

Ready or Not:

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

2020



Inside

- Preparedness Incidents, Events and Actions: 2019 in Review
- The Public Health Response to the Vaping Crisis
- Ensuring Appropriate Disaster Response for People with Disabilities
- State Preparedness Assessments
- Policy Recommendations

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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Ready or Not 2020

Executive Summary

The public health emergencies of the past year—outbreaks of measles, hepatitis A, and other vaccine preventable diseases¹, record heat, foodborne illness, devastating hurricanes, a mysterious lung illness associated with vaping, wildfires, and months of cascading flooding² along the Missouri, Mississippi, and Arkansas Rivers affecting 16 states and nearly 14 million people—all reinforce the need for every jurisdiction to be vigilant about preparing for emergencies in order to safeguard the public's health.

From disease outbreaks to natural disasters, including those fueled by climate change, the stakes are high: Americans face serious health risks and even death with increasing regularity. Therefore, as a nation, it's critical to ask, "Are we prepared?"

The *Ready or Not: Protecting the Public's Health from Diseases, Disasters, and Bioterrorism* series from Trust for America's Health (TFAH) has tracked public health emergency preparedness in the United States since 2003. The series has documented significant progress in the nation's level of preparedness as well as areas still in need of improvement.

A fundamental role of the public health system is to protect communities from disasters and disease outbreaks. To this end, the nation's health security infrastructure has made tremendous strides since 2001 by building modern laboratories, maintaining a pipeline of and the ability to use medical countermeasures, and recruiting and retaining a workforce trained in emergency operations. Yet, unstable and insufficient funding puts this progress at risk, and a familiar pattern takes shape: underfunding, followed by a disaster or outbreak, then an infusion of onetime supplemental funds, and finally a retrenchment of money once the

emergency wanes. What's more, states are uneven in their levels of preparedness. Some—often those that most frequently face emergencies—have the personnel, systems, and resources needed to protect the public. Others are less prepared, less experienced and have fewer resources, elevating the likelihood of preventable harms. Additionally, some states are prepared for certain types of emergencies but not others. This unstable funding and uneven preparation undermine America's health security. The thousands of Americans who lost their lives during Hurricanes Maria and Irma—particularly as a result of extended power outages³—are a grim warning of potential outcomes of increasingly severe weather. Yet, through strategic investments and proactive policies to promote resilience and response capabilities, the nation could mitigate or prevent some of these impacts.

The implications of failing to prepare could be devastating. The National Academies of Science, Engineering, and Medicine estimate pandemics could cost the global economy over \$6 trillion in the 21st century.⁴ The Centers for Disease Control and Prevention (CDC) also estimate that a global disease outbreak could cost the United States billions in lost trade revenue and tourism, costing hundreds of thousands—if not millions—of U.S. jobs.⁵

Ready or Not examines the country’s level of public health emergency preparedness on a state-by-state basis using 10 priority indicators. (See Table 1.) Taken together, the indicators are a checklist of priority aspects for state prevention and emergency readiness programs. However, these indicators do not necessarily reflect the effectiveness of states’ public health departments or in some cases the full

breadth of a jurisdiction’s preparedness capacities. It is also important to note that improvement in these priority areas often requires action from officials outside the public health sector, including other administrators and agencies, legislators, citizens or the private sector.

This edition of the *Ready or Not* series finds that states have made progress

in key areas, including public health funding and seasonal flu vaccination. However, performance in other areas—such as water security and paid time off for workers—has stalled or lost ground. In this 2020 report, TFAH found that 10 states and the District of Columbia improved their standing compared with last year. Four states improved by two tiers, and six states improved by one tier.

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

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

Notes: The 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. Every indicator, and some categorical descriptions, were drawn 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 Index⁶

The *Ready or Not* report groups states and the District of Columbia into one of three tiers based on their performances across the 10 indicators. This year, 25 states and the District of Columbia scored in the high-performance tier, 12 placed in the middle-performance tier, and 13 were in the low-performance tier. (See Table 2.) (See Appendix A: Methodology for more information on the scoring process.)

Four states (Delaware, Pennsylvania, Tennessee, and Utah) showed particularly notable improvement, moving up from the low tier to the high tier. Delaware improved its standing by increasing its funding for public health and reducing the share of its residents that used a

community water system that was in violation of health-based standards, and Delaware saw a dramatic increase in the percentage of its hospitals with a top-quality safety ranking. Pennsylvania’s improved score stemmed from its newly acquired accreditation from the Public Health Accreditation Board and from strengthened drinking-water security and hospital patient safety. Tennessee increased its public health funding level in fiscal year 2019, achieved a substantial increase in its seasonal flu vaccination rate, and improved hospital patient safety. Utah significantly increased its community drinking-water security, elevated its seasonal flu vaccination rate,

and became one of just three states in which a majority of general acute-care hospitals received an “A” grade on the Leapfrog Hospital Safety Grade.

Six states and the District of Columbia moved up from the middle tier to the high tier: Illinois, Iowa, Maine, New Mexico, Oklahoma, Vermont, and the District of Columbia.

No state fell from the high tier to the low tier.

Six states moved from the middle tier to the low tier: Hawaii, Montana, Nevada, New Hampshire, South Carolina, and West Virginia.

Seasonal flu vaccination rates rose during the 2018 – 2019 flu season but were still below target.

TFAH's analysis found:

- **A majority of states have made preparations to expand capabilities in an emergency, often through collaboration.** Thirty-two states participated in the Nurse Licensure Compact, up from 26 in 2017 and 31 in 2018,⁷ with Alabama as the most recent member, effective January 1, 2020.⁸ 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 lend their support 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, most states had public health laboratories that had planned for a large influx of testing needs: 48 states and the District of Columbia had a plan to surge public health laboratory capacity for six to eight weeks as necessary during overlapping emergencies or large outbreaks, a net increase of four states since 2017.
- **Most residents who got their household water through a community water system had access to safe water.** On average, just 7 percent of state residents used a community water system in 2018 (latest available data) that did not meet all applicable health-based standards, up slightly from 6 percent in 2017. Water systems with such violations increase the chances of water-based emergencies in which contaminated water supplies place the public at risk.
- **Most states are accredited in the areas of public health, emergency management, or both.** As of November 2019, the Public Health Accreditation Board or the Emergency Management Accreditation Program accredited 41 states and the District of Columbia; 28 states and the District of Columbia were accredited by both groups, an increase of three (Iowa, Louisiana and Pennsylvania) since October 2018. Nine states (Alaska, Hawaii, Indiana, Nevada, 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, rose.** The seasonal flu vaccination rate among Americans ages 6 months and older rose from 42 percent during the 2017–2018 season to 49 percent during the 2018–2019 season.⁹ (See Section 2, page 45 for additional discussion of what may have helped generate the vaccine rate increase.) *Healthy People 2020*, a set of federal 10-year objectives and benchmarks for improving the health

of all Americans by 2020, set a seasonal influenza vaccination-rate target of 70 percent annually.¹⁰

- **In 2019, only 55 percent of employed state residents, on average, had access to paid time off, the same percentage as in 2018.** Those without such leave are more likely to work when they are sick and risk spreading infection. In the past, the absence of paid sick leave has been linked to or has exacerbated some infectious disease outbreaks.¹¹

- **Only 30 percent of hospitals, on average, earned a top-quality patient safety grade, up slightly from 28 percent in 2018.** Hospital safety scores measure performance on such issues as healthcare-associated infection rates, intensive-care capacity, and an overall culture of error prevention. In the absence of diligent actions to protect patient safety, deadly infectious diseases can take hold or strengthen.

TABLE 2: State Public Health Emergency Preparedness
State performance, by scoring tier, 2019

Performance Tier	States	Number of States
High Tier	AL, CO, CT, DC, DE, IA, ID, IL, KS, MA, MD, ME, MO, MS, NC, NE, NJ, NM, OK, PA, TN, UT, VA, VT, WA, WI	25 states and DC
Middle Tier	AZ, CA, FL, GA, KY, LA, MI, MN, ND, OR, RI, TX	12 states
Low Tier	AK, AR, HI, IN, MT, NH, NV, NY, OH, SC, SD, WV, WY	13 states

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

Based on our policy research and analysis, consultation with experts, and review of progress and gaps in federal and state preparedness, TFAH is recommending policy action in seven priority areas – see report’s recommendations section starting on page 48.

- **Provide stable, sufficient funding for domestic and global public health security.**
- **Prevent outbreaks and pandemics.**
- **Build resilient communities and promote health equity in preparedness.**
- **Ensure effective leadership, coordination, and workforce.**
- **Accelerate development and distribution, including last mile distribution, of medical countermeasures.**
- **Ready the healthcare system to respond and recover.**
- **Prepare for environmental threats and extreme weather.**

HOW DO INEQUITIES REDUCE HEALTH SECURITY?

Health inequities refer to the ways in which certain population groups are prevented from achieving optimal health due to where they live, the discrimination or racism they encounter, their social and/or economic situation, their age or health condition, where they work, or the language they speak.¹² In terms of emergency preparedness, health inequities put certain population groups at elevated risk of injury, illness, displacement, and death during an emergency.¹³

For example:

- Those who live in lower-income households are more likely to have housing that is sub-par and vulnerable during a natural disaster. They may also lack adequate heat or air conditioning. They may live in areas more prone to flooding¹⁴ or in housing that is not earthquake resistant. And they may not have the resources needed to leave an area when evacuation is necessary.¹⁵
- Those who are older or have a disability, cognitive issue or a complex or chronic medical condition may have limited mobility and/or be dependent on medical equipment. They may find themselves in harm's way if they are not provided with the necessary assistance or notification.¹⁶ For example, power outages can

have a disproportionate impact on older adults or people with medical equipment dependent on electricity.¹⁷

- Those who are limited English proficient or are worried about immigration policies may not receive warnings and notifications and/or be reluctant to share information with or get assistance from government agencies.¹⁸
- Those who work for an employer that does not provide any paid leave or excused absences, may not be able to take the recommended precautions — such as staying out of work if they have an infectious disease — to safeguard their health and that of those around them.

