

Ready or Not:

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

2021



Acknowledgements

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

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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.

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Editor's note: This report was being prepared during a presidential transition. We have included comments in the report where we have noted action on TFAH policy recommendations by the Biden administration.

View this report online at www.tfah.org/report-details/readyornot2021

Ready or Not 2021

Ready or Not 2021

Executive Summary

The past year, 2020, will long be remembered as the year more than 2 million people lost their lives due to a global pandemic. Not since the 1918 influenza pandemic has a single event so urgently demonstrated the criticality of a strong public health system. This *Ready or Not* report has tracked the country's level of public health emergency preparedness since 2003. For nearly two decades, it has asked the fundamental question: "are we ready?" Unfortunately, the COVID-19 crisis has provided a clear answer: an emphatic "no."

The COVID-19 crisis has illuminated the urgent need for federal, state, local, tribal, and territorial leaders to take aggressive steps to shore up the nation's preparedness for all types of emergency events. The pandemic put a spotlight on a public health system hollowed-out by years of insufficient funding. Health departments were overstretched, responding to the pandemic with archaic technologies¹ and with overworked staff who faced threats and retribution.² These gaps were all the more critical in 2020 because the federal government failed to take an evidence based, leadership role in the pandemic response, with many decisions being left to states that would ordinarily be federally coordinated. It also demonstrated the harm that can be done when science and public health expertise are stifled by political interference and misinformation.

In addition, the pandemic has once again demonstrated and exacerbated the impact of structural racism, both historic and current, on the health and well-being of communities of color and Tribal Nations. Acknowledging the lingering health impacts of slavery and the treatment of native peoples and addressing current day racist policies, systems, and attitudes must be part of building the nation's resilience. In short, equity is not separate from preparedness. Ensuring an equitable opportunity for the health and well-being of all residents before a disaster creates more resilient communities during an emergency. Equity must be an explicit and foundational principle in all emergency planning. Achieving equity in all facets of emergency response requires including equity accountability metrics in emergency preparation and management.

Foundational capabilities are necessary throughout the public health system, from the Centers for Disease Control and Prevention (CDC) to state, local, tribal, and territorial health departments, including:³

- Health monitoring and assessment, comprising surveillance, epidemiology, and laboratory capacity;
- All-hazards preparedness and response;
- Policy development and support;
- Public communications;
- Community outreach and partnership development;
- Organizational and administrative competencies (i.e., leadership, governance, and health equity); and
- Accountability and performance management.⁴

Today, only half of Americans are protected by a comprehensive local public health system.⁵ The Public Health Leadership Forum estimates a \$4.5 billion annual shortfall in the spending necessary to meet the infrastructure needs of public health agencies nationwide.⁶ This shortfall was on display throughout the COVID-19 pandemic, as decades of chronic underfunding hindered communications, disease surveillance, contact tracing, vaccine delivery, and other key health department activities.

“A powerful aspect of this report is its long history objectively measuring states’ preparedness. This year’s recommendations are almost identical to past years. Had the nation paid more attention to pandemic threats and TFAH’s commonsense and consistent recommendations, this country would be in a very different place today.”

Shelley A. Hearne, DrPH

Johns Hopkins University Bloomberg School of Public Health

It is also important to note that the infusion of COVID-19 emergency funding was onetime funding—critical to the pandemic response but not a solution to the system’s longtime underinvestment.

This 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’ performance against like jurisdictions. These data points, or ones similar to them, have been the focus of this report for over a decade and are meant to measure readiness for a broad set of health security

threats. They are not tailored to 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 impact and local responses. A state may do well in terms of its ranking in this report but poorly in its response to the COVID-19 pandemic—and vice versa. While no state has been spared, what seems to have mattered most in the pandemic response is a state’s socioeconomic and racial profile, as well as the adherence of elected leaders and residents to evidence-based public health guidelines. The pandemic has illustrated that robust and sustained funding, elected officials’ leadership, and federal-state coordination and planning are key to protecting Americans’ health security. Moreover, there is no substitute at the state or local level for a strong federal response.

COVID-19 AND EMERGENCY PREPAREDNESS: TRAGIC LESSONS

TFAH's *Ready or Not: Protecting the Public's Health from Diseases, Disasters and Bioterrorism* report has tracked the nation's readiness to respond to a public health emergency for nearly two decades. During that time, no event highlighted the critical importance of this report's purpose—measuring and promoting readiness to safeguard Americans' health during an emergency—to the degree the COVID-19 crisis has.

The COVID-19 pandemic is an on-the-ground, real-time measure of the nation's public health emergency response system—a test the federal government failed according to most public health experts. An October 2020 report by Columbia University Earth Institute's National Center for Disaster Preparedness estimated that the federal government's inadequate pandemic response led to between 130,000 and 210,000 avoidable deaths. The report submits that if the United States had implemented sufficient testing, earlier lockdowns, a national mask-wearing mandate, and provided federal guidance on social distancing, over 200,000 lives could have been saved.⁷

With a possible single exception (water system safety), all of the readiness indicators measured annually by this *Ready or Not* report played a role in jurisdictions' COVID-19 response. Seven were relevant to the effort to control the pandemic and save lives: (1) nurse licensure compact (allowing jurisdictions to borrow medical personnel when they need to surge capacity), (2) hospital participation in healthcare coalitions, (3) public health and emergency management



accreditation, (4) public health funding, (5) access to paid time off, (6) flu vaccination rates (as a proxy for a community's vaccination infrastructure and receptivity), and (7) laboratory surge capacity. TFAH will continue to measure states on these indicators, as they play a central role in the standing-ready, public health protection capacity that every state needs.

The pandemic has also spotlighted a number of issues not currently measured by the report but critical and dramatically apparent if absent during a health emergency: federal and state political leadership, interagency coordination, consistent and well-executed public communications, and health equity.

Importance of Federal Leadership

Government at multiple levels shares responsibility for emergency planning and response. Under this tiered structure, when an event requires a larger response than a local entity can provide, government from the tier above it—typically a tribal, territorial or state agency—provides assistance. When a state's response resources are not enough to meet demands during an emergency, the federal government provides support. For a public health emergency as significant and contagious as COVID-19, clear communication and strong leadership and coordination by the federal government are essential, elements

that were lacking during the initial months of the pandemic response. Instead, inconsistent messages between federal agencies and the White House; lack of centralized coordination, such as for procurement of personal protective equipment (PPE); and political interference with guidance from scientific agencies—all led to confusion and contradictory policies among states and weakened the emergency response.

TFAH has made a number of policy recommendations designed to ensure robust and nonpartisan federal leadership during future public health emergencies, including:

- Create a White House Health Security Directorate, including senior advisors to the president with public health expertise on health security issues. This directorate would oversee the national biodefense strategy and all interagency emergency responses.
- Ensure full transparency and consistency in federal messaging from the White House, CDC, ASPR, FDA, and National Institutes of Health (NIH) concerning public health issues to ensure message clarity, avoid confusion, and build trust.
- Ensure that federal public health officials are fully empowered to make decisions based on science and without undue political influence. Efforts to infuse politics into public health decision-making puts the public's health at risk.
- HHS should strengthen leadership by working with states and suppliers to ensure adequate stockpiling and distribution of medical countermeasures and ancillary emergency response products, such as personnel protective equipment.

Overcoming the Legacy of Racism

The legacy of slavery, genocide, and centuries of racism, combined with current day interpersonal and structural racism, is at the root of the disproportionate impact COVID-19 has had on communities of color and Tribal Nations. These systemic inequities, in access to healthcare, housing, education, transportation, and employment, existed before the pandemic and have been exacerbated by it. Health inequities due to disadvantages experienced by racial, ethnic, or other population groups are preventable differences in the burden of disease, injury, and health emergencies and to opportunities to achieve good health.⁸ Addressing issues at the root of health inequity is imperative to ensuring all people, regardless of their race or ethnicity or where they live, have the opportunity for good health and are protected during a health emergency.

TFAH has called on the administration and Congress to make advancing health equity and eliminating health disparities a national priority by:

- Ensuring that all COVID-19 response actions prioritize advancing health equity, including access to COVID-19 testing and vaccinations.
- Creating a Truth, Racial Healing, and Transformation Commission, and provide funding to communities to begin the process of acknowledging a history of racism and working to dismantle the myth of hierarchy based on race.
- Expanding funding for initiatives serving communities that have been marginalized by disinvestment, and ensure that federal funding supports processes that meaningfully engage the most affected communities in the planning and implementation of such initiatives.

- Developing a White House led strategy focused on addressing the root causes of disease and on promoting health equity.
- Creating a *social determinants of health* line item at the Centers for Disease Control and Prevention (CDC), authorized and fully funded by Congress, with sufficient funding to guarantee grant-funded efforts throughout the nation.
- Requiring all agencies to collect, disaggregate, and report health data in such a way that the impact of health conditions, policies, or interventions on specific population groups are known, including health status data by race, ethnicity, sexual orientation, gender identity, primary language, and disability status.

The tragedy of the COVID-19 pandemic, including over 500,000 deaths in the United States (as this publication was being prepared) and unprecedented harm to the economic security of millions of American families, will forever be a painful reminder of the critical importance of pre-event public health emergency preparations, investments in public health infrastructure, and evidence-based policy and communications. The pandemic has undeniably demonstrated that historical discrimination coupled with current-day racism impacts a community's health status and ability to weather a disaster. The COVID-19 crisis has also painfully reinforced that national leadership must be grounded in science and committed to addressing structural racism, both of which are imperative to saving lives during an emergency.

This edition of the *Ready or Not* series finds that states have made progress in most of the report’s measured areas, especially rates of seasonal flu vaccination. However, improvement in

other areas—such as paid time off for workers and hospital patient safety—has stalled. In this 2021 report, Trust for America’s Health (TFAH) found that three states improved their standing

compared with last year, while eight fell behind. Three states improved by one tier, six states dropped one tier, and two dropped two tiers.

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

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

Notes: The National Council of State Boards of Nursing organizes the Nurse Licensure Compact. The federal Hospital Preparedness Program of the U.S. Office of the Assistant Secretary for Preparedness and Response supports healthcare coalitions. 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 A: Methodology” for a description of TFAH’s funding data-collection process, including its definition.

Source: National Health Security Preparedness Index ⁹

The *Ready or Not* report groups states and the District of Columbia into one of three tiers (high, middle, low) based on their performances across the 10 indicators. This year, 20 states and the District of Columbia scored in the high-performance tier, 15 placed in the middle-performance tier, and 15 were in the low-performance tier (see Table 2). (See “Appendix A: Methodology” for more information on the scoring process.)

Three states showed notable improvement, moving up a tier: Georgia, Montana, and Rhode Island. Georgia, which rose from the middle tier to the high tier, improved its standing by achieving accreditation by the Emergency Management Accreditation Program and by having

a greater share of its hospitals receive high marks on patient safety. Montana, which elevated from the low tier to the middle tier, increased its public health funding level in fiscal year 2020. And Rhode Island, which rose from the middle tier to the high tier, did so by dramatically increasing its community drinking-water security.

Two states fell from the high tier to the low tier: Missouri and Pennsylvania. Missouri cut its public health funding in FY2020 and saw an increase in the share of its residents that used a community water system with one or more health-based violations. Its flu vaccination rate ticked up marginally, but by less than the nation as a whole. Likewise, Pennsylvania also cut its public health funding level, and its share of hospitals

that received an “A” rating—one of the highest in the nation—rose by slightly less than the national average. Other steps it could take to improve its standing include joining the Nurse Licensure Compact or increasing its below-average share of residents who take paid time off from work.

Five states fell from the high tier to the middle tier: Alabama, Illinois, Iowa, New Jersey, and Tennessee. These states did not experience significant backsliding overall, but they lost ground, as a number of other states took greater steps that increased their standing.

One state fell from the middle tier to the low tier: Arizona. Arizona’s below-average flu vaccination rate rose, but by less than the nation overall, so its overall standing fell back.

TABLE 2: State Public Health Emergency Preparedness
State performance, by scoring tier, 2020

Performance Tier	States	Number of States
High Tier	CO, CT, DC, DE, GA, ID, KS, MA, MD, ME, MS, NC, NE, NM, OK, RI, UT, VA, VT, WA, WI	20 states and DC
Middle Tier	AL, CA, FL, IA, IL, KY, LA, MI, MN, MT, ND, NJ, OR, TN, TX	15 states
Low Tier	AK, AR, AZ, HI, IN, MO, NH, NV, NY, OH, PA, SC, SD, WV, WY	15 states

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

TFAH's Analysis Found:

A majority of states have made preparations to expand healthcare and public health capabilities in an emergency, often through collaboration.

Thirty-four states participated in the Nurse Licensure Compact, up from 26 in 2017,¹⁰ with Indiana and New Jersey being the most recent adopters.¹¹ 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, **hospitals in most states have a high degree of participation in healthcare coalitions.** On average, 89 percent of hospitals were in a coalition, and 17 states and the District of Columbia had universal participation, meaning every hospital in the jurisdiction was part of a coalition. Such coalitions bring hospitals and other healthcare facilities together with emergency management and public health officials to plan for and respond to incidents or events requiring extraordinary action. This increases the likelihood that providers serve patients in a coordinated and efficient manner

during an emergency. What's more, **every state had public health laboratories that had plans for how to manage a large influx of testing needs.** States had a plan to surge public health laboratory capacity for six to eight weeks as necessary during overlapping emergencies or large outbreaks, an increase of six states since 2017.

Most states are accredited in the areas of public health, emergency management, or both. As of December 2020, the Public Health Accreditation Board (PHAB) or the Emergency Management Accreditation Program (EMAP) accredited 42 states and the District of Columbia; 29 states and the District of Columbia were accredited by both groups, a net increase of one since November 2019. (EMAP has now accredited Delaware and Georgia; Maryland transitioned from being accredited by both bodies to the PHAB only, with the EMAP providing conditional accreditation.) Eight states (Alaska, Hawaii, Indiana, 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. The seasonal flu vaccination rate among Americans ages 6 months or older rose from 42 percent during the 2017–2018 season to 52 percent during the 2019–2020 season.¹² 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.¹³

In 2019, only 55 percent of employed state residents, on average, used paid time off, the same percentage as in 2018. 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.¹⁴ This became particularly relevant during the COVID-19 pandemic, as isolation and quarantine were 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.¹⁵ In January 2021, the Biden administration economic stimulus package proposal included extending paid sick leave to over 100 million U.S. workers.

Only 31 percent of hospitals, on average, earned a top-quality patient safety grade, up slightly from 30 percent in 2019. Hospital safety scores measure performance on such issues as healthcare-associated infection rates, intensive-care capacity, and an overall culture of error prevention. In January 2021, the Biden administration’s economic aid package included extending paid sick leave to over 100 million U.S. workers.

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.

Based on its policy research and analysis, consultation with experts, and review of progress and gaps in federal and state preparedness—with a particular focus on the preparation gaps and shortfalls identified by the COVID-19 pandemic—**TFAH is recommending policy action in seven priority areas:**

- 1. Provide stable, sufficient funding for domestic and global public health security.**
- 2. Strengthen policies and systems to prevent and respond to outbreaks and pandemics.**
- 3. Build resilient communities and promote health equity generally and in preparedness.**
- 4. Ensure effective public health leadership, coordination, and workforce.**
- 5. Accelerate development and distribution, including last-mile distribution, of medical countermeasures.**
- 6. Strengthen the healthcare system’s ability to respond to and recovery from health emergencies.**
- 7. Prepare for environmental threats and extreme weather.**

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 together 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 research after consultation with a diverse group of subject-matter experts and practitioners.

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),¹⁶ with one exception: a measure of state public health funding-level trends, which reflects how well-resourced key agencies are to prepare 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 A: Methodology" for a detailed description of how TFAH selected and scored the indicators.)

While state placements 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 Index 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. 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.





Earning Vaccine Confidence in Communities of Color

Interview with Claude A. Jacob, Dr.PH(c), MPH, the chief public health officer at the Cambridge, Massachusetts, Public Health Department, and Maria Lemus, the executive director of Visión y Compromiso, about barriers—both historic and contemporary—to COVID-19 vaccinations within communities of color. This interview was conducted in December 2020.

TFAH: As this report is being finalized, the United States is nearing a time when many Americans, particularly those at the highest risk of infection or the most serious impact if infected, can be vaccinated. What are the barriers to high rates of vaccination in communities of color and among Tribal nations?

Dr. Jacob: We are fortunate in Cambridge. Flu vaccine participation is strong and childhood vaccine compliance is also very high, which we view as rough proxies for COVID-19 vaccine acceptance. That being said, there is a long and sordid history of abuse and mistreatment of these communities by the U.S. government and healthcare system. That many Black and Brown people continue to feel deep mistrust of the healthcare system is understandable. All of us in healthcare and public health must understand that this mistrust goes back to slavery for Black Americans and the genocide perpetuated against indigenous people that lasted for centuries.

We have strong relationships with community organizations, leaders in the faith community, and others who are well known and trusted among communities of color, and we will partner with them to overcome these barriers to vaccine uptake. Recent national and state surveys have told us that Americans view their personal physician as the most trusted

voice on COVID-19. Given this finding, we plan to work closely with our hospitals, ambulatory sites, and healthcare providers to help spread the message.

Ms. Lemus: There are many barriers. The ones I'm most concerned about are myths and misinformation, including crazy social media propaganda, fear of adverse reactions, and problems with vaccine accessibility. High rates of the uninsured among some populations groups and misconceptions about who is at risk are additional concerns.

TFAH: The pace of COVID-19 vaccines development has been quicker than many people expected. In some communities this may mean that the vaccine will be available before communications programs about the vaccine's safety and availability have fully taken root. What do those responsible for vaccine distribution need to do when distributing the vaccine under these circumstances?

Dr. Jacob: First of all, we need to celebrate the news that, so far, two vaccines have received FDA emergency use authorization. That two vaccines were developed, tested, and manufactured in less than 12 months is a breathtaking achievement. While we can't let down our guard on physical distancing, wearing masks,

and continuing to practice good hand hygiene, the COVID-19 vaccine marks a watershed moment in the pandemic. We now see the light at the end of the tunnel. At the same time, it's understandable that people have many questions and deep concerns given how quickly the vaccine was developed and approved. For communities of color, the concern over safety comes with a long-standing, entrenched, and well-placed mistrust of the healthcare system.

Communication will be pivotal in educating everyone, especially communities of color, about the safety and importance of this vaccine. To start, we need to have communities of color and physicians of color at the decision-making table to inform and ensure a vaccine rollout that is equitable for all members of our community. Messaging around the vaccine also needs to be informed by, and tested with, communities of color to make sure that these communication efforts resonate. We have a superb opportunity to work with those on the front line of this pandemic, especially doctors, nurses, and physicians' assistants, to help amplify the message in core communities. By all accounts, frontline medical workers are the most trusted source of health information and they are the first to be vaccinated, starting this past December. We should use their voices of trust and reason to speak to communities of color about the safety and critical importance of getting this vaccine.

Ms. Lemus: It will be imperative to share data about the vaccine without jargon and to have trusted messengers deliver the information. I heard a quote recently in response to the question, "Do you know what's in Tylenol?": "No, but I trust it will help me."



TFAH: A woeful history of mistreatment of people of color by government and the healthcare system is at the root of much of the lack of trust in the COVID-19 vaccine within those communities but there are other barriers to vaccine access. What are they and how can they be overcome?

Ms. Lemus: The understandable distrust of government is going to be a huge barrier to the vaccine. A specific example for my community is the Bracero Program, which between 1942 and 1964, based on a series of bilateral agreements between the U.S. and Mexican governments, brought nearly 4.6 million Mexican citizens to work on U.S. farms, railroads, and factories. Those workers experienced racial and wage discrimination and were forced to live and work in substandard conditions. More recently, there have been allegations of unnecessary hysterectomies being performed in ICE detention centers.

The only way to overcome these histories will be to first acknowledge them. Leaders must acknowledge and

speak to these injustices; they must denounce them and support remedies. They need to give real-time examples of the efforts being made to engage with and empower communities and to correct past wrongs. Only then will government be able to be heard and only by using trusted messengers and community navigators.

It's also important to remember that the reasons for distrust of government within underrepresented communities is not only about historical legacies; it is based on current-day events and climates. However, it can be corrected. My organization, *Visión y Compromiso*, has as its mission providing leadership-development and capacity-building opportunities for *promotores* and community health workers in over 4,000 communities. These community-based *promotores* will have a critical role to play in reducing vaccine hesitancy in communities of color. Messaging to convince people to be vaccinated has to feature their heroes, their community leaders, their voices.

Dr. Jacob: Communities of color have historically had difficulty accessing healthcare. Lack of transportation, work schedules, childcare needs, and competing financial interests—such as paying rent and bills—pose significant barriers to healthcare, as do other social determinants of health, such as poverty and lack of education. Even with the Affordable Care Act—which greatly expanded access to health insurance for everyone—Hispanic, Black, and some Asian communities have lower insurance coverage rates than any other population. Many of them remain uninsured altogether.

The cost of the vaccine is being covered by the federal government through tax dollars, but providers can charge to administer the vaccine, if they choose. We need to do everything we can and work with providers to eliminate fees they may charge in the interest of overcoming this public health emergency. When it is available, we need to bring the vaccine to the public rather than making people come to the vaccine. In Cambridge, the public health department, through its partnership with the city’s first-responders and others, have made free COVID-19 testing available to all residents (regardless of symptoms) since July 2020. Starting in November 2020, this “no-barrier,” city-funded testing program expanded to seven days a week (from two days/week) and from two neighborhood sites to four. These testing sites are geographically dispersed, and all but one are located in neighborhoods with disproportionately high rates of new COVID-19 infections.

TFAH: What is the importance of where the COVID-19 vaccine is available in your community?

Ms. Lemus: Where the vaccine will be available is another critical issue. The credibility, location, hours, accessibility, relationship to community, their staff, and emissaries are important to individual and families’ decision to be vaccinated. *Promotores* are important also in gathering information to contribute to the vaccine distribution and administration, planning implementation, and communications. Community-based organizations must be included in all planning and execution; they are a big part of the solution. Partnering with community-based organizations allows local officials to scale means and resources.

Dr. Jacob: As I have already mentioned, the Cambridge Public Health Department has had enormous success with COVID-19 testing and flu vaccinations by bringing these services to people in the communities where they live and work. We have taken a traditional grassroots approach—going door to door in harder-hit neighborhoods and providing information in eight languages—to build trust and understanding. We need to use this same approach with the COVID-19 vaccine and build on these robust community linkages, which are anchored to the long-standing relationships that we have with partners on the ground.

TFAH: As the chief public health officer for the city of Cambridge, Massachusetts, what is your department’s role in increasing vaccine

uptake in your community? What resources do you need to be successful?

Dr. Jacob: Local public health has an important role and responsibility in educating communities about the safety and importance of the COVID-19 vaccine, as it does with all vaccinations. Once the vaccine is made available to the general public, the Cambridge Public Health Department, through its partnership with city agencies and the private sector, will be ready to provide vaccines to residents. Throughout the pandemic, our department has worked hand in hand with city partners, especially first-responders, to provide testing and flu shots, and we will rely on this strong, successful relationship to provide the COVID vaccine. It is critically important to note that we could not do our work without strong financial support. Our city manager, Louis A. DePasquale, and the Cambridge City Council have provided financial resources to fight this pandemic and keep our residents and those who work in Cambridge safe. They have long been committed to the important work of the public health department, which is enhanced by the Cambridge Health Alliance led by Dr. Assaad Sayah, who is the commissioner of public health for the city of Cambridge.

Dr. Claude A. Jacob is the chief public health officer for the City of Cambridge, Massachusetts. He served as the president of the National Association of City and County Health Officials in 2016–2017.

Maria Lemus is the executive director of Visión y Compromiso, headquartered in San Francisco, California. Visión y Compromiso provides leadership, advocacy, and capacity-development training to community health workers.

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 their readiness, and to highlight a checklist of top-priority concerns and action areas, this report examines a set of 10 select indicators. The indicators, used consistently year to year, draw heavily from 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 A: Methodology" for scoring details), TFAH placed states into three performance tiers: high, middle, and low. (See Table 3.)

TABLE 3: State Public Health Emergency Preparedness
State performance, by scoring tier, 2020

Performance Tier	States	Number of States
High Tier	CO, CT, DC, DE, GA, ID, KS, MA, MD, ME, MS, NC, NE, NM, OK, RI, UT, VA, VT, WA, WI	20 states and DC
Middle Tier	AL, CA, FL, IA, IL, KY, LA, MI, MN, MT, ND, NJ, OR, TN, TX	15 states
Low Tier	AK, AR, AZ, HI, IN, MO, NH, NV, NY, OH, PA, SC, SD, WV, WY	15 states

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

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.

INDICATOR 1: ADOPTION OF NURSE LICENSURE COMPACT

KEY FINDING: 34 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 was starkly illuminated by the COVID-19 pandemic as healthcare capacity in some parts of the country was overwhelmed by the number of people needing care. In an event like a pandemic, the ability to quickly surge qualified medical personnel by bringing 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.

Throughout much of 2020, the COVID-19 pandemic placed extraordinary pressure on hospitals across the country as surging infections sent admissions soaring. 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. For example, New Jersey, which experienced one of the most severe outbreaks in spring 2020, began implementing the NLC, immediately qualifying out-of-state nurses with a multistate license to practice.¹⁷ “I think the COVID-19 outbreak is going to cause the states that are not in the compact now to really take a second look at it,” says NLC Director Jim Puente. “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.”

