Reopening the U.S. Healthcare System

TRACKING THE PANDEMIC, REOPENING READINESS, AND HEALTH SERVICES UTILIZATION

JUNE
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Introduction

The COVID-19 pandemic has passed the peak number of cases in the United States, and attention is now shifting to the lifting of the unprecedented restrictions placed on society and restarting the economy. The dynamics playing out at a state and local level vary considerably within this national picture, and understanding readiness to reopen and the extent of the health system shutdown that continues are critical to informing decisions still to come.

The IQVIA Institute for Human Data Science is publishing this second report as part of a series of reports that highlight the current status and trajectory in the United States of states, with regard to their COVID-19 cases and measurements of readiness to manage reopening while maintaining control of a still-ongoing pandemic.

In this report, we include an update of the applied data science simulating the evolution of active cases at the national and state level.

As the pandemic caused crisis decisions to shutter large portions of the health system across the country, many patients with non-COVID conditions have seen their healthcare disrupted. The risk of this continuing longer than absolutely necessary prompts interest in measuring the return to normal healthcare, which is understood to be a precursor to a return to normal life generally.

As some states demonstrate rebounding case numbers after declines, concerns about a second wave in the pandemic are rising, even as reopening accelerates as summer begins.

Collectively, this intersection of human data, data science, and human science is accumulating lessons for researchers to apply to the current pandemic and future pandemics to be better understood and managed.

The study was produced independently by the IQVIA Institute for Human Data Science as a public service, without industry or government funding. The contributions to this report of the IQVIA Data Science and Advanced Analytics team, led by Yilian Yuan; the U.S. Thought Leadership team led by Jay Margolis; Alana Simorellis and Allen Campbell are gratefully acknowledged. We also acknowledge the critical factor of organizations that have collated and cleansed public COVID data, generated new algorithms or released useful contextual data to enable us and other researchers to make sense of rapidly evolving times.

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Overview

As attention has shifted from the initial responses to the pandemic toward a focus on lifting restrictions and re-starting the economy, a state-level view reveals the diversity of reopening readiness and utilization of health services. Most states do not meet threshold levels of readiness on one or more of the five criteria reviewed, suggesting risk in further relaxing of restrictions, especially due to the lack of contact tracing programs. At the same time, the utilization of five key health services such as doctor visits, elective procedures, and new prescriptions are at about half the level they were prior to the pandemic, suggesting large numbers of delayed or deferred medical treatments.

Tracking the Pandemic

While the United States has passed a modeled peak number of active cases in late May, state-level profiles differ widely, and significant numbers of active cases persist. Total active cases peaked in the United States on May 29 and are projected to reach a total of 2.8 million by November, based on modeling by the IQVIA COVID-19 Active Cases Curve Simulator. Significant numbers of active cases persist and drive risks as efforts to reduce restrictions intensify.

States fall into six very different segments based on their COVID-19 new active case trajectory. In aggregate, a total of 25 states with a combined population of 146 million are declining from their peak, some down more than 90% (e.g., New York). At the same time, a total of 25 states with a combined population of 149 million are seeing an increasing number of new active cases resulting from an unknown combination of expanded testing and spread of the virus.

Movement in all states has been increasing since April in advance of reductions in stringency levels, reflecting the limits of policy in curbing human behavior, and movement increases have accelerated somewhat in the past two weeks. Those states that have had the greatest level of stringency rule relaxation and greater levels of movement are mostly seeing rising new cases reported in recent days. For example, six states that relaxed stringency measures since early May have seen dramatic increases in new cases: Alabama, Arkansas, Arizona, North Carolina, South Carolina, and Utah.

Reopening Readiness Index

As states progress with phased reopening, a Reopening Readiness Index (RRI) based on five factors provides a systematic way to assess a state's progress and level of readiness to further reduce restrictions, and the associated social and economic impact. The five index components are weighted equally and selected based on their contribution to readiness as described by public health officials as requirements, excluding hospital, ICU capacity, PPE, and other COVID-related equipment availability. Key findings from the RRI are as follows:

- The national R_t level is 0.9, indicating a reduction in the rate of spread of the virus, but 14 states have R_t values above one, up from ten states at the beginning of May, and reflecting the impact of movement restrictions being reduced.

- The current level of tests performed per week nationally has risen sharply since mid-April, though is still not at the suggested level of 1.1% of the population nationally, despite some states testing at significantly higher rates.

- The national positive testing ratio exceeds (i.e., is lower than) the recommended level of 10% in all but two states, reflecting asymptomatic testing is occurring.

- Contact tracing plans and implementation are below optimal levels in almost all states and remain largely of unproven effectiveness, even as this area of reopening readiness receives a large amount of attention.

- Much progress has been achieved across the country in improving the data quality and granularity required to effectively manage the pandemic response, with 15 states having reached exceptional levels.

The composite Reopening Readiness Index – with equal weighting for each factor – indicates just three states are well prepared to extend their reopening, while many are hampered by poor contact tracing and testing levels. The median state has a score of 84 on the RRI, and states currently range from a low of 63 in Arizona to a high of more than 100 for New York, Rhode Island, and New Jersey.

Health Services Utilization Index

The revival of the health system is critical to ensuring all Americans – including all those who have not received the virus – receive the preventive and treatment services they need, but states are still seeing these services operating well below baseline levels

A Health Services Utilization Index (HSI) has been created, weighting five essential components of a health system and measuring their utilization against a base period of the eight week average from January 4 to February 28, 2020

National utilization of most of these key healthcare services has rebounded modestly since the middle of April when volumes fell to their lowest levels, though the levels and trajectories show some difference nationally as well as at the state levels and depending on the disease or therapy area.

• Elective procedures nearly ceased during the depths of the COVID-19 shutdown in April but have mostly recovered through the week of May 22, particularly orthopedic procedures, while colonoscopies/sigmoidoscopies are still at levels 40% below the baseline. Oncology visits have rebounded while new diagnoses lag and lab diagnostics remain about 40% below baseline levels nationally.

• Total new starts for medicines since March 6th are down 34% cumulatively through May 29th, with 80 million fewer new prescriptions filled compared to baseline.

• Acute care prescriptions have a cumulative reduction of 62 million over the same period (about 38%), This includes 24 million fewer antibiotic prescriptions dispensed in the past 13 weeks (down about 37%).

• There were two million fewer narcotic analgesics new starts over the same period (down about 25%) but in the latest week these were down only 2% versus baseline

• Chronic care prescriptions have a cumulative reduction of 18 million over the same period (about 20%).

• Respiratory prescriptions rose dramatically in the early weeks of the pandemic in part due to patients being prescribed them for COVID symptoms.

• Most medicines are showing a mild rebound from the lowest point of usage in late April, however in the latest week, new prescriptions are still down 41% for acute therapies and 23% for chronic.

The composite Health Services Utilization Index has a median value of 50 across all States, indicating services are being provided at half the level of the beginning of the year. The HSUI ranges from a high more than 60 in Louisiana, South Carolina, Idaho, and Oklahoma, to a low of 31 in California and 37 in New Jersey. Across most states, diagnostic lab testing levels have recovered the most, followed by new to brand prescriptions and office visits, with institutional visits and elective procedures recovered the least.

Comparing the Reopening Readiness Index and Health Services Utilization Index

Current levels of state readiness to extend reopening – based on their RRI – are higher than the level of health services utilization in most states. Those states with RRIs over 100 – New York, Rhode Island, New Jersey – but with a healthcare utilization index at 40% of pre-pandemic levels, are best positioned to see an acceleration of the return to normal service levels.

For ten states with RRIs between 90 and 100, there are distinct differences in the extent to which health services have rebounded, ranging from Louisiana, now at 64% of pre-pandemic levels, down to a low of 31% in California.

Those states with lower readiness scores and already operating their health systems at higher levels (though still 40% lower than pre-pandemic levels) – such as Arizona, Mississippi, Texas, and Idaho – may see a future decline in health services utilization if the level of new active cases rises sharply.

While the United States has passed a modeled peak number of active cases in late May, state-level profiles differ widely

Exhibit 1: Projected Active Cases in the United States and Selected States
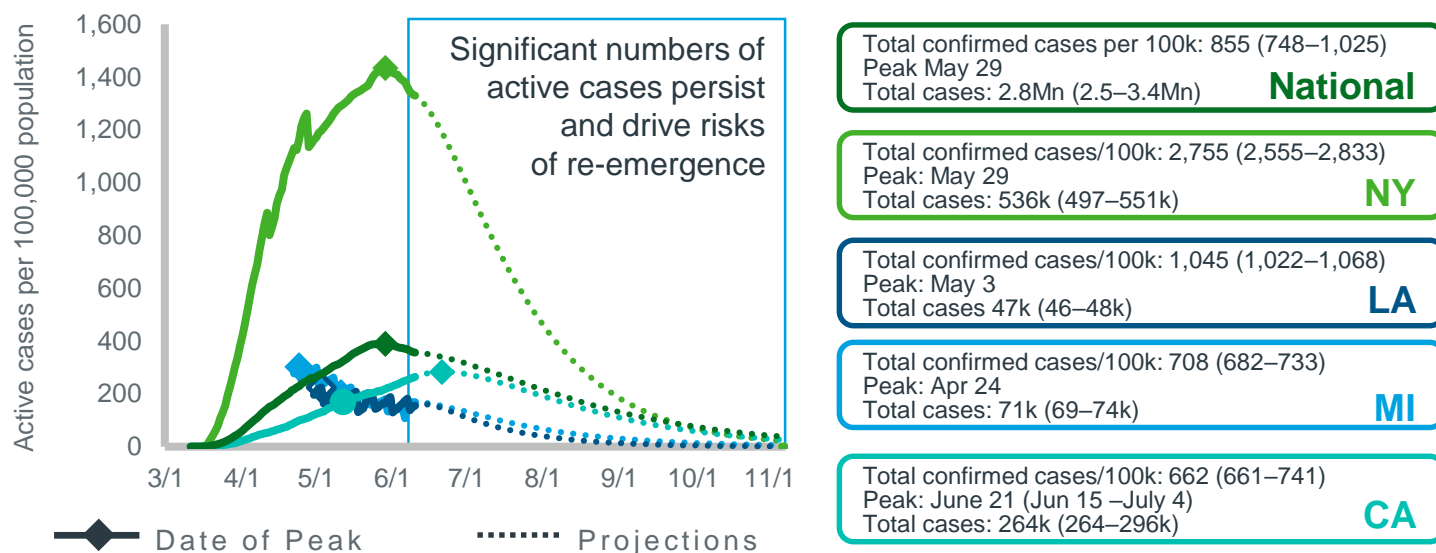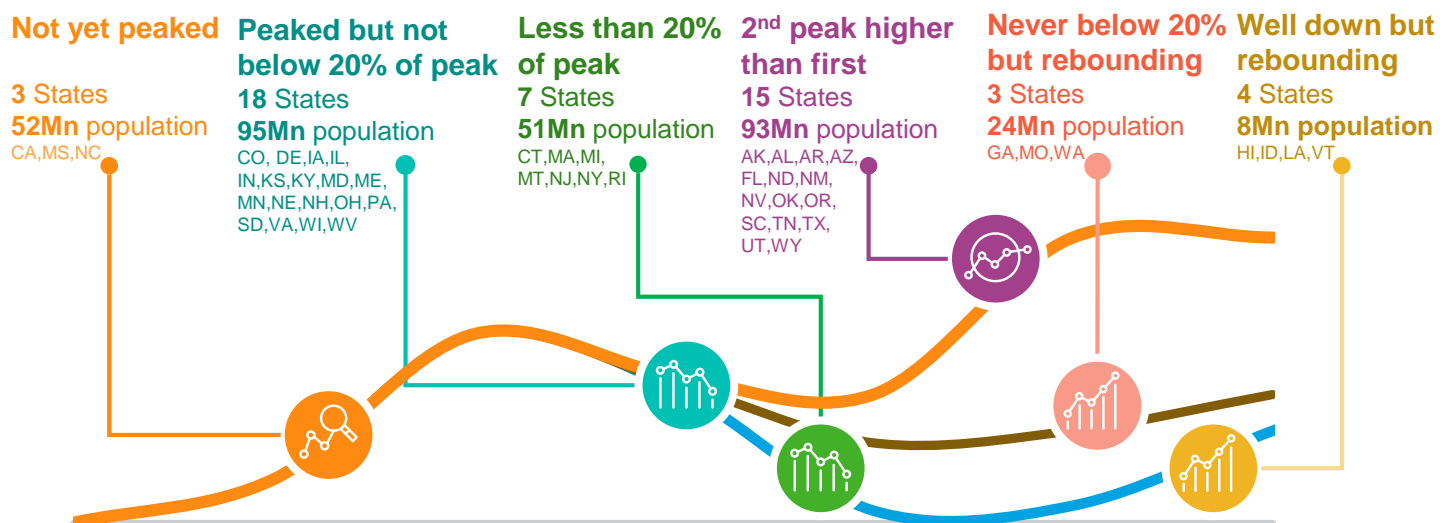

Source: IQVIA COVID-19 Active Cases Curve Simulator, updated June 10, 2020

- While the United States has passed a modeled peak number of active cases in late May, state-level profiles differ widely from those which have yet to peak to those which have declining rates of infection, and those which have well below their peak.

- Active infections, where patients can infect others, or where patients may require treatment may impact health system capacity and significant numbers of active cases persist weeks after the rate of infection slows.

- Nationally, total infections are now projected to reach 2.8 million with active cases still significant through November, and if some states continue to see hotspots of infections, this could extend further.

- New York which peaked on May 29th, has had the highest number of infected patients, and while new infections are trending down more quickly, active case management is still expected to persist at high levels through the summer.

- Notably, Michigan and Louisiana have both peaked but modeling of active cases prior to April is problematic due to data irregularities, which has been more widespread across states, complicating tracking and management of the pandemic.

- California, one of the earliest states to have COVID cases still has yet to reach its peak, similar to 17 other states despite widespread moves to reopen.

Exhibit notes: Modeling based on public data using IQVIA SEIR model, see Notes on Sources for more details.

