COVID-19

RESOLVE TO SAVE LIVES | Vital Strategies

NOVEMBER 2020

Tracking COVID-19 in the United States

Progress and Opportunities

Contents

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Prevent Epidemics is a project of Resolve to Save Lives, an initiative of Vital Strategies.

Introduction and executive summary

In July 2020, Resolve to Save Lives released Tracking COVID-19 in the United States: From Information Catastrophe to Empowered Communities, a review of state-level COVID-19 data dashboards for each of the 50 US states, the District of Columbia (DC) and Puerto Rico. We demonstrated that the use of accurate, real-time data for decision-making is essential for infectious disease control and proposed a set of 15 essential indicators. Our analysis highlighted the lack of both transparent, standardized, national data on the virus and its control, and standards for public reporting of this vital data at state, county, and city levels in the United States.

This report updates our earlier review, capturing progress and identifying persistent gaps, and highlights areas of new or increasing importance, including antigen testing, risk-alert systems, travel-related measures, schools, and vaccines. We also make minor adjustments to our recommended indicators.

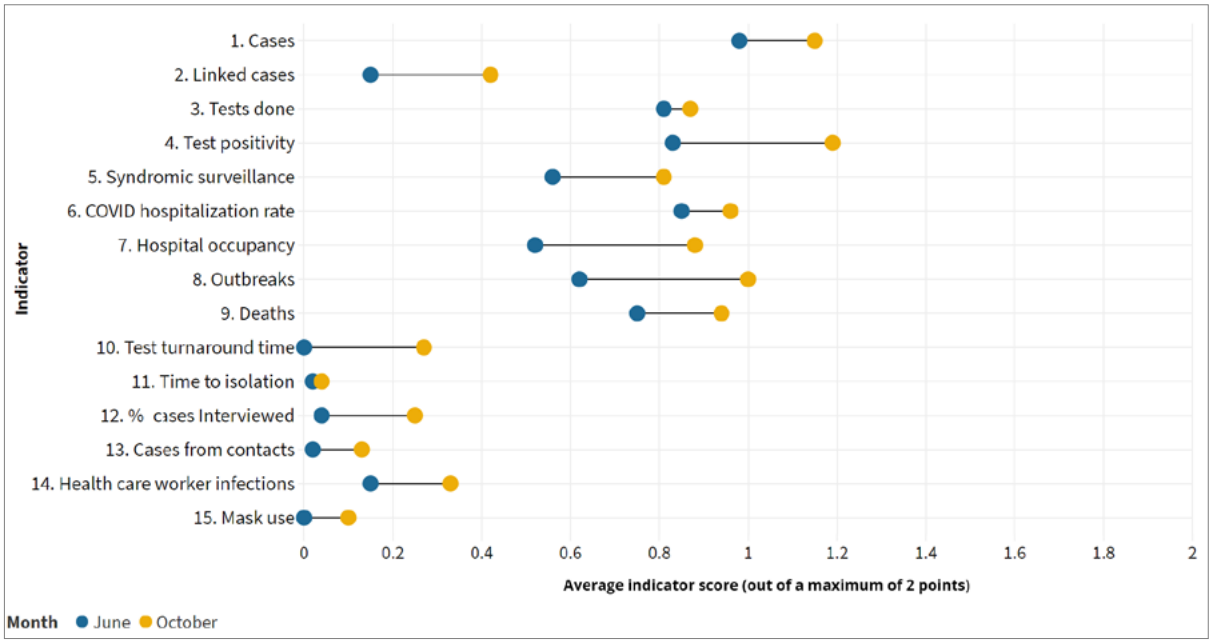
As we noted in July, tremendous efforts have been made by state, county and city public health departments to share COVID-19 data over the past several months. As we approach the end of 2020 in the midst of another national COVID-19 surge, it is increasingly important to make clear and accurate information available for individuals and communities to better understand and reduce their COVID-19 risk.

OVERALL RESULTS OF OUR ANALYSIS

We assessed the availability and detail of data provided for each of our 15 essential indicators (Appendix 2), which include data on syndromic surveillance, cases, hospitalizations, deaths, testing, and contract tracing. Overall, states reported more data that aligned with the criteria for the 15 essential indicators (Figure 1), with the greatest improvement seen in indicators on outbreaks (e.g., nursing home and other high-risk facilities) and test positivity. Less progress was made with indicators on tests performed and time from specimen collection to case isolation. Data on some indicators remained largely unavailable, specifically those that relate to case investigation and contact tracing. (We believe that score increases between the first and second review primarily represent dashboard improvements, although such increases could also reflect our more complete assessment of existing information during the second review.) As a companion to the review, we developed an interactive, digital map to showcase changes in indicator availability at the state level.

In the absence of national standards or guidance or coordination, state dashboards continue to be highly variable with respect to the information presented, ease of use and functionality. In our first review, we highlighted best practices of dashboard design and functionality that continue to be relevant. It is also important to reiterate that all states should report data the same day it is collected to inform timely risk assessment and action .

Figure 1: Change in average essential indicator scores across all states*, June to October, 2020[1]



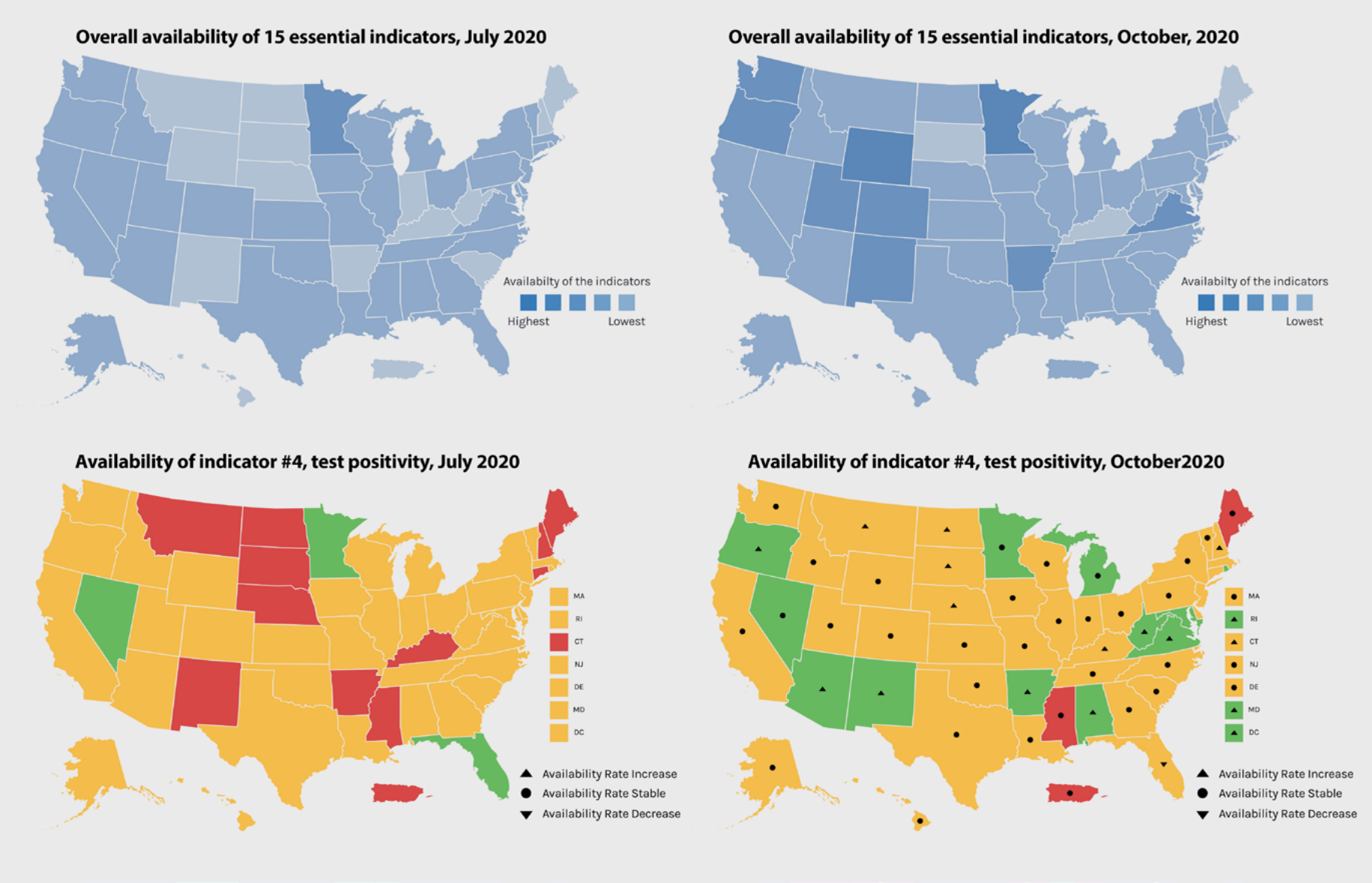
* Includes Washington D.C. and Puerto Rico

PROGRESS: TOP PERFORMING STATE DASHBOARDS

According to our analysis, the top four COVID-19 data dashboards were those from Minnesota, Oregon, Utah and Washington, D.C. These dashboards provide robust information, enabling communities to be better informed on the local spread of COVID-19 and risk of infection. Other states, such as Arkansas and New Mexico, were notable for substantial improvements in their dashboards since our last assessment in June. (See Appendix 2 for complete results for all states.)

[1] Includes Washington D.C. and Puerto Rico

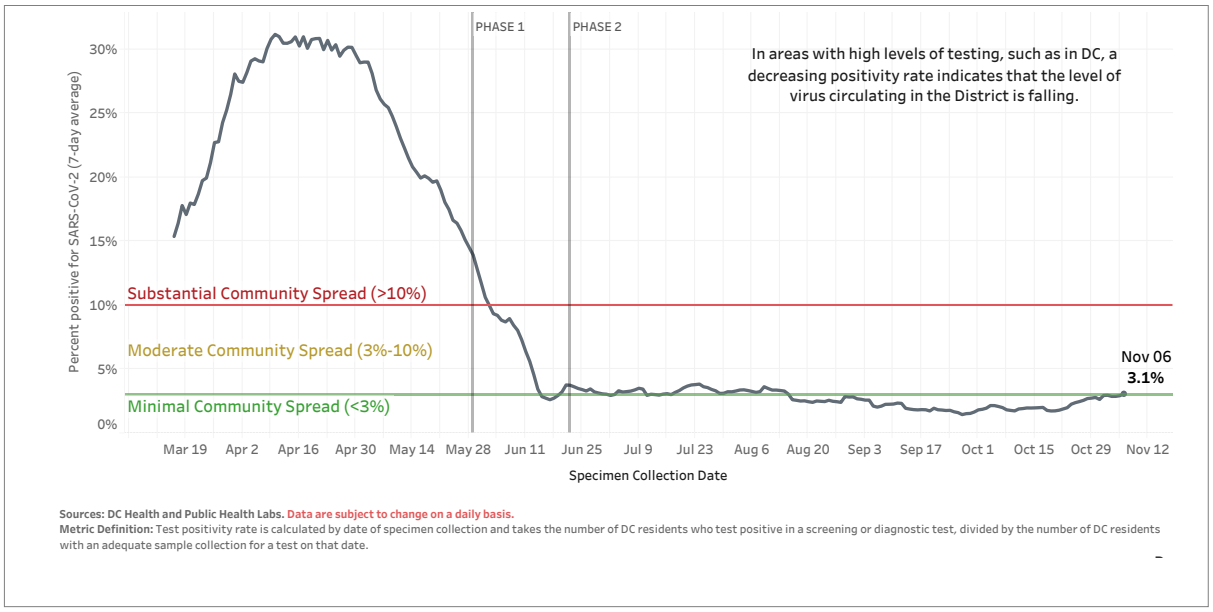
Figure 2. Change in state scores over time



ONGOING CHALLENGES

The most common reasons for indicators not meeting the criteria for reporting were missing data trends over time, lack of clear targets and thresholds, and lack of demographic stratification over time. Many states continue to report only cumulative totals, which is less helpful than a trend line for informing current risk. Clear representation of targets and thresholds on the graphs is important to show whether the objectives established by state leaders are being met. These thresholds and targets may vary by state but should be explicitly represented when displaying data. For example, this chart tracking positive test results from Washington D.C.'s dashboard clearly depicts both the local trend and some meaningful targets, and provides a clear and useful explanation (Figure 3).

Figure 3. Test positivity graph from Washington, D.C.'s COVID-19 dashboard

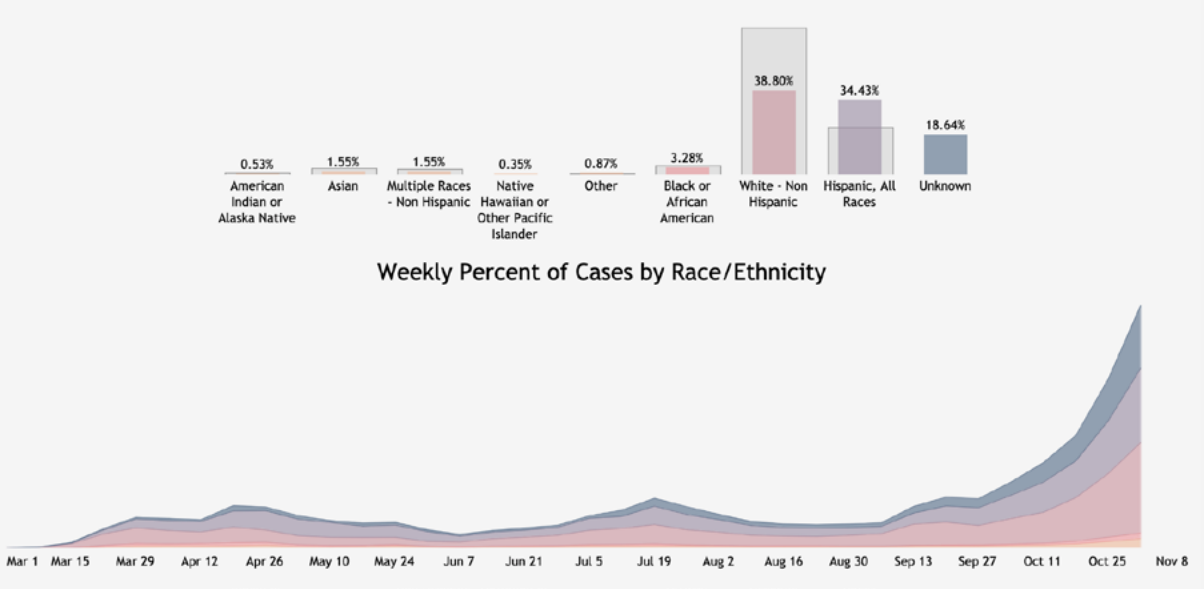


Source: Washington D.C. COVID-19 Dashboard

Many states still do not stratify essential indicators, such as cases, tests, hospitalizations and deaths, by age and race/ethnicity over time. This kind of stratification is essential to understand patterns, triangulate risk, address bottlenecks, and inform public health action. A good example of effectively displaying stratification can be found in Colorado (Figure 4), which reports new cases stratified by race by week, and compares those percentages to the proportion of the overall state population comprised by each group.

One reason that states may not stratify by race and ethnicity is that these characteristics are missing in a substantial portion of laboratory case reports from which data are drawn. We recommend updating the race and ethnicity data from case investigation files and explicitly stating in titles or footnotes what percentage of all cases is represented in the stratified display.

Figure 4. Stratification of new cases by race/ethnicity from Colorado's COVID-19 dashboard



Source: Colorado COVID-19 Data Dashboard

In addition to the 15 essential indicators, we examined information in five key areas to answer critical questions and review the availability of relevant data (see Appendix 5).

- **Antigen testing** – Millions of antigen tests are being deployed across the country with varying approaches to test use and results reporting. How do states report on antigen versus PCR testing and test results?
- **Risk alert level systems** – We recommend the use of risk alert-level systems to inform the public on COVID-19 risk and appropriate corresponding public health and social measures. How many states have implemented a risk alert-level system?
- **Schools** – In many parts of the country, children have resumed in-person education. How are states publicly reporting on COVID-19 in educational settings?
- **Travel guidance** – Some states have guidance or restrictions on travelers from other states. How common is this and what criteria do states use to inform these decisions?
- **Vaccine planning** – As COVID-19 vaccine candidates advance towards approval, how many states are sharing their plans for how they will deploy vaccines and monitor uptake?

Methods

After our initial review in July, we received feedback from several states that certain data sources were missed. To address this issue, we performed a broader and more comprehensive search for state-level government information on COVID-19 in the current review. This included looking for data dashboards from Departments of Health and Education, Governors' offices and reopening plans. We used internet searches to locate COVID-19 data dashboards for all 50 US States, the District of Columbia and Puerto Rico. For many states, multiple data sources and dashboards were reviewed. Although it is possible that we still missed information sources, we believe we captured those that could be easily found by the public. (See Appendix 1 for a complete list of sources).

We created a standardized tool to collect basic information presented by each state. Using this tool, we assessed the availability and detail of data provided for each of our 15 essential indicators (see Appendix 2 for an explanation of changes to the indicators since July 2020), which include information on syndromic surveillance, cases, hospitalizations, deaths, testing, and contract tracing. Data were collected October 14-19, 2020, and are subject to change as states modify their dashboards.

First, we examined whether states had the exact information specified by the indicators, similar but incomplete information (e.g., slightly different data or missing stratification), or no information at all. We then compiled these data into a simple score. We compiled a list of examples by indicator (see Appendix 3).

We also created a structured internal survey to capture information on priority areas including antigen testing, risk-alert systems, travel-related measures, schools and vaccines.

Limitations

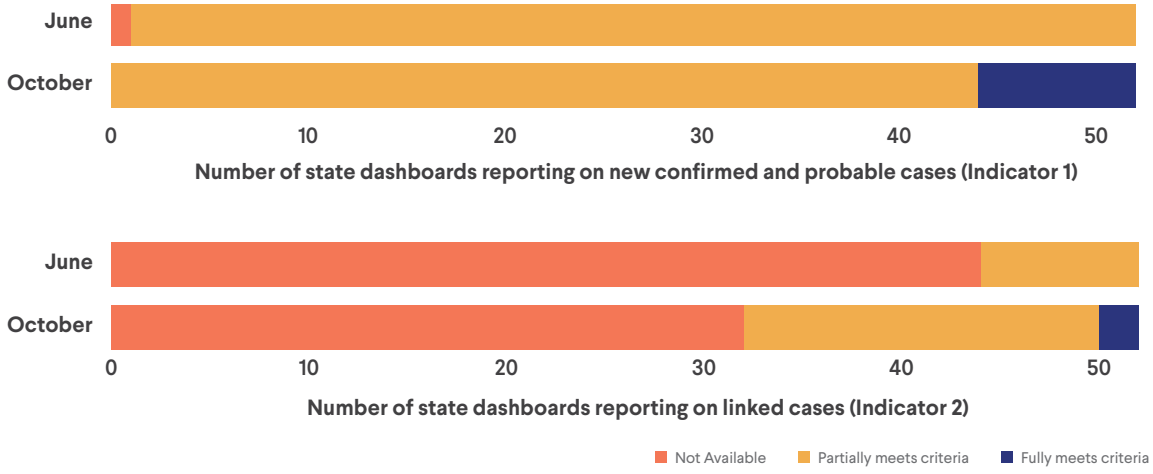
Our study and evaluation are subject to some limitations. The researchers conducted a thorough search of state-level government information on COVID-19, including data dashboards from Departments of Health and Education, Governors' offices and reopening plans. Data points that could not be located in this process were not considered accessible to the public, and thus may not have been awarded full credit. We did not formally evaluate dashboard usability as a part of this iteration of the indicator report. Next, COVID-19 and state responses to the pandemic are rapidly evolving. Sites are continually being updated and the information available on an individual state's dashboard may have changed from the time of evaluation to the time of this report's publication. Finally, a team of people were involved in the process of evaluating individual websites and dashboards. Great effort was taken to harmonize the approach to the evaluation process and ensure that each state was being evaluated using the same criteria, and audits were performed to ensure the accuracy of the ratings across indicators and states. However, given the variety of data visualization formats and information available from different states, it is possible that some indicators were not rated absolutely uniformly across states.

Results by indicator

CASES

#	Indicator or information	Stratification	Suggested target
1	New confirmed and probable cases and per-capita rates by date[2] with 7-day moving average	Age, sex, race, ethnicity and zip code Outbreak vs. community	Decreasing over 14 days or at low level[3]
2	Percent of new cases epidemiologically linked to at least one other case by date, stratified by whether part of known outbreak or not, with threshold*	Age, sex, race & ethnicity Outbreak vs. community	›80%[4]

Figure 5. Case indicator availability, June and October 2020



Key findings: All states now display data on new daily cases, with eight states providing a moving average, differentiating between probable and confirmed cases, and stratifying by important demographic categories over time.

Why it matters: Case incidence and case trends are basic indicators of any disease outbreak. If the majority of cases are not linked to at least one other case or a known source of exposure, public health departments do not have sufficient awareness of ongoing spread of disease.

Recommendations: Though we originally recommended zip code-level stratification of cases on state dashboards, as of October 2020, this level of stratification is largely presented on county-level COVID-19 dashboards. This seems appropriate. Ideally, reciprocal links should be clearly provided between state and county dashboards so users can access this information. Minnesota and Oregon provide the most robust information on whether new cases are linked to existing cases.

[2] Confirmed cases should be reported by date of specimen collection when possible or, if that is not possible, by date of report or date of symptom onset. Probable cases should be reported by date of report; jurisdictions reporting by date of specimen collection should also provide information on date of report for inter-state comparability, until all states are reporting by date of specimen collection.

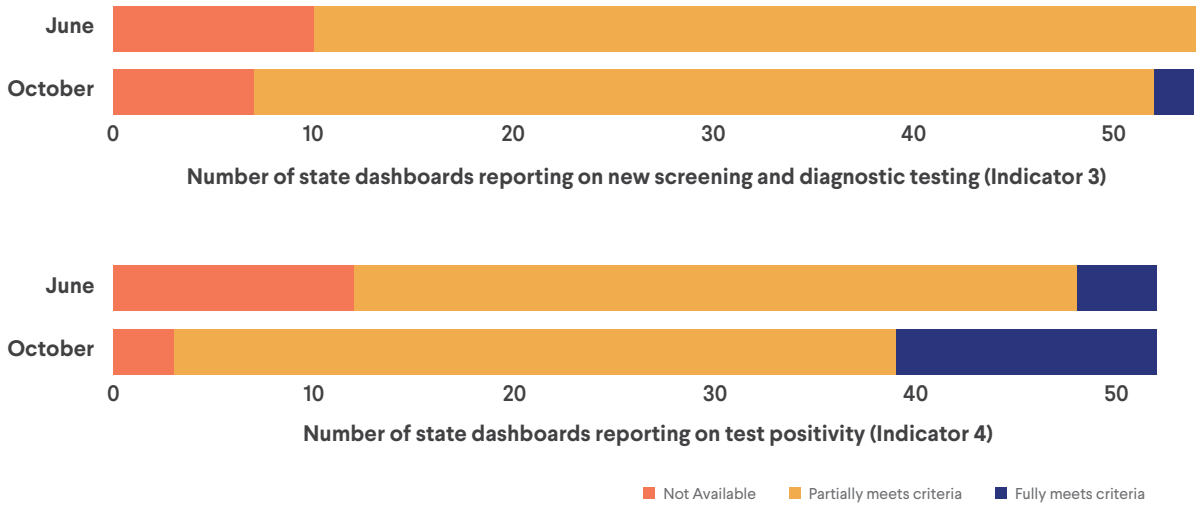
[3] Such as below 10 cases per 100,000 population over 2 weeks (CDC).

[4] If not reported, assume none linked to existing known source

TESTING

#	Indicator or information	Stratification	Suggested target
3	New screening (e.g. antigen) and diagnostic (e.g. PCR) testing per-capita rates by date, with threshold, with 7-day moving average	Age, sex, race & ethnicity	›1.5 tests/1,000/day[5]
4	Percent of screening (e.g. antigen) and diagnostic (e.g. PCR) tests positive by date, with threshold, with 7-day moving average	Age, sex, race & ethnicity	‹3% PCR positivity

Figure 6. Testing indicator availability, June and October 2020



Key findings: Although numbers of tests performed are widely reported, little progress has been made in reporting per capita testing rates, and less progress has been made in stratifying these data by age and race/ethnicity. This is due, in part, to lack of recording race and ethnicity information at testing sites. Current per capita testing rates vary greatly, with some states performing 5-10 times as many PCR tests per capita as others. This directly impacts case incidence estimates and should be considered when interpreting new case and test positivity data. Currently, 13 states provide clear data on test positivity over time with a labeled threshold on their charts. Another issue stems from the varied guidelines on the use of antigen tests: under some but not all testing algorithms, a single individual will have a screening antigen test and a confirmatory PCR test performed on the same day. (See *Spotlight on Antigen Testing*, below, for a more complete discussion of this issue).

Why it matters: Stratified, trended testing information is critical both to identify areas where the number of cases may have been underestimated, and to ensure that testing is focused on the most highly impacted communities. Test positivity can be a critical metric when making policy decisions around business and school reopening, travel restrictions and the implementation of other public health and social measures.

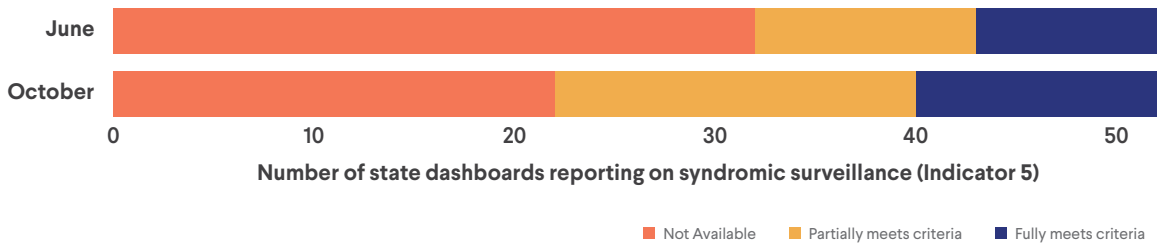
[5] Target applies to each major racial and ethnic group separately

Recommendations: Per capita testing rates should be reported as the number of individuals tested per 100,000 population per day, in addition to the total number of tests per day, to take the use of screening and confirmatory testing (including two-step pooled PCR testing) into account. State dashboards should display the test positivity targets they are currently using for risk levels or reopening thresholds on their charts; they may wish to use multiple thresholds to indicate gradated levels of risk as exemplified in US Center for Disease Control and Prevention (CDC) indicators for school reopening and White House Task Force Governor's reports.

SYNDROMIC SURVEILLANCE

#	Indicator or information	Stratification	Suggested target
5	Covid-like illness and influenza like illlenss trends from emergency departments		At or below adjusted baseline, declining

Figure 7. Syndromic surveillance indicator availability, June and October 2020



Key findings: Few states are incorporating syndromic surveillance into early decisions around implementation of COVID-19 public health and social measures.

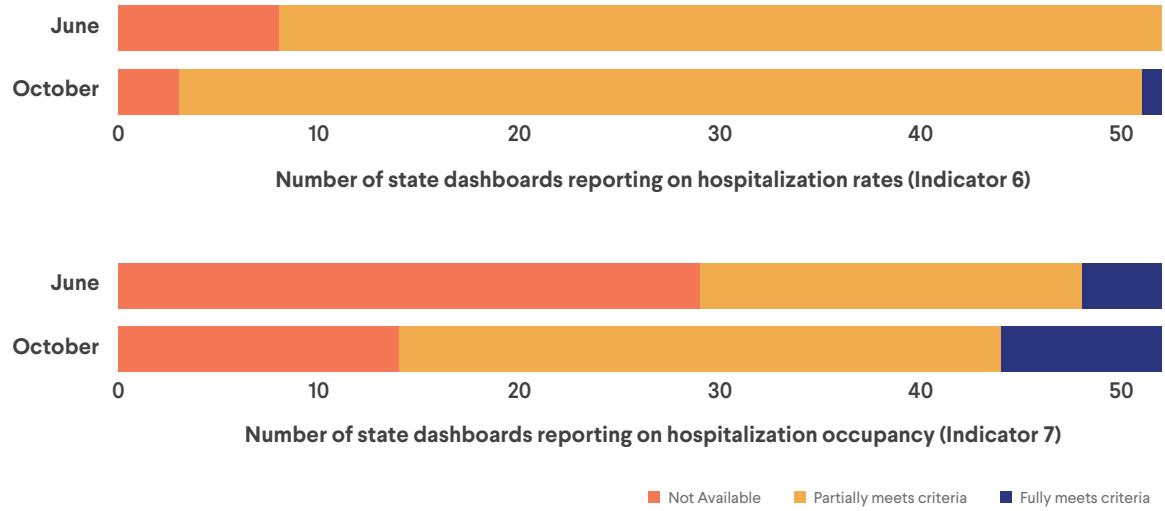
Why it matters: Syndromic surveillance data reflects people who present to healthcare facilities complaining of symptoms such as fever and cough that are consistent with a particular disease before a diagnosis is made. Syndromic surveillance for influenza-like illness (ILI) and for COVID-like illness (CLI) are most useful as early evidence of a rise in COVID-19 transmission.

Recommendations: We recommend more states report on syndromic surveillance, as this remains an important leading signal of increasing disease spread. We recommend displaying the state's adjusted baseline for ILI on the ILI chart.

HOSPITALIZATION INDICATORS

#	Indicator or information	Stratification	Suggested target
6	COVID hospitalization per-capita rates by date and 7-day moving average	Age, sex, race & ethnicity	Decreasing or low level
7	Percentage of licensed beds occupied by suspected and confirmed COVID-19 patients by date		Low proportion (<10%)

Figure 8. Hospitalization indicator availability, June and October 2020



Key findings: Many hospitalization indicator permutations exist, including new admission rates and total occupancy by regular or ICU hospital beds. Some states report these indicators stratified by hospital preparedness regions rather than counties; this is appropriate where a regional preparedness regime is in place, and where these regions better represent the true catchment areas for the state's hospitals.