As of December 2020, 34 states had adopted the NLC, with Indiana and New Jersey being the most recent adopters.¹⁸ This was a net increase of two since 2019 and eight since 2017. Toni Herron, the education compliance officer of the Indiana State Board of Nursing, which joined the compact on July 1, 2020, said that the NLC “presents innovative ways for our Indiana nurses to improve both access to care for patients, while simultaneously reducing the regulatory burden on licensees.”¹⁹

TABLE 4: 34 States Participate in the Nurse Licensure Compact
Participants and nonparticipants, 2020

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

Note: Indiana and New Jersey joined the NLC in 2020.

Source: National Council of State Boards of Nursing.²⁰



INDICATOR 2: HOSPITAL PARTICIPATION IN HEALTHCARE COALITIONS

KEY FINDING: Widespread hospital participation in healthcare coalitions was common in 2017*; only four states (California, New Hampshire, Ohio, and South Carolina) reported 70 percent or less of their hospitals participated in coalitions supported by the HHS Hospital Preparedness Program.

The federal Hospital Preparedness Program (HPP), which is managed by the HHS Office of the Assistant Secretary for Preparedness and Response, provides cooperative agreements to states, localities, and territories to develop regional coalitions of healthcare organizations that collaborate to prepare for, and in many cases respond to, medical surge events.²¹ Coalitions prepare members with critical tools, including medical equipment and supplies, real-time information, enhanced communication systems, and exercises and training for healthcare personnel.²² A healthcare coalition must contain a minimum of two acute-care hospitals, emergency medical services, emergency management, and public health agencies.²³ Healthcare coalitions invest in local capacity to prepare for and respond to events, reducing jurisdictions' reliance on federal medical assets during disasters.

Broad and meaningful participation by hospitals in healthcare coalitions means that when disaster strikes, systems are in place to coordinate the response, freeing hospitals to focus on clinical care. In the past, healthcare coalitions have assisted in patient transfer, evacuations, and information sharing in events such as Hurricane Harvey in 2017.²⁴ More recently, the COVID-19 pandemic presented the most intense, widespread, and prolonged test of U.S. hospital systems in a century, threatening at several points to overwhelm facilities' capacities. Healthcare coalitions performed roles such as facilitating the transport of equipment and supplies, sharing

information about available beds and ICU capacity, and training healthcare workers on PPE use, treatments, and testing guidelines.²⁵ During a pandemic, coordination across a region is essential to alleviate pressure on any single facility, to promote cooperation and information sharing for supplies and bed availability, and to facilitate training of healthcare personnel.²⁶ The extent to which healthcare systems leveraged the resources of their coalitions during the pandemic is a subject that requires further research.

On average, 89 percent of hospitals in states belonged to a healthcare coalition in 2017, with universal participation, meaning every hospital in the state was part of a coalition, in 17 states (Alaska, Colorado, Connecticut, Delaware, Hawaii, Louisiana, Minnesota, Mississippi, Nevada, North Dakota, Oregon, Rhode Island, South Dakota, Utah, Vermont, Virginia, and Washington) and the District of Columbia. (See Table 5.) However, some states, such as Ohio (25 percent) and New Hampshire (47 percent) lagged behind.

The pandemic exposed major gaps in healthcare preparedness, mentioned in TFAH's 2020 report, including coordinating surge capacity across the healthcare system;²⁷ building and maintaining preparedness for high-consequence infectious diseases;²⁸ preparedness of facilities that serve people at higher risk, such as long-term care facilities; and lack of training and preparedness for events in healthcare.²⁹ Experts have also identified additional gaps, such as pediatric surge capacity,³⁰ burn capacity and other specialty

care needed for emerging threats, and ongoing stress on the healthcare system’s ability to provide emergency care. While healthcare coalitions can help address some of these vulnerabilities, systemwide approaches to preparedness are needed.

**This summary reflects the latest available data (2017). Because these data are no longer being updated, TFAH will consider replacing this measure in future assessments.*

TABLE 5: Widespread Participation of Hospitals in Healthcare Coalitions

Percent of hospitals participating in healthcare coalitions, 2017

States	Percent of Participating Hospitals
AK, CO, CT, DC, DE, HI, LA, MN, MS, NV, ND, OR, RI, SD, UT, VT, VA, WA	100%
ID, WI	98%
GA, WV	97%
KS	96%
AL, NE, NC, OK	95%
ME	94%
KY	93%
WY	92%
TN	91%
MI	90%
MD	89%
IL	88%
MO	87%
NY, PA	86%
MT	83%
MA, NJ	82%
AR	81%
IA, TX	80%
IN	75%
FL	73%
AZ	72%
NM	71%
CA	70%
SC	56%
NH	47%
OH	25%

Note: This indicator measures participation by hospitals in healthcare coalitions supported through the federal Hospital Preparedness Program of the Office of the Assistant Secretary for Preparedness and Response. The latest available data is from 2017.

Source: NHSPI analysis of data from the Office of the Assistant Secretary for Preparedness and Response, U.S. Department of Health and Human Services.³¹

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.³² 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.³³

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.³⁴

The PHAB and the EMAP each provide important mechanisms for improving evaluation and accountability. Accreditation by these entities demonstrates 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.^{35,36} States sometimes aim to meet applicable standards but do not pursue accreditation.

As of December 2020, 29 states and the District of Columbia were accredited by both the PHAB and the EMAP—a net increase of one (Delaware and Georgia are now accredited by the EMAP; Maryland transitioned from being accredited by both bodies to the PHAB only, with the EMAP providing conditional accreditation) since November 2019. Nevada is once again accredited by the EMAP, alongside an additional 12 states that have received accreditation from one or the other. (See Table 6.) “Over the last eighteen months we have worked diligently to review our processes, plans, and relationships,” said the director of Delaware’s Emergency Management Agency, A.J. Schall. “Over that time, we learned a tremendous amount and modernized procedures.”³⁷

Just eight states (Alaska, Hawaii, Indiana, 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 accreditation; the state may not have pursued 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.

TABLE 6: 42 States and the District of Columbia Accredited by the PHAB and/or EMAP
Accreditation status by state, December 2020

PHAB and EMAP			PHAB only	EMAP only	No Accreditation
Alabama	Idaho	New Mexico	Maine	Kentucky	Alaska
Arizona	Illinois	New York	Maryland	Michigan	Hawaii
Arkansas	Iowa	North Dakota	Minnesota	Nevada	Indiana
California	Kansas	Ohio	Montana	North Carolina	New Hampshire
Colorado	Louisiana	Oklahoma	Oregon	South Carolina	South Dakota
Connecticut	Massachusetts	Pennsylvania	Washington	Tennessee	Texas
Delaware	Mississippi	Rhode Island		Virginia	West Virginia
District of Columbia	Missouri	Utah			Wyoming
Florida	Nebraska	Vermont			
Georgia	New Jersey	Wisconsin			
29 states + DC			6 states	7 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.

Sources: NHSPI analysis of data from the PHAB and the EMAP.³⁸

INDICATOR 5: STATE PUBLIC HEALTH FUNDING TRENDS

Key Finding: Most states held their public health funding steady or increased it in FY 2020, but seven reduced funding.

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 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:³⁹

- 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, 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,⁴⁰ while 21 percent of local health department revenue is from state sources, on average.⁴¹

Fortunately, 43 states and the District of Columbia maintained or increased public health funding in FY 2020. (See Table 7.) But seven 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.) The COVID-19 economic recession has already had a severe impact on state revenue,⁴² which could constrain state public health funding levels over the coming years.

TABLE 7: State Public Health Funding Held Stable or Increased in 43 states and DC
Public Health Funding, by state FY 2019 – 2020

State	Percentage Change
Alabama	-4%
Alaska	118%
Arizona	52%
Arkansas	-2%
California	40%
Colorado	9%
Connecticut	8%
Delaware	8%
District of Columbia	2%
Florida	8%
Georgia	3%
Hawaii	-2%
Idaho	2%
Illinois	7%
Indiana	0%
Iowa	-3%
Kansas	13%
Kentucky	1%
Louisiana	3%
Maine	24%
Maryland	4%
Massachusetts	4%
Michigan	14%
Minnesota	78%
Mississippi	2%
Missouri	-1%
Montana	2%
Nebraska	7%
Nevada	15%
New Hampshire	11%
New Jersey	2%
New Mexico	8%
New York	0.3%
North Carolina	2%
North Dakota	31%
Ohio	13%
Oklahoma	29%
Oregon	0.5%
Pennsylvania	-0.4%
Rhode Island	3%
South Carolina	3%
South Dakota	2%
Tennessee	9%
Texas	28%
Utah	9%
Vermont	7%
Virginia	-6%
Washington	6%
West Virginia	6%
Wisconsin	2%
Wyoming	8%



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Note: While states received federal one-time COVID response funding, those funds are not included in these tallies, as all federal funds are excluded from this measure. However, in some cases, state funding for pandemic response may have been included in the data reported to TFAH. For some states, COVID response funding may have resulted in an increase in the state's overall public health expenditure for the year. Other states may have reallocated money from one line to another with little impact on the overall funding level.

Owing to differences in organizational responsibilities and budgeting, funding data are not necessarily comparable across states. See "Appendix A: 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, and the efficient operation of the healthcare system. In the United States, the vast majority of the population gets water from a public water system,⁴³ and the U.S. Environmental Protection Agency (EPA) sets legal limits on contaminants in drinking water, including microorganisms, disinfectants, and their byproducts, chemicals, and radionuclides;⁴⁴ the EPA also requires states to periodically report drinking-water quality information.⁴⁵ 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.⁴⁶

The United States has one of the safest public drinking-water supplies in the world, but some communities, particularly low-income communities, struggle to maintain 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 supply 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 toxins.⁴⁷ In 2019, residents of Newark, New Jersey, had to rely on bottled water due to high levels of lead in their tap

water.⁴⁸ In children, even low levels of lead exposure can damage the nervous system and contribute to developmental delays, learning disabilities, weight and hearing loss.⁴⁹ 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.^{50,51} Among the health effects of long-term exposure to unsafe levels of benzene is a decrease in red blood cells, which can lead to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.⁵²

Other water-related emergencies and concerns in the United States include harmful algal blooms,⁵³ which can impact human and animal health, the safety of seafood, damage the economies of affected communities, increase the presence of toxic chemicals like per- and polyfluoroalkyl substances (PFAS), and reduce the availability of clean water during power outages,⁵⁴ 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.

New CDC data indicate waterborne pathogens cause nearly 7,000 deaths, seven million illnesses and more than \$3 billion in healthcare costs each year. The risks around drinking water disproportionately threaten communities of color, highlighting the impact historical structural racism and continued institutional bias can have on a critical resource most Americans take for granted. 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.⁵⁵

According to the EPA, across the nation, 5 percent of state residents on average used a community water system in 2019 that failed to meet all applicable health-based standards, down from 7 percent in 2018. That share was 0 to 1 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.

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 American households get their drinking water from private wells.⁵⁶ The data reported by this indicator do not reflect the water quality of those households. 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 because of an uncovered reservoir, but it has no current violations with respect to contaminants.

Source: NHSPI analysis of data from the EPA.⁵⁷

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 2019. Most states were closely clustered to that midpoint, with few outliers.

Note: 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.

The need for paid time off was obvious during the pandemic, when frontline and essential workers—people who could not work from home during the outbreak—were often compelled to work when sick themselves or caring for a sick family member. Black and Hispanic workers typically have less access to paid sick leave and are overrepresented in groups of frontline workers.⁵⁸

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 food service, older adults and nursing care facilities and childcare commonly have no paid sick leave.⁵⁹ Low-wage workers⁶⁰ and workers of color are also less likely to have access to paid leave compared with white and higher-earning workers.⁶¹ 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.^{62,63}

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.^{64,65} When employees who previously did not have access are granted paid or unpaid sick leave, rates of flu infections decrease.⁶⁶

During the COVID-19 pandemic, studies consistently showed that access to paid sick leave helped slow the spread of the virus.⁶⁷ The Families First Coronavirus Response Act helped temporarily address this issue for employers with fewer than 500 employees and certain public employers, temporarily requiring employees to be paid sick leave benefits 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 employers to offer paid sick leave.⁶⁸

But many workers, particularly low-wage workers, did not have access to paid sick leave during the pandemic and were therefore left to make impossible choices between protecting their health and that of their family or protecting their financial security. State paid leave laws helped in a few jurisdictions. Beginning in March 2020, two states with existing state paid sick leave policies, California and Rhode Island, experienced large increases in temporary disability and family caregiving leave claims. California claims rose by 43 percent between February and March 2020.⁶⁹ Rhode Island claims nearly tripled between February and March 2020.⁷⁰ A January Biden administration proposal, if adopted by Congress, would provide paid leave to people who are: sick with

Covid-19 symptoms; quarantining because of Covid-19 exposure; needing time off to get the vaccine; caring for family members who are sick with Covid-19 symptoms; caring for children whose school or day care center is closed because of the pandemic; caring for older relatives or adult dependents whose long-term care facility is closed because of the pandemic.⁷¹

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.⁷²

In 2019, 55 percent of workers in states, on average, took some type of paid time off—the same percentage as in 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.⁷³ Connecticut (64 percent), the District of Columbia (65 percent), Mississippi and Oregon (63 percent), and Texas (68 percent) stood out as states where relatively high percentages of workers used such benefits, whereas fewer workers used them in Arkansas (45 percent), South Carolina (45 percent), South Dakota (44 percent), Utah (45 percent), and Wyoming (47 percent).⁷⁴ (See Table 9.)

TABLE 9: 55 Percent of Workers, On Average, Used Paid Time Off
Percent of employed population that took paid time off, 2019

States	Percent of Workers
TX	68%
DC	65%
CT	64%
MS, OR	63%
MD, NM, NY	61%
AK, IA, WA	60%
GA, HI, MA	59%
MT, VA	58%
NE	57%
CA, CO, KS, RI, VT, WI	56%
AL, IL, NV, OK, WV	55%
FL, NH	54%
LA, MO, TN	53%
MN, NJ	52%
ID, IN, ME, NC, ND, PA	51%
MI, OH	49%
AZ, DE, KY	48%
WY	47%
AR, SC, UT	45%
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.

Source: NHSPI analysis of data from the Annual Social and Economic Supplement of the Current Population Survey.⁷⁵

INDICATOR 8: FLU VACCINATION RATE

KEY FINDING: Flu vaccination coverage rose for the second consecutive year during the 2019–2020 season, with a greater share of every age group analyzed receiving a vaccine. Overall, 52 percent of U.S. residents ages 6 months or older received vaccinations—still well below the overall target level of 70 percent of the population vaccinated annually.

The CDC recommends that, with few exceptions, everyone ages 6 months or older get vaccinated for seasonal influenza annually; yet, year after year, even with a steady increase among adults over the past three decades, coverage estimates indicate that just over half of Americans do.⁷⁶ *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.⁷⁷

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 help prepare the country to vaccinate all Americans quickly during the pandemic. 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. During 2021, as the country works to deliver the COVID-19 vaccine, seasonal flu vaccination programs provide important process lessons, networks, communications strategies, and goals for the COVID-19 vaccination effort.

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 act. Some barriers to flu vaccination may



include a belief that the vaccine does not work very well; misconceptions about the safety of the vaccine;⁷⁸ or a belief that the flu does not carry serious risks.⁷⁹ State laws may also make it more difficult for parents to get their children vaccinated by a pharmacist, as some states do not allow children to get flu vaccines at a pharmacy and even more have age restrictions and/or require a physician’s prescription.

During the 2019–2020 flu season, 52 percent of residents ages 6 months or older were vaccinated, according to the CDC, the highest rate in at least a decade. This was a notable uptick from 42 percent during the 2017–2018 flu season. One possible explanation is the increased awareness of the public, clinicians, and public health officials about the importance of vaccination, owing to the high number of illnesses and deaths two years prior. The major role that vaccination will play in the country’s—and the world’s—recovery from the extraordinarily deadly COVID-19 pandemic will, hopefully, make an indelible impression on all Americans about the value of vaccination.

Across the country, states have taken noteworthy actions to vaccinate residents against seasonal flu. For example, during the 2018–2019 flu season, the Tennessee Department of Health organized statewide Fight Flu TN events with vaccination clinics, and last year, it launched a statewide media campaign.⁸⁰ The state’s flu vaccine rate (ages 6 months or older) increased from 36 percent during the 2017–2018 flu season to 49 percent during the 2019–2020 season. Indiana’s Department of Health has also engaged in focused efforts to increase vaccination rates, particularly among people who are uninsured or underinsured. One way it has done this is by partnering with local health departments and pharmacies to provide vaccinations, and by working with the Indiana Immunization Coalition to create education and outreach materials and social media messaging.⁸¹ Indiana’s flu vaccination rate (ages 6 months or older) improved from 37 percent for the 2017–2018 flu season to 51 percent for the 2019–2020 season.

Rhode Island (61 percent), Connecticut (61 percent), and Massachusetts (61 percent) had the highest coverage, while vaccination rates were lowest in Nevada (44 percent), Florida (45 percent), and Idaho (45 percent). (See Table 10.)

Children, particularly young children, were more likely to receive vaccinations than were adults. Nearly 64 percent of those ages 6 months to 17 years received vaccinations in 2019–2020, compared with 48 percent of adults.⁸²

TABLE 10: Just Over Half of Americans Received a Seasonal Flu Vaccination
States’ seasonal flu vaccination rates for people ages 6 months or older, 2019–2020

State	Vaccination Rate, Ages 6 Months or Older
Rhode Island	60.9
Connecticut	60.7
Massachusetts	60.6
Virginia	58.8
South Dakota	58.7
Nebraska	58.3
Wisconsin	58.3
Maryland	57.8
District of Columbia	57.6
New Hampshire	57.6
Vermont	57
Iowa	56.6
North Dakota	56.5
Minnesota	56.3
Washington	56.3
Pennsylvania	56.1
North Carolina	55.8
Colorado	55.6
Maine	55.6
Delaware	55
Arkansas	54.9
Kansas	54.5
New Jersey	54
Oklahoma	54
New Mexico	53.2
New York	52.9
Illinois	52.2
West Virginia	52.2
Utah	51.9
Oregon	51.4
California	51.3
Hawaii	51
Ohio	51
Kentucky	50.9
Indiana	50.8
South Carolina	50.7
Missouri	50.2
Michigan	49.7
Montana	49.6
Tennessee	49.1
Alabama	48.4
Louisiana	47.5
Texas	47.3
Wyoming	47.3
Arizona	46.5
Georgia	45.9
Mississippi	45.9
Alaska	45.8
Idaho	44.9
Florida	44.5
Nevada	44.4

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

Source: Centers for Disease Control and Prevention.^{83,84}

INDICATOR 9: PATIENT SAFETY IN HOSPITALS

KEY FINDING: On average, 31 percent of hospitals received an “A” grade in the fall 2020 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.^{85,86} 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 an active setting for viral transmission, threatening the safety of patients, staff and visitors, and also discouraging people in need of urgent or emergency care from going to the ER, likely contributing to overall excess mortality.⁸⁷ But universal masking and availability and proper use of 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.

The Leapfrog Group calculates its hospital safety score by using 28 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.⁸⁸ 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 2020 assessment, 31 percent of general acute-care hospitals across the United States, on average, met the requirements for an “A” grade—a slight increase from fall 2018, when the share was 28 percent. But results varied widely state to state, from no hospitals in Alaska, North Dakota, or South Dakota receiving the top score, to a majority of hospitals doing so in Maine (63 percent), Idaho (58 percent), Delaware (57 percent), Massachusetts (57 percent), Oregon (55 percent), Virginia (53 percent), and North Carolina (52 percent). (See Table 11.)

TABLE 11: Hospital Patient Safety Scores Vary Significantly by State
States percentage of hospitals with “A” grade, fall 2020

State	Percent of Hospitals
Maine	63%
Idaho	58%
Delaware	57%
Massachusetts	57%
Oregon	55%
Virginia	53%
North Carolina	52%
Vermont	50%
Colorado	48%
Pennsylvania	47%
Utah	46%
Hawaii	45%
Texas	43%
Michigan	43%
Washington	40%
Maryland	38%
New Jersey	37%
Ohio	37%
Florida	36%
California	36%
Kentucky	36%
South Carolina	34%
Illinois	34%
Tennessee	33%
Wyoming	33%
Georgia	32%
Kansas	32%
Connecticut	32%
Mississippi	30%
Louisiana	29%
Rhode Island	29%
Arizona	26%
Wisconsin	24%
Missouri	24%
Minnesota	23%
Oklahoma	23%
Montana	22%
Nevada	21%
District of Columbia	20%
Alabama	20%
Indiana	19%
New Mexico	17%
Iowa	16%
New Hampshire	15%
New York	10%
Arkansas	7%
Nebraska	6%
West Virginia	5%
Alaska	0%
North Dakota	0%
South Dakota	0%

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

Source: The Leapfrog Group.⁸⁹



INDICATOR 10: STATE SURGE CAPACITY

KEY FINDING: Every state reported having a plan in 2020 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.⁹⁰

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.”⁹¹ 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.⁹² 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 the CDC authorized to conduct testing.⁹³ 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 2020.⁹⁴ Testing capacity increased over time, as private labs received authorization and ramped up capacity, and as a variety of rapid molecular tests were manufactured and approved for use at home; but the processing of the CDC’s 2019-nCoV Real-Time RT-PCR Diagnostic Panel assisted officials throughout with monitoring the course of the pandemic. Still, the country’s testing capacity never reached what most experts argued was necessary to allow for comprehensive, timely surveillance of the virus’s spread during the height of the pandemic. This problem was most acute in spring 2020, when an estimated one in 10 infections were confirmed, improving somewhat to roughly one in three in late 2020.^{95,96}

In addition, public health laboratories are studying the genetic sequencing of the COVID-19 virus to identify variants. Such genomic surveillance is critical to understanding and preventing the spread of the virus but more federal funding is needed to support the work.⁹⁷

Going forward, some challenges to the effectiveness of public health laboratory preparedness include funding gaps to invest in infrastructure and modernization, workforce shortages, a lack of standardized platforms to exchange data electronically, and a limited ability to detect radiological, nuclear, and chemical threats.⁹⁸

In 2020, the District of Columbia and all states reported to the Association of Public Health Laboratories that they had a plan for a six- to eight-week surge in testing capacity, a net increase of six since 2017 and 2018. (See Table 12.)

TABLE 12: Every State Planned for a Laboratory Surge.
State public health laboratories with a plan for a six- to eight-week surge in testing capacity, 2020

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

Note: This indicator tracks only the existence of a plan, not its quality or comprehensiveness, or the frequency with which it is used or tested.
Source: Association of Public Health Laboratories.⁹⁹



TABLE 13: INDICATORS OF PUBLIC HEALTH EMERGENCY PREPAREDNESS

	Nurse Licensure Compact (NLC)	Hospital Preparedness Program	Public Health Accreditation Board (PHAB)	Emergency Management Accreditation Program (EMAP)	Public Health Funding	Water Security
	State participates in NLC, 2020	Percent of hospitals participating in health care coalitions, 2017	Accredited by PHAB, 2020	Accredited by EMAP, 2020	Percentage change, FY 2019-20	Percent of population who used a community water system in violation of health-based standards, 2019
Alabama	✓	95%	✓	✓	-4%	2%
Alaska		100%			118%	4%
Arizona	✓	72%	✓	✓	52%	5%
Arkansas	✓	81%	✓	✓	-2%	8%
California		70%	✓	✓	40%	1%
Colorado	✓	100%	✓	✓	9%	2%
Connecticut		100%	✓	✓	8%	3%
Delaware	✓	100%	✓	✓	8%	2%
D.C.		100%	✓	✓	2%	5%
Florida	✓	73%	✓	✓	8%	3%
Georgia	✓	97%	✓	✓	3%	7%
Hawaii		100%			-2%	0%
Idaho	✓	98%	✓	✓	2%	1%
Illinois		88%	✓	✓	7%	1%
Indiana	✓	75%			0%	1%
Iowa	✓	80%	✓	✓	-3%	4%
Kansas	✓	96%	✓	✓	13%	5%
Kentucky	✓	93%		✓	1%	4%
Louisiana	✓	100%	✓	✓	3%	13%
Maine	✓	94%	✓		24%	1%
Maryland	✓	89%	✓		4%	0%
Massachusetts		82%	✓	✓	4%	7%
Michigan		90%		✓	14%	2%
Minnesota		100%	✓		78%	0%
Mississippi	✓	100%	✓	✓	2%	8%
Missouri	✓	87%	✓	✓	-1%	9%
Montana	✓	83%	✓		2%	8%
Nebraska	✓	95%	✓	✓	7%	2%
Nevada		100%		✓	15%	0%
New Hampshire	✓	47%			11%	2%
New Jersey	✓	82%	✓	✓	2%	16%
New Mexico	✓	71%	✓	✓	8%	6%
New York		86%	✓	✓	0%	45%
North Carolina	✓	95%		✓	2%	2%
North Dakota	✓	100%	✓	✓	31%	0%
Ohio		25%	✓	✓	13%	1%
Oklahoma	✓	95%	✓	✓	29%	15%
Oregon		100%	✓		0%	16%
Pennsylvania		86%	✓	✓	0%	9%
Rhode Island		100%	✓	✓	3%	4%
South Carolina	✓	56%		✓	3%	3%
South Dakota	✓	100%			2%	4%
Tennessee	✓	91%		✓	9%	4%
Texas	✓	80%			28%	4%
Utah	✓	100%	✓	✓	9%	5%
Vermont		100%	✓	✓	7%	0%
Virginia	✓	100%		✓	-6%	3%
Washington		100%	✓		6%	0%
West Virginia	✓	97%			6%	16%
Wisconsin	✓	98%	✓	✓	2%	5%
Wyoming	✓	92%			8%	2%
51-state average	N/A	89%	N/A	N/A	12%	5%

Note: See "Appendix A: Methodology" for a description of TFAH's data-collection process and scoring details. States with conditional or pending accreditation at the time of data collection were classified as having no accreditation. Some state residents use private drinking-water sources, rather than community water systems. Private sources are not captured by these data. Only regulated contaminants are measured. Paid time off includes sick leave, vacations, and holidays. The patient safety measure captures only general acute-care hospitals.