Based on new active cases reported, 177 million people – 55% of the population – live in States that are rebounding or have not peaked

Exhibit 2: Pandemic Status Based on Historic and Current Trajectory of New Confirmed Cases

Not yet peaked

3 States
52Mn population
CA,MS,NC

Peaked but not below 20% of peak
18 States
95Mn population
CO, DE,IA,IL, IN,KS,KY,MD,ME, MN,NE,NH,OH,PA, SD,VA,WI,WV

Less than 20% of peak
7 States
51Mn population
CT,MA,MI, MT,NJ,NY,RI

2nd peak higher than first
15 States
93Mn population
AK,AL,AR,AZ, FL,ND,NM, NV,OK,OR, SC,TN,TX, UT,WY

Never below 20% but rebounding
3 States
24Mn population
GA,MO,WA

Well down but rebounding
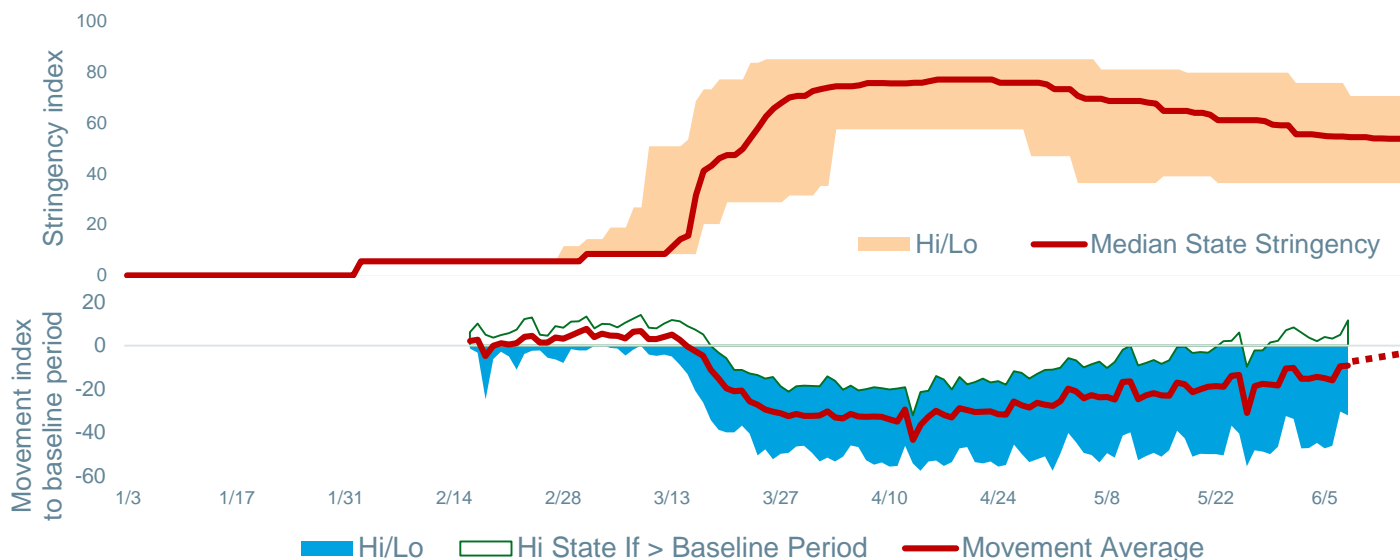**4** States
8Mn population
HI,ID,LA,VT

Source: IQVIA Institute analysis of active case trends as of 6/12/202

- States fall into six segments based on their COVID-19 new case trajectory. These segments are more of a leading indicator than active cases alone, which can include treatment for a month or more for a patient.

- While nationally the number of new cases has peaked and is trending down, this belies different dynamics at a state level. For example, 149 million people live in states where cases are trending up, some because they have not yet peaked and others because of a rebound in infections after an initial decline.

- Overall, 45% of the U.S. population lives in states that have seen peak cases decline, by an average of 64%, and by as much as 92%.

- There are seven states with a population of 51 million that are now at less than 20% of their peak level of new cases.

- Another 19 states with a population of 95 million are seeing their new cases decline but not yet down to below 20% of their peak.

- 18 states with a population of 117 million have had an initial peak and declined but are now rebounding and 15 of them (93 million population) have had a second peak higher than the initial peak

- Only three states with a population of 52 million have not reached their initial peak, or the determination of peak is unclear, because they remain within 20% of the peak.

- Three smaller states with total population of eight million are rebounding in their number of active cases after falling more than 80% from their initial peak.

Exhibit notes: States modeled based on 7-day moving average new cases from COVID Tracking Project. Peak is defined as a high number of cases or up to 20% below the highest number. All other identified statuses have declined by more than 20% from an initial peak.

Most states have relaxed stringency, particularly since May 1st while rebounds in movement pre-dated policies

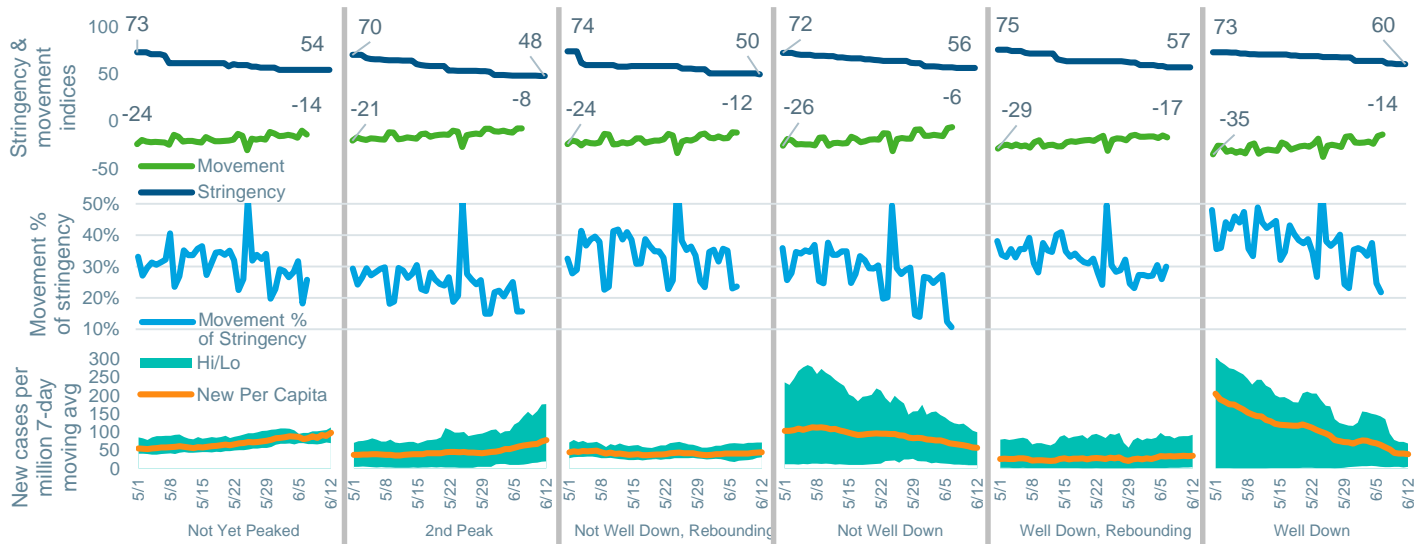**Exhibit 3: State Stringency and Movement Indices January to June 2020**

Source: IQVIA Institute, base on information up to 6/12/2020; Google LLC "Google COVID-19 Community Mobility Reports". https://www.google.com/covid19/mobility/ Accessed: 6/13/2020. Stringency developed modeled on approach by the Oxford Government Response with specific state stringency research by IQVIA Institute.

- Most states have relaxed stringency measures, particularly since May 1st, although movement increases pre-dated policy changes and have accelerated somewhat in the past two weeks.

- State shutdown policies have had an unprecedented effect. However, polices have varied considerably between states, even at the peak of shutdowns, and some states relaxed rules weeks ahead of others.

- The widespread concern and interest in the pandemic has prompted some unusual data transparency, including publication of movement data derived from millions of Americans' cellphones that has indicated the country was remarkably compliant with early shutdown restrictions.

- The rebound in movement data predates the relaxation of shutdown orders in many states as the general public appeared to tire of the shutdown after approximately eight weeks.

- Across a variety of location types, including workplaces, transit, entertainment and grocery stores, public movement dropped almost 40% at the most nationally, but some states saw drops of 50−60% averaged across types of locations.

- Conversely, time at residential areas rose, and this confirms patterns that have been widely reported. In this analysis, movement is averaged across location types with the inverse of residential that otherwise increased.

- Some states never had movement reduced by more than 20%, and some have rebounded to higher than baseline movement in the last several weeks.

Relaxing stringency rules, greater levels of movement by the public vary across the country and may be related to some states ongoing rising cases

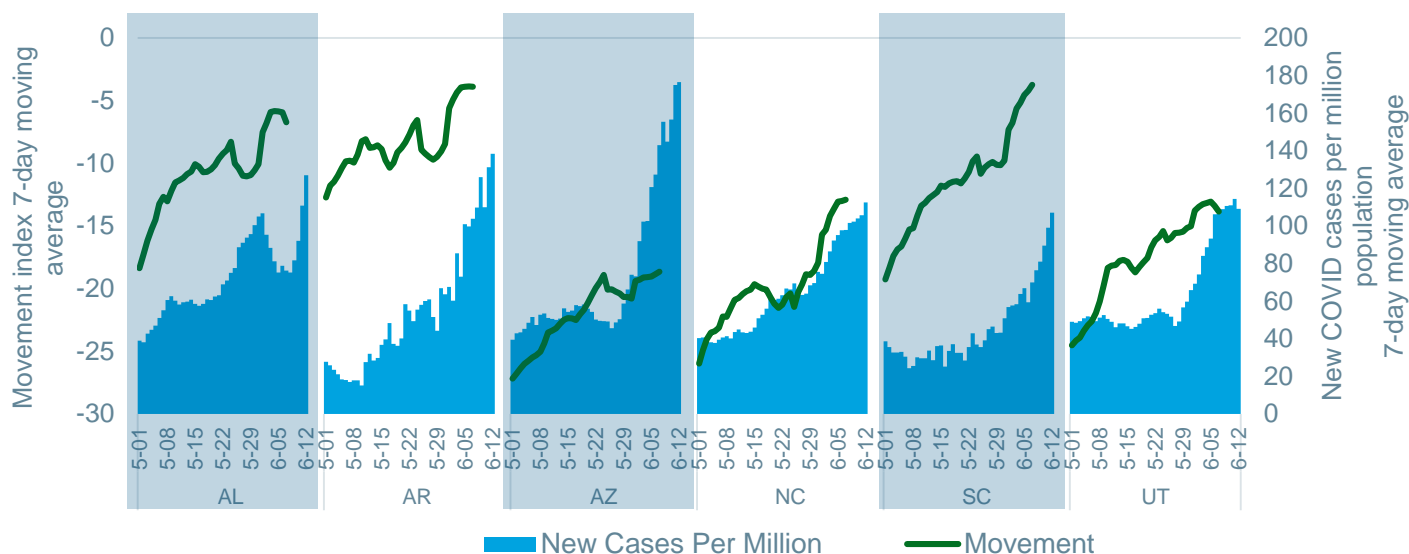**Exhibit 4: Stringency, Movement and New Cases Per Capita**

Source: IQVIA Institute, base on information up to 6/12/2020; Google LLC "Google COVID-19 Community Mobility Reports". https://www.google.com/covid19/mobility/ Accessed: 6/13/2020. Stringency developed modeled on approach by the Oxford Governme nt Response with specific state stringency research by IQVIA Institute.

- The states that have had the greatest level of stringency rule relaxation and greater levels of movement are the ones mostly seeing rising new cases reported in recent days.

- The states that have retained the highest levels of stringency have also seen the least resumption of normal movement patterns, and new infection numbers continue to trend down.

- Generally, compliance with stringency has been declining since early May, as most of the country endured about eight weeks of unprecedented restrictions including closures of workplaces, schools, public events, and restaurants.

- As some states began to consider reducing restrictions, movement data suggests the public responded more quickly than the policies in their specific states.

- When examining these trends while grouping states by their pandemic status, those states with the highest historic numbers of cases and those that are now well down from their peak or still trending down from it, retained the highest levels of stringency but also showed reduced compliance with those policies.

- Those states with still rising case numbers reduced stringency on average from over 70 to under 55, and rising movement indices preceded the policy changes.

- In these cases, it is unclear the degree to which these returns to more open social interactions are driving case numbers upwards.

Six states that relaxed stringency since early May have seen dramatic increases in new cases and movement predated change

Exhibit 5: Stringency Compared to New Cases Per Capita and Population Movement Patterns
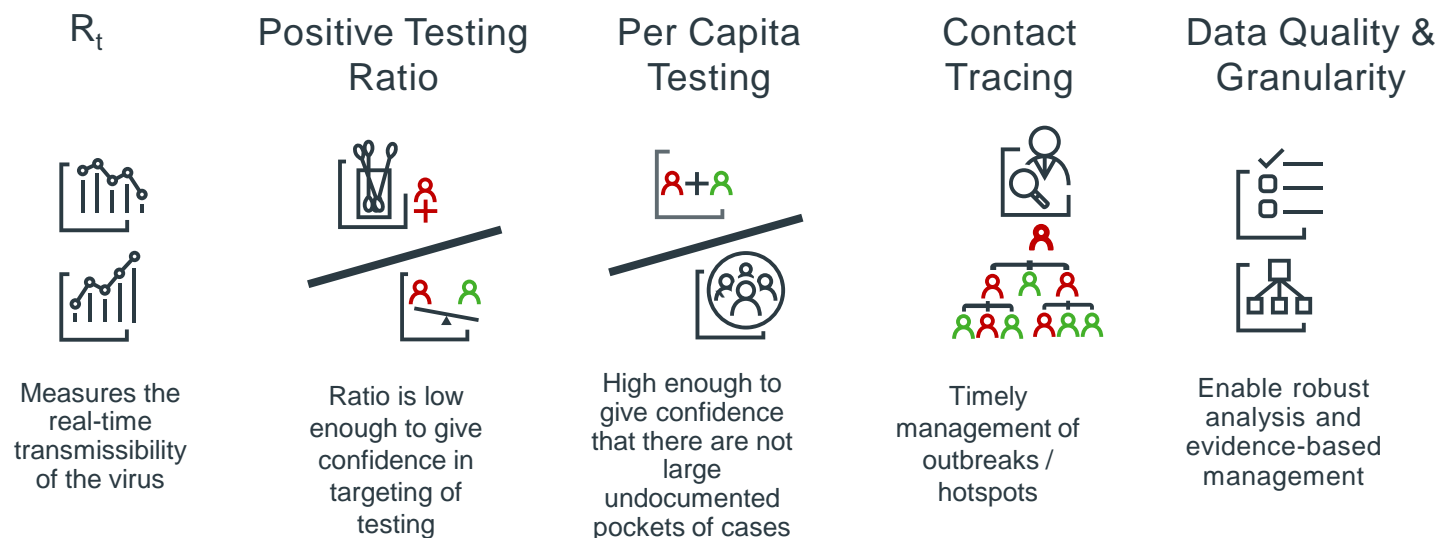

Source: IQVIA Institute, base on information up to 6/12/2020; Google LLC *"Google COVID-19 Community Mobility Reports"*. https://www.google.com/covid19/mobility/ Accessed: 6/13/2020. New Cases from COVID Tracking Project accessed 6/13/2020

- Exhibit five shows the six states that relaxed stringency measures since early May. Movement has risen dramatically from the shutdown levels, and new cases have begun to spike upwards.