Why it matters: Hospitalization data are a preferred indicator for many government leaders, as they are less dependent on testing capacity. Hospitalization data also reflect the burden of moderate to critical illness and the availability of ICU hospital beds in the community, a marker of health system capacity. Discrepancies between state and federal hospitalization data have also been documented.

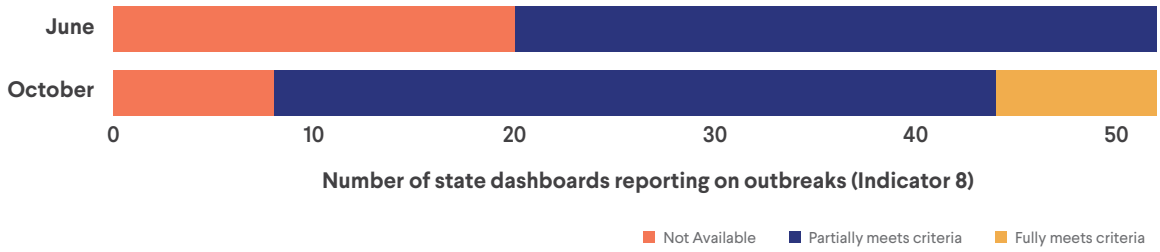
Recommendations: Although most states report hospitalizations as counts (assuming a stable underlying population), rates per 100,000 population are more useful for comparisons across states and counties. Hospitalization data should be stratified by key demographic variables to determine disproportionate impact and emerging or changing patterns in disease spread between different populations. While not an explicit part of our essential indicators, case hospitalization rates—the percent of cases who are admitted to the hospital—is a good indicator of the severity of disease, trended over time, and can easily be calculated from Indicators 1 and 6.

OUTBREAKS

#	Indicator or information	Stratification	Suggested target
8	List of long-term care and other congregate facilities (homeless shelters, correctional facilities), essential workplace (e.g. meat-packing) outbreaks with COVID-19 cases and deaths in residents and staff[6]	Cumulative and most recent week	Low level of cases Outbreaks, if any, rapidly detected and stopped

[6] Cumulative and most recent week; aggregate numbers until specifics legally allowed to be reported, if there are current restrictions

Figure 9. Outbreak indicator availability, June and October 2020

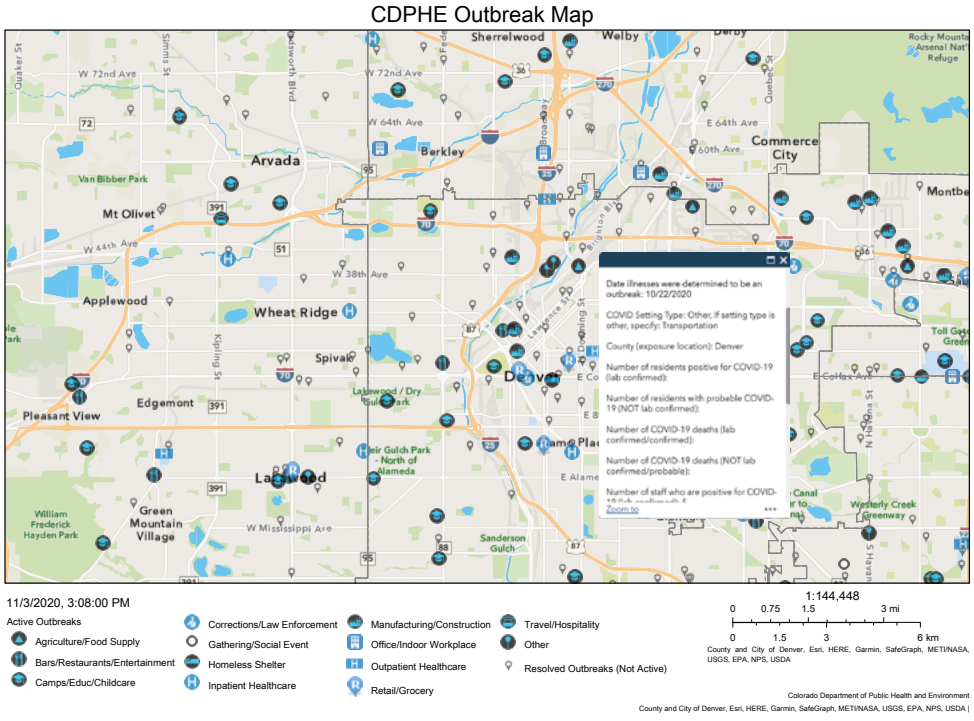


Key findings: Data on outbreaks, including in long-term care facilities, correctional facilities and homeless shelters have improved significantly since our last review, with only eight states failing to share information on these key residential facilities. Many states now provide detailed information on where outbreaks are occurring, in what type of facility, the number of cases and deaths, the date on which the outbreak occurred, and whether it is still active. Colorado provides detailed information on outbreaks including a map of outbreaks with relevant information on each outbreak (Figure 10).

Why it matters: Long-term care facilities and congregate work and living settings pose unique challenges in infectious disease control and prevention, and sometimes house more vulnerable people. Data on outbreaks, cases and deaths from these settings are essential to inform decisions on protecting the health of these special populations.

Recommendations: More states should provide more detailed information, such as the facility type, active vs old outbreaks, and breakdowns of the who is affected in each facility.

Figure 10. Map of outbreaks from Colorado's COVID-19 dashboard

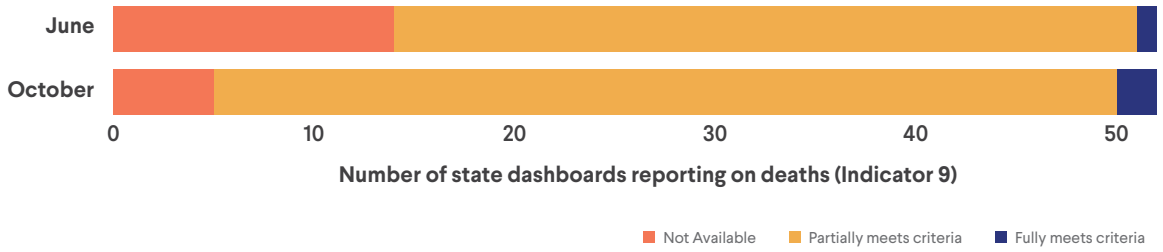


Source: Colorado COVID-19 data

DEATHS

#	Indicator or information	Stratification	Suggested target
9	New COVID-19 confirmed and probable deaths by date and per-capita rates with 7-day moving average	Age, sex, race, ethnicity and zip code Outbreak vs. community	Decreasing over 14 days or at low level

Figure 11. COVID-19 deaths indicator availability, June and October 2020



Key findings: Surprisingly, gaps in death reporting persist. Most states do not stratify deaths by key demographic factors over time.

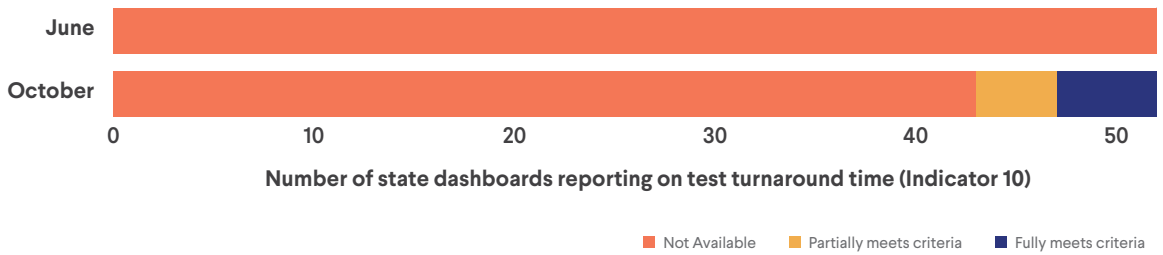
Why it matters: Deaths are an important measure of disease severity.

Recommendations: We recommend that zip code data be displayed on either county or state dashboards, and that county and state dashboards be reciprocally linked. New Mexico provides this key information in a supplementary mortality report produced weekly. While not explicitly a part of our 15 essential indicators, mortality in excess of levels recorded in previous years is also an important metric to understand the total impact of COVID-19. CDC provides excess death information by state on a weekly basis, and some states such as Oklahoma include excess mortality in their regular epidemiologic bulletin. Another indicator worth tracking over time is monthly case-fatality rate, the percentage of cases who die. This can be easily calculated from essential indicators 1 and 9 (accounting for lag).

TEST TURNAROUND TIME

#	Indicator or information	Stratification	Suggested target
10	Diagnostic (e.g. PCR) test turnaround time (specimen collection to test report), by week	Age, sex, race & ethnicity	Median ≤48 hours and a high and increasing proportion ‹24 hours

Figure 12. Test turnaround time availability, June and October 2020



Key findings: Soon after our first review, where we found not a single state reporting PCR test turnaround time, there were significant testing delays across the country, with PCR tests often returning too late to inform disease control efforts. Since then, a handful of states, including Alaska, California, Hawaii, Minnesota, Missouri, Nebraska, New Hampshire and North Carolina, have begun to provide this critical piece of information. Unfortunately, many laboratory test reports include only the date of specimen collection, not the time, so it is impossible to report turnaround time in hours.

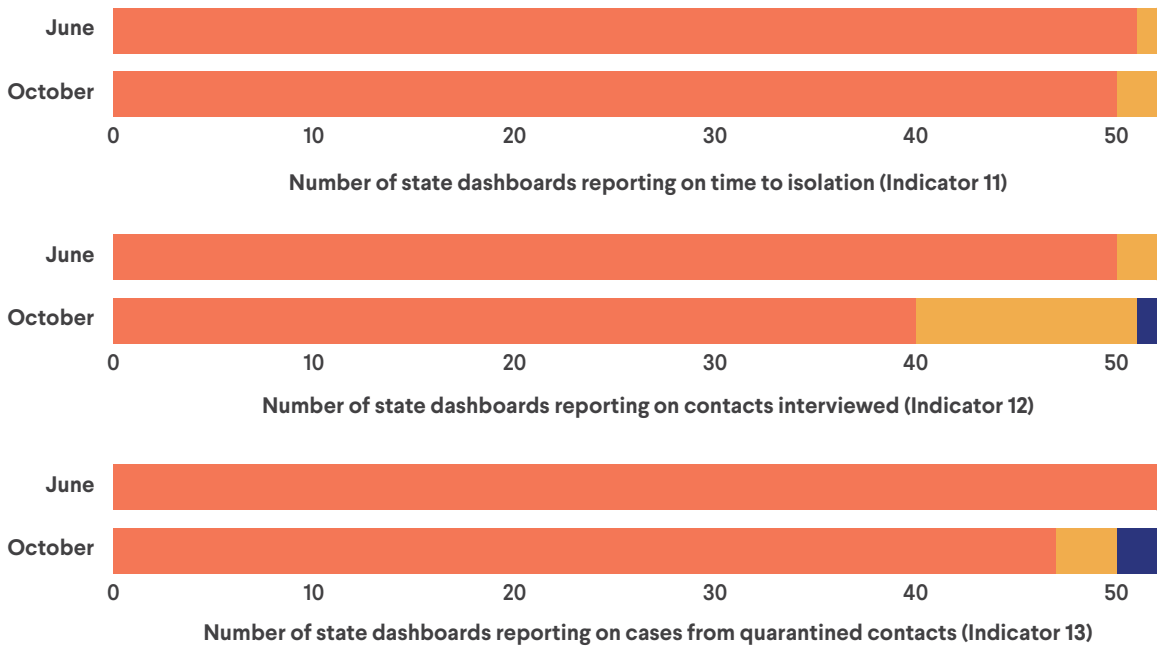
Why it matters: Timely test results are needed to support rapid isolation of cases and contact tracing efforts. Test results are unlikely to be valid or useful unless they are returned to the patient, the provider and the relevant public health officials within two days or less.

Recommendations: This information should be stratified by key demographic groups. As an NPR survey highlights, test turnaround times can vary greatly by race and ethnic group, and this information should be tracked and reported to inform testing strategies. Test turnaround time is most useful when reported by the laboratory or specimen collection site, to inform patients and providers selecting a laboratory.

CONTACT TRACING INDICATORS

#	Indicator or information	Stratification	Suggested target
11	Time from specimen collection to isolation of cases, by week	Age, sex, race & ethnicity	≥80% within 48 hours
12	Percentage of cases interviewed for contact elicitation within 48 hours of case specimen collection, including all people with positive tests who reside in the jurisdiction, by week	Age, sex, race & ethnicity	≥80%
13	Percentage of new cases from among quarantined contacts, by week	Outbreak vs. community	≥50%

Figure 13. Contact tracing indicator availability, June and October 2020



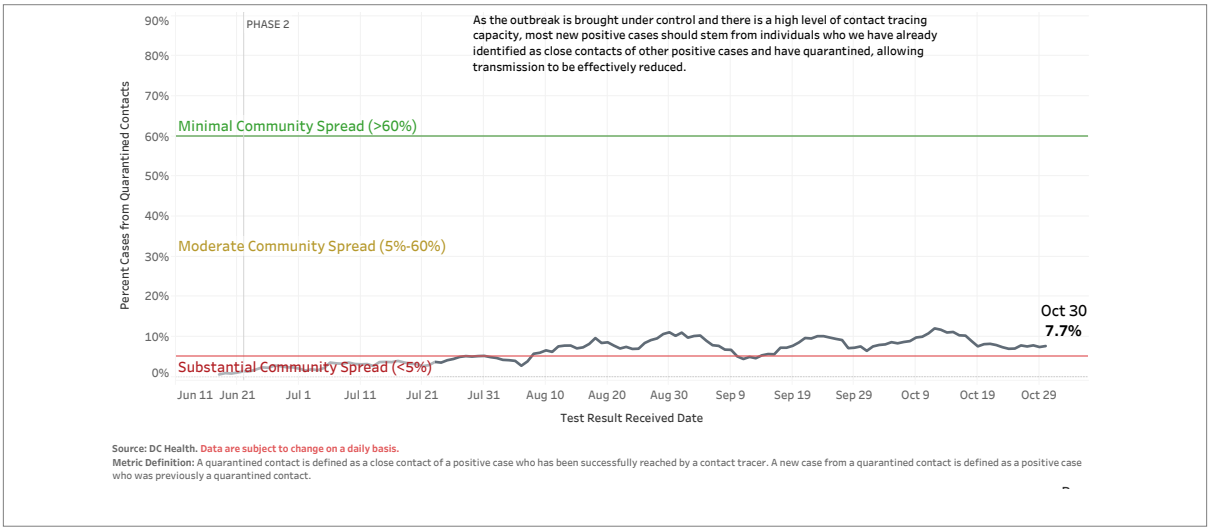
Key findings: We identified major gaps in the reporting of contact tracing indicators in our initial review. These data continue to be sparse. Consequently, we lack clarity on how our public health response is performing national, and whether states and jurisdictions are measuring these key indicators and using this data for decision-making to improve their epidemic responses. Washington D.C. has been a notable trailblazer in this area, reporting on the proportion of cases arising from quarantined contacts before any other state. Delaware provides detailed information on their case investigation and contact tracing program, including important insights on the steps at which people fall out of the process. Both places report key indicators such as cases and contacts contacted and interviewed. These metrics are often easier to track in smaller geographic areas, and larger states may not be able to report these measures if all counties are not tracking this critical information.

Why it matters: Public reporting of performance on these indicators would provide a general benchmark of what is feasible and facilitate sharing of successful strategies among states and jurisdictions. (In a forthcoming report, we define a number of additional indicators of testing, case investigation and contact tracing and outline a process to eliminate gaps and bottlenecks in these critical public health programs.)

Recommendations: Data on indicators 11 and 12 provide valuable, actionable information on aspects of contact tracing, an intrinsic component of efforts to prevent transmission. Although these two indicators are similar (most jurisdictions issue an isolation order and elicit contacts during the same interview with a case), the isolation date in indictor 11 may be defined either as the date of issuance of the isolation order or as the date the case reports self-isolating. Self-isolation may occur prior to the interview. Of note, practically, specimen collection is often reported by date without a specific time marker, making it impossible to count the number of hours between specimen collection and interview or isolation. In these areas, states may target interviewing 80% of cases within three days to account for this limitation. Also of note, for indicator 13, the denominator should be the total number of cases for whom specimens were collected in the current week. The numerator should be the subset of those cases that were quarantined as contacts during the two weeks prior.

In addition to data on indicators 11-13, it may be advisable to collect and report data on the proportion of cases that report self-isolation from the time of symptom onset or when testing is performed. Relatedly, it may be advisable to collect and report data on the number of days between symptom onset and testing. For COVID-19, a significant amount of transmission may occur during the pre-symptomatic phase of disease. Public health measures designed to increase the proportion of those who self-isolate and/or decrease the number of days between symptom onset and testing may have a significant impact on the risk of transmission during the infectious period. Thus, tracking these data and targeting interventions to optimize performance could significantly reduce transmission and facilitate containment of the virus through contact tracing efforts.

Figure 14. Percentage of cases from quarantined contacts from Washington D.C.'s COVID-19 data dashboard

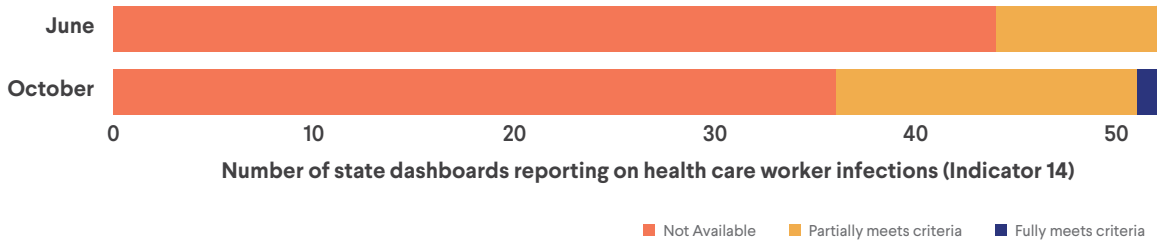


Source: Washington DC reopening metrics

HEALTH CARE WORKER INFECTIONS

#	Indicator or information	Stratification	Suggested target
14	New infections among health care workers not confirmed to have been contracted outside of the workplace, by week	Age, sex, race & ethnicity	0

Figure 15. Health care worker infection indicator availability, June and October 2020



Key findings: Despite some improvement, only Georgia provides robust information on health care worker infections over time and includes information on these infections stratified by key demographic groups. Although CDC reports data on health care worker infections, this is likely an underestimate as they only have health care personnel status for about one in four cases.

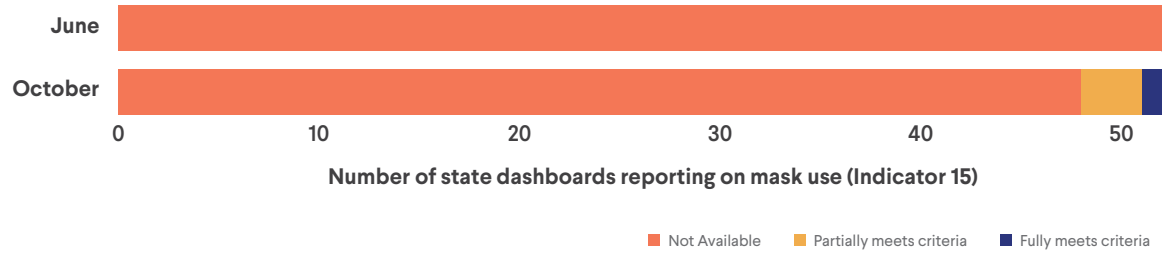
Why it matters: Tracking COVID-19 infections of health care personnel is an essential indicator that addresses the safety of this critical workforce as well as their patients, and can provide surrogate information on facility infection prevention and control practices

Recommendations: It can be difficult to ascertain where health care workers contracted their illness, especially when community transmission is high, but ideally information on whether or not infections in health care personnel are linked to their workplace or not should be reported. This is a critical indicator to monitor over time, to gauge whether health care personnel are being sufficiently protected; any workplace-associated infection is one too many.

MASK USE

#	Indicator or information	Stratification	Suggested target
15	Percentage of people wearing masks correctly in public indoor settings (e.g., mass transit, shopping), based on direct observation or security camera analysis, by a standard, consistent method, by week	Location type (e.g. indoor vs outdoor)	≥80%

Figure 16. Mask use indicator availability, June and October 2020



Key findings: Mask use data was not available from any state at the time of our initial review So far, Hawaii, Oklahoma, Oregon and Utah have reported on mask use in their states. Utah provides the most comprehensive information, using two methods including direct observation and telephone surveys. This allows them to report mask use weekly for both indoor and outdoor settings and by key demographic variables. A newer related measure reported by some states is disease indicators stratified by areas with and without mask mandates. Oklahoma reports the 7-day weekly average of new cases in areas with and without mask mandates, to provide information on the potential impact of these mandates.

Why it matters: Mask use data can inform on population-level adherence with a critical public health measure that has been shown to limit the spread of COVID-19. Since our initial report, additional evidence has accumulated supporting the use of masks as a critical part of our public health response to COVID-19.

Recommendations: Data should be collected using a reliable and consistent method over time, and can inform on the effectiveness of mask recommendations or mandates to increase mask use adherence and, ultimately, to control disease spread. Data may be used to target public health messaging around the importance of mask use.

Spotlights

SPOTLIGHT: COVID-19 ANTIGEN TESTING INDICATORS

Key findings: With the emergence of antigen testing, tracking essential testing indicators (number of tests performed and individuals tested, the number of tests that are positive, and the test positivity rate) has become increasingly complex. Most state dashboards do not differentiate between molecular and antigen tests, and those that do, report on the number of tests performed, rather than the number of individuals tested. No state presents antigen test data entirely in keeping with best reporting practices: presenting data daily and over time, with a rolling 7-day average and with weekly stratification by age, sex, race and ethnicity, and geographic breakdown (e.g., county-level) when possible.

Key recommendations:

- Report the number of tests performed and the number of individuals tested, with molecular test and antigen test data presented separately.
- Report the number of tests that are positive and the test positivity rate, with molecular test and antigen test data presented separately.
- Report all data daily, with a rolling 7-day average and with weekly stratification by age, sex, race and ethnicity, as well as at the county level when possible.

The standard diagnostic test used to confirm a COVID-19 infection is a PCR test, a molecular test that detects the genetic material of the virus. Antigen tests, which detect larger pieces of the virus, may be cheaper, easier and faster to perform. However, antigen tests are not as accurate as molecular tests and therefore diagnoses made via antigen testing are not officially considered "confirmed" unless a molecular test is also positive. Because of this, and because antigen tests may be used in different ways and in different settings than molecular tests (e.g., to conduct weekly screenings of students living on university campuses), it is important to gather and report on molecular and antigen testing separately. We reviewed the official government public health websites maintained by all states in order to describe practices around reporting molecular and antigen testing and results in the U.S.[7]

Most (58%) state dashboards do not differentiate between molecular and antigen tests.

- Only 22 states differentiate between test types when reporting results of tests performed or individuals tested.
- Failure to report the results of antigen testing may leave communities uninformed of local transmission and outbreaks that have not been confirmed by molecular testing.
- Failure to differentiate between test types may disguise a lack of confirmatory (molecular) test availability.

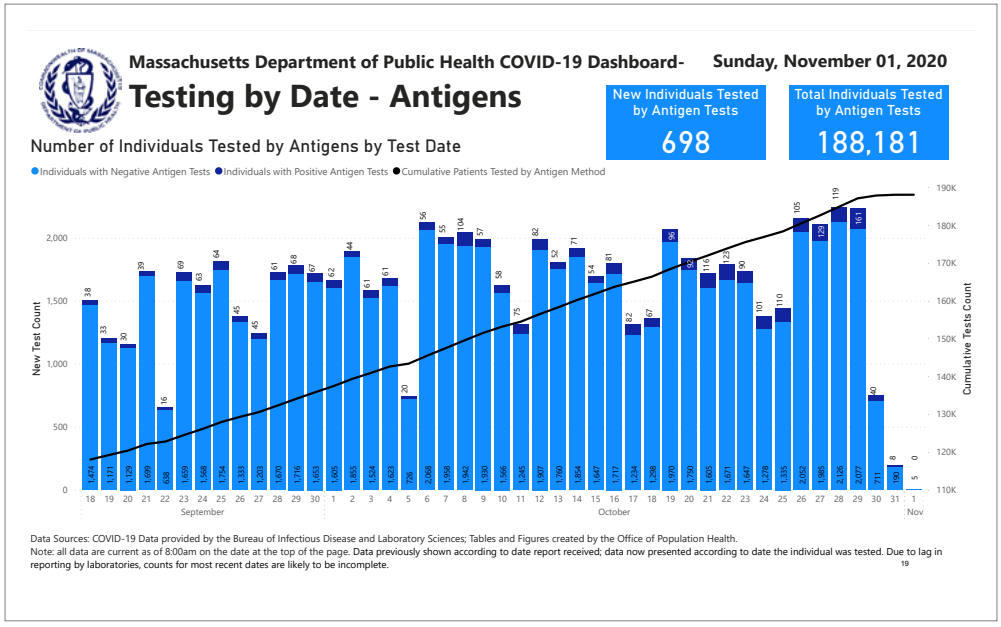
Most states that differentiate between types of tests report the number of tests performed rather than the number of people tested.

[7] Includes Washington D.C. and Puerto Rico

All 22 states that differentiate between test types report the number of molecular tests performed. Eight states, including North Carolina, also report the number of antigen tests performed. Data on both test types reflect the true volume of tests performed and are important to monitor, especially as antigen test volume increases.

Only five states report the number of people tested with antigen tests. If antigen tests become more widely used to screen the same people multiple times, the number of tests performed and the number of people tested may increasingly diverge. Failure to report the number of people tested may also disguise inequities in access to testing. Massachusetts is an example of a state that reports the number of people tested daily and cumulatively using antigen tests as well as the results of those tests (Figure 17).

Figure 17. Antigen test data from Massachusetts' COVID-19 dashboard



Source: Massachusetts antigen testing data

Few states differentiate between test types when reporting the number of positive tests or test positivity rates. Among states that do differentiate, all report molecular test results, but few also report antigen test results.

- Seventeen states report the number of positive molecular test results and seven of those (e.g., Utah and Minnesota) also report positive antigen test results.
- Twenty states report molecular test positivity rates and one (Arkansas) also reports antigen test positivity rate.
- It is important to report the results of both test types for several reasons. A positive molecular test and a positive antigen test do not mean the same thing, especially when the prevalence of COVID-19 is low, and an antigen test may be more likely to give a false positive result. In addition, confirmatory molecular testing is not uniformly mandatory; it cannot be assumed that antigen test results will ultimately be reflected in molecular test results. Lastly, access to different tests may not be consistent across communities, and divergent positivity rates may reflect differences in transmission between communities.

SPOTLIGHT: COVID-19 SCHOOL INDICATORS

Key findings: Although local data relevant to CDC indicators are available on many official state websites, data from within school settings are not consistently reported, with nearly half of states not publicly reporting data on school-associated COVID-19 cases. Definitions of school-associated cases or outbreaks vary between states, as do ways in which data are presented, and completeness and timeliness of data vary, all of which complicate effective monitoring.

Key recommendations:

- Data on COVID-19 in schools should be transparently reported, from as many schools as possible. Data collection practices should be publicized and reporting time periods and frequency of updates should be clear.
- Data should be reported at the school level if possible, stratified by student versus staff, and with precise case and outbreak numbers. However, the importance of public disclosure and the need to maintain patient privacy must be balanced. Reporting outbreaks that pose significant risk to public health should be prioritized.
- Reporting criteria should be clearly defined. Standard definitions of school-associated cases and outbreaks should be utilized.

Reopening schools is a priority for many communities, but it must be done safely. CDC provides guidance to aid jurisdictions in making decisions about reopening schools, including a list of indicators to monitor community transmission. Although local data relevant to CDC's suggested indicators are available on many official state websites, data from within school settings are not consistently reported; independent efforts to report on COVID-19 in schools, including a database maintained by the National Education Association and a database that sources a mixture of official and public reports, have emerged in response. We reviewed official government websites maintained by all states[8] to spotlight publicly available, official data on COVID-19 in schools.

Schools are congregate settings for youth and adults, and there can be extensive interaction with surrounding communities. Schools also serve as important employers, including of people at increased risk of severe COVID-19. Investigating and reporting disease transmission within schools can be complex, particularly if there is ongoing community transmission; privacy concerns can complicate this further. Nonetheless, a fundamental component of re-opening schools safely is publicly shared, complete, reliable COVID-19 transmission data that empowers communities to safely adapt.

Nearly half of states do not publicly report data on COVID-19 cases associated with schools. Only 29 (56%) publicly report data on COVID-19 cases linked to specific schools, counties or school districts. An additional five states report state-level data on COVID-19 in schools. The remaining areas do not report any data on COVID-19 cases associated with schools.

[8] Includes Washington D.C. and Puerto Rico

Information shared on COVID-19 in schools is highly variable.

- Only two thirds of reporting states, such as Kentucky, report student and staff cases separately. Understanding who has been infected within a school can aid decision-making around enforcing or implementing mitigation measures.
- Nineteen states report school-specific data, while seven states only report at the county or district level. Granular data is more actionable and informative to parents, students and staff.
- Of the 19 states that report school-specific data, 14 report cases only, three report outbreaks only and two (New Hampshire and Mississippi) report both cases and outbreaks. School-associated cases and outbreaks have different implications, and both types of data are useful.

Figure 24.
Do states publicly present officially-sourced, location-specific data on COVID-19 among K-12 students and/or staff?

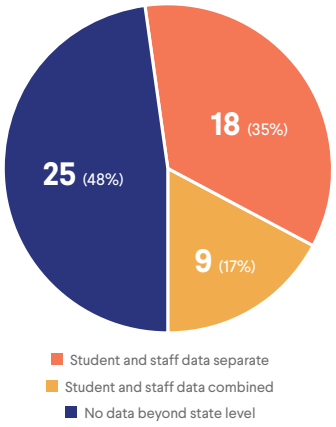


Figure 25.
Among states that present data, what is the most granular level of data available?

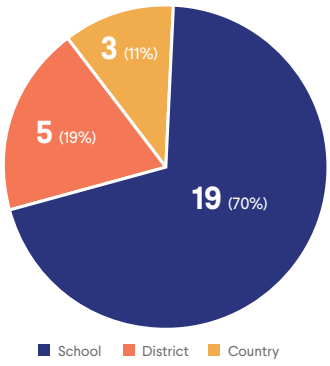
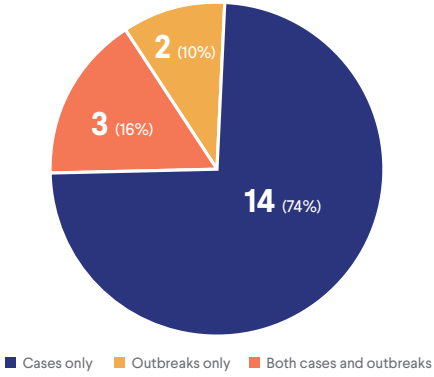


Figure 26.
Among states that report school-level data, are data on cases and/or outbreaks reported?



- Approximately half of reporting states present the exact number of cases and half conceal the exact number if it is less than five. Some states, including Tennessee and Vermont, conceal reporting on specific schools that have few total students. Suppression of some data may be necessary if there are privacy concerns.
- Only eight states officially report school-specific data on COVID-19 at institutions of higher education. Some, such as Louisiana, offer pages dedicated to institutions of higher education; New Hampshire's data can be searched by school. While universities may maintain their own dashboards that present data on university-associated cases and outbreaks, these data may be more accessible if presented with other epidemic data on official state dashboards.

Definitions of school-associated cases or outbreaks vary. While some states, such as Utah and Colorado, present clear criteria on their dashboards, it is not clear how school-associated cases are defined in some states. If it is unclear whether or not the likelihood of community

versus school transmission has been determined, or if determination criteria vary between settings, this can undermine the meaning and value of school-related data.

The completeness and timeliness of data vary.

- Although most states update their school COVID-19 data at least weekly, the frequency of updating is unclear in some states. If update frequency is not specified, data becomes less actionable.
- Most states report data from the prior 1-2 weeks, and report them cumulatively, while some only report active cases. Others do not clarify the reporting period.
- Some states appear to offer a comprehensive list of schools. However, because list completeness is rarely specified and reporting practices vary, it cannot be assumed that the absence of a report means there have not been cases at a particular school.

The ways in which data are presented vary considerably between states. Kentucky provides a line listing of public school data in PDF format, while New York and Ohio provide searchable database of school data. Although there may be advantages and disadvantages to each modality, all are examples of official, publicly accessible data that is complete, up-to-date and well-defined.

SPOTLIGHT: COVID-19 TRAVEL RESTRICTIONS

Key findings: In the U.S., 27 states had enforceable interstate travel restrictions in place at any point since March 2020, often incorporating case incidence and/or test positivity to inform the list of places from which travel is restricted. There is currently no national-level guidance for interstate travel within the U.S. and its territories, leading to a patchwork of requirements and restrictions; these could be streamlined to maximize safety if a unified, science-based approach were implemented.

Key recommendations:

- Travel restrictions can prevent spread of COVID-19 from areas with higher transmission and risk to lower risk areas and should be used to guide residents and visitors on risks of interstate travel.
- There should be a unified approach to how restrictions are determined and applied to make them most effective.
- Tourism and transportation industries are key stakeholders when it comes to decisions about travel restrictions and should be part of the discussion on how to apply travel restrictions most safely and effectively.

Early in the COVID-19 pandemic, many countries used travel restrictions and border controls as a means of mitigating further spread of the disease. Since then, most have gradually reopened borders for both essential and non-essential travel, and many are relying on epidemiologic data to determine who they permit to cross their borders. The European Union has adopted a standardized system to inform residents about COVID-19 risk in various locations based on test positivity and incidence while also accounting for variable testing rates. It is important for people who are making decisions about travel from both lower and higher risk areas to be able to access information on risks and requirements at their destination or upon return. Travel guidance can be an important tool to minimize spread of disease, especially for travel from higher-to-lower risk areas. Relevant data and guidance on risks and restrictions should be standardized across areas.

In the U.S., some states have used a similar approach for interstate travelers. We reviewed individual state government, travel, tourism and transportation websites for information about travel restrictions related to COVID-19 for all states[9].

In the U.S., **27 states were found to have enforceable interstate travel restrictions** in place at any point since March 2020. These restrictions required people to follow specific steps to travel more safely, and most frequently involved a quarantine period of 14 days when traveling to or returning from a particular state.

- Some states applied restrictions universally to all travelers whereas others applied them only to travelers after visiting or coming from select states with higher COVID-19 activity and risk, or from attending high-risk gatherings in any state (e.g., Kansas).

[9] Includes Washington D.C. and Puerto Rico

- As of November 1, there are 13 states that still have travel restrictions in place requiring mandatory quarantine periods for interstate travelers. Eight of these allow for a shortened duration of quarantine or no quarantine with a negative test result, such as Hawaii.
- Eleven states clearly list people who are exempted from quarantine requirements such as those who are traveling for essential work (e.g., New York).
- In some states without statewide restrictions such as Illinois and Idaho, smaller jurisdictions (e.g., city or county) have their own travel restrictions in place.

Most states incorporate case incidence and/or COVID-19 test positivity to inform the list of places from which travel is restricted. There are also states that give guidance to their own residents on where it may be safer or riskier to travel to, and several that have restrictions or requirements for their residents if they are returning from areas with higher COVID-19 activity.

Figure 27. States with travel restrictions

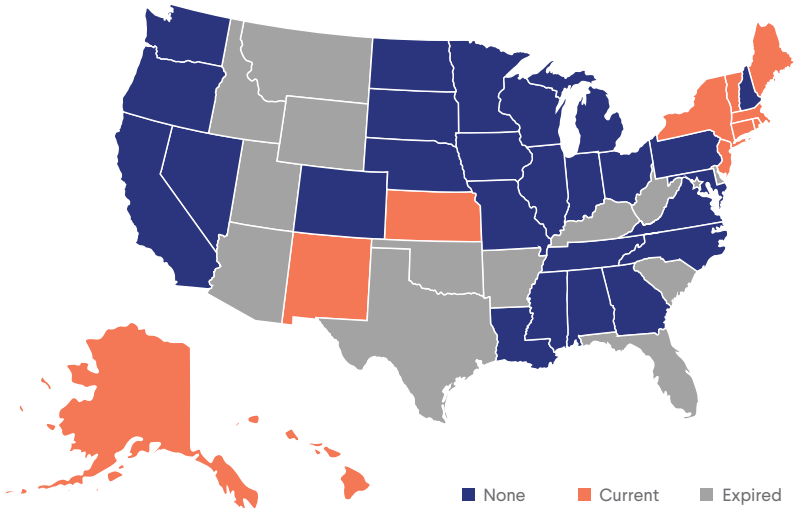
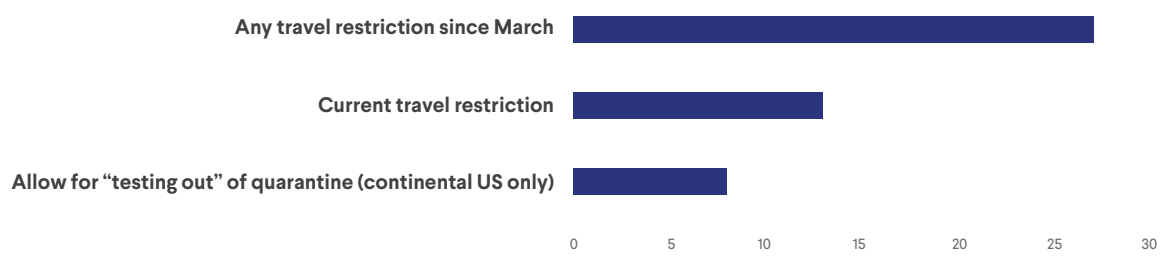


Figure 28. States with Travel Restrictions



Restrictions on interstate travel are currently made possible by individual governors' executive orders, and **there is no national-level guidance for interstate travel within the U.S. and its territories**. This has led to a patchwork of requirements and restrictions that could be streamlined to maximize safety if a unified, science-based approach were implemented. Non-continental states and territories may have special considerations that should be addressed. Currently, the U.S. CDC and State Department provide guidance on travel risk for international destinations and Puerto Rico.

SPOTLIGHT: COVID-19 RISK ALERT LEVEL SYSTEMS

Key findings: Color-coded alert systems can be an important tool to visually communicate changing COVID-19 health risks beyond the misleading dichotomy of 'safe' and 'risky,' and inform the public of ways to maximize safety at each risk level. Organizations ranging from universities to state and local health departments have now adopted alert-level systems, and 21 states currently have a public, online COVID-19 alert-level system. They are most effective when linked to individual and community actions, and when messaging is consistent, objective, transparent, sincere and empathetic. However, less than half of states tie their alert systems to information about public health and social measures and mitigation strategies designed to maximize safety at each level.

Key recommendations:

- Alert-level systems should be used to provide clear guidance on COVID-19 risk. Varying risk levels should be tied to actions that reduce risk.
- Avoid oversimplified messaging such as designating levels as "safe" or "risky" and economies as "open" or "closed." Alert-level systems can help maximize safety while using sector-specific guidance to support economic activity.
- Avoid overly complex systems and set objective criteria using publicly available and reported data to adjust levels.

In May 2020, we published guidance on the importance and utility of color-coded alert level systems as a tool to visually communicate changing COVID-19 health risks and inform the public on ways to maximize safety at each risk level. Since then, organizations ranging from universities to state and local health departments have adopted alert-level systems to better inform their constituents. We assessed how states[10] are using alert levels to communicate clearly and effectively with the public about health risks and mitigating measures by reviewing state public health websites and dashboards as well as municipal websites (e.g., governor's COVID-19 site) and by performing internet searches.

Currently, **22 states have a public, online COVID-19 alert-level system** or COVID-19 activity and risk system.

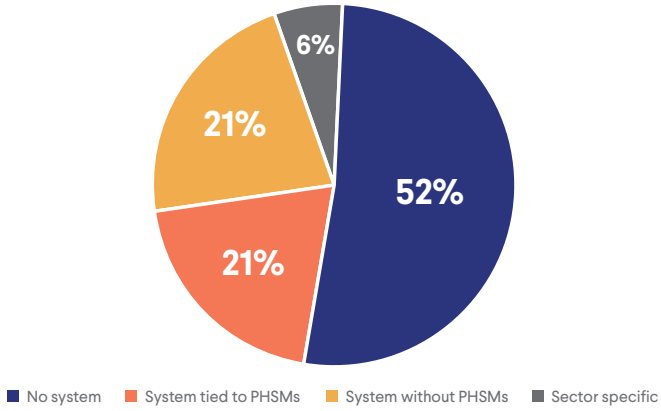
- Most of these systems determine risk level based on an index score from select epidemiologic indicators such as trends in COVID-19 test positivity rate, case incidence and hospitalizations; three use a single indicator (e.g., Alaska).
- All the alert- or risk-level systems use color-coding to differentiate levels of risk. The number of colors/levels varies between two and six.
- Green and blue are most frequently used to communicate lower risk; red and purple are used to communicate higher risk. Some use numbers in addition to colors. Information about risk levels is most often assigned at the county level.

[10] Includes Washington D.C. and Puerto Rico

- Three states have color-coded systems that are tied strictly to school or business reopening plans and mitigation measures, with no ties to messaging around more general communitywide risk and mitigation.

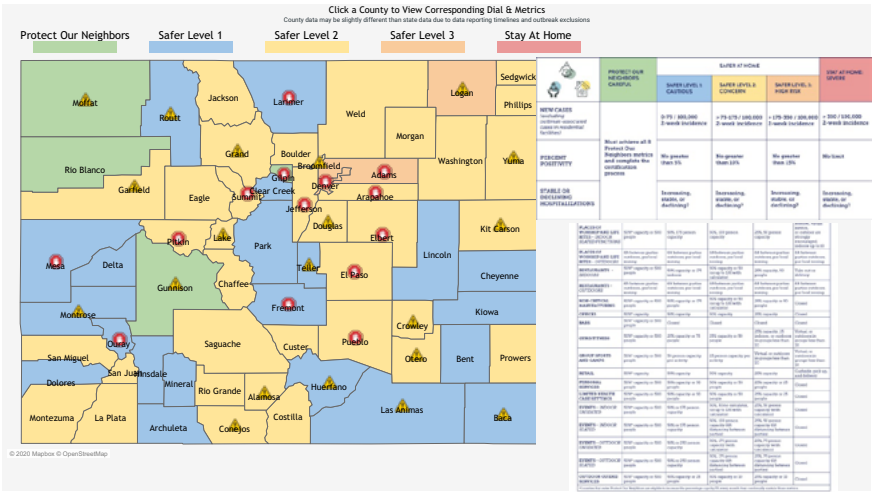
Among the 22 states with an alert- or risk-level system, only 11 (50%, or 21% overall) tie them to information about public health and social measures and mitigation strategies designed to maximize safety at each level, such as Colorado's COVID-19 Dial Dashboard. This type of system gives clear communication about what actions people and communities can take to reduce risk and maximize safety. The remaining 11 states set thresholds for COVID-19 transmission risk or disease activity and communicate this risk, often using color-coded maps, but do not share any specific actions or measures that should be taken based on these levels (e.g., New Jersey).

Figure 29. Presence and Type of Alert- or Risk-Level System



Alert-level systems have been used successfully in many sectors to clearly and concisely inform the public about risks and what actions can be taken to mitigate those risks. They are most effective when they are linked to individual and community actions, and when messaging is consistent, objective, transparent, sincere and empathetic. State health departments are uniquely positioned to deliver this type of communication given their connection with the local community, and the 'importance of trust in the pandemic response.

Figure 30. Colorado County COVID-19 Status Alert-level System



Source: Colorado dial dashboard

SPOTLIGHT: STATE COVID-19 VACCINATION PLANS

Key findings: To prepare for the earliest available safe and effective COVID-19 vaccine, the CDC requested that all states develop and submit a draft vaccination plan by October 16, 2020. As of November 1, 43 of the 50 states plus Washington D.C. and Puerto Rico have posted complete draft or interim vaccination plans on government websites. Because the content of vaccination plans may be too technical for lay audiences, many states are summarizing general information including providing answers to Frequently Asked Questions (FAQs) that address common inquiries for the public and health care providers.

Key recommendations:

- Transparency in planning and execution of activities around COVID-19 vaccination will be key to maintaining the public's trust in a safe and effective vaccine. Whenever possible, this information should be made available to the public.
- In addition to official documents, websites providing a summary and schedule of COVID-19 vaccine activities as well as general information that is locally contextualized can further aid in ensuring that accurate and reliable information about any COVID-19 vaccine is readily available.
- Health care personnel who will be delivering the vaccine when it is available should be recruited and engaged early to ensure they are adequately informed and trained about key aspects of COVID-19 vaccination.

The federal government, partner organizations and advisory bodies are working hard to prepare the U.S. for the earliest available safe and effective COVID-19 vaccine. As a part of this effort, the U.S. CDC requested that all states develop and submit a draft vaccination plan by October 16, 2020, guided by a jurisdiction vaccine operations playbook. This playbook guides states through the planning and processes of a mass vaccination effort, with sections addressing critical populations, phased availability and provider engagement as well as logistical factors such as ordering, storage, distribution and inventory management. On November 6, CDC made the executive summaries of each state health department's COVID-19 vaccination plan available online.

There is great public interest in and anticipation for the availability of a safe and effective vaccine to prevent COVID-19. We reviewed state websites such as health department and governor's sites for all states[11], and performed internet searches for each state to survey publicly available information.

As of Nov. 1, complete draft or interim **vaccination plans are publicly available online on government sites for 43 of 52 states (83%)**. Two states (Hawaii, Pennsylvania) have made only an executive summary of their plans available to the public online, and one state (Texas) has released its complete plan to the media without making it available on a public municipal site.

- Seven states have not made their vaccination plans available in any format (see Appendix 5 for details).

[11] Includes Washington D.C. and Puerto Rico

- 22 states, including Minnesota and Louisiana, have dedicated COVID-19 vaccine information on their health department or immunization program website. Some states provide links to vaccine information from the CDC.
- Several states, such as South Carolina, are actively recruiting health care providers online to become part of their COVID-19 vaccination plan, and a few areas, such as Washington, D.C., provide links to COVID-19 vaccine trials being conducted in their jurisdiction.

While the content of vaccination plans may be too technical for lay audiences, states that accompany their plans with dedicated COVID-19 vaccine websites are taking steps to secure the trust and confidence of their constituents in a proactive manner. One strategy adopted by some states, such as Iowa, is to provide general information as well as a COVID-19 Frequently Asked Questions (FAQs) section to address common inquiries from the public. Other states, such as Louisiana, provide general information, links to their plan and updates on COVID-19 vaccine development.

Figure 31. Snapshot of a Vaccine Information Website

Louisiana's COVID-19 Vaccine Information website

Every aspect of the COVID-19 vaccine situation is rapidly evolving. As trusted public health authorities, state and local health departments are uniquely positioned to provide their constituents with as much clear and relevant information about vaccination as possible. They also have an opportunity to educate providers ahead of time, so they can proactively respond with actions like having routine conversations with patients to combat vaccine hesitancy.

Conclusion

Overall, our original conclusions and recommendations from July 2020 remain relevant and critical to improving the U.S. response to COVID-19. We congratulate states on their development of data dashboards to educate the public on the progress of this pandemic. This work has been particularly impressive, given that it was conducted during the most disruptive public health crisis the world has seen in over 100 years. States, counties and cities continue to put effort into designing, implementing and improving COVID-19 dashboards. It is crucial to establish standardized, timely, accurate, interlinked, comparable and accessible dashboards for every state in the U.S.

In our updated review of public data dashboards from all 50 U.S. states, Washington, D.C. and Puerto Rico, we found broad improvements in data reporting, including gold-standard examples of dashboards for 14 of the 15 essential indicators in the U.S. Still, there were persistent gaps, particularly around testing, isolation and contact tracing. When data are presented, there is high variability in the overall content, how it is presented, and the level of information shared.

Resolve to Save Lives has also developed a downloadable model workbook (in Tableau) which can be easily adapted by adding line-by-line de-identified data and embedding on state websites. These examples can help guide a unified approach to presenting data on the COVID-19 pandemic.

Indicators related to the effectiveness of disease control programs are particularly important. These include indicators #2 (linked cases), #10 (test turnaround time), #11 (time to case isolation) and #13 (cases from quarantined contacts). It is important to track whether we can rapidly identify and isolate cases, and ensure we can track a rising proportion of disease transmission chains.

As we enter a period of rising case rates in the United States, health departments and other agencies involved in COVID-19 response are strained. Improvements in data dashboards can be challenging, requiring changes in current data systems, new data agreements and engagement with entities outside the public sector. Implementing changes can require additional financial resources and staff, but the cost of investing in better information is far less than the cost of inaction and the prolonged health, economic and social impacts of COVID-19.

Many states collect information on essential indicators but do not publicly share it. As individuals and communities make decisions around managing their own risk, it is important that states are transparent with data on COVID-19 and the response so citizens have access to information to inform how they protect themselves. It is also important to use commonly accepted, best practice thresholds to categorize risk and establish targets. These thresholds and targets should not be adjusted to reflect increasing acceptance of high disease morbidity and mortality, but rather represent conditions in which communities may live more safely.

Appendices