Recognizing and eliminating these and other barriers to health equity is central to reducing the disproportionate impact of natural disasters and other health security threats on communities now at greatest risk, including communities of color and low-income households. Public health and disaster response entities need to work directly with communities, including by ensuring that community leaders have a seat at the planning table, in order to understand their specific needs and where resources will be most needed in the event of an emergency.¹⁹

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), with one exception: a measure of state public health funding-level trends, which reflects how equipped key agencies are prepared for and respond to emergencies. The NHSPI is a joint initiative of the Robert Wood Johnson

Foundation, the University of Kentucky, and the University of Colorado.

See “Appendix 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 performance 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.

STATE PUBLIC HEALTH FUNDING	
TFAH collected data for fiscal year 2019 and for earlier years from states’ publicly available funding documents. With assistance from the Association of State and Territorial Health Officials, TFAH provided data to states for review and verification. Informed by the Public Health Activities and Services Tracking project at the University of Washington, TFAH defines “public health programming and services” to include	communicable disease control; chronic disease prevention; injury prevention; environmental public health; maternal, child, and family health; and access to and linkage with clinical care. TFAH excludes from its definition of “public health programming and services” insurance coverage programs, such as Medicaid or the Children’s Health Insurance Program, and inpatient clinical facilities.

TABLE 3: STATE INDICATORS AND SCORES

	Nurse Licensure Compact (NLC)	Hospital Preparedness Program	Public Health Accreditation Board (PHAB)	Emergency Management Accreditation Program (EMAP)	Public Health Funding	Water Security	
	State participated in NLC, 2019	Percent of hospitals participating in health care coalitions, 2017	Accredited by PHAB, 2019	Accredited by EMAP, 2019	Percentage change, FY 2018-19	Percent of population who used a community water system in violation of health-based standards, 2018	
Alabama	✓	95%	✓	✓	-5%	3%	
Alaska		100%			1%	7%	
Arizona	✓	72%	✓	✓	2%	1%	
Arkansas	✓	81%	✓	✓	-3%	6%	
California		70%	✓	✓	10%	12%	
Colorado	✓	100%	✓	✓	3%	1%	
Connecticut		100%	✓	✓	4%	3%	
Delaware	✓	100%	✓		2%	1%	
D.C.		100%	✓	✓	10%	5%	
Florida	✓	73%	✓	✓	1%	1%	
Georgia	✓	97%	✓		2%	8%	
Hawaii		100%			6%	0%	
Idaho	✓	98%	✓	✓	-3%	1%	
Illinois		88%	✓	✓	16%	1%	
Indiana		75%			5%	2%	
Iowa	✓	80%	✓	✓	-1%	3%	
Kansas	✓	96%	✓	✓	9%	8%	
Kentucky	✓	93%		✓	4%	10%	
Louisiana	✓	100%	✓	✓	3%	16%	
Maine	✓	94%	✓		3%	1%	
Maryland	✓	89%	✓	✓	2%	1%	
Massachusetts		82%	✓	✓	10%	11%	
Michigan		90%		✓	17%	3%	
Minnesota		100%	✓		7%	1%	
Mississippi	✓	100%	✓	✓	8%	7%	
Missouri	✓	87%	✓	✓	1%	0%	
Montana	✓	83%	✓		-3%	8%	
Nebraska	✓	95%	✓	✓	-4%	3%	
Nevada		100%			40%	0%	
New Hampshire	✓	47%			-6%	3%	
New Jersey		82%	✓	✓	3%	11%	
New Mexico	✓	71%	✓	✓	3%	8%	
New York		86%	✓	✓	-1%	45%	
North Carolina	✓	95%		✓	-2%	2%	
North Dakota	✓	100%	✓	✓	9%	16%	
Ohio		25%	✓	✓	7%	2%	
Oklahoma	✓	95%	✓	✓	12%	13%	
Oregon		100%	✓		27%	16%	
Pennsylvania		86%	✓	✓	2%	13%	
Rhode Island		100%	✓	✓	9%	38%	
South Carolina	✓	56%		✓	5%	2%	
South Dakota	✓	100%			2%	1%	
Tennessee	✓	91%		✓	4%	3%	
Texas	✓	80%			8%	7%	
Utah	✓	100%	✓	✓	0%	2%	
Vermont		100%	✓	✓	4%	1%	
Virginia	✓	100%		✓	4%	2%	
Washington		100%	✓		1%	1%	
West Virginia	✓	97%			-2%	16%	
Wisconsin	✓	98%	✓	✓	0%	5%	
Wyoming	✓	92%			-6%	1%	
51-state average	N/A	89%	N/A	N/A	5%	6.5%	

Note: See "Appendix A: Methodology" for a description of TFAH's data-collection process and scoring details. Indiana and New Jersey have joined the NLC, but had not yet set a date for implementation as of December 2019. States with conditional or pending accreditation at the time of data collection were classified as having no accreditation. Nebraska's year-over-year funding change incorporates a modification to its accounting methodology—some funds were previously double-counted—that the state was unable to apply retroactively to fiscal year 2018.

TABLE 3: STATE INDICATORS AND SCORES

		Paid Time Off	Seasonal Flu Vaccination	Patient Safety	Public Health Lab Capacity	State Performance
		Percent of employed population with paid time off, 2019	Seasonal flu vaccination rate for people ages 6 months and older, 2018-19	Percentage of hospitals with "A" grade, fall 2019	Public health laboratories had a plan for a six- to eight-week surge in testing capacity, 2019	Scoring tier, 2019
	Alabama	55%	48.3%	23%	✓	High
	Alaska	60%	44.1%	0%	✓	Low
	Arizona	48%	45.6%	26%	✓	Middle
	Arkansas	45%	48.8%	14%	✓	Low
	California	56%	47.4%	35%	✓	Middle
	Colorado	56%	51.6%	36%	✓	High
	Connecticut	64%	56.8%	38%	✓	High
	Delaware	48%	50.7%	33%	✓	High
	D.C.	65%	Data incomplete	20%	✓	High
	Florida	54%	40.9%	37%	✓	Middle
	Georgia	59%	43.1%	26%	✓	Middle
	Hawaii	59%	50.2%	25%	✓	Low
	Idaho	51%	43.6%	45%	✓	High
	Illinois	55%	45.4%	43%	✓	High
	Indiana	50%	47.9%	17%	✓	Low
	Iowa	60%	54.8%	9%	✓	High
	Kansas	56%	50.7%	27%	✓	High
	Kentucky	48%	49.6%	26%	✓	Middle
	Louisiana	53%	41.6%	31%	✓	Middle
	Maine	51%	48.8%	59%	✓	High
	Maryland	61%	57.1%	23%	✓	High
	Massachusetts	59%	58.9%	42%	✓	High
	Michigan	49%	46.1%	41%	✓	Middle
	Minnesota	52%	52.7%	23%	✓	Middle
	Mississippi	63%	42.0%	31%	✓	High
	Missouri	53%	50.0%	28%	✓	High
	Montana	58%	48.7%	44%	✓	Low
	Nebraska	57%	54.2%	13%	✓	High
	Nevada	55%	37.8%	26%	✓	Low
	New Hampshire	54%	52.0%	31%	✓	Low
	New Jersey	52%	Data incomplete	45%	✓	High
	New Mexico	61%	49.9%	12%	✓	High
	New York	61%	51.9%	7%	✓	Low
	North Carolina	51%	54.9%	47%	✓	High
	North Dakota	51%	51.1%	0%	✓	Middle
	Ohio	49%	50.4%	39%	✓	Low
	Oklahoma	55%	51.3%	25%	✓	High
	Oregon	63%	48.3%	48%	✓	Middle
	Pennsylvania	51%	54.2%	46%	✓	High
	Rhode Island	56%	60.4%	43%	✓	Middle
	South Carolina	45%	46.8%	37%	✓	Low
	South Dakota	44%	54.4%	10%	✓	Low
	Tennessee	53%	48.2%	34%	✓	High
	Texas	68%	47.9%	38%	✓	Middle
	Utah	45%	45.9%	56%		High
	Vermont	56%	51.9%	33%		High
	Virginia	58%	54.7%	56%	✓	High
	Washington	60%	53.8%	33%	✓	High
	West Virginia	55%	48.2%	5%	✓	Low
	Wisconsin	56%	50.9%	38%	✓	High
	Wyoming	47%	40.7%	0%	✓	Low
	51-state average	55%	49.5%	30%	N/A	N/A

North Dakota's fiscal 2019 funding combines funds for the Department of Health and the Department of Environmental Quality, which were separated, beginning in fiscal 2019. 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.

Ready or Not 2020

Year in Review: 2019

HEALTH THREATS—INCIDENTS AND ACTIONS

Disease Outbreaks

Notable Incidents:

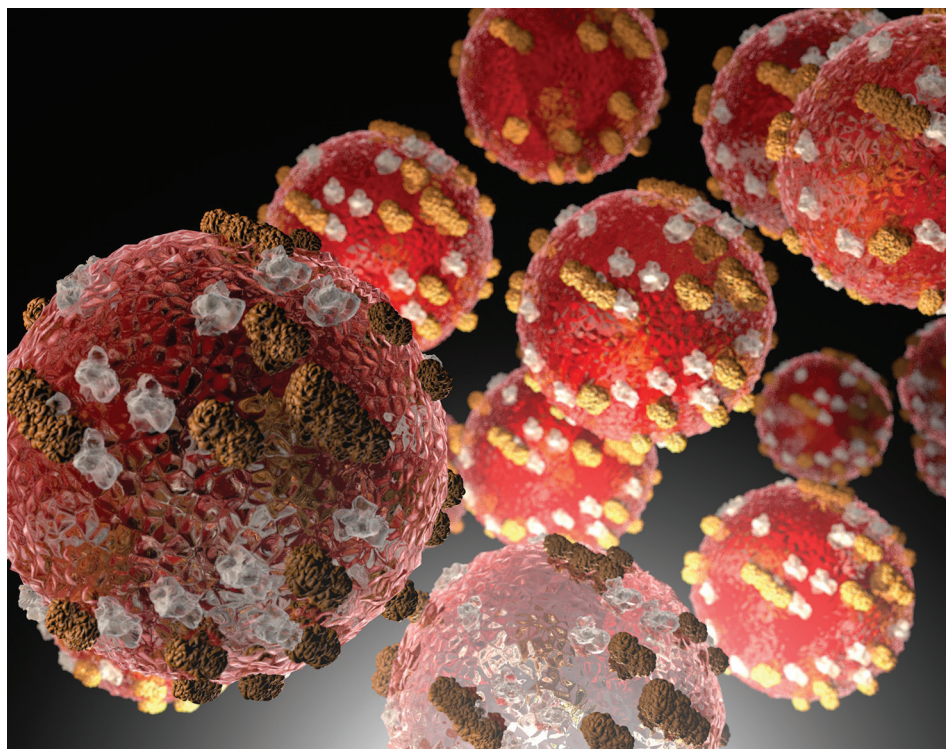
- Seasonal flu.** The 2018–2019 flu season was of “moderate severity” lasting 21 weeks, the longest season over the past decade.²⁰ Over the past five seasons, the flu season lasted between 11–21 weeks with an average of about 18 weeks.²¹ The Centers for Disease Control and Prevention’s (CDC) preliminary estimates found that the flu accounted for approximately 37.4 to 42.9 million illnesses and 36,400 to 61,200 deaths in the 2018–2019 season.²² The CDC estimates that influenza has resulted in between 9 million and 45 million illnesses, between 140,000 and 810,000 hospitalizations, and between 12,000 and 61,000 deaths annually since 2010, the high end of that range occurred during the high severity 2017–2018 season. Vaccine coverage rates increased across all age groups in 2018–2019, possibly as a result of the prior season’s severity, with vaccine rates among adults increasing by 8.2 percent over the previous season and up 4.7 percent among children.²³ At this report’s press time in late December, the 2019 – 2020 flu season was having an impact nationwide as all regions of the country were experiencing evaluated levels of flu-like illness. According to the CDC, as of December 14, 2019 there had been 3.7 million reported flu cases leading to 32,000 hospitalizations and 1,800 deaths during the in-progress flu season.²⁴
- Hepatitis A.** In 2019, 29 states experienced outbreaks of the Hepatitis A virus, driven in part by increases among those who reported drug use and homelessness.²⁵ Hepatitis A is a highly transmissible infection.²⁶ The Hepatitis A vaccine is recommended for certain populations; in February, the Advisory Committee on Immunization Practice updated its recommendations for people experiencing homelessness to receive the vaccine.²⁷ Hepatitis A infections had been going down between 2000 and 2012 but increased between 2012 and 2013 and again between 2015 and 2016 (2016 is the latest available data).²⁸ Since the on-going outbreak began in 2016, there have been 28,466 reported cases that lead to 17,217 hospitalizations and 288 deaths.²⁹
- Measles outbreaks, United States.** As of December 31, 2019, for the year, there were 1,282 confirmed cases of measles in 31 states, the highest number of cases since 1992.³⁰ Measles is a highly contagious disease predominantly affecting young children that can cause serious complications, such as pneumonia, encephalitis, hospitalization, and death.³¹ It can cause up to a 90 percent chance of disease contraction in unimmunized individuals.³² Outbreaks have been linked to the sustained spread of measles among unvaccinated communities: 88 percent of all cases occurred in close-knit, under-immunized communities.³³ In 2019, the United States narrowly maintained its measles elimination status, a status it has had for 20 years.³⁴

- **Measles outbreaks, global.** The World Health Organization (WHO) reported that there were nearly three times as many measles cases from January 2019 to July 2019 as there were during the same period in 2018,³⁵ the highest number for any year since 2006.³⁶ The Democratic Republic of the Congo, Madagascar, and Ukraine reported the highest numbers of cases in 2019, with ongoing outbreaks in other nations.³⁷ In Samoa, an outbreak sickened more than 5,600 people and led to at least 81 deaths, most of the dead were children younger than five.³⁸ The reasons for under-vaccination varied by country, with lack of access, armed conflict and displacement, vaccine misinformation, or low awareness driving down immunization rates in some countries.

- **The Democratic Republic of Congo Ebola outbreak.** On July 17, 2019, the WHO declared the Ebola virus outbreak in the Democratic Republic of Congo (DRC) a Public Health Emergency of International Concern.³⁹ As of the end of December, there were 3,380 confirmed cases and 2,232 deaths.⁴⁰

- **Candida auris.** *C. auris* is an emerging drug-resistant fungus that has led to severe illnesses in hospitalized patients; a majority of reported cases were in New Jersey, New York, and Illinois. This multi-drug-resistant fungus has a mortality rate close to 60 percent and presents a serious global health threat.⁴¹ At year's end, there were 685 clinical cases of *C. auris*, and 1,341 patients infected with *C. auris* in the United States with transmission in multiple countries.⁴²

- **Eastern equine encephalitis virus.** In 2019, the CDC confirmed 36 cases of Eastern equine encephalitis (EEEV) disease across eight states, including 14 deaths.⁴³ EEEV is a serious mosquito-borne disease in which 33 percent of those infected die and eight out of 10



survivors are severely brain damaged.⁴⁴ The previous 10 years, from 2009 to 2018, only saw 72 reported cases altogether.⁴⁵ The reasons for the atypical EEEV year are not entirely clear but may be the result of a milder winter extending mosquito activity.⁴⁶

- **Cholera.** Cholera, an acute intestinal infection, is rare in the U.S. but globally cases have increased steadily since 2005⁴⁷ and 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 2019, Yemen, Somalia, and Sudan faced serious outbreaks.⁴⁸ In Yemen, over the past five years, there have been more than 2 million total cases of cholera and 3,716 deaths as a result of the disease.⁴⁹

- **Polio.** The world is 99 percent of the way to eradicating polio globally,⁵⁰ with just two countries that have never stopped the transmission of polio: Afghanistan and Pakistan. The fight

to eradicate polio in Pakistan faltered when the country experienced an uptick in the number of cases in 2019. According to public health officials on the ground, efforts to collect reliable data and increase vaccination rates are hindered by widespread resistance to required vaccination.⁵¹

- **Foodborne illnesses.** In 2019, multistate foodborne illness outbreaks included infections resulting from ground beef, ground turkey, romaine lettuce, frozen ground tuna, and flour.⁵² Other outbreaks included *Listeria monocytogenes* in deli-sliced meats and cheeses, and salmonella in melon, tahini products, and papaya.⁵³ 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.⁵⁴ *Campylobacter* and salmonella were the most commonly identified infections, with the incidence of *Cyclospora* increasing markedly in 2018.^{55,56}

Notable Actions:

- **HIV strategy.** In his February 2019 State of the Union address, President Donald Trump announced a strategy to stop the spread of HIV by 2030 by concentrating prevention resources in nationwide hot spots where half of all new infections occur. The announcement did not specify a budget for the initiative.⁵⁷ The U.S. Department of Health and Human Services (HHS) has proposed the “Ending the HIV Epidemic: A Plan for America” initiative to end the HIV epidemic in the United States within 10 years. The goal is to reduce new HIV infections by 90% in the next 10 years. To achieve maximum impact, the first phase of the initiative will focus on geographic areas that are hardest hit by HIV.⁵⁸ In December, Congress approved the largest increase to domestic HIV-AIDS programs in decades.⁵⁹
- **U.S. Role in Ebola and global health security.** On May 20, 2019, U.S. Secretary of Health and Human Services Alex Azar addressed the World Health Assembly in Geneva, Switzerland, calling attention to the Ebola outbreak in the DRC, vaccine purchasing, and the importance of vaccination. Azar declared America’s full support for the implementation of the International Health Regulations and Global Health Security Agenda to better protect the public from health emergencies.⁶⁰
- **Emergency diagnostics task force.** The U.S. Food and Drug Administration (FDA), CDC, and Centers for Medicare and Medicaid Services (CMS) launched a Tri-Agency Task Force for Emergency Diagnostics to “advance the rapid development and deployment of diagnostic tools for clinical and public health laboratories during public health emergencies.”⁶¹
- **Changes in vaccine laws.** Measles outbreaks occurring across the nation led states—often those most afflicted with an outbreak—to enact laws or temporary policy changes to address vaccine hesitancy. States that make it easier to opt out of school entry vaccination requirements for nonmedical reasons – sometimes called personal belief or religious exemptions – are more likely to have lower overall vaccination rates.⁶² Two states—Maine, and New York—removed personal- and/or religious-belief exemptions for at least some vaccines for public-school entry⁶³ during the year, bringing the number of states nationally that have eliminated such exemptions to five. (*See “Vaccine Hesitancy” side bar on page 15.*) A new law in California creates a review process that gives public health officials the final say on medical exemptions, with the authority to reject them.⁶⁴ With the goal of reducing nonmedical-based exemptions, California’s government will review physicians who write five or more exemptions as well as academic institutions that have immunization rates below 95 percent beginning in 2020.
- In September, the President issued an **Executive Order on Modernizing Influenza Vaccines in the United States to Promote National Security and Public Health.** The executive order established a National Influenza Vaccine Task Force charged with creating a 5-year plan to promote the use of more agile and scalable vaccine manufacturing technologies and accelerate the development of influenza vaccines.⁶⁵
- **New CDC Vaccine initiative.** In October, CDC launched a new “Vaccinate with Confidence” strategic framework to strengthen vaccine confidence by identifying pockets of under-vaccination and by expanding resources for health professionals to support effective vaccine conversations and stop misinformation.⁶⁶

VACCINE HESITANCY: A GLOBAL HEALTH THREAT

According to the WHO, vaccine hesitancy was one of the top 10 global health threats in 2019. The WHO identifies complacency, inconvenience in accessing vaccines, and lack of confidence as three key factors that lead to the underutilization of vaccines, and, estimates that 1.5 million deaths worldwide could be avoided if vaccine rates improved.⁶⁷

Vaccine hesitancy makes the U.S. more vulnerable to outbreaks of vaccine-preventable diseases and especially more vulnerable during a pandemic. During an influenza pandemic or an outbreak of an emerging infectious disease, wide swaths of the population may need to be vaccinated. Resistance to vaccines would put the entire population at risk during a severe outbreak.

Measles outbreaks during 2019 brought attention to the fact that, while generally childhood vaccination rates in the United States are, according to the CDC, “high and stable,”⁶⁸ there is reason to be concerned about certain trends, including lower vaccination rates for uninsured children, misinformation campaigns about vaccine safety, and the impact of vaccine exemption laws. Additionally, while state and national data showed relatively high overall vaccination rates, pockets of under vaccination place some communities at risk for measles and other vaccine-preventable diseases.