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, 2019	Seasonal flu vaccination rate for people ages 6 months or older, 2019-20	Percentage of hospitals with "A" grade, fall 2020	Public health laboratories had a plan for a six- to eight-week surge in testing capacity, 2020	Scoring tier, 2020
Alabama	55%	48.4	20%	✓	Middle
Alaska	60%	45.8	0%	✓	Low
Arizona	48%	46.5	26%	✓	Low
Arkansas	45%	54.9	7%	✓	Low
California	56%	51.3	36%	✓	Middle
Colorado	56%	55.6	48%	✓	High
Connecticut	64%	60.7	32%	✓	High
Delaware	48%	55	57%	✓	High
D.C.	65%	57.6	20%	✓	High
Florida	54%	44.5	36%	✓	Middle
Georgia	59%	45.9	32%	✓	High
Hawaii	59%	51	45%	✓	Low
Idaho	51%	44.9	58%	✓	High
Illinois	55%	52.2	34%	✓	Middle
Indiana	51%	50.8	19%	✓	Low
Iowa	60%	56.6	16%	✓	Middle
Kansas	56%	54.5	32%	✓	High
Kentucky	48%	50.9	36%	✓	Middle
Louisiana	53%	47.5	29%	✓	Middle
Maine	51%	55.6	63%	✓	High
Maryland	61%	57.8	38%	✓	High
Massachusetts	59%	60.6	57%	✓	High
Michigan	49%	49.7	43%	✓	Middle
Minnesota	52%	56.3	23%	✓	Middle
Mississippi	63%	45.9	30%	✓	High
Missouri	53%	50.2	24%	✓	Low
Montana	58%	49.6	22%	✓	Middle
Nebraska	57%	58.3	6%	✓	High
Nevada	55%	44.4	21%	✓	Low
New Hampshire	54%	57.6	15%	✓	Low
New Jersey	52%	54	37%	✓	Middle
New Mexico	61%	53.2	17%	✓	High
New York	61%	52.9	10%	✓	Low
North Carolina	51%	55.8	52%	✓	High
North Dakota	51%	56.5	0%	✓	Middle
Ohio	49%	51	37%	✓	Low
Oklahoma	55%	54	23%	✓	High
Oregon	63%	51.4	55%	✓	Middle
Pennsylvania	51%	56.1	47%	✓	Low
Rhode Island	56%	60.9	29%	✓	High
South Carolina	45%	50.7	34%	✓	Low
South Dakota	44%	58.7	0%	✓	Low
Tennessee	53%	49.1	33%	✓	Middle
Texas	68%	47.3	43%	✓	Middle
Utah	45%	51.9	46%	✓	High
Vermont	56%	57	50%	✓	High
Virginia	58%	58.8	53%	✓	High
Washington	60%	56.3	40%	✓	High
West Virginia	55%	52.2	5%	✓	Low
Wisconsin	56%	58.3	24%	✓	High
Wyoming	47%	47.3	33%	✓	Low
51-state average	55%	52.8	31%	N/A	N/A

Ready or Not 2021

Recommendations for Policy Actions

As 2020 has shown, saving lives and protecting the country's economic stability during a pandemic requires pre-event investment and planning, a strong public health system, federal leadership, and a coordinated response. The same is true for all types of public health emergencies. Effective preparedness and response require sufficient funding, a trained workforce, and multisector teamwork. Authentic engagement with community-based leaders and organizations are also necessary.

TFAH based the following policy recommendations on research and analysis, consultation with experts, and a review of gaps in federal and state preparedness. TFAH offers the following recommendations for federal, state, local, tribal, and territorial policymakers and other stakeholders to improve public health emergency readiness.

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

The COVID-19 pandemic has uncovered the tragic consequences of the nation's long-term neglect of public health capacity at the global, federal, state, local, tribal, and territorial levels. Understaffed health departments are in some cases using 20th-century tools, such as telephones and fax machines,^{100,101} to respond to a 21st-century pandemic.¹⁰² At the same time, 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 just over one-quarter since FY2003, or about half, after adjusting for inflation.¹⁰³ The HPP,

the only 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.¹⁰⁴ Therefore, health departments were already working from a deficit when the pandemic emerged. Federal policymakers need to rapidly improve the COVID-19 response and build back a system currently unprepared to address future emergencies. Short-term investments made through COVID response funding legislation cannot fill the gap left by ongoing public health funding shortfalls, nor can they address underlying health inequities that are making the nation less resilient.

RECOMMENDATIONS FOR FEDERAL GOVERNMENT:

- **Rebuild and modernize the public health system, including by creating a mandatory \$4.5 billion per year Public Health Infrastructure Fund to support foundational public health capabilities at the state, local, territorial, and tribal levels (STLT).** Strong foundational capabilities would improve the protection of all communities across a range of threats. However, a nationwide funding shortage, exacerbated by the pandemic, has prevented health departments across the country from developing and maintaining these capabilities. An additional funding limitation is that health departments receive very little funding that is not tied to specific diseases or categories. Congress should invest in cross-cutting public health capabilities, such as proposed in the Public Health Infrastructure Saves Lives Act.¹⁰⁵ Congress must also increase funding for specific programs that support health security, including the Public Health Emergency Preparedness and the HPP cooperative agreements. These state and local preparedness programs have demonstrated their value by saving lives, improving the speed and quality of response 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 the CDC and ensure the agency has the capacity to respond to any event.
- **Invest in sustained public health data modernization.** Sustained investment in health data systems at the federal, state, and local levels is imperative. The CDC is the world's premier public health agency, yet years of inadequate funding has



meant that the agency and its partners are reliant on archaic data systems. Americans felt the pain of delayed and disjointed disease surveillance throughout the pandemic, as the public health surveillance infrastructure relied on antiquated, disconnected systems and methods for tracking and responding to diseases. Congress wisely invested \$500 million in the Coronavirus Aid, Relief, and Economic Security Act (P.L.116-136) and \$50 million in the FY 2020 and FY 2021 appropriations bills as a down-payment on the CDC's data modernization initiative. These investments will help build the foundations for data sharing across public health, modernize the 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 \$450 million in immediate funding and at least \$100 million per

year to the CDC's data modernization initiative to modernize and sustain these systems. New data systems should be interoperable and cloud-based.

- **Ensure complete, disaggregated demographic data collection and reporting during public health emergencies.** The gaps in COVID-19 data reporting by race, ethnicity, sexual identity, gender identity, primary language, disability 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 public health. Congress should invest in data modernization for STLT public health to enable accurate and comprehensive data collection. In addition, HHS should stand up a task force—including the Office of the Assistant Secretary for Planning and Evaluation, CDC, Office of the National Coordinator on Health Information Technology, Office of Minority Health,

and CMS, in consultation with state, local, territorial and tribal agencies 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 to report race and ethnicity during public health emergencies.¹⁰⁶

- **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 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 recommit to partnerships with international bodies such as the WHO, and Congress should solidify America’s role as a global health leader, commit to implementing the Global Health Security Strategy,¹⁰⁷ and provide sustained annual funding for global health security programs at the CDC and the U.S. Agency for International Development. Congress should fund and the CDC should implement the modernization of the U.S. quarantine system, including IT systems, quarantine stations, regulatory framework, and traveler engagement and information.

Editor’s note: on January 21, 2021, the Biden administration restored U.S. membership in the WHO.

RECOMMENDATION FOR FEDERAL AND STATE GOVERNMENT:

- **Enable efficient use of emergency funding.** During an emergency, responding agencies at all levels of government must be able to adapt spending policies. States should review their administrative preparedness to ensure they can efficiently use emergency monies, including speeding up contracting and hiring procedures. In addition, Congress may allocate emergency funding to multiple federal agencies. However, differing agency policies and practices can impede speed and coordination of funding across agencies. This can lead to

disconnected and less effective emergency responses on the ground. The Office of Management and Budget, HHS, and FEMA should allow waivers of regulatory or administrative requirements to awardees of emergency response funding to allow funding braiding, to encourage coordination between programs and funding streams with similar goals, to provide flexibility to best meet the needs of the affected populations, and to increase efficiencies and reduce administrative duplication, such as in grant reporting.

Priority Area 2: Prevent Outbreaks and Pandemics

Infectious diseases represent a threat to the health, safety, and economic and social stability of the country. The COVID-19 pandemic has cost the nation hundreds of thousands of lives and at least \$16 trillion in losses to the U.S. gross domestic product as of October 2020.¹⁰⁸ The toll in lost educational achievement

and long-term mental health impacts have yet to be fully understood. As TFAH, scientists, and public health experts have warned for many years, the nation was not prepared for a severe pandemic. At the same time as the nation battles the worst pandemic in a century, public health and medical providers continue

to respond to “everyday” outbreaks: seasonal influenza, vaccine-preventable diseases, healthcare-associated infections, and antibiotic resistance continue to pose threats to health and safety. 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.**

The CDC’s immunization program, sometimes called the “317 program,” supports state and local immunization systems to increase vaccination rates among uninsured and underinsured adults and children, to respond to outbreaks, to educate the public, to target hard-to-reach populations, to improve vaccine confidence, to establish partnerships, and to improve information systems. Yet, funding has not kept up with needs, as states have to spend immunization dollars to respond to outbreaks,¹⁰⁹ deal with increases in the numbers of residents who lack health insurance,¹¹⁰ and attempt to manage the impact of vaccine underutilization. State, local, and tribal health departments are depending on this underfunded infrastructure to distribute and dispense the COVID-19 vaccine, yet COVID funding was not distributed until January 2021. Congress should monitor the COVID-19 vaccination progress and provide additional funding, if needed. Congress should also increase annual funding for the CDC’s immunization program as well as the seasonal influenza program and post-licensure vaccine safety monitoring. Congress should also provide needed resources

to HHS to study the causes of vaccine resistance and to educate clinical providers on methods for improving vaccine acceptance, such as those proposed in the VACCINES Act.¹¹¹

- **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, as cost sharing, such as co-pays, can be a significant barrier to vaccination.¹¹² 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.¹¹³ An example of legislation that takes steps to improve senior vaccination rates is the Protecting Seniors Through Immunization Act. CMS should encourage state Medicaid plans in states that have not expanded Medicaid to cover all ACIP-recommended vaccines without cost sharing.¹¹⁴

- **Significantly increase investments in public health initiatives to combat antibiotic resistance.** Congress should increase funding for innovative

prevention methods of detecting and containing outbreaks supported by the Antibiotic Resistance Solutions Initiative at the CDC. The 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 healthcare associated infection/antibiotic resistance programs and activities at state and local health departments. In addition, increases in funding are necessary to build global capacity to prevent and detect resistant infections and to combat the threat to national security.

- **Create incentives for new-product discovery to fight 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; (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 with limited budgets and limited research and development capacity. Legislation, such as the DISARM Act, would strengthen the market for antibiotic developers, improving patient access for those who need it most.

- **Eliminate overuse of antibiotics in agriculture.** The FDA should enforce rules regarding veterinary oversight and 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 the WHO,¹¹⁵ 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.** The CDC estimates that improving prescribing practices and preventing infections could save 37,000 lives over five years.¹¹⁶ CMS should finalize, implement, and enforce requirements for all CMS-enrolled facilities to have effective antibiotic stewardship programs that align with the CDC's Core Elements guidance and

to work with public health stakeholders to track progress in prescribing rates and resistance patterns.¹¹⁷ 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 the CDC's Core Elements.¹¹⁸

- **Fund the CDC to support state and local public health laboratories.** The CDC should be sufficiently funded to strengthen the Laboratory Response Network and to support state and local public health laboratories; currently, the Epidemiology and Laboratory Capacity grant is only funding approximately half of what laboratories and health department epidemiologists nationwide have requested.

RECOMMENDATIONS FOR FEDERAL AND STATE GOVERNMENT:

- **Provide job-protected paid leave.** The pandemic has called attention to the fact that paid family 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 policies that enable universal childhood vaccinations to ensure children, their classmates, educators, and the general public are protected from vaccine-preventable diseases. This includes eliminating nonmedical exemptions and opposing legislation to expand exemptions.¹¹⁹ States should ensure medical vaccine exemptions are only given when appropriate and are not used as a de facto personal-belief exemption in states where those exemptions have been eliminated. States should require healthcare personnel to receive

all ACIP-recommended vaccinations to protect staff and patients, assure continuity of operations in the event of an outbreak, and achieve necessary healthcare infection control. As this report was being prepared for publication, the COVID-19 vaccine was not an ACIP-required vaccine. Healthcare facilities should ensure access 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 the CDC's National Healthcare Safety Network.

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

Social, economic, and health disparities impact how people within specific communities' experience disasters and how quickly they can recover. Unfortunately, the disproportionate impact of COVID-19 on communities of color and Tribal Nations was foreseeable: underlying health conditions driven by years of structural racism; uneven access to prevention and care during the pandemic; increased risk of exposure due to being frontline workers, such as in food processing, food service, or healthcare;¹²⁰ increased

risk of exposure due to living in crowded or inadequate housing;¹²¹ and more severe economic impacts for lower-income workers has meant that people of color and Tribal Nations are bearing a disproportionate burden from the pandemic. When intersectional issues, such as homelessness, incarceration, disability, age, lack of access to paid leave, LGBTQ+ status, and immigration status are also at play, the inequities are more pronounced. Addressing underlying inequities and intentionally and meaningfully

engaging with the people and communities most likely to be impacted throughout the emergency planning and response process are critical to reducing vulnerability and ensuring that all receive appropriate services, regardless of circumstance. Equity must be an explicit and foundational principle in all emergency planning. Some communities have taken steps to integrate principles of equity throughout public health emergency activities,¹²² but more needs to be done.

RECOMMENDATIONS FOR FEDERAL, STATE, AND LOCAL GOVERNMENT:

- **Examine and address gaps in equity in response capabilities.** An external body (such as the GAO or the National Academy of Sciences, Engineering and Medicine) should conduct an assessment of the pandemic specifically focused on gaps in equitable response, including inequities in allocation of scarce resources, healthcare capacity, data collection and reporting, and planning for communities at higher risk, underserved communities, and communities of color.
- **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,¹²³ 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; 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. The legislation would strengthen SDOH capacity at the 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 PHACCS reports.^{124,125}
- **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 should direct targeted resources to community-based organizations and existing community health networks that focus on the health of communities of color and other groups that bear a disproportionate burden during disasters. Evacuation plans should be inclusive of the community as a whole by meeting and enforcing the requirements of the Americans with Disabilities Act. Grants should support culturally 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, and 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. Congress should provide the CDC funding to extend its COVID-19 Health Equity Strategy¹²⁶ to ongoing preparedness and response work at the agency and with partners. All state and local 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 is engaged in every emergency operation center activation. Health equity and emergency preparedness officials should work across programs to incorporate equity issues and goals into preparedness

policies and plans;¹²⁷ 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 advance equity before and during events.

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.** Emergencies can exacerbate existing mental health and substance use concerns and disrupt access to care.

During the COVID-19 pandemic, there have been reports of increases in a number of mental health concerns,¹²⁸ including suicide ideation¹²⁹ and drug overdoses.¹³⁰ Short-term regulatory relief, like take-home medication for opioid use disorder¹³¹ and waivers for telehealth,¹³² have helped, but coordination among state, local, and federal agencies remains vital to delivering resources to affected communities. Policymakers should also incorporate behavioral health needs into disaster planning, as required by the Pandemic and All-Hazards Preparedness and Advancing Innovation Act.

Priority Area 4: Ensure Effective Leadership, Coordination, and Workforce

The political polarization and contradictory messaging exhibited throughout the pandemic contributed to a wide variation in how individuals and communities responded. Issues such as face coverings, business- and school-closure decisions, and even the mortality numbers became matters for debate by a vocal minority of Americans.¹³³ Clear national leadership and communication, following the advice of public health and scientific experts, is needed to ensure consistent policies and messaging during a situation as complicated and dangerous as a public health emergency. Perhaps

more important than any technology or invention is the presence of trained, experienced people, from the frontline responder to the top of government. The nation's local public health departments responded to the pandemic with an estimated 26,000 fewer public health workers compared with before the 2008 recession.¹³⁴ The state budget cuts likely to continue in the years following the pandemic threaten to intensify this workforce shortage. Effective crisis response requires coordination, cooperation, and leadership—elements that governments must build and sustain over time.

RECOMMENDATIONS FOR FEDERAL 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. The 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 across jurisdictions. The optimal approach is a federal-state partnership rooted in shared decision-making and a clear division of labor.
- **Rebuild trust in federal public health agencies.** The COVID-19 pandemic has damaged faith in federal agencies, including public health agencies such as

the CDC and the FDA. Policy decisions from the federal to the local level should be based on the best available science, led by public health experts, and free from any perception of political interference. The president, the HHS secretary, and the leadership of federal public health and emergency response agencies, including the CDC, ASPR, DHS, FEMA and the FDA, must conduct a thorough review on the independence and performance of these agencies. Leaders should establish procedures and policies to ensure the scientific integrity and independence of the agencies, without political interference, and they must correct any errors made during the COVID-19 response. At the same time, elected leaders must publicly support public health to rebuild confidence in those agencies and officials. All federal messages and messengers about public health issues must be consistent and based in science.



Sundry Photography

- **The White House should reestablish a health security directorate with public health expertise.** The White House should ensure senior advisors to the president have a strong background in public health and/or biodefense, and the White House should ensure that senior-level interagency cooperation is progressing before, during, and after public health emergencies.
Editor's note: on January 20, 2021, the Biden administration reestablished a National Security Council Directorate for Global Health Security and Biodefense.
- **Invest in public health communications.** Congress must make a significant investment in effective public health communications, including research into best practices for different audiences. The 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. From vaccines to mask-wearing, there are subgroups of Americans who are skeptical, hesitant, or confused about COVID-19 public health guidance for various reasons. While some will be recalcitrant, many Americans are simply hesitant or have not been properly engaged. 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.
- **Clarify and restore roles and responsibilities for government's emergency support functions.** The White House, HHS, CDC, ASPR, U.S. Department of Homeland Security, FEMA, and FDA should work together to clarify roles and responsibilities to improve the nation's emergency preparedness and response capacity.
- **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, and epidemiology. Congress should also invest in public health workforce development and retention programs, such as student loan repayment and other incentives, especially in underserved areas. Public health schools should incorporate health equity and cultural competency into their preparedness curricula.

Priority Area 5: Accelerate Development and Distribution of Medical Countermeasures

A robust Public Health Emergency Medical Countermeasures Enterprise (PHEMCE)¹³⁵ could negate a range of health threats, but a drug or vaccine is only effective if it reaches the right person at the right time. Medical countermeasures (MCM) are FDA-regulated products that could be used in the event of a public health emergency; they include biologics, drugs, and devices.¹³⁶ 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. During the first ten months of the pandemic, there was a notable gap in federal coordination, with many

federal responsibilities being left to states or to the private sector. The federal government circumnavigated or significantly modified established MCM and medical supply-chain coordination and distribution channels at various points in the pandemic, contributing to confusion and chaos. For example, the lack of federal coordination and transparency left individual hospitals and states to compete with each other for scarce resources,¹³⁷ and FEMA and the U.S. Department of Defense were brought in to manage some supply-chain operations despite long-standing systems in place at HHS. Clear federal coordination is necessary during the pandemic, with an eye toward preventing future shortages and shortfalls.

RECOMMENDATIONS FOR FEDERAL GOVERNMENT:

- **Provide significant, long-term funding for the entire MCM enterprise.** The MCM enterprise involves research, manufacturing, surveillance, delivery, training, and monitoring. Long-term coordinated and transparent funding to the Biomedical Advance Research and Development Authority, Strategic National Stockpile, CDC, FDA, NIH, 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 biothreats, rather than focusing on products for a single pathogen.¹³⁸
- **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 the CDC's MCM Operational Readiness Review.^{139,140} 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 access and address gaps in vaccine development, procurement, maintenance, deployment and administration; and improve the training of state and local personnel to ensure vaccine administration is well-coordinated.

- **Clarify and strengthen MCM and supply-chain management for emergencies.** HHS must maintain primary authority over public health emergency response, including deployment of the Strategic National Stockpile and emergency medical supply-chain management, in coordination with other federal agencies and in consultation with private-sector and public health partners.

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. The HHS secretary should clarify roles and responsibilities for supply-chain management throughout the pandemic and, moving forward, should develop and disseminate best practices for supply management.¹⁴¹ HHS should strengthen the PHEMCE's work, including regular interagency meetings; engagement with private-sector, supply-chain partners; and improved transparency and communication with state, local, tribal, and territorial partners.

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

- **Improve MCM guidance and communications for groups at higher risk during an event.** HHS, including the CDC, should consult with experts and work with healthcare professionals and state, local, and tribal partners to develop standardized guidance for dispensing MCMs to groups such as children, 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 Americans, 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 hearing or vision loss.

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

In the 2019 and 2020 *Ready or Not* reports, TFAH warned that medical surge capacity for a pandemic remained a major gap in the nation's preparedness. The COVID-19 pandemic has placed tremendous strain on the healthcare system, from acute-care facilities¹⁴² to long-term care facilities¹⁴³ to small outpatient clinics.¹⁴⁴ Overcrowded facilities, exhausted

workforces, disruptions in the supply chain, shortages of PPE and other supplies, interruptions in primary and preventive care, lack of situational awareness, and loss of revenue have been among the significant challenges to the nation's healthcare system. The toll in lives lost due to these compounding issues has yet to be calculated. The NHSPI has consistently

found that healthcare delivery readiness scores are in the lowest levels among preparedness domains, with little progress in the past five years.¹⁴⁵ Policymakers need to strengthen existing systems and consider long-term mechanisms to create sustainable healthcare readiness across systems and across 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 and the awardees should ensure healthcare leaders takes the lead on HPP planning and implementation to the extent possible, with support and coordination from public health, emergency management, and others, and awardees 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 for a tiered regional disaster system to coordinate across coalitions and states,¹⁴⁶ to map specialized disaster care (such

as burn or pediatric care) across the country, and to leverage those assets in a coordinated way.¹⁴⁷ Congress should also provide increased funding for healthcare surveillance through CDC's National Healthcare Safety Network—which is the nation's domestic tracking and response system to identify emerging and enduring threat across 37,000 healthcare facilities, including COVID-19, healthcare-associated infections (HAIs), and antibiotic-resistant (AR) infections. These data drive improvements in patient safety and monitor the surge capacity of healthcare facilities to confront new threats.

• **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. Similarly, the Joint Commission's preparedness standards apply to individual facilities and not to the readiness of the healthcare system as a whole.¹⁴⁸ 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, including:

- 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.¹⁴⁹
- 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 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, and other factors have been exacerbated by the pandemic-induced recession.¹⁵⁰ Congress and the administration should strengthen incentives for states to expand Medicaid, make marketplace coverage more affordable, and improve outreach and marketing for enrollment.¹⁵¹

- **Assess impact of CMS Preparedness Standards and improve transparency.** An external review by the GAO 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.¹⁵²

RECOMMENDATIONS FOR STATE GOVERNMENT AND HEALTHCARE:

- **Integrate healthcare delivery into emergency preparedness and response.** Jurisdictions should engage and integrate 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,¹⁵³ the Uniform Emergency Volunteer Health Practitioners Act,¹⁵⁴ emergency prescription refill laws and protocols, and implementation and education of providers regarding crisis standards of care guidelines.^{155,156}

Priority Area 7: Prepare for Environmental Threats and Extreme Weather

Climate change, environmental hazards, and extreme weather pose serious 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 (see sidebar on page 60). 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 impact communities differently and exacerbate disparities among people living in poverty, people of color, people with underlying health conditions, and children and older people—all of whom are at particular risk.¹⁵⁷

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 public health climate-adaptation efforts.** Funding for the 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 2008.¹⁵⁸ Climate-informed health interventions include identifying likely climate impacts, potential health effects associated with these impacts, and the most at-risk populations and

locations.¹⁵⁹ Congress should increase funding for environmental health programs, including the CDC's Climate and Health program and environmental health tracking 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 the 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 other 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. All states should include water security and sewage removal in their preparedness plans, and they should build relationships among health departments and local environmental and water agencies. The 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 the 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.

Ready or Not 2021

Year in Review – 2020 Health Threats Incidents and Actions

This section reviews 2020's major events, research, and policy actions related to global and domestic health security.