- The level of infections per million of population are far below the levels seen in the worst areas of infection at their peaks, but to date, these states have yet to re-impose shutdown rules. Without further action, these states will likely see many more infections before they peak and trend down.

- Five of the six states shown are ones which had a peak and were declining, but since May 1st, have had a second peak higher than the first.

- These case trajectories represent a contrast to the moves to reopen after the pandemic, which appears to be accelerating.

- Other states which have relaxed shutdown provisions later than those shown here may be exposed to rising case numbers following a similar pattern with a slight delay. These include Texas, Florida, Nevada, Oklahoma, and Oregon, among others.

Five factors provides a systematic way to assess a state's progress and level of readiness to further reduce restrictions

Exhibit 6: Reopening Readiness Index

R_t	Positive Testing Ratio	Per Capita Testing	Contact Tracing	Data Quality & Granularity
Measures the real-time transmissibility of the virus	Ratio is low enough to give confidence in targeting of testing	High enough to give confidence that there are not large undocumented pockets of cases	Timely management of outbreaks / hotspots	Enable robust analysis and evidence-based management

Source: IQVIA institute

- As states progress with phased reopening, a Reopening Readiness Index provides a systematic way to assess a state's progress, level of readiness to further reduce restrictions, and the associated social and economic impact.

- The five index components are weighted equally and selected based on their contribution to readiness as described by public health officials as requirements, excluding hospital, intensive care unit (ICU) capacity, personal protective equipment (PPE) and other COVID-related equipment availability.

- R_t measures the effective reproduction rate of the virus and a leading indicator of the trajectory of the virus spread. Values of less than one are desirable as this reflects a declining number of new cases spreading from an infected individual.

- Positive testing ratio is an indicator of testing reaching beyond symptomatic patients. It is more useful in understanding the level of containment of the virus,

with a positive testing ratio of 10% considered the minimum to reliably use reported case numbers and 2% being a number closer to true disease epidemiology as a threshold for reopening.

- Testing per capita reflects the availability and use of testing at levels required as movement restrictions are lifted and work, travel and social interactions increase. A national level of 500−700,000 per day is considered a minimum level, or 1.1% of the population per week.

- Contacting tracing capability are the systems and resources needed in place to be able to track individuals exposed to the novel coronavirus, where the planning and implementation of a program is a prerequisite to reopening.

- Data granularity and quality of reporting provides the ability to monitor and track potential hotspot outbreaks and the level of containment or spread at a county or ZIP code level, as well as the settings of care.

The median R_t value for states is rising and 14 states now have an R_t over 1.0, up from 10 states in early May

Exhibit 7: Trends for States R_t
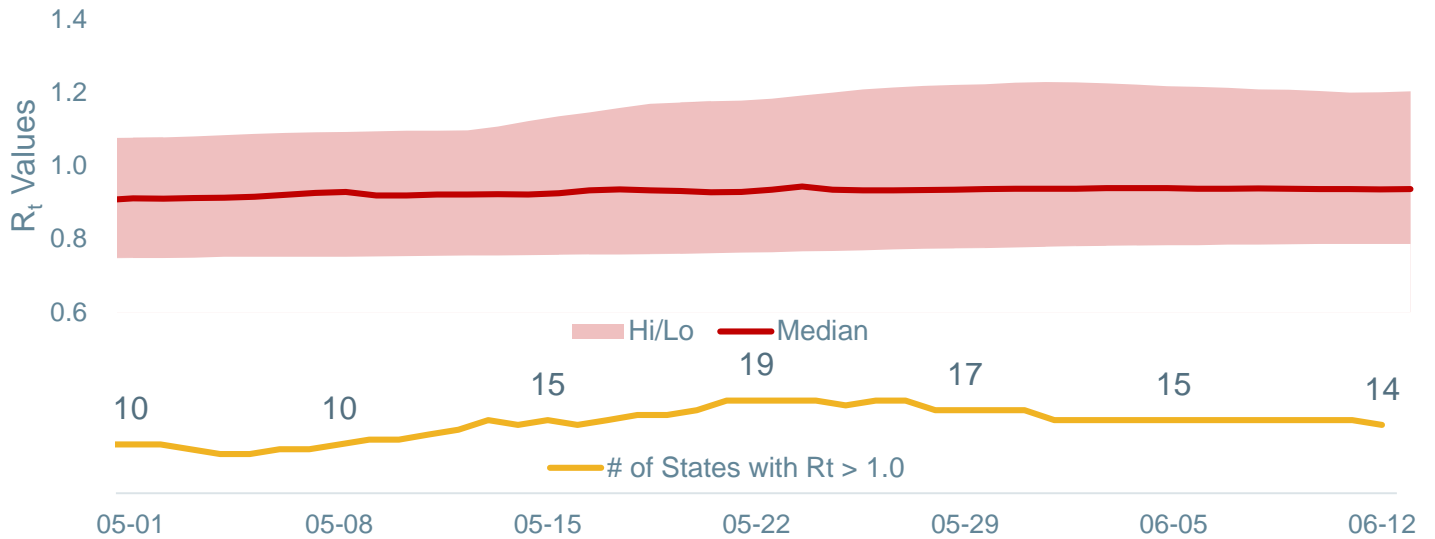
Source: Rt.live accessed 6/13/2020

- By mid-June, the national R_t level was 0.94, indicating a reduction in the rate of spread of the virus, but 14 states have R_t values above one, up from ten states at the beginning of May and reflecting the impact of movement restrictions being reduced.

- States vary considerably in their level of R_t, ranging from 0.79 in New York to 1.20 in Arizona.

- Additionally while values below 1.0 are an indication that the spread of infections is being reduced, more states have numbers above 1.0 than in early May.

- R_t acts as an early indicator of trajectory, and as some states move back down, it suggests some of their recent spikes may ease in the coming weeks.

- These trends are particularly challenging for the general public as well as health workers, as so far few states have re-imposed movement restrictions, and the pressure continues to rise for some states to relax rules despite high levels of infections.

Testing rates have increased rapidly since mid-April, but nationally are still below suggested levels

**Exhibit 8: Testing and Target Per Capita Rate**
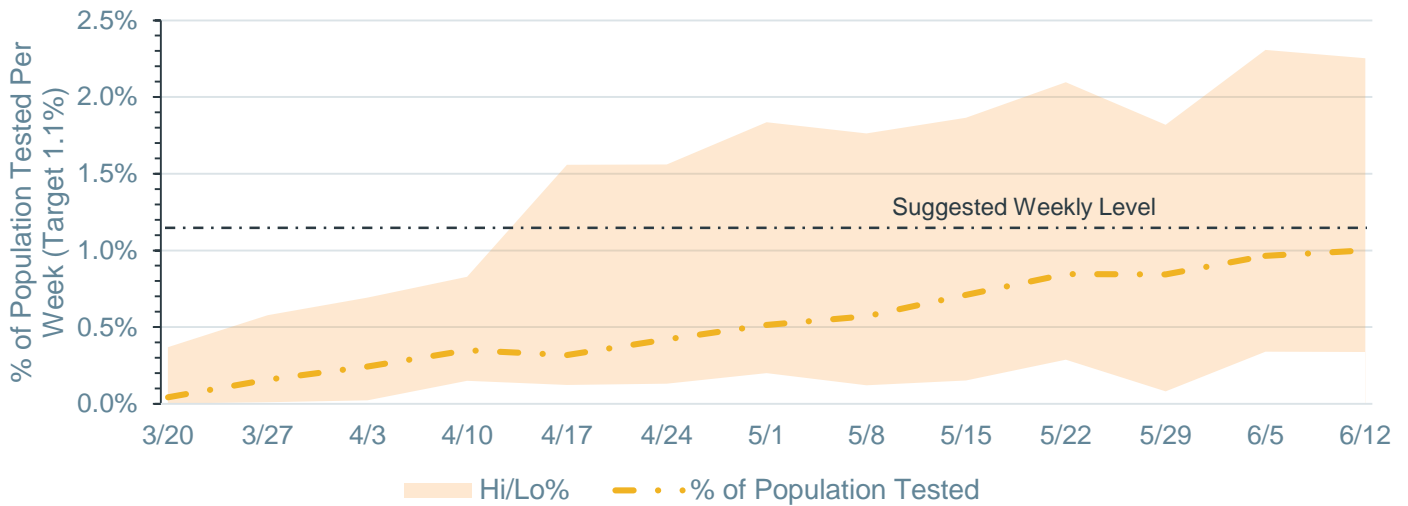
Source: COVID Tracking Project, Jun 13, 2020

- Measuring the progress of the pandemic relies critically on the testing results. Epidemiologists consider the absolute level of tests performed per week needs to exceed 500 to 700,000 tests per week nationally, or about 1.1% of the population per week.

- This level of testing availability will result in greater identification of asymptomatic patients, early isolation of infection hotspots, and greater degrees of confidence in the overall testing numbers.

- For those states which far exceed this level, their rising case numbers could reflect greater degrees of identification of asymptomatic patients, which in previous lower-testing periods would have been unknown.

- This factor leads to potential confusion where rising testing rates could appear as rising case rates.

- While this is no doubt a factor, if cases are being identified, they are also resulting in disease transmission given the number of asymptomatic cases. Experts agree the only way to assure that the pandemic is trending down is to test significantly more people than just the symptomatic patients that had been the early focus when resources were more limited.

- Nationally, the average week is approaching the recommended levels but some states are lagging far behind that rate.

Notes: Additional sources include: Harvard Global Health Institute. Pandemics Explained. Accessed Jun 2020. Available from: https://globalepidemics.org/2020/04/18/why-we-need-500000-tests-per-day-to-open-the-economy-and-stay-open/

Most states have improved (reduced) their positive testing ratio since early May, while some have worsened (increased), notably AZ

Exhibit 9: Positive Testing Ratio Week ending Jun 12th compared to May 8th
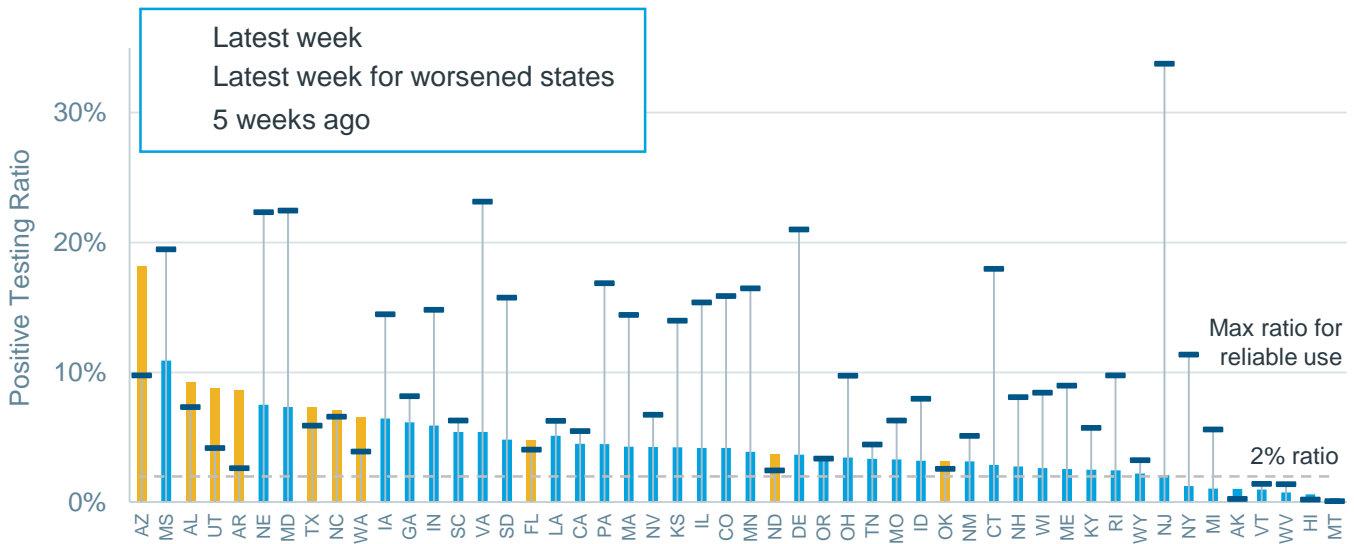

Source: COVID Tracking Project, Accessed 6/13/2020

- The national positive testing ratio is below the recommended level of 10% in all but two states, bringing added confidence in the accuracy of the test results being presented. A positive testing ratio of 10% is considered the minimum to reliably use reported case numbers.

- When compared to early May, ten states' ratios have worsened, which indicates they may be having a rebound in overall case numbers.

- For those states with cases trending down, and positive testing ratios below 10%, there is a great degree of confidence that these numbers are a reliable basis to inform policy decisions.

- Some states, like New Jersey, have made great strides in the past five weeks reducing their positive testing ratio from 34% to 2%, and as cases have declined to less than 20% of peak, it is likely the significant increase in testing volume is allowing greater precision to manage any potential re-emergence.

- Arizona by contrast has seen the positive testing ratio worsen from 10% in early May to 18% in the latest week, as new cases have spiked.

Exhibit Notes: Positive testing ratio in the week ending 6/12 compared to the week ending 5/8. South Carolina week ending 6/5 used due to data restatements in latest week.