In the United States, between January 1 and December 31, 2019, 1,282 measles cases were confirmed in 31 states, the most reported cases in any year since 1992, and the United States narrowly missed losing its measles-elimination status.⁶⁹



For the 2018–2019 school year, the measles, mumps, and rubella (MMR) vaccine rate (two doses) for kindergartners nationwide was 94.7 percent,⁷⁰ but nine states were below 92 percent: Alabama, Colorado, Hawaii, Idaho, Indiana, Kansas, New Hampshire, Ohio, and Washington.⁷¹ According to infectious disease experts and the WHO, a vaccination rate of 95 percent is necessary to protect a population from the measles.⁷²

Increases in reported cases of whooping cough and mumps were also up during the year, and some colleges reported outbreaks of meningococcal disease.⁷³

As of November 2019, while all states required vaccinations for children

to attend public school, all states also allowed medical exemptions, 45 states allowed religious exemptions, and 15 states allowed philosophical exemptions.⁷⁴

According to the CDC, about 2.5 percent of kindergartners nationwide had an exemption to one or more vaccines for the 2018–2019 school year, up from 2.3 percent in 2017–2018 and 2.1 percent in 2016–2017.⁷⁵ Among young children, vaccination rates were lower for uninsured children and those insured by Medicaid as compared with children covered by private insurance. According to the CDC, an expansion of the “Vaccines for Children” program could help address these disparities.⁷⁶

Despite decades of strong science that debunks them, myths and misinformation about the short- and long-term side effects of vaccines persist. In June 2019, *The Washington Post* reported on well-financed campaigns driven by online messaging, live events, and high-profile spokespersons that have stoked fears about vaccine safety.⁷⁷ Follow-up reporting in November found that two anti-vaccine groups funded over half of the ads on Facebook that contained misinformation about vaccines.⁷⁸ In March 2019, Facebook announced that it would no longer accept advertising that included misinformation about vaccines. Then, in fall 2019, Facebook, Instagram, and Pinterest announced changes in their search algorithms to ensure their sites return scientifically accurate information for searches related to vaccines. All three sites now render or will connect site users to the CDC and/or the WHO for content about vaccines and vaccine safety.⁷⁹

Most U.S. parents are protecting their children from vaccine-preventable diseases by making sure they are vaccinated. However, in some communities, those that are distrustful of government, that claim a religious exemption, or that are in

other ways insular, can be at higher risk for infectious diseases due to low immunization rates. A measles outbreak in an ultra-orthodox Jewish community in Brooklyn, New York, is an example. It accounted for 75 percent of all the measles cases nationwide, i.e. 934 cases in the New York City/New York state area.⁸⁰ Experts believe that measles cases were introduced into the under-immunized community by people who had traveled there from Europe and Israel. As a result, New York experienced its most severe measles outbreak in decades.⁸¹ Somali-American communities in Minnesota, Amish in Ohio and Ukrainian-Americans in Washington State have also experienced measles outbreaks.

In June of 2019, in the wake of the outbreak in Brooklyn and surrounding areas, New York state ended its religious exemption for immunizations, joining four other states that have eliminated such exemptions: California, Maine, Mississippi, and West Virginia.⁸² In 2019, Washington state also enacted a law removing philosophical exemptions following two measles outbreaks,⁸³ although Washington's policy only applies to MMR vaccine requirements.⁸⁴

Measles is also on the rise globally. According to preliminary data reported by the WHO, measles cases rose by 300 percent worldwide during the first three months of 2019 as compared to the same time frame in 2018.⁸⁵

In 2019, the United Kingdom lost its measles-free status. In England, where vaccinations are not mandatory for school attendance, vaccination rates for 13 childhood diseases—including measles, mumps, rubella, whooping cough, and meningitis—have fallen. Uptake of the MMR vaccine in England for 2-year-old children has gone down every year for the last five years, dropping to 90.3 percent in 2018–2019. Health experts throughout England are warning of the serious health risks for unprotected children.⁸⁶ There were 989 confirmed cases of measles in England and Wales during 2018.⁸⁷

Vaccination rates in Germany are reportedly under 90 percent for 13 preventable illnesses, and one in five German 2-year-olds does not have a vaccination against the measles.⁸⁸

Measles is also making a resurgence in Africa with 10 African nations experiencing outbreaks in 2019.⁸⁹

- Nationwide Antibiotic Stewardship Requirements.** Antimicrobial resistance, the rise of superbugs that are resistant to existing medicines, is a major threat to health. Antibiotic stewardship programs (ASPs) are a coordinated approach that promotes appropriate use of antibiotics in healthcare settings and reduce antimicrobial resistance.⁹⁰ CMS finalized new conditions of participation mandating that U.S. hospitals and critical access hospitals create and implement antibiotic stewardship programs as well as infection-prevention and -control mechanisms. CMS now requires all critical access hospitals to implement antibiotic stewardship programs by March 31, 2020. These programs will follow national guidelines for appropriate use of antibiotics, in order to prevent the transmission and development of antibiotic-resistant organisms.⁹¹ In addition, HHS and the Office of the Assistant Secretary for Preparedness and Response (ASPR) are leading an effort to update the National Action Plan on Combating Antimicrobial Resistant Bacteria.⁹²
- Crimson Contagion functional exercise.** In August, HHS and ASPR hosted a functional exercise, “Crimson Contagion.” This exercise was a multistate, whole-government and -community effort focused on policy issues responses, information exchange, economic and social impact, and other topics based on a scenario featuring a novel influenza virus. The goal of Crimson Contagion exercise was to practice information exchange, coordinate resources, and compare policy decisions across various levels of public and private sector entities in a pandemic influenza scenario.⁹³

- Social media platforms and vaccine disinformation.** Some social media platforms pledged to promote evidence-based decisions about vaccines and to strive to offer links that will lead users to appropriate online sources.⁹⁴ In August, Pinterest announced that all searches for “measles” or “vaccine safety” or other related terms will return results from leading public health organizations, including the WHO, the CDC, and the American Academy of Pediatrics.⁹⁵ In addition, site users will not be able to add comments or recommendations to the vaccine-related content, and no advertising will publish with vaccine-related content.⁹⁶ In September, Facebook announced that all searches for vaccine-related content on the platform (and on Instagram—also owned by Facebook) will return a pop-up box directing the site user to vaccine information on the CDC website domestically and on the WHO website outside the United States.⁹⁷
- Food Safety and Modernization Act implementation.** In a September progress statement,⁹⁸ the FDA announced it would establish a dashboard to publish metrics relating to the implementation of the Food Safety Modernization Act, including food safety outcomes and associated measures. This act shifted the nation’s food safety system from a response posture to one of global food safety and prevention.⁹⁹ The dashboard’s initial data showed the majority of companies in compliance with the new requirements experienced an overall improvement in the time from identifying a recall event to initiating a voluntary recall.



- **The FDA’s new imported food safety strategy.** The FDA also released a new imported food safety strategy guided by four goals: (1) food offered for import must meet U.S. food safety requirements; (2) the FDA’s border surveillance must prevent the entry of unsafe foods; (3) there must be a rapid and effective response to unsafe imported food; and (4) there must be an effective and efficient food import program.¹⁰⁰ The United States imports about 15 percent of its food supply from other countries, including about 32 percent of its fresh vegetables, 55 percent of its fresh fruit, and 94 percent of its seafood consumed annually.
- **The Predict program ended.** In October, the U.S. Agency for International Development’s (USAID) emerging pandemics program, Predict, ended. USAID designed Predict to track and research deadly zoonotic diseases globally.¹⁰¹ Specifically, it worked with global researchers to collect blood samples from animals in order to track and understand pathogens. Over 10 years, the program collected 140,000 biological samples, found over 1,000 new viruses, trained approximately 5,000 individuals in African and Asian countries, and erected and bolstered 60 new medical research facilities.¹⁰² USAID will transfer some aspects of the project to other government agencies. However, the United States could lose the international relationships, approaches, and training goals that USAID’s Predict established.¹⁰³
- **Global influenza strategy.** The WHO released a global influenza strategy for 2019–2030,¹⁰⁴ outlining strategic objectives and actions for stakeholders. The high-level goals for the strategy include “better global tools to prevent, detect, control, and treat influenza” and to focus on building stronger country capacities that are integrated within national health security planning and universal health coverage efforts.
- **Polio eradication.** On World Polio Day, October 24, a global commission declared polio type III eradicated. This is the second of three polio strains declared eradicated.¹⁰⁵

Notable Research Findings, Meetings, and Federal Hearings:

• Inaugural Global Health Security

Index finds no country fully prepared for epidemic or pandemic. A joint project by the Nuclear Threat Initiative and Johns Hopkins Center for Health Security, with research by the Economist Intelligence unit, the Global Health Security Index conducted a comprehensive assessment and benchmarking of health security and related capabilities across 195 countries.¹⁰⁶

- **Universal flu vaccine study.** The National Institutes of Health (NIH) began conducting the first human trial of a universal influenza vaccine, which could confer long-lasting immunity from multiple influenza subtypes among all age groups. The NIH is currently in Phase 1 of the clinical trial.¹⁰⁷

- **Advancements in Ebola medical countermeasures.** There were several breakthroughs in research and development of treatments, vaccines, and diagnostics to combat the Ebola virus. Researchers found two Ebola treatments utilized in the DRC showed promise against the current Ebola strain.¹⁰⁸ The European Medicines Agency also announced the world's first authorization for an Ebola vaccine, shown to be effective in protecting people from the virus.¹⁰⁹ Preliminary results showed 97.5 percent vaccine effectiveness.¹¹⁰ A second Ebola vaccine, produced by Johnson & Johnson, began a clinical trial late in 2019 in the DRC.¹¹¹ In October, the FDA permitted a new Ebola rapid diagnostic test, OraQuick Ebola Rapid Antigen Test, to officially

hit the market in the United States. This test will take protein samples from living and recently deceased individuals to try to obtain an initial diagnosis or to refute a suspected Ebola case diagnosis. This test will be used in cases where more sensitive molecular testing is not available to try to obtain an initial diagnosis or to refute suspected Ebola cases.¹¹² In December, the FDA announced approval of Ervebo, the first FDA-approved vaccine for the prevention of Ebola virus disease (EVD) in individuals 18 years of age and older. In addition, the NIH awarded funding to the University of Texas Medical Branch at Galveston, Profectus Biosciences, Vanderbilt University Medical Center, Mapp Biopharmaceutical, and Genevant Sciences Corp. to advance the development of vaccines and treatments to address Ebola and Marburg viruses. According to the HHS, these viruses contain the highest risk of weaponization by bioterrorists and will render the most catastrophic effects.¹¹³

