	(4)	5.1%	(12)	4.8%	(19)	28,561	(4)	284.5	(5)
Michigan	35,291	(7)	3,533.7	(8)	2,977	(3)	8.4%	(1)	2.8%	(41)	13,274	(26)	86.2	(13)
Minnesota	2,942	(35)	521.7	(47)	200	(25)	6.8%	(4)	5.9%	(9)	9,326	(45)	26.1	(41)
Mississippi	5,153	(25)	1,731.4	(17)	201	(24)	3.9%	(26)	5.3%	(13)	18,532	(14)	73.4	(19)
Missouri	6,384	(21)	1,040.2	(31)	243	(22)	3.8%	(28)	3.0%	(39)	9,732	(40)	28.1	(39)
Montana	442	(50)	413.6	(51)	14	(47)	3.2%	(34)	0.7%	(50)	11,399	(32)	3.6	(51)
Nebraska	2,124	(40)	1,098.0	(30)	47	(40)	2.2%	(44)	10.5%	(1)	9,818	(37)	78.1	(15)
Nevada	4,208	(28)	1,366.2	(20)	189	(28)	4.5%	(20)	3.0%	(37)	14,612	(21)	41.1	(32)
New Hampshire	1,670	(43)	1,228.2	(25)	51	(39)	3.1%	(36)	4.5%	(21)	11,917	(30)	48.2	(24)
New Jersey	100,025	(2)	11,261.3	(2)	5,428	(2)	5.4%	(9)	4.2%	(25)	22,482	(7)	397.4	(1)
New Mexico	2,379	(38)	1,134.6	(28)	78	(37)	3.3%	(33)	5.8%	(10)	22,253	(8)	53.3	(23)
New York	268,581	(1)	13,806.3	(1)	20,861	(1)	7.8%	(2)	2.2%	(42)	35,473	(2)	311.2	(3)
North Carolina	7,854	(20)	748.8	(44)	281	(19)	3.6%	(29)	4.3%	(23)	9,471	(42)	30.6	(35)
North Dakota	709	(47)	930.4	(35)	15	(46)	2.1%	(45)	6.1%	(8)	21,710	(10)	59.2	(22)
Ohio	14,694	(14)	1,257.1	(23)	656	(15)	4.5%	(21)	7.5%	(4)	8,789	(47)	76.8	(16)
Oklahoma	3,017	(34)	762.5	(43)	179	(29)	5.9%	(6)	3.3%	(34)	12,247	(29)	23.8	(42)
Oregon	2,127	(39)	504.3	(48)	83	(36)	3.9%	(25)	2.9%	(40)	10,773	(36)	13.2	(46)
Pennsylvania	37,053	(5)	2,894.3	(11)	1,685	(6)	4.5%	(18)	3.1%	(35)	13,443	(23)	104.0	(11)
Rhode Island	6,256	(22)	5,905.4	(5)	189	(28)	3.0%	(38)	6.9%	(5)	42,039	(1)	326.1	(2)
South Carolina	4,917	(27)	955.0	(34)	150	(31)	3.1%	(37)	3.0%	(38)	8,972	(46)	27.4	(40)
South Dakota	1,956	(41)	2,211.0	(13)	9	(50)	0.5%	(51)	4.9%	(17)	16,273	(17)	104.2	(10)
Tennessee	8,266	(19)	1,209.7	(26)	170	(30)	2.1%	(46)	4.1%	(29)	18,508	(15)	41.9	(29)
Texas	22,393	(11)	772.3	(42)	576	(16)	2.6%	(42)	3.7%	(31)	8,072	(49)	28.4	(38)
Utah	3,612	(30)	1,126.7	(29)	35	(44)	1.0%	(50)	4.3%	(24)	26,475	(5)	41.4	(31)
Vermont	825	(46)	1,322.1	(21)	43	(43)	5.2%	(11)	0.5%	(51)	22,164	(9)	13.0	(47)
Virginia	10,998	(18)	1,288.5	(22)	372	(18)	3.4%	(31)	6.4%	(7)	7,668	(50)	68.8	(20)
Washington	12,753	(16)	1,674.7	(18)	711	(13)	5.6%	(7)	1.6%	(46)	21,027	(11)	32.5	(34)
West Virginia	981	(44)	548.9	(46)	31	(45)	3.2%	(35)	3.5%	(33)	15,919	(18)	19.3	(43)
Wisconsin	5,052	(26)	867.7	(36)	257	(20)	5.1%	(30)	3.8%	(30)	9,779	(39)	28.9	(37)
Wyoming	453	(49)	782.7	(40)	7	(51)	1.5%	(49)	1.4%	(47)	13,102	(27)	12.8	(48)
United States	886,442		2,700.1		50,236		5.7%		3.9%		14,189		88.0	

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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. 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. Today, we add the final ten states in order of Total Cases - New Hampshire, Nebraska, Maine, West Virginia, Vermont, Hawaii, North Dakota, Montana, Wyoming and Alaska.

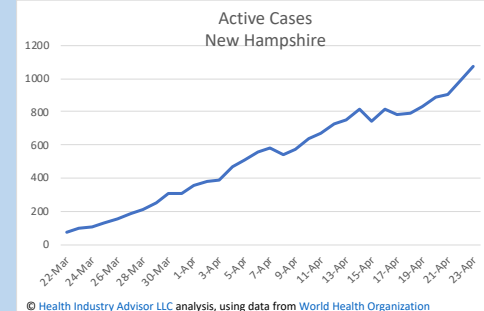
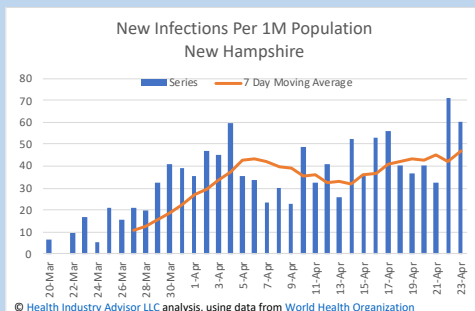
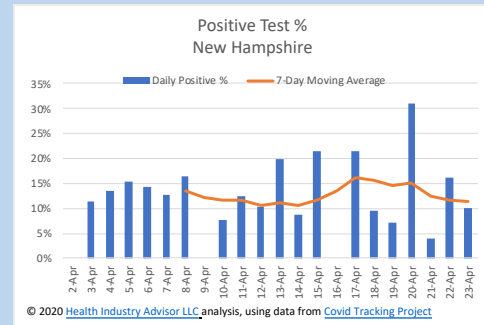
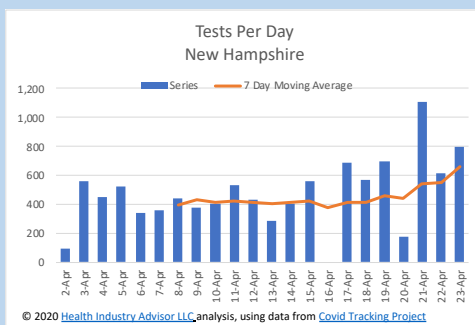
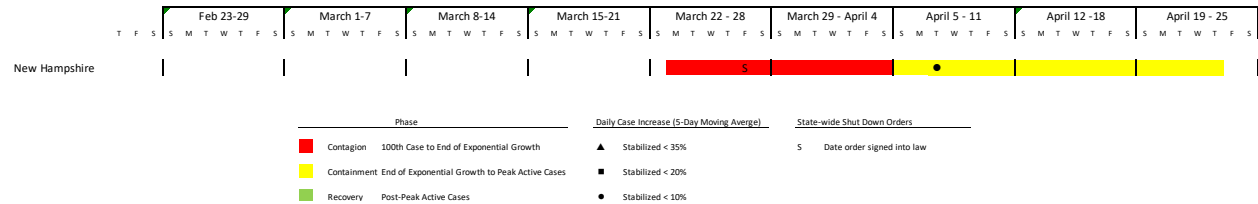
On these pages, we show:

- 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

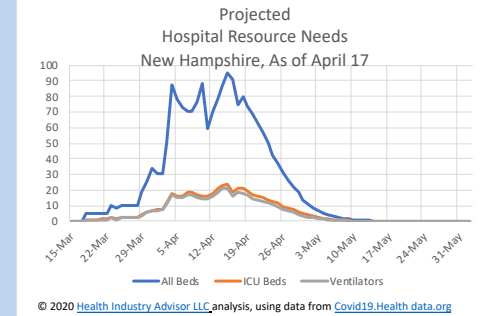
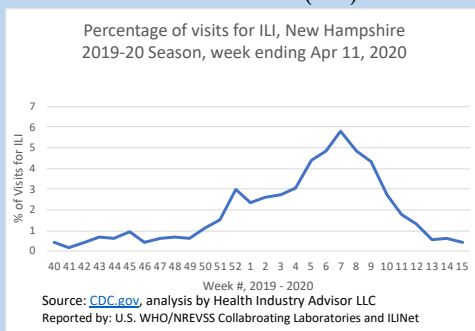
Note: these measures are not necessarily those that will be used by the states, however, they could serve as useful proxies. **Still, no one should rely on any of the following for a determination of what actions each state will take, and when.**

New Hampshire

Timeline

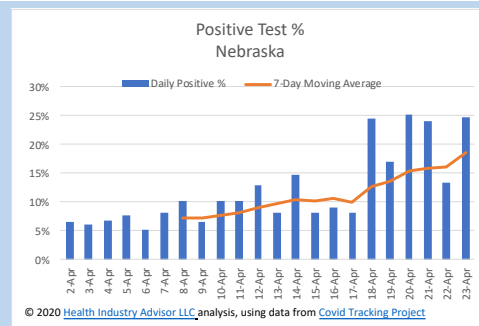
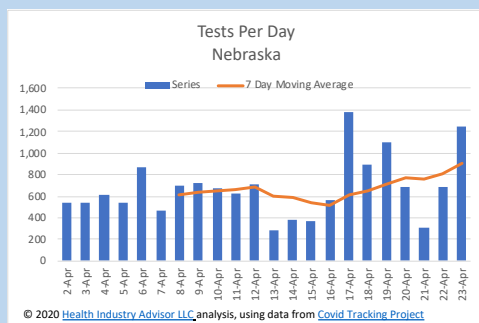
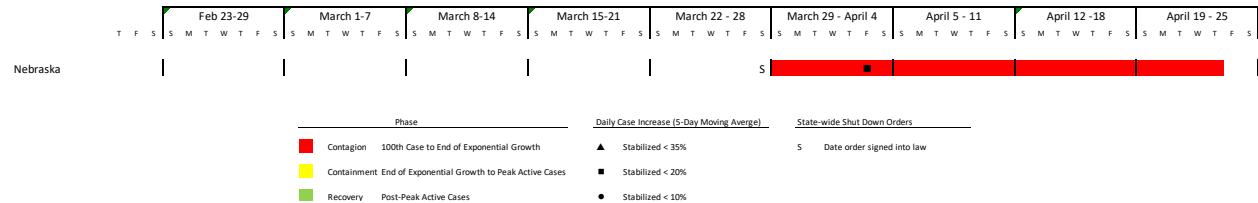


Influenza Like Illness (ILI) Trend

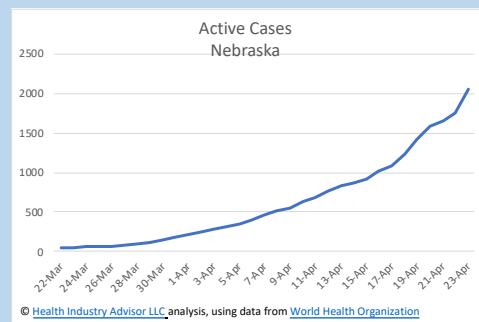
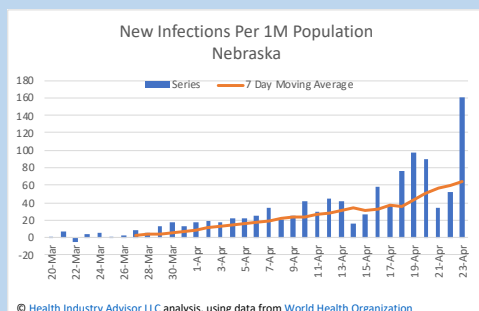


Nebraska

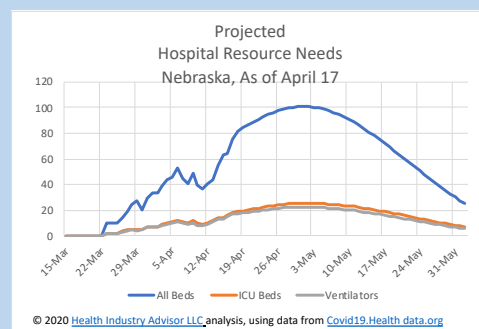
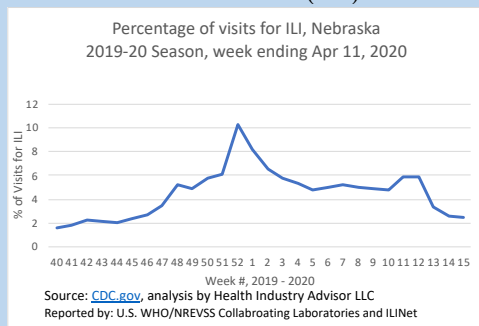
Timeline



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

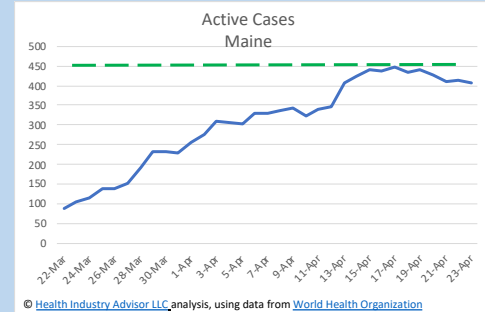
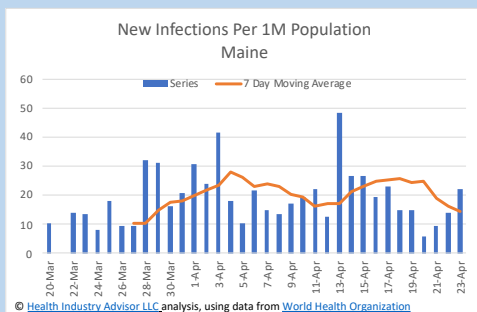
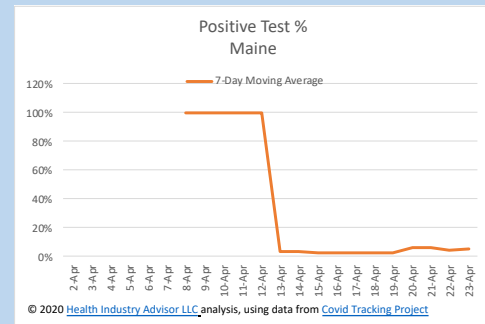
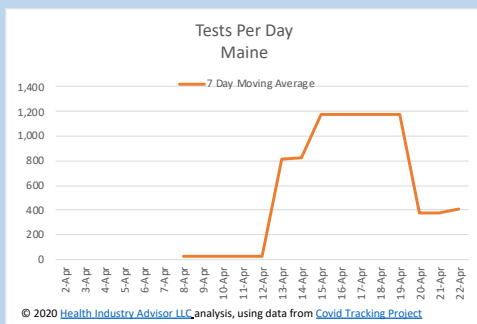
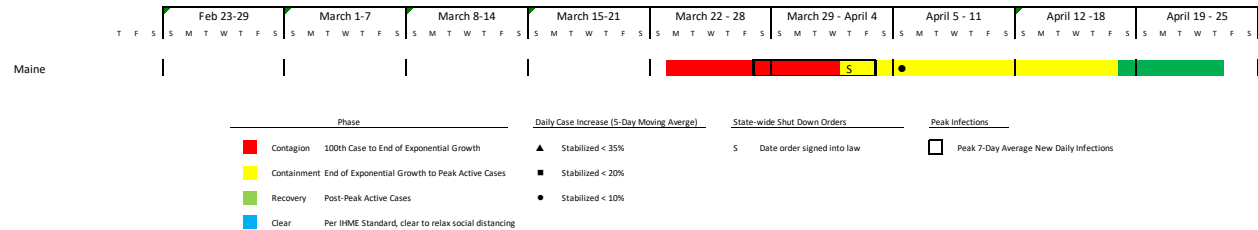


Influenza Like Illness (ILI) Trend

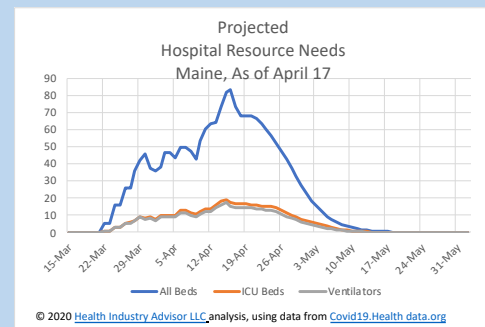
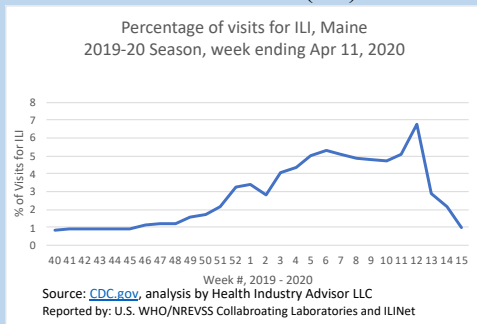


Maine

Timeline



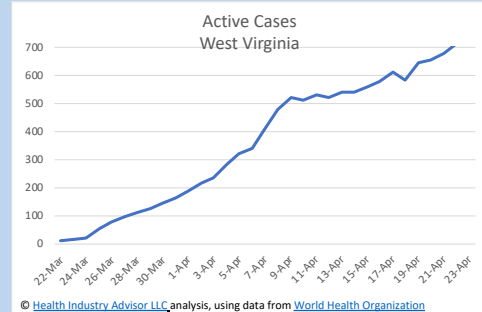
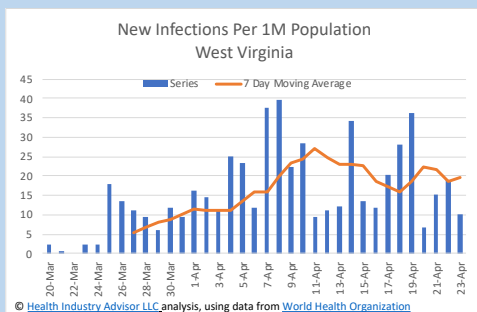
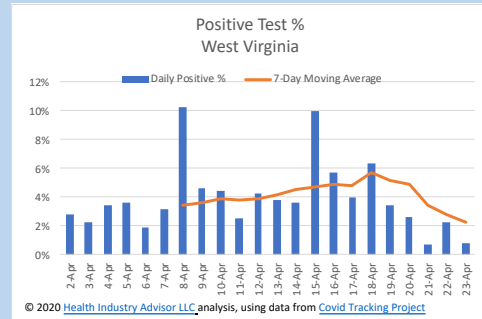
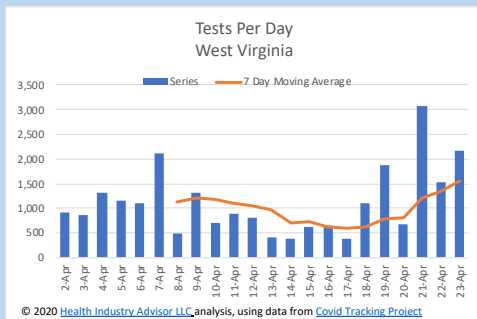
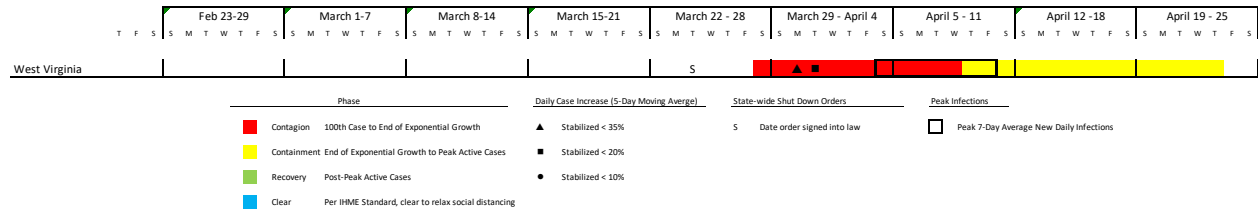
Influenza Like Illness (ILI) Trend



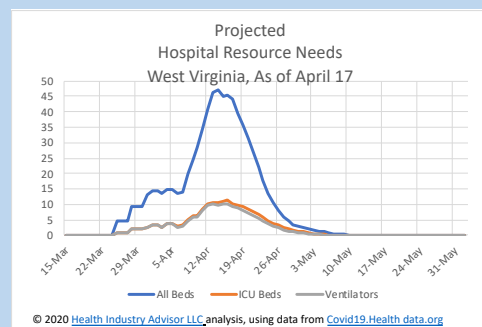
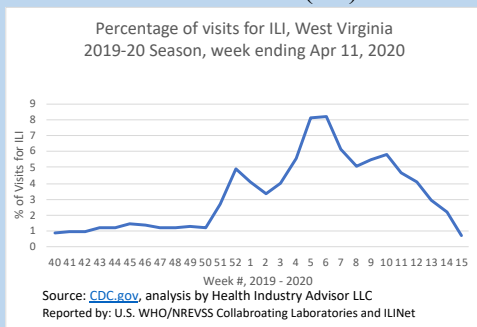
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West Virginia

Timeline

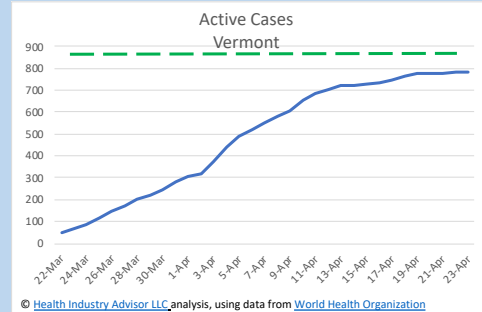
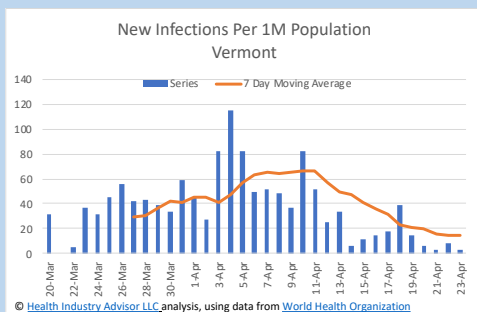
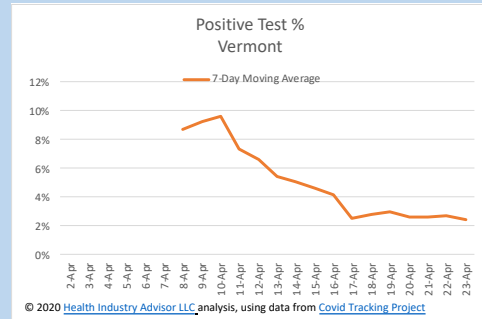
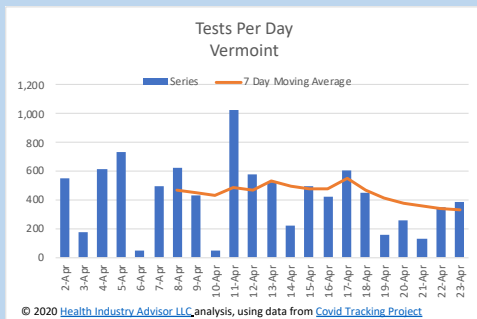
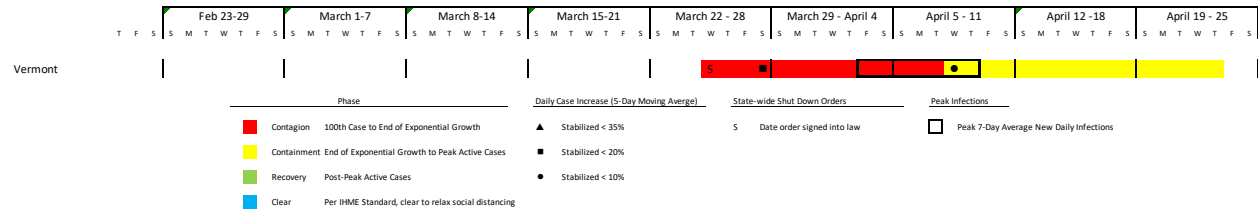


Influenza Like Illness (ILI) Trend

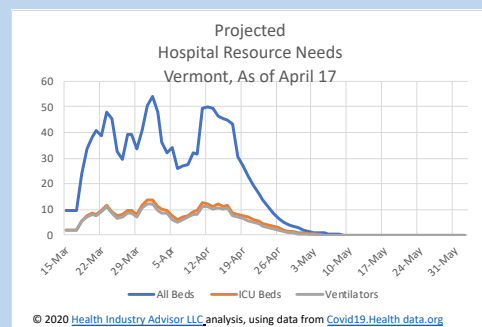
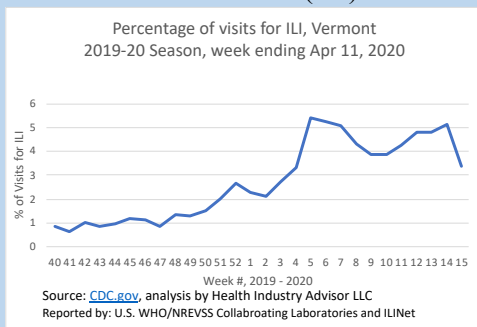


Vermont

Timeline

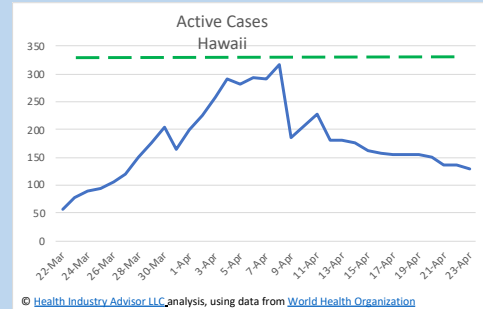
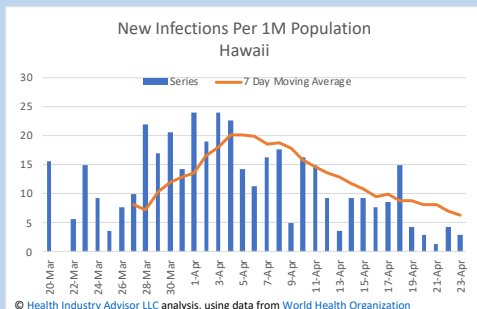
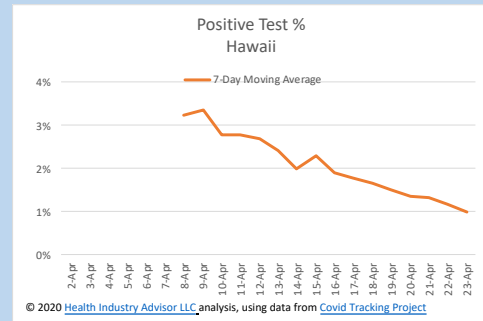
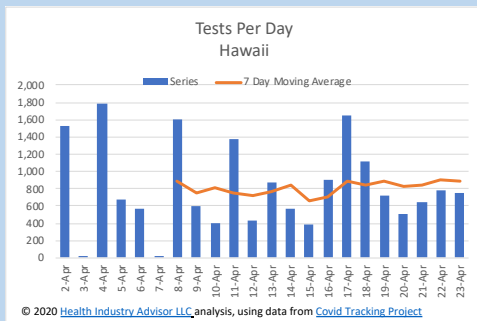
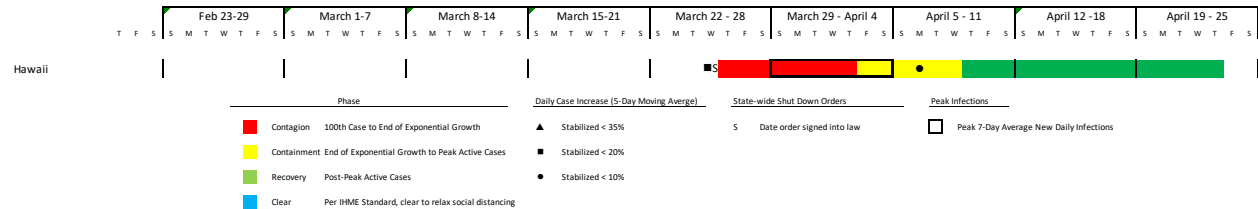


Influenza Like Illness (ILI) Trend

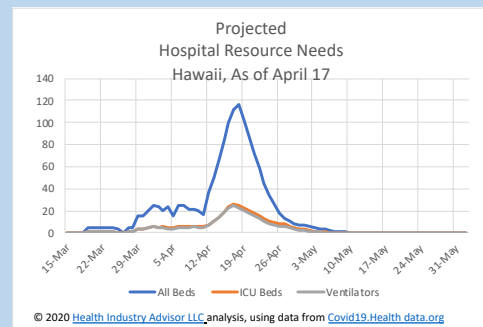
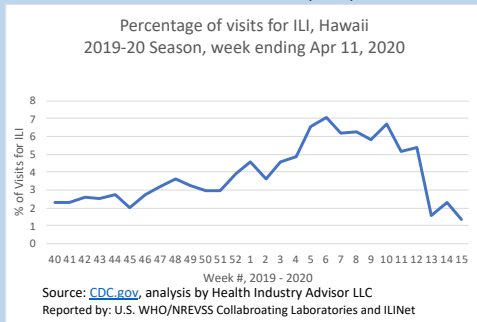


Hawaii

Timeline

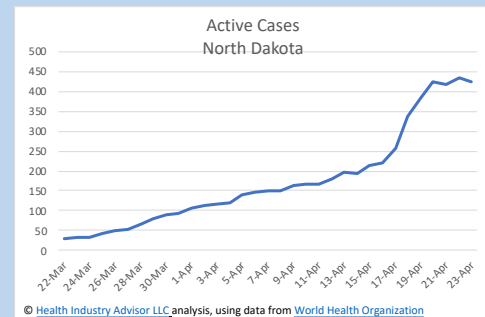
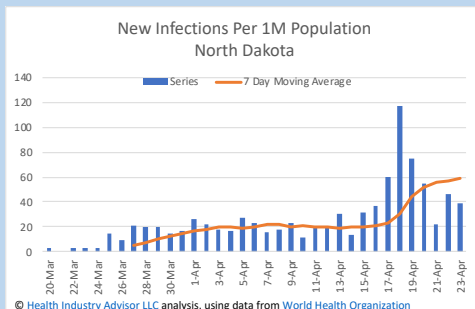
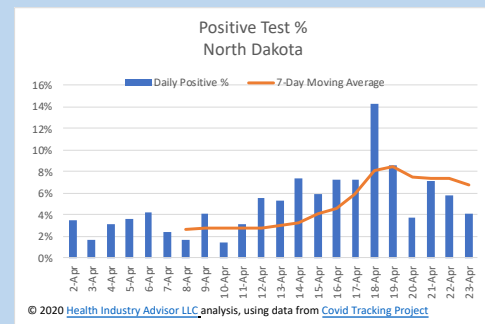
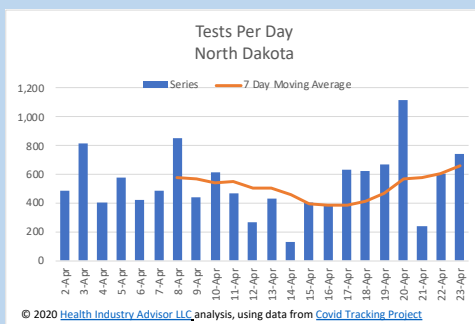
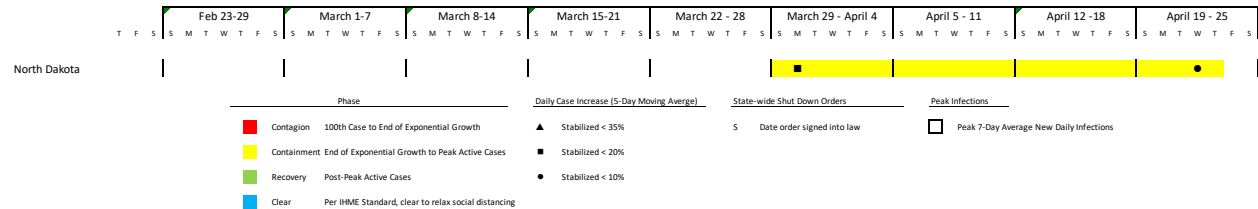


Influenza Like Illness (ILI) Trend

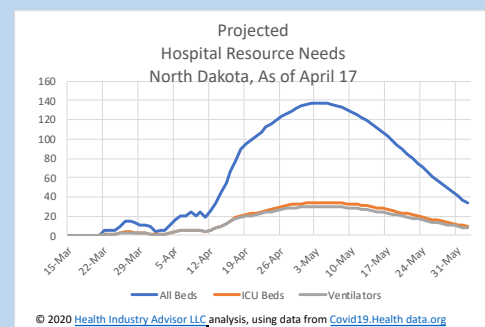
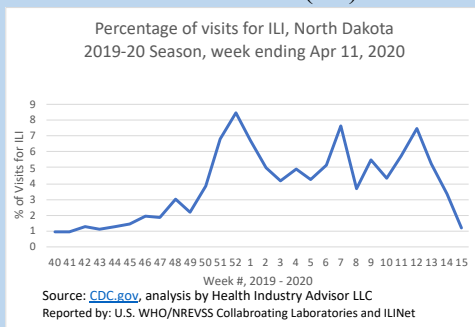


North Dakota

Timeline



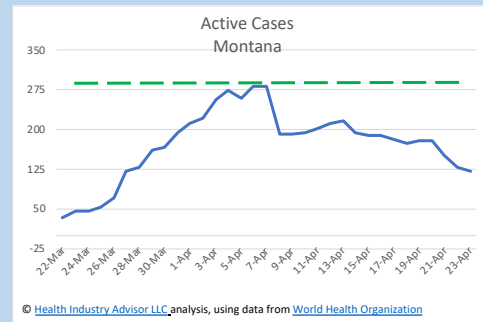
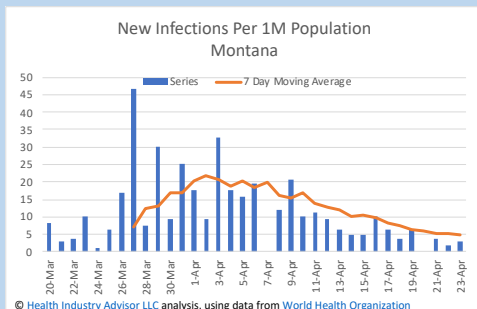
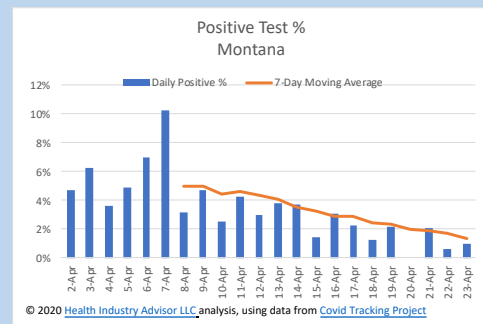
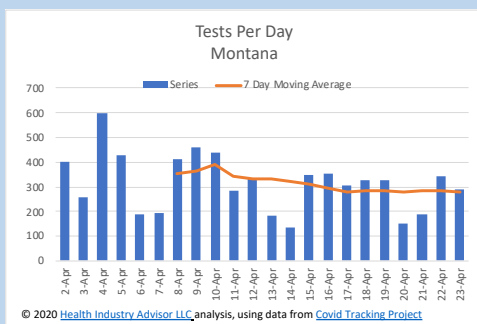
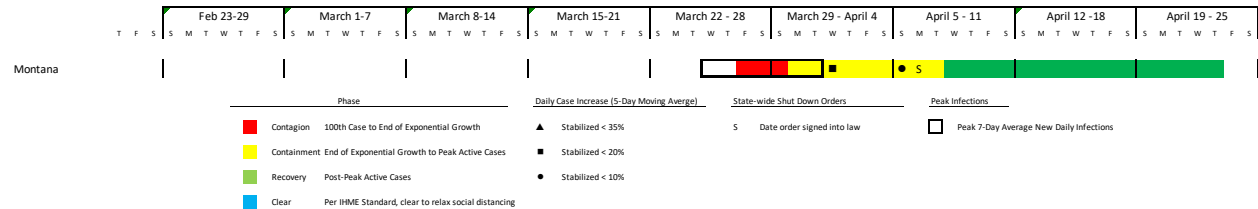
Influenza Like Illness (ILI) Trend



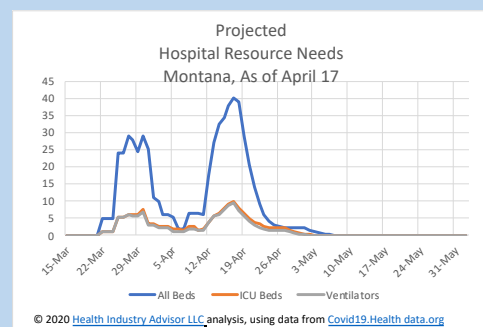
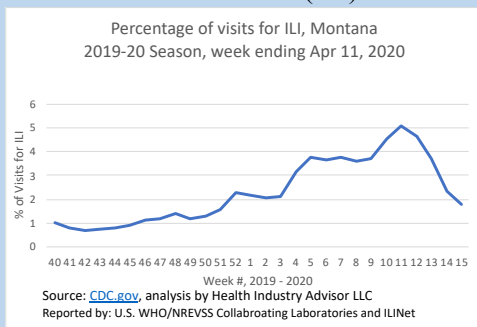
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Montana

Timeline

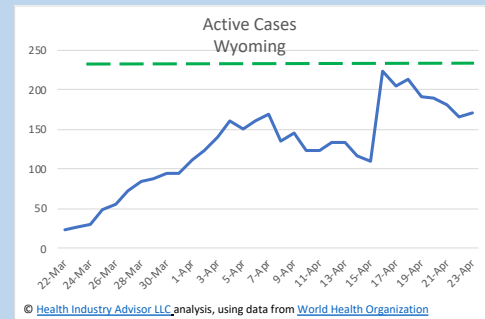
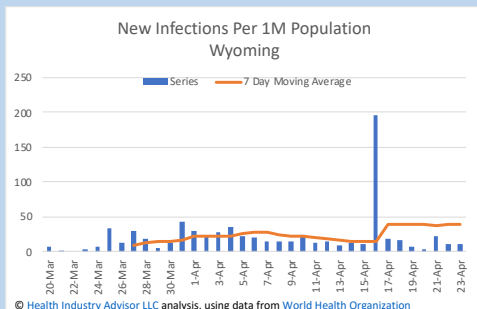
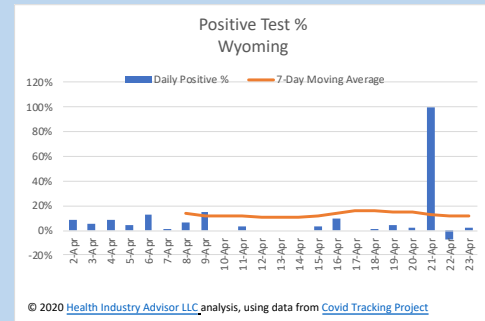
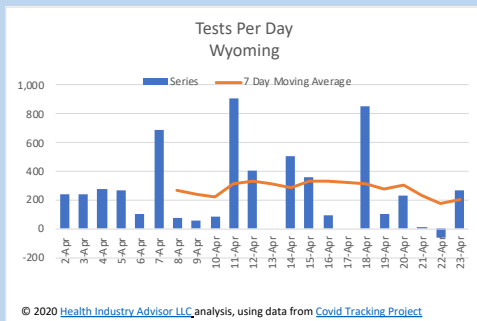
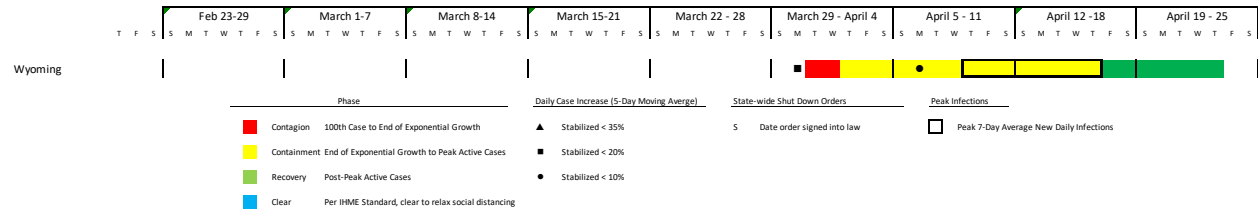


Influenza Like Illness (ILI) Trend

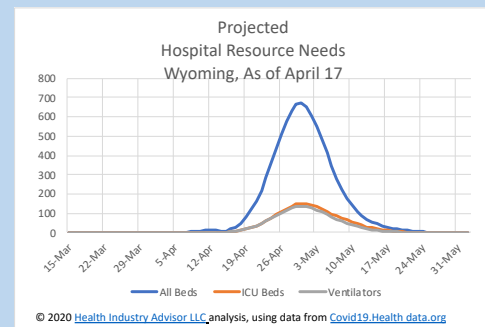
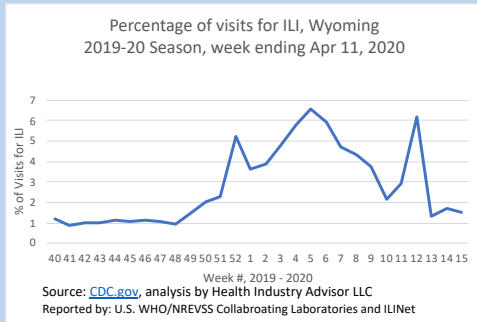


Wyoming

Timeline



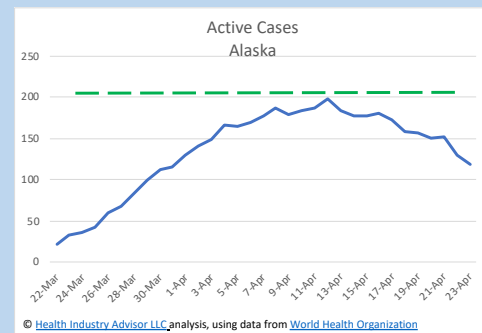
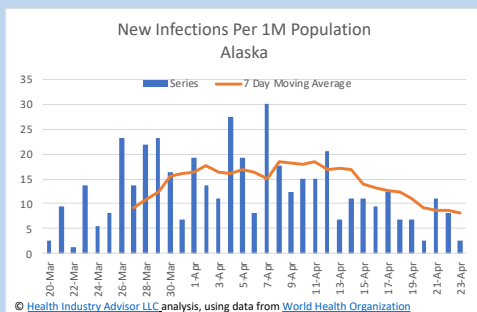
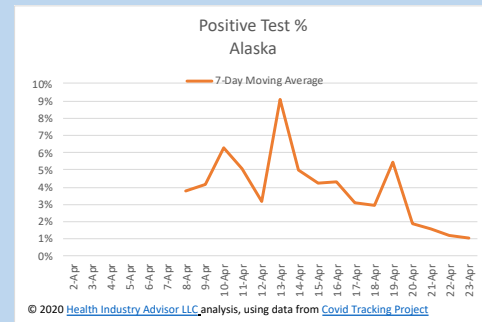
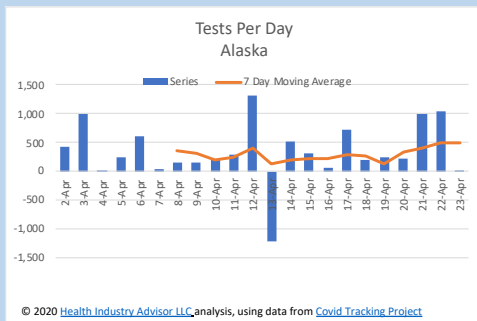
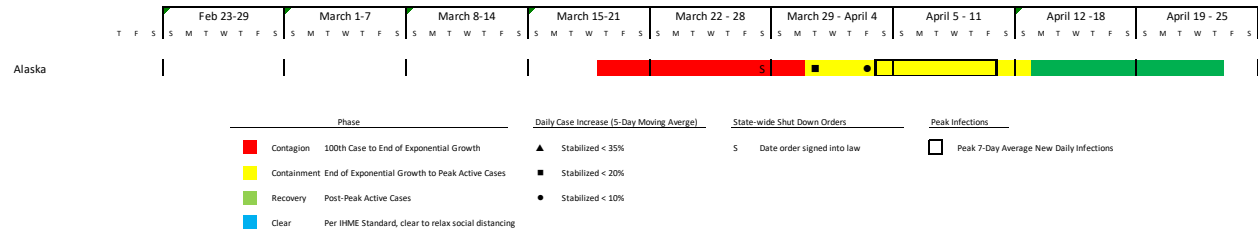
Influenza Like Illness (ILI) Trend



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Alaska

Timeline



Influenza Like Illness (ILI) Trend