Contact tracing plans and implementation are in progress in most states and remain of unproven effectiveness in most (all) States

Exhibit 10: State Contact Tracing Plans and Status Index
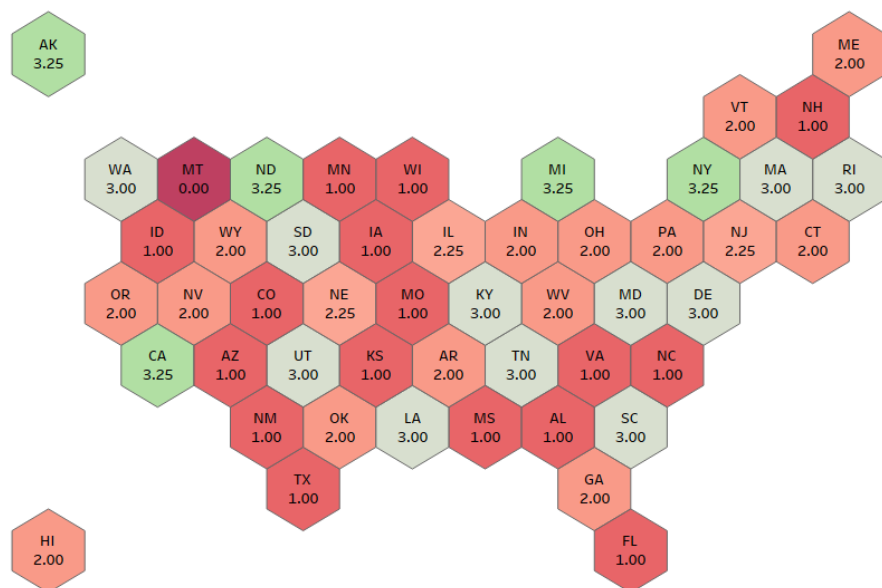
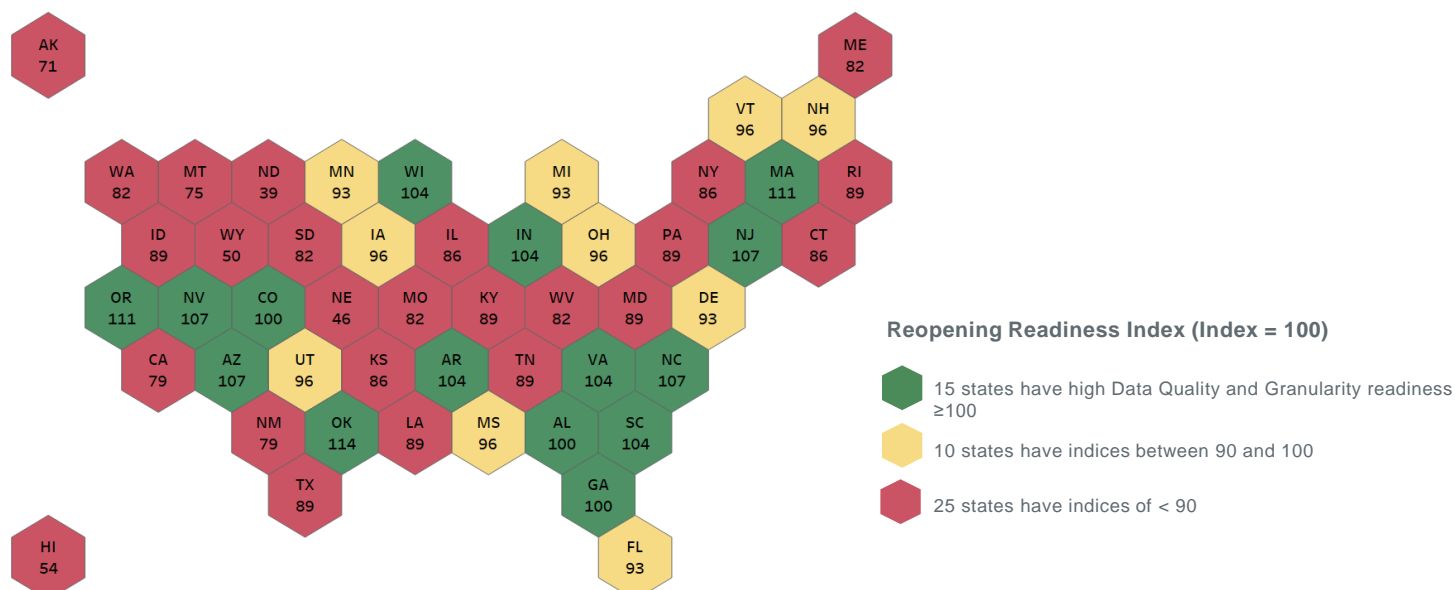| Description	Score
Plan that exceeds recommendations	>3
Plan and actively moving toward	3
Plan in place but in early phases of (or slow) implementation	>2
Vague plan with no real detail	1
No plan and current staffing materially under projected need	0

Source: IQVIA Institute, June 12, 2020

- States had focused much of their efforts through April in managing the direct aspects of the pandemic by directing the flow of personal protective equipment and medical supplies, and by rationing the limited testing capacity to those most critical.

- As cases have begun to peak nationally, discussion has shifted to the traditional public health tool for managing epidemics and pandemics, the on-the-ground resource-intensive approaches to follow each infection to any potential subsequent infections.

- While some countries around the world have rapidly adopted modern technology, such as using cellphones and mobile apps to trigger identification of contact between confirmed infected patients and any other member of the public, many U.S. states have been reluctant to pursue these approaches due to privacy concerns as well as corresponding challenges of implementing a novel technology solution.

- While some states have pursued partnerships with tech companies, most have designed human staff solutions and begun to hire largely low-paid workers.

- States are generally far from having solutions in place based on an assessment of states' plans.

Exhibit Notes: Scoring system developed by the IQVIA institute. Status based on publicly available information pertaining to state's contact tracing programs including each state's COVID website, a survey conducted by NPR*, and state issued press releases. (*Source: NPR, States Nearly Doubled Plans For Contact Tracers Since NPR Surveyed Them 10 Days Ago. May 7. Available from: https://www.npr.org/sections/health-shots/2020/04/28/846736937/we-asked-all-50-states-about-their-contact-tracing-capacity-heres-what-we-learn

Fifteen states have exceptional data quality and granularity which will help manage pandemic response

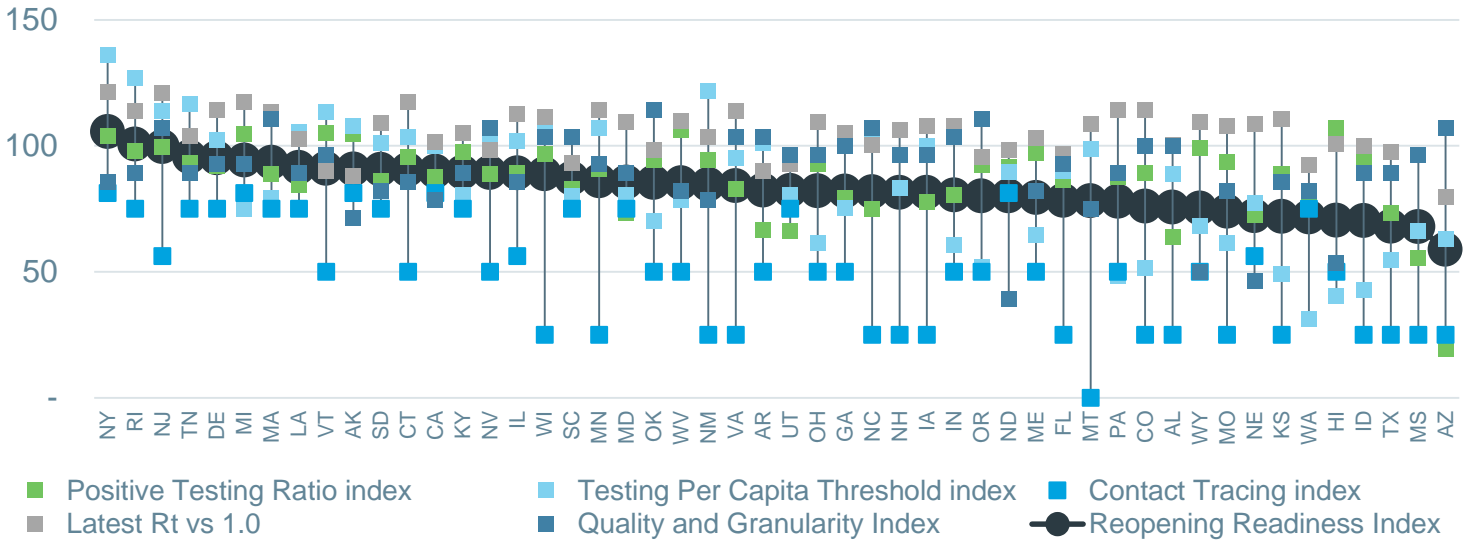**Exhibit 11: State Data Reporting Quality and Granularity Index**

Reopening Readiness Index (Index = 100)

- 15 states have high Data Quality and Granularity readiness ≥100
- 10 states have indices between 90 and 100
- 25 states have indices of < 90

Source: IQVIA Institute, June 13, 2020; COVID Tracking Project Data Quality Scores Accessed June 13, 2020

- Public policy and media reporting of the progress of the COVID pandemic is dependent entirely on the quality, consistency, and granularity of data being reported by each of the 50 states with highly variable contents.

- States range from an index of 39 in North Dakota to 114 in Oklahoma.

- The attributes also identify if states report data on recovered patients, hospitalized patients, those in ICU, on ventilators, and measures of hospital capacity. Other patient factors are assessed including whether infected patients have pre-existing conditions, and segmenting them by racial and ethnic data. Reporting whether patients were in vulnerable situations, such as nursing homes, is also assessed as it is not consistently reported across states or at sub-state levels.

- While state level reporting has been the norm for several months, albeit with significant variability in the quality and contents on key metrics, most states were not releasing sub-state level data until later in the pandemic.

- Currently, all states are releasing county or ZIP code level data for confirmed cases, but some report deaths only at a state level. Others do not report vulnerable populations, such as nursing homes or data by race and ethnicity, with more granularity than state totals.

- While broad trends can be identified at a state level, it is clear that hotspots emerge locally, and a shift to significantly more granular and consistent data reporting is critical to managing reopening while avoiding blind spots that would drive rebounds in cases.

The Reopening Readiness Index median value of 84 shows 3 states prepared for reopening while many are hampered by poor contact tracing, and testing

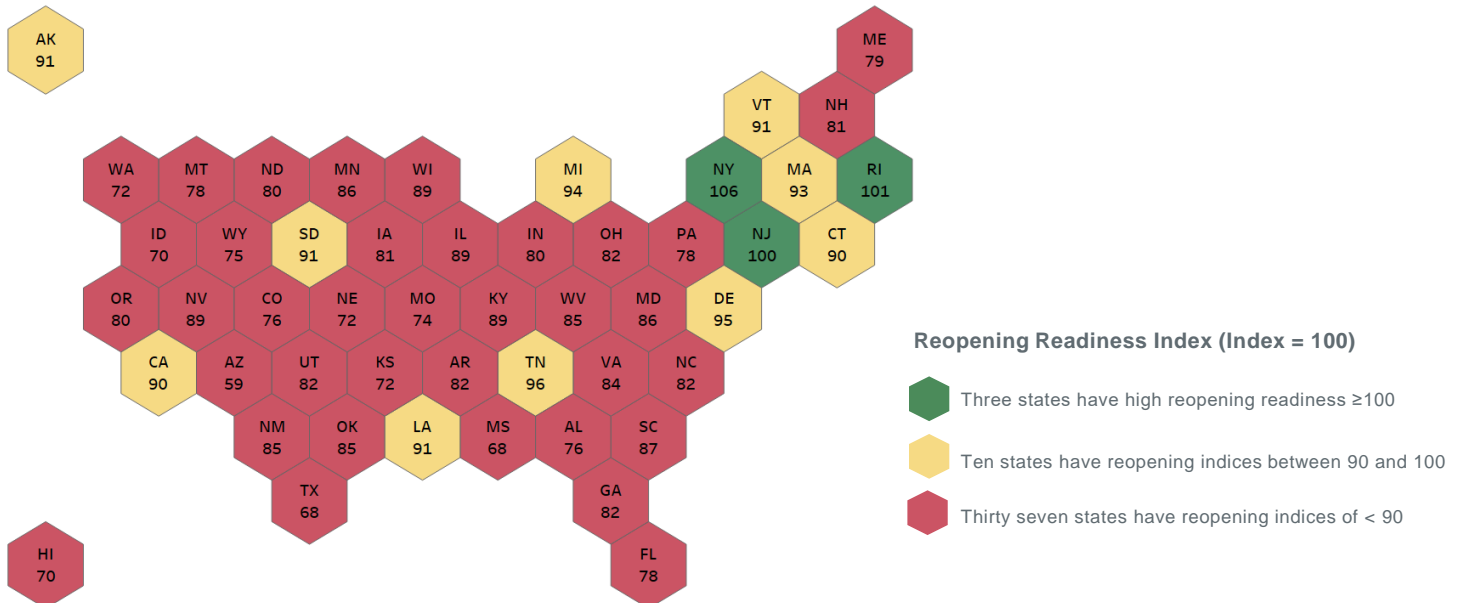**Exhibit 12: Reopening Readiness Index, Readiness ≥ 100**

Legend:
- Positive Testing Ratio index
- Latest Rt vs 1.0
- Testing Per Capita Threshold index
- Quality and Granularity Index
- Contact Tracing index
- Reopening Readiness Index

Source: IQVIA Institute Compiled from Data available 6/13/2020; COVID Tracking Project, Rt.live

- The composite Reopening Readiness Index – with equal weighting for each factor – indicated just three states are well prepared to extend their reopening, while many are hampered by poor contact tracing and testing levels.

- Many of the states with lower overall indices also have lower testing per capita rates, lower data quality, and contact tracing scores, and in some cases R_t above the 1.0 threshold.

- Some states with relatively high indices overall have poor data quality and granularity, but have relatively low R_t and testing per capita to offset.

- The median state has a score of 84 on the Reopening Readiness Index, and states currently range from a low of 63 in Arizona to a high of more than 100 for New York, Rhode Island, and New Jersey.