- **EEEV vaccine.** The National Institute of Allergy and Infectious Diseases (NIAID) employed researchers to develop vaccines and treatments to fight EEEV. Specifically, NIAID's Vaccine Research Center has been developing an injection (WEVEE) that would protect individuals from equine encephalitis virus. WEVEE is currently undergoing a Phase 1 clinical trial to determine if the treatment is safe and successful in inducing a clinical response. So far, researchers report that the vaccine "appears to be safe and tolerable among 30 healthy volunteers."¹¹⁴

- **Vaccines and treatments to address smallpox, monkeypox, Marburg and Sudan viruses.** Also during the year, the FDA licensed a novel vaccine for the prevention of smallpox and monkeypox as well as a Phase 3 trial of a new anthrax vaccine, and the HHS invested in the first vaccine development against Marburg virus.^{115,116,117} In addition, the Biomedical Advanced Research and Development Authority (BARDA) contracted Mapp Biopharmaceutical, to develop a Ab therapeutic for Marburg and contracted with Sabin and Public Health Vaccines for the development of vaccines for Marburg and Sudan viruses.
- **Detecting bacteria for bioterrorism-related threats.** In March, the FDA issued finalized requirements for the review process of device and diagnostic test development aimed at detecting bacteria that could cause bioterrorism-related threats. These rules will allow manufacturers to provide more appropriate performance evaluations and consistent data on testing criteria for these medical countermeasures.¹¹⁸
- **African Epidemic Preparedness Index.** On August 28, the African Risk Capacity and Africa Centres for Disease Control and Prevention agreed to a partnership to establish the African Epidemic Preparedness Index. This framework establishes an early warning and response platform for member states to address all emergencies in an effective time frame and to build the capacity to alleviate the burden of disease on the African continent. The framework uses a collaborative approach that allows member states to share knowledge and lessons learned, strengthen capacity, and provide technical support to one another.¹¹⁹
- **Global Fund Replenishment.** In October, the Global Fund held its

Sixth Replenishment Conference, during which donor states pledged \$14 billion in funding to continue efforts to eradicate AIDS, tuberculosis, and malaria.^{120,121}

- **Antimicrobial Resistance (AMR) Threats Report.** In November, a new CDC report, *Antibiotic Resistance Threats in the United States, 2019*,¹²² found that drug-resistant germs in the United States sicken about 2.8 million people annually and about 35,000 die as a result.¹²³ In addition, 223,900 cases of *Clostridioides difficile* occurred in 2017 and at least 12,800 people died. This new report found that earlier estimates of the incidence of drug-resistant infections underreported the number of such infections. Patients in hospitals and nursing homes with weak immune systems are at particular risk for drug-resistant infections, but these infections are also becoming more common among otherwise healthy patients having routine procedures.¹²⁴ However, the report also found that AMR-prevention activities are working: Prevention efforts have reduced deaths from antibiotic-resistant infections by 18 percent overall and by nearly 30 percent in hospitals since the 2013 report.¹²⁵ In Europe, the European Centre for Disease Prevention and Control recently reviewed and updated their response to AMR in order to encourage member states to aggressively address and control antimicrobial resistance.¹²⁶
- **Congressional Flu Hearing.** In December, the U.S. House of Representatives Committee on Energy and Commerce, Sub-committee on Oversight and Investigations held a hearing on flu preparedness: *Flu Season: U.S. Public Health Preparedness and Response*.

Severe Weather and Natural Disasters

Notable Incidents:

- **Extreme heat.** July 2019 was the hottest month ever recorded on Earth, with a temperature nearly 1.2 degrees Celsius above preindustrial levels.¹²⁷ What's more, 2015 to 2019 has been the warmest five-year period since at least the 19th century.¹²⁸ A summer heat wave in Europe also resulted in the hottest June ever recorded on the continent, resulting in hundreds, if not thousands, of excess deaths.¹²⁹ According to European climate scientists, the heat wave in Europe pushed Arctic temperatures into the 80s (Fahrenheit), melting about 40 billion tons of Greenland's ice sheet.¹³⁰

- **Hurricane Dorian.** In late August, Hurricane Dorian, which started as a tropical storm and quickly intensified to a category 5 hurricane, first made landfall in the U.S. Virgin Islands causing blackouts and power outages in St. Thomas, St. John, and St. Croix.¹³¹ With winds up to 185 miles per hour, Dorian struck the Bahamas. The storm is believed to have killed approximately 65 people and caused catastrophic damage, destroying an estimated 45 percent of the homes on Abaco and Grand Bahama islands. The estimated cost of the damages caused by Dorian is over \$7 billion.^{132,133,134} When Dorian reached the U.S. East Coast, it had weakened to a tropical storm, but it still caused catastrophic flooding and widespread power outages in and around Cape Hatteras, North Carolina, and stranded 940 residents and possibly others.¹³⁵ Dorian hit Ocracoke, North Carolina, particularly hard, raising concerns about whether the island community would be able to rebuild. According to climate-change experts, Ocracoke's experience is a bellwether for what coastal communities up and down the eastern seaboard may



experience in future storms.¹³⁶ HHS Secretary Azar declared public health emergencies in North Carolina, Georgia, South Carolina, Florida, and Puerto Rico as a result of Dorian.¹³⁷ Dorian matched or broke records for its intensity according to climate scientists and was another example of a pattern of the increased likelihood of storms, fueled by warmer water, that are more likely to stall over land, increasing the amount of wind and rain communities experience.¹³⁸ Meanwhile, 2019 was the fourth straight year that a category 5 hurricane formed in the Atlantic, the longest such streak on record.¹³⁹

- **Wildfires in California and other states.** Several states experienced wildfires in 2019, including Nevada, Alaska, Texas, and California.¹⁴⁰ 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.¹⁴¹ The increase in temperature in many areas withered the state's vegetation, allowing wildfires to spread quickly through dry land. During 2019, there were approximately 6,190 fire incidences in California of varying size and intensity, with three fatalities.¹⁴² As of November 6, approximately 198,392 acres of land have burned and over 700 structures have been destroyed or damaged.¹⁴³ The Circadian Fire in the northern part of the state and the San Francisco Bay Area

created clouds of smoke that triggered a "Spare the Air" announcement, warning residents that the quality of air was unhealthy and unsafe and that those exposed to it could experience detrimental health effects.¹⁴⁴

- **California power outages.** In an attempt to reduce the risk of wildfire created by the combination of hot, dry winds and sparks from an aging electric infrastructure, Pacific Gas & Electric shutoff power in some high-risk areas of the state. These planned blackouts created a related health emergency for some residents, including presenting significant risk 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.¹⁴⁵

- **Flooding throughout the United States.** Many communities in the Midwest and South experienced record flooding—in terms of height, spread, and duration¹⁴⁶—as the Arkansas, Mississippi and Missouri Rivers flooded, affecting nearly 14 million people.¹⁴⁷ As many as 7.9 percent of U.S. counties received Federal Emergency Management Agency (FEMA) natural disaster declarations as a result of the 2019 floods, and damages were estimated to exceed \$10 billion.¹⁴⁸ (See "2019: The Year of the Flood" on page 22.)

2019: THE YEAR OF THE FLOOD

“The year of the flood,” that’s how many will remember 2019. In communities large and small, coastal and non-coastal, flooding created major damage and disruption. The winter of 2018–2019 was the wettest winter on record in the United States.¹⁴⁹ The health risks associated with this weather and subsequent flooding required mobilizations by public health emergency preparedness and response teams throughout the nation.

“Planning and training for weather-related emergencies enabled our partners to effectively evacuate 98 nursing home residents to safety during the Arkansas River flood of 2019.”

Nathaniel Smith, MD and MPH

Arkansas Secretary of Health

Flooding along coastal areas tends to get the most media attention, particularly when associated with a hurricane or tropical storm. In 2019, there were 18 tropical storms and six hurricanes, three of which meteorologists classified as intense, including Hurricane Dorian, whose 185 miles per hour winds devastated the Bahamas and brought significant flood damage to North Carolina. Other storms that caused major damage and flooding included Hurricane Barry, which hit Louisiana, and Tropical Storm Imelda,¹⁵⁰ which hit Louisiana and Texas. Imelda led to an astounding three feet of rain in a large region of Texas, including Houston.

Also noteworthy was an increase in flooding in non-coastal areas¹⁵¹ as a result of river and lake flooding caused by heavy rainfall, alterations in land usage, and/or rapid snow melting. A series of record floods occurred in the Mississippi River tributary basins, including the Ohio, Missouri, and Arkansas Rivers.¹⁵² The Arkansas River had its worst flooding in nearly 30 years during May and June, reaching more than seven feet above flood stage and leaving downtown Little Rock inundated with water.¹⁵³ According to Arkansas state health officials, the 2019 flooding was unique in a number of ways, including the length of time before the water receded, about 25 days, and the fact that the flooding included highly populated areas.

Arkansas Secretary of Health Dr. Nathaniel Smith and Emergency Preparedness Director Dr. Micheal Knox and their teams prioritized the following during the flooding response: immunizing first responders and people who would be temporarily living in shelters (Hepatitis A and Tdap), ensuring access to healthcare for anyone displaced by the floods, insect control, communications, and monitoring for possible chemical releases or other contaminants in the Arkansas River and in municipal water systems and private wells.

According to Smith and Knox, it was fortunate that the state’s health department had situational awareness about when the flood would hit and how it would progress. (The flooding was the result of an upriver reservoir release after heavy rain in Kansas and Oklahoma.) But the keys to success involved their prior planning and collaboration with a wide range of governmental and private agencies, including the Arkansas Department of Emergency Management.

A test of their preparedness and emergency planning occurred when the city had to evacuate patients from a long-term care facility and a major hospital—both evacuations were successful.

A lesson for the team, which they will incorporate into future planning, was the need to provide opioid reversal kits to shelters during large-scale emergencies.