Disease Outbreaks

Notable Incidents

• COVID-19

- The novel coronavirus SARS-CoV-2, the virus that causes COVID-19, emerged internationally in late 2019. As of late February 2021, as this report was being prepared for publication, over 28 million cases; and over 500,000 deaths have been reported in the U.S. alone.¹⁶⁰ Globally, there have been over 109 million confirmed cases of COVID-19, and over two million deaths, reported to the World Health Organization (WHO).¹⁶¹ The number of cases and the number of deaths from COVID-19 is higher in the United States than in any other country.¹⁶² In the United States, slightly more women than men have been infected, but deaths in men are disproportionate (54 percent to 46 percent).¹⁶³ Black people account for nearly 16 percent of COVID-19 deaths, where race is known, despite representing 13 percent of the U.S. population.¹⁶⁴ Hispanic or Latino people account for 18 percent of reported COVID-19 cases in the U.S. as of late January 2021, a proportion approximately equal to their percentage of the U.S. population.¹⁶⁵ In addition, research indicates a significant level of asymptomatic cases, so true infection counts are likely higher than confirmed cases.¹⁶⁶ Deaths may also be underreported due to inadequate testing and given

that the pandemic response itself may have indirectly caused mortality due to limited access to healthcare during pandemic surges and due to those who avoided seeking care in hospitals.^{167,168} The Centers for Disease Control and Prevention (CDC) found that in the 10 weeks following declaration of the COVID-19 national emergency, emergency department visits declined 23 percent for heart attack, 20 percent for stroke, and 10 percent for hyperglycemic crisis.¹⁶⁹

- Those at highest risk for severe disease and death are the elderly and people with underlying medical conditions, but COVID-19 has severely sickened and killed many young and otherwise healthy individuals, as well. Researchers are trying to determine if certain genetic characteristics are responsible for severe versus mild disease.¹⁷⁰ The disease in young children is usually mild, but in rare cases it is associated with multisystem inflammatory syndrome in children, in which different body parts can become inflamed, including the heart, lungs, kidneys, brain, skin, eyes, or gastrointestinal organs.¹⁷¹ National data reported between March and July 2020 showed that MIS-C disproportionately impacted Black and Latino children.¹⁷² The long-term effects of COVID-19 infection aren't fully known, but findings show heart

and lung damage in some patients, and many patients report lingering fatigue, shortness of breath, and confusion.¹⁷³

- In June 2020, the U.S. Department of Health and Human Services (HHS) Office of Minority Health announced Morehouse School of Medicine as the awardee for a new \$40 million initiative to fight COVID-19 in racial- and ethnic-minority, rural, and socially vulnerable communities. The initiative—the National Infrastructure for Mitigating the Impact of COVID-19 within Racial and Ethnic Minority Communities (NIMIC)—is a three-year project designed to work with community-based organizations nationwide to deliver education and information on resources to help fight the pandemic. Its aim is to strengthen efforts to link communities to COVID-19 testing, healthcare, and social services and to share and implement effective response, recovery, and resilience strategies.¹⁷⁴
- The United States has undertaken unprecedented efforts to accelerate the development, manufacturing, and distribution of COVID-19 vaccines and therapeutics through significant federal investments and scientific cooperation, while maintaining standards for safety and efficacy.¹⁷⁵ Usually, vaccines take years of research and testing before they are available to the public. As of December 2020, two vaccines, one developed and manufactured by Pfizer-BioNTech, the other by Moderna, received emergency-use authorization (EUA) from the U.S. Food and Drug Administration (FDA).¹⁷⁶ Initial administration of the vaccine to priority groups, including healthcare workers and residents of nursing



nycshooter

homes, also began in December 2020.

- The Trump Administration created a centralized system to order, distribute, and track COVID-19 vaccines.¹⁷⁷ States can order vaccine quantities (as supply allows) from the CDC. Airlines worldwide are providing transportation for billions of doses of vaccine that must be stored in frigid temperatures. FedEx and UPS are installing ultracold freezers near their air-cargo hubs, and dry-ice producers are increasing production to support vaccine distribution.¹⁷⁸ The U.S. Department of Defense and HHS coordinated the shipment of the initial doses to states.¹⁷⁹ The CDC released a playbook for state, tribal, territorial, and local jurisdictions on how to plan and operationalize a vaccination response to COVID-19 within their jurisdictions.¹⁸⁰ The Advisory Committee on Immunization Practices recommended priority groups to receive the initial doses of the vaccines,¹⁸¹ but the final decisions on population prioritization and logistics

are up to the states to determine, with most states prioritizing healthcare providers and long-term care facility residents in the initial phase.¹⁸²

- While shipping of the vaccine began shortly after the FDA issued emergency-use authorizations, the initial administration of the newly approved vaccines fell far short of projected goals. As of December 30, 2020, 12.4 million vaccine doses had been distributed to states, but only 2.6 million had been administered. Experts called on the federal government to provide more coordination and resources to the states to increase their capacity to quickly administer the vaccine to more people.¹⁸³ The challenges in initial administration of the vaccine likely occurred for many reasons, including: funding for states to administer the vaccine was not signed into law until December 27, 2020, which hindered planning, communications, hiring, and training; the lack of a centralized planning effort; the lack of federal leadership; the lack of communication between federal, state, and local planners on the number of initial doses available and when; slow engagement with local partners; and the sheer immensity and complexity of the project.^{184,185} HHS is partnering with pharmacies, including CVS and Walgreens, to deliver vaccines on-site at nursing homes and assisted-living facilities. Following distribution to the initial critical populations, states are planning for COVID-19 vaccines to be available in a phased approach to the priority groups in the broader population at locations such as retail pharmacies, healthcare facilities, and vaccination sites, but as this report was

being finalized, a specific time frame for availability of the vaccine to the general population was unclear and may be different from state to state.¹⁸⁶

Editor's note: In January 2021, the Biden administration set a goal and put in place a plan to administer 100 million vaccine doses during its first 100 days in office.¹⁸⁷ That goal was later increased to 150 million doses. FEMA and National Guard troops went to work in many states to assist in the vaccination effort. As of March 1, 2021, 96,402,490 vaccine doses had been distributed nationwide and 76,899,987 had been administered.¹⁸⁸ However, based on preliminary data from 17 states, during the first two months of vaccine distribution, Blacks and Hispanics were being vaccinated at a much lower rate than were whites.¹⁸⁹

- **Seasonal flu.** As TFAH was preparing this report, flu rates for the 2020–2021 flu season were lower than usual for major regions of the country.¹⁹⁰ The 2019–2020 flu season was of “moderate severity”; however, the severity of the season in some age groups was higher: hospitalization rates among children ages 0 to 4 years old and adults ages 18 to 49 years old were higher than observed during the 2009 H1N1 pandemic.¹⁹¹ The CDC estimates found that the 2019–2020 flu accounted for approximately 38 million illnesses, 405,000 hospitalizations, and 22,000 flu deaths.¹⁹² Seasonal flu vaccine coverage rates increased modestly across all age groups in 2019–2020, with vaccine rates among adults increasing 3.1 percentage points over the previous season and up 1.2 percentage points among children—but that was still far below Healthy People 2020 and 2030 goals.¹⁹³ The CDC estimates that influenza vaccination prevented 7.5 million illnesses, 3.7 million medical visits, 105,000 hospitalizations, and 6,300

deaths due to influenza during the 2019–2020 season.¹⁹⁴ The low 2020–2021 seasonal flu activity was likely a result of the mitigation measures to reduce the spread of COVID-19.¹⁹⁵

- **Hepatitis A.** In 2020, 27 states experienced outbreaks of the Hepatitis A virus, driven in part by increases among those who reported drug use and homelessness.¹⁹⁶ Hepatitis A is a highly transmissible infection.¹⁹⁷ The Hepatitis A vaccine is recommended for certain populations; in 2019, the Advisory Committee on Immunization Practice updated its recommendations to include people experiencing homelessness in the populations who should receive the vaccine.¹⁹⁸ Hepatitis A infections had been going down between 2000 and 2012 but increased in 2013, 2016, and 2018.¹⁹⁹ As of December 4, 2020, there have been 36,848 reported cases that lead to 22,546 hospitalizations and 348 deaths since the ongoing outbreak began in 2016.²⁰⁰
- **Measles outbreaks, United States.** In 2020, U.S. measles cases were low—only 13 confirmed cases in eight jurisdictions, as of November 30, 2020.²⁰¹ Conversely, 31 states confirmed 1,282 individual cases of measles in 2019.²⁰² Measles is a highly contagious disease that predominantly affects young children and can cause hospitalization, and death and serious complications, such as pneumonia, encephalitis.²⁰³ It can cause up to a 90 percent chance of disease contraction in unimmunized individuals.²⁰⁴ Outbreaks have been linked to the sustained spread of measles among unvaccinated communities.²⁰⁵
- **Measles outbreaks, global.** The WHO reported that during 2019, there were more measles cases reported worldwide than in any year since

1996—869,770 confirmed cases and an estimated 207,500 deaths.²⁰⁶ Fortunately, as of September 2020, the number of confirmed cases worldwide was much lower, though the Democratic Republic of the Congo, Brazil, and Nigeria reported high numbers and there were ongoing outbreaks in other nations.²⁰⁷ However, COVID-19 is increasing the risk of measles outbreaks, following the suspension of measles vaccination campaigns in 26 countries. On the current trajectory, experts predict more child deaths from measles than from COVID-19 in Africa.²⁰⁸

- **The Democratic Republic of Congo Ebola outbreak.** On June 1, 2020, the Democratic Republic of the Congo declared its 11th outbreak of Ebola virus disease.²⁰⁹ In November 2020, it was declared over, following a total of 130 cases and 55 deaths.²¹⁰
- **Candida auris.** *C. auris* is an emerging drug-resistant fungus that has led to severe illnesses in hospitalized patients. A majority of reported cases in 2020 were in New Jersey, New York, and Illinois. Infection by this multi-drug-resistant fungus has a mortality rate close to 60 percent and presents a serious global health threat.²¹¹ As of November 30, 2020, in the United States, there were 1,595 reported clinical cases of *C. auris* and an additional 3,056 patients identified with *C. auris*. There is transmission in multiple countries, as well.²¹² With the increase of patient transfers from long term care facilities to ICUs due to COVID-19, the CDC said that it expects *C. auris* and other fungal infections to remain an infection control challenge for healthcare facilities in the U.S. and around the world.²¹³

- **Cholera.** Cholera, an acute intestinal infection, is rare in the United States, but cases have increased steadily since 2005 globally,²¹⁴ and it is a major cause of epidemic diarrhea in the developing world. Regions with humanitarian crises, high rates of poverty, and a lack of water and sanitation infrastructure are at higher risk. In 2020, Yemen and Somalia faced serious outbreaks.²¹⁵ Researchers estimate that every year, there are 1.3 to 4.0 million cases and 21,000 to 143,000 deaths worldwide due to cholera.²¹⁶
- **Polio.** In August 2020, the African Continent was certified wild poliovirus free by the World Health Organization, making the world poliovirus free except for Pakistan and Afghanistan.²¹⁷ After months of severe disruptions from the COVID-19 pandemic, polio vaccination campaigns have resumed in both countries as of August 2020. UNICEF estimates up to 50 million children missed their vaccinations when efforts were halted in March 2020 to minimize transmission of COVID-19.²¹⁸
- **Foodborne illnesses.** In 2020, multistate foodborne illness outbreaks resulted from mushrooms, peaches, onions, clover sprouts, deli meats, and bagged salads. The pathogens involved include several strains of Salmonella and *E. coli*, as well as Listeria and Cyclospora.²¹⁹ The CDC estimates that 48 million people get sick, 128,000 are hospitalized, and 3,000 die from foodborne illness each year in the United States.²²⁰ The five most common pathogens that cause foodborne illness are: (1) Norovirus, (2) Salmonella, (3) Clostridium perfringens, (4) Campylobacter, and (5) Staphylococcus aureus.²²¹

COVID RESPONSE

- **Public Health Emergency Declaration and early COVID-19 response.**

On January 31, 2020, U.S. Health and Human Services Secretary Alex Azar declared a public health emergency for the United States for the 2019 novel coronavirus.²²² Since then, HHS has renewed the declaration several times. The declaration allowed some flexibilities for states, such as temporary reassignment of personnel to the response. Before the declaration and before the Trump administration requested emergency funding, Secretary Azar tapped \$105 million from the Infectious Disease Rapid Response Reserve Fund for the initial response.²²³ The WHO issued a public health emergency declaration of international concern in January and labeled the outbreak as a pandemic in March, 2020.^{224 225}

- **COVID Response Legislation.**

Congress has enacted several public laws providing funding and authorities to assist in the response to the pandemic.^{226,227}

- **Coronavirus Preparedness and Response Supplemental Appropriations Act (P.L. 116-123).**

The President signed the act into law on March 6, 2020, providing \$8.3 billion in emergency funding for public health measures, including the development of medical countermeasures and grants for public health agencies.

- **The Families First Coronavirus Response Act (P.L. 116-127).**

The President signed the act into law on March 18, 2020; it included the Second Coronavirus Preparedness and Response Supplemental Appropriations Act. The legislation expanded food and nutrition programs, unemployment benefits, and emergency family and medical leave; it also required certain employers to provide paid sick leave for workers unable to work due to COVID-19, and it provided access to COVID-19 testing with no cost to the individual.

- **The Coronavirus Aid, Relief, and Economic Security (CARES) Act (P.L. 116-136).**

The President signed the act into law on March 27, 2020, providing over \$2.2 trillion in relief to individuals; businesses; state, local, and federal agencies; and industry sectors affected by the COVID-19 pandemic and the government-led effort to limit its public health impact. It also included a variety of oversight provisions designed to increase the information available to Congress regarding the federal government's implementation of the CARES Act and response to the COVID-19 pandemic.²²⁸

- **The Paycheck Protection Program and Health Care Enhancement Act (P.L. 116-139).**

The President signed the act into law on April 24, 2020; it included Additional Emergency Appropriations for

Coronavirus Response. The bill extended the Paycheck Protection Program and small-business loans and allocated funding for healthcare providers and COVID-19 testing.

- **The Coronavirus Response and Relief Supplemental Appropriations Act, 2021 (P.L. 116-26).**

Congress passed and the President signed the act with the fiscal year (FY) 2021 appropriations bills and signed it into law on December 27, 2021. The bill provided \$900 billion in emergency appropriations, including \$73 billion for HHS, of which \$8.75 billion will support the vaccination campaign.

- **Payments to healthcare providers.**

The CARES Act, Paycheck Protection Program and Health Care Enhancement Act, and the Coronavirus Response and Relief Supplemental Appropriations Act allocated \$178 billion for a provider relief fund for hospitals, clinics, and other healthcare providers to recover some revenue lost due to the pandemic.²²⁹ In addition, changes in HHS telehealth policies were put in place to expand access to telehealth services during the pandemic.²³⁰

COVID-19 Vaccine

- **COVID-19 Vaccine.** As of December 2020, two vaccines—one developed and manufactured by Pfizer-BioNTech, the other by Moderna—received emergency-use authorization from the FDA (see COVID sidebar, on page 55).

COVID RESPONSE

Additional COVID-19 Response Actions:

- **Medical supply shortages.** The quantities of medical supplies in the Strategic National Stockpile and through the private-sector supply chain were not sufficient for a pandemic as widespread as COVID-19. Shortages of PPE,²³¹ ventilators,²³² testing supplies,²³³ and other medical supplies and products reached critical levels at different phases of the pandemic. President Trump invoked the Defense Production Act in April 2020 to try to spur private-sector production of these supplies.²³⁴
- **National Special Pathogen System.** In March 2020, ASPR expanded the Regional Ebola Treatment Network to

become the National Special Pathogen System (NSPS) through COVID-19 emergency supplemental funding. The NSPS builds on the Regional Ebola Treatment Network and was originally created to support the urgent preparedness and response needs of hospitals, health systems, and healthcare providers on the front lines of the COVID-19 outbreak. The system is designed to help prepare hospitals and health systems to identify, isolate, assess, transport, and treat patients with COVID-19 or other special pathogens or persons under investigation for such illnesses. The long-term vision of the NSPS is to create a nationwide systems-based network approach, similar to other national systems (e.g., the

national trauma system) for all special pathogens.

- **Crisis standards of care.** Major surges in COVID-19 patients caused hospitals and intensive-care units to exceed capacity. Hospitals canceled admissions and nonemergency procedures and established alternate care sites. In December 2020, 10 national organizations issued a statement outlining urgent action for states, healthcare systems, and health departments to implement crisis standards of care, including legal protections for healthcare workers, statewide information sharing, distribution of patients and resources, and care coordination across jurisdictions.²³⁵

Vaccines: Earning Trust and Access in Communities of Color and Tribal Nations

The reported hesitance among some populations of color and Tribal Nations toward COVID-19 vaccines²³⁶ has a basis in historic mistreatment and the effect of current-day structural racism. These experiences could have long-term impacts on vaccine confidence and vaccination rates in these groups. In October 2020, TFAH, the National Medical Association, and UnidosUS partnered to host an expert convening on how

to earn vaccine trust and increase vaccine access within communities of color and Tribal Nations. The experts concluded that earning such trust will require working with leaders in those communities to use their agency as trusted messengers. Leaders from these communities must have a place at the planning table and be provided the resources needed to engage with and share information with their stakeholders. All vaccine education

messaging must be culturally and linguistically appropriate. Messaging campaigns must feature trusted messengers, and education programs should take advantage of existing health communications networks. Read the full policy brief, *Building Trust in and Access to a COVID-19 Vaccine Within Communities of Color and Tribal Nations*, or find it on the TFAH website.²³⁷

- **Ending the HIV epidemic.** In FY 2020, the Trump administration awarded funding to its *Ending the HIV Epidemic: A Plan for America Initiative*, which aims to reduce the number of new HIV infections in the United States by 90 percent by 2030. In December 2019, Congress approved the largest increase to domestic HIV/AIDS-prevention programs from multiple federal sources, including the CDC, in decades, bringing federal funding in FY 2020 for HIV/AIDS (across multiple programs) to just over \$28 billion.^{238,239} In addition, HHS, through the Health Resources and Services Administration (HRSA), awarded more than \$2 billion in Ryan White HIV/AIDS Program grants to cities, counties, states, and local community-based organizations. This funding supports a comprehensive program of HIV primary medical care, medication, and essential support services with the goal of improving the health quality of more than half a million people with HIV in the United States.²⁴⁰
- **Emerging infectious diseases.** The National Institute of Allergy and Infectious Diseases (NIAID), within NIH, awarded 11 grants totaling approximately \$17 million to establish the Centers for Research in Emerging Infectious Diseases. The new global network will involve multidisciplinary investigations into how and where viruses and other pathogens emerge from wildlife and spillover to cause disease in people. NIAID intends to provide approximately \$82 million over five years to support the network.²⁴¹
- **Viral hepatitis strategic plan.** HHS released the Viral Hepatitis National Strategic Plan for the United States: A

Roadmap to Elimination 2021–2025, which serves as a roadmap to hepatitis elimination. HHS sought input from a broad mix of stakeholders on whether the plan’s goals, objectives, and strategies appropriately address the viral hepatitis epidemic and whether there are any critical gaps.²⁴²

- **National Action Plan for Combating Antibiotic-Resistant Bacteria (CARB).** Antimicrobial resistance, the rise of superbugs that are resistant to existing medicines, is a major threat to health. Originally released in 2015, the 2020–2025 CARB builds on the original by expanding evidence-based activities that have been shown to stop the spread of antibiotic resistance, such as increasing infection prevention and control and improving the way antibiotics are used. Developed by the HHS Office of the Assistant Secretary for Planning and Evaluation and authored by agencies within the CARB Task Force, which is co-chaired by HHS, the U.S. Department of Agriculture, and the U.S. Department of Defense, the plan’s purpose is to guide U.S. government activities, as well as action by public health, healthcare, and veterinary partners to address urgent and serious antibiotic-resistant threats that affect people in the United States and globally.²⁴³
- **United States officially withdraws from the World Health Organization.** In July 2020, President Trump formally announced his intention to withdraw the United States from the WHO, effective July 6, 2021.²⁴⁴

Editor’s note: on January 21, 2021, the Biden administration restored U.S. membership in the WHO.

- **Food safety.** In July 2020, the FDA released its *New Era of Smarter Food Safety Blueprint*, which reflects input from a variety of stakeholders and outlines a path forward building on the implementation of the FDA Food Safety Modernization Act.²⁴⁵ Its four core elements are: (1) tech-enabled traceability and foodborne outbreak response—using technologies, data streams, and approaches that will greatly reduce the time it takes to trace the origin of a contaminated food; (2) smarter tools and approaches for prevention—identifying new tools, processes, and communications to inform prevention efforts; (3) new business models and retail modernization—advancing the safety of both new business models, such as e-commerce and home delivery of food, and traditional business models, such as retail food establishments; and (4) food safety culture—supporting and strengthening cultures that embrace food safety within the FDA, on farms, and in facilities.²⁴⁶

Notable Research Findings, Meetings, and Federal Hearings:

- **Malaria treatment and prevention.** In May 2020, the FDA approved artesunate for injection to treat severe malaria in adult and pediatric patients.²⁴⁷ Treatment of severe malaria with intravenous artesunate should always be followed by a complete treatment course of an appropriate oral antimalarial regimen. According to the CDC, approximately 2,000 cases of malaria are diagnosed in the United States each year, with 300 of those infected having severe disease.²⁴⁸ In addition, the first phase

1 clinical trial, testing the safety and effectiveness of a monoclonal antibody against malaria, began. If effective, it would prevent malaria infections for several months with a single dose—a benefit to tourists, medical workers, and military personnel.²⁴⁹

- **Eastern Equine Encephalitis vaccine.** In June 2020, Bavarian Nordic announced topline results from the first-in-human trial of a prophylactic vaccine candidate against three equine encephalitis viruses (EEEV): western, eastern, and Venezuelan. The study, although small, showed that the vaccine was well tolerated and immunogenic across all dose groups, with injection-site pain as the most common vaccine-related adverse event.²⁵⁰

- **Ebola treatment.** In October 2020, the FDA approved Inmazeb, a mixture of three monoclonal antibodies made by Regeneron. This is the first FDA-approved treatment for Ebola virus infection in adult and pediatric patients, following a U.S. government-supported trial and expanded-access protocol in the Democratic Republic of the Congo.²⁵¹

- **Universal flu vaccine study.** A universal influenza vaccine, FLU-v, which could confer long-lasting immunity from multiple influenza subtypes among all age groups, demonstrated immunogenicity and safety in its phase 2b study and will enter a larger phase 3 trial.²⁵² The FLU-v vaccine is designed to stimulate the production of flu-specific cytotoxic T lymphocytes, which kill and remove influenza-infected cells, by targeting internal viral proteins that are not as variable as the constantly mutating surface proteins currently targeted in seasonal flu vaccines.²⁵³

Severe Weather and Natural Disasters

Notable Incidents:

- **Tornados.** In early March 2020 in the Nashville area, 24 people were killed by two tornadoes, one of which was an EF-4 traveling at 60 miles per hour (mph)—significantly harder to outrun (or take cover from) than a typical tornado’s 10 to 20 mph speed.²⁵⁴ Also during a two-day period in mid-March, over 100 tornadoes ravaged the South and Southeast,²⁵⁵ causing over \$450 million in damage and 32 fatalities.²⁵⁶
- **Extreme heat.** In the United States, extreme heat kills more people than any other weather-related threat.²⁵⁷ July 2020 nearly tied July 2019’s record of the hottest month ever recorded on Earth—coming in just 0.02 degrees shy.^{258,259} In August 2020, Death Valley reached 130 degrees Fahrenheit, and on September 6, 2020, Los Angeles County recorded its highest temperature ever, at 121 degrees Fahrenheit.²⁶⁰ September 2020 was also the hottest September on record.²⁶¹
- **Hurricanes.** The 2020 Atlantic hurricane season was the most active—breaking the record for the most named storms in a season, including six major hurricanes.²⁶² In the United States, Hurricane Isaias made landfall in North Carolina as a Category 1 and killed nine people as it moved up the coast,²⁶³ causing more than \$4 billion in damage.²⁶⁴ Laura formed in the Caribbean, leaving nine dead, before developing into a Category 4 storm and making landfall in Louisiana, where it killed 27 people²⁶⁵ and caused an estimated \$10 to \$12 billion in damage.²⁶⁶ In September 2020, Hurricane Sally hit Alabama as a Category 2 and caused major flooding but no deaths,²⁶⁷ though damage is estimated at \$8 to \$10 billion.²⁶⁸
- **Hurricane Delta** hit Louisiana in October 2020, killing at least four.²⁶⁹ Central America was hit hard in 2020 with two back-to-back Category 4 storms: just weeks after Hurricane Eta made landfall and killed over 130 people, Hurricane Iota (a massive Category 5 storm while in the Atlantic) hit the same area. Together, the storms killed over 200 people.²⁷⁰ In addition, the pandemic made hurricane preparations, evacuations, and sheltering more difficult.
- **Iowa derecho.** A powerful derecho—a fast wind storm associated with strong thunderstorms—tore through central Iowa in August 2020. Winds topped 100 mph and destroyed miles of crops, homes, businesses, and vehicles, and killed four people. The derecho was officially the costliest thunderstorm event in recorded U.S. history—estimated at \$7.5 billion in damages.²⁷¹
- **Wildfires in California and other states.** Several states experienced wildfires in 2020, including California, Oregon, and Colorado.^{272,273} California experienced another historic fire season in 2020—five of the six largest wildfires since 1932 in California happened in 2020.²⁷⁴ As of November 29, 2020, over 4 million acres had burned, compared with just under 260,000 acres burned during the same period in 2019.²⁷⁵ Thirty-three people, including four firefighters, died in California in 2020 due to wildfires.²⁷⁶ California’s average temperature has increased by about 3 degrees Fahrenheit over the past century, which is three times the global temperature increase of 1 degree Fahrenheit.²⁷⁷ Heavy spring rains promoted extensive vegetation growth, which withered in the heat and became fuel for wildfires to spread quickly through dry land.²⁷⁸ In addition, the 2020 season was a La Niña cycle—colder than average surface-water temperatures in the Pacific—which often trigger hotter and drier weather in the Southwest.²⁷⁹ Oregon also experienced an especially destructive wildfire season: 4,009 homes burned down in 2020, compared with 93 homes total from 2015 to 2019.²⁸⁰ In Colorado, wildfires have consumed 9 percent of Rocky Mountain National Park and destroyed several historic buildings.²⁸¹ Exacerbating these fires is an ongoing pine-beetle outbreak, which has increased the number of dead trees for fuel.²⁸² Across the United States, 9.5 million acres have burned as of December 4, 2020, compared with 4.6 million acres for the same period in 2019.²⁸³
- **California power outages.** In an attempt to reduce the risk of overloading the power grid during an extreme heatwave, California’s Independent System Operator, which manages the state’s power supply, ordered utilities to impose temporary blackouts for the first time in 19 years.²⁸⁴ While these outages only lasted an hour or two,²⁸⁵ there is potential for unplanned and planned outages to create health emergencies for some residents, including by presenting significant risks to patients in healthcare and long-term care facilities; people with electrically dependent medical equipment or medicines, such as oxygen, wheelchairs, and insulin; and the safety of food and water.²⁸⁶

Notable Events and Policy Actions:

- **Public health emergency declarations.**

In January 2020, HHS Secretary Azar declared a public health emergency for Puerto Rico following the late-December 2019 earthquakes and continuing aftershocks.²⁸⁷ Azar declared emergencies in Louisiana and Texas due to Hurricane Laura and in Oregon and California due to wildfires. The declarations and related waivers give HHS's Centers for Medicare & Medicaid Services (CMS) beneficiaries and their healthcare providers and suppliers greater flexibility in meeting emergency health needs.^{288,289}

- **Health center support.** In September 2020, HHS, through HRSA, awarded more than \$79 million in construction and other capital support for 165 HRSA-funded health centers impacted by Hurricanes Florence and Michael, Typhoon Mangkut, and Super Typhoon Yutu, as well as for wildfires and earthquakes that occurred in 2018 and tornadoes and floods that occurred in 2019.²⁹⁰

Notable Research Findings, Meetings, and Federal Hearings:

- **Extreme rain.** Research from the National Oceanic and Atmospheric Administration on all Atlantic hurricanes affecting the southeastern and eastern United States during the 20th century found that extreme rain risk is highest after hurricanes weaken into tropical storms. The heaviest rainfall over the largest areas occurs after major hurricanes become tropical storms, not during the hurricanes—even major hurricanes—themselves.²⁹¹
- **National Risk Index.** In November 2020, the Federal Emergency Management Agency (FEMA) released the National Risk Index, an online

tool to help illustrate the nation's communities most at risk of natural hazards. It provides a holistic view of community-level risk nationwide by combining 18 hazards with socioeconomic and built-environment factors. The tool determines risk by reviewing a community's expected annual loss, by measuring hazard frequency, exposure, and historic loss rate; social vulnerability, by measuring the susceptibility of impacted social groups; and community resilience, by measuring the ability of a community to recover from the impacts of natural hazards. These data can help in developing a FEMA-approved hazard-mitigation plan to help increase community resilience, which is a prerequisite for applying for FEMA's mitigation grants.²⁹²

- **Climate reports.** The United Nations' World Meteorological Organization released two reports on climate in 2020. The State of Climate Services (2020) found that between 1970 and 2019, 79 percent of disasters worldwide involved weather-, water-, and climate-related hazards, which accounted for 56 percent of deaths and 75 percent of economic losses from disasters. The report highlights progress made in early warning systems' capacity, and it identifies where and how governments can invest in effective early warning systems to strengthen countries' resilience to multiple weather-, water-, and climate-related hazards. United in Science 2020, a new multi-agency report from leading science organizations, highlights the increasing and irreversible impacts of climate change and documents how COVID-19 has impeded the ability to monitor these changes through the global observing system.²⁹³

CLIMATE CHANGE & HEALTH: MEASURING STATES' VULNERABILITY AND PREPAREDNESS

TFAH and JHU Bloomberg School of Public Health study reports on states' vulnerability to and readiness for the health impacts of climate change.

Climate change poses serious, immediate threats to human health. Catastrophic impacts are well-understood, such as death and injury from more frequent and more intense hurricanes and wildfires. Many dangers, however, lack a singular, spectacular event and are therefore more insidious: longer-lasting heatwaves; poorer air quality; chronic flooding; increases in vector-, water-, and food-related infections; and the toll all of this takes on people's mental health and well-being.

The release of greenhouse gases through human activities over the past two centuries has made some level of global warming inevitable. Humans must learn to live with the effects of this change (adaptation), even as they pursue the essential objective of minimizing future warming by reducing greenhouse gas emissions (mitigation).

Climate change, however, does not affect all people and places equally. A person's experience depends, in large part, on where she lives. Many health outcomes are linked to environmental factors and, therefore, sensitive to changes in climate. Social and demographic factors also drive vulnerability, meaning that the health of some communities or people could be more affected than others. In many cases, vulnerability reflects existing health risk factors and disparities, which are in turn tied to structural and systemic racism.

Fortunately, important opportunities to protect people's health from the impacts of climate change exist at the state and local level. Adaptation, which seeks to reduce injuries, illness, death, and suffering, is an extension of public health approaches that emphasize prevention and preparedness. Many of these actions are driven by state-level plans, policies, and programs, which provide a critical foundation and supply of resources to support additional efforts at the community level.

Given the size and diversity of the country, each state and its communities will experience climate change differently. State leaders must understand their particular risks and vulnerabilities in order to plan effectively. In areas of a state where vulnerability is higher, state leaders should invest more in adaptation and preparedness. Likewise, states that are more vulnerable overall should go to greater lengths to adapt to climate-related hazards.

A December 2020 report, *Climate Change & Health: Assessing State Preparedness*, by TFAH and the Johns Hopkins Bloomberg School of Public Health, examined states' readiness to protect residents from the health impacts of climate change in light of the nature and level of risks they face.²⁹⁴ While every state had engaged in at least some level of planning and preparation, there was significant variation, and, in many places, a great deal of room for improvement. Of greatest concern, states with the highest

levels of vulnerability—predominantly located in the Southeast—tended to be among the least prepared. (See Table 14.)

Leaders at all levels of government must act with urgency and persistent focus to ensure that their people,

particularly those who are most vulnerable, are safe and secure. The report offers federal and state policy and program recommendations, including enacting legislation requiring a national strategic plan,

fully funding the CDC’s Climate and Health program, bolstering states’ core public health preparedness capabilities, and establishing ongoing, dedicated state funding and staff for climate-related preparations.

Table 14. States Grouped by Level of Vulnerability and Preparedness

Vulnerability Group	State	Vulnerability Score		Preparedness Score	
		Least Vulnerable: 3.4-4.7	More Vulnerable: 4.8-5.3	Least Prepared: 4.0-5.0	More Prepared: 5.1-5.8
Least Vulnerable	Utah	3.8		6.6	
	Maryland	4.4		6.3	
	Vermont	4.3		6.3	
	Colorado	4.0		6.2	
	Wisconsin	4.4		6.1	
	New Hampshire	4.1		6.0	
	District of Columbia	4.5		5.9	
	Maine	4.5		5.9	
	Minnesota	4.4		5.8	
	Washington	4.5		5.8	
	Michigan	4.7		5.8	
	Alaska	3.4		5.4	
	North Dakota	4.1		5.2	
	Nebraska	4.6		5.1	
	Idaho	4.2		5.0	
Montana	4.3		4.8		
Wyoming	4.2		4.5		
More Vulnerable	Virginia	4.8		6.3	
	Massachusetts	4.9		6.2	
	Rhode Island	4.9		6.0	
	Illinois	4.9		6.0	
	New York	5.3		5.9	
	Pennsylvania	5.3		5.9	
	Connecticut	4.9		5.9	
	Oregon	4.8		5.8	
	Delaware	4.9		5.7	
	Kansas	5.1		5.3	
	Iowa	4.9		5.3	
	Indiana	5.0		5.0	
	Ohio	5.1		5.0	
	New Jersey	5.2		4.9	
	Hawaii	5.3		4.8	
Nevada	4.9		4.6		
South Dakota	4.8		4.5		
Most Vulnerable	North Carolina	5.5		6.0	
	Arizona	5.4		5.9	
	Alabama	5.8		5.8	
	California	5.5		5.8	
	Louisiana	5.9		5.7	
	New Mexico	5.8		5.7	
	Arkansas	6.1		5.5	
	Missouri	5.4		5.5	
	Florida	6.3		5.1	
	Tennessee	5.5		4.9	
	Georgia	5.6		4.9	
	Kentucky	5.9		4.8	
	South Carolina	5.9		4.8	
	Texas	5.5		4.6	
	Mississippi	5.9		4.5	
Oklahoma	5.5		4.5		
West Virginia	5.8		4.0		

“Most prepared,” among states that were “least vulnerable.”

“Least prepared,” among states that were “least vulnerable.”

All Hazards Events and Policy Actions

Notable Incidents:

- **E-cigarette and vaping injuries and deaths.** According to the CDC, as of February 18, 2020, a total of 2,807 hospitalized e-cigarette or vaping-associated lung injuries (EVALI) or deaths were reported to the CDC from all 50 states, DC, Puerto Rico, and the U.S. Virgin Islands. Sixty-eight deaths have been confirmed in 29 states and DC. Due to continued declines in new EVALI cases since September 2019, and the identification of vitamin E acetate as a likely primary cause of EVALI, the CDC is no longer collecting case reports.²⁹⁵
- **Mass shootings.** During 2020, in the United States, there were 611 mass shootings—defined as an incident in which at least four people are shot, excluding the shooter—in 2020.²⁹⁶ This is a significant increase since 2019, when there were 417 total mass shootings.²⁹⁷ These events have long-term health effects on communities and survivors, including post-traumatic-stress disorder, substance abuse, anxiety, and depression.²⁹⁸
- **Terror attacks.** On Christmas day, a bomb detonated in downtown Nashville, damaging over 40 businesses in the area and injuring three people. Quick evacuations by first-responders likely saved lives in the area.²⁹⁹ While the motivation for the Christmas Day bombing is not known, the Center for Strategic and International Studies reported that white supremacists and other like-minded extremists conducted two-thirds of terrorist plots and attacks in the United States as of October 2020.³⁰⁰

Notable Events and Policy Actions:

- **Animal disease research.** The U.S. Department of Homeland Security is transferring a new facility—the

National Bio and Agro-Defense Facility, which will research foreign animal diseases—to the U.S. Department of Agriculture. Foreign animal diseases pose a risk to livestock (and in rare cases, people) and the facility will develop countermeasures for these diseases. A report by the Government Accountability Office (GAO) found that it may not be ready to open in December 2022 as planned, despite both departments following practices for a successful transfer.³⁰¹

- **Radiological detection.** The Defense Advanced Research Projects Agency (DARPA) greenlit an automated, networked radiation detection system known as SIGMA for use by the Port Authority of New York and New Jersey, which is theoretically capable of providing counterterrorism support through constant monitoring for radiological and nuclear threats. DARPA has further developed and tested sensors for SIGMA to add chemical, biological, and explosive threat detection to its list of capabilities. SIGMA is based in worn, portable sensors, vehicular-mounted sensors, and stationary sensors at key transportation nodes, and it can be constantly improved through regular software updates. Officials and first-responders can use SIGMA to track alerts and threats in real time, allowing for enhanced coordination.³⁰²
- **Next Generation 911.** The U.S. Department of Homeland Security Science and Technology Directorate and the U.S. Department of Transportation have begun systems interoperability and compatibility testing for the Next Generation 911 (NG911) through a contract with the Critical Infrastructure

Resilience Institute of the University of Illinois at Urbana-Champaign. NG911 will update the current nationwide emergency response system to an Internet Protocol (IP) platform, which will enable voice, video, photographs, text, and future communications technologies to be transmitted to and by the public and first-responders for assistance.³⁰³ No system launch date has been announced.

- **HHS/ASPR Strategic Plan.** In April 2020, the U.S. Office of the Assistant Secretary for Preparedness and Response (ASPR) released the ASPR Strategic Plan for FY 2020-23, which organizes and identifies how ASPR will fulfill its mission of saving lives and protecting Americans from 21st-century health security threats and achieve its strategic vision: “the nation’s health care and response systems and the communities they serve are prepared, responsive, and resilient, thereby limiting the adverse health impacts of emergencies and disasters.” The plan builds on the successful foundation established by the ASPR strategic plans issued in 2011 and 2014, and aligns with the HHS Strategic Plan FY 2018-2022 and other relevant national strategies and legislation. It is also informed by experience and lessons from real-world incidents, exercises, and training activities occurring over more than a decade. The plan organizes ASPR’s efforts under four priority goals: (1) foster strong leadership; (2) sustain robust and reliable public health security capabilities; (3) advance an innovative medical countermeasures enterprise; and (4) build a regional disaster health response system.³⁰⁴

Notable Research Findings, Meetings, and Federal Hearings:

• Retention of the public health

workforce. As of November 2020, at least 70 top public health officials had been fired, resigned, or planned to leave their posts since the beginning of the pandemic.³⁰⁵ The alarming trend often resulted from threats, both in-person and via social media, scapegoating, or political retribution. Even before the pandemic and related recession, state health agencies had lost nearly 10 percent of their full-time equivalent (FTE) workforce from 2012 to 2019,³⁰⁶ while local health departments lost about 16 percent of their FTE staff from 2008 to 2019.³⁰⁷

• Recruitment and retention of

scientists. A May 2020 GAO report found that HHS has had trouble recruiting and retaining medical, engineering, and other science and technology professionals to support activities like biomedical and clinical research. The 21st Century Cures Act provides additional hiring and retention authority—allowing HHS to hire up to 2,000 scientists with certain specialized graduate degrees and to increase the top pay to hire and retain an expert staff.³⁰⁸

• Rebuilding the Public Health

Workforce. State and local revenue losses due to the COVID-19 economic crisis is likely to lead to budget cuts at the state and local level and is expected to worsen the public health workforce staffing shortfall. COVID response funding did allow for short-term staffing increases but not for the hiring of the permanent public health professionals necessary to meet 21st-century challenges.³⁰⁹

• **Antibiotic resistance.** Two novel investigative drugs that target antibiotic-resistant infections began advanced development through the Biomedical Advanced Research and Development Authority to begin phase 2 and 3 clinical trials. One drug tackles *Clostridioides difficile* (*C. difficile*) infections, which causes an estimated 12,800 deaths per year.³¹⁰ The second uses CRISPR technology to kill *Escherichia coli* (*E. coli*) bacteria that cause recurring or drug-resistant urinary tract infections. If successful, it would be the first CRISPR-engineered bacteriophage therapy to be FDA-approved.³¹¹ Bacteriophages are viruses that infect and replicate only in bacterial cells. They cannot infect human cells, and because each type of bacteriophage only kills a specific set of bacteria, it's less likely to disturb the beneficial bacteria in the human body.³¹² In addition, the FDA approved cefiderocol for hospital-acquired, ventilator-associated bacterial pneumonia due to multidrug-resistant gram-negative bacteria.³¹³

• Legislative pandemic preparation

blueprint. In July 2020, then-Senate Health, Education, Labor and Pensions (HELP) Committee Chairman Lamar Alexander released “Preparing for the Next Pandemic,” a legislative blueprint with five recommendations for legislators to address future pandemics based on lessons learned from COVID-19 and the past 20 years of pandemic planning. The five recommendations involve: (1) accelerated research and development for tests, treatments, and vaccines; (2) expanded disease surveillance; (3) improved stockpile capacity and distribution process; (4) improved state and local response

capacity; and (5) improved federal coordination.³¹⁴ Leading public health experts sent the committee over 350 recommendations of short-term and long-term proposals to address future pandemics on a range of topics, including sustaining onshore manufacturing, creating and sustaining state stockpiles, and improving the federal stockpile.³¹⁵

• **Preparedness Summit.** In August 2020, more than 1,300 attendees—who work in all levels of government, emergency management, volunteer organizations, healthcare coalitions, and academia—participated in the first ever virtual Preparedness Summit, “Fixing Our Fault Lines: Addressing Systemic Vulnerabilities.” Attendees participated in more than 115 demonstrations, workshops, and educational sessions, and heard from expert-led panels, which provided an opportunity to prepare for, respond to, and recover from the waves of the COVID-19 pandemic and the many other threats to public health and health security.³¹⁶

• **COVID-19 and Achieving Health Equity Report.** In September 2020, then-Senate HELP Committee Ranking Member Patty Murray also released a report, “COVID-19 & Achieving Health Equity: Congressional Action is Necessary to Address Racism and Inequality in the U.S. Health Care System.” The report included 30 recommendations to Congress, including dedicated funding for COVID-19 relief for communities of color, requiring an equitable vaccine distribution plan, and a federal right to paid sick days and family and medical leave.³¹⁷

Ready or Not 2021

Appendix B: Methodology

Trust for America's Health (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.³¹⁸

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 all or 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 2020 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 examined states' publicly available funding documents and 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 2019.) 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 their funding data.

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 hospitals participating in healthcare coalitions: 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 universal participation): 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.
- 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.
- 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 with paid time off: 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.
 - Between one and two standard deviations below the mean: 0.25 point.
 - More than two standard deviations below the mean: 0 points.

- 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.
 - Between one and two standard deviations below the mean: 0.25 point.
 - More than two standard deviations below the mean: 0 points.
- 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 6 to 7; states in the middle tier had scores ranging from 5.25 to 5.75; and states in the low tier had scores ranking from 4 to 5.

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.

Endnotes

- 1 Kliff S and Sanger-Katz M. “Bottleneck for U.S. Coronavirus Response: The Fax Machine.” *The New York Times*, July 13, 2020. <https://www.nytimes.com/2020/07/13/upshot/coronavirus-response-fax-machines.html> (accessed January 25, 2021).
- 2 King A. “Embattled Public Health Workers Leaving At ‘Steady And Alarming’ Rate.” *All Things Considered*, NPR, November 25, 2020. <https://www.npr.org/2020/11/25/938873547/embattled-public-health-workers-leaving-at-steady-and-alarming-rate> (accessed January 25, 2021).
- 3 “Building Strong Foundation of Public Health Infrastructure.” In *The Public Health Center for Center Innovations*. <https://phnci.org/national-frameworks/fphs> (accessed January 25, 2021).
- 4 “Celebrating 25 Years and Launching the Revised 10 Essential Public Health Services.” In *Public Health National Center for Innovation*. September 2020. <https://phnci.org/national-frameworks/10-eph> (accessed January 25, 2021).
- 5 Systems for Action. “National Longitudinal Survey of Public Health Systems.” accessed August 14, 2020, <http://systemsforaction.org/national-longitudinal-survey-public-health-systems>
- 6 “Public Health Leadership Forum.” In *RESOLVE*. <https://www.resolve.ngo/site-healthleadershipforum/developing-a-financing-system-to-support-public-health-infrastructure.htm> (accessed January 25, 2021).
- 7 Earth Institute. “Inadequate COVID-19 Response Likely Resulted in 130,000–210,000 Avoidable Deaths.” *State of the Planet*, Columbia University, October 22, 2020. <https://blogs.ei.columbia.edu/2020/10/22/covid-19-response-avoidable-deaths/> (accessed January 25, 2021).
- 8 “Alzheimer’s Disease and Healthy Aging: Health Disparities.” In *Centers for Disease Control and Prevention*, updated January 31, 2017. <https://www.cdc.gov/aging/disparities/> (accessed January 25, 2021)
- 9 “National Trend Data.” In *National Health Security Health Preparedness Index*. <https://nhspi.org/> (accessed January 25, 2021).
- 10 “Nurse Licensure Compact Member States.” In *The National Council of State Boards of Nursing*. <https://www.ncsbn.org/nlcmemberstates519.pdf> (accessed January 25, 2021).
- 11 Ibid.
- 12 Centers for Disease Control and Prevention. “2010-11 Through 2019-20 Influenza Seasons Vaccination Coverage Trend Report.” *FluVaxView*, National Center for Immunization and Respiratory Diseases. <https://www.cdc.gov/flu/fluvoxview/reportshtml/trends/index.html> (accessed January 25, 2021).
- 13 U.S. Department of Health and Human Services. “Increase Proportion of People Who Get the Flu Vaccine Every Year.” *Healthy People 2030*, Office of Disease Prevention & Health Promotion. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/vaccination/increase-proportion-people-who-get-flu-vaccine-every-year-iid-09> (accessed January 25, 2021).
- 14 Clemans-Cope L, Perry CD, Kenney GM, et al. “Access to and Use of Paid Sick Leave Among Low-Income Families With Children.” *Pediatrics*, 122(2): e480-486, August 2008. <https://pubmed.ncbi.nlm.nih.gov/18676534/> (accessed January 25, 2021).
- 15 U.S. Department of Labor. “Families First Coronavirus Response Act: Employer Paid Leave Requirements.” <https://www.dol.gov/agencies/whd/pandemic/ffcra-employer-paid-leave> (accessed February 4, 2021).
- 16 National Health Security Preparedness Index. NHSPI | National Health Security Preparedness Index (accessed February 4, 2021).
- 17 “The Nurse Licensure Compact and COVID-19 – a Tale of Two States.” In *National Council of State Boards of Nursing*, June 2020. <https://www.ncsbn.org/14826.htm> (accessed January 25, 2021).
- 18 “Nurse Licensure Compact Member States.” In *National Council of State Boards of Nursing*, 2020. <https://www.ncsbn.org/nlcmember-states.pdf> (accessed January 25, 2021).
- 19 National Council of State Boards of Nursing. “Indiana Implements the Nurse Licensure Compact.” Press release: June 29, 2020. <https://www.prnewswire.com/news-releases/indiana-implements-the-nurse-licensure-compact-301084656.html> (accessed January 25, 2021).
- 20 “Nurse Licensure Compact Member States.” In *National Council of State Boards of Nursing*, 2020. <https://www.ncsbn.org/nlcmemberstates.pdf> (accessed January 25, 2021).
- 21 Assistant Secretary for Preparedness and Response. “Introduction to the Hospital Preparedness Program.” *Public Health Emergency Fact Sheet*, U.S. Department of Health and Human Services. <https://www.phe.gov/Preparedness/planning/hpp/Documents/hpp-intro-508.pdf> (accessed January 25, 2021).
- 22 Office of the Assistant Secretary for Preparedness and Response. 2017-2022 *Health Care Preparedness and Response Capabilities*. Washington: Public Health Emergency, U.S. Department of Health and Human Services, November 2016. <https://www.phe.gov/Preparedness/planning/hpp/reports/Documents/2017-2022-healthcare-pr-capabilities.pdf> (accessed January 25, 2021).
- 23 U.S. Department of Health and Human Services. *Department of Health and Human Services Fiscal Year 2020, Public Health and Social Services Emergency Fund, Justification of Estimates for Appropriations Committee*. Washington: U.S. Department of Health and Human Services. <https://www.hhs.gov/sites/default/files/fy-2020-cj-phssec-final-print.pdf> (accessed January 25, 2021).
- 24 Upton L, Kirsch TD, Harvey M, and Hanfling D. “Health Care Coalitions as Response Organizations: Houston After Hurricane Harvey.” *Disaster Medicine and Public Health Preparedness*, 11(6): 637-639, December 2017. <https://www.cambridge.org/core/journals/disaster-medicine-and-public-health-preparedness/article/health-care-coalitions-as-response-organizations-houston-after-hurricane-harvey/65743EE4F17718DF05E9FC212BB17F0D/core-reader> (accessed January 25, 2021).
- 25 Fraley M. “Healthcare Coalitions: The New Structure for Disaster Response.” *EMSI*, September 11, 2020. <https://www.emsl.com/ems-products/personal-protective-equipment-ppe/articles/healthcare-coalitions-the-new-structure-for-disaster-response-Wf1HXg2i1qB-0L7iw/#:~:text=During%20the%20COVID%2D19%20pandemic,Providing%20PPE%20supplies> (accessed January 25, 2021).
- 26 “COVID-19 Healthcare Planning Checklist.” In *Public Health Emergency, U.S. Department of Health and Human Services*, 2020. <https://www.phe.gov/preparedness/covid19/documents/covid-19%20healthcare%20planning%20checklist.pdf> (accessed January 25, 2021).

- 27 Branswell H. “A Severe Flu Season Is Stretching Hospitals Thin. That Is a Very Bad Omen.” *STAT*, January 15, 2018. <https://www.statnews.com/2018/01/15/flu-hospital-pandemics/> (accessed January 25, 2021).
- 28 Popescu S and Leach R. “Identifying Gaps in Frontline Healthcare Facility High-Consequence Infectious Disease Preparedness.” *Health Security*, 17(2), April 26, 2019. <https://www.liebertpub.com/doi/10.1089/hs.2018.0098> (accessed January 25, 2021).
- 29 National Academies of Sciences, Engineering, and Medicine. “2. Perspectives on the Nation’s Capacity to Respond to Threats to Health, Safety, and Security.” In *Engaging the Private-Sector Health Care System in Building Capacity to Respond to Threats to the Nation’s Health*. Washington: National Academies Press, 2018. <https://www.nap.edu/read/25203/chapter/3#12> (accessed January 25, 2021).
- 30 National Academies of Sciences, Engineering, and Medicine. “3. Leveraging Health Care Coalitions.” In *Forum on Medical and Public Health Preparedness for Catastrophic Events, Board on Health Sciences Policy, Institute of Medicine. Preparedness, Response, and Recovery Considerations for Children and Families: Workshop Summary*. Washington: National Academies Press, March 21, 2014. <https://www.ncbi.nlm.nih.gov/books/NBK195866/> (accessed January 25, 2021).
- 31 Prepared. *The National Health Security Preparedness Index*. Princeton, NJ: Robert Wood Johnson Foundation, June 2020. <https://nhspi.org/> (accessed January 25, 2021).
- 32 Public Health Accreditation Board. *Health Accreditation Board Standards and Measures: Version 1.5*. Alexandria, VA: Public Health Accreditation Board, December 2013. <http://www.phaboard.org/wp-content/uploads/SM-Version-1.5-Board-adopted-FINAL-01-24-2014.docx.pdf> (accessed January 25, 2021).
- 33 “Why Become Accredited.” In *Public Health Accreditation Board*. <https://www.phaboard.org/accreditation-overview/what-are-the-benefits/> (accessed January 25, 2021).
- 34 Emergency Management Accreditation Program. *Applicant Guide to Accreditation, 2017*. Falls Church, VA: Emergency Management Accreditation Program, 2017. https://www.emap.org/images/2017_Applicant_Guide_.pdf (accessed January 25, 2021).
- 35 Public Health Accreditation Board. *Public Health Accreditation Board Standards: An Overview*. Alexandria, VA: Public Health Accreditation Board, December 2013. http://www.phaboard.org/wp-content/uploads/StandardsOverview1.5_Brochure.pdf (accessed January 25, 2021).
- 36 Emergency Management Accreditation Program. *2016 Emergency Management Standard*. Falls Church, VA: Emergency Management Accreditation Program, 2016. <https://www.emap.org/index.php/root/about-emap/96-emap-em-4-2016/file> (accessed January 25, 2021).
- 37 “Delaware Emergency Management Agency Earns Accreditation.” In *Delaware Emergency Management Agency*, January 8, 2020. <https://news.delaware.gov/2020/01/08/delaware-emergency-management-agency-earns-accreditation/> (accessed January 25, 2021).
- 38 Prepared. *The National Health Security Preparedness Index*. Princeton, NJ: Robert Wood Johnson Foundation, June 2020. <https://nhspi.org/> (accessed January 25, 2021).
- 39 “About Us.” In *Public Health Activities and Services Tracking*. <https://phastdata.org/about> (accessed January 25, 2021).
- 40 “Profile of State and Territorial Public Health.” In *Association of State and Territorial Health Officials*. <https://www.astho.org/profile/#close> (accessed January 25, 2021).
- 41 National Association of County and City Health Officials. *2019 National Profile of Local Health Departments*. Washington: NACCHO, 2020. https://www.naccho.org/uploads/downloadable-resources/Programs/Public-Health-Infrastructure/NACCHO_2019_Profile_final.pdf (accessed January 25, 2021).
- 42 Leachman M and McNichol E. *Pandemic’s Impact on State Revenues Less Than Earlier Expected But Still Severe*. Washington: Center on Budget and Policy Priorities, October 30, 2020. <https://www.cbpp.org/research/state-budget-and-tax/pandemics-impact-on-state-revenues-less-than-earlier-expected-but> (accessed January 25, 2021).
- 43 U.S. Geological Survey. Domestic Water Use. https://www.usgs.gov/mission-areas/water-resources/science/domestic-water-use?qt-science_center_objects=0#qt-science_center_objects (Accessed February 3, 2021).
- 44 “National Primary Drinking Water Regulations.” In *U.S. Environmental Protection Agency*, updated January 5, 2021. <https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations> (accessed January 25, 2021).
- 45 “Safe Drinking Water Information System (SDWIS) Federal Reporting Services.” In *U.S. Environmental Protection Agency*, updated June 27, 2017. <https://www.epa.gov/ground-water-and-drinking-water/safe-drinking-water-information-system-sdwis-federal-reporting> (accessed January 25, 2021).
- 46 Ibid.
- 47 Centers for Disease Control and Prevention. “CDC Investigation: Blood Lead Levels Higher After Switch to Flint River Water.” Press release: June 24, 2016. <http://www.cdc.gov/media/releases/2016/p0624-water-lead.html> (accessed January 25, 2021).
- 48 Iati M. “Toxic Lead, Scared Parents and Simmering Anger: A Month Inside a City Without Clean Water.” *The Washington Post*, October 3, 2019. <https://www.washingtonpost.com/climate-environment/2019/10/03/toxic-lead-scared-parents-simmering-anger-month-inside-city-without-clean-water/> (accessed January 25, 2021).
- 49 Mayo Clinic. Lead Poisoning. <https://www.mayoclinic.org/diseases-conditions/lead-poisoning/symptoms-causes/syc-20354717> (Accessed February 3, 2021).
- 50 Peterson M. “Paradise Residents Still Can’t Drink the Water.” *KQED*, September 30, 2019. <https://www.kqed.org/science/1948232/paradise-residents-still-cant-drink-the-water> (accessed January 25, 2021).
- 51 “Water Quality Advisory—After the Camp Fire.” In *Paradise Irrigation District*, updated May 2020. <https://pidwater.com/wqadvisory> (accessed January 25, 2021).
- 52 “Facts About Benzene.” In *Centers for Disease Control and Prevention*, updated April 4, 2018. <https://emergency.cdc.gov/agent/benzene/basics/facts.asp> (accessed January 25, 2021).
- 53 “Harmful Algal Blooms: Tiny Organisms with a Toxic Punch.” In *National Oceanic and Atmospheric Administration*, updated May 10, 2020. <https://oceanservice.noaa.gov/hazards/hab/> (accessed January 25, 2021).

- 54 Alexander K. “When the Power Goes Out, So Does the Water in Some Places.” *San Francisco Chronicle*, October 9, 2019. <https://www.sfchronicle.com/bayarea/article/When-the-power-goes-out-so-does-the-water-in-14505539.php> (accessed January 25, 2021).
- 55 Centers for Disease Control and Prevention. “Waterborne Disease and Outbreak Surveillance Reporting”. <https://www.cdc.gov/healthywater/surveillance/burden/findings.html> (accessed February 4, 2021).
- 56 “Private Drinking Water Wells.” In *U.S. Environmental Protection Agency*, July 15, 2020. <https://www.epa.gov/privatewells> (accessed January 25, 2021).
- 57 Prepared. *The National Health Security Preparedness Index*. Princeton, NJ: Robert Wood Johnson Foundation, June 2020. <https://nhspi.org/> (accessed January 25, 2021).
- 58 Blau F, Koebe J, and Meyerhofer P. “Essential and Frontline Workers in the COVID-19 Crisis.” *EconoFACT*, April 30, 2020. <https://econofact.org/essential-and-frontline-workers-in-the-covid-19-crisis> (accessed January 25, 2021).
- 59 National Partnership for Women and Families. “Paid Sick Days Improve Public Health.” Fact Sheet, October 2018. <http://www.nationalpartnership.org/research-library/work-family/psd/paid-sick-days-improve-our-public-health.pdf> (accessed January 25, 2021).
- 60 U.S. Bureau of Labor Statistics. “Table 31. Leave Benefits: Access, Civilian Workers, March 2019.” *National Compensation Survey*, March 2019. <https://www.bls.gov/ncs/ebs/benefits/2019/ownership/civilian/table31a.pdf> (accessed January 25, 2021).
- 61 Rho HJ, Brown H, and Fremstad S. “A Basic Demographic Profile of Workers in Frontline Industries.” Center for Economic and Policy Research, April 2020. <https://cepr.net/wp-content/uploads/2020/04/2020-04-Frontline-Workers.pdf> (accessed January 25, 2021).
- 62 Kumar S, Grefenstette JJ, Galloway D, et al. “Policies to Reduce Influenza in the Workplace: Impact Assessments Using an Agent-Based Model.” *American Journal of Public Health*, 103(8): 1406-1411, 2013. <https://www.ncbi.nlm.nih.gov/pubmed/23763426> (accessed January 25, 2021).
- 63 Pichler S and Ziebarth NR. “The Pros and Cons of Sick Pay Schemes: Contagious Presenteeism and Noncontagious Absenteeism Behavior.” *VOXEU CEPR Policy Portal*, May 12, 2018. <https://voxeu.org/article/pros-and-cons-sick-pay> (accessed January 25, 2021).
- 64 Ibid.
- 65 National Partnership for Women and Families. “Paid Sick Days Improve Public Health.” *Fact Sheet*, October 2018. <http://www.nationalpartnership.org/research-library/work-family/psd/paid-sick-days-improve-our-public-health.pdf> (accessed January 25, 2021).
- 66 Pichler S and Ziebarth NR. *The Pros and Cons of Sick Pay Schemes: Testing for Contagious Presenteeism and Shirking Behavior*. Cambridge, MA: National Bureau of Economic Research, Working Paper 22530, August 2016. <https://www.nber.org/papers/w22530> (accessed January 25, 2021).
- 67 Pichler S, Wen K, and Ziebarth NR. “COVID-19 Emergency Sick Leave Has Helped Flatten the Curve in the United States.” *Health Affairs*, 39(12), October 15, 2020. <https://www.healthaffairs.org/doi/10.1377/hlthaff.2020.00863> (accessed January 25, 2021).
- 68 Fields S. “Congress Lets Paid Sick, Family and Medical Leave Mandate Expire.” *Marketplace*, January 1, 2021. <https://www.marketplace.org/2021/01/01/congress-lets-sick-family-and-medical-leave-mandate-expire/> (accessed January 25, 2021).
- 69 “Disability Insurance.” In *State of California Employment Development Department*. <https://data.edd.ca.gov/browse?category=Disability+Insurance&utf8=%E2%9C%93> (accessed January 25, 2021).
- 70 “Unemployment Insurance: Income Support Programs.” In *Rhode Island Department of Labor and Training*. <https://dlt.ri.gov/lmi/datacenter/uitdi.php> (accessed January 25, 2021).
- 71 The White House. “National Strategy for the COVID-19 Response and Pandemic Preparedness.” January 2021. <https://www.whitehouse.gov/wp-content/uploads/2021/01/National-Strategy-for-the-COVID-19-Response-and-Pandemic-Preparedness.pdf> (whitehouse.gov) (accessed February 4, 2021).
- 72 Bureau of Labor Statistics. “Labor Force Statistics from the Current Population Survey.” Current Population Survey, U.S. Department of Labor. <https://www.bls.gov/cps/> (accessed January 25, 2021).
- 73 Ibid.
- 74 Ibid.
- 75 Prepared. *The National Health Security Preparedness Index*. Princeton, NJ: Robert Wood Johnson Foundation, June 2020. <https://nhspi.org/> (accessed January 25, 2021).
- 76 National Center for Health Statistics. “Table 68. Influenza Vaccination Among Adults Aged 18 and Over, by Selected Characteristics: United States, Selected Years 1989–2016.” *Centers for Disease Control and Prevention*, 2017. <https://www.cdc.gov/nchs/data/hus/2017/068.pdf> (accessed January 25, 2021).
- 77 U.S. Department of Health and Human Services. “Increase proportion of people who get the flu vaccine every year.” *Healthy People 2030*, Office of Disease Prevention and Health Promotion (accessed January 25, 2021).
- 78 Centers for Disease Control and Prevention. “2010-11 through 2018-19 Influenza Seasons Vaccination Coverage Trend Report.” *FluVaxView*, National Center for Immunization and Respiratory Diseases, October 1, 2020. <https://www.cdc.gov/flu/fluvoxview/reportshtml/trends/index.html> (accessed January 25, 2021).
- 79 “37% of Americans Do Not Plan to Get a Flu Shot This Season.” In *NORC, University of Chicago*, December 3, 2019. <https://www.norc.org/NewsEventsPublications/PressReleases/Pages/37-of-americans-do-not-plan-to-get-a-flu-shot-this-season.aspx> (accessed January 25, 2021).
- 80 Piercey L (Commissioner, Tennessee Department of Health). Interview with Trust for America’s Health. December 12, 2019.
- 81 McCormick D (Division Director, Indiana State Department of Health). Interview with Trust for America’s Health, December 10, 2019.
- 82 Centers for Disease Control and Prevention. “Flu Vaccination Coverage, United States, 2019–20 Influenza Season.” *FluVaxView*, National Center for Immunization and Respiratory Diseases, October 1, 2020. <https://www.cdc.gov/flu/fluvoxview/coverage-1920estimates.htm> (accessed January 25, 2021).

- 83 Centers for Disease Control and Prevention. "2010-11 through 2019-20 Influenza Seasons Vaccination Coverage Trend Report." *FluVaxView*, National Center for Immunization and Respiratory Diseases, October 1, 2020. <https://www.cdc.gov/flu/fluview/reportshtml/trends/index.html> (accessed January 25, 2021).
- 84 Centers for Disease Control and Prevention. "Flu Vaccination Coverage, United States, 2018–19 Influenza Season." *FluVaxView*, National Center for Immunization and Respiratory Diseases, September 26, 2020. <https://www.cdc.gov/flu/fluview/coverage-1819estimates.htm> (accessed January 25, 2021).
- 85 "Study Suggests Medical Errors Now Third Leading Cause of Death in the U.S." In *Johns Hopkins Bloomberg School of Public Health*, May 3, 2016. https://www.hopkinsmedicine.org/news/media/releases/study_suggests_medical_errors_now_third_leading_cause_of_death_in_the_us (accessed January 25, 2021).
- 86 "Errors, Injuries, Accidents, Infections." In *Leapfrog Hospital Safety Grade*. <http://www.hospital-safetygrade.org/what-is-patient-safety/errors-injuries-accidents-infections> (accessed January 25, 2021).
- 87 Richterman A, Meyerowitz EA, and Cevik M. "Hospital-Acquired SARS-CoV-2 Infection: Lessons for Public Health." *JAMA*, 324(21): 2155-2156, 2020. <https://jamanetwork.com/journals/jama/fullarticle/27773128> (accessed January 25, 2021).
- 88 Leapfrog Group. *Leapfrog Hospital Safety Grade: Scoring Methodology, Spring 2020*. Washington: Leapfrog Hospital Safety Grade, April 14, 2020. https://www.hospital-safetygrade.org/media/file/HospitalSafetyGrade_ScoringMethodology_Spring2020.pdf (accessed January 25, 2021).
- 89 "How Safe Is Your Hospital." In *Leapfrog Hospital Safety Grade*. <https://www.hospital-safetygrade.org/your-hospitals-safety-grade/state-rankings> (accessed January 25, 2021).
- 90 "About Public Health Laboratories." In *Association of Public Health Laboratories*. <https://www.aphl.org/aboutAPHL/Pages/about-phls.aspx> (accessed January 25, 2021).
- 91 Association of Public Health Laboratories. *Surge Capacity Planning Tool for the Laboratory Response Network for Biological Threats Preparedness (LRN-B)*. Silver Spring, MD: Association of Public Health Laboratories, January 2015. https://www.aphl.org/aboutAPHL/publications/Documents/PHPR_SurgeCapacityLRNB_JAN2015.pdf (accessed January 25, 2021).
- 92 Ibid.
- 93 "Responding to the Coronavirus Disease (COVID-19) Pandemic." In *Association of Public Health Laboratories*. June 4, 2020. <https://www.aphl.org/programs/preparedness/Crisis-Management/COVID-19-Response/Pages/default.aspx> (accessed January 25, 2021).
- 94 Ibid.
- 95 "The Data: Total for the US." In *The COVID Tracking Project at The Atlantic*. <https://covidtracking.com/data/national> (accessed January 25, 2021).
- 96 "COVID-19 Projections Using Machine Learning." In *COVID-19 Projections*. <https://covid19-projections.com/> (accessed January 25, 2021).
- 97 *Emory Health News*. "Viral sequencing can reveal how SARS-COV-2 spreads and evolves." EurekAlert!/AAAS. Viral sequencing can reveal how SARS-CoV-2 spreads and evolves | EurekAlert! Science News (accessed February 5, 2021).
- 98 Association of Public Health Laboratories. *Surge Capacity Planning Tool for the Laboratory Response Network for Biological Threats Preparedness (LRN-B)*. Silver Spring, MD: Association of Public Health Laboratories, January 2015. https://www.aphl.org/aboutAPHL/publications/Documents/PHPR_SurgeCapacityLRNB_JAN2015.pdf (accessed January 25, 2021).
- 99 Samuel Abrams (Senior Public Health Preparedness and Response Specialist, Association of Public Health Laboratories). Interview with Trust for America's Health, December 2, 2020.
- 100 Kliff S and Sanger-Katz M. "Bottleneck for U.S. Coronavirus Response: The Fax Machine." *The New York Times*, July 13, 2020. <https://www.nytimes.com/2020/07/13/upshot/coronavirus-response-fax-machines.html> (accessed January 25, 2021).
- 101 Hamilton JJ, Turner K, and Lichtenstein Cone M. "Responding to the Pandemic: Challenges With Public Health Surveillance Systems and Development of a COVID-19 National Surveillance Case Definition to Support Case-Based Morbidity Surveillance During the Early Response." *Journal of Public Health Management and Practice*, 27: S80-S86, January/February 2021. https://journals.lww.com/jphmp/Fulltext/2021/01001/Responding_to_the_Pandemic_Challenges_With_Public.14.aspx (accessed January 25, 2021).
- 102 "Developing a Financing System to Support Public Health Infrastructure." In *Resolve, Public Health Leadership Forum*. <https://www.resolve.ngo/site-healthleadershipforum/developing-a-financing-system-to-support-public-health-infrastructure.htm> (accessed January 25, 2021).
- 103 Funding for PHEP was \$939 million in FY 2003 and \$695 million in FY 2021.
- 104 Funding for HPP was \$515 million in FY 2003 and \$280 million in FY 2021.
- 105 "Public Health Infrastructure Saves Lives Act." In Trust for America's Health, *Fact Sheet*, September 2020. https://www.tfah.org/wp-content/uploads/2020/09/PHI_FactSheet.pdf (accessed January 25, 2021).
- 106 U.S. Government Accountability Office. *COVID-19: Federal Efforts Could Be Strengthened by Timely and Concerted Actions*. GAO-20-701. Washington: Government Accountability Office, September 21, 2020. <https://www.gao.gov/reports/GAO-20-701/> (accessed January 25, 2021).
- 107 Devine R. "The White House Releases its 2019 Global Health Security Strategy." *Homeland Security Digital Library*, May 10, 2019. <https://www.hsdl.org/c/the-white-house-releases-its-2019-global-health-security-strategy/> (accessed January 25, 2021).
- 108 Cutler DM and Summers LH. "The COVID-19 Pandemic and the \$16 Trillion Virus." *JAMA*, 324(15):1495-1496, 2020. <https://jamanetwork.com/journals/jama/fullarticle/2771764#:~:text=The%20estimated%20cumulative%20financial%20costs,domestic%20product%20of%20the%20US> (accessed January 25, 2021).

- 109 Goldstein-Street J. “Cost of Washington’s Measles Outbreak Tops \$1M.” *Associated Press*, February 23, 2019. <https://www.apnews.com/a88d9198385a4e04a3491c9e8dc6404e> (accessed January 25, 2021).
- 110 Garfield R, Orgera K, and Damico A. *The Uninsured and the ACA: A Primer—Key Facts about Health Insurance and the Uninsured Amidst Changes to the Affordable Care Act*. San Francisco: Kaiser Family Foundation, January 25, 2019. <https://www.kff.org/report-section/the-uninsured-and-the-aca-a-primer-key-facts-about-health-insurance-and-the-uninsured-amidst-changes-to-the-affordable-care-act-how-many-people-are-uninsured/> (accessed January 25, 2021).
- 111 Vaccine Awareness Campaign to Champion Immunization Nationally and Enhance Safety Act of 2019. U.S. House of Representatives, May 21, 2019. <https://www.congress.gov/bill/116th-congress/house-bill/2862/all-info?r=5&s=1> (accessed January 25, 2021).
- 112 Adult Vaccines Now. “Financial Barriers to Adult Immunization.” *Medicare Financial Barriers Fact Sheet, 2017*. http://www.adultvaccinesnow.org/wp-content/uploads/2017/03/avac_financial_barriers_FINAL_.pdf (accessed January 25, 2021).
- 113 Center for Value-Based Insurance Design. “Cost-Sharing for Immunizations in Medicare: Impacts on Beneficiaries and Recommendations for Policymakers.” University of Michigan. <http://vbidcenter.org/cost-sharing-for-immunizations-in-medicare-impacts-on-beneficiaries-and-recommendations-for-policymakers/> (accessed January 25, 2021).
- 114 Stewart AM, Lindley MC, Chang KHM, et al. “Vaccination Benefits and Cost-Sharing Policy for Non-Institutionalized Adult Medicaid Enrollees in the United States.” *Vaccine*, 32(5): 618-623, January 23, 2014. <https://www.sciencedirect.com/science/article/pii/S0264410X13015843> (accessed January 25, 2021).
- 115 World Health Organization. *WHO Guidelines on Use of Medically Important Antimicrobials in Food-Producing Animals*. Geneva: WHO, 2017. http://www.who.int/food-safety/publications/cia_guidelines/en/ (accessed January 25, 2021).
- 116 Centers for Disease Control and Prevention. *Antibiotic Use in the United States, 2017: Progress and Opportunities*. Atlanta: Centers for Disease Control and Prevention, 2017. <https://www.cdc.gov/antibiotic-use/stewardship-report/pdf/stewardship-report.pdf> (accessed January 25, 2021).
- 117 “Core Elements of Antibiotic Stewardship.” In *Centers for Disease Control and Prevention*. <https://www.cdc.gov/antibiotic-use/core-elements/index.html> (accessed January 25, 2021).
- 118 “National Healthcare Safety Network.” In *Centers for Disease Control and Prevention*, updated August 15, 2019. <https://www.cdc.gov/nhsn/index.html> (accessed January 25, 2021).
- 119 “Infectious Diseases Society of America’s Policy on State Immunization Mandates.” In *Infectious Diseases Society of America*, June 23, 2012. https://www.idsociety.org/globalassets/idsa/policy-advocacy/current_topics_and_issues/immunizations_and_vaccines/statements/062312-idsa-policy-statement-on-state-immunization-mandates.pdf (accessed January 25, 2021).
- 120 Wingfield AH. “The Disproportionate Impact of COVID-19 on Black Health Care Workers in the U.S.” *Harvard Business Review*, May 14, 2020. <https://hbr.org/2020/05/the-disproportionate-impact-of-covid-19-on-black-health-care-workers-in-the-u-s> (accessed January 25, 2021).
- 121 Carroll N. “The Backstory: Pollution. Poor health care. Crowded housing. High-risk jobs. Prejudice. Why people of color are dying of COVID-19.” *USA Today*, October 23, 2020. <https://www.usatoday.com/story/opinion/2020/10/23/covid-racism-communities-color-have-higher-rates-covid-here-why/3727325001/> (accessed January 25, 2021).
- 122 Louissaint N. “Building Community Resilience Through Health Equity.” *Domestic Preparedness*, April 5, 2017. <https://www.domesticpreparedness.com/healthcare/building-community-resilience-through-health-equity/> (accessed January 25, 2021).
- 123 Substance Abuse and Mental Health Services Administration. “Greater Impact: How Disasters Affect People of Low Socioeconomic Status.” *SAMHSA Disaster Technical Assistance Center Supplemental Research Bulletin*, July 2017. https://www.samhsa.gov/sites/default/files/dtac/srb-low-ses_2.pdf (accessed January 25, 2021).
- 124 Auerbach J, Gracia JN, Farberman R, et al. *A Blueprint for the 2021 Administration and Congress: The Promise of Good Health for All: Transforming Public Health in America*. Washington: Trust for America’s Health, October 2020. <https://www.tfah.org/wp-content/uploads/2020/10/2021BluePrintRpt.pdf> (accessed January 25, 2021).
- 125 Lustig A and Cabrera M. *Promoting Health and Cost Control in States: How States Can Improve Community Health & Well-being Through Policy Change*. Washington: Trust for America’s Health, February 2019. <https://www.tfah.org/report-details/promoting-health-and-cost-control-in-states/> (accessed January 25, 2021).
- 126 “CDC COVID-19 Response Health Equity Strategy: Accelerating Progress Towards Reducing COVID-19 Disparities and Achieving Health Equity.” In *Center for Disease Control and Prevention*, updated August 21, 2020. <https://www.cdc.gov/coronavirus/2019-ncov/community/health-equity/cdc-strategy.html> (accessed January 25, 2021).
- 127 Louissaint N. “Building Community Resilience Through Health Equity.” *Domestic Preparedness*, April 5, 2017. <https://www.domesticpreparedness.com/healthcare/building-community-resilience-through-health-equity/> (accessed January 25, 2021).
- 128 Mental Health America. *2021 State of Mental Health in America*. Alexandria, VA: Mental Health America, 2020. <https://www.mhanational.org/issues/state-mental-health-america> (accessed January 25, 2021).
- 129 Czeisler ME, Lane RI, Petrosky E, et al. “Mental Health, Substance Use, and Suicidal Ideation During the COVID-19 Pandemic—United States, June 24–30, 2020.” *Morbidity and Mortality Weekly Report*, 69(32): 1049-1057, August 14, 2020. <https://www.cdc.gov/mmwr/volumes/69/wr/mm6932a1.htm> (accessed January 25, 2021).
- 130 Alter A and Yeager C. “The Consequences Of Covid-19 On The Overdose Epidemic: Overdoses Are Increasing.” *Overdose Detection Mapping Application Program*, May 13, 2020. <http://www.odmap.org/Content/docs/news/2020/ODMAP-Report-May-2020.pdf> (accessed January 25, 2021).

- 131 “FAQs: Provision of Methadone and Buprenorphine for the Treatment of Opioid Use Disorder in the COVID-19 Emergency.” In *Substance Abuse and Mental Health Services Administration*, April 21, 2020. <https://www.samhsa.gov/sites/default/files/faqs-for-oud-prescribing-and-dispensing.pdf> (accessed January 25, 2021).
- 132 “Telehealth: Delivering Care Safely During COVID-19.” In *U.S. Department of Health and Human Services*, updated July 15, 2020. <https://www.hhs.gov/coronavirus/telehealth/index.html> (accessed January 25, 2021).
- 133 Juliano C, Castrucci B, and Fraser MR. “COVID-19 and Public Health: Looking Back, Moving Forward.” *Journal of Public Health Management and Practice*, 27: S1-S4, January/February 2021. https://journals.lww.com/jphmp/Fulltext/2021/01001/COVID_19_and_Public_Health__Looking_Back_Moving.1.aspx (accessed January 25, 2021).
- 134 National Association of County and City Health Officials. *National Profile of Local Health Departments: 2019 Profile Study*. Washington: NACCHO, May 2020. <https://www.naccho.org/resources/lhd-research/national-profile-of-local-health-departments> (accessed January 25, 2021).
- 135 “Public Health Emergency Medical Countermeasures Enterprise.” In *Public Health Emergency*, updated December 30, 2020. <https://www.phe.gov/Preparedness/mcm/phemce/Pages/default.aspx> (accessed January 25, 2021).
- 136 “What are Medical Countermeasures?” In *U.S. Food and Drug Administration*, June 1, 2020. [https://www.fda.gov/emergency-preparedness-and-response/about-mcmi/what-are-medical-countermeasures#:~:text=Medical%20countermeasures,%20or%20MCMs,%20are%20FDA-regulated%20products%20\(biologics,,radiological/nuclear%20material,%20or%20a%20naturally%20occurring%20emerging%20disease](https://www.fda.gov/emergency-preparedness-and-response/about-mcmi/what-are-medical-countermeasures#:~:text=Medical%20countermeasures,%20or%20MCMs,%20are%20FDA-regulated%20products%20(biologics,,radiological/nuclear%20material,%20or%20a%20naturally%20occurring%20emerging%20disease) (accessed January 25, 2021).
- 137 Dall C. “As Pandemic Rages, PPE Supply Remains a Problem.” *CIDRAP News*, Center for Infectious Disease Research and Policy, University of Minnesota, July 29, 2020. <https://www.cidrap.umn.edu/news-perspective/2020/07/pandemic-rages-ppe-supply-remains-problem> (accessed January 25, 2021).
- 138 Center for Health Security. “Implications of Clade X for National Policy.” In *Johns Hopkins Bloomberg School of Public Health, Clade X: A Pandemic Exercise*. http://www.centerforhealthsecurity.org/our-work/events/2018_clade_x_exercise/pdfs/Clade-X-policy-statements.pdf (accessed January 25, 2021).
- 139 Centers for Disease Control and Prevention. *2015-2016 National Report of Medical Countermeasure Readiness: Key Findings*. Atlanta: Centers for Disease Control and Prevention. https://www.cdc.gov/cpr/readiness/2015-2016_KeyFindings.html (accessed January 25, 2021).
- 140 National Academies of Science, Engineering and Medicine. *The Nation’s Medical Countermeasure Stockpile: Opportunities to Improve the Efficiency, Effectiveness, and Sustainability of the CDC Strategic National Stockpile: Workshop Summary*. Washington: National Academies Press, June 28, 2016. <http://www.nationalacademies.org/hmd/Reports/2016/nations-medical-countermeasure-stockpile-ws.aspx> (accessed January 25, 2021).
- 141 U.S. Government Accountability Office. *COVID-19: Federal Efforts Could Be Strengthened by Timely and Concerted Actions. GAO-20-701*. Washington: Government Accountability Office, September 21, 2020. <https://www.gao.gov/reports/GAO-20-701/> (accessed January 25, 2021).
- 142 Webber T and Hollingsworth H. “‘Very Dark Couple of Weeks’: Morgues and Hospitals Overflow.” *Associated Press*, December 1, 2020. <https://apnews.com/article/pandemics-coronavirus-pandemic-2d8758a7bac85cd136248d5ce85533ed> (accessed January 25, 2021).
- 143 Werner RM, Hoffman AK, and Coe NB. “Long-Term Care Policy after Covid-19 — Solving the Nursing Home Crisis.” *New England Journal of Medicine*, 383: 903-905, September 3, 2020. <https://www.nejm.org/doi/full/10.1056/NEJMp2014811> (accessed January 25, 2021).
- 144 Glauser TA, Williamson C, Berger L, et al. “Impact of Covid-19 on Outpatient Clinical Practices: A Survey of Physicians and Practice Administrators in the United States.” *Policy and Medicine*, June 15, 2020. <https://www.policymed.com/wp-content/uploads/2020/06/COVID-19-manuscript-06.15.2020.pdf>
- 145 <https://nhspi.org/indicator/hd-health-care-delivery/> (accessed January 25, 2021).
- 146 Toner E, Schoch-Spana M, Waldhorn R, et al. *A Framework for Healthcare Disaster Resilience: A View to the Future*. Baltimore: Center for Health Security, 2018. http://www.centerforhealthsecurity.org/our-work/pubs_archive/pubs-pdfs/2018/180222-framework-healthcare-disaster-resilience.pdf (accessed January 25, 2021).
- 147 “Regional Disaster Health Response System: An Overview.” In *Public Health Emergency*, updated October 5, 2020. <https://www.phe.gov/Preparedness/planning/RDHRS/Pages/rdhrs-overview.aspx> (accessed January 25, 2021).
- 148 “Emergency Management.” In *The Joint Commission*. <https://www.jointcommission.org/resources/patient-safety-topics/emergency-management/> (accessed January 25, 2021).
- 149 Harvey M. “Using the Energy Sector As a Model for Healthcare Reliability.” U.S. Department of Homeland Security, presentation at 2019 National Healthcare Preparedness Conference, December 5, 2019.
- 150 *NPR. Planet Money Newsletter*. How the Crisis is Making Racial Inequity Worse. May 26, 2020. <https://www.npr.com/2020/05/26/841111111-how-the-crisis-is-making-racial-inequity-worse> (accessed February 3, 2021)
- 151 Aron-Dine A. “House Bill Would Help Millions Get Health Coverage, Cut Costs for Millions More.” Center on Budget and Policy Priorities, June 29, 2020. <https://www.cbpp.org/blog/house-bill-would-help-millions-get-the-health-coverage-cut-costs-for-millions-more> (accessed January 25, 2021).
- 152 Toner E, Schoch-Spana M, Waldhorn R, et al. *A Framework for Healthcare Disaster Resilience: A View to the Future*. Baltimore: Center for Health Security, 2018. http://www.centerforhealthsecurity.org/our-work/pubs_archive/pubs-pdfs/2018/180222-framework-healthcare-disaster-resilience.pdf (accessed January 25, 2021).
- 153 “The EMS Compact.” In *National Registry of Emergency Medical Technicians*. <https://www.nremt.org/rwd/public/document/replica> (accessed January 25, 2021).
- 154 “Uniform Emergency Volunteer Health Practitioners Act.” In *The American College of Surgeons*. <https://www.facs.org/advocacy/state/uevhpa> (accessed January 25, 2021).

- 155 “Topic Collection: Crisis Standards of Care.” In *ASPR Tracie Technical Resources, U.S. Department of Health and Human Services*, updated January 28, 2021. <https://asprtracie.hhs.gov/technical-resources/63/crisis-standards-of-care/0> (accessed January 28, 2021).
- 156 “Crisis Standards of Care.” In *National Academies of Sciences Engineering and Medicine*. <https://www.nationalacademies.org/our-work/crisis-standards-of-care-successes-and-challenges-from-the-past-ten-years-a-workshop> (accessed January 28, 2021).
- 157 Crimmins A, Balbus J, Gamble JL, et al. *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment*. Washington: U.S. Global Change Research Program, 2016. <https://health2016.global-change.gov/> (accessed January 28, 2021).
- 158 “Health and Climate Change: Accounting for Costs.” In *Natural Resources Defense Council*, November 2011. <https://www.nrdc.org/sites/default/files/accounting-costs.pdf> (accessed January 28, 2021).
- 159 Ibid.
- 160 “CDC COVID Data Tracker: United States COVID-19 Cases and Deaths by State.” In *Centers for Disease Control and Prevention*. https://covid.cdc.gov/covid-data-tracker/#cases_totalcases (accessed January 25, 2021).
- 161 “WHO Coronavirus Disease (COVID-19) Dashboard.” In *World Health Organization*, updated January 25, 2021. <https://covid19.who.int> (accessed January 25, 2021).
- 162 “COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU).” In *John Hopkins University & Medicine, Coronavirus Resource Center*. <https://coronavirus.jhu.edu/map.html> (accessed January 25, 2021).
- 163 “CDC COVID Data Tracker: Demographic Trends of COVID-19 Cases and Deaths in the US Reported to CDC.” In *Centers for Disease Control and Prevention*, updated January 24, 2021. <https://covid.cdc.gov/covid-data-tracker/#demographics>. (accessed January 25, 2021).
- 164 “The COVID Racial Data Tracker: COVID-19 Is Affecting Black, Indigenous, Latinx, and Other People of Color The Most.” In *The COVID Tracking Project at The Atlantic*. <https://covidtracking.com/race>. (accessed January 25, 2021).
- 165 Statista. “Distribution of COVID-19 Deaths in the United States as of January 27, 2021, by race”. <https://www.statista.com/statistics/1122369/covid-deaths-distribution-by-race-us/> (Accessed February 1, 2021).
- 166 Van Beusekom M. “Studies Explore Asymptomatic COVID-19 Cases, Racial Inequities.” *CIDRAP News*, Center for Infectious Disease Research and Policy, University of Minnesota, September 22, 2020. <https://www.cidrap.umn.edu/news-perspective/2020/09/studies-explore-asymptomatic-covid-19-cases-racial-inequities> (accessed January 25, 2021).
- 167 Lake S. “COVID-19 Death Toll Underreported, Study Finds.” *Virginia Business*, July 1, 2020. <https://www.virginiabusiness.com/article/covid-19-death-toll-underreported-study-finds/> (accessed January 25, 2021).
- 168 Samuels M. “U.S. COVID Deaths May be Undercounted by 36 Percent.” Boston University School of Public Health, 2020. <https://www.bu.edu/sph/news/articles/2020/us-covid-deaths-may-be-undercounted-by-36-percent/> (accessed January 25, 2021).
- 169 Lange SJ, Ritchey MD, Goodman AB, et al. “Potential Indirect Effects of the COVID-19 Pandemic on Use of Emergency Departments for Acute Life-Threatening Conditions—United States, January–May 2020.” *Morbidity and Mortality Weekly Report*, 69(25): 795–800, 2020. <https://www.cdc.gov/mmwr/volumes/69/wr/mm6925e2.htm> (accessed January 25, 2021).
- 170 National Institutes of Health. “Scientists Discover Genetic and Immunologic Underpinnings of Some Cases of Severe COVID-19.” *Press release: National Institute of Allergy and Infectious Diseases*, September 24, 2020. <https://www.nih.gov/news-events/news-releases/scientists-discover-genetic-immunologic-underpinnings-some-cases-severe-covid-19> (accessed January 25, 2021).
- 171 “For Parents: Multisystem Inflammatory Syndrome in Children (MIS-C) associated with COVID-19.” In *Centers for Disease Control and Prevention*, updated May 20, 2020. <https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/children/mis-c.html> (accessed January 25, 2021).
- 172 CDC. *Morbidity and Mortality Report. COVID-19 Associated Multisystem Inflammatory Syndrome in Children - United States, March - July 2020. COVID-19–Associated Multisystem Inflammatory Syndrome in Children — United States, March–July 2020 | MMWR (cdc.gov)* (Accessed February 1, 2021).
- 173 “What We Know About Long-Term Effects of COVID-19.” In *World Health Organization*, updated September 9, 2020. https://www.who.int/docs/default-source/coronaviruse/risk-comms-updates/update-36-long-term-symptoms.pdf?sfvrsn=5d3789a6_2 (accessed January 25, 2021).
- 174 U.S. Department of Health and Human Services. “HHS Announces Partnership with Morehouse School of Medicine to Fight COVID-19 in Racial and Ethnic Minority and Vulnerable Communities.” *Press release: HHS*, June 23, 2020. <https://www.hhs.gov/about/news/2020/06/23/hhs-announces-partnership-morehouse-school-medicine-fight-covid-19-racial-ethnic-minority.html> (accessed January 25, 2021).
- 175 “Fact Sheet: Explaining Operation Warp Speed.” In *U.S. Department of Health and Human Services*, updated January 21, 2021. <https://www.hhs.gov/coronavirus/explaining-operation-warp-speed/index.html> (accessed January 25, 2021).
- 176 “COVID-19 Vaccines.” In *The U.S. Food and Drug Administration*. Updated January 14, 2021. <https://www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines> (accessed January 25, 2021).
- 177 “Frequently Asked Questions about COVID-19 Vaccination.” In *Centers for Disease Control and Prevention*, updated January 25, 2021. <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/faq.html#:~:text=The%20federal%20government%20will%20oversee,be%20ordered%20through%20CDC> (accessed January 25, 2021).
- 178 Chokshi N. “Airlines Gear Up to Transport Vaccines That Could Revive Travel.” *The New York Times*, December 10, 2020. <https://www.nytimes.com/2020/12/10/business/airlines-vaccines-coronavirus.html> (accessed January 25, 2021).

- 179 Vergun D. “DOD Officials Announce Distribution Plan for Initial Batch of COVID-19 Vaccine.” *Defense News*, U.S. Department of Defense, December 9, 2020. <https://www.defense.gov/Explore/News/Article/Article/2440577/dod-officials-announce-distribution-plan-for-initial-batch-of-covid-19-vaccine/> (accessed January 25, 2021).
- 180 Centers for Disease Control and Prevention. *COVID-19 Vaccination Program Interim Playbook for Jurisdiction Operations*. Atlanta: Centers for Disease Control and Prevention, October 29, 2020. https://www.cdc.gov/vaccines/imz-managers/downloads/COVID-19-Vaccination-Program-Interim_Playbook.pdf (accessed January 25, 2021).
- 181 Dooling K, Marin M, Wallace M, et al. “The Advisory Committee on Immunization Practices’ Updated Interim Recommendation for Allocation of COVID-19 Vaccine—United States, December 2020.” *Morbidity and Mortality Weekly Report*, 69(51-52): 1657, January 1, 2021. <https://www.cdc.gov/mmwr/volumes/69/wr/pdfs/mm695152e2-H.pdf> (accessed January 25, 2021).
- 182 Frosch D, Findell E, and Loftus P. “As Covid-19 Vaccines Roll Out, States to Determine Who Gets Shots First.” *The Wall Street Journal*, December 9, 2020. <https://www.wsj.com/articles/as-covid-19-vaccines-roll-out-states-to-determine-who-gets-shots-first-11607509801> (accessed January 25, 2021).
- 183 Stanley-Baker I. “Shots Are Slow to Reach Arms as Trump Administration Leaves Final Steps of Mass Vaccination to Beleaguered States.” *The Washington Post*, December 30, 2020. <https://www.washingtonpost.com/health/2020/12/30/covid-vaccine-delay/> (accessed January 25, 2021).
- 184 Feuer W. “Dr. Fauci Says Slow COVID Vaccine Rollout Has Been Disappointing.” *CNBC*, December 31, 2020. <https://www.cnbc.com/2020/12/31/dr-fauci-says-slow-covid-vaccine-rollout-has-been-disappointing.html> (accessed January 25, 2021).
- 185 Sun LH, Stanley-Becker I, Sellers FS, et al. “Vaccines Were a Chance to Redeem Failures in the U.S. Coronavirus Response. What Went Wrong?” *The Washington Post*, January 11, 2021. https://www.washingtonpost.com/health/covid-vaccine-slow-rollout/2021/01/11/2e804898-5100-11eb-bda4-615aaefd0555_story.html (accessed January 25, 2021).
- 186 Centers for Disease Control and Prevention. *COVID-19 Vaccination Program Interim Playbook for Jurisdiction Operations*. Atlanta: Centers for Disease Control and Prevention, October 29, 2020. https://www.cdc.gov/vaccines/imz-managers/downloads/COVID-19-Vaccination-Program-Interim_Playbook.pdf (accessed January 25, 2021).
- 187 *CBS News*. “Biden vows to distribute 100 million vaccine doses in first 100 days”. December 8, 2020. <https://www.cbsnews.com/news/biden-covid-vaccine-100-million-doses-first-100-days/> (accessed February 4, 2021).
- 188 Centers for Disease Control and Prevention. “COVID-19 Vaccinations in the U.S.” *CDC COVID Data Tracker* (accessed February 4, 2021).
- 189 Nambi Ndugga, et al. Kaiser Family Foundation. “Early State Vaccination Data Raise Warning Flags for Racial Equity”. January 21, 2021. <https://www.kff.org/policy-watch/early-state-vaccination-data-raise-warning-flags-racial-equity/> (Accessed February 1, 2021).
- 190 Centers for Disease Control and Prevention. “Flu Activity & Surveillance: Find COVID-19 Surveillance Data.” *Flu View*, updated July 8, 2020. <https://www.cdc.gov/flu/weekly/fluactivitysurv.htm> (accessed January 25, 2021).
- 191 “Estimated Influenza Illnesses, Medical Visits, Hospitalizations, and Deaths in the United States—2019–2020 Influenza Season.” In *Centers for Disease Control and Prevention*, updated October 6, 2020. <https://www.cdc.gov/flu/about/burden/2019-2020.html> (accessed January 25, 2021).
- 192 Ibid.
- 193 Centers for Disease Control and Prevention. “Flu Vaccination Coverage, United States, 2019–20 Influenza Season.” *Flu Vax View*, updated January 21, 2021. <https://www.cdc.gov/flu/fluview/> (accessed January 25, 2021).
- 194 “Estimated Influenza Illnesses, Medical Visits, and Hospitalizations Averted by Vaccination in the United States — 2019–2020 Influenza Season.” In *Centers for Disease Control and Prevention*, updated October 6, 2020. <https://www.cdc.gov/flu/about/burden-averted/2019-2020.htm> (accessed January 25, 2021).
- 195 Centers for Disease Control and Prevention. “Weekly Influenza Surveillance Report: Key Updates for Week 51, Ending December 21, 2019.” *Flu View*, updated January 22, 2021. <https://www.cdc.gov/flu/weekly/index.htm> (accessed January 25, 2021).
- 196 “Widespread Person-to-Person Outbreaks of Hepatitis A Across the United States.” In *Centers for Disease Control and Prevention*, updated January 25, 2021. <https://www.cdc.gov/hepatitis/outbreaks/2017March-HepatitisA.htm> (accessed January 25, 2021).
- 197 Ibid.
- 198 Doshani M, Weng M, Moore KL, et al. “Recommendations of the Advisory Committee on Immunization Practice for People Experiencing Homelessness.” *Morbidity and Mortality Reports*, 68(6):153-156, February 15, 2019. <https://www.cdc.gov/mmwr/volumes/68/wr/mm6806a6.htm>.
- 199 “Hepatitis A Outbreaks in the United States.” In *Centers for Disease Control and Prevention*, updated July 28, 2020. <https://www.cdc.gov/hepatitis/outbreaks/hepatitisaoutbreaks.htm> (accessed January 25, 2021).
- 200 “Widespread Person-to-Person Outbreaks of Hepatitis A Across the United States.” In *Centers for Disease Control and Prevention*, updated January 25, 2021. <https://www.cdc.gov/hepatitis/outbreaks/2017March-HepatitisA.htm> (accessed January 25, 2021).
- 201 “Measles Cases and Outbreaks.” In *Centers for Disease Control and Prevention*, updated December 2, 2020. <https://www.cdc.gov/measles/cases-outbreaks.html> (accessed January 25, 2021).
- 202 Ibid.
- 203 “Complications of Measles.” In *Centers for Disease Control and Prevention*, updated November 5, 2020. <https://www.cdc.gov/measles/symptoms/complications.html> (accessed January 25, 2021).
- 204 Paules CI, Marston HD, and Fauci AS. “Measles in 2019—Going Backward.” *New England Journal of Medicine*, 380: 2185-2187, June 6, 2019. <https://www.nejm.org/doi/full/10.1056/NEJMp1905099> (accessed January 25, 2021).
- 205 “Measles Cases and Outbreaks: Measles Cases in 2019.” In *Centers for Disease Control and Prevention*, updated December 2, 2020. <https://www.cdc.gov/measles/cases-outbreaks.html> (accessed January 25, 2021).

- 206 “Worldwide Measles Deaths Climb 50% from 2016 to 2019 Claiming Over 207,500 Lives in 2019.” In *Measles & Rubella Initiative*. <https://measles-rubellainitiative.org/measles-news/worldwide-measles-deaths-climb-50-from-2016-to-2019-claiming-over-207500-lives-in-2019/> (accessed January 25, 2021).
- 207 “Immunization Analysis and Insights: Provisional Monthly Measles and Rubella Data.” In *World Health Organization*. <https://www.who.int/teams/immunization-vaccines-and-biologicals/immunization-analysis-and-insights/surveillance/monitoring/provisional-monthly-measles-and-rubella-data> (accessed January 25, 2021).
- 208 “Emergency Call to Action for Measles and Polio Outbreak Prevention and Response.” In *World Health Organization and UNICEF*, November 2020. <http://polioeradication.org/wp-content/uploads/2020/11/Call-To-Action-20201105.pdf> (accessed January 25, 2021).
- 209 “2020 Democratic Republic of the Congo, Equateur Province.” In *Centers for Disease Control and Prevention*, updated November 18, 2020. <https://www.cdc.gov/vhf/ebola/outbreaks/drc/2020-june.html> (accessed January 25, 2021).
- 210 “Latest Ebola outbreak in DR Congo is declared over, with lessons for COVID-19.” In *UN News*, November 18, 2020. <https://news.un.org/en/story/2020/11/1077912> (accessed January 25, 2021).
- 211 Nett JE. “Candida auris: An Emerging Pathogen ‘Incognito?’” *PLoS Pathogens*, 15(4): e1007638, April 8, 2019. <https://journals.plos.org/plospathogens/article?id=10.1371/journal.ppat.1007638> (accessed January 25, 2021).
- 212 “Tracking Candida auris: CDC Works With Global Partners to End Cholera.” In *Centers for Disease Control and Prevention*, updated January 15, 2021. <https://www.cdc.gov/fungal/candida-auris/tracking-c-auris.html> (accessed January 25, 2021).
- 213 Centers for Disease Control and Prevention. “Candia auris Outbreak in a COVID-19 Specialty Care Unit – Florida, July – August 2020”. <https://www.cdc.gov/mmwr/volumes/70/wr/mm7002e3.htm> July–August 2020 | MMWR (cdc.gov) (accessed February 4, 2021).
- 214 Ibid.
- 215 “Cholera: Cholera Outbreaks.” *World Health Organization*, November 2019. <http://www.emro.who.int/health-topics/cholera-outbreak/cholera-outbreaks.html> (accessed January 25, 2021).
- 216 “Cholera.” In *World Health Organization*. https://www.who.int/health-topics/cholera#a#tab=tab_1 (accessed January 25, 2021).
- 217 World Health Organization. *How Do Vaccines Work?* <https://www.who.int/news-room/feature-stories/detail/how-do-vaccines-work> (who.int) (Accessed February 1, 2021).
- 218 “Polio Vaccination Campaigns Restart in Afghanistan and Pakistan After COVID-19 Hiatus.” In *UN News*, August 11, 2020. <https://news.un.org/en/story/2020/08/1069972> (accessed January 25, 2021).
- 219 “Foodborne Outbreaks.” In *Centers for Disease Control and Prevention*, updated January 13, 2021. <https://www.cdc.gov/foodsafety/outbreaks/index.html> (accessed January 25, 2021).
- 220 Centers for Disease Control and Prevention. “Foodborne Germs and Illnesses” March 18, 2020. <https://www.cdc.gov/foodsafety/foodborne-germs.html> (Accessed February 3, 2021).
- 221 “Foodborne Germs and Illnesses.” In *Centers for Disease Control and Prevention* updated March 14, 2020. <https://www.cdc.gov/foodsafety/foodborne-germs.html> (accessed January 25, 2021).
- 222 U.S. Department of Health and Human Services. “Secretary Azar Declares Public Health Emergency for United States for 2019 Novel Coronavirus.” *Press release*, HHS, January 31, 2020. <https://www.hhs.gov/about/news/2020/01/31/secretary-azar-declares-public-health-emergency-us-2019-novel-coronavirus.html> (accessed January 25, 2021).
- 223 “Another Coronavirus Emerges: U.S. Domestic Response to 2019-nCoV.” In *EveryCRSReport*, January 29, 2020. <https://www.everycrsreport.com/reports/IN11212.html> (accessed January 25, 2021).
- 224 “Statement on the Second Meeting of the International Health Regulations (2005) Emergency Committee Regarding the Outbreak of Novel Coronavirus (2019-nCoV).” In *World Health Organization*, January 30, 2020. [https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-\(2019-ncov\)](https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov)) (accessed January 25, 2021).
- 225 World Health Organization. “WHO Director-General remarks at media briefing, March 11, 2020. WHO Director-General’s opening remarks at the media briefing on COVID-19 - 11 March 2020 (accessed February 4, 2021).
- 228 Wilhelm B. and Egar WT. “Congressional Oversight Provisions in the Coronavirus Aid, Relief, and Economic Security (CARES) Act (P.L. 116-136).” *Congressional Research Service*, April 17, 2020. <https://fas.org/sgp/crs/misc/R46315.pdf> (accessed January 25, 2021).
- 229 “CARES Act Provider Relief Fund.” In *U.S. Department of Health and Human Services*, updated January 21, 2021. <https://www.hhs.gov/coronavirus/cares-act-provider-relief-fund/index.html#:~:text=The%20Provider%20Relief%20Fund%20supports,lines%20of%20the%20coronavirus%20response> (accessed January 25, 2021).
- 230 “Policy Changes During COVID-19.” In *Telehealth.HHS.gov*, updated January 19, 2021. <https://telehealth.hhs.gov/providers/policy-changes-during-the-covid-19-public-health-emergency/> (accessed January 25, 2021).
- 231 Cohen J and van der Meulen Rodgers Y. “Contributing Factors to Personal Protective Equipment Shortages During the COVID-19 Pandemic.” *Preventative Medicine*, 141: 106263, December 2020. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7531934/> (accessed January 25, 2021).
- 232 Ranney ML, Griffeth V, and Jha AK. “Critical Supply Shortages—The Need for Ventilators and Personal Protective Equipment during the COVID-19 Pandemic.” *New England Journal of Medicine*, 382: e41, April 30, 2020. <https://www.nejm.org/doi/full/10.1056/NEJMp2006141> (accessed January 25, 2021).

- 233 “Supply Shortages Impacting COVID-19 and Non-COVID Testing.” In *American Society for Microbiology*, January 19, 2021. [\(https://asm.org/Articles/2020/September/Clinical-Microbiology-Supply-Shortage-Collecti-1#:~:text=Those%20responding%20this%20week%20report,tips%20reagent%20bins%20\(41.2%25\)\)](https://asm.org/Articles/2020/September/Clinical-Microbiology-Supply-Shortage-Collecti-1#:~:text=Those%20responding%20this%20week%20report,tips%20reagent%20bins%20(41.2%25)) (accessed January 25, 2021).
- 234 U.S. Department of Health and Human Services. “Secretary Azar Statement on New Defense Production Act Orders.” *Press release*: April 3, 2020. <https://www.hhs.gov/about/news/2020/04/03/secretary-azar-statement-on-new-defense-production-act-orders.html> (accessed January 25, 2021).
- 235 “National Organizations Call for Action to Implement Crisis Standards of Care During COVID-19 Surge.” In *National Academy of Medicine*, December 18, 2020. <https://nam.edu/national-organizations-call-for-action-to-implement-crisis-standards-of-care-during-covid-19-surge/> (accessed January 25, 2021).
- 236 Tyson A, Johnson C, and Funk C. “U.S. Public Now Divided Over Whether to Get COVID-19 Vaccine.” *Pew Research Center*, September 17, 2020. www.pewresearch.org/science/2020/09/17/u-s-public-now-divided-over-whether-to-get-covid-19-vaccine/ (accessed January 25, 2021).
- 237 Trust for America’s Health. “Building Trust in and Access to a COVID-19 Vaccine Within Communities of Color and Tribal Nations.” *Policy Brief*, December 2020. <https://www.tfah.org/report-details/trust-and-access-to-covid-19-vaccine-within-communities-of-color/> (accessed January 25, 2021).
- 238 “FY 2020 Appropriations for Federal HIV/AIDS Programs.” In *The AIDS Institute*, November 4, 2019. [https://www.theaidsinstitute.org/sites/default/files/attachments/FY2020%20ABAC%20Chart%2011.04.19%20\(1\).pdf](https://www.theaidsinstitute.org/sites/default/files/attachments/FY2020%20ABAC%20Chart%2011.04.19%20(1).pdf) (accessed January 25, 2021).
- 239 “Budget.” In *HIV.gov*, May 12, 2020. <https://www.hiv.gov/federal-response/funding/budget> (accessed January 25, 2021).
- 240 U.S. Department of Health and Human Services. “HHS Awards \$2.24 Billion in Grants to Help Americans Access HIV/AIDS Care, Support Services, and Medication.” *Press release*: October 1, 2020. <https://www.hhs.gov/about/news/2020/10/01/hhs-awards-2.24-billion-in-grants-to-help-americans-access-hiv-aids-care-support-services-and-medication.html> (accessed January 25, 2021).
- 241 National Institutes of Health. “NIH establishes Centers for Research in Emerging Infectious Diseases.” *Press release*: August 27, 2020. <https://www.nih.gov/news-events/news-releases/nih-establishes-centers-research-emerging-infectious-diseases> (accessed January 25, 2021).
- 242 “Viral Hepatitis National Strategic Plan.” In *U.S. Department of Health and Human Services*, October 9, 2020. <https://www.hhs.gov/hepatitis/viral-hepatitis-national-strategic-plan/index.html> (accessed January 25, 2021).
- 243 “U.S. National Action Plan for Combating Antibiotic-Resistant Bacteria (National Action Plan).” In *Centers for Disease Control and Prevention*, updated October 9, 2020. <https://www.cdc.gov/drugresistance/us-activities/national-action-plan.html> (accessed January 25, 2021).
- 244 Huang, P. “Trump Sets Date To End WHO Membership Over Its Handling Of Virus.” *NPR*, July 7, 2020. <https://www.npr.org/sections/goatsand-soda/2020/07/07/888186158/trump-sets-date-to-end-who-membership-over-its-handling-of-virus> (accessed January 25, 2021).
- 245 Food and Drug Administration. “FDA Launches New Era of Smarter Food Safety Initiative, Releases Blueprint and Pilot Study.” *Press release*: July 13, 2020. <https://www.fda.gov/news-events/press-announcements/fda-launches-new-era-smarter-food-safety-initiative-releases-blueprint-and-pilot-study> (accessed January 25, 2021).
- 246 “New Era Of Smarter Food Safety: FDA’s Blueprint for the Future.” In *Food and Drug Administration*, July 2020. <https://www.fda.gov/media/139868/download> (accessed January 25, 2021).
- 247 U.S. Food and Drug Administration. *FDA Approves Only Drug in U.S. to Treat Severe Malaria*. May 26, 2020. <https://www.fda.gov/news-events/press-announcements/fda-approves-only-drug-us-treat-severe-malaria> Accessed February 3, 2021.
- 248 Centers for Disease Control and Prevention. *Parasites - Malaria*. January 26, 2021. <https://www.cdc.gov/parasites/malaria/index.html> (Accessed February 3, 2021)
- 249 National Institutes of Health. “First Human Trial of Monoclonal Antibody to Prevent Malaria Opens.” *Press release*: January 27, 2020. <https://www.nih.gov/news-events/news-releases/first-human-trial-monoclonal-antibody-prevent-malaria-opens> (accessed January 25, 2021).
- 250 Bavarian Nordic. “Bavarian Nordic Announces Topline Results from Phase 1 Clinical Trial of Equine Encephalitis Virus Vaccine.” *Press release*: June 8, 2020. <https://www.bavarian-nordic.com/investor/news/news.aspx?news=6058> (accessed January 25, 2021).
- 251 U.S. Department of Health and Human Services. “HHS Secretary Azar Statement on First FDA Approval of Ebola Therapeutic.” *Press release*: October 14, 2020. <https://www.hhs.gov/about/news/2020/10/14/hhs-secretary-azar-statement-first-fda-approval-ebola-therapeutic.html> (accessed January 25, 2021).
- 252 Abbasi J. “FLU-v, a Universal Flu Vaccine Candidate, Advances in Trial.” *JAMA*, 323(14): 1336, April 14, 2020. <https://jamanetwork.com/journals/jama/article-abstract/2764436> (accessed January 25, 2021).
- 253 Pleguezuelos O, James E, Fernandez A, et al. Efficacy of FLU-v, a broad-spectrum influenza vaccine, in a randomized phase IIb human influenza challenge study. *npj Vaccines*, 5(22), March 13, 2020. <https://doi.org/10.1038/s41541-020-0174-9> (accessed January 25, 2021).
- 254 Bliss J. “Inside the Storm.” *Nashville Tennessean*, April 4, 2020. <https://www.tennessean.com/in-depth/news/local/2020/04/03/tennessee-tornadoes-weather-science/5025110002/> (accessed January 25, 2021).

- 255 Cappucci M. “Last Month Was the Second-Most Active April For Tornadoes.” *The Washington Post*, May 5, 2020. <https://www.washingtonpost.com/weather/2020/05/05/april-2020-was-second-most-active-such-month-tornadoes/> (accessed January 25, 2021).
- 256 Beddoes M. “Ranking the Easter 2020 Tornado Outbreak Versus the Worst Outbreaks in History.” *WHSV*, April 22, 2020. <https://www.wHSV.com/content/news/Ranking-the-Easter-2020-outbreak-versus-the-worst-outbreaks-in-history-569861941.html%20target=> (accessed January 25, 2021).
- 257 Newberger E. “Heatwaves Are Becoming More Deadly As Nights Warm Faster Than Days.” *CNBC*, September 12, 2020. <https://www.cNBC.com/2020/09/12/climate-change-why-heatwaves-are-more-deadly-as-nights-warm-faster.html> (accessed January 25, 2021).
- 258 Rice D. “If You Thought July Was Hot, You Were Right: It Was One of Earth’s Hottest Months Ever Recorded.” *USA Today*, August 13, 2020. <https://www.usatoday.com/story/news/nation/2020/08/13/july-2020-record-heat-one-hottest-months-ever-recorded/3366762001/> (accessed January 25, 2021).
- 259 Di Liberto T. “September 2020: Another Record-Setting Month for Global Heat.” *Climate.gov*, October 16, 2020. <https://www.climate.gov/news-features/features/september-2020-another-record-setting-month-global-heat> (accessed January 25, 2021).
- 260 Patel K. “California Heatwave Fits a Trend.” *Earth Observatory*, September 6, 2020. <https://earthobservatory.nasa.gov/images/147256/california-heat-wave-fits-a-trend> (accessed January 25, 2021).
- 261 Penney V. “2020 Had the Warmest September on Record, Data Shows.” *The New York Times*, October 7, 2020. <https://www.nytimes.com/2020/10/07/climate/hottest-september.html> (accessed January 25, 2021).
- 262 Allen G. “Too Many Storms, Not Enough Names.” *Morning Edition, NPR*, November 30, 2020. <https://www.npr.org/2020/11/30/937986687/too-many-storms-not-enough-names> (accessed January 25, 2021).
- 263 “2020 Atlantic Hurricane Season Fast Facts.” In *CNN*, November 23, 2020. <https://www.cnn.com/2020/05/11/us/2020-atlantic-hurricane-season-fast-facts/index.html> (accessed January 25, 2021).
- 264 “2020 Atlantic Hurricane Season.” In *Center for Disaster Philanthropy*, December 1, 2020. <https://disasterphilanthropy.org/disaster/2020-atlantic-hurricane-season/> (accessed January 25, 2021).
- 265 “2020 Atlantic Hurricane Season Fast Facts.” In *CNN*, November 23, 2020. <https://www.cnn.com/2020/05/11/us/2020-atlantic-hurricane-season-fast-facts/index.html> (accessed January 25, 2021).
- 266 “2020 Atlantic Hurricane Season.” In *Center for Disaster Philanthropy*, December 1, 2020. <https://disasterphilanthropy.org/disaster/2020-atlantic-hurricane-season/> (accessed January 25, 2021).
- 267 “2020 Atlantic Hurricane Season Fast Facts.” In *CNN*, November 23, 2020. <https://www.cnn.com/2020/05/11/us/2020-atlantic-hurricane-season-fast-facts/index.html> (accessed January 25, 2021).
- 268 “2020 Atlantic Hurricane Season.” In *Center for Disaster Philanthropy*, December 1, 2020. <https://disasterphilanthropy.org/disaster/2020-atlantic-hurricane-season/> (accessed January 25, 2021).
- 269 “2020 Atlantic Hurricane Season Fast Facts.” In *CNN*, November 23, 2020. <https://www.cnn.com/2020/05/11/us/2020-atlantic-hurricane-season-fast-facts/index.html> (accessed January 25, 2021).
- 270 “Over 400,000 Need Urgent Aid in Central America: Rights Group.” In *Al Jazeera*, December 9, 2020. <https://www.aljazeera.com/news/2020/12/9/refugee-group-over-400000-in-need-of-aid-in-central-america> (accessed January 25, 2021).
- 271 Schwartz MS. “Iowa Derecho this August Was Most Costly Thunderstorm Event in Modern U.S. History.” *NPR*, October 18, 2020. <https://www.npr.org/2020/10/18/925154035/iowa-derecho-this-august-was-most-costly-thunderstorm-event-in-modern-us-histor> (accessed January 25, 2021).
- 272 “Declared Disasters 2020.” In *FEMA*. https://www.fema.gov/disasters/disaster-declarations?field_dv2_state_territory_tribal_dv2_declaration_year_value=2020&field_dv2_declaration_type_value=DR&field_dv2_incident_type_target_id_selective=49121 (accessed January 25, 2021).
- 273 Miller S. “‘This Season Is Off the Charts’: Colorado Fights the Worst Wildfires in its Recent History.” *The Guardian*, October 30, 2020. <https://www.theguardian.com/us-news/2020/oct/30/colorado-fires-cameron-peak-east-troublesome> (accessed January 25, 2021).
- 274 “Top 20 Largest California Wildfires.” In *Cal Fire*, November 3, 2020. https://www.fire.ca.gov/media/4jandlhh/top20_acres.pdf (accessed January 25, 2021).
- 275 “Stats and Events.” In *Cal Fire*. <https://www.fire.ca.gov/stats-events/> (accessed January 25, 2021).
- 276 Bay Area News. “Map: 33 People Killed in California Wildfires, 2020 Season.” *The Mercury News*, November 18, 2020. <https://www.mercurynews.com/2020/10/02/map-31-people-killed-in-california-wildfires-2020-season/> (accessed January 25, 2021).
- 277 Borunda A. “Climate Change Is Contributing to California’s Fires.” *National Geographic*, October 25, 2019. https://www.nationalgeographic.com/science/2019/10/climate-change-california-power-outage/?utm_source=All+Members+List_New+website&utm_campaign=c8855162b1-ClimateChange_2018_1-9_COPY_01&utm_medium=email&utm_term=0_5aec46f054-c8855162b1-206919617&mc_cid=c8 (accessed January 25, 2021).
- 278 DiGiovanna S. “Spring Rain and Heat Add Up to Heavy Vegetation Growth and a Potentially Explosive Fire Season.” *NBC Los Angeles*, May 5, 2020. <https://www.nbcalosangeles.com/news/california-wildfires/california-wildfires-rain-vegetation-spring-fire-season-prepare/2350979/> (accessed January 25, 2021).
- 279 Rand J. “La Nina Forms in the Pacific—Here’s What That Means For California’s Rain and Fire Seasons.” *ABC7*, September 12, 2020. <https://abc7.com/la-nina-california-wildfires-drought-what-is/6419469/> (accessed January 25, 2021).

- 280 Urness Z. "Oregon's 2020 Wildfire Season Brought a New Level of Destruction. It Could Be Just the Beginning." *Salem Statesman Journal*, October 30, 2020. <https://www.statesmanjournal.com/story/news/2020/10/30/climate-change-oregon-wildfires-2020/6056170002/> (accessed January 25, 2021).
- 281 Worthington D. "Video Shows Damage at Rocky Mountain National Park After Wildfires Burned 30,000 Acres." *The Denver Post*, November 16, 2020. <https://theknow.denverpost.com/2020/11/16/rocky-mountain-national-park-damage-east-troublesome-cameron-peak-wildfires/248942/> (accessed January 25, 2021).
- 282 Worthington D. "Rocky Mountain National Park Loses Several Historic Structures in East Troublesome Fire." *The Denver Post*, November 6, 2020. <https://theknow.denverpost.com/2020/11/06/rocky-mountain-national-park-east-troublesome-fire-damage/248479/> (accessed January 25, 2021).
- 283 "National Preparedness Level." In *National Interagency Fire Center*, December 4, 2020. <https://www.nifc.gov/fireInfo/nfn.htm> (accessed January 25, 2021).
- 284 Liedtke M. "Q&A: Why California is facing power outages, rolling blackouts again." *Desert Sun*, August 19, 2020. <https://www.desertsun.com/story/news/environment/wildfires/2020/08/19/california-power-outages-rolling-blackouts-why-they-happening-again/5612003002/> (accessed January 25, 2021).
- 285 Ibid.
- 286 Wetsman N. "California's Blackouts Reveal Health Care's Fragile Power System." *The Verge*, October 28, 2019. <https://www.theverge.com/2019/10/28/20932780/california-blackout-healthcare-electricity-fires> (accessed January 25, 2021).
- 287 U.S. Department of Health and Human Services. "HHS Secretary Azar Declares Public Health Emergency for Puerto Rico Following Earthquakes." *Press release*: January 8, 2020. <https://www.hhs.gov/about/news/2020/01/08/hhs-secretary-azar-declares-public-health-emergency-for-puerto-rico-following-earthquakes.html> (accessed January 25, 2021).
- 288 "Public Health Emergency Declarations." In *Public Health Emergency*, updated January 12, 2021. <https://www.phe.gov/emergency/news/healthactions/phe/Pages/default.aspx> (accessed January 25, 2021).
- 289 U.S. Department of Health and Human Services. "HHS Secretary Azar Declares Public Health Emergencies in Louisiana and Texas due to Hurricane Laura." *Press release*: August 26, 2020. <https://www.hhs.gov/about/news/2020/08/26/hhs-secretary-azar-declares-public-health-emergencies-in-louisiana-and-texas-due-to-hurricane-laura.html> (accessed January 25, 2021).
- 290 U.S. Department of Health and Human Services. "HHS Awards \$79 Million to Support Health Center Response to Emergencies." *Press release*: September 8, 2020. <https://www.hhs.gov/about/news/2020/09/08/hhs-awards-79-million-to-support-health-center-response-to-emergencies.html> (accessed January 25, 2021).
- 291 Dos Passos Coggin D. "In the Eastern U.S., Tropical Storms that Were Once Major Hurricanes Pose Greatest Threat of Extreme Rain." *Climate.gov*, June 29, 2020. <https://www.climate.gov/news-features/featured-images/eastern-us-tropical-storms-were-once-major-hurricanes-pose-greatest> (accessed January 25, 2021).
- 292 Federal Emergency Management Agency. "FEMA Releases National Risk Index: New Online Data Shows Natural Hazards Risks for Communities." *Press release*: November 16, 2020. <https://www.fema.gov/press-release/20201116/fema-releases-national-risk-index-new-online-data-shows-natural-hazards> (accessed January 25, 2021).
- 293 "Climate Reports." In *United Nations*. <https://www.un.org/en/climatechange/reports> (accessed January 25, 2021).
- 294 McKillop M, Links JM, Latshaw MW, et al. *Climate Change & Health: Assessing State Preparedness*. Washington: Trust for America's Health, December 2020. https://climateandhealthreport.org/assets/pdfs/JHU-004_Climate_Change_and_Health_Report_FINAL_112520.pdf (accessed January 25, 2021).
- 295 "Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products." In *Centers for Disease Control and Prevention*, updated February 25, 2020. https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease.html#latest-outbreak-information (accessed January 25, 2021).
- 296 "Gun Violence Archive." In *Gun Violence Archive*. <https://www.gunviolencearchive.org> (accessed January 25, 2021).
- 297 Ibid.
- 298 Santilli A, O'Connor Duffany K, Carroll-Scott A, et al. "Bridging the Response to Mass Shootings and Urban Violence: Exposure to Violence in New Haven, Connecticut." *American Journal of Public Health*, 107(3): 374-379, March 2017. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5296698/> (accessed January 25, 2021).
- 299 Jeong Y and Hineman B. "Downtown Nashville Explosion an Intentional Act, Police Say." *Tennessean*, December 25, 2020. <https://www.tennessean.com/story/news/local/2020/12/25/downtown-nashville-explosion-christmas/4044635001/> (accessed January 25, 2021).
- 300 Jones SG, Doxsee C, and Harrington N. "The War Comes Home: The Evolution of Domestic Terrorism in the United States." *CSIS Briefs*, October 22, 2020. <https://www.csis.org/analysis/war-comes-home-evolution-domestic-terrorism-united-states> (accessed January 25, 2021).
- 301 Galford C. "DHS Transferring Ownership of National Bio and Agro-Defense Facility to USDA for Research, Vaccine Development." *Homeland Preparedness News*, September 9, 2020. <https://homelandprepnews.com/stories/55275-dhs-transferring-ownership-of-national-bio-and-agro-defense-facility-to-usda-for-research-vaccine-development/> (accessed January 25, 2021).
- 302 Galford C. "DARPA Deploys Automated Radiation Detection System to Port Authority of New York and New Jersey." *Homeland Preparedness News*, September 9, 2020. <https://homelandprepnews.com/stories/55268-darpa-deploys-automated-radiation-detection-system-to-port-authority-of-new-york-and-new-jersey/> (accessed January 25, 2021).

- 303 Clark D. “DHS Initiates NG911 Systems Viability Testing.” *Homeland Preparedness News*, August 6, 2020. <https://homeland-prepnews.com/stories/53427-dhs-initiates-ng911-systems-viability-testing/> (accessed January 25, 2021).
- 304 U.S. Department of Health and Human Services. *Strategic Plan for 2020-2023*. Washington: Office of the Assistant Secretary for Preparedness and Response, 2020. <https://medicalcountermeasures.gov/media/37185/2020-aspr-strategic-plan.pdf> (accessed January 25, 2021).
- 305 King A. “Embattled Public Health Workers Leaving At ‘Steady And Alarming’ Rate.” *All Things Considered, NPR*, November 25, 2020. <https://www.npr.org/2020/11/25/938873547/embattled-public-health-workers-leaving-at-steady-and-alarming-rate> (accessed January 25, 2021).
- 306 Association of State and Territorial Health Officials, “New Data on State Health Agencies Shows Shrinking Workforce and Decreased Funding Leading up to the COVID-19 Pandemic.” *Press release*: September 24, 2020. <https://astho.org/Press-Room/New-Data-on-State-Health-Agencies-Shows-Shrinking-Workforce-and-Decreased-Funding-Leading-up-to-the-COVID-19-Pandemic/09-24-20/> (accessed January 25, 2021).
- 307 National Association of County and City Health Officials “NACCHO’s 2019 Profile Study: Changes in Local Health Department Workforce and Finance Capacity Since 2008.” Research brief, May 2020. <https://www.naccho.org/uploads/downloadable-resources/2019-Profile-Workforce-and-Finance-Capacity.pdf> (accessed January 25, 2021).
- 308 Government Accountability Office. “Biomedical Research: HHS Has Not Yet Used New Authorities to Improve Recruitment and Retention of Scientists.” GAO-20-531R, May 8, 2020. <https://www.gao.gov/products/GAO-20-531R> (accessed January 25, 2021).
- 309 Trust for America’s Health. *A Blueprint for the 2021 Administration and Congress: The Promise of Good Health for All – Transforming Public Health in America*. Washington: Trust for America’s Health, October 6, 2020. <https://www.tfah.org/report-details/blueprint2021/> (accessed January 25, 2021).
- 310 Center for Disease Control and Prevention *Healthcare-related Infections*. Clostridoides difficile Infection. Clostridoides difficile Infection | HAI | CDC November 13, 2019. (Accessed February 3, 2021).
- 311 Public Health Emergency “Two Novel Investigational Drugs Targeting Antibiotic-Resistant Infections Move into Advanced Development with HHS.” *Press release*, September 30, 2020. <https://www.phe.gov/Preparedness/news/Pages/carbX-grads-30sept2020.aspx> (accessed January 25, 2021).
- 312 Srisuknimit V. “Fighting Fire with Fire: Killing Bacteria with Virus.” *Science in the News*, Harvard University, February 1, 2018. <http://sitn.hms.harvard.edu/flash/2018/bacteriophage-solution-antibiotics-problem/> (accessed January 25, 2021).
- 313 Center for Disease Research and Policy. “FDA approves cefiderocol for hospital-acquired, ventilator-associated pneumonia.” *News Scan*, University of Minnesota, September 28, 2020. <https://www.cidrap.umn.edu/news-perspective/2020/09/news-scan-sep-28-2020> (accessed January 25, 2021).
- 314 Office of Senator Lamar Alexander. “Senate Health Committee Chairman Alexander Says Congress Should Prepare This Year for the Next Pandemic.” *Press release*: June 9, 2020. <https://www.alexander.senate.gov/public/index.cfm/pressreleases?ID=74C40CDB-CE78-4CC2-9A93-72DD16F659CD> (accessed January 25, 2021).
- 315 U.S. Senate Committee on Health, Education, Labor and Pensions. “Senate Health Chairman Alexander Introduces Bill to Prepare for the Next Pandemic.” *Press release*: July 20, 2020. <https://www.help.senate.gov/chair/newsroom/press/senate-health-chairman-alexander-introduces-bill-to-prepare-for-the-next-pandemic> (accessed January 25, 2021).
- 316 Hess B. “Recap: 2020 Preparedness Summit.” *National Association of County and City Health Officials*, August 28, 2020. <https://www.naccho.org/blog/articles/recap-2020-preparedness-summit> (accessed January 25, 2021).
- 317 U.S. Senate Committee on Health, Education, Labor and Pensions. “Health Equity: Amid COVID-19 Pandemic, New Report From Senator Murray Outlines Roots of Systemic Racism and Inequality in U.S. Health Care, Lays Out Recommendations For Congressional Action.” *Press release*: September 30, 2020. <https://www.help.senate.gov/ranking/newsroom/press/health-equity-amid-covid-19-pandemic-new-report-from-senator-murray-outlines-roots-of-systemic-racism-and-inequality-in-us-health-care-lays-out-recommendations-for-congressional-action> (accessed January 25, 2021).
- 318 Trust for America’s Health. *Ready or Not: Protecting the Public’s Health from Diseases, Disasters and Bioterrorism, 2019*. Washington: Trust for America’s Health, 2019. <https://www.tfah.org/report-details/ready-or-not-protecting-the-publics-health-from-diseases-disasters-and-bioterrorism-2019/> (accessed January 28, 2021).



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