Three states are well positioned to further reduce restrictions with measures in place to effectively manage COVID-19

Exhibit 13: Reopening Readiness Index, Composite Readiness

Reopening Readiness Index (Index = 100)

- Three states have high reopening readiness ≥100
- Ten states have reopening indices between 90 and 100
- Thirty seven states have reopening indices of < 90

Source: IQVIA Institute Compiled from Data available 6/13/2020; COVID Tracking Project, Rt.live

- Three states in the Northeast have high reopening readiness across the five metrics used to assess them.

- Ten states have reopening readiness indices between 90 and 100 and would likely rise to over 100 if testing rates, data quality, or contact tracing were improved.

- The index scores less than 90 in the 37 other states are not necessarily a suggestion that policies to reopen are incorrect, but they indicate a risk that re-emergence of COVID cases will be more difficult to manage without further changes, including reallocation of resources.

Readiness is highly variable but generally lower in those states which are rebounding or have not yet peaked

Exhibit 14: Reopening Readiness By State Pandemic Status

Source: IQVIA Institute Compiled from Data available 6/13/2020; COVID Tracking Project, Rt.live

- While the median state has a score of 84 on the Reopening Readiness Index, those which have dropped to below 20% of their peak infections average 95.

- A further 18 states that have peaked but are not yet down by 80% average Reopening Readiness Index of 84, indicating they may be equipped to maintain their downtrend while relaxing some of the stringent shutdown policies.

- States that have cases trending up, either as a first or subsequent peak, or in a rebound, have average index scores lower than 81, with notable exceptions.

- Tennessee, Louisiana, Vermont, and California all index above 90, which indicates readiness to reopen, but the index is not a measure pandemic control

National utilization of most key healthcare services categories have rebounded modestly since the end of April

Exhibit 15: Health Services Utilization Index Measures Compared to Baseline
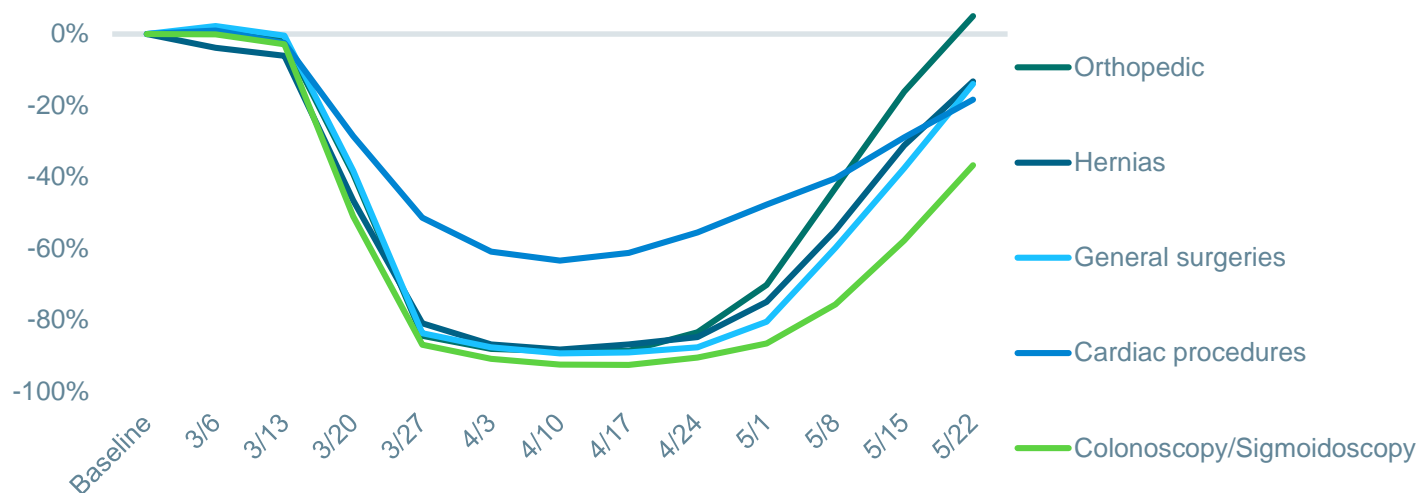

Source: IQVIA Real World Claims, 6/12/2020, Claims limited to processed within 14 days of service date for stability; Week Ending 5/29 factored to adjust for Holiday week based on impact observed in 2019

- The revival of the health system is critical to ensuring all Americans – including all those who have not been infected by the virus SARS-CoV-2 – receive the preventive and treatment services they need. Currently, states are still seeing these services operating well below baseline levels.

- A Health Services Utilization Index has been created. The index includes five essential components of a health system and measures their utilization against a base period of the eight week average from January 4 to February 28, 2020.

- The five index components are equally weighted, and for each component a score of 100 or higher indicates a return to baseline levels, including elective procedures, institutional (hospital or clinic) visits, office visits, diagnostic lab results, and new brand or generic prescriptions filled.

- Each of these metrics have been selected as early indicators of reopening of health services to more normal utilization by non-COVID patients.

- National utilization of most of these key healthcare services has rebounded modestly since the middle of April when volumes fell to their lowest levels. However, the levels and trajectories show some difference a national and state levels and depending on disease or therapy area.

- Elective procedures nearly ceased during the depths of the COVID-19 shutdown in April but have mostly recovered through the week of May 22, particularly orthopedic procedures. Colonoscopies/ sigmoidoscopies are still at levels 40% below the baseline.

Elective procedures nearly ceased during the height of COVID-19 shutdowns and have come back at different rates nationally

Exhibit 16: Selected Elective Procedures Percent Difference from Baseline
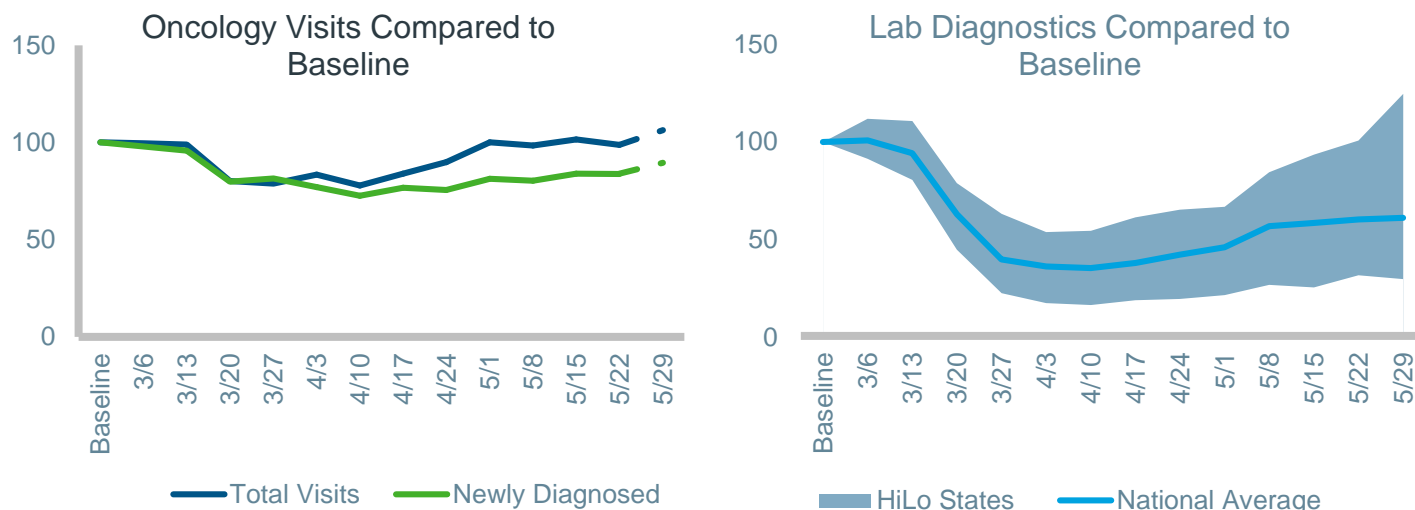

Source: IQVIA Real World Claims, 6/12/2020, Claims limited to processed within 14 days of service date for stability; Baseline 8 weeks from Jan 4 to Feb 28.

- Several elective procedures illustrate the decline in overall procedures during the height of the COVID-19 pandemic.

- For the most part, the percent of procedures for non-life-threatening conditions were rescheduled or canceled to a greater degree at the lowest point in April. Cardiac procedures dropped the least out of the procedures examined, to approximately 60% in the same period.

- Aside from cardiac procedures, the other procedures dropped by 80−90% during the month of April but rebounded sharply in May.

- To date, some orthopedic procedures, including hip and knee replacements, have begun to catch up the backlog, as the latest week had volumes estimated above the baseline level.

- For patients in need of elective procedures, this national trend is indicative, but does not address, the ongoing limits on some procedures that persist in some states where the numbers of the procedures remain low.

Oncology visits have rebounded while new diagnoses continue to lag, and lab diagnostics have rebounded only in some states

Exhibit 17: Oncology Patient Interactions and Overall Lab Diagnostics Compared to Baseline
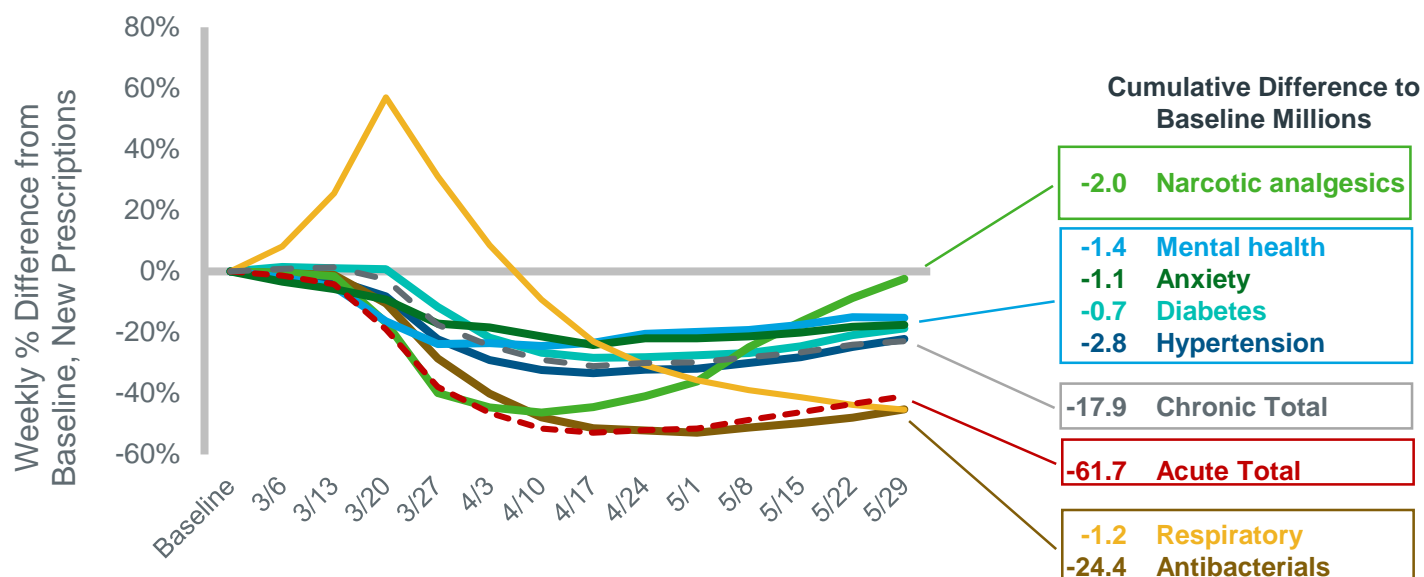

Source: IQVIA Real World Claims, 6/12/2020, Claims limited to processed within 14 days of service date for stability; Baseline 8 weeks from Jan 4 to Feb 28. Week ending 5/29 adjusted to estimate impact of Memorial day holiday

- Oncology visits declined by 20–30% at the most and have returned to above baseline levels in the latest week available. Newly diagnosed patients have lagged behind, as some patients may not be identified with regular screening tests.

- Overall, lab diagnostic volumes remain well down from baseline levels. This is influenced by the variability between states, with some much worse than others and others returning above baseline levels of lab tests.

- These tests are typically a key component of therapy decisions where they may inform the severity of a condition, the dosing required, or confirm an escalation that requires intervention.

- As such, a rebound on lab tests is a strong indicator that other decisions may rebound, subsequently.

- As noted in prior reports, the decline in some common screening tests for cancers was more severe than these overall lab results and is likely contributing to the new oncology diagnoses lagging behind overall oncology visits.

Exhibit Notes: Oncology patient interactions as a percentage of baseline (8 weeks ending 2-28)

New prescriptions have been significantly disrupted as patients were unable to see prescribers though this has begun to recover

Exhibit 18: Expected Versus Actual New to Product Prescriptions, Millions

Cumulative Difference to Baseline Millions

-2.0	Narcotic analgesics
-1.4	Mental health
-1.1	Anxiety
-0.7	Diabetes
-2.8	Hypertension
-17.9	Chronic Total
-61.7	Acute Total
-1.2	Respiratory
-24.4	Antibacterials

Source: IQVIA National Prescription Audit Patient Insights Weekly, May 29, 2020

- Total new starts for medicines since March 6th are down 34% cumulatively through May 29th, with 80 million fewer new prescriptions filled compared to baseline.

- Acute care prescriptions have a cumulative reduction of 62 million over the same period (about 38%),

- This includes 24 million fewer antibiotic prescriptions dispensed in the past 13 weeks (down about 37%)

- There were 2 million fewer narcotic analgesics new starts over the same period (down about 25%) but in the latest week these were down only 2% versus baseline

- Chronic care prescriptions have a cumulative reduction of 18 million over the same period (about 20%).

- Respiratory prescriptions rose dramatically in the early weeks of the pandemic in part due to patients being prescribed them for COVID symptoms.

- Most medicines are showing a mild rebound from the lowest point of usage in late April, however, in the latest week, new prescriptions are still down 41% for acute therapies and 23% for chronic treatments.

Notes: Difference between actual values per week and baseline average for the 8 weeks from January 4th to February 28th are plotted. Prescriptions where patient has not received a prescription of the same medicine in the past year, includes both new therapy starts and switched or added-on prescriptions.

The composite Health Services Utilization Index ranges from a high of 64 in LA to 31 in CA and a median value of 50

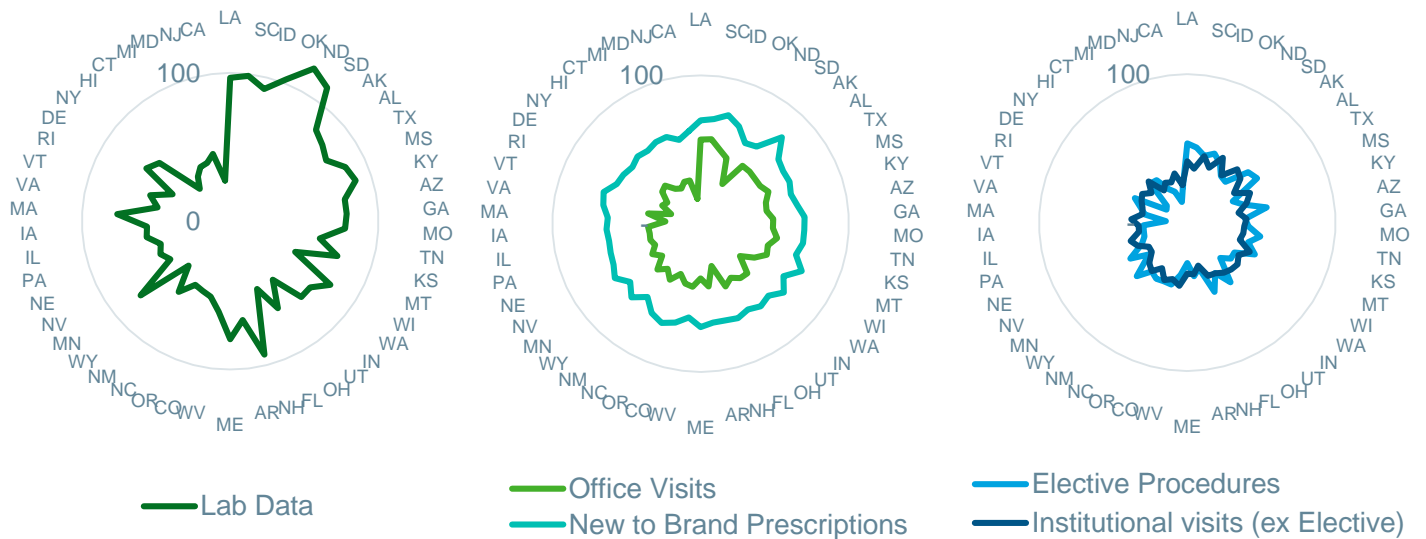**Exhibit 19: Health Services Utilization Index**
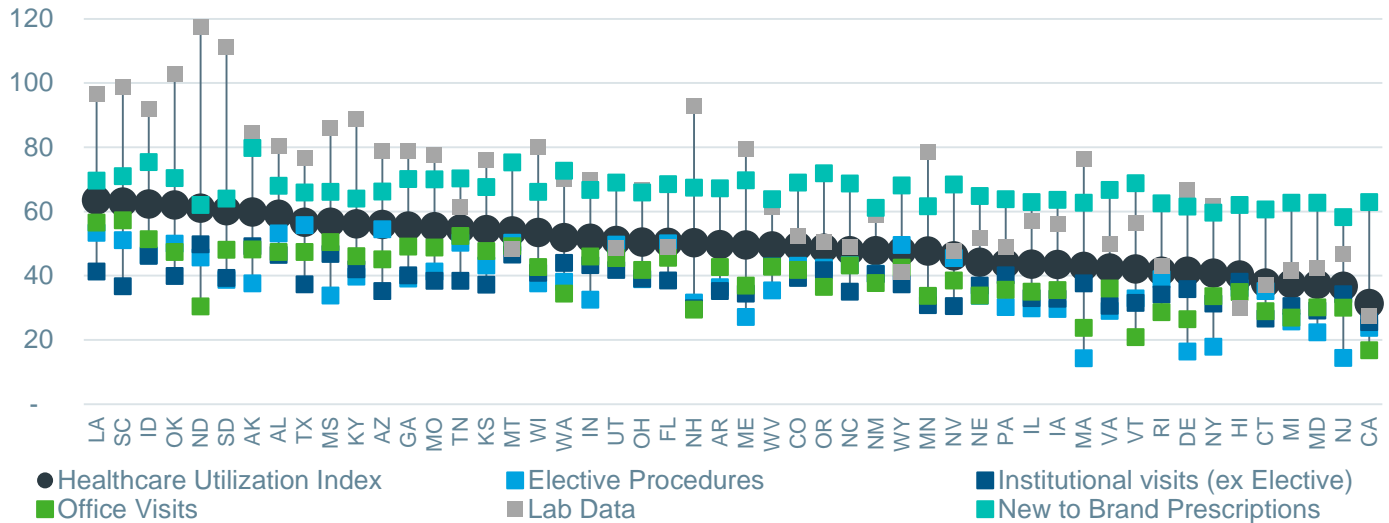
Source: IQVIA Real World Claims, 6/12/2020, Claims limited to processed within 14 days of service date for stability; Week Ending 5/29 factored to adjust for Holiday week based on impact observed in 2019

- The Health Services Utilization Index still lags between 31–64% of baseline levels across the country with a median of 50.

- Across most states, diagnostic lab testing levels have recovered the most, followed by new to brand prescriptions and office visits, with institutional visits and elective procedures recovered the least

- It is not clear if patients are not seeking care, delaying visits due to COVID-19 concerns, policies restricting access, or financial or insurance concerns related to the economic impact of the shutdown.

- Some states have demonstrated strong rebounds on key leading indicators shown in Exhibit 19. Generally, the latest week represents an improvement over prior weeks across all of the indices.

- New to brand (or generic) prescriptions have consistently retained the highest index scores throughout the pandemic, partly due to the ability of patients and prescribers to use telehealth tools to initiate therapy without an in-person interaction, an option that is not available as readily for surgeries or lab tests.

- Four states, Massachusetts, Delaware, New York, and New Jersey, still have elective procedures at less than 20% of their baseline levels.

- Three states have lab tests above baseline levels, including Oklahoma, North Dakota, and South Dakota.

Lab tests are an early diagnostic tool and restarting earlier in some states, while other measures of utilization have recovered less

Exhibit 20: Health Services Utilization Indices by State

—Lab Data

—Office Visits
—New to Brand Prescriptions

—Elective Procedures
—Institutional visits (ex Elective)

Source: IQVIA Real World Claims, 6/12/2020, Claims limited to processed within 14 days of service date for stability; Week Ending 5/29 factored to adjust for Holiday week based on impact observed in 2019

- In Exhibit 20, states are sorted clockwise from top based on the overall highest Health Services Utilization Index.

- Louisiana has nearly recovered to baseline levels of lab testing, while remaining far below on other metrics, and most states are similarly far below baseline levels for elective procedures and institutional visits.

- As each state is indexed to their own normal level of utilization, these metrics indicate the weekly amount of delayed or disrupted care and suggest a sustained period of catching up will be required across the country.

- The impact of these dynamics will affect the patients not receiving the care they otherwise would have, as well as the institutions delivering care that may suffer financially from revenue disruptions.

Exhibit notes: States sorted based on overall Health Services Utilization Index clockwise. The baseline average in the 8 weeks from Jan 4 to Feb 28 2020 for each metric in each state are set to = 100.

Health system reopening levels significantly lag the readiness of States to reduce movement and activity restrictions

**Exhibit 21: Comparing Reopening Readiness to Health Services Utilization by State**
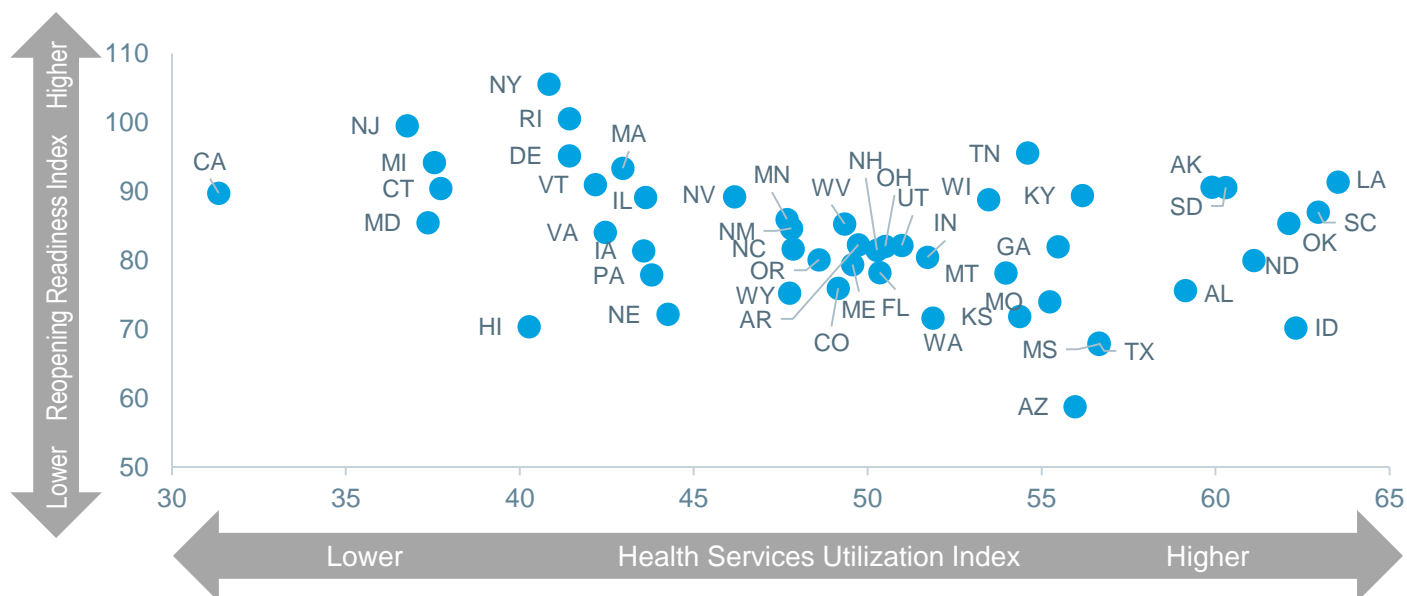
Source: IQVIA Institute, June 13, 2020

- The three states with the highest Reopening Readiness Index are poised to manage infection risk well while reopening, but all have generally lower use of health services relative to baseline than other states.

- States with a score of 90–100 on the Reopening Readiness Index have very different patterns of health system utilization.

- California and Louisiana have a similar Reopening Readiness Indices but very different Health Services Utilization Indices.

- Several states with the lowest Reopening Readiness Index have some of the highest Health Services Utilization, including Arizona, Idaho, Mississippi, and Texas, which all have Readiness Indices below 71 and Health Services Utilization indices above 55.

- Health Services Utilization measured as usage compared to the baseline reflects that there is less usage in the system. This was the result of physically closed premises early in the crisis, but more recently could be associated with a variety of patient and provider decisions and motivations evolving differently across the country.

- Some patients facing financial pressures may continue to forego services out of an abundance of caution, while others may not be able to afford their share of costs, or have lost health insurance due to unemployment.

- As shutdowns continue, some providers are still not allowed to bring all the patients back in traditional scheduling density because of ongoing spacing requirements.

- Generally, low Health Services Utilization reflects that the system is not working at its normal capacity, and the trajectory with which it returns to baseline levels is an issue evolving differently across the country.

States with RRIs over 100 have much lower healthcare utilization indices and may see an acceleration of the return to normal

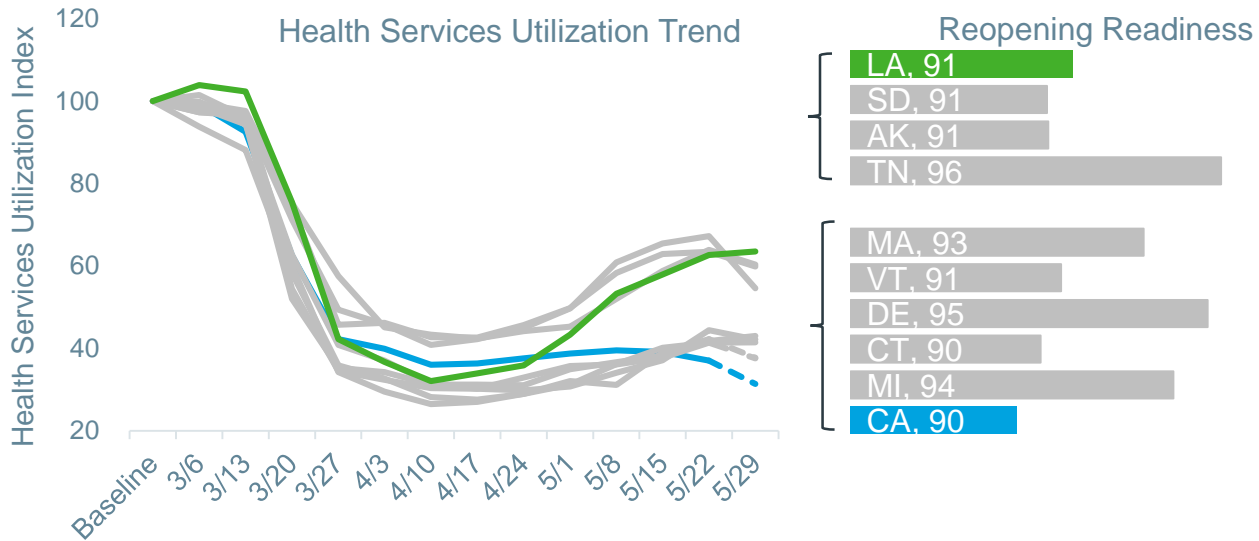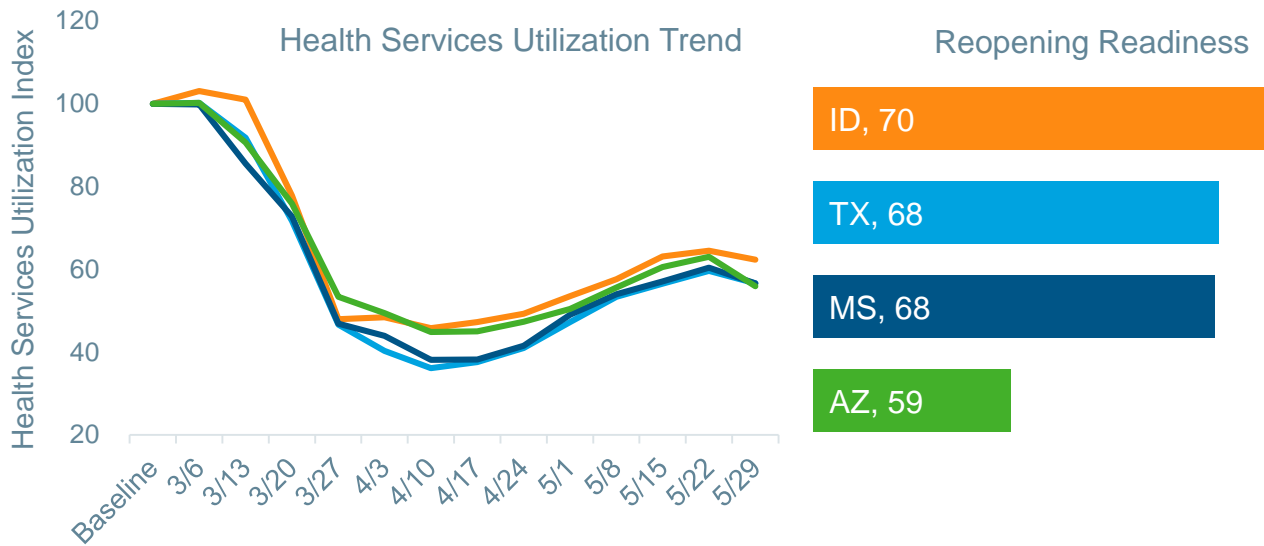**Exhibit 22: Selected States Reopening Readiness and Health Service Utilization Comparisons**
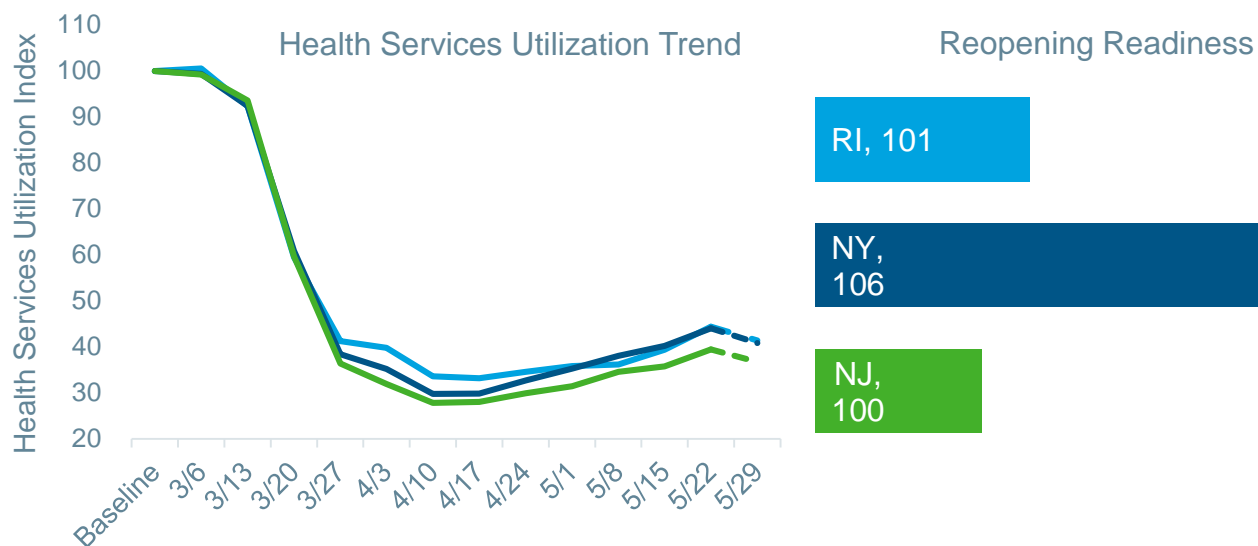
Source: IQVIA Real World Claims, 6/12/2020, Claims limited to processed within 14 days of service date for stability; Week Ending 5/29 factored to adjust for Holiday week based on impact observed in 2019; Reopening readiness as of 6/12/2020

- Three states with Reopening Readiness Index scores over 100 all remain at approximately 40% of their baseline Health Services Utilization levels with only modest rebound from the lowest levels in April.

- These states can expect significant rebound in Health Services Utilization in the coming weeks as restrictions are lifted, provided patients are willing to venture out.

- The influence of unemployment and associated loss of insurance is a complicating factor for the recovery in utilization and will bear careful examination.

- The Utilization index components include some that are widely used, such as medicines, and others that are much rarer but more costly, such as surgeries.

- Loss of insurance will likely act as a dampening force on rebounds in utilization, to the degree that patients lost insurance, though this is understood to be far below the overall new unemployment claim levels.

Ten states with Reopening Readiness between 90–100 had markedly different Health System Utilization patterns in the past month

Exhibit 23: Selected States Reopening Readiness and Health Service Utilization Comparisons

- California and Louisiana have similar Reopening Readiness indices, and both have noted hotspots of re-emergence of infections, but differ substantially in their Health System Utilization in the past month.

- Both Louisiana and California had declined to about 40% of their baseline Health System Utilization by April, but since early May, Louisiana has recovered to 64% of baseline while California has declined further to 31%.

- Eight other states followed similar utilization paths over the past two months while all having similar Reopening Readiness Index scores between 90–100.

States with lower readiness and health services at higher levels, there is a risk services could decline again if new cases rise

Exhibit 24: Selected States Reopening Readiness and Health Service Utilization Comparisons

Source: IQVIA Real World Claims, 6/12/2020, Claims limited to processed within 14 days of service date for stability; Week Ending 5/29 factored to adjust for Holiday week based on impact observed in 2019; Reopening readiness as of 6/12/2020

- Those states with lower Reopening Readiness scores and already operating their health systems at higher levels – such as Arizona, Mississippi, Texas, and Idaho – may see a future decline in health services utilization if the level of new active cases rises sharply from current levels.

- These states have some of the higher Health System Utilization levels in the country, having not declined to the same lows as other states.

- They are also notable for having not yet reached peak infection levels, currently experiencing a second peak larger than their first, or are in the midst of a rebound in cases.

Notes on Sources

THIS REPORT IS BASED ON THE IQVIA SERVICES DETAILED BELOW

The trends presented reflect United States activities only.

IQVIA's Longitudinal Prescription Data: IQVIA receives nearly 4 billion prescription claims per year with history from January 2006 with coverage over 90% for the retail channel, 60–85% for mail service, and 75–80% for long-term care. Longitudinal data derives from electronic data received from pharmacies, payers, software providers and transactional clearinghouses. This information represents activities that take place during the prescription transaction and contains information regarding the product, provider, payer, and geography. Rx data is longitudinally linked back to an anonymous patient token and is linkable to events within the data set itself and across other patient data assets.

IQVIA's Medical Claims Data: Dx data are pre-adjudicated claims collected from office-based physicians and specialists. These data are sourced from CMS-1500 form-based claim transactions, the standard reimbursement form for all non-cash claims. Medical claims data includes patient-level diagnosis and procedures for visits to U.S. office-based individual professionals, ambulatory and general healthcare sites. The medical claims data includes more than 205 million patients, over 1.7 billion claims and 3 billion service records obtained annually.

Diagnosis, telehealth and procedural claims have been derived based on IQVIA's medical claims database through the week ending 5/29/2020. Normal claims processing lags are adjusted for by IQVIA using a methodology called "date control" in order to estimate claim levels where the full number of claims has not yet been received. The methodology considers historic patterns of lag periods between service dates and receipt of claims to project missing claims.

Disruptions from COVID-19 may result in claim lags that differ from historic patterns. IQVIA's medical claims database is dynamic and IQVIA will always employ the latest available information to consider in its estimates — therefore estimates of growth may change from publication to publication.

IQVIA's National Prescription Audit (NPA): NPA is the industry standard source of national prescription activity for all pharmaceutical products. It measures demand for prescription drugs, including dispensed pharmaceuticals to consumers across three unique channels: retail, mail service, and long-term care pharmacies. From sample pharmacies, IQVIA collects new and refilled prescription data daily. NPA represents and captures over 92% of all outpatient prescription activity in the United States and covers all products, classes, and manufacturers.

IQVIA's National Prescription Audit: New To Brand (NPA NTB)

NPA New to Brand provides enhanced visibility into the volume of a patient's true, first-time use of a brand versus continued therapies. IQVIA's longitudinal data allows users to analyze new therapy starts, switched to/add-on products, as well as continued therapies. In addition to reporting the new or refill information from a prescription, the therapy history for the patient is taken into account in order to categorize that prescription. New to Brand RX (NBR) = New Therapy Start Rx + Switch/Add-On Rx

Notes on Sources

IQVIA COVID-19 Active Cases Curve Simulator

The core of this simulator developed by the IQVIA Data Science and Advanced Analytics team is the Susceptible-Exposed-Infected-Removed epidemiology model using inputs from publicly available sources and updated daily. The simulator focuses on total active cases and shows the number of active cases at a given time and the number of active cases per 100K population, shape of increase of the curve, timing of the apex of the curve and the shape and timing of the decline from the apex. The base scenario assumes that existing mitigation measures (nonpharmaceutical interventions) are maintained at current levels through the duration of the future period simulated. It does not predict or forecast when those measures might be relaxed or modified.

**PUBLIC DATA SOURCES USED AND NOTES ON METHODOLOGIES EMPLOYED:**

- **Google Community Mobility Reports** are were created with anonymized and aggregated data at the county level across the US based on users who have turned on the location history setting in Google's services, which is off by default. The baseline is the median value, for the corresponding day of the week, during the 5-week period Jan 3–Feb 6, 2020 and is indexed for five types of locations where people would move (Grocery & Pharmacy, Transit Stations, Retail & Recreation, Parks, and Workplaces), and one (residential) where they would be located more if they were staying home more often. The IQVIA Institute averaged four of the five movement types (excluding parks) with the inverse of residential locations to determine movement indices in this report. Accessed at: https://www.google.com/covid19/mobility

- **Rt.live** is an initiative based on calculating with open-source algorithms the real-time transmissibility of the virus. Accessed a: http://Rt.live

- **The COVID Tracking Project** is aggregating published data in the US on a daily basis. Accessed at: http://covidtracking.com

- **Stringency** is an index metric and calculation developed by researchers at Oxford University as the Oxford COVID-19 Government Response Tracker, and adapted with State level data inputs not otherwise included in the Oxford model developed by the IQVIA Institute. Oxford's methods were access at: https://www.bsg.ox.ac.uk/research/research-projects/coronavirus-government-response-tracker
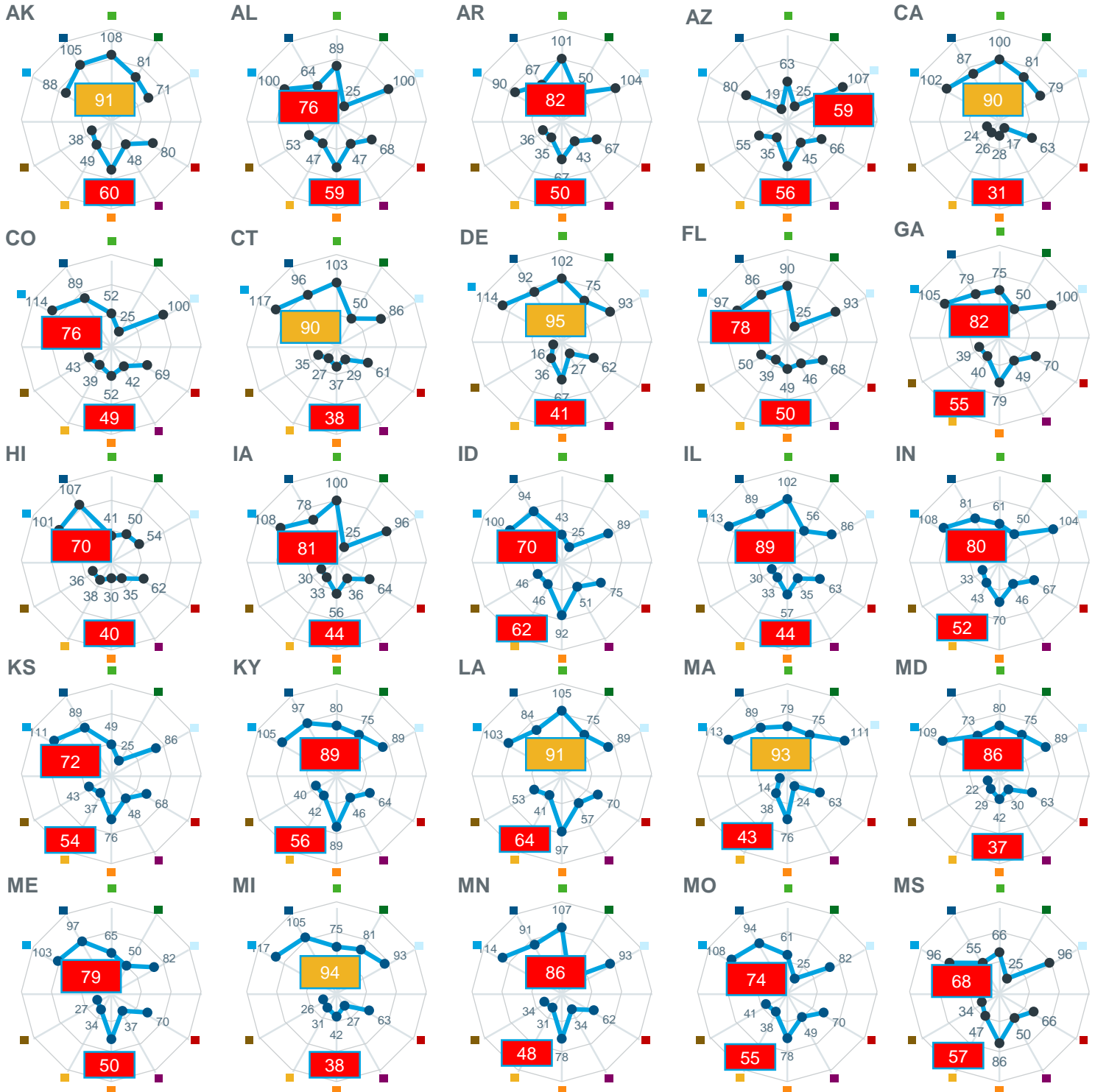
Appendix

Reopening Readiness Index

■ R_t level: The real-time measure of transmissibility. 100+ = values of 1.0 or lower

■ Positive testing ratio: The percentage of tests conducted which produce a positive result. 100+ = 2% or lower

■ Testing level per capita: 100+ = Testing 1.1% of population per week or more

■ Contact tracing planning and implementation: 100+ = Fully implemented plans that are above recommended levels

■ Granularity and quality of case reporting: 100+ = Achieving 21 of 25 data quality and granularity metrics

• Reopening Index: <90, 90-100, ≥100

AK

91	**Reopening Readiness Index**

60	**Health Services Utilization Index**

Values shown on chart: 108, 81, 71, 105, 88, 38, 49, 48, 80, 85
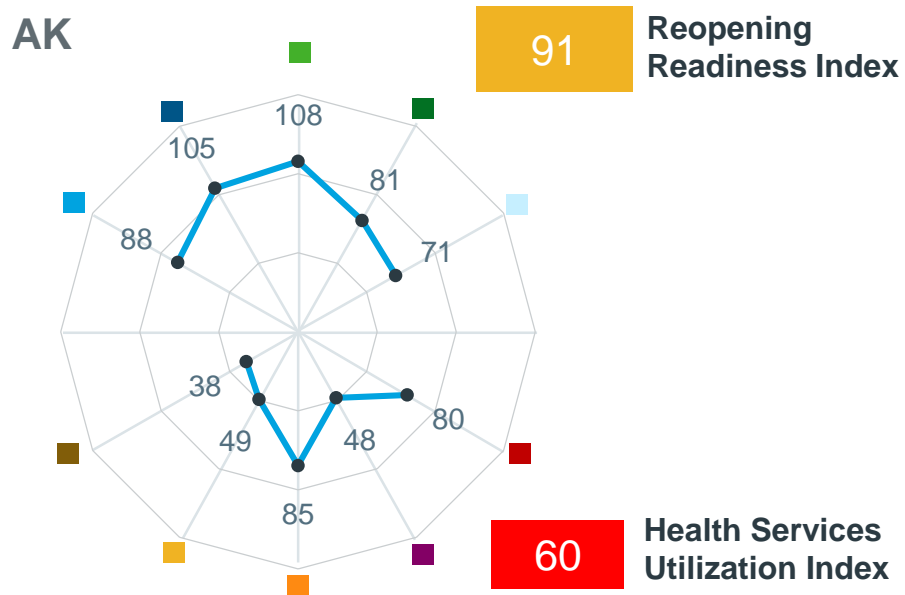
Health Services Utilization Index latest week (5/29/2020) vs baseline (1/4-2/28/2020)

■ Elective procedures

■ Institutional visits

■ Diagnostic lab tests

■ Office visits

■ New to brand prescriptions

• Utilization Index: <90, 90-100, ≥100

• Volumes adjusted for expected impact of Memorial Day Holiday

Appendix
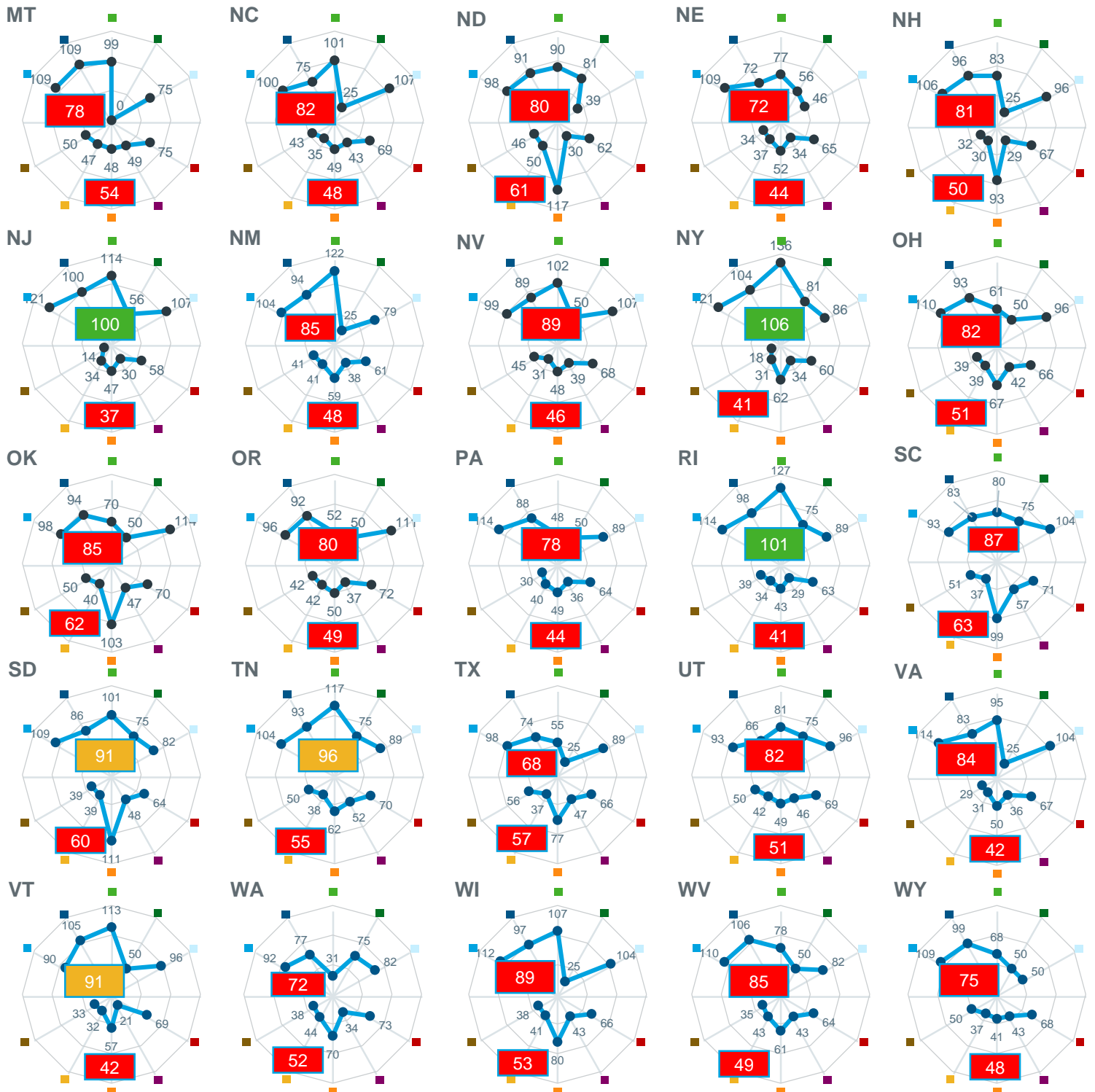
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Murray Aitken is Executive Director, IQVIA Institute for Human Data Science, which provides policy setters and decisionmakers in the global health sector with objective insights into healthcare dynamics. He led the IMS Institute for Healthcare Informatics, now the IQVIA Institute, since its inception in January 2011. Murray previously was Senior Vice President, Healthcare Insight, leading IMS Health's thought leadership initiatives worldwide. Before that, he served as Senior Vice President, Corporate Strategy, from 2004 to 2007. Murray joined IMS Health in 2001 with responsibility for developing the company's consulting and services businesses. Prior to IMS Health, Murray had a 14-year career with McKinsey & Company, where he was a leader in the Pharmaceutical and Medical Products practice from 1997 to 2001. Murray writes and speaks regularly on the challenges facing the healthcare industry. He is editor of Health IQ, a publication focused on the value of information in advancing evidence-based healthcare, and also serves on the editorial advisory board of Pharmaceutical Executive. Murray holds a Master of Commerce degree from the University of Auckland in New Zealand, and received an M.B.A. degree with distinction from Harvard University.

Michael Kleinrock serves as research director for the IQVIA Institute for Human Data Science, setting the research agenda for the Institute, leading the development of reports and projects focused on the current and future role of human data science in healthcare in the United States and globally. Kleinrock leads the research development included in Institute reports published throughout the year. The research is focused on advancing the understanding of healthcare and the complex systems and markets around the world that deliver it. Throughout his tenure at IMS Health, which began in 1999, he has held roles in customer service, marketing, product management, and in 2006 joined the Market Insights team, which is now the IQVIA Institute for Human Data Science. He holds a B.A. degree in History and Political Science from the University of Essex, Colchester, UK, and an M.A. in Journalism and Radio Production from Goldsmiths College, University of London, UK.

About the Institute ⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯ + ⎯

The IQVIA Institute for Human Data Science contributes to the advancement of human health globally through timely research, insightful analysis and scientific expertise applied to granular non-identified patient-level data.

Fulfilling an essential need within healthcare, the Institute delivers objective, relevant insights and research that accelerate understanding and innovation critical to sound decision making and improved human outcomes. With access to IQVIA's institutional knowledge, advanced analytics, technology and unparalleled data the Institute works in tandem with a broad set of healthcare stakeholders to drive a research agenda focused on Human Data Science including government agencies, academic institutions, the life sciences industry and payers.

Research Agenda

The research agenda for the Institute centers on 5 areas considered vital to contributing to the advancement of human health globally:

• Improving decision-making across health systems through the effective use of advanced analytics and methodologies applied to timely, relevant data.

• Addressing opportunities to improve clinical development productivity focused on innovative treatments that advance healthcare globally.

• Optimizing the performance of health systems by focusing on patient centricity, precision medicine and better understanding disease causes, treatment consequences and measures to improve quality and cost of healthcare delivered to patients.

• Understanding the future role for biopharmaceuticals in human health, market dynamics, and implications for manufacturers, public and private payers, providers, patients, pharmacists and distributors.

• Researching the role of technology in health system products, processes and delivery systems and the business and policy systems that drive innovation.

Guiding Principles

The Institute operates from a set of Guiding Principles:

• Healthcare solutions of the future require fact based scientific evidence, expert analysis of information, technology, ingenuity and a focus on individuals.

• Rigorous analysis must be applied to vast amounts of timely, high quality and relevant data to provide value and move healthcare forward.

• Collaboration across all stakeholders in the public and private sectors is critical to advancing healthcare solutions.

• Insights gained from information and analysis should be made widely available to healthcare stakeholders.

• Protecting individual privacy is essential, so research will be based on the use of non-identified patient information and provider information will be aggregated.

• Information will be used responsibly to advance research, inform discourse, achieve better healthcare and improve the health of all people.
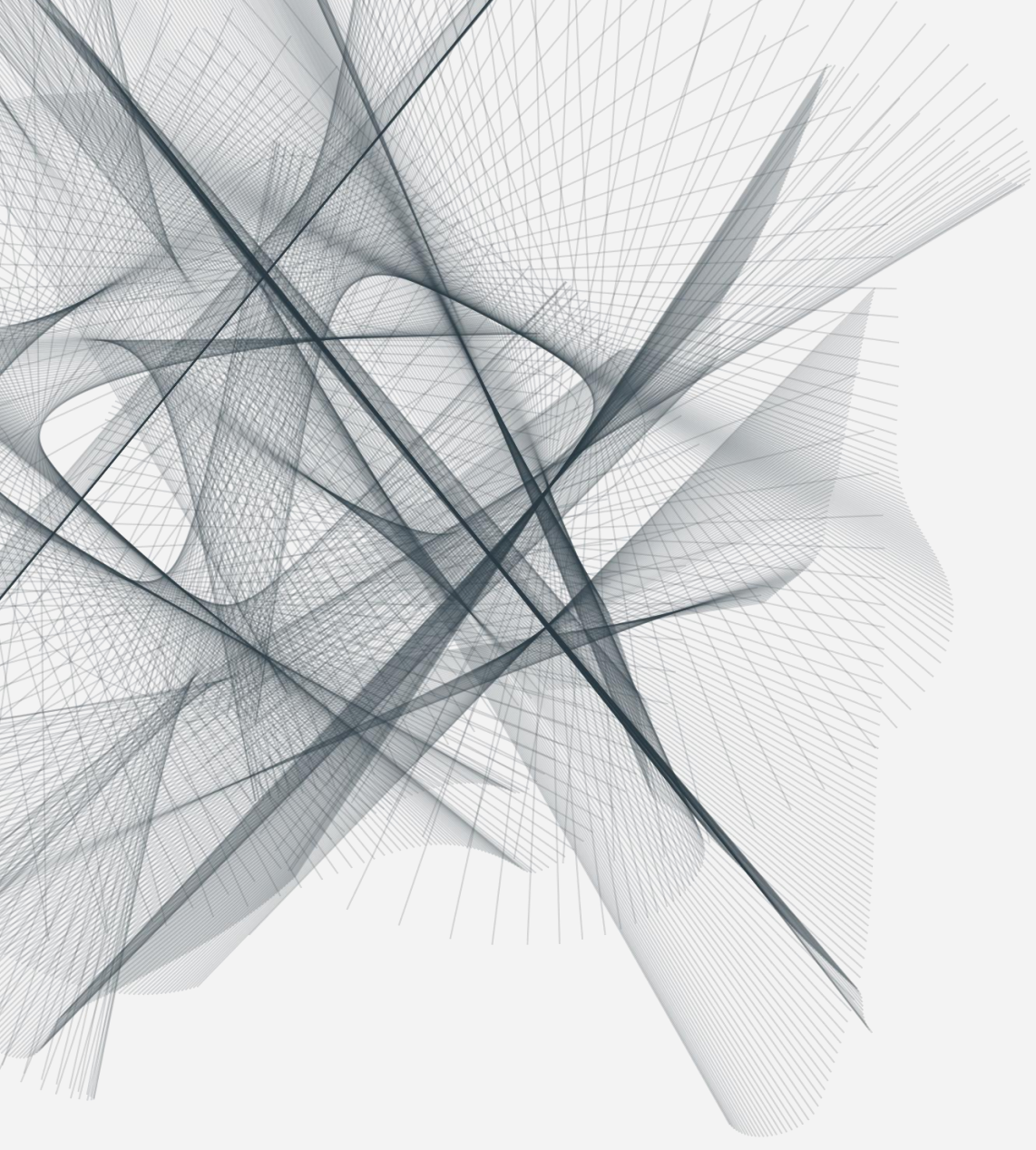
The Algorithmic Art featured on this report is generated using testing data compiled by the COVID-19 Tracking Project and analyzed by the IQVIA Institute to assess rates of coronavirus testing by state.

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