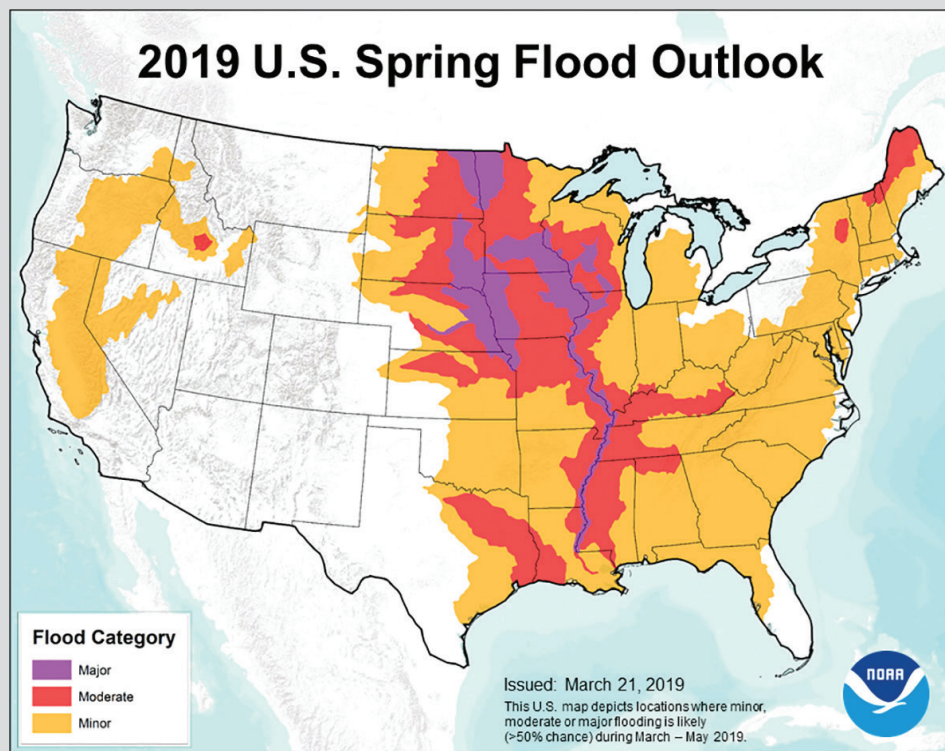
While reaching record levels in 2019, the problem of flooding has been growing for a number of years. The U.S. National Weather Service¹⁵⁴ recorded 10 rain storms and subsequent flooding in 2015–2016 that scientists expected to occur only once every 500 years.

The health risks associated with flooding includes drowning, sewage contamination, waterborne diseases (such as *Vibrios* skin infections or *E. coli* or salmonella-caused diarrheal disease), mold, and increased risk of mosquito-borne diseases. Following Hurricane Harvey in 2017, the Texas Department of State Health Services attributed 26 deaths¹⁵⁵ to a wide range of causes from unsafe or unhealthy conditions related to such factors as loss of electricity and clean water, lack of transportation, electrocutions, and/or infections from flood waters.

In addition, floods often increase the risk of the release of harmful chemicals and other pollution into the water or the air. In 2019, for example, the U.S. Environmental Protection Agency (EPA) closely monitored floods in areas with Superfund sites, taking immediate action in Nebraska, Missouri, and other locations to prevent the spread of contaminated groundwater.^{156,157}

Additional consequences of flooding include loss of or damage to property, necessary relocation away from home, and the loss of income due to the temporary closing of businesses. Some people may be more negatively affected. Lower-income people and people of color may have fewer resources—such as flood insurance, alternative housing, transportation and cash for essential items like food and medicine—to help them survive and recover.

In response to the growing frequency and severity of flooding, public health



agencies at the local, state, and federal levels are mobilizing. CDC supports a website page devoted to flooding with resources for local and state health departments: www.cdc.gov/disasters/floods/index.html.

The work of the Tulsa, Oklahoma, Health Department is an example of the comprehensiveness of the local public health response to the 2019 flooding. Departmental employees staffed the Tulsa County Emergency Operations and Medical Emergency Response Centers, opened and/or expanded vaccination sites, increased mosquito-control efforts to reduce the risks associated with elevated standing water, monitored drinking-water quality and the risk of exposure to sewage, sheltered pets and livestock, improved access to shelters for residents when evacuations were needed, inspected and reopened food and drink facilities shuttered by the flood, and used a stress response team to deal with the trauma that residents experienced.¹⁵⁸

Events and Policy Actions:

- **Disaster relief bill.** In June 2019, President Trump signed a \$19.1 billion disaster relief bill providing aid to communities recovering from hurricanes, flooding, and wildfires.¹⁵⁹ The bill included funds to provide nutrition assistance for Puerto Rico, cover crop losses for farmers, assist wildfire suppression efforts, and repair damaged highways and public lands.
- **U.S. officially withdraws from the Paris Climate Agreement.** In November, President Trump formally announced his intention to withdraw the United States from the Paris Agreement, which aims to reduce global greenhouse-gas emissions to keep temperatures from rising to dangerous levels.¹⁶⁰ As of November 11, the United States officially entered the agreement exit process, which will conclude on November 4, 2020.¹⁶¹

Notable Research Findings, Meetings, and Federal Hearings:

- **Extreme rain events.** The European Centre for Research and Advanced Training in Scientific Computing estimated that extreme rain events with a one in 1,000 chance of occurring in a given year will become two to five times more frequent if global temperatures rise 2 degrees Celsius higher than preindustrial levels.¹⁶² Of all the regions in the United States, New England, the Southern Great Plains, and the Rocky Mountains are at the greatest risk of extreme rainfall.

- **National Mitigation Investment Strategy.**

In August, FEMA released the National Mitigation Investment Strategy, an effort to improve the coordination and effectiveness of mitigation investments¹⁶³ for state and community officials, businesses, nonprofits, and others. FEMA released the strategy in response to the U.S. Government Accountability Office's recommendations, which identified the need for a coordinated federal and national investment strategy for risk reduction, following Hurricane Sandy.¹⁶⁴

- **Oceanic warming.** A September special report by the 195-member Intergovernmental Panel on Climate Change found that the impact of climate change includes heating the oceans and altering their chemistry so dramatically that it is threatening seafood supplies, fueling cyclones and floods, and posing profound risks to the hundreds of millions of people living along the world's coastlines.¹⁶⁵

- **Rising seas.** A November report by Climate Central found that rising seas will be a more serious problem than previously thought due to an increase in the number of people living on low ground. The report estimates that 110 million people are currently living below sea level and that even "very modest" climate change could increase that number to 150 million by 2050 and 190 million by 2100.¹⁶⁶

- **Health effects of climate change.** A 2019 report in *The Lancet* found that the health effects of climate change will be unevenly distributed and that children will be among those especially harmed.¹⁶⁷

THE DISPROPORTIONATE IMPACTS OF CLIMATE CHANGE

Climate change affects everyone, but certain populations and communities are at elevated risk for a disproportionate impact. According to the U.S. Global Change Research Project, the vulnerability of any population group is a measure of that group's exposure to climate risks and its capacity to respond. The project has identified 10 "populations of concern"—groups at a heightened risk for the health consequences of climate change: (1) low-income people; (2) some communities of color; (3) immigrant groups, including those with limited English proficiency; (4) indigenous people; (5) children; (6) pregnant women; (7) older adults; (8) vulnerable occupation groups; (9) people with disabilities; and (10) people with chronic or preexisting medical conditions.¹⁶⁸ Individuals who are socially, medically, or economically vulnerable or who are living near the coast or on a flood plain are also more likely to be physically at risk.¹⁶⁹

Adverse health effects of climate change include heat-related disorders; infectious diseases, such as those spread by contaminated food, mosquitos, or water; respiratory and allergy disorders; malnutrition; and mental health issues. People with chronic health conditions are more likely to need emergency care following climate-related events, due to a lack of access to medication, electricity, and primary or behavioral healthcare.¹⁷⁰ Furthermore, in some places, climate change will affect

where people can live due to rising sea levels, what land can be farmed, employment opportunities, and access to clean water—causing some people to become "environmental refugees."¹⁷¹ Families with the fewest resources to relocate will be at higher risk of displacement.

Those of lower socioeconomic status often suffer the most severe consequences due to a lack of resources to prepare for and rebound from natural disasters.¹⁷² For example, people with limited incomes may not be able to afford air conditioning to mitigate the likelihood of hyperthermia during heat waves, a particular vulnerability for older adults.

Researchers studying the impact of climate change on poor people and communities of color in California found that it has a disproportionate impact on those communities and coined the term "climate gap" to describe the unequal climate change impact on communities least able to prepare for and recover from climate events.¹⁷³ According to the report, Black residents of Los Angeles are almost twice as likely to die from a heat-related illness as are other L.A. residents.¹⁷⁴ The authors believe their California findings are representative of the risks facing low-income people and communities of color across the nation. They submit that policies and programs to adapt to the health impacts of climate change need to focus first on those people and communities most at risk.¹⁷⁵

The impact of wildfires on California are another example of how a family's or a community's resources affect their ability to rebound and rebuild after a disaster. In 2018, California fires destroyed nearly 19,000 homes and led to more than \$12 billion in insurance claims.¹⁷⁶ This high rate of insurance claims is affecting the current price of insurance, limiting the number of people who can afford it. According to industry experts, rate increases to annual premiums between 30 and 70 percent are likely, especially for homeowners in areas at high risk of fire.¹⁷⁷ Some homeowners may not be able to get any coverage through the private market. Their only option may be public insurance programs with limited coverage, and some may not be able to afford that.¹⁷⁸

Adaptation programs can also have unintended consequences on lower-income people. Infrastructure improvements in neighborhoods to make them more climate resilient can also make those neighborhoods more attractive to developers and higher-income residents. A community's new viability can lead to increases in property values, rents, and property taxes, often forcing the original lower-income residents out of the area.¹⁷⁹ Post-storm rebuilding in Atlanta, Houston, Miami, New Jersey, and New Orleans are examples of places where post-event investments to protect communities against extreme weather have led to the gentrification of some formerly low-income communities and to the displacement of former residents.^{180,181}

All Hazards Events and Policy Actions

Notable Incidents:

- **E-cigarette and Vaping injuries and deaths.** According to the CDC,¹⁸² as of late December, 2,506 e-cigarette or vaping-associated lung injuries (EVALI) were reported nationally for the prior 11 months, causing 54 deaths. Additional deaths are under investigation. During the fall, the injuries and deaths were believed to be possibly linked to an additive oil, vitamin E acetate, found in THC-containing vaping materials used by many of the people who became sick; the substance was identified as a “chemical of concern.”¹⁸³ Also during the fall, as public health officials worked to pinpoint the exact source of

the illnesses, several states responded to the outbreak, as well as to the alarming rise in youth vaping,¹⁸⁴ by taking emergency actions: Massachusetts declared a public health emergency and a temporary ban on all vaping products, and New York implemented a ban on most flavored vaping products. Michigan, Rhode Island, Montana, Washington, California, and Oregon also passed executive orders or other processes to attempt to respond to the dual crises of severe lung illness and the youth vaping epidemic.¹⁸⁵

In December the CDC released additional data showing that vitamin E acetate was “closely associated” to EVALI.¹⁸⁶



A DIFFERENT TYPE OF EMERGENCY: E-CIGARETTE OR VAPING-ASSOCIATED LUNG INJURY

In August 2019, a public health emergency arose due to a multistate outbreak of e-cigarette/vaping-associated lung injury (EVALI).¹⁸⁷ Officials identified this emergency when local, state, and federal surveillance found a rapidly growing cluster of cases of serious lung injury and death among those who had used e-cigarette or vaping products.

In September, due to the seriousness of the health risk, the uncertainty about the cause, and the widespread usage of these products, including by adolescents and young adults, public health officials at the CDC and several states activated an emergency response.¹⁸⁸

EVALI was a different type of health risk than is most common public health emergencies. No infectious disease was suspected, nor was the cause a single catastrophic event, such as a hurricane, wildfire, or flood. The outbreak illustrated the challenges of identifying an emerging health threat, building seamless communications between clinical providers and public health amid a rapidly changing event, and determining the source of illnesses with limited or delayed information. In some ways, the EVALI investigation was comparable to a contaminated-foodborne outbreak, during which health officials rush to identify the likely source. The EVALI response benefited from the existence of a public health emergency system, trained personnel, and well-established communication mechanisms that had been used for other emergencies.

The CDC, FDA, state, and local health departments as well as other clinical and public health partners began coordinated investigations, ultimately identifying more than 2,000 people with EVALI¹⁸⁹ due to their use of e-cigarette or vaping

products. There has been at least one case in every state. As of December 17, 54 deaths were associated with EVALI.¹⁹⁰

The EVALI investigation was made particularly challenging because e-cigarette vaping products are not fully regulated by the federal government, and therefore experts did not immediately know or understand the ingredients. Furthermore, the products were often purchased informally rather than from traditional retailers. So, tracing and testing the products was often difficult.¹⁹¹

Most of those who had serious medical problems were young people—78 percent were under 35 years old, with a median age of 24 years. What's more, 16 percent were under the age of 18, too young to even legally purchase the products. Two-thirds were male (67 percent). The majority of those injured did report using products that contained THC. During the fall, experts identified vitamin E acetate as a “chemical of concern” among people who became ill. Other chemicals have not been ruled out.¹⁹² In December, and based on further data, the CDC said that vitamin E acetate was “closely associated” with EVALI.¹⁹³

As with other emergencies, the public health sector sought to identify and define the risk factors; detect and track confirmed and probable cases; communicate actionable recommendations to state, local, and clinical audiences and the public; and establish procedures that could assist with the public health investigation and patient care.

On September 16th, CDC activated its Incident Management System and used the Emergency Operations Center (EOC) to coordinate activities and assist states, public health partners, and clinicians

around the nation. The EOC worked with states to create case definitions that allowed for the classification of patients, tested specimens in its laboratories, held regular calls with state and local health departments, and communicated frequently with the media. Epidemic Intelligence Service officers—who are customarily deployed in infectious disease outbreaks—were deployed to work in collaboration with those at the state and local levels.

As of December, more than 350 CDC staff had mobilized as part of the emergency response, with major representation from trained epidemiological staff including epidemiologists, clinicians, health communicators, policy analysts, and others. Because of the relatively unusual nature of this type of emergency operation, it was the first time that many from the non-infectious disease centers participated in an agency-wide response.

State and local health departments mobilized as well. For example, in Washington state, the health department used its emergency operations center, drawing on the expertise of both its core emergency preparedness team and its communicable and non-communicable disease staff. Their work included giving information to healthcare providers regarding the signs and symptoms of EVALI; communicating with the local health departments to which providers reported likely cases; developing standardized forms to be used for patient interviews; conducting patient interviews to determine the vaping products used; collecting sample products from the patients and regularly informing the public through email updates press events, interviews, and updated web-based data.

- **Lead in the water.** Throughout the year, some residents of Newark, New Jersey, had to rely on bottled water due to high levels of lead in their tap water. The problem began in 2017 when the city changed its water's acidity, which experts believe caused lead from aging pipes within the water system to enter the water supply.¹⁹⁴
- **Mass shootings.** As of December 27, in the United States, there were 410 mass shootings—defined as an incident in which at least four people are shot, excluding the shooter—in 2019.¹⁹⁵ Mass shootings, such as those in Dayton, El Paso, Gilroy, and Virginia Beach, require an emergency health response, including mass-casualty healthcare management, communications, family assistance, and mental health first aid.¹⁹⁶ In addition, these events have long-term health effects on communities and survivors, including post-traumatic stress disorder, substance abuse, anxiety, and depression.¹⁹⁷

Notable Events and Policy Actions:

- **Advancements in chemical medical countermeasures.** Some significant advancements in medical countermeasures against chemicals and other threats included an evidence-based chemical decontamination decision tool, a fast-acting spray for chemical decontamination,^{198,199} and an agreement to bolster the supply of medical countermeasures against chemical warfare agents.²⁰⁰
- **Advisory guide for emergencies.** The U.S. Department of Homeland Security (DHS) Science and

Technology Directorate worked with their associates in the United Kingdom and Canada to examine the recently updated *Science Advisory Guide for Emergencies*. The officials focused on potential public health threats to promote a department-wide approach that fosters a coordinated response. Specifically, officials participated in an activity that assessed communication obstacles and highlighted each country's strengths and shortcomings.²⁰¹

- **National Health Security Strategy.** In January, the Office of the Assistant Secretary for Preparedness and Response released the *2019–2022 National Health Security Strategy*. The strategy outlines steps the nation should take to strengthen its ability to prevent, detect, assess, prepare for, mitigate, respond to, and recover from disasters and emergencies. The strategy identifies five potential threats: (1) extreme weather and natural disasters; (2) a chemical, biological, radiological, or nuclear (CBRN) incident; (3) infectious disease with pandemic potential; (4) cyber threats that could destabilize the healthcare system; and (5) advances in biotechnology that could be misused to cause harm. The strategy articulates three objectives: (1) prepare, mobilize, and coordinate a whole-of-government approach to health security; (2) protect against emerging and pandemic infectious diseases and CBRN threats; and (3) leverage the capabilities of the private sector as partners in the effort to protect the nation against health security threats.²⁰²

- **Pandemic and All-Hazards**

- **Preparedness and Advancing**

- **Innovation Act.** In June, President Trump signed the Pandemic and All-Hazards Preparedness and Advancing Innovation Act, which ensures that the United States is better equipped to respond to a range of public health emergencies.²⁰³ The passage of this legislation expands funding for critical areas, such as strengthening the National Health Security Strategy, improving preparedness and response, advancing the emergency response workforce, prioritizing a threat-based approach, and enhancing communication and technologies for medical countermeasures.²⁰⁴

- **Pediatric disaster care centers.**

- In September, the Office of the Assistant Secretary of Preparedness and Response allocated \$6 million to create a pilot program for two Pediatric Disaster Care Centers of Excellence. The centers will model programs designed to decrease the impacts of exposure to trauma, infectious disease, and other public health emergencies on children by providing pediatric-specific care (that is, specialized training, equipment, supplies, and pharmaceuticals) during public health emergencies.²⁰⁵

- **Repeal of clean water regulations.**

- In September, the administration announced the repeal of major clean water regulations that had placed limits on polluting chemicals that companies could use near certain bodies of water.²⁰⁶

- **National Response Framework.**

- FEMA released the *National Response Framework, Fourth Edition* in

October.²⁰⁷ The updated framework included additional emphasis on nongovernmental capabilities, including the role of individuals and private-sector partners in responding to disasters. A new Emergency Support Function also focused on leveraging coordination between government and infrastructure owners/operators.

- **Notable Research Findings, Meetings, and Federal Hearings:**

- **WHO's 10 threats to global health.**

- The WHO identified 10 major threats to global health that demand attention from the WHO and its partners in 2019: (1) air pollution and climate change, (2) noncommunicable diseases, (3) global influenza pandemic, (4) fragile and vulnerable settings, (5) antimicrobial resistance, (6) high-threat pathogens, (7) weak primary healthcare, (8) vaccine hesitancy, (9) dengue, and (10) HIV. The report was part of the WHO's strategic plan, which strives to ensure 1 billion more people benefit from access to universal health coverage, 1 billion more people have protection from health emergencies, and, 1 billion more enjoy better health and well-being.²⁰⁸

- **DNA screening system.** Researchers at Battelle National Biodefense Institute developed a DNA screening system that compiles more than 10,000 sequences of concern and streamlines the review process of detecting and characterizing pathogens that pose threats to biosecurity.²⁰⁹

- **Congressional oversight of BioWatch replacement.** Bipartisan members of the House Energy and

Commerce Committee asked the U.S. Government Accountability Office to evaluate a new system to detect airborne infectious disease agents, BioDetection 21, which is intended to replace the BioWatch system,²¹⁰ after reports questioned the effectiveness and accuracy of the new system. At an October congressional hearing—"Defending the Homeland from Bioterrorism: Are We Prepared?"—experts testified before the U.S. House Homeland Security Subcommittee on Emergency Preparedness, Response, and Recovery about BD21 and other bioterrorism concerns. Officials from the U.S. Government Accountability Office testified that obstacles pertaining to the nation's ability to adequately defend against biological threats include: (1) assessing enterprise-wide threats; (2) situational awareness and data integration; (3) bio-detection technologies; and (4) biological laboratory safety and security. While strategies such as the 2018 National Biodefense Strategy have been established to address some of these challenges, implementation and monitoring of these strategies are still in the process.²¹¹ Other experts asserted that the country's efforts to develop new threat-detective technologies, such as BD21, were focused in the wrong direction.²¹² In addition, public health experts testified as to the importance of the role of public health in detection, prevention, and mitigation of events but said that federal-local coordination, equipment, workforce, and training are needed.²¹³

Interview with Germán Luis Parodi

Germán Luis Parodi is the Co-Executive Director of The Partnership for Inclusive Disaster Strategies and works with the United Nations Disaster Risk Reduction Focal Point for Persons with Disabilities in the Americas



Germán and co-executive director of the Partnership for Inclusive Disaster Strategies, Shaylin Sluzalis, at the general assembly of the UN during the CRPD State Parties convention.

Q: You have deployed as a disaster-responder, what have you seen and experienced first-hand about what happens to people with disabilities during an emergency?

A: As a first responder and a disabled person, I've witnessed first-hand how those who are marginalized, isolated, or not part of the local planning process, are left behind in an emergency. More often than not, children and adults with disabilities are left to the good intentions of family, neighbors and friends, while responders learn of and find people with disabilities, those who need rescue, last. Often, people with disabilities are forced to evacuate without essential

assistive technology and durable medical equipment. Nationwide, rarely do you see an American Sign Language interpreter next to officials in disaster related press conferences and many emergency shelters are not accessible for people with access and functional needs. Then, for those people with disabilities lucky enough to survive the initial event, post event they must cope not only with their disability and possible post-traumatic stress, which is rarely attended to, but with aid processes and protocols of emergency management agencies that are, in my experience, intentionally discouraging.

Q: As you indicate, when disasters happen, people with disabilities are disproportionately affected. What needs to be done to protect the health and safety of people with disabilities during a disaster?

A: Government, community-based and volunteer organizations must involve us, people with disabilities and other subject matter experts in planning before an emergency or disaster! This is established law that has been ignored for years. Individuals with disabilities and advocates must be encouraged to be part of the planning process, including involvement in exercises and drills. During a disaster is no time to be introduced “for the first time” to emergency planners.

Disaster risk reduction can be achieved through inclusion. People with disabilities need to be included at the federal level all the way down to the municipal level. Including our voices in all mitigation and preparedness work will be the best way to help ensure that emergency

procedures will help to protect our health and safety when a disaster strikes.

Q: What are your main concerns for those who are either quadriplegic or paraplegic? Are there specific preparations or responses necessary for people with these conditions? Are there other disabilities you would highlight as requiring specialized care?

A: All people with disabilities must plan for themselves, as if no one is coming to assist or evacuate them. In most cases, that is exactly what happens. People with disabilities, most age-related, were the highest percentage to lose their lives in the Camp wildfire that devastated Paradise, California. After a disaster, during the recovery process, people who use assistive technology or durable medical equipment often go without supplies, which leads to involuntary and unnecessary institutionalization.

While there certainly might be additional training and knowledge responders need, much of what might be called “specialized” training or planning should actually be a part of any routine and inclusive training. If that were the case less “specialized” care would be needed. A couple big areas that come up when we talk about people with access and functional needs are building evacuations and accessible transportation and shelters. When we think of the elevator warnings in case of emergency, *use stairs*, we can immediately see a barrier for some quadriplegics or paraplegics that might need specialized care like the knowledge of how to use an evacuation chair. However, accessible responses to evacuating in a building with stairs would also be useful for anyone with mobility issues, endurance restraints, small children, etc. Similarly, a quiet room for people with sensory sensitivity could be useful for people to

silently process the trauma of a disaster, or quietly observe religious prayer time.

People need a place to go and a way to get there. Having reliable and accessible transportation that can help individuals get to an accessible shelter (including the bathrooms!), is often not available.

Q: A lot of your work is advocating for policy change. What is your highest priority for action steps by policymakers to ensure that the health and safety of people with disabilities are considered during emergency planning and response? What legislation needs to be passed? What should the federal government do? What do state and local governments need to do?

A: The Partnership for Inclusive Disaster Strategies has worked with Senator Bob Casey’s (PA) office and other members of Congress to introduce and build support for bicameral bills, the Real Emergency Access for Aging and Disability Inclusion for Disasters Act (REAADI) and the Disaster Relief Medicaid Act (DRMA). REAADI and DRMA create and expand policies which focus on inclusion of the disability community in federal response efforts. There is also already legislation that requires inclusion and communication with the disability community, as well as access requirements for anything funded with federal dollars. We need increased compliance and enforcement of the policies that already exist and help to rectify the harm caused by current response mechanisms. States and U.S. territories have centers for independent living, protection and advocacy organizations, ADAPT chapters and other disability centered organizations that can connect the state or city emergency management agencies with disabled people to inform, collaborate, and save lives when disasters strike.

A couple of big areas that come up when we talk about people with access and functional needs are building evacuations and accessible transportation and shelters.

Ready or Not 2020

Assessing State Preparedness

While it is important that every state be ready to handle public health emergencies, each faces its own mix of threats, and some are more prepared than others. 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 that we strive to use consistently year to year. The indicators, drawn 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, capture core elements of 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 4.)

TABLE 4: State Public Health Emergency Preparedness
State performance, by scoring tier, 2019

Performance Tier	States	Number of States
High Tier	AL, CO, CT, DC, DE, IA, ID, IL, KS, MA, MD, ME, MO, MS, NC, NE, NJ, NM, OK, PA, TN, UT, VA, VT, WA, WI	25 states and DC
Middle Tier	AZ, CA, FL, GA, KY, LA, MI, MN, ND, OR, RI, TX	12 states
Low Tier	AK, AR, HI, IN, MT, NH, NV, NY, OH, SC, SD, WV, WY	13 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: 32 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. Therefore, the capacity to quickly surge qualified medical personnel is critical. The ability to bring in additional 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.

To help make participation in the compact more viable for states, the National Council of State Boards of Nursing enhanced its requirements in 2017–2018, standardizing licensure requirements among participating states, in addition to other changes.²¹⁴

The NLC has been crucial to response efforts after several recent disasters.²¹⁵ In 2017, when Hurricane Harvey struck Texas, the storm’s effects overwhelmed healthcare systems and nurses from many member states were able to immediately assist those in need. In 2018, when Hurricane Florence left severe damage in South Carolina from rain, flooding, and high winds, DaVita Renal Dialysis Centers were in dire need of nurses. Thanks to South Carolina’s membership in the compact, DaVita was able to recruit nurses from other NLC states without delay. A few weeks later, when flooding from Hurricane Michael forced at least one hospital in the state to evacuate, nurses from other member states were able to assist.

As of November 2019, 32 states had adopted the NLC, with Alabama’s membership taking effect on January 1, 2020.²¹⁶ This was a net increase of one since 2018 and six since 2017. Karen C. Lyon, the chief executive officer of the Louisiana State Board of Nursing, which joined the compact on July 1, 2019, said that doing so was a “large step toward advancing professional nursing practice in Louisiana and surrounding states.”²¹⁷

TABLE 5: 32 States Participate in the Nurse Licensure Compact Participants and nonparticipants, 2019				
Participants			Nonparticipants	
Alabama	Louisiana	Oklahoma	Alaska	Nevada
Arizona	Maine	South Carolina	California	New Jersey
Arkansas	Maryland	South Dakota	Connecticut	New York
Colorado	Mississippi	Tennessee	District of Columbia	Ohio
Delaware	Missouri	Texas	Hawaii	Oregon
Florida	Montana	Utah	Illinois	Pennsylvania
Georgia	Nebraska	Virginia	Indiana	Rhode Island
Idaho	New Hampshire	West Virginia	Massachusetts	Vermont
Iowa	New Mexico	Wisconsin	Michigan	Washington
Kansas	North Carolina	Wyoming	Minnesota	
Kentucky	North Dakota			

Note: Alabama began implementing the NLC in January 2020. Indiana and New Jersey have joined the NLC but had not yet set a date for implementation, as of December 2019.

Source: National Council of State Boards of Nursing.²¹⁸

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 fewer 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 grants 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.²¹⁹ Coalitions prepare members with critical tools, including medical equipment and supplies, real-time information, enhanced communication systems, and exercises and training for healthcare personnel.²²⁰ A healthcare coalition must contain a minimum of two acute-care hospitals, emergency medical services, emergency management, and public health agencies.²²¹ HPP invests 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. For example, when a train derailed on the border of two counties and two coalitions in Washington state in December 2017, nine participating hospitals across three counties used a shared tracking system to streamline the documentation and distribution of 69 patients and to aid family reunification.²²² The Houston area's coalition, which comprises 25 counties that are home to 9.3 million people and 180 hospitals, coordinated activities, such as evacuations and patient transfers, during and after Hurricane Harvey in 2017.²²³ After Hurricane

Florence knocked out communication capabilities at a major regional hospital in North Carolina in 2018, the area coalition established a backup system within eight hours.²²⁴

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 6.) However, some states, such as Ohio (25 percent) and New Hampshire (47 percent) lagged behind.

Recent events such as Hurricane Maria, the California wildfires, mass shootings, and even a severe seasonal flu season have exposed gaps in healthcare preparedness at the individual facility, coalition and systems levels.²²⁵ Some major gaps in healthcare preparedness include pediatric surge capacity²²⁶ and coordinating surge capacity across the healthcare system;²²⁷ building and maintaining preparedness for high-consequence infectious diseases,²²⁸ such as Ebola; burn capacity and other specialty care needed for emerging threats; ongoing stress on the healthcare system's ability to provide emergency care; 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.²²⁹ While healthcare coalitions can help address some of these vulnerabilities, systemwide approaches to preparedness are needed.

TABLE 6: 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 data available are for participation in 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.²³⁰

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 nine 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.²³¹ 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.²³²

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.²³³

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.^{234,235} (States sometimes aim to meet applicable standards, but do not pursue accreditation.)

As of November 2019, both the PHAB and the EMAP accredited 28 states and the District of Columbia—an increase of three (Iowa, Louisiana, Pennsylvania) since October 2018—and an additional 13 states received accreditation from one or the other. (See Table 7.) “This is a very important milestone in our continued efforts to promote healthy lifestyles, prevent injury and disease, and assure the safe delivery of quality healthcