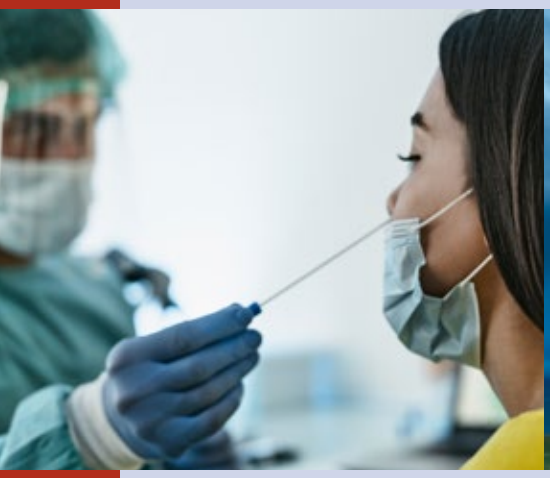
ISSUE REPORT

# Ready or Not:

## PROTECTING THE PUBLIC'S HEALTH FROM DISEASES, DISASTERS, AND BIOTERRORISM 2022

*SPECIAL SECTION: Lessons of the Pandemic's Tragic Death Toll: What Needs to be Done to Save Lives During the Next Public Health Emergency?*

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## Acknowledgements

**Trust for America's Health (TFAH)** is a nonprofit, nonpartisan public health policy, research, and advocacy organization the promotes optimal health for every person and community and makes the prevention of illness and injury a national priority.

Any opinions, findings, conclusions, or recommendations expressed in this report are those of the authors and do not necessarily reflect the views of the funders.

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*Ready or Not* and the NHSPI are complementary projects that work together to measure and improve the country's health security and emergency preparedness. TFAH looks forward to a continued partnership in order to protect the public's health.





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Ready or Not 2022

# Executive Summary

As this report was being prepared, over 900,000 people in the United States and nearly 6 million worldwide had died due to COVID-19,[1] and the world had experienced two years of economic and social disruption. In addition, 2021 saw record heat in many states, extensive flooding, a highly active Atlantic hurricane season, and unusual and deadly December tornados. These events led to nearly unprecedented levels of illness, social upheaval, and economic hardship, including overwhelmed hospitals, job loss, property loss, children's learning loss, and mental health concerns.

During 2021, the nation made progress in many areas in its response to the pandemic. As this report was being produced, 62 percent of the nation's population was fully vaccinated,[2] averting an estimated 1.1 million COVID-19 deaths and over 10 million COVID-19-related hospitalizations.[3] The Biden Administration restored the White House Directorate on Global Health Security and Biodefense and created the Presidential COVID-19 Health Equity Task Force (see sidebar on pg. 15). And the approval of new treatments for COVID-19 has increased the likelihood of survival for many patients.[4]

At the same time, major challenges remained. Hospital systems in many states were overwhelmed during pandemic waves. Testing was difficult to access during surges—at-home tests were particularly difficult to find—and in some cases testing was expensive, misinformation was abundant, and public patience with and trust in public health guidance wore thin. Of great concern, lawmakers in many states introduced or enacted laws to restrict the authority of public health officials.[6] In addition, according to *The New York Times,* approximately 500 public health officials nationwide had left the field since the start of the pandemic. Some

*Editor's note: as of January 16, 2022, the Centers for Disease Control and Prevention (CDC) defined "fully vaccinated" as a person who has received their primary series of COVID-19 vaccines. CDC is also using "Up to Date" to denote that a person has received all recommended COVID-19 vaccines including any booster dose(s) when eligible.*[5]

retired, some left due to threats and harassment, some due to firings when public health guidance clashed with what elected officials wanted to do.[7]

In addition, the pandemic has illuminated two stark realities: the nation and the world's public health systems are inadequate and in immediate need of significant and sustained funding. And, once again, the nation's health inequities led to some population groups, particularly communities of color and low-income communities, experiencing a disproportionate burden during the pandemic, with less access to resources like vaccines during the response, and having more barriers to recovery.[8,9]

To better meet the challenges of future public health emergencies, including climate change, the nation must address underlying drivers of economic and health inequities, including ongoing discrimination, structural racism, and social determinants of health. Investments in public health infrastructure alone, while critical, will not make the United States more resilient. Equity must be an explicit and foundational principle in all public health preparedness, response, and recovery.[8,9]

The COVID-19 pandemic's impact—including its high death tolls and extreme economic disruption—was, at least to some degree, an avoidable tragedy. But with this tragedy comes opportunity. The pandemic has shined a bright light on what's needed: robust, flexible, and sustained investment in public health infrastructure, modernization of data systems and surveillance capacity, increased public health laboratory capacity, sustained growth and increased diversity in the public health workforce, and addressing the social determinants of health. Today, only half of all U.S. residents are protected by a comprehensive local public health system,[10] and it is estimated that state and local health departments need to hire a minimum of 80,000 additional full-time workers to be able to meet their communities' basic public health needs.[11]

**It is estimated that state and local health departments need to hire a minimum of 80,000 additional full-time workers to be able to meet their communities' basic public health needs.**

This annual report, *Ready or Not: Protecting the Public's Health from Disease, Disasters, and Bioterrorism,* has tracked the nation's public health emergency preparedness since 2003. The report is designed to give policymakers at all levels of government actionable data and recommendations with which they can target policies and spending to strengthen their jurisdiction's emergency preparedness. The report's 10 key public health preparedness indicators give state officials benchmarks for progress, point out gaps within their states' all-hazards preparedness, and provide data to compare states' performances against similar jurisdictions.

These data points are meant to measure states' readiness on a broad set of health security measures and have been the focus of this report for over a decade. However, for this 2022 edition of the report (and going forward), there is one change to the indicators set: the hospital participation in healthcare coalitions indicator, which was based on 2017 data that has not been recently updated by the National Health Security Preparedness Index (NHSPI), has been replaced with a new indicator, also tracked by NHSPI, that measures the percentage of state populations served by a comprehensive public health system.

Readers should note that this report is not designed to be an assessment of a given state's response to the COVID-19 pandemic, as widescale political, funding, economic, and social factors all influenced the virus's impact and local responses. Controlling the pandemic has been extremely challenging in every state. Moreover, the pandemic has illustrated that being prepared to adequately respond to a public health emergency the scale of a pandemic—and execute that response—is enormously complex and beyond the sole control of state and local officials. However, this report measures critical capacities that are foundational to protecting the public's health every day and during emergencies, including robust and sustained public health funding, disease surveillance capacity, healthcare, public health laboratory and hospital surge capacity, access to safe water, and access to paid time-off. In addition, the pandemic has shown that there is no substitute at the state or local level for a strong federal response during an emergency.

## This Year's Findings

In this 2022 report, Trust for America's Health (TFAH) found that 12 states improved their relative standing—for each indicator and overall, states were scored relative to one another—compared with last year, while 16 fell behind. Nine states improved by one tier, three states improved by two tiers, and 16 states dropped one tier. *(Note:* There was greater year-over-year state movement between tiers this year than in past years—in both directions—in part because of the introduction of a new indicator.)

**TABLE 1: Top-Priority Indicators of State Public Health Preparedness**

| INDICATORS | | | |
|---|---|---|---|
| 1 | **Incident Management:** Adoption of the Nurse Licensure Compact. | 6 | **Water Security:** Percentage of the population that used a community water system that failed to meet all applicable health-based standards. |
| 2 | **Public Health System Comprehensiveness:** Percentage of state population served by a comprehensive public health system **(new)**. | 7 | **Workforce Resiliency and Infection Control:** Percentage of employed population that used paid time off in a given month. |
| 3 | **Institutional Quality:** Accreditation by the Public Health Accreditation Board. | 8 | **Countermeasure Utilization:** Percentage of people ages 6 months or older who received a seasonal flu vaccination. |
| 4 | **Institutional Quality:** Accreditation by the Emergency Management Accreditation Program. | 9 | **Patient Safety:** Percentage of hospitals with a top-quality ranking ("A" grade) on the Leapfrog Hospital Safety Grade. |
| 5 | **Institutional Quantity:** Size of the state public health budget compared with the past year. | 10 | **Health Security Surveillance:** The public health laboratory has a plan for a six- to eight-week surge in testing capacity. |

*Notes: The 2022 edition of the report introduces a new indicator, measuring the percentage of state populations served by a comprehensive public health system. This new indicator replaces a previous indicator tracking the percentage of hospitals participating in healthcare coalitions. The National Council of State Boards of Nursing organizes the Nurse Licensure Compact. Systems for Action uses the National Longitudinal Survey of Public Health Systems to measure public health system comprehensiveness. The U.S. Environmental Protection Agency assesses community water systems. Paid time off includes sick leave, vacation time, or holidays, among other types of leave. The Leapfrog Group is an independent nonprofit organization. TFAH drew every indicator, and some categorical descriptions, from the National Health Security Preparedness Index, with one exception: public health funding. See "Appendix B: Methodology" for a description of TFAH's funding data-collection process, including its definition.*

*Source: National Health Security Preparedness Index*[12]

The *Ready or Not* report groups states and the District of Columbia into one of three tiers (high, middle, and low) based on their relative performances across the 10 indicators. This year, 17 states and the District of Columbia scored in the high-performance tier, 20 placed in the middle-performance tier, and 13 were in the low-performance tier (see Table 2). (See "Appendix B: Methodology" for more information on the scoring process.)

**Nine states showed notable improvement, moving up a tier: Alabama, Florida, Illinois, Iowa, New Jersey moved from the middle tier to the high tier, and Arizona, Missouri, New Hampshire, and New York moved from the low tier to the middle tier.** As an example of the factors behind such movement, New Hampshire's rise from the low tier to the middle tier had three primary drivers. First, while still below average, the state performed better in the new indicator (Public Health System Comprehensiveness) than it had in the now-replaced measure of hospital participation in healthcare coalitions. Second, its share of employed residents who used paid time off based on a one-month sample increased, while the national average stayed flat. Third, the state's hospitals made marked improvement in the area of patient safety.

**Three states—Ohio, Pennsylvania, and South Carolina—demonstrated exceptional progress, elevating from the low tier to the high tier.** Ohio adopted the Nurse Licensure Compact in 2021, and its score also benefited from the introduction of the new Public Health System Comprehensiveness indicator. Pennsylvania also adopted the Nurse Licensure Compact, benefited from the new indicator, increased its public health funding, and experienced only a small reduction in the share of its hospitals who received an "A" rating for patient safety at a time when the national average fell by a greater extent. Collectively, these improvements were sufficient to offset some decline in the share of its employed residents who used paid time off. Finally, South Carolina's score benefited from the new indicator, in addition to the state achieving accreditation by the Public Health Accreditation Board and greater usage of paid time off.

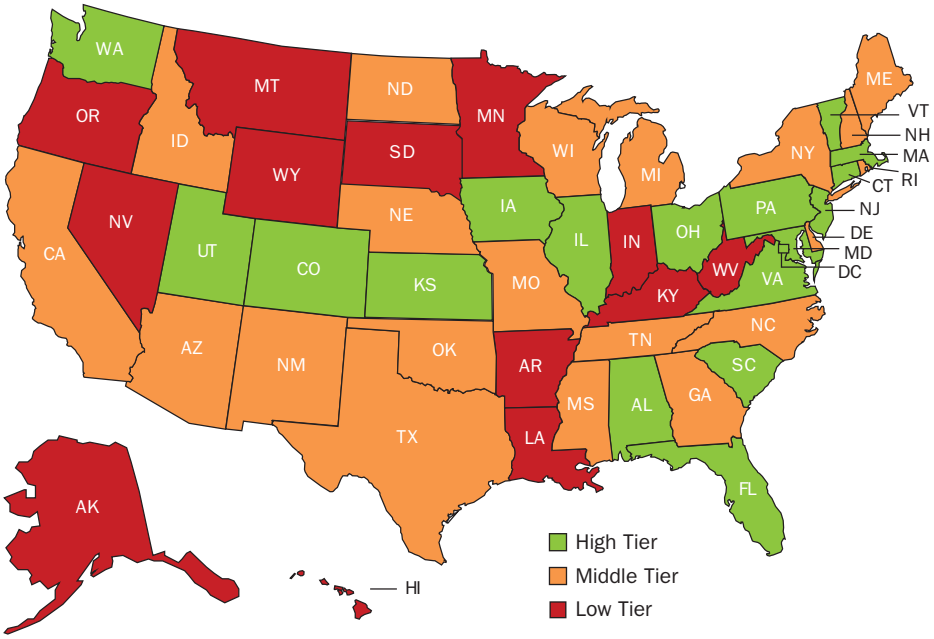
**Sixteen states fell one tier: Delaware, Georgia, Idaho, Maine, Mississippi, Nebraska, New Mexico, North Carolina, Oklahoma, Rhode Island, and Wisconsin moved from the high tier to the middle tier, and Kentucky, Louisiana, Minnesota, Montana, and Oregon moved from the middle tier to the low tier).** New Mexico, for instance, saw its score fall because it lost its accreditation from the Emergency Management Accreditation Program, vaccinated a smaller percentage of its residents against seasonal flu, and had a slightly smaller share of its hospitals receive an "A" rating for patient safety.

**TABLE 2: State Public Health Emergency Preparedness**
**State performance, by scoring tier, 2021**

| Performance Tier | States | Number of States |
|---|---|---|
| **High Tier** | AL, CO, CT, DC, FL, IA, IL, KS, MA, MD, NJ, OH, PA, SC, UT, VA, VT, WA | 17 states and DC |
| **Middle Tier** | AZ, CA, DE, GA, ID, ME, MI, MO, MS, NC, ND, NE, NH, NM, NY, OK, RI, TN, TX, WI | 20 states |
| **Low Tier** | AK, AR, HI, IN, KY, LA, MN, MT, NV, OR, SD, WV, WY | 13 states |

*Note: See "Appendix B: Methodology" for scoring details. Complete data were not available for U.S. territories.*

**Indicators of State Public Health Emergency Preparedness**
**State performance, by scoring tier, 2021**



## TFAH's Analysis Found:

**A majority of states have made preparations to expand healthcare and public health capabilities in an emergency.** Thirty-seven states participated in the Nurse Licensure Compact, up from 26 in 2017,[13] with Ohio, Pennsylvania, and Vermont being the most recent adopters.[14] The compact allows registered nurses and licensed practical or vocational nurses to practice in multiple jurisdictions with a single license. In an emergency, this enables health officials to quickly increase their staffing levels. For example, nurses may cross state lines to work at evacuation sites or other healthcare facilities. In addition, only the District of Columbia reported not having a plan to ensure public health laboratories are prepared for a large influx of testing needs. (The District of Columbia reported that it was in the process of updating its Continuity of Operations Plan and developing a discrete plan for laboratory surges.) All other states had a plan to surge public health laboratory capacity for six to eight weeks as necessary during overlapping emergencies or large outbreaks.

**Most residents who received their household water through a community water system had access to safe water.** On average, just 5 percent of state residents used a community water system in 2019 (latest available data) that did not meet all applicable health-based standards, down slightly from 7 percent in 2018. Water systems with such violations increase the chances of water-based emergencies in which contaminated water supplies place the public at risk.

**Most states are accredited in the areas of public health, emergency management, or both.** As of November 2021, the Public Health Accreditation Board or the Emergency Management Accreditation Program accredited 42 states and the District of Columbia; 32 states and the District of Columbia were accredited by both groups, a net increase of three since December 2020. Eight states (Alaska, Hawaii, Kentucky, New Hampshire, South Dakota, Texas, West Virginia, and Wyoming) were not accredited by either group. Both programs help ensure that necessary emergency prevention and response systems are in place and staffed by qualified personnel.

**Seasonal flu vaccination rates, while still too low, have risen significantly in recent years.** The seasonal flu vaccination rate among Americans ages 6 months and older rose from 42 percent during the 2018–2019 season to 52 percent during the 2019–2020 and 2020–2021 seasons.[15,16] However, *Healthy People 2030,* a set of federal 10-year objectives and benchmarks for improving the health of all Americans by 2030, set a seasonal influenza vaccination-rate target of 70 percent annually.[17]

**Still, despite these positive steps, just half of the U.S. population is served by a comprehensive public health system**—an indicator newly tracked in the 2022 edition of this series. Such systems tend to engage in a wide array of recommended activities to assess their communities' health and needs, develop evidenced-based public policy that promotes health and safety, ensure that necessary services are accessible to all residents, and cultivate a broad coalition of stakeholder partners. Comprehensive systems have been shown to contribute to positive health outcomes in a cost-effective manner. In just eight states and the District of Columbia were a majority of residents served by a comprehensive public health care system.

**In March 2020, 55 percent of employed state residents, on average, used paid time off, the same percentage as in 2018 and 2019.** Those without paid leave are more likely to work when they are sick and risk spreading infection. In the past, the absence of dedicated paid sick leave has been linked to or has exacerbated some infectious disease outbreaks.[18] This has become particularly relevant during the COVID-19 pandemic, as isolation and quarantine are important tools for controlling the outbreak. The Families First Coronavirus Response Act helped address this issue during the early stages of the pandemic for employers with fewer than 500 employees and certain public employers, temporarily requiring employees to be paid up to 80 hours of sick leave benefits under certain conditions, but these protections expired on December 31, 2020.[19] Importantly, the United States could join numerous countries across the world in establishing a national minimum standard of paid family or medical leave, if proposed provisions of the Build Back Better Act become law.

**Only 28 percent of hospitals, on average, earned a top-quality patient safety grade, down slightly from 31 percent in 2020.** Hospital safety scores measure performance on such issues as healthcare-associated infection rates, intensive-care capacity, and an overall culture of error prevention. In the absence of diligent actions to protect patient safety, deadly infectious diseases can take hold or strengthen.

## POLICY RECOMMENDATIONS

Based on the data collection and analysis summarized in this report, and consultation with public health and emergency preparedness experts, the report includes recommendations for policy action in seven priority areas:

1. **Providing stable and sufficient funding for public health security.** Congress and state and local governments must invest in the foundations of public health, including public health infrastructure, workforce, and data systems.
2. **Preventing disease outbreaks and pandemics.** Policymakers should support the vaccination infrastructure, fight antibiotic resistance, and support paid leave for all workers.
3. **Building resilient communities and promoting health equity in preparedness.** Congress and leaders at all levels of government should prioritize investments in health equity, incorporate equity leadership into preparedness and response, and invest in social determinants of health.
4. **Ensuring effective leadership and coordination.** Policymakers should strengthen public health leadership and communications and reject attempts to weaken public health authorities. Congress should create a COVID-19 Commission to review and address gaps in pandemic response.
5. **Accelerating development and distribution of medical countermeasures (MCMs).** Congress should invest in the entire MCM enterprise to enable rapid development and effective deployment of life-saving products during emergencies.
6. **Readying the healthcare system to respond during and recover from public health emergencies.** Federal and state policymakers and the healthcare system must prioritize effective coordination and planning for a surge of patients.
7. **Preparing for environmental threats and extreme weather.** Congress and the White House should develop a strategic plan, along with funding, to minimize the health impacts of climate change and promote health equity.

For a full description of the report's recommendations, see the recommendations section beginning on page 40.

## Report Purpose and Methodology

TFAH's annual *Ready or Not* report series tracks states' readiness for public health emergencies based on 10 key indicators that collectively provide a checklist of top-priority issues and action items for states and localities to continuously address. By gathering timely data on all 50 states and the District of Columbia, the report assists states in benchmarking their performance against comparable jurisdictions. TFAH completed this analysis after consultation with a diverse group of subject-matter experts and practitioners.

*See Appendix B for more detail on the report's methodology.*

### *READY OR NOT* AND THE NATIONAL HEALTH SECURITY PREPAREDNESS INDEX

The indicators included in this report were drawn from, and identified in partnership with, the National Health Security Preparedness Index (NHSPI),[20] with one exception: a measure of state public health funding-level trends, which reflects how well-resourced key agencies are to prepare for and respond to emergencies. The NHSPI is a joint initiative of the Robert Wood Johnson Foundation, the University of Kentucky, and the University of Colorado. (See "Appendix B: Methodology" for a detailed description of how TFAH selected and scored the indicators.)

While state rankings in *Ready or Not* and the NHSPI largely align, there are some important differences. The two projects have somewhat different purposes and are meant to be complementary, rather than duplicative. With more than 100 indicators, the NHSPI paints a broad picture of national health security, allowing users to zoom out and holistically understand the extent of both individual states and the entire nation's preparedness for large-scale public health threats. In slight contrast, *Ready or Not,* with its focus on 10 select indicators, focuses attention on state performances on a subset of the Index and spotlights important areas for stakeholders to prioritize a smaller, more focused set of improvement goals. TFAH and the NHSPI work together to help federal, state, and local officials use data and findings from each project to make Americans safer and healthier.

# SPECIAL SECTION:

## Lessons of the Pandemic's Tragic Death Toll: What Needs to be Done Now to Save Lives During the Next Public Health Emergency?

The over 900,000 U.S. lives lost due to the COVID-19 pandemic[21] is made even more tragic by the fact that many of these deaths were preventable. If the public health community's warnings of over a decade that the country's public health infrastructure was dangerously inadequate had been heeded lives would have been saved and economic upheaval lessened. In addition, misinformation, mistrust in government, and political division have driven anti-public health and anti-vaccine policies and actions. Furthermore, underinvestment in health equity and social determinants of health contributed to high rates of chronic disease, leaving some populations vulnerable to severe outcomes during the pandemic. Confusing and disjointed leadership and messaging led to disparate responses in every state. And the healthcare system, which operates near capacity on many days, was unprepared for multiple surges throughout the pandemic.

But within this tragedy is opportunity. The pandemic has shined a light on what is needed: Congress and states must work to create robust and sustained investment in public health infrastructure, modernization of data systems and surveillance capacity, increased public health laboratory capacity, sustained growth in a diverse and highly skilled public health workforce, and improved public health messaging and communications. However, these investments in public health infrastructure alone will not make America more resilient in the face of the next public health emergency. Protecting health in every community will also require addressing the systemic inequities that led to COVID-19's disproportionate health and economic impacts, particularly in communities of color and low-income communities.

### What went wrong?

Policymakers did not heed the decades-long call by public health experts to fund public health on a sustained basis and not just in response to an emergency. Underfunding contributed to understaffed and overworked health departments using out-of-date technologies. In addition, lack of support and outright threats against public health officials contributed to hundreds of senior-level state and local public health officials leaving the profession.[22]

The nation's public health data systems are woefully dated and not up to the task of tracking an infectious disease outbreak on the scale of a pandemic. While data collection has improved as Congress has invested in data modernization, early in the outbreak basic questions such as how many people were infected by the virus, which population groups were at the highest risk, and where infections were surging were largely unanswerable in a timely manner due to insufficient testing and reporting processes. Where data were collected, they were spread across multiple data sets with no way to quickly roll up into one national picture.[23]

Communities of color were disproportionately affected in large part due to the ways in which structural racism and classism impacts where people are born, grow, live, work, and age; the resources available in their community; their access to healthcare; and the prevalence of chronic disease in their communities. According to the Centers for Disease Control and Prevention (CDC), as of November 2021, nationwide American Indians and Alaska Natives died due to COVID-19 at a rate that was 2.2 times higher than whites. Hispanic/Latino Americans died at a rate that was 2.1 times higher than whites Americans. Black Americans died from COVID-19 at a rate that was 1.9 times higher than the rates of deaths among whites. Asian Americans died at a rate that was 0.9 times that of whites.[24,25] In addition, as of mid-November 2021, an estimated

167,082 children had lost a parent, guardian, or caregiver due to COVID-19; many of these children were already experiencing significant social and economic adversity.[26]

During the early stages of the pandemic (2020) the federal government lacked an evidence-based leadership role in the pandemic response, and science and public health expertise were often not heeded. In addition, political polarization at the federal and state levels confounded critical public health guidance and contributed to a confusing spectrum of responses across the country, from some areas issuing mask mandates to other jurisdictions limiting public health authorities. An October 2020 Columbia University report concluded that earlier implementation of lockdowns, a national mask-wearing mandate, and federal guidance on social distancing could have saved between 130,00 and 210,000 American lives.[27] Similarly, Peterson-Kaiser Family Foundation reported in October 2021 that between June and December 2021, approximately 163,000 U.S. COVID-19 deaths could have been prevented through vaccination.[28]

Social media platforms were (and still are) greenhouses for misinformation about the virus and vaccines. The Global Health Security Index found that, despite strong health security capacity, the United States had the lowest possible score on public confidence in the government, a factor that has been common in countries with higher rates of COVID-19 cases and deaths.[29]

Public health leaders Daniel Dawes, executive director of the Satcher Health Leadership Institute, and Dr. Brian Castrucci, president and CEO of the de Beaumont Foundation, wrote in their February 2021 op-ed in *STAT* that while COVID-19 does not discriminate by race, it undeniably exposed the "devastating inequities that come with being a person of color in America."[30] Structural racism impacts people of color in nearly every facet of their lives, from where they live and work to their access to healthcare. Racism is often at the root of conditions that drive poor health outcomes in communities of color. The disproportionate impact of COVID-19—higher rates of infection, hospitalization, and death—in communities of color were stark illustrations of this fact according to Dawes and Castrucci. A baseline goal in public health must be increasing the health status (and therefore the strength and resilience) of every community. In order to improve the health status within communities of color, long-standing racist policies and practices, and their legacies, in employment, housing, education, and healthcare must be changed. Dawes and Castrucci write that America's pre-COVID-19 "normal" "was not equitable or just"; therefore, a return to pre-COVID normal would allow the inequities that fueled the pandemic to persist.

### What's needed?

**Increased, flexible, and sustained funding.** Funding for public health must be increased, flexible, and sustained over time. The pattern of public health funding in this country has long been that money is found (often borrowed from other public health priorities like chronic disease prevention) to fund needed response during an emergency. Once the emergency has passed, governments return to a pattern of inadequate levels of funding for public health. Without increased, predictable, and sustained funding—for personnel, equipment, training, and data systems—the next public health emergency response will be less effective than it needs to be, putting lives and livelihoods at risk.

It is also important to note that while the pandemic response and recovery funding authorized in 2020 and 2021 were critical to meet the urgent needs of the pandemic response, those resources were one-time appropriations. What's needed to protect all Americans from the next public health emergency is year-in, year-out sustained, predictable funding.

*Editor's note: In November 2021, the U.S. House of Representatives passed the $1.75 trillion Build Back Better Act, including approximately $10 billion for public health—about $7 billion over five years for public health infrastructure and about $3 billion for other pandemic preparedness.[31] These funds, if ultimately appropriated, would be an important down payment toward rebuilding the nation's public health system.*

**Federal leadership.** In an event as large and complex as a pandemic, there is no substitute for a strong, coordinated federal response. TFAH has made a number of policy recommendations designed to ensure strong federal leadership during future public health emergencies, including the creation of a White House Health Security Directorate.[32]

*Editor's note: The Biden Administration created a National Security Council Directorate on Global Health Security and Biodefense, led by a senior director for global health security and biodefense, in January 2021.[33] Future administrations should strengthen this senior-level advisory structure at the White House.*

**A diverse and highly skilled public health workforce.** According to an October 2021 report released by the de Beaumont Foundation and the Public Health National Center for Innovations, a division of the Public Health Accreditation Board, state and local public health departments need approximately 80 percent more full-time staff to meet the nation's basic public health needs. According to the report, years of budget cuts have reduced essential state and local public health staff by 15 percent over the last decade. These reductions in the size of the workforce make local and state health departments less able to meet community health needs, including responding to emergencies. The report concludes that the nation needs to hire an additional 80,000 full-time public health staff to ensure that basic community health needs are met in all jurisdictions.[34]

**Modernized health data and disease tracking systems, including disaggregated data collection and reporting.** Improved response to public health emergencies requires 21st-century data collection and management, including real-time data on the social determinants of health. Achieving health equity is rooted in understanding health disparities and what causes them. Such understanding begins with a health data systems infrastructure that is able to surveil, collect, disaggregate, interpret, and share data in a timely fashion, including on race, ethnicity, income, disability, social determinants, other demographic factors, and the drivers of health. These capacities and these data are often missing from many federal and state data sets that currently provide data on white, Black, and Hispanic people but lack data on other groups, such as American Indians, Alaska Natives, Asian Americans, and Native Hawaiians or other Pacific Islanders, or treat these groups as one homogeneous population.[35]

The Robert Wood Johnson Foundation created the National Commission to Transform Public Health Data Systems to review how public health data are collected, shared, and used, as well as to make recommendations to ensure that such data are comprehensive and create a blueprint for health equity. Among the recommendations included in its October 2021 report was to ensure that public health measurement captures race and ethnicity information at the individual level whenever person-level data is collected, and addresses structural racism and other inequities.[36]

Also released in October 2021, a report from Grantmakers in Health and the National Committee for Quality Assurance stated that having more complete data will require action across multiple sectors, including changes in data standards and systems; regulations, including a clear and sufficient federal standard for data completeness; and a roadmap for collecting and reporting on data in ways that will reduce health inequities and provide incentives, requirements, resources, and technical assistance as needed.[37]

*Editor's note: Congress has allocated over $1 billion through the Coronavirus Aid, Relief, and Economic Security (CARES) Act (P.L. 116-136), the America Rescue Plan Act (P.L. 117-2), and annual appropriations to support rapid public health data modernization.[38] In August 2021, CDC announced plans to use some of this funding for a new analytics center to better forecast and track disease outbreaks.[39]*

**Modernize public health labs and increase their surge capacity.** Congress must sufficiently fund CDC to support sustained modernization of state and local public health laboratories, so they are better connected and ready to meet public health threats.[40] Also needed is better coordination between public health and private laboratories, including clinical and academic settings. Public and private laboratories both

played critical roles during the pandemic response. (See interview: pg. 15.)

**Strengthen public health departments' emergency response functioning** by providing sufficient funding and requiring plans in order to allow for execution of rapid hiring, rapid procurement, and project scale-up and management in response to a public health emergency.

**Combat misinformation and increase the public's trust in science and government.** U.S. Surgeon General Dr. Vivek Murthy has identified health misinformation as a serious threat to Americans' health. In July 2021, the Surgeon General issued an advisory, *Confronting Health Misinformation: The Surgeon General's Advisory on Building a Healthy Information Environment,* including ways in which institutions in education, media, medicine, research, social media and technology companies, and government stakeholders can address the issue.[41] Distrust of government and science was at the root of at least some vaccine hesitancy. Addressing this distrust will be critical to being prepared to respond to future public health emergencies.

**Invest in the social determinants of health and anti-poverty programs to support the public's health and promote resilience.** Key drivers of everyone's health are the conditions in which they are born, grow, live, work, and age. These health drivers, also known as "social determinants of health," in large part determine if a population group or community has the resources and resilience to weather and recover from a public health emergency. In an emergency, every community needs access to healthcare, food, clean water, and transportation. Communities without these resources tend to have poorer health outcomes at the individual and population level and are more vulnerable during an emergency.

A 2017 report from the National Academies of Sciences, Engineering, and Medicine stated that "health inequities are in large part a result of poverty, structural racism, and discrimination."[42] In addition, as illuminated and exacerbated by COVID-19, structural racism has contributed to a public health crisis in the United States—rates of illness are higher and life expectancy is lower for people of color, including Black people and American Indian people, than for white people.[43]

## COVID-19 HEALTH EQUITY TASK FORCE REPORT ADDRESSES HEALTH INEQUITIES

The Biden Administration created the Presidential COVID-19 Health Equity Task Force in January 2021. The October 2021 *COVID-19 Health Equity Task Force Report* and proposed implementation plan made recommendations to the President for mitigating the health inequities caused or exacerbated by the pandemic and for preventing such inequities in the future.[44] The task force, chaired by Dr. Marcella Nunez-Smith, included multisector experts and people with lived experience concerning communities suffering disproportionate rates of illness and death from COVID-19.

In its report, the task force made 55 recommendations to address and eliminate health disparities, many of which mirrored TFAH policy recommendations. Among the report's five high-level recommendations to the President were:

1. Invest in community-led solutions to address health equity.
2. Enforce a data ecosystem that promotes equity-driven decision making.
3. Increase accountability for health equity outcomes.
4. Invest in a representative healthcare workforce, and increase equitable access to quality healthcare for all.
5. Lead and coordinate implementation of the COVID-19 Health Equity Task Force's recommendations from a permanent health equity infrastructure in the White House.

Within those areas, the task force recommended increased and sustained funding for the public health workforce and emergency response, investment in modernized public health data systems and equity-centered public health data collection, and systems to address the social determinants of health and increase access to behavioral healthcare.

In a statement applauding the report, TFAH President and CEO Dr. J. Nadine Gracia, said: "The COVID-19 Health Equity Task Force has laid out a road map for reducing inequities during the pandemic and before the next public health emergency. As the report acknowledges, we must engage in a multisector effort to address the upstream factors that contribute to underlying health inequities in order to promote optimal health and build resilience in all communities."

# The Critical Role of Public Health Laboratories During COVID-19 and Beyond

## An Interview with Scott Becker, MS, CEO of the Association of Public Health Laboratories

**TFAH: How did public health laboratories perform during the pandemic?**

**Becker:** Public health laboratories have performed remarkably well despite a number of challenges. Performance issues with the initial CDC assay presented significant hurdles and delays at the beginning of the pandemic. The laboratories were resilient, though, quickly notifying CDC and the Association of Public Health Laboratories (APHL) of assay issues and identifying solutions, such as using their own laboratory-developed tests. For instance, Wadsworth Center, New York State Department of Health, secured an emergency-use authorization for its real-time PCR assay. Other ongoing challenges included the limited national supply chain for reagents and consumables.

Typically, public health laboratories identify novel threats, perform initial testing, and then hand off to the private sector for high-throughput surge testing. The state public health laboratory traditionally maintains ongoing responsibility for testing in high-priority or potential outbreak situations, as well as for regional surveillance. In the case of COVID-19, public health laboratories have been in response mode for an extended period, providing sustained surge capacity for their jurisdictions and, in some locations, serving as the primary test provider. We are almost at the two-year mark for the COVID-19 pandemic, and during this time public health laboratories have tested more than 21 million specimens for SARS-CoV-2. All of APHL's member public health laboratories—that is, most laboratories nationwide—are meeting the testing demands within their jurisdictions.

The emergence of the Omicron variant created an increase in demand for COVID-19 testing for all public health laboratories. Many of these same laboratories are also sequencing SARS-CoV-2 samples to monitor for Omicron and other variants, and they report cases to CDC for surveillance purposes.

**TFAH: What lessons—on lab performance/capacity and beyond—should the nation learn as a result of the pandemic?**

**Becker:** There are significant lessons from this pandemic as well as previous responses to Zika and Ebola viruses. First, we must look at the coordination, or lack thereof, of the U.S. national laboratory system and how this limits our ability to respond to novel threats. APHL believes that we need to develop a national laboratory system that better integrates public and private laboratories, including large commercial facilities, hospitals, and academic institutions. We also need to transform the public health laboratory system to be more agile and interconnected to respond to all threats.

Another area of concern is the shrinking public health workforce and lack of diversity within its ranks. A key place to address this is by building and supporting a diverse, equitable, and inclusive public health laboratory workforce. The fundamental purpose of public health laboratories is to serve their communities, so it is vital that lab staff represent the diverse communities in which they are working. A representative workforce not only creates a better work environment for all staff, but it also allows a public health lab to better serve the community's health needs.

Finally, there are lessons on the use of various technologies for screening and testing. For instance, point-of-care diagnostics and at-home testing play a pivotal role in reducing the testing burden on laboratories. Such technologies also ensure access to testing for underserved communities. Understanding the quality of these screening tools and sharing results with public health agencies will be critical for surveillance and contact tracing for future pandemics.

**TFAH: Does the nation have the needed level of lab capacity for when another pandemic happens?**

**Becker:** Responding to a pandemic is complex and encompasses the actual laboratory test (assay), instruments, supplies (reagents), test results (electronic laboratory reporting), safe and secure facilities, personal protective equipment, and trained personnel.

Whether or not we are ready for the next threat will vary. We often prepare for what we have experienced instead of preparing for a true unknown. We may have instrument capacity, but we still need to collaborate with the private sector and other governmental agencies, beyond CDC, to develop and pre-position tests in laboratories. We also need to rebuild and strengthen the laboratory workforce as well as the broader public health workforce.

**TFAH: What's the role of public health labs in overall healthcare? Has that relationship worked during the COVID-19 pandemic?**

**Becker:** The quintessential role of public health laboratories is to monitor the diseases and health status of populations. This role has evolved over time, especially given increasing threats such as natural disasters, human-caused incidents, emerging and pandemic infectious diseases, and acts of terrorism. In executing their 11 core functions, public health laboratories engage the entire healthcare community to varying degrees in the state public health laboratory system. While there were some initial bumps in the response, overall, public health laboratories worked well with healthcare—including commercial laboratories and other private institutions including in nontraditional testing sites, such as prisons and nursing homes.

Public health and healthcare take different yet equally important approaches to serving and protecting the nation's health. At the foundation of both approaches is laboratory testing, which is necessary for health departments to monitor disease in the population and identify novel threats, and for healthcare providers to make decisions to treat patients. The interdependency of public- and private-sector testing has never been more important than as seen with the COVID-19 response. These two systems must work together to provide timely and accurate testing, covering a significant portion of the U.S. population. As is the case with novel infectious threats, prompt and quality testing is critical as it shapes treatment options and epidemiological actions such as contact tracing, and as it influences larger public health decisions, including quarantine.

**TFAH: Are rapid, self-administered tests, followed by a lab test if positive, part of the right approach to ending the pandemic?**

**Becker:** As noted earlier, a multilayered approach of laboratory testing, point-of-care diagnostics, and self-administered ("at-home") tests is critical to alleviating the testing burden and providing information on community transmission. These tests must be based in sound science and have performance data that support their use. Further, such tests should also have a reporting component, so public health agencies can determine community transmission rates and can utilize these data for public health actions.

**TFAH: New monies within the federal pandemic recovery packages have been dedicated to lab building and renovation. Is it enough?**

**Becker:** The American Rescue Plan Act has provided funding to public health laboratories for COVID-19 testing and surveillance, for expanding and sustaining a stronger workforce, for genomic sequencing and analytics, for global health security beyond just COVID-19, and for supporting the Data Modernization Initiative and more.

While this funding is much needed and appreciated, public health laboratories have been chronically underfunded. This is a great boost, especially at a time when they need it most, but these laboratories need a consistent increase in funding to be able to keep up with changing technologies and threats. Federal funding to significantly improve public health data management operations at the state and local levels of government requires an additional $7.8 billion over the next five years, and state and local public health laboratory construction needs are likely to be around $5 billion over that same time frame.

**TFAH: How does the overall modernizing of the public health data systems and the strengthening of lab systems work together?**

**Becker:** Like many aspects of public health, the effective, efficient movement of public health data has been chronically underfunded, resulting in a fragmented and obsolete national information technology system. This issue has limited the ability of the nation's public health system to make actionable decisions. The perpetual funding issue, combined with a sharp increase in data production from new laboratory techniques, such as sequencing, have added great volumes of data to an already overburdened system.

On the positive side, Congress has allocated over $1 billion through the Coronavirus Aid, Relief, and Economic Security (CARES) Act (P.L. 116-136), the American Rescue Plan Act (P.L. 117-2), and annual appropriations to continue public health data modernization activities. Within this funding CDC received $500 million to advance surveillance and analytics infrastructure. In August 2021, CDC announced plans to use some of this funding for a forecasting center to better track emerging biological threats.

**TFAH: It seems like Omicron identification is moving at a faster pace than earlier detection. Is that accurate? What accounts for the improved performance?**

**Becker:** If you are comparing the pace with the detection of the Alpha variant (or B.1.1.7), which emerged in December 2020, then yes, the pace is faster. However, the pace with which we've detected other emerging variants like the Delta variant has been strong for many months. This is almost entirely because of the investments and improvements to genomic-sequencing capability and capacity in the U.S. public health system. Public health laboratories as well as other key laboratory partners are a critical part of the CDC-led National SARS-CoV-2 Strain Surveillance (NS3) program. In January 2021, the network was publishing between 3,000 and 5,000 sequences to public databases every week. Today, the network consistently publishes between 15,000 and 20,000 specimens per week. In November 2021 alone, 190,000 SARS-CoV-2 sequences were published across the U.S. public health system. This significant increase in capacity positions us to quickly detect emerging variants, even when circulating at low levels.

*Editor's note: this interview was conducted in December 2021.*

# Assessing State Preparedness

Every state needs to be prepared to respond to a variety of potential public health emergencies; such readiness requires understanding an individual state's preparedness strengths, risks, and vulnerabilities. To help states assess readiness, and to highlight a checklist of top-priority concerns and action areas, this report examines a set of 10 select indicators. The indicators, overwhelmingly consistent from year to year, draw heavily on the National Health Security Preparedness Index (NHSPI), a joint initiative of the Robert Wood Johnson Foundation, the University of Kentucky, and the University of Colorado. They capture core elements of emergency preparedness. Based on states' standing across the 10 indicators (see "Appendix B: Methodology" for scoring details) and TFAH analysis, the states were placed into three performance tiers: high, middle, and low. (See Table 3.)

Importantly, the implications of this assessment, and responsibility for continuously improving, extend beyond any one state or local agency. Such improvement typically requires sustained engagement and coordination by a broad range of policymakers and administrators. Moreover, some indicators are under the direct control of federal and state lawmakers, whereas improvement in other indicators requires multisector, statewide efforts, including by residents.

**TABLE 3: State Public Health Emergency Preparedness**
**State performance, by scoring tier, 2021**

| Performance Tier | States | Number of States |
|---|---|---|
| **High Tier** | AL, CO, CT, DC, FL, IA, IL, KS, MA, MD, NJ, OH, PA, SC, UT, VA, VT, WA | 17 states and DC |
| **Middle Tier** | AZ, CA, DE, GA, ID, ME, MI, MO, MS, NC, ND, NE, NH, NM, NY, OK, RI, TN, TX, WI | 20 states |
| **Low Tier** | AK, AR, HI, IN, KY, LA, MN, MT, NV, OR, SD, WV, WY | 13 states |

*Note: See "Appendix B: Methodology" for scoring details. Complete data were not available for U.S. territories.*

## INDICATOR 1: ADOPTION OF NURSE LICENSURE COMPACT

KEY FINDING: 37 states participate in the Nurse Licensure Compact.

Workforce shortages can impair a state's ability to effectively manage disasters or disease outbreaks, potentially resulting in poorer health outcomes for those affected. This reality has been on display during the COVID-19 pandemic, as healthcare capacity in most parts of the country has at times been pushed to the brink amid regional waves of infections and hospitalizations. In an event like a pandemic, the ability to quickly surge qualified medical personnel by bringing in healthcare workers from out of state is a key component of healthcare readiness.

This indicator examines whether states have adopted legislation to participate in the Nurse Licensure Compact (NLC). Launched in 2000 by the National Council of State Boards of Nursing, the NLC permits registered nurses and licensed practical nurses to practice with a single multistate license—physically or remotely—in any state that has joined the compact. The NLC provides standing reciprocity, with no requirement that an emergency be formally declared.

The COVID-19 pandemic has placed extraordinary pressure on hospitals across the country when surging infections send admissions soaring, primarily among unvaccinated people. States that were members of the NLC were well positioned to bring in nurses from other member states, without harmful delays, or to send nurses to other member states that were experiencing acute shortages. "I think the COVID-19 [pandemic] is going to cause the states that are not in the compact now to really take a second look at it," said NLC Director Jim Puente in June 2020. "If the NLC was expanded to all 50 states, none of the guesswork with emergency orders would be necessary because nurses could travel to other states where they are needed. No applications, fees, or background checks would be necessary."[45]

As of November 2021, 37 states had adopted the NLC, with Ohio, Pennsylvania, and Vermont being the most recent adopters.[46] This was a net increase of 11 since 2017.

When Lisa M. Boscola, a state senator in Pennsylvania who represents a district bordering Allentown's east side,[47] first learned of the NLC, she recalls contacting her staff immediately and saying, "get bills introduced ASAP."[48] Sen. Boscola believes "the pandemic has only shown us more proof as to why we need these compacts in the medical field." As she puts it: "As the country several times saw geographic swells with positive COVID cases and surges, the nurses and doctors nationally were able to respond to this. If the Northeast was struggling and the Midwest was not, then thousands and thousands of doctors and nurses came to the Northeast to help in the response. And when that changed in the other direction, we were able to send physicians and nurses to the areas of greater impact. In our state, because we were not in the nurse compact, the governor had to issue emergency waivers to permit out-of-state licensed nurses and doctors to come in and help with the surges."

Noah Logan of the Pennsylvania State Nurses Association agrees. "COVID definitely had a huge impact on us," he says. "We needed to be able to move nurses around quickly. All the things that were going through the nurses' minds in March, April, and May [2020]; those were rough months. Having to deal with the hassle of licensing, especially during that time, was an unneeded stressor."[49]

## TABLE 4: 37 States Participate in the Nurse Licensure Compact

**Participants and nonparticipants, 2021**

| Participants | | | Nonparticipants | |
|---|---|---|---|---|
| Alabama | Maine | Pennsylvania | Alaska | Michigan |
| Arizona | Maryland | South Carolina | California | Minnesota |
| Arkansas | Mississippi | South Dakota | Connecticut | Nevada |
| Colorado | Missouri | Tennessee | District of Columbia | New York |
| Delaware | Montana | Texas | Hawaii | Oregon |
| Florida | Nebraska | Utah | Illinois | Rhode Island |
| Georgia | New Hampshire | Vermont | Massachusetts | Washington |
| Idaho | New Jersey | Virginia | | |
| Indiana | New Mexico | West Virginia | | |
| Iowa | North Carolina | Wisconsin | | |
| Kansas | North Dakota | Wyoming | | |
| Kentucky | Ohio | | | |
| Louisiana | Oklahoma | | | |

*Note: Ohio, Pennsylvania, and Vermont joined the NLC in 2021. Ohio's and Vermont's planned implementation dates are January 1, 2023, and February 1, 2022, respectively. Pennsylvania had not set a date for implementation as of November 2021.*

*Source: National Council of State Boards of Nursing.*[50]

## INDICATOR 2: COMPREHENSIVE PUBLIC HEALTH SYSTEMS

KEY FINDING: Only about half of the U.S. population—a state average of 45 percent—is served by a comprehensive public health system. Comprehensive public health systems have been shown to contribute cost-effectively to residents' health and safety. At the state level, in 2018, the share of residents served by such a system ranged from more than two-thirds in the District of Columbia (86 percent), New York (77 percent), Arizona (67 percent), and Pennsylvania (67 percent) to fewer than one-third in Arkansas (31 percent), South Dakota (28 percent), and Indiana (25 percent).

*The 2022 edition of the* Ready or Not *report introduces a new indicator, measuring the percentage of state populations served by a comprehensive public health system, based on survey responses from a representative sample of local health departments. This new indicator replaces a previous indicator tracking the percentage of hospitals participating in healthcare coalitions. The move to this new indicator was made because (1) The National Health Security Preparedness Index (NHSPI) has not recently updated data on coalition participation (NHSPI provides data for several indictors used in this report), and (2) public health system comprehensiveness is a proven measure of a jurisdiction's overall health outcomes and public health emergency preparedness.*

Since 1998, a team of researchers who are now part of Systems for Action, a joint initiative of the Robert Wood Johnson Foundation and the Colorado School of Public Health, have periodically administered the National Longitudinal Survey of Public Health Systems to a nationally representative cohort of U.S. communities.[51] Through the survey, they estimate the percentage of the U.S. population who reside in communities with a comprehensive public health system, defined as a place in which "a broad array of the recommended public health activities are available in the community, AND in which a relatively broad range of organizations contribute to implementing these activities, AND/OR in which the local public health agency contributes [a] relatively large share of the effort to implement these activities."[52]

The survey asks local public health officials whether their agencies or community partners:[53]

1. Conduct community needs assessments that systematically describe the prevailing health status in the community.
2. Survey the population for behavioral risk factors.
3. Conduct on an ongoing basis timely investigations of adverse health events, including communicable disease outbreaks and environmental health hazards.
4. Make necessary laboratory services available to support investigations of adverse health events and meet routine diagnostic and surveillance needs.
5. Complete periodic analyses of the determinants of and contributing factors to priority health needs, the adequacy of existing health resources, and the population groups most effected.
6. Complete periodic analyses of age-specific participation in preventive and screening services.
7. Cultivate a network of support and communication relationships that includes health-related organizations, the media, and the general public.
8. Make formal efforts at least annually to inform public officials about the potential public health impact of decisions under their consideration.
9. Periodically prioritize community health needs based on a community needs assessment.
10. Implement community health initiatives that are consistent with priorities established from a community health needs assessment.
11. Develop and periodically update a community health action plan with community participation to address community health needs.
12. Develop and periodically update plans to allocate resources in a manner consistent with community health action plans.
13. Deploy resources as necessary to address priority health needs identified in the community health needs assessment.

**14.** Periodically conduct an organizational assessment of the public health agency.

**15.** Address age-specific priority health needs through the provision of or linkage to appropriate services.

**16.** Regularly evaluate the effects of public health services on community health status.

**17.** Regularly use professionally recognized process and outcome measures to monitor public health programs and to redirect resources as appropriate.

**18.** Regularly make public information about current health status, health care needs, health behaviors, and health care policy issues.

**19.** Regularly report to media on health issues affecting the community.

**20.** Implement mandated public health programs or services as required by state or local law, ordinance, or regulation.

For each activity, surveyors ask respondents how well the measure is being performed (five-point Likert scale), the proportion of effort contributed by the local public health agency, and which types of other organizations (state health agency; other federal, state, or local agencies; faith-based organizations; hospitals; health insurers; employers/business groups; physician practices; community health centers; other nonprofits; k-12 schools; colleges/universities; tribal organizations; or others) are also involved, among other questions. It also asks how respondents would rate their agencies' effectiveness at assuring the conditions in which their residents can be healthy, and how they would rate the overall health of their jurisdictions' people.[54]

The researchers aggregate respondents' answers to determine whether a comprehensive public health system is serving a jurisdiction; that is, one in which there is high availability of recommended activities, a high level of organizational contributions, and/or a high level of local health agency effort. There is evidence that when localities improve from having a noncomprehensive system to a comprehensive one, they enjoy significant reductions in premature mortality rates from potentially preventable conditions, such as infant mortality, cardiovascular disease, diabetes, and cancer.[55] Moreover, these places tend to be more cost-effective, using relatively fewer resources despite supporting a broader array of public health activities.[56]

Since 1998, when the survey began, the estimated percentage of U.S. residents who are served by a comprehensive public health system has increased markedly, from 25 percent[57] to 49 percent in 2020.[58] Still, the survey documented much of that improvement during its early years, as the percentage hasn't increased since 2006.[59] In 2018, the latest year for which state-level estimates were available, the states where a comprehensive public health system served the greatest percentage of residents were the District of Columbia (86 percent), New York (77 percent), Arizona (67 percent), and Pennsylvania (67 percent), compared with Indiana (25 percent), South Dakota (28 percent), and Arkansas (31 percent). (No data were available for Hawaii and Rhode Island.)

This wide range demonstrates that the capacities of a person's local health department, a meaningful contributor to one's health and safety, depends significantly on where the person lives. Of note, there seems to be a persistent and expanding gap between rural and urban jurisdictions, with rural areas providing fewer recommended public health activities and engaging narrower networks of partners compared with their urban counterparts.[60] Researchers suggest that these disparities are due to several factors, including rural departments having relatively lower levels of funding and staffing, as well as marketplace and policy dynamics such as a greater prevalence of hospital closures and health insurer consolidations in rural areas and greater health insurance coverage gains recently in urban areas.

**TABLE 5: Only About Half of the U.S. Population Has a Comprehensive Public Health System**
**Percent population served by a comprehensive public health system, 2018**

| States | Percent of Residents |
|---|---|
| DC | 86% |
| NY | 77% |
| AZ, PA | 67% |
| MA | 63% |
| AK | 62% |
| CA | 59% |
| NV, UT | 55% |
| FL, WA | 49% |
| IL, MN, NJ | 47% |
| MI | 46% |
| ME, VT, WV | 45% |
| CO, LA, NC, NE, SC, VA | 44% |
| GA, MD, MO | 43% |
| DE, OR, WI | 42% |
| ID, OK | 39% |
| IA, KS, NH, TX | 38% |
| CT, KY, NM, OH | 37% |
| MT, TN, WY | 36% |
| AL, MS | 35% |
| ND | 34% |
| AR | 31% |
| SD | 28% |
| IN | 25% |

*Note: No data were available for Hawaii or Rhode Island. The District of Columbia's value was imputed by Systems for Action.*

*Source: NHSPI analysis of data from the National Longitudinal Survey of Public Health Systems.*[61]

## INDICATORS 3 AND 4: ACCREDITATION

KEY FINDING: Most states are accredited by one or both of two well-regarded bodies—the Public Health Accreditation Board and the Emergency Management Accreditation Program—but eight are not accredited by either.

The Public Health Accreditation Board (PHAB), a nonprofit organization that administers the national public health accreditation program, advances quality within public health departments by providing a framework and a set of evidence-based standards against which they can measure their performance. Among standards with direct relevance to emergency preparedness are assurances of laboratory, epidemiologic, and environmental expertise to investigate and contain serious public health problems, policies, and procedures for urgent communications, and maintenance of an all-hazards emergency operations plan.[62] Through the process of accreditation, health departments identify their strengths and weaknesses, increase their accountability and transparency, and improve their management processes, which all promote continuous quality improvement.[63]

Emergency management, as defined by the Emergency Management Accreditation Program (EMAP), encompasses all organizations in a given jurisdiction with emergency or disaster functions, which may include prevention, mitigation, preparedness, response, and recovery. The EMAP helps applicants ensure—through self-assessment, documentation, and peer review—that they meet national standards for emergency response capabilities.[64]

The PHAB and the EMAP each provide important mechanisms for improving evaluation and accountability. Accreditation and reaccreditation by these entities demonstrate that a state's public health and emergency management systems are capable of effectively responding to a range of health threats. The priority capabilities that the PHAB and the EMAP test include identification, investigation, and mitigation of health hazards; a robust and competent workforce; incident, resource, and logistics management; and communications and community-engagement plans.[65,66] States sometimes aim to meet applicable standards but do not pursue accreditation.

As of November 2021, 32 states and the District of Columbia were accredited by both the PHAB and the EMAP—a net increase of three since December 2020. South Carolina and Virginia joined this group after gaining accreditation from the PHAB; Maryland rejoined the group after being reaccredited by the EMAP; Washington joined after receiving its first accreditation from EMAP; New Mexico's EMAP accreditation lapsed. Indiana is now accredited by the PHAB, alongside an additional nine states that have received accreditation from just one of the two. (See Table 6.)

After receiving accreditation from the PHAB in February 2021, Dr. Edward Simmer, MD, MPH, DFAPA, the director of the South Carolina Department of Health and Environmental Control (DHEC), said, "At a time in our nation's history when public health has been thrusted into the spotlight, DHEC hopes that achieving national accreditation will help reaffirm our commitment to putting people and their needs first."[67] PHAB President and CEO Paul Kuehnert, DNP, RN, FAAN, said of the achievement: "People living and working in communities served by these health departments can be assured that their health department is strong and has the capacity to protect and promote their health. Just going through the accreditation process itself helps health departments pinpoint the areas that are critical to improving the work they do for their communities."

Just eight states (Alaska, Hawaii, Kentucky, New Hampshire, South Dakota, Texas, West Virginia, and Wyoming) received no accreditation from either body. A state without an accreditation has not necessarily been denied; the state may not have pursued one or may still be in the process of seeking accreditation. It is also important to note that this analysis includes state-level accreditation only. It does not include local or tribal health departments that may be accredited.

**TABLE 6: 42 States and the District of Columbia Accredited by the PHAB and/or EMAP**
**Accreditation status by state, November 2021**

| PHAB and EMAP | | | PHAB only | EMAP only | No Accreditation |
|---|---|---|---|---|---|
| Alabama | Illinois | North Dakota | Indiana | Michigan | Alaska |
| Arizona | Iowa | Ohio | Maine | Nevada | Hawaii |
| Arkansas | Kansas | Oklahoma | Minnesota | North Carolina | Kentucky |
| California | Louisiana | Pennsylvania | Montana | Tennessee | New Hampshire |
| Colorado | Maryland | Rhode Island | New Mexico | | South Dakota |
| Connecticut | Massachusetts | South Carolina | Oregon | | Texas |
| Delaware | Mississippi | Utah | | | West Virginia |
| District of Columbia | Missouri | Vermont | | | Wyoming |
| Florida | Nebraska | Virginia | | | |
| Georgia | New Jersey | Washington | | | |
| Idaho | New York | Wisconsin | | | |
| **32 states + DC** | | | **6 states** | **4 states** | **8 states** |

*Note: These indicators track accreditation by the PHAB and the EMAP. TFAH classified states with conditional or pending accreditation at the time of data collection as having no accreditation. States sometimes aim to meet applicable standards but do not pursue accreditation. This analysis includes state-level accreditations only, it does not include accredited local or tribal health departments. In some instances, local public health departments have an accreditation in states that do not.*

*Sources: PHAB[68] and EMAP.[69]*

## INDICATOR 5: STATE PUBLIC HEALTH FUNDING TRENDS

Key Finding: A majority of states held their public health funding steady or increased it in FY 2021, but at least 15 reduced funding. (Data were not available for five states.)

The COVID-19 pandemic showed how sufficient and sustained funding for a comprehensive public health system is integral to preparedness and response, including the ability to detect, prevent, and control disease outbreaks and mitigate the health consequences of disasters. General public health capabilities—such as those pertaining to epidemiology, environmental hazard detection and control, infectious disease prevention and control, and risk communications—and targeted emergency response resources are necessary to ensure that officials maintain routine capabilities and that surge capacity is readily available for emergencies. A trained and standing-ready public health workforce, and one that knows its community, is critical to the surge capacity that is so often necessary during an emergency.

According to the Public Health Activities and Services Tracking project at the University of Washington, state public health programming and services span six core areas:[70]

1. **Communicable disease control.** Public health services related to communicable disease epidemiology, hepatitis, HIV/AIDS, immunization, sexually transmitted diseases, tuberculosis, etc.
2. **Chronic disease prevention.** Public health services related to asthma, cancer, cardiovascular disease, diabetes, obesity, tobacco use, etc.
3. **Injury prevention.** Public health services related to firearms, motor vehicles, occupational injuries, senior fall prevention, substance-use disorder, other intentional and unintentional injuries, etc.
4. **Environmental public health.** Public health services related to air and water quality, fish and shellfish, food safety, hazardous substances and sites, lead, onsite wastewater, solid and hazardous waste, zoonotic diseases, etc.
5. **Maternal, child, and family health.** Public health services related to the coordination of services; direct service; family planning; newborn screening; population-based maternal, child, and family health; supplemental nutrition; etc.
6. **Access to and linkage with clinical care.** Public health services related to beneficiary eligibility determination, provider or facility licensing, etc.

The overall infrastructure of public health supports states' ability to promote health equity, build resilience in the population, and carry out emergency response activities. But public health funding is typically discretionary, making it vulnerable to neglect or retrenchment, especially when times are tight. This can undermine emergency preparedness activities and weaken response and recovery efforts. State investment in public health is important for the operations of health agencies: about 28 percent of state and territorial health department revenues are from state sources,[71] while 21 percent of local health department revenue is from state sources, on average.[72]

Fortunately, at least 30 states and the District of Columbia maintained or increased public health funding in FY 2021. (See Table 7.) But at least 15 states reduced the money they directed to these vital activities, increasing the likelihood that they will be less prepared and less responsive in the moments that

matter most. (This indicator does not assess the adequacy of states' public health funding. It should also be noted that due to inflation and population growth, stable funding is in some cases a funding reduction.)

**From FY 2019 to FY 2020, and again from FY 2020 to FY 2021, some states experienced sizeable fluctuations in the state-supported funding allotted to public health services, owing to a host of pandemic-related funding actions. For example, in some cases, a temporary infusion of state-supported funds might have been appropriated for just one year. In other cases, state-supported funding might have been temporarily cut and replaced by pandemic-related federal aid. Importantly, states are asked to report to TFAH only their state-supported funding.**

**TABLE 7: State Public Health Funding Held Stable or Increased in at Least 30 States and DC**

**Public health funding, by state, FY 2020 to 2021**

| State | Percentage Change |
|---|---|
| Alabama | 12% |
| Alaska | -58% |
| Arizona | -36% |
| Arkansas | -6% |
| California | -49% |
| Colorado | 1% |
| Connecticut | 7% |
| Delaware | Not reported |
| District of Columbia | 3% |
| Florida | 1% |
| Georgia | 12% |
| Hawaii | -4% |
| Idaho | -3% |
| Illinois | 3% |
| Indiana | 3% |
| Iowa | 9% |
| Kansas | Not reported |
| Kentucky | -17% |
| Louisiana | 58% |
| Maine | 32% |
| Maryland | 1% |
| Massachusetts | 8% |
| Michigan | 10% |
| Minnesota | -14% |
| Mississippi | -1% |
| Missouri | -7% |
| Montana | -2% |
| Nebraska | -1% |
| Nevada | 13% |
| New Hampshire | 4% |
| New Jersey | 4% |
| New Mexico | 6% |
| New York | 7% |
| North Carolina | -1% |
| North Dakota | 0% |
| Ohio | 20% |
| Oklahoma | 168% |
| Oregon | 2% |
| Pennsylvania | 15% |
| Rhode Island | Not reported |
| South Carolina | 0% |
| South Dakota | 4% |
| Tennessee | 28% |
| Texas | 10% |
| Utah | Not reported |
| Vermont | 7% |
| Virginia | 7% |
| Washington | 88% |
| West Virginia | Not reported |
| Wisconsin | -1% |
| Wyoming | -5% |

*Note: In Alaska, at the beginning of the COVID-19 pandemic, the state established a dedicated supplemental fund for related activities, as necessary. As federal aid became available, it supplanted the state funds, creating the appearance of a major reduction in FY 2021. In New Jersey, the end of FY 2020 was extended by three months and the beginning of FY 2021 was delayed by three months.*

*Because of differences in organizational responsibilities and budgeting, funding data are not necessarily comparable across states. Owing to the significant and persistent demands on the time of state public health officials that responding to the COVID-19 pandemic has necessitated, five states (Delaware, Kansas, Rhode Island, Utah, and West Virginia) were unable to provide TFAH with public health funding data for FY 2021.*

*See "Appendix B: Methodology" for a description of TFAH's data-collection process, including its definition of public health funding.*

*Source: TFAH analysis of states' publicly available funding data.*

## INDICATOR 6: COMMUNITY WATER SYSTEM SAFETY

KEY FINDING: Few Americans drink from community water systems that are in violation of applicable health-based standards required by the Safe Drinking Water Act. But room for improvement remains.

Access to safe water is essential for consumption, sanitation, hygiene, and the efficient operation of the healthcare system and other critical infrastructure. In the United States, the vast majority of the population gets water from a public water system,[73] and the U.S. Environmental Protection Agency (EPA) sets legal limits on contaminants in drinking water, including microorganisms, disinfectants, and their byproducts, other chemicals, and radionuclides.[74] The EPA also requires states to periodically report drinking-water quality information from public water systems in their jurisdictions.[75] Water systems must report any violations, such as failing to follow established monitoring and reporting schedules, failing to comply with mandated treatment techniques, violating any maximum contaminant levels, and failing to meet customer-notification requirements.[76]

The United States has one of the safest public drinking-water supplies in the world, but some communities, particularly low-income communities, do not have constant access to safe water. When water safety issues occur, it can require a multisector emergency response, as well as a long-term public health response. The most prominent water-contamination crisis in recent years occurred in Flint, Michigan, where a 2014 change in water source caused distribution pipes to corrode and to leach lead and other contaminants into the drinking water. Tens of thousands of residents, including young children, were exposed to high levels of lead and other contaminants.[77] In 2019, residents of Newark, New Jersey, had to rely on bottled water due to high levels of lead in their tap water, though nearly all of the city's 23,000 lead service lines have since been replaced with pipes, and in July 2021 the state enacted laws requiring public water systems to inventory and replace lead service lines within 10 years.[78,79] In children, even low levels of lead exposure can damage the nervous system and contribute to developmental delays, learning disabilities, and weight and hearing loss.[80] These incidents could have long-term consequences on the health and brain development of children, as well as the mental health and trust of the community.

As climate change contributes to more frequent wildfires, a residual danger is the release of toxic chemicals into community water systems. For example, months after the deadly Camp Fire in Paradise, California, in 2018, experts still advised residents not to drink or cook with the water due to concerns about benzene contamination.[81,82] Long-term exposure to unsafe levels of benzene can lead to numerous adverse health outcomes, including anemia and excessive bleeding, and can impair the immune system. Exposure to high levels increases the risk for leukemia.[83]

Major storms, which are made more frequent and more intense by climate change,[84] can damage water infrastructure and lead to power outages, sometimes causing potable water to become inaccessible or tainted. When Hurricane Ida devastated coastal Louisiana in August 2021, pumps and treatment plants serving hundreds of thousands of residents were left without power.[85] In Jefferson Parish to the west and south of New Orleans, the state's second-largest parish,[86] most residents either had dry taps or were under boil advisories. Power outages are a particular concern in rural areas where smaller utilities may not have enough

backup power to meet the demands of the water and sewage services. Water shortages can have a particularly dire impact on healthcare systems, which rely on clean water for many procedures and hygiene practices.

Other water-related hazards in the United States include harmful algal blooms that cause algal toxins and the emerging presence of per- and polyfluoroalkyl substances (PFAS) from industrial chemicals.[87]

CDC data indicate waterborne pathogens cause nearly 7,000 deaths, 7 million illnesses, and more than $3 billion in healthcare costs each year. The risks from contaminated drinking water disproportionately threaten communities of color, highlighting the impact that structural racism can have on a critical resource most Americans consider a basic service. In some areas, redlining has kept peri-urban communities of color, tribal lands, and rural agricultural areas out of municipal water systems, thereby increasing their potential exposure to waterborne illness. In addition, older buildings are more vulnerable to waterborne pathogens in their pipes.[88]

Encouragingly, the federal Infrastructure Investment and Jobs Act, enacted in November 2021, took several significant steps toward expanding access to safe drinking water. Among its provisions were $24 billion in grants to states under the existing Clean Water Act (focused on regulating pollution and protecting surface water quality[89]) and the Safe Drinking Water Act (focused on protecting waters actually or potentially designed for drinking[90]); $15 billion to replace lead pipes and service lines; $9 billion to address emerging contaminants (PFAS); and a number of initiatives to provide dedicated assistance to small, disadvantaged, low-income, rural, and/or tribal communities.[91,92]

According to the EPA, across the nation, 5 percent of state residents on average used a community water system in 2019 (the most recent year for which data were available) that failed to meet all applicable health-based standards, down from 7 percent in 2018.[93] That share was actually or effectively 0 percent in Hawaii, Maryland, Minnesota, Nevada, North Dakota, Vermont, and Washington. (See Table 8.) But in four states (New Jersey, New York, Oregon, and West Virginia), more than 15 percent of residents used a community water system with health-based violations.

It is also important to note that approximately 13 million U.S. households get their drinking water from private wells. The data reported by this indicator do not include water quality for those households.[94]

**TABLE 8: Few Americans Used Contaminated Community Water Systems**

**Percent of state populations who used a community water system in violation of health-based standards, 2019**

| States | Percent of Population |
|---|---|
| HI, MD, MN, ND, NV, VT, WA | 0% |
| CA, ID, IL, IN, ME, OH | 1% |
| AL, CO, DE, MI, NC, NE, NH, WY | 2% |
| CT, FL, SC, VA | 3% |
| AK, IA, KY, RI, SD, TN, TX, | 4% |
| AZ, DC, KS, UT, WI | 5% |
| NM | 6% |
| GA, MA | 7% |
| AR, MS, MT | 8% |
| MO, PA | 9% |
| LA | 13% |
| OK | 15% |
| NJ, OR, WV | 16% |
| NY | 45% |

*Note: The EPA estimates that more than 13 million U.S. households get their drinking water from private wells.[95] The data reported by this indicator do not reflect the water quality of those households, though they are included in population percentage calculations. Only regulated contaminants are measured. These data do not include water safety on Indian reservations. According to health officials in New York, a drinking-water system in New York City is in violation due to an uncovered reservoir, but it has no current violations with respect to contaminants.*

*Source: NHSPI analysis of data from the EPA.[96]*

## INDICATOR 7: USE OF PAID TIME OFF

KEY FINDING: Just over half of workers in states, on average, used some type of paid time off—sick leave, vacation, holidays—in a one-month sample. Most states were closely clustered to that midpoint, with few outliers.

*Note: The specification of this indicator has been adjusted slightly in recent years from a measure of those who received paid time off to a measure of those who used it. Additionally, these figures reflect a one-month snapshot, intended to show relative usage across states, not a measure of the total percentage of workers who used paid time off during the entire year.*

The need for paid time off has been evident during the pandemic, as frontline and essential workers—people whose jobs do not permit them to work remotely—have often been compelled to work when sick themselves, caring for a sick family member, or experiencing temporary side effects immediately after vaccination. Black and Hispanic workers typically have less access to paid sick leave and are overrepresented in groups of frontline workers.[97]

When workers without paid leave get sick, they face the choice of going to work and potentially infecting others or staying home and losing pay—or even their jobs. They encounter similarly impossible decisions when a child or another dependent family member gets sick. Therefore, access and the ability to use job-protected paid time off, especially dedicated paid sick leave, can strengthen infection control and resilience in communities by reducing the spread of contagious diseases and bolstering workers' financial security. This is particularly important for industries and occupations that require frequent contact with the public. For example, people working in the food-service, older adult and nursing care facilities, and childcare industries commonly have no paid sick leave.[98] Low-wage workers[99] and workers of color are also less likely to have access to paid leave compared with white and higher-earning workers.[100] This often leads employees to work throughout an illness or return to work before their symptoms have fully subsided, when time off could have dramatically reduced the potential of workplace infections.[101,102]

The public health benefit is clear: at a societal level, flu rates have been shown to be lower in cities and states that mandate paid sick leave.[103,104] When employees who previously did not have access are granted paid or unpaid sick leave, rates of flu infections decrease.[105]

Paid time off also increases access to preventive care among workers and their families, including routine checkups, screenings, and immunizations. Delaying or skipping such care can result in poor health outcomes and can ultimately lead to costlier treatments. Workers without paid sick days are less likely to get a flu shot, and their children are less likely to receive routine checkups, dental care, and flu shots.[106]

During the COVID-19 pandemic, studies have shown that access to paid sick leave helped slow the spread of the virus.[107] The Families First Coronavirus Response Act, enacted in March 2020, helped temporarily address this issue for employers with fewer than 500 employees and certain public employers, temporarily requiring employees to be provided with paid sick leave under certain conditions. This helped reduce the spread of the virus in workplaces and communities by removing a barrier to employees staying home when necessary. However, these protections expired on December 31, 2020, despite the ongoing need for the use of paid leave to control the pandemic; instead, Congress provided a tax credit for qualifying employers

to offer paid sick leave from January 1, 2021, to September 30, 2021.[108,109] State and local paid leave laws helped fill in some of the gap, but most states and localities do not have them.[110]

Importantly, the United States could join numerous countries across the world in establishing a national minimum standard of paid family or medical leave if the Build Back Better Act, which the U.S. House of Representatives passed in November 2021, becomes law. The Act includes a requirement that, starting in 2024, employers provide four weeks of partially paid leave to employees who need time off after the birth of a child, to recover from a serious illness, or to care for a family member.[111,112]

In March 2020, 55 percent of all workers in states, on average, took some type of paid time off—the same percentage as in March 2019 and March 2018—according to the Current Population Survey, which is sponsored jointly by the U.S. Census Bureau and the U.S. Bureau of Labor Statistics.[113] Alaska (63 percent), Iowa (62 percent), Mississippi (65 percent), Oregon (61 percent), and Texas (65 percent) stood out as states where relatively high percentages of workers used such benefits, whereas fewer workers used them in Arkansas (48 percent), Kentucky (49 percent), Pennsylvania (47 percent), South Dakota (44 percent), and Wyoming (47 percent).[114] (See Table 9.)

**TABLE 9: 55 Percent of Workers, On Average, Used Paid Time Off**
**Percent of employed population that took paid time off, March 2020**

| States | Percent of Workers |
|---|---|
| MS, TX | **65%** |
| AK | **63%** |
| IA | **62%** |
| OR | **61%** |
| DC, MA, NY | **60%** |
| AL, KS, MD, NM | **59%** |
| GA | **58%** |
| CT, DE, ND, VA | **57%** |
| CO, HI, ID, WA, WI | **56%** |
| CA, FL, LA, NH, OK, VT | **55%** |
| AZ, MO, MT | **54%** |
| NC, NJ | **53%** |
| IL, IN, NE, OH, RI, TN, WV | **52%** |
| MN, NV, SC | **51%** |
| ME, MI, UT | **50%** |
| KY | **49%** |
| AR | **48%** |
| PA, WY | **47%** |
| SD | **44%** |

*Note: Paid time off includes sick leave, vacations, and holidays. The data are measured based on a survey of a sample of the general population. The specification of this indicator has been adjusted slightly from a measure of those who received paid time off to a measure of those who used it. Additionally, these figures reflect a one-month snapshot, intended to show relative usage across states, not a measure of the total percentage of workers who used paid time off during the entire year.*

*Source: NHSPI analysis of data from the Annual Social and Economic Supplement of the Current Population Survey.[115]*

## INDICATOR 8: FLU VACCINATION RATE

KEY FINDING: Flu vaccination coverage held at a relatively high level for the second consecutive year during the 2020–2021 season, with an especially high rate for older adults. Overall, 52 percent of U.S. residents ages 6 months and older received vaccinations—still well below the overall target level of 70 percent of the population vaccinated annually.

CDC recommends that, with few exceptions, everyone ages 6 months and older get vaccinated for seasonal influenza annually; yet, year after year, even with a steady increase among adults over the past three decades,[116] coverage estimates indicate that just over half of Americans do. *Healthy People 2030* set federal 10-year benchmarks for improving the health of all Americans, including an overall seasonal influenza vaccination-rate target of 70 percent annually.[117]

Vaccination is the long-standing best prevention against the seasonal flu, particularly for people at high risk of severe flu-related outcomes, including people with certain chronic health conditions and older adults, groups that are also at higher risk from COVID-19. In addition to protecting Americans from the seasonal flu, establishing a cultural norm of vaccination, building vaccination infrastructure, and establishing policies that support vaccinations can all help prevent or limit other illnesses for which there is a vaccine, including COVID-19. A major concern as the 2020–2021 flu season opened was that a high incidence of seasonal flu coupled with the amount of illness caused by the pandemic would overwhelm health systems. Fortunately, that scenario was avoided, as COVID-related mitigation measures also helped to tamp down transmission of seasonal flu,[118] but experts fear that the 2021–2022 season could be worse, in part because of looser mitigation measures and the dominance of a particularly virulent strain.[119,120]

Under the Affordable Care Act, all routine vaccines recommended by the Advisory Committee on Immunization

Practices, including flu vaccines, are fully covered when provided by in-network providers, except in states that have not expanded their Medicaid programs in accordance with the law. Some barriers to flu vaccination may include a belief that the vaccine does not work very well; misconceptions about the safety of the vaccine;[121] or a belief that the flu does not carry serious risks.[122]

There are a number of policy options available to states and localities seeking to increase vaccination levels. To help increase access, states can expand the number of qualified healthcare workers who can administer vaccines. There is evidence, for example, that pharmacists can play a key role in facilitating broader access and controlling epidemics and their costly consequences.[123] States and localities can also target residents at high-risk (e.g., people in long-term care facilities, older adults, young children, and people with chronic conditions) and promote vaccination through public information campaigns.[124]

According to the National Conference of State Legislatures, states have recently taken creative steps to broaden the scope of qualified vaccine administrators. For example, Indiana recently began allowing pharmacy technicians to administer flu vaccines, and New Hampshire and West Virginia permit qualified pharmacy interns to do so. Ohio even allows podiatrists to administer flu vaccines. Virginia requires certified long-term care facilities to provide or arrange for vaccination for their residents, and New Mexico requires hospitals to offer the influenza vaccine to patients over 65 on discharge.

During the 2020–2021 flu season, 52 percent of U.S. residents ages 6 months and older were vaccinated, according to CDC, tying the 2019–2020 season for the highest rate in at least a decade. This was a notable and welcome uptick from 42 percent during the 2017–2018 flu season. Massachusetts (67 percent), Rhode Island (66 percent), and Connecticut (62 percent) had the highest coverage, while vaccination rates were lowest in Florida (42 percent), Mississippi (42 percent), Wyoming (43 percent), Nevada (43 percent), and Georgia (43 percent). (See Table 10.)

Children, particularly young children, were more likely to receive vaccinations than were adults. Nearly 59 percent of those ages 6 months to 17 years received flu vaccinations in 2020–2021, compared with 50 percent of adults. The most highly vaccinated age group was people ages 65 or over at 75 percent.[125]

**TABLE 10: Just Over Half of U.S. Residents Received a Seasonal Flu Vaccination**
**States' seasonal flu vaccination rates for people ages 6 months and older, 2020–2021**

| State | Vaccination Rate, Ages 6 Months or Older |
|---|---|
| Massachusetts | 66.5 |
| Rhode Island | 66.4 |
| Connecticut | 62.3 |
| New Hampshire | 60.7 |
| Vermont | 59.9 |
| Nebraska | 58.7 |
| Maryland | 58.5 |
| Pennsylvania | 58.5 |
| Iowa | 58.4 |
| Delaware | 58.3 |
| District of Columbia | 58.3 |
| South Dakota | 58.1 |
| Minnesota | 57.6 |
| Illinois | 56.9 |
| Washington | 56.5 |
| Maine | 56.4 |
| Wisconsin | 56.2 |
| Virginia | 56.0 |
| New York | 55.6 |
| Colorado | 55.4 |
| New Jersey | 55.2 |
| North Dakota | 54.4 |
| Hawaii | 54.2 |
| Michigan | 53.7 |
| North Carolina | 53.3 |
| Kansas | 53.0 |
| Utah | 52.5 |
| Ohio | 52.4 |
| Missouri | 52.2 |
| Arkansas | 51.5 |
| Oregon | 51.4 |
| Indiana | 51.1 |
| New Mexico | 51.1 |
| Tennessee | 50.4 |
| California | 49.4 |
| West Virginia | 48.9 |
| Montana | 48.5 |
| Alabama | 48.3 |
| Arizona | 48.3 |
| South Carolina | 48.1 |
| Kentucky | 46.7 |
| Texas | 46.7 |
| Idaho | 46.0 |
| Oklahoma | 45.9 |
| Alaska | 45.4 |
| Louisiana | 44.2 |
| Georgia | 43.1 |
| Nevada | 43.0 |
| Wyoming | 42.6 |
| Mississippi | 42.1 |
| Florida | 41.7 |

*Note: Data are calculated from a survey sample, with a corresponding sampling error.*

*Source: Centers for Disease Control and Prevention.*[126]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## INDICATOR 9: PATIENT SAFETY IN HOSPITALS

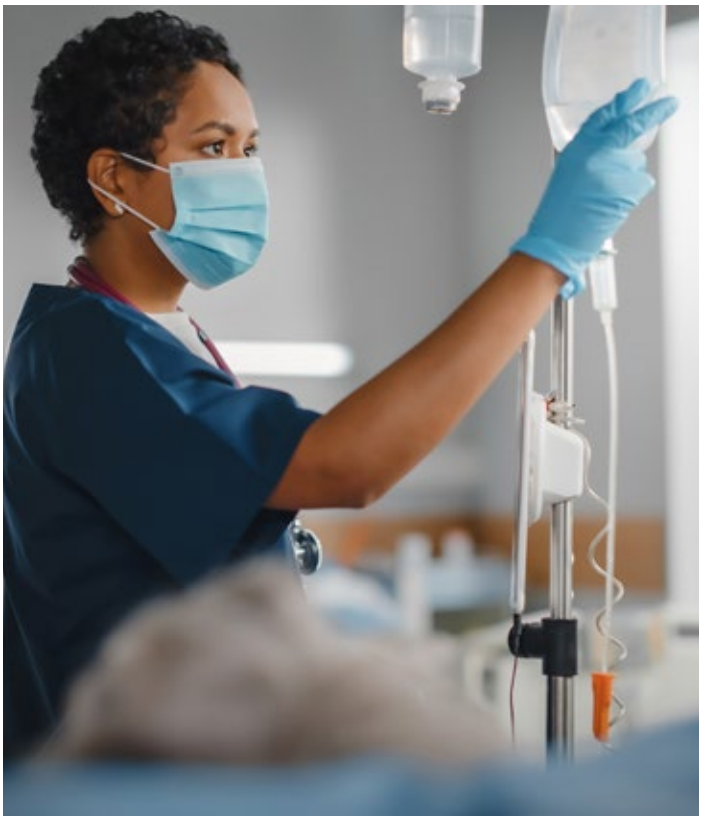
KEY FINDING: On average, 28 percent of hospitals received an "A" grade in the fall 2021 hospital safety assessment administered by the Leapfrog Group, a nonprofit advocate for safety, quality, and transparency in hospitals.

Every year, hundreds of thousands of people die from hospital errors, injuries, accidents, and infections, collectively making such incidents a leading cause of death in the United States.[127,128] Keeping hospital patients safe from preventable harm is an important element of preparedness; those hospitals that excel in safety are less likely to cause or contribute to a public health emergency and are better positioned to handle any emergencies that put routine quality standards to the test.

During the COVID-19 pandemic, hospitals, were one of numerous settings for viral transmission, threatening the safety of patients, staff, and visitors. The pandemic also discouraged people in need of urgent or emergency care from going to the emergency department, likely contributing to overall excess mortality.[129] Universal masking and availability and proper use of personal protective equipment (PPE)—in addition to other steps, such as adequate ventilation, limiting the sharing of patient rooms, and universal hand hygiene—proved to be critical in preventing outbreaks in hospitals. Still, hospital crowding from regional waves of infection during the pandemic has been shown to contribute to adverse outcomes, such as increased medical errors and reduced quality of care as well as delays in treatment, medication error, longer patient stays, poorer outcomes, and increased mortality.[130]

The Leapfrog Group calculates its hospital safety score by using more than two dozen evidence-based metrics that measure the success of healthcare processes and outcomes. The measures track such issues as healthcare-associated infection rates, the number of available beds and qualified staff in intensive-care units, patients' assessments of staff communications and responsiveness, and a hospital's overall culture of error prevention.[131] These measures are especially critical for health systems' readiness for emergencies and outbreak prevention and control, which include workforce training and availability, surge capacity, and infection-control practices.

In the Leapfrog Group's fall 2021 assessment, 28 percent of general acute-care hospitals across the United States, on average, met the requirements for an "A" grade—a slight decrease from fall 2020, when the share was 31 percent. But results varied widely from state to state, with no hospitals in Delaware, the District of Columbia, and North Dakota receiving the top score, to a majority of hospitals doing so in Virginia (56 percent), North Carolina (55 percent), Idaho (54 percent), and Massachusetts (52 percent). (See Table 11.)



## TABLE 11: Hospital Patient Safety Scores Vary Significantly by State

**State percentage of hospitals with "A" grade, fall 2021**

| State | Percent of Hospitals |
|---|---|
| Virginia | 56% |
| North Carolina | 55% |
| Idaho | 54% |
| Massachusetts | 52% |
| Colorado | 49% |
| Utah | 48% |
| Hawaii | 46% |
| Pennsylvania | 46% |
| New Jersey | 43% |
| Michigan | 43% |
| Maine | 41% |
| Oregon | 41% |
| Florida | 36% |
| Kansas | 36% |
| Tennessee | 35% |
| Texas | 35% |
| Ohio | 34% |
| Missouri | 33% |
| Rhode Island | 33% |
| California | 33% |
| Washington | 33% |
| Mississippi | 32% |
| New Hampshire | 31% |
| Arkansas | 30% |
| South Carolina | 29% |
| Illinois | 29% |
| Connecticut | 28% |
| Louisiana | 27% |
| Minnesota | 26% |
| Kentucky | 25% |
| Oklahoma | 24% |
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| Maryland | 21% |
| Nevada | 21% |
| Montana | 20% |
| Georgia | 20% |
| Alabama | 19% |
| Alaska | 17% |
| Nebraska | 17% |
| Vermont | 17% |
| Iowa | 15% |
| New Mexico | 14% |
| Wyoming | 13% |
| South Dakota | 10% |
| New York | 8% |
| West Virginia | 5% |
| Delaware | 0% |
| District of Columbia | 0% |
| North Dakota | 0% |

*Note: This measure captures only general acute-care hospitals.*

*Source: The Leapfrog Group.*[132]

## INDICATOR 10: STATE PUBLIC HEALTH LABORATORY SURGE CAPACITY

KEY FINDING: Only the District of Columbia reported not having a plan in 2021 for a six-to-eight week surge in laboratory-testing capacity to respond to an outbreak or other public health event.

Public health laboratories have been essential to emergency response and effective disease surveillance systems throughout the pandemic. They help detect and diagnose health threats as they emerge, and they track and monitor the spread of those threats, which can help public health officials learn how to control them. Public health labs exist in every state and territory and are the backbone of the Laboratory Response Network (LRN), a national network of laboratories that provide the infrastructure and capacity to respond to public health emergencies.[133]

When a disaster or disease outbreak strikes, public health laboratories must be able to surge to meet increased demand, just like hospitals and other responders. The Association of Public Health Laboratories defines internal surge capacity as a "sudden and sustained increase in the volume of testing that a LRN reference laboratory can perform in an emergency situation, implementing substantial operational changes as defined in laboratory emergency response plans and using all resources available within the laboratory."[134] Surging capacity can require staff movement or reassignment, extra shifts, and hiring. Labs also have to plan for infrastructure factors, such as sufficient biological safety cabinets and chemical fume hoods; amount and type of supplies; space for intake, processing, and storage of samples; versatility and capacity of analytical equipment and instruments; availability of PPE; and power supply.[135] It should also be noted that while the existence of surge plans are important, these plans have to be funded, tested, and regularly updated.

State public health laboratories have been critical assets throughout the COVID-19 pandemic, especially in early 2020, when they were the only laboratories outside CDC authorized to conduct testing.[136] Despite early challenges in the tests rolled out to states, at least one public health laboratory in every state, DC, Puerto Rico, and Guam was able to test for COVID-19 as of June 2020.[137] Testing capacity increased over time, as private labs received authorization and ramped up capacity, and as a variety of rapid antigen tests were manufactured and approved for use at home; but the processing of CDC's 2019-nCoV Real-Time RT-PCR Diagnostic Panel assisted officials with monitoring throughout the course of the pandemic.

In Minnesota, for instance, once officials recognized in spring 2020 that their normal sample receiving area would not be able to handle the exploding number of COVID-19-related specimens on top of added social distancing and other safety restrictions, they converted the state's training laboratory into a triage unit. In days, leaders held walk-through meetings to organize the space, collaborated with state technology staff to procure necessary equipment, and set up supplies (racks, proper waste bins, transport containers). The site was up and running as the state's primary public COVID-19 testing facility within two weeks.[138]

In addition, public health laboratories are studying the genomic sequencing of the COVID-19 virus to identify variants. Such genomic surveillance is critical to understanding and preventing the

spread of the virus,[139] and proved critical during the emergence of the Delta and Omicron variants, which were each more transmissible than earlier strains.[140] Throughout 2021, the scale of sequencing increased dramatically from fewer than 3,000 samples per week in January to about 80,000 samples per week by early December,[141] an increase that coincided with a $2 billion increase in federal investments, much of which was made possible by the American Rescue Plan Act.[142,143] However, the slow rollout of data modernization funding, the need to update these systems after years of underfunding, and a dwindling public health workforce continued to hamper rapid surveillance efforts at the end of 2021.[144]

Going forward, challenges to the effectiveness of public health laboratory preparedness include funding gaps to invest in infrastructure and modernization; a lack of standardized platforms to exchange data electronically; a limited ability to detect radiological, nuclear, and chemical threats; and perhaps most significantly, workforce shortages.[145] California, for example, has long been losing public health lab staff—as of November 2021, the state operated 29 labs, down from nearly 40 before the Great Recession—and this trend has accelerated over the past year as lab workers join a broader exodus of experienced public health officials.[146,147]

In 2021, the District of Columbia was the only jurisdiction that reported to the Association of Public Health Laboratories that it did not have a plan for a six- to eight-week surge in testing capacity. (See Table 12.) Massachusetts and Oklahoma did not indicate whether they had such a plan, though each reported having one in 2020.[148] The District of Columbia reported being in the process of developing a discrete plan for its laboratory surge capacity.

## TABLE 12: Nearly Every State Planned for a Laboratory Surge

**State public health laboratories with a plan for a six- to eight-week surge in testing capacity, 2021**

| Had a Plan | | | No Plan |
|---|---|---|---|
| Alabama | Kentucky | North Dakota | District of Columbia |
| Alaska | Louisiana | Ohio | |
| Arkansas | Maine | Oregon | |
| Arizona | Maryland | Pennsylvania | |
| California | Michigan | Rhode Island | |
| Colorado | Minnesota | South Carolina | |
| Connecticut | Mississippi | South Dakota | |
| Delaware | Missouri | Tennessee | |
| Florida | Montana | Texas | |
| Georgia | Nebraska | Utah | |
| Hawaii | Nevada | Vermont | |
| Idaho | New Hampshire | Virginia | |
| Illinois | New Jersey | Washington | |
| Indiana | New Mexico | West Virginia | |
| Iowa | New York | Wisconsin | |
| Kansas | North Carolina | Wyoming | |

*Note: Massachusetts and Oklahoma did not indicate whether they had a plan, though each reported having one in 2020. The District of Columbia reported not having a current plan, indicating that it was in the process of updating its Continuity of Operations Plans and developing a discrete plan for laboratory surges. This indicator tracks only the existence of a plan, not its quality or comprehensiveness, or the frequency in which it is used or tested.*

*Source: Association of Public Health Laboratories.*[149]

## TABLE 13: INDICATORS OF PUBLIC HEALTH EMERGENCY PREPAREDNESS

| | Nurse Licensure Compact (NLC) | Public Health System Comprehensiveness | Public Health Accreditation Board (PHAB) | Emergency Management Accreditation Program (EMAP) | Public Health Funding | Water Security | |
|---|---|---|---|---|---|---|---|
| | State participates in NLC, 2021 | Percentage of population served by a comprehensive public health system, 2018 | Accredited by PHAB, 2021 | Accredited by EMAP, 2021 | Percentage change, FY 2020-21 | Percent of population who used a community water system in violation of health-based standards, 2019 | |
| Alabama | ✓ | 35% | ✓ | ✓ | 12% | 2% | |
| Alaska | | 62% | | | -58% | 4% | |
| Arizona | ✓ | 67% | ✓ | ✓ | -36% | 5% | |
| Arkansas | ✓ | 31% | ✓ | ✓ | -6% | 8% | |
| California | | 59% | ✓ | ✓ | -49% | 1% | |
| Colorado | ✓ | 44% | ✓ | ✓ | 1% | 2% | |
| Connecticut | | 37% | ✓ | ✓ | 7% | 3% | |
| Delaware | ✓ | 42% | ✓ | ✓ | - | 2% | |
| D.C. | | 86% | ✓ | ✓ | 3% | 5% | |
| Florida | ✓ | 49% | ✓ | ✓ | 1% | 3% | |
| Georgia | ✓ | 43% | ✓ | ✓ | 12% | 7% | |
| Hawaii | | - | | | -4% | 0% | |
| Idaho | ✓ | 39% | ✓ | ✓ | -3% | 1% | |
| Illinois | | 47% | ✓ | ✓ | 3% | 1% | |
| Indiana | ✓ | 25% | ✓ | | 3% | 1% | |
| Iowa | ✓ | 38% | ✓ | ✓ | 9% | 4% | |
| Kansas | ✓ | 38% | ✓ | ✓ | - | 5% | |
| Kentucky | ✓ | 37% | | | -17% | 4% | |
| Louisiana | ✓ | 44% | ✓ | ✓ | 58% | 13% | |
| Maine | ✓ | 45% | ✓ | | 32% | 1% | |
| Maryland | ✓ | 43% | ✓ | ✓ | 1% | 0% | |
| Massachusetts | | 63% | ✓ | ✓ | 8% | 7% | |
| Michigan | | 46% | | ✓ | 10% | 2% | |
| Minnesota | | 47% | ✓ | | -14% | 0% | |
| Mississippi | ✓ | 35% | ✓ | ✓ | -1% | 8% | |
| Missouri | ✓ | 43% | ✓ | ✓ | -7% | 9% | |
| Montana | ✓ | 36% | ✓ | | -2% | 8% | |
| Nebraska | ✓ | 44% | ✓ | ✓ | -1% | 2% | |
| Nevada | | 55% | | ✓ | 13% | 0% | |
| New Hampshire | ✓ | 38% | | | 4% | 2% | |
| New Jersey | ✓ | 47% | ✓ | ✓ | 4% | 16% | |
| New Mexico | ✓ | 37% | ✓ | | 6% | 6% | |
| New York | | 77% | ✓ | ✓ | 7% | 45% | |
| North Carolina | ✓ | 44% | | ✓ | -1% | 2% | |
| North Dakota | ✓ | 34% | ✓ | ✓ | 0% | 0% | |
| Ohio | ✓ | 37% | ✓ | ✓ | 20% | 1% | |
| Oklahoma | ✓ | 39% | ✓ | ✓ | 168% | 15% | |
| Oregon | | 42% | ✓ | | 2% | 16% | |
| Pennsylvania | ✓ | 67% | ✓ | ✓ | 15% | 9% | |
| Rhode Island | | - | ✓ | ✓ | - | 4% | |
| South Carolina | ✓ | 44% | ✓ | ✓ | 0% | 3% | |
| South Dakota | ✓ | 28% | | | 4% | 4% | |
| Tennessee | ✓ | 36% | | ✓ | 28% | 4% | |
| Texas | ✓ | 38% | | | 10% | 4% | |
| Utah | ✓ | 55% | ✓ | ✓ | - | 5% | |
| Vermont | ✓ | 45% | ✓ | ✓ | 7% | 0% | |
| Virginia | ✓ | 44% | ✓ | ✓ | 7% | 3% | |
| Washington | | 49% | ✓ | ✓ | 88% | 0% | |
| West Virginia | ✓ | 45% | | | - | 16% | |
| Wisconsin | ✓ | 42% | ✓ | ✓ | -1% | 5% | |
| Wyoming | ✓ | 36% | | | -5% | 2% | |
| **51-state average** | **N/A** | **45%** | **N/A** | **N/A** | **7%** | **5%** | |

Note: See "Appendix B: Methodology" for a description of TFAH's data-collection process and scoring details. For the measure of public health system comprehensiveness, no data were available for Hawaii and Rhode Island. States with conditional or pending accreditation at the time of data collection were classified as having no accreditation. Public health funding data for FY 2021 were not available for Delaware, Kansas, Rhode Island, Utah, and West Virginia. Some state residents use private drinking-water sources, rather than community water systems. Private sources are not captured by these data.

## TABLE 13: INDICATORS OF PUBLIC HEALTH EMERGENCY PREPAREDNESS

| | Paid Time Off | Seasonal Flu Vaccination | Patient Safety | Public Health Lab Capacity | State Performance |
|---|---|---|---|---|---|
| | Percent of employed population who used paid time off, March 2020 | Seasonal flu vaccination rate for people ages 6 months or older, 2020–21 | Percentage of hospitals with "A" grade, fall 2021 | Public health laboratories had a plan for a six- to eight-week surge in testing capacity, 2021 | Scoring tier, 2021 |
| Alabama | 59% | 48.3% | 19% | ✓ | High |
| Alaska | 63% | 45.4% | 17% | ✓ | Low |
| Arizona | 54% | 48.3% | 24% | ✓ | Middle |
| Arkansas | 48% | 51.5% | 30% | ✓ | Low |
| California | 55% | 49.4% | 33% | ✓ | Middle |
| Colorado | 56% | 55.4% | 49% | ✓ | High |
| Connecticut | 57% | 62.3% | 28% | ✓ | High |
| Delaware | 57% | 58.3% | 0% | ✓ | Middle |
| D.C. | 60% | 58.3% | 0% | | High |
| Florida | 55% | 41.7% | 36% | ✓ | High |
| Georgia | 58% | 43.1% | 20% | ✓ | Middle |
| Hawaii | 56% | 54.2% | 46% | ✓ | Low |
| Idaho | 56% | 46% | 54% | ✓ | Middle |
| Illinois | 52% | 56.9% | 29% | ✓ | High |
| Indiana | 52% | 51.1% | 24% | ✓ | Low |
| Iowa | 62% | 58.4% | 15% | ✓ | High |
| Kansas | 59% | 53% | 36% | ✓ | High |
| Kentucky | 49% | 46.7% | 25% | ✓ | Low |
| Louisiana | 55% | 44.2% | 27% | ✓ | Low |
| Maine | 50% | 56.4% | 41% | ✓ | Middle |
| Maryland | 59% | 58.5% | 21% | ✓ | High |
| Massachusetts | 60% | 66.5% | 52% | ✓ | High |
| Michigan | 50% | 53.7% | 43% | ✓ | Middle |
| Minnesota | 51% | 57.6% | 26% | ✓ | Low |
| Mississippi | 65% | 42.1% | 32% | ✓ | Middle |
| Missouri | 54% | 52.2% | 33% | ✓ | Middle |
| Montana | 54% | 48.5% | 20% | ✓ | Low |
| Nebraska | 52% | 58.7% | 17% | ✓ | Middle |
| Nevada | 51% | 43% | 21% | ✓ | Low |
| New Hampshire | 55% | 60.7% | 31% | ✓ | Middle |
| New Jersey | 53% | 55.2% | 43% | ✓ | High |
| New Mexico | 59% | 51.1% | 14% | ✓ | Middle |
| New York | 60% | 55.6% | 8% | ✓ | Middle |
| North Carolina | 53% | 53.3% | 55% | ✓ | Middle |
| North Dakota | 57% | 54.4% | 0% | ✓ | Middle |
| Ohio | 52% | 52.4% | 34% | ✓ | High |
| Oklahoma | 55% | 45.9% | 24% | ✓ | Middle |
| Oregon | 61% | 51.4% | 41% | ✓ | Low |
| Pennsylvania | 47% | 58.5% | 46% | ✓ | High |
| Rhode Island | 52% | 66.4% | 33% | ✓ | Middle |
| South Carolina | 51% | 48.1% | 29% | ✓ | High |
| South Dakota | 44% | 58.1% | 10% | ✓ | Low |
| Tennessee | 52% | 50.4% | 35% | ✓ | Middle |
| Texas | 65% | 46.7% | 35% | ✓ | Middle |
| Utah | 50% | 52.5% | 48% | ✓ | High |
| Vermont | 55% | 59.9% | 17% | ✓ | High |
| Virginia | 57% | 56% | 56% | ✓ | High |
| Washington | 56% | 56.5% | 33% | ✓ | High |
| West Virginia | 52% | 48.9% | 5% | ✓ | Low |
| Wisconsin | 56% | 56.2% | 23% | ✓ | Middle |
| Wyoming | 47% | 42.6% | 13% | ✓ | Low |
| **51-state average** | **55%** | **53%** | **28%** | **N/A** | **N/A** |

Only regulated contaminants are measured. Paid time off includes sick leave, vacations, and holidays. The patient safety measure captures only general acute-care hospitals. Data were not available in 2021 to verify the existence of a laboratory surge plan in Massachusetts or Oklahoma, so a response of "yes" was imputed for both, given that each had a plan in 2020. While the District of Columbia reported having a plan in 2020, it indicated that in 2021 it was in the process of replacing it.

# Recommendations for Federal and State Policy Actions

The nation's struggle to emerge from the COVID-19 pandemic is a reminder of the need for urgent action to prepare for the next public health emergency. Policymakers must recognize and address the lessons of the pandemic through science-based leadership and investment in equity-based health security for all communities. Without significant and sustained attention to the nation's preparedness and response capabilities, Americans will enter the next public health crisis with the same lack of readiness they experienced during the early stages of the COVID-19 pandemic.

TFAH based the following policy recommendations on research and analysis, consultation with experts, and a review of gaps in federal and state preparedness, and makes the following recommendations for federal, state, local, tribal, and territorial policymakers and other stakeholders to improve public health emergency readiness. They are intended to strengthen the nation's preparedness for possible future pandemics and to build a stronger foundation on which to respond to a range of public health emergencies.

## Priority Area 1: Provide Stable, Flexible, and Sufficient Funding for Domestic and Global Public Health Security

The chronic underfunding of the nation's public health capacity at all levels has had deadly consequences. On top of over 900,000 lives lost in the United States alone, the pandemic has contributed to a disproportionate health, economic, and mental health toll on people of color, low-income people, people with disabilities, LGBTQ people, and other underserved groups.[150] Health departments have never received the funding needed to modernize, address health inequities, and prepare for emerging health threats. The Staffing Up project estimates an additional 90,000 full-time equivalent positions—an 80 percent increase—are needed in state and local health departments to comprise an adequate infrastructure and provide minimum public health services.[151] And disinvestment in health departments is often the most severe in places with larger populations of people of color.[152] Finally, short-term investments made through COVID-response funding legislation cannot fill the gaps left by ongoing public health funding shortfalls. Short-term resources do not allow for sustaining the public health workforce, nor can they address underlying health inequities that are making the nation less resilient.

## RECOMMENDATIONS FOR FEDERAL GOVERNMENT:

- **Rebuild and modernize the public health infrastructure, including by investing $4.5 billion per year to support foundational public health capabilities at the federal, state, tribal, local, and territorial levels.** The chronic underfunding of public health, combined with siloed funding tied to specific diseases and categories, has prevented health departments across the country from developing and maintaining strong foundational capabilities. Congress should invest in cross-cutting public health capacities, such as those proposed in the Public Health Infrastructure Saves Lives Act.[153] While mandatory funding would ensure sustainability and predictability, if that is not feasible, Congress should provide a robust annual investment in public health infrastructure through the appropriations process.

- **Increase funding for Public Health Emergency Preparedness and Hospital Preparedness Programs (HPP).** Funding for the Public Health Emergency Preparedness cooperative agreement, a critical source of funding for health departments to build capabilities to effectively respond to a range of public health threats, has been cut by nearly a third since FY 2003, or by about half, after adjusting for inflation.[154] The HPP, the primary federal source of funding to help the healthcare delivery system prepare for and respond to disasters, has been cut by nearly half over the same time period, or by nearly two-thirds, after adjusting for inflation. These state and local preparedness programs have demonstrated their value by establishing a foundation for national healthcare readiness, improving the speed and quality of response during emergencies, promoting a focus on patient outcomes during emergencies, and ensuring that local authorities can adequately respond to most local health emergencies and outbreaks without federal assistance. Congress should provide additional funding to modernize public health and response functions at CDC and ASPR and ensure the programs have the capacity to respond to any event.

- **Invest in continuous public health data modernization.** Sustained investment in public health data systems at the federal, state, and local levels is imperative. CDC is the world's premier public health agency, yet years of inadequate funding has meant that the agency and the public health partners that it supports are reliant on archaic data systems. Americans have felt the pain of delayed and disjointed disease surveillance throughout the pandemic, as the public health surveillance infrastructure relied on antiquated, disconnected, and slow systems and methods for tracking and responding to diseases. Congress has begun investing in public health data through the Coronavirus Aid, Relief, and Economic Security Act (P.L. 116-136), the American Rescue Plan Act (P.L. 117-2), and annual appropriations. These investments will help build the foundations for data sharing across public health, modernize CDC's services and systems, leverage new data sources, and ensure public health can act on innovative data analytics. However, these advancements must be augmented and sustained, making up for decades of neglect. Congress should build on these initial investments with at least $250 million per year to CDC's data modernization initiative to modernize and sustain these systems.

- **Ensure complete, disaggregated demographic data collection and reporting, especially during public health emergencies.** The gaps in COVID-19 data reporting by race, ethnicity, income, sexual identity, gender identity, primary language, disability status, pregnancy status, the intersections of these demographics, and other factors hindered the response and masked the true breadth of inequities during the pandemic. These gaps exposed long-standing shortcomings in demographic data collection and reporting in healthcare and public health. Consistent data on demographics and social determinants that influence health outcomes would enable a more effective, equitable response to public health emergencies. In addition to continued investment in data modernization, when implementing this initiative, CDC and public health departments should ensure that health equity and demographic data collection are central to these efforts, including prioritizing funding for under-resourced communities and ensuring sustained community engagement in decisions around public health data system design and use.[155] In addition, the U.S. Department of Health and Human Services (HHS) should stand up a task force—including but not limited to, Office of the Assistant Secretary for Planning and Evaluation, CDC, Office of the National Coordinator on Health Information Technology, Office of Minority Health, Centers for Medicare & Medicaid Services (CMS), the Substance Abuse and Mental Health Services Administration, and the Agency for Healthcare Research and Quality, in consultation with state, local, territorial,

and tribal agencies, community leaders, and private-sector stakeholders—to identify and address barriers to the collection and regular reporting of disaggregated, detailed demographic data during the pandemic and beyond. If needed, Congress should provide HHS agencies the authority to require jurisdictions and healthcare facilities to report race and ethnicity during public health emergencies.[156]

- **Fund the recruitment and training of public health personnel.** The health security enterprise requires trained, experienced personnel. Federal, state, and local governments must prioritize stable, long-term funding for recruitment and retention of a diverse workforce, including one with experience in public health informatics, laboratory science, health equity, epidemiology, and other foundational public health capacities. Congress should also invest in public health workforce development and retention programs, such as the proposed Public Health Workforce Loan Repayment Act and other incentives to serve in governmental public health, fellowships that increase workforce diversity, and recruitment in underserved areas and populations. Public health schools should incorporate health equity, data equity, and cultural competency into their curricula and training programs.

- **Accelerate crisis responses through a standing public health emergency response fund and faster supplemental funding.** In addition to stable core funding, the federal government needs readily available funds on hand to enable a rapid response while Congress assesses the necessity for supplemental funding. Congress should continue a no-year infusion of funds into the Public Health Emergency Rapid Response Fund and/or the Infectious Disease Rapid Response Reserve Fund to serve as available funding that would provide a temporary bridge between preparedness and supplemental emergency funds. Congress should replenish such funding on an annual basis, and funding should not come from existing preparedness resources, as response capacity cannot substitute for adequate readiness. The HHS secretary should only use such funding for acute emergencies that require a rapid response to save lives and protect the public.

- **Demonstrate a long-term commitment to global health security.** The United States should continue to strengthen partnerships with international bodies such as the World Health Organization (WHO), while working with bilateral foreign country partners to strengthen core public health capabilities. Congress should solidify America's role as a global health leader by committing sufficient resources to successfully implement the U.S. Government Global Health Security Strategy[157] and by investing in proven initiatives such as the Field Epidemiology Training and Global Laboratory Leadership Programs, Public Health Emergency Operations Centers, and National Public Health Institutes. Success will require sustained annual funding for global health security programs at CDC. Congress should fund and CDC should implement the modernization of the U.S. quarantine system, including IT systems, quarantine stations, regulatory framework, and traveler engagement and information.

## Priority Area 2: Prevent Outbreaks and Pandemics

The COVID-19 pandemic will not be the last infectious disease outbreak to threaten the country's health and economic security. Emerging infectious diseases have been increasing over the past five decades.[158] At the same time, the increasing polarization and misinformation around COVID-19 vaccines and nonpharmaceutical interventions could affect the prevention and control of more common outbreaks, such as seasonal influenza, vaccine-preventable diseases, and antibiotic resistance. The United States must be able to prevent and respond to both major pandemics and localized outbreaks.

### RECOMMENDATIONS FOR FEDERAL GOVERNMENT, HEALTHCARE, AND AGRICULTURE:

- **Support the vaccine infrastructure.** CDC's Section 317 Immunization Program supports state and local immunization systems to increase vaccination rates among uninsured and underinsured adults and children, respond to outbreaks, educate the public, target populations experiencing disadvantage, improve vaccine confidence, establish partnerships, and improve information systems. Yet, funding has not kept up with needs, as states have to spend immunization dollars to respond to outbreaks,[159] deal with increases in the numbers of residents who lack health insurance,[160] and attempt to manage the impact of vaccine underutilization. Health departments depended on this underfunded infrastructure to distribute and dispense the COVID-19 vaccines, with new money not available until January 2021, leading to a slow and chaotic vaccination rollout early in 2021. Congress should increase annual funding for CDC's immunization program as well as the seasonal influenza program and post-licensure vaccine safety monitoring. Congress should also provide annual appropriations to HHS to study and address the causes of vaccine resistance, improve community engagement, and to educate clinical providers on methods for improving vaccine acceptance, such as those included in the recently enacted VACCINES Act.[161]

- **Fund CDC to support state and local public health laboratories.** Congress should substantially increase annual funding for the Epidemiology and Laboratory Capacity cooperative agreement to support state and local public health laboratories. Prior to the pandemic, the Epidemiology and Laboratory Capacity grant was only funding approximately half of what laboratories and health department epidemiologists nationwide requested to combat infectious disease outbreaks. In addition, increasing the Public Health Emergency Preparedness cooperative agreement will allow LRN labs to improve protection of communities across a range of health threats.

- **Ensure first-dollar coverage for recommended vaccines under Medicaid, Medicare, and commercial insurance.** Public and private payers should ensure that all vaccines recommended by the Advisory Committee on Immunization Practices (ACIP) are fully covered with no out of pocket payment by the consumer, as cost-sharing, such as co-pays, can be a significant barrier to vaccination.[162] Congress should require zero cost-sharing in Medicare Part D and B plans, and CMS should incentivize Part D plans to eliminate cost-sharing and increase receipt of vaccines.[163] An example of legislation that takes steps to improve older adult vaccination rates is the Protecting Seniors Through Immunization Act.

- **Significantly increase investments in public health initiatives to combat antibiotic resistance (AR).** Congress should increase funding for innovative prevention methods of detecting and containing outbreaks supported by the Antibiotic Resistance Solutions Initiative at CDC including its One Health program approach to surveillance and prevention. CDC is investing in prevention measures in every state to strengthen lab capacity, track infections across healthcare systems, detect new threats, disrupt pathogens, coordinate prevention strategies, educate healthcare providers on appropriate antibiotic use, and advocate for other innovations. To fully address the scope of AR spread, particularly in healthcare

settings, Congress should increase funding for the National Healthcare Safety Network and healthcare associated infection/antibiotic resistance programs and activities at state and local health departments. In addition, increases in funding and significant global coordination, as recommended by the National Academies, are necessary to build global capacity to prevent and detect resistant infections and to combat the threat to national security.[164]

- **Create incentives for new-product discovery to fight resistant infections.** The antibiotic development pipeline has failed, leaving patients at risk for antimicrobial-resistant infections. It is extremely challenging for companies to earn a return on their investments for the development of new antibiotics: (1) antibiotics are typically given for a short duration and do not return profits; (2) the most highly resistant infections are still relatively rare; and (3) new antibiotics must be used judiciously to preserve their effectiveness. These factors have resulted in nearly all major pharmaceutical companies exiting the antibiotics market, leaving the critical innovation domain of discovering and developing new antibiotics to small biotech companies that have struggled to survive. Legislation that includes development incentives that are de-linked from sales and strong stewardship and surveillance provisions, such as the PASTEUR Act, would strengthen the market for antibiotic developers, improving patient access for those who need it most.

- **Eliminate overuse of antibiotics in agriculture.** The Food and Drug Administration (FDA) should enforce rules regarding the judicious use of antibiotics in food animals, ensure data collection and publication, promote antibiotic stewardship programs, and track the impact of these policies on resistance patterns. Farmers and the food industry should stop using medically important antibiotics to promote growth and prevent disease in healthy animals, as recommended by WHO,[165] and they should invest in research to develop and adopt husbandry practices that reduce the need for routine antibiotics.

- **Decrease over prescription of antibiotics through implementation of antibiotic stewardship and antibiotic-use reporting.** CDC estimates that improving prescribing practices and preventing infections could save 37,000 lives over five years.[166] CMS should enforce stewardship requirements for hospitals and work with public health stakeholders to track progress in prescribing rates and resistance patterns.[167] CMS should also advance policies to improve outpatient antibiotic prescribing, such as through quality measures and value-based reimbursement programs. All relevant facilities must drastically improve their reporting of antibiotic use and resistance through the National Healthcare Safety Network and should adopt stewardship programs that meet CDC's Core Elements.[168]

## RECOMMENDATIONS FOR FEDERAL AND STATE GOVERNMENT:

- **Provide job-protected paid leave.** The pandemic has called attention to the fact that paid family, sick, and medical leave are important infection-control measures, protecting both workers and customers, in addition to creating economic security. Workers are unable to adhere to public health guidance to isolate if they risk losing their jobs or paychecks. While Congress temporarily expanded access to paid leave during the pandemic, a permanent fix is needed. Congress should enact a permanent federal paid family and medical leave policy and dedicated paid sick days protections, and states should ensure effective implementation by passing paid leave laws and/or removing preemption exemptions.
- **Minimize state vaccine exemptions for schoolchildren and increase vaccination of healthcare workers.** States should enact or strengthen policies that enable universal childhood vaccinations to ensure children, educators and other school personnel, and the general public are protected from vaccine-preventable diseases. This includes eliminating nonmedical exemptions and opposing legislation to expand exemptions.[169] States should require healthcare personnel to receive all ACIP-recommended vaccinations to protect staff and patients and achieve necessary healthcare infection control. Healthcare facilities should ensure access and education to vaccines for all staff and contractors, and they should remove any barriers to staff receiving vaccines. Healthcare facilities should also report healthcare worker vaccination status, such as for seasonal flu and COVID-19, to CDC's National Healthcare Safety Network.

## Priority Area 3: Build Resilient Communities and Promote Health Equity in Preparedness

Social, economic, and structural drivers of health inequities mean that some populations experience a disproportionate impact of disasters, receive fewer resources during the response, and take longer to recover. These same drivers were exacerbated by the pandemic, with communities of color experiencing more severe economic and health impacts. When the intersectionality of factors, such as homelessness, incarceration, disability, age, employment, LGBTQ+ status, and immigration status are taken into consideration, the inequities are compounded. The pandemic will have had both acute and cascading impacts on mental health and wellbeing for years to come. More than 140,000 children have lost caregivers.[170] Increases in mental health concerns have already been documented,[171] including substance use[172] and drug overdoses.[173,174] Rates of suicide among people ages 25 to 34 overall, among males 25 to 34, and among Hispanic males overall, increased significantly.[175] The recent response to the pandemic in some areas has demonstrated that there can be progress in reducing disparities if concerted attention is paid to equity. For example, racial and ethnic gaps in COVID-19 vaccination rates largely closed by the end of 2021.[176]

Addressing underlying inequities and intentionally and meaningfully engaging with the people and communities most likely to be disproportionately impacted throughout the emergency planning and response process are critical to promoting community resilience and ensuring that all receive appropriate services, regardless of circumstance. Equity must be an explicit and foundational principle in all emergency planning, response, and recovery.

### RECOMMENDATIONS FOR FEDERAL, STATE, AND LOCAL GOVERNMENT:

- **Strengthen leadership for health equity and incorporate lessons learned into future preparedness and response capabilities.** The White House, Congress, and relevant federal, state, local, tribal, and territorial agencies should implement the recommendations of the COVID-19 Health Equity Task Force. [See box on pg. 14.] The White House should create a permanent health equity infrastructure to implement and ensure accountability for these recommendations and bolster equity leadership and coordination for future health crises.

- **Invest in policies and capacity to address the social determinants of health (SDOH):** People at highest risk during disasters and those who have the hardest time recovering are often those with unstable or unhealthy housing, those with limited access to transportation, and those who live in low-socioeconomic-status communities,[177] all of which bore out during the COVID-19 pandemic. Addressing SDOH can improve resilience, but it must be a cross-sector effort to increase healthy, affordable housing; improve transportation access; advance economic opportunity and fight poverty; and implement other policies proven to advance health. Congress should fund a public health approach to address SDOH, such as the approach proposed in the Improving Social Determinants of Health Act and in the President's FY 2022 CDC budget request. The legislation would strengthen SDOH capacity at CDC and enable grants to public health agencies to build cross-sector partnerships and develop community solutions to SDOH. For further discussion on policy options to address SDOH, see TFAH's Blueprint and Leveraging Evidence-Based Policies to Improve Health, Control Costs, and Create Equity reports.[178,179]

- **Provide resources and technical assistance to communities to enhance equity and resilience before, during, and after an event.** Rather than a top-down approach to promote equity and resilience, policymakers should support an asset-based approach that relies on communities identifying and leveraging their assets. Congress and federal agencies should direct targeted resources to community-based organizations and existing community health networks that focus on the health of communities of color, older adults, people with disabilities, and other groups that bear a disproportionate burden during disasters. Grants should support evidence-based, culturally relevant, and linguistically appropriate public health campaigns that address prevention and treatment, providing community leaders the opportunity to fully participate in planning activities, allowing organizations to hire and engage community members so emergency plans better reflect the community, as well as improving data collection and sharing. Federal and other grant makers and states should ensure that existing grants and sub-awards reach the grassroots level and communities most in need.

- **Public health agencies should strengthen their health equity leadership and adopt strategies and accountability metrics to incorporate equity into preparedness.** Equity must not be considered separate from preparedness activities but must serve as the foundation for a more resilient community. Ensuring equity is central to all preparedness activities and requires integrating equity accountability measures into all elements of emergency response. Before an event occurs, public health and partner organizations—such as schools, agencies on aging, healthcare and behavioral health facilities, homeless service organizations, and community-based organizations—must plan together to identify and plan with communities at higher risk. HHS, CDC, and state, local, tribal, and territorial governments, including health departments, should build up internal infrastructure to drive equity, including by identifying a chief health equity officer who has a leadership role in the emergency operations center and/or incident command structure for all-hazards events and who is engaged in every emergency operation center activation with sufficient resources and authority. Health equity and emergency preparedness officials should work across programs to incorporate equity issues and goals into preparedness policies and plans;[180] to improve staff capacity to understand how the legacies of discrimination, current-day racial trauma, and other structural inequities affect disaster resilience and recovery; develop and disseminate communications materials that are culturally and linguistically tailored; and to collect and leverage data to identify unique community assets and measures of well-being and to advance equity before and during events. All jurisdictions should establish metrics and procedures for ensuring responses are equitable and for addressing inequities as they occur.

## RECOMMENDATIONS FOR STATE AND LOCAL GOVERNMENT AND COMMUNITY LEADERS:

- **Plan with communities, not for them, and empower their involvement with resources.** Emergency planners must conduct meaningful engagement, partnerships, and listening efforts as well as ongoing inclusion and local hiring (especially from communities typically at higher risk in disasters) in emergency planning and response. Officials should establish relationships with services and organizations that serve these populations before emergencies take place, and government should fund community leaders and community-based organizations to participate in preparedness efforts. Health departments and emergency management agencies should rely on the expertise, community trust, and networks of those who may bear a disproportionate risk, such as older adults, people with disabilities, and individuals with chronic health conditions to ensure emergency plans, procedures, and evacuation shelters meet the needs of all in the community.

- **Address mental health and substance use gaps, bolster crisis resources, and incorporate mental health first-aid and long-term treatment into disaster response and recovery strategies.** All jurisdictions should assess existing mental health and substance use resources and gaps before the next emergency, strengthen partnerships across sectors, and incorporate these assets into preparedness planning. Policymakers must consider in advance what waivers may be needed to ensure continuity of care for people in treatment. Policymakers should also incorporate behavioral health needs into disaster planning, as required by the Pandemic and All-Hazards Preparedness and Advancing Innovation Act. For additional discussion of strengthening prevention of alcohol, drug, and suicide deaths, see TFAH's *Pain in the Nation* report series.

## Priority Area 4: Ensure Effective Leadership and Coordination

Political polarization, interference and threats against public health officials, and contradictory messaging at different points throughout the pandemic has contributed to a wide variation in how individuals and communities have responded. The undermining of public health at all levels has made the nation less secure. At the state level, as of May 2021, 15 legislatures have passed or are considering measures to limit the legal authority of health agencies to protect the public health,[181] and more than 100 of these laws have been approved.[182] These laws could have deadly consequences during COVID-19 and future public health emergencies. At the same time, public health officials at the state and local level have been subjected to threats and career reprisals. More than 500 top health officials have left their positions in the past two years,[183] which will have ramifications beyond the pandemic.

### RECOMMENDATIONS FOR FEDERAL, STATE, AND LOCAL GOVERNMENT:

- **Strengthen federal leadership, guidance, and regulatory authorities for public health emergencies.** During the COVID-19 pandemic, authority and decision-making over the response was ceded to states to an unprecedented degree. This diffusion of responsibility meant wide variation in policy and response decisions regarding business closures, mask mandates, testing strategies, and other tactics. CDC must be empowered to lead the public health response during a pandemic and issue clear, feasible guidance and regulations for state, local, tribal, and territorial officials and to the public to minimize variation and public confusion across jurisdictions.
- **Create a COVID-19 commission to examine the pandemic and make recommendations to Congress.** Congress should authorize an independent commission to investigate the preparedness and response to the pandemic and make concrete recommendations for addressing gaps and missteps. A comprehensive, congressionally authorized commission would help inform future policymaking and pandemic preparedness and response. The commission should recommend ways to strengthen public health and healthcare system preparedness, health equity, medical countermeasures, PPE development and deployment, messaging and

communications, and workforce before the next public health emergency.

- **Rebuild trust in public health agencies and leaders.** The COVID-19 pandemic has damaged faith in federal agencies, including public health agencies such as CDC and FDA. Policy decisions from the federal to the local levels should be based on the best available science, led by public health experts, and free from any real or perceived political interference. The president, the HHS secretary, and the leadership of federal public health and emergency response agencies, including CDC, Office of the Assistant Secretary for Preparedness and Response, U.S. Department of Homeland Security, Federal Emergency Management Agency, and FDA, must conduct a thorough review on the independence and performance of these agencies during the pandemic. Federal health agencies need to build capacity for more rapid response during a health emergency. Leaders should establish procedures and policies to ensure the scientific integrity and independence of their agencies, without political interference, and they must identify and correct any errors made during the COVID-19 response. At the same time, elected leaders at all levels must publicly support public health to rebuild confidence in those agencies and officials.

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- **Strengthen public health protections.** Governors and legislatures should reject laws that weaken public health powers, including such basic public health protections as vaccinations and quarantine.
- **Invest in public health communications.** Congress must make a significant investment in effective public health communications, including research into best practices for different audiences. CDC and other federal, state, and local public health agencies should engage with a diverse group of stakeholders to research and test effective public health messaging, translating complicated concepts to a lay audience, using social media, and countering misinformation and disinformation. While the substance of communications should be consistent, messages must acknowledge the historical context of distrust and be linguistically and culturally tailored for different populations, and trusted, nongovernmental messengers should receive funding to help deliver messages.

## Priority Area 5: Accelerate Development and Distribution of Medical Countermeasures

Robust Assistant Secretary for Preparedness and Response (ASPR) coordination of the multi-sector partners of the Public Health Emergency Medical Countermeasures Enterprise (PHEMCE)[184] could improve medical countermeasure (MCM) development and negate a range of health threats. However, developed drugs or vaccines are only effective if they reach anyone who needs them, when they need them. Medical countermeasures are FDA-regulated products that could be used in the event of a public health emergency, such as vaccines, treatments, drugs, personal protective equipment (PPE) and devices.[185] The challenges faced in distributing scarce medical resources during the pandemic as well as the deployment of COVID-19 vaccine demonstrate the urgency of the right-product/right-time equation. Congress has made significant investments in research and development, but investments must match the size and scope of the threat.

### RECOMMENDATIONS FOR FEDERAL GOVERNMENT:

- **Provide significant, long-term funding for the entire MCM enterprise.** The MCM enterprise involves multisector partners that share capabilities such as: research, regulation, manufacturing, surveillance, distribution, dispensing, delivery, stockpiling, training, and monitoring. Long-term coordinated and transparent funding to the Biomedical Advance Research and Development Authority, Strategic National Stockpile, CDC, FDA, National Institutes of Health, and other components of the PHEMCE would offer more certainty to the biotechnology industry and researchers, would strengthen public-private partnerships, and would enable the purchase of ancillary medical supplies, such as PPE. The United States should grow its investment in innovative, flexible technologies and platforms that will enable faster production of products for a range of threats, rather than focusing on products for a single pathogen.[186]
- **Prioritize the distribution and dispensing of MCMs.** It is important that MCMs reach the right person at the right time during emergencies; the challenges in mass vaccination were predicted by CDC's MCM Operational Readiness Review.[187,188] HHS, along with state, local, tribal, and territorial health departments should be properly resourced and require integration of private-sector healthcare supply distributors and supply-chain partners into planning, exercises, and emergency responses to better leverage existing systems and resources. Once the COVID-19 vaccination campaign is complete, HHS should assess and address gaps in vaccine development, procurement, maintenance, deployment, and equitable administration.

- **Clarify and strengthen PHEMCE leadership of MCM and supply-chain management for emergencies.** HHS should reinvigorate interagency PHEMCE coordination,[189] including regular interagency meetings; engagement with private-sector supply-chain partners; and improved transparency and communication with state, local, tribal, and territorial agencies and collaborative long-term planning and evaluation. These agencies should be included in planning and decision-making. HHS should take steps to minimize political interference with its decision-making and ensure transparency and communication with stakeholders. The HHS Secretary and ASPR should leverage its advisory board for strategic and policy advice. Federal agencies should also explore all available authorities, such as through the Defense Production Act, and communicate strategies with stakeholders to bolster the supply chain during emergencies. HHS should clarify roles and responsibilities for supply-chain management, in consultation with private-sector and public health partners, and should develop and disseminate best practices for supply management.[190]

## RECOMMENDATIONS FOR FEDERAL, STATE, AND LOCAL GOVERNMENTS AND PARTNERS:

- **Improve MCM guidance and communications for groups at higher risk during an event.** HHS, including CDC, should consult with experts and work with healthcare professionals and state, local, and tribal public health partners to develop standardized guidance for dispensing MCMs to groups such as children, pregnant women, older adults, people with disabilities, and people who are homebound. And HHS and state, local, and tribal agencies should work with organizations that reach the public, especially communities at disproportionate risk—such as groups representing older adults, people with disabilities, and limited-English-proficient communities—to improve communications around MCM issues before an event. Communities need to be engaged before an outbreak or event to ensure their understanding of the risks, benefits, and distribution challenges of introducing a medical product to a large portion of the population and ultimately improving acceptance and access to MCMs. It is important to provide clear and accurate guidance to the public in multiple formats and languages, via trusted sources and multiple communications channels, including formats that are accessible to people with low literacy and hearing or vision loss.

## Priority Area 6: Ready the Healthcare System to Respond and Recover

Access to healthcare is a critical component of a resilient population and effective emergency response. In addition to harming day-to-day health of Americans, the Global Health Security Index found that failure to guarantee Americans' access to healthcare hurts the nation's ability to rapidly contain an outbreak.[191] The pandemic has illustrated the way compounding crises—including COVID-19 infections, delays in prevention and treatment of other health conditions, natural disasters, and a severe mental health burden among healthcare workers and the public—can strain the healthcare system beyond its level of preparedness. For several years, TFAH has warned that medical surge capacity for a pandemic remained a major gap in the nation's preparedness. This gap has been evident throughout the healthcare delivery system, from outpatient settings to long-term care to acute care hospitals, with troubling impacts on patients' outcomes.[192] In some areas, healthcare coalitions supported by the national HPP served a critical role in allocating resources, such as PPE and ventilators.[193,194] However, overstretched facilities, exhausted workforces, disruptions in the supply chain, interruptions in primary and preventive care, and lack of information-sharing and situational awareness have been among the significant challenges to the nation's healthcare system during the pandemic. There was also wide variation in implementation of crisis standards of care, with some states providing very little information to providers about legal and clinical issues when making triage decisions. The NHSPI has consistently found that healthcare delivery readiness scores are lowest among preparedness domains, with little progress in the past five years.[195] Policymakers need to strengthen existing systems and consider long-term mechanisms to create sustainable healthcare readiness across systems and geographic borders.

### RECOMMENDATIONS FOR FEDERAL GOVERNMENT AND HEALTHCARE:

- **Strengthen the Hospital Preparedness Program and fund regional coordination.** HPP can help build strong healthcare coalitions capable of engaging and supporting members during disaster responses, but the program has been severely underfunded. Congress must provide more robust annual funding—which it has cut in half over the past decade. HHS should assess the role of HPP in the COVID-19 response and address funding gaps in the program.[196] HHS and the recipients should ensure healthcare leaders take the lead on HPP planning and implementation to the extent possible, with support and coordination from public health, emergency management, and others, and recipients should ensure as much funding as possible is reaching healthcare coalitions. Healthcare administrators should ensure their facilities have tools and support for meaningful participation in healthcare coalitions, including the ability to share information and resources across the coalition and with public health agencies. Congress should provide additional funding to the Regional Disaster Health Response System to coordinate across coalitions and states,[197] to map specialized disaster care (such as burn or pediatric care) across the country, and to leverage those assets in a coordinated way.[198]
- **Create incentives and ramifications to build sustainable preparedness and surge capacity across healthcare systems.** The shortages of beds, healthcare personnel, and equipment during the pandemic underscores the need for cooperation among healthcare entities, across systems, and across geographic borders. Although there has been progress in developing healthcare coalitions in many regions and progress in meeting CMS and other accreditation preparedness standards by individual healthcare facilities, these existing mechanisms have not provided enough incentive for many healthcare facilities to create meaningful surge capacity and cooperation across competing entities.

In addition to strengthening existing systems, Congress and HHS should consider long-term sustainability for building healthcare readiness across the system, including meaningful incentives and disincentives, such as:

- An external self-regulatory body, in alignment with federal policy goals, could set, validate, and enforce standards for healthcare facility readiness, stratified by facility type, with authority for financial ramifications.[199]
- Payment incentives could sustain preparedness, surge capacity, regional disaster partnerships, and reward facilities that maintain specialized disaster care.

- **Expand access to healthcare.** Access to healthcare is always important for promoting health and well-being and particularly so during a pandemic or disaster. Federal and state governments must ensure every person has access to healthcare, including robust insurance coverage. Millions of Americans still lack insurance coverage, and disparities by race, ethnicity, sexual or gender identity, disability status, and other factors have been exacerbated by the pandemic-related job loss.[200] Congress and the Administration should strengthen incentives for states to expand Medicaid, make marketplace overage more affordable, and improve outreach and marketing for enrollment.[201]

- **Assess impact of CMS Preparedness Standards and improve transparency.** An external review by the Government Accountability Office or a similar entity should assess how CMS preparedness standards have affected overall healthcare readiness, and HHS should begin tracking progress on preparedness measures over time. CMS should also strengthen preparedness standards by adding medical surge capacity and other capabilities, including infection prevention and control, stratified by facility type, as a necessary requirement within the next iteration of the rule.[202]

## RECOMMENDATIONS FOR STATE GOVERNMENT AND HEALTHCARE:

- **Integrate healthcare delivery into emergency preparedness and response.** Jurisdictions should continue and increase engagement and integration of the healthcare sector into emergency planning and responses, including plugging healthcare coalitions and other entities representing private healthcare and the healthcare supply chain into emergency planning and response and incident command. Health systems, healthcare coalitions, and public health should develop memoranda of understanding ahead of disasters to improve situational awareness across healthcare and to enable movement of patients, personnel, and supplies. Private-sector healthcare leadership should prioritize preparedness moving forward, including training and workforce protections, surveillance for emerging threats, stockpiling of supplies ahead of disasters, and full engagement in regional collaborations and coalitions.

- **Strengthen state policies regarding disaster healthcare delivery.** States should review credentialing standards to ensure healthcare facilities can call on providers from outside their states, and health systems should ensure they can receive outside providers quickly during a surge response. States should also adopt policies that promote healthcare readiness and ease the ability to surge care and services, such as the NLC, the Interstate Medical License Compact, the Recognition of EMS Personnel Licensure Interstate CompAct,[203] the Uniform Emergency Volunteer Health Practitioners Act,[204] emergency prescription refill laws and protocols, and implementation and education of providers regarding crisis standards of care guidelines.[205,206] State and healthcare leaders must take crisis standards of care planning and implementation seriously and ensure transparency for healthcare providers who must make decisions in constrained conditions. Jurisdictions must ensure equitable application of crisis standards of care so as not to create or exacerbate disparities.

## Priority Area 7: Prepare for Environmental Threats and Extreme Weather

Climate change, environmental hazards, and extreme weather pose serious and growing threats to human health. According to a December 2020 report by TFAH and the Johns Hopkins Bloomberg School of Public Health, many of the states most at risk from climate change are also the least ready to deal with it. Environmental health involves detecting and protecting communities from hazardous conditions in air, water, food, and other settings, and it is therefore a critical component of the nation's health security. Environmental hazards like climate change and pollution impact communities differently and exacerbate disparities. People living in poverty, people of color, people with underlying health conditions or disabilities, and children and older people are all at higher risk for exposure to and impacts from environmental threats.[207,208,209]

### RECOMMENDATIONS FOR FEDERAL AND STATE GOVERNMENT:

- **Enact legislation requiring a national strategic plan.** The United States urgently needs a strategic action plan to address the health impacts of climate change. Policymakers should enact legislation requiring HHS to develop such a plan and to fund development and ongoing maintenance of health system capacity specifically for this purpose.
- **Support climate and health, environmental health equity and environmental justice efforts.** Congress should fund the HHS Office of Climate Change and Health Equity[210] to expand its work to address the health effects of climate change, especially on those who are experiencing higher risks.
- **Support public health climate-adaptation efforts.** Funding for CDC's Climate and Health program stands at $10 million per year, while the annual health costs of climate change events were estimated to be more than $14 billion in 2008.[211] Climate-informed health interventions include identifying likely climate impacts, potential health effects associated with these impacts, and the most at-risk populations and locations.[212] Congress should increase funding for environmental health programs, including CDC's Climate and Health program and the National Environmental Public Health Tracking Network to conduct surveillance and target interventions.
- **Develop sustainable state and local vector-control programs.** As the threat and geographic distribution of mosquitos, ticks, and other vectors changes, Congress should expand funding for the vector-borne disease program at CDC to support state and local capacity to prevent and detect vector-borne diseases, such as Zika, West Nile Virus, and Lyme disease.
- **Guarantee clean water for all U.S. residents, including after disasters.** The Administration and Congress should restore the Clean Water Rule, which includes measures to protect a safe water supply, such as addressing the ongoing problem of lead, per- and polyfluoroalkyl substances, and algal toxins in drinking water; taking steps to reduce the potential for waterborne illnesses; and increasing protection against potential acts of terrorism on America's drinking and agricultural water systems. All states should include water security and wastewater management in their preparedness plans, and they should build relationships among health departments and local environmental and water agencies. CDC should include national guidance and metrics for planning for a range of water-related crises.

## RECOMMENDATIONS FOR STATE GOVERNMENT:

- **Every state should have a comprehensive climate vulnerability assessment and adaptation plan that incorporates public health.** Public health and environmental agencies should work together to track concerns, coordinate risk-management and communications, and prioritize necessary capabilities to reduce and address threats. States and localities should investigate what additional capacities are necessary and identify vulnerable populations and communities. State and local public health officials should incorporate environmental health into emergency operations planning and incident command.

- **Complete all steps of CDC's Building Resilience Against Climate Effects, or "BRACE," framework, and continuously work to enhance and refine preparations for climate change.** State agencies must conduct and facilitate rigorous vulnerability assessments at the state and local levels. The assessments should focus especially on populations at highest risk and the health threats most pertinent to them. States must also push ahead to complete all steps of the framework, including identifying and implementing evidence-based interventions to protect residents. Finally, as agencies implement interventions, they should continually evaluate effectiveness and strive for quality improvement.

# Year in Review: Overview of 2021's Major Public Health Emergencies, Threats, and Reports

## Infectious Disease Outbreaks and Control

### COVID-19 PANDEMIC

#### COVID-19 deaths

Deaths due to the COVID-19 pandemic neared 6 million globally and surpassed 900,000 in the United States as this report was being prepared for publication.[213]

In December 2020 and through spring 2021, COVID-19 was the leading cause of death in the United States, surpassing cancer and heart disease.[214] The impact of the COVID-19 vaccine being widely available was perhaps most noticeable in July as pandemic related deaths dropped to the seventh leading cause of death in the United States. But the Delta variant caused cases, hospitalizations, and deaths to increase in the late summer and fall.[215] In early December, the first U.S. case of an infection due to the Omicron variant was reported.[216] By the end of the month, COVID-19 infections were surging in many parts of the country further stressing the healthcare system.

Throughout the pandemic, communities of color were disproportionately affected in large part due to the ways in which structural racism contributes to underlying health inequities, as well as access to healthcare and COVID-19 services. According to CDC, as of November 2021, nationwide American Indians and Alaska Natives died at a rate that was 2.2 times higher than whites. Hispanic and Latino people died at a rate that was 2.1 times higher than whites. Black people died from COVID-19 at a rate that was 1.9 times higher than the rates of deaths among whites. Asian Americans died at a rate that was 0.9 times higher than whites.[217] [218]

The majority of COVID-19 deaths in the summer and fall of 2021 were in people who had not been vaccinated.[219]

#### Disruptions to other healthcare delivery; impact on life expectancy

According to WHO, prevention and treatment for noncommunicable diseases, including cancer and heart disease, were "severely disrupted" during the pandemic.[220] A study published in PubMed, found that in Canada, COVID-19 caused "significant healthcare service disruptions" that the authors believed could have led to delayed diagnoses and increased mortality.[221]

In December 2021, CDC released new data showing that U.S. life expectancy decreased by 1.8 years in 2020 to 77.[222]

## Vaccines and treatments

In December 2020, two vaccines, one manufactured by Pfizer-BioNTech and the other by Moderna, received emergency-use authorization from FDA. In February, a vaccine manufactured by the Johnson & Johnson Company received its emergency-use authorization. The Pfizer and Moderna vaccines are two-shot doses, the J&J vaccine a one-shot dose. The vaccines were initially made available for healthcare workers, people living and working in long-term care facilities, and other emergency responders. Availability then opened to older adults and people at heightened risk due to underlying medical conditions, and then opened to a phased approach by age. By year's end, the vaccine was recommended for everyone ages 5 and older.

On August 23, FDA issued full approval to the Pfizer-BioNtech COVID-19 vaccine, now known as Comirnaty, for people 16 years of age and older.[223] The vaccine continues to be administered for people 5 to 15 years of age under the emergency-use authorization.

By the fall, as the Delta variant caused cases, hospitalizations, and deaths to increase, booster doses of the vaccine were recommended for all adults ages 18 and older. In December, the Delta variant remained the cause of most new infections, and the Omicron variant was being studied.[224] Early data suggested that Omicron was highly contagious but might cause less serious illness.[225]

At year's end, 71 percent of the U.S. population had received at least one dose of a COVID vaccine, and 62 percent were fully vaccinated.[226] As this report was being prepared, the United States ranked 58th out of 180 countries worldwide for vaccination rate.[227] Native Hawaiian and Pacific Islanders had the highest fully vaccinated rate among all race/ethnic groups at 74.3 percent, 55 percent of the American Indian/Alaska Native population were fully vaccinated, 48 percent of Asian Americans were fully vaccinated, 45 percent of Hispanic Americans were fully vaccinated, 42 percent of the white population were fully vaccinated, and 36 percent of Black Americans were fully vaccinated.[228] In addition, vaccination rates were lagging in rural communities. According to CDC data reported in May 2021, 38.9 percent of residents in rural communities were vaccinated, while 45.7 percent of residents in urban communities were vaccinated.[229] By year's end, thanks to concerted efforts by the Biden Administration, states, and stakeholder groups, the gap between vaccination rates among population groups had narrowed.[230]

During the year, COVID-19 treatments in the form of monoclonal antibodies treatments were developed, and by January 2022, four were approved for emergency use by FDA.[231] Monoclonal antibodies treatments work by mimicking a person's immune system function to block the COVID-19 virus from entering cells or to help clear cells already infected.[232] These treatments lessen symptoms and speed recovery.

*Editor's note: On January 25, 2022, the FDA stopped use of two COVID-19 antibody treatments, drugs manufactured by Regeneron and Eli Lilly, because they weren't effective against the Omicron variant. If the drugs prove effective against additional variants their use could be reauthorized, FDA said.*[233]

## COVID-19 and trends in deaths of despair

The COVID-19 pandemic had well-documented impacts on Americans' physical health and economic security. The pandemic also had significant impacts on mental health leading to increases in mental health distress, substance misuse, drug overdoses, and, in some population groups, an increase in suicide.[234] While one report found a tripling of reported symptoms of anxiety or depression in American adults between March 2020 and March 2021,[235] a February 2021 Milliman report found reduced utilization of mental and behavioral healthcare during 2020.[236]

Provisional data from CDC shows a rapid increase in drug overdose deaths since the beginning of the pandemic. Data from May 2020 through April 2021 shows 97,990 drug overdoses deaths compared with 77,007 between May 2019 and April 2020.[237]

According to the December 2021 U.S. Surgeon General's advisory, *Protecting Youth Mental Health*, rates of depression and anxiety among youths doubled during the pandemic, with 25 percent of youths reporting that they were experiencing depressive symptoms and 20 percent reporting they were experiencing anxiety. Compared with 2019, emergency room visits for suspected suicide attempts rose 51 percent for adolescent girls in early 2021. For boys, the rate of suspected suicide attempts rose by 4 percent.[238]

## Antimicrobial Resistance

According to CDC, more than 2.8 million antibiotic-resistant infections occur in the United States annually, leading to about 35,000 deaths.[239] In December, CDC announced two new programs and $22 million in awards funding to identify and prevent antimicrobial-resistant infections: The Global Action in Healthcare Network and the Global Antimicrobial Resistance Laboratory and Response Network.[240]

## Childhood Immunizations

According to CDC data released in October 2021, routine vaccination among children remained high between 2018–2020. According to the latest National Immunization Survey-Child (NIS-Child), during 2018–2020, over 90 percent of children were fully vaccinated against measles, mumps, and rubella, polio, hepatitis B, and varicella by age 24 months. However, there are disparities in vaccination coverage based on health insurance status, race/ethnicity, poverty level, and jurisdiction, and the COVID-19 pandemic may increase these disparities.[241]

## Foodborne Illness

During 2021, CDC and FDA released advisories concerning foodborne illness associated with soft cheeses (listeria and salmonella), alkaline water (non-viral hepatitis illness), shrimp and other seafood (salmonella), salad (salmonella and listeria), onions (salmonella), and spinach (e-coli).[242] In December, FDA released a Foodborne Outbreak Response Improvement Plan to modernize the agency's response to foodborne disease.[243]

## Hepatitis A

Since outbreaks of hepatitis A were first identified in 2016, 43,084 cases have been reported in 37 states. People in the highest-risk category for contracting hepatitis A virus infection are people who use drugs, people experiencing unstable housing or homelessness, men who have sex with men, people who are currently or were recently incarcerated, and people with chronic liver disease including cirrhosis and hepatitis B and C.[244]

## HIV/AIDS

An estimated 37.7 million people are living with HIV across the globe, over two-thirds of whom live in Africa. The majority of all new infections occurred in sub-Saharan Africa. In 2020, an estimated 680,000 people worldwide died due to HIV/AIDS.[245] In 2019, there were approximately 1.2 million people living with HIV in the United States and approximately 34,800 new infections in the United States, an 8 percent decrease in the infection rate since 2015.[246] People living with HIV experienced more severe outcomes and have higher comorbidities from COVID-19 than most people without HIV.[247]

## Lyme Disease

Lyme Disease is the most common vector-borne disease in the United States. It is transmitted to humans through bites of blacklegged ticks. CDC estimates that approximately 476,000 people in the United States are diagnosed and treated for Lyme Disease annually.[248]

## Measles.

**Measles outbreaks, United States.** In 2021, U.S. measles cases remained relatively low: 49 measles cases reported by five jurisdictions as of January 3, 2022. Although this is an increase from the 13 individual measles cases confirmed in 2020, the number of reported cases is still well below the 1,282 cases of measles in 2019. Measles is a highly contagious disease; outbreaks in the United States have been linked to sustained spread in U.S. communities, with pockets of unvaccinated people and/or an increase in the number of travelers who get measles abroad.[249]

**Measles outbreaks, global.** WHO reported that during 2019, there were more measles cases reported worldwide than in any year since 1996: 869,770 confirmed cases, leading to an estimated 207,500 deaths. The number of confirmed cases worldwide in 2020 and 2021 was much lower, although Nigeria, Pakistan, and Somalia reported high numbers and there were ongoing outbreaks in several other nations.

Almost 41 countries paused or considered pausing their measles campaigns for 2020 or 2021 due to the COVID-19 pandemic, which increases the risk of bigger outbreaks around the world and in the United States.[250] New data showed that 22 million children worldwide missed their first measles vaccine during 2020 and just 70 percent of children who were due for their second vaccination shot in 2021 received it. WHO and CDC officials are concerned that these low vaccination rates could lead to a global measles outbreak.[251]

## Malaria Control and Prevention

According to a March 2021 CDC report, approximately 2,000 cases of malaria are diagnosed in the United States each year, reaching a high of 2,161 cases in 2017. Worldwide, the 2017 data continues a decades-long increase in malaria cases. The disease remains endemic in many countries, and global travel increases its spread.[252]

## Polio

The United States continues to be polio (poliovirus) free (no cases have originated in the United States) thanks to the polio vaccine.[253] However, polio continues to be a threat in some countries, including Afghanistan, Pakistan, China, Iran, and numerous African nations.[254]

## Seasonal Flu

Season influenza cases and deaths were sharply down during the 2020–2021 flu season, likely due to the public health measures in place to combat COVID-19. Estimates suggest influenza vaccination during the 2021–2022 season was similar to the prior year, with a record number of influenza vaccines (193.8 million doses) distributed. However, at the time this report was being produced (winter 2022), influenza surveillance was showing the return of influenza activity, which was expected to continue to increase.[255]

## Tuberculosis

WHO revealed in October that for the first time in over a decade, tuberculosis (TB) deaths had increased worldwide, with fewer people being diagnosed and treated and more deaths, due to the impact of the global pandemic on prevention and treatment efforts.[256] Kenya is one of the 30 countries with the majority (at least 83 percent) of TB cases. Last year, an estimated 140,000 people in Kenya were estimated to have TB, according to the country's Ministry of Health. COVID-19 also meant that the number of people with TB who go undetected increased. Nearly half of people with TB in Kenya last year were likely to have missed out on diagnosis and treatment. An estimated 15 percent reduction in case finding was "largely attributable to the pandemic," according to the Ministry of Health's national tuberculosis, leprosy, and lung disease program annual report.[257]

## West Nile Virus

West Nile Virus is the leading cause of mosquito-borne disease in the United States. There were 2,695 reported cases of West Nile Virus in 2021, the majority of those (1,645) in Arizona.[258]

## Severe Weather and Natural Disasters

### Drought Conditions

Nine states: California, Arizona, Nevada, Oregon, Washington, Idaho, Utah, Montana, and North Dakota experienced severe drought conditions during 2021. In October, 52 percent of the western states' land area was classified as experiencing extreme or exceptional drought.[259]

Most of California experienced extreme drought conditions throughout 2021, and May and June were the state's warmest months on record since 1896. The state's water shortages have been called "immediate and dire" by state officials, and water-use limitations have been imposed. Capacity of numerous critical water sources, such as Lake Oroville, the Sacramento-Sand Joaquin Delta, and the Russian River, are at greatly reduced capacity.[260]

### Extreme Heat

A June heatwave broke all-time records for high temperatures across the western United States with multiple days of 100-plus-degree weather in many places. Between June 15–20, all-time-high temperatures were recorded in seven states: California, Arizona, New Mexico, Utah, Colorado, Wyoming, and Montana.[261]

High heat, drought, and increased risk for wildfires are strongly interrelated.

### Flooding

By September, 116 people had died due to flooding in the United States, the highest number since 2017. Hurricane Ida caused extensive damage as it made landfall in Louisiana and tracked its way up the East Coast, including with deaths in Tennessee, New Jersey, New York City, Pennsylvania, and Connecticut. Additional deaths associated with other storms occurred in Arizona (10 deaths), New Mexico (six deaths), and Texas (six deaths).[262]

### Hurricanes

The 2021 Atlantic hurricane season counted 21 named storms, including seven hurricanes. 2021 was the third most active hurricane year for named storms and was the sixth consecutive above-normal Atlantic hurricane season.[263]

Hurricane Ida made landfall in Louisiana in August 2021 as a Category 4 storm. It was the second most damaging hurricane to make landfall in the state. As of September 2021, a total of 115 deaths had been associated with Ida, including 95 in the United States. The storm caused approximately $65 billion in property damage.[264]

### Tornadoes

During 2021, 1,376 tornados were reported, causing 101 deaths. The reported number of storms in 2020 was 1,075.[265]

On December 11 and 12, a massive storm spurned 41 tornados, including at the EF-3 and EF-2 levels, across eight states reaching from Mississippi to Illinois. Kentucky was hardest hit with whole communities leveled. December tornados are highly unusual, and the number and strength of these twisters was unprecedented. In Kentucky, one twister traveled over 200 miles destroying virtually everything in its path. In total, the tornados caused 90 deaths in five states, including 77 in Kentucky.[266]

### Wildfires

In August, more than 100 wildfires were burning throughout the western United States with more than a dozen burning in northern California. Climate researchers believe that higher temperatures are increasing the length of the fire season and the number of places where wildfires can happen.[267]

The Dixie Fire, which burned in Northern California throughout the summer, was the second largest in the state's history and burned nearly 1 million acres.[268]

The Caldor Fire burned nearly 222,000 areas across three California counties: El Dorado, Amador, and Alpine. It burned for 67 days starting in mid-August and destroyed over 1,000 structures.[269]

## Reports, Risk Assessment Tools, and Convenings

The National Risk Index released in January 2021, is an online tool created by the Federal Emergency Management Agency to identify communities most at risk for 18 natural hazards.[270]

In April, the Group of Friends on Tackling AMR released a Call to Action on Antimicrobial Resilience (AMR) 2021. The call to action calls demands a strengthened global effort to decrease AMR through increased research and investment and improved antimicrobial stewardship. As of December 2021, 113 member states were signatories to the Call to Action, including the United States.[271]

In October, the de Beaumont Foundation and the Public Health National Center for Innovations, a division of the Public Health Accreditation Board, released a brief, Staffing up: Investing to improve public health services and protections, which reported that public health departments need an increase in full-time staff members of about 80 precent to meet their communities' basic public health needs. According to the brief, the staffing gap has been created by years of budget cuts.[272]

Also in October, the Global Health Security Agenda Annual Report, *Strengthening Health Security Across the Globe: Progress and Impact of United States Government Investments in the Global Health Security Agenda,* was released. The report details the U.S. government's impact in helping countries across the world build their health security capacity.[273]

In August and October, TFAH released a two-part case studies series as a follow-up to its December 2020 report *Climate Change & Health: Assessing State Preparedness* produced with the Johns Hopkins Bloomberg School of Public Health. The case-studies series identifies and reports on states and localities' efforts to implement climate change adaptation strategies that center on equity. The first case study features programs that advance procedural equity in climate adaptation. The second in the series features programs that advance distributional equity in climate adaptation.

In October, the Bipartisan Commission on Biodefense released its report *Saving Sisyphus: Advanced Biodetection for the 21st Century.* The report, released 20 years after the 2001 anthrax attacks, detailed "critical failures" in the nation's bio-detection program and makes recommendations for congressional action.[274]

The National Commission to Transform Public Health Data Systems, created by the Robert Wood Johnson Foundation, was established to review how public health data is collected, shared, and used and to make recommendations to ensure that such data is comprehensive and creates a blueprint for health equity. Among the recommendations included in its October 2021 report was to ensure the public health measurement captures and addresses structural racism and other inequities.[275]

In November, the Biden Administration's COVID-19 Health Equity Task Force released its report, including recommendations to the President for mitigating the health inequities caused by or exacerbated by the pandemic.[276] (See side bar on pg. 14.)

The Bipartisan Policy Center's December 2021 report *Public Health Forward: Modernizing the U.S Public Health System* described the ways the COVID-19 pandemic exposed weaknesses in the nation's public health system and pervasive disparities that affect Americans' health. The report outlined a five-year vision and action framework for how states, territorial, and local elected and public health officials can strengthen their jurisdiction's public health infrastructure.[277]

2021 Global Health Security Index, released in December, reported that no country is better prepared to respond to pandemics and epidemics than they were in 2019, the year of the initial index report. The Index, produced by NTI and the Johns Hopkins Bloomberg School of Public Health Center for Health Security, found that 90 percent of all countries worldwide had no plan for distributing vaccines or medications during an emergency, and 70 percent lack the amount of healthcare capacity that would be needed in an emergency. The United States ranked first in the index with a score of 75.9 out of 100, but the report found that high levels of mistrust in government hampered the U.S. pandemic response.[278]

# Appendix B: Methodology

TFAH made major refinements to its methodology for *Ready or Not* in 2018. For more information, see the 2019 edition of the series, Appendix A: Methodology.[279]

To meet TFAH's criteria, each indicator must be:

- **Significant.** The indicator needed to be a meaningful measure of states' public health emergency preparedness. The NHSPI first measured significance by using a multistage Delphi process with a panel of experts and then again by TFAH through interviews with additional experts.
- **Broadly relevant and accessible.** The indicator needed to be relevant—and timely data needed to be accessible—for every state and the District of Columbia.
- **Timely.** Data for the indicator needed to be updated regularly.
- **Scientifically valid.** Data supporting the indicator needed to be credible and rigorously constructed.
- **Nonpartisan.** The indicator, and data supporting the indicator, could not be rooted in or seen as rooted in any political goals.

Using these criteria, TFAH aims to select a broad set of actionable indicators with which it—and other stakeholders, including states themselves—can continue to track states' progress. (Complete data were not available for U.S. territories.) TFAH will strive to retain most of these indicators for multiple years to assist states in tracking their progress against each measure.

TFAH seeks measures that are incorporated in the NHSPI and that most closely meet TFAH's criteria. There is one exception: a measure of state public health funding-level trends that the NHSPI does not track.

### Indicator Data Collection

The NHSPI provided TFAH with data for every indicator except five (those data tied to the NLC, public health funding, flu vaccination, hospital patient safety, and laboratory surge capacity). In cases where newer data were available than those modeled in the 2021 edition of the NHSPI, TFAH collected and verified figures from their original sources.

### Public Health Funding Data Collection and Verification

To collect public health funding data for this report, TFAH surveyed state officials. Informed by the Public Health Activities and Services Tracking project at the University of Washington, TFAH defines public health programming and services as inclusive of communicable disease control; chronic disease prevention; injury prevention; environmental public health; maternal, child, and family health; and access to and linkage with clinical care. Specifically, this definition includes:

- **Communicable disease control.** Public health services related to communicable disease epidemiology, hepatitis, HIV/AIDS, immunization, sexually transmitted diseases, tuberculosis, etc.

- **Chronic disease prevention.** Public health services related to asthma, cancer, cardiovascular disease, diabetes, obesity, tobacco, etc.
- **Injury prevention.** Public health services related to firearms, motor vehicles, occupational injuries, senior falls prevention, substance-use disorder, other intentional and unintentional injuries, etc.
- **Environmental public health.** Public health services related to air and water quality, fish and shellfish, food safety, hazardous substances and sites, lead, onsite wastewater, solid and hazardous waste, zoonotic diseases, etc.
- **Maternal, child, and family health.** Public health services related to the coordination of services; direct service; family planning; newborn screening; population-based maternal, child, and family health; supplemental nutrition; etc.
- **Access to and linkage with clinical care.** Public health services related to beneficiary eligibility determination, provider or facility licensing, etc.

TFAH excludes from its definition insurance coverage programs, such as Medicaid or the Children's Health Insurance Program, as well as inpatient clinical facilities.

TFAH, under the guidance of state respondents, revised data for the base year. (In this report, that was FY 2020.) For some states, this was necessary to improve comparability between the two years when a reorganization of departmental responsibilities had occurred over the period.

All states and the District of Columbia verified earlier funding data and provided new funding data, with five exceptions: Delaware, Kansas, Rhode Island, Utah, and West Virginia.

## Scoring and Tier Placements

TFAH grouped states based on their performances across the 10 indicators, and TFAH gave partial credit for some indicators to draw finer distinctions among states and within states over time. TFAH placed states into three tiers—high tier, middle tier, and low tier—based on their relative performance across the indicators.

Specifically, TFAH scored each indicator as follows:

- Adoption of the NLC: 0.5 point. No adoption: 0 points.
- Percent of the state's population served by a comprehensive public health system, as determined through administration of the National Longitudinal Survey of Public Health Systems.
  - More than one standard deviation above the mean: 1 point.
  - Within one standard deviation above the mean: 0.75 point.
  - Within one standard deviation below the mean: 0.5 point.
  - More than one standard deviation below the mean: 0.25 point.
  - A score of .625—halfway between .25 point and 1 point—was assigned to Hawaii and Rhode Island, for which data were not available.
- Accreditation by the PHAB: 0.5 point. Not accredited: 0 points.
- Accreditation by the EMAP: 0.5 point. Not accredited: 0 points.
- Size of state public health budget compared with the past year (nominally, not inflation-adjusted).
  - No change or funding increase: 0.5 point.
  - Funding decrease: 0 points.
  - A score of .25—halfway between 0 points and .5 point—was assigned to Delaware, Kansas, Rhode Island, Utah, and West Virginia, which were not able to provide data for FY 2021.
- Percent of population who used a community water system that failed to meet all applicable health-based standards: TFAH scored states according to the number of standard deviations above or below the mean of state results.
  - Within one standard deviation above the mean (and states with 0 percent of residents who used a noncompliant community system): 1 point.
  - Within one standard deviation below the mean: 0.75 point.
  - Between one and two standard deviations below the mean: 0.5 point.
  - Between two and three standard deviations below the mean: 0.25 point.
  - More than three standard deviations below the mean: 0 points.
- Percent of employed population who used paid time off in March 2020: TFAH scored states according to the number of standard deviations above or below the mean of state results.
  - More than one standard deviation above the mean: 1 point.
  - Within one standard deviation above the mean: 0.75 point.
  - Within one standard deviation below the mean: 0.5 point.
  - More than one standard deviation below the mean: 0.25 point.
- Percent of people ages 6 months or older who received a seasonal flu vaccination: TFAH scored states according to the number of standard deviations above or below the mean of state results.

- More than one standard deviation above the mean: 1 point.
- Within one standard deviation above the mean: 0.75 point.
- Within one standard deviation below the mean: 0.5 point.
- More than one standard deviation below the mean: 0.25 point.

- Percent of hospitals with a top-quality ranking ("A" grade) on the Leapfrog Hospital Safety Grade. TFAH scored states according to the number of standard deviations above or below the mean of state results.
  - More than one standard deviation above the mean: 1 point.
  - Within one standard deviation above the mean: 0.75 point.
  - Within one standard deviation below the mean: 0.5 point.
  - Positive number, more than one standard deviation below the mean: 0.25 point.
  - No hospitals with a top-quality ranking ("A" grade): 0 points.
- Public health laboratory has a plan for a six- to eight-week surge in testing capacity: 0.5 point. Did not report having a plan: 0 points.

The highest possible score a state could receive was 7.5 points.

TFAH placed states whose scores ranked among the top 17 in the high-performance tier. TFAH placed states whose scores ranked between the 18th-highest and 34th-highest in the middle tier. TFAH placed states with scores ranked between the 35th-highest and 51st-highest in the low-performance tier. (Ties in states' scores can prevent an even distribution across the tiers.)

This year, states in the high tier had scores ranging from 5.75 to 6.75; states in the middle tier had scores ranging from 5 to 5.625; and states in the low tier had scores ranking from 3.25 to 4.75.

### Assuring data quality

TFAH conducted several rigorous phases of quality assurance to strengthen the integrity of the data and to improve and deepen TFAH's understanding of states' performance, especially that of outliers on specific indicators. During collection of state public health funding data, researchers systematically inspected every verified data file to identify incomplete responses, inconsistencies, and apparent data entry errors. Following this inspection, TFAH contacted respondents and gave them the opportunity to complete or correct their funding data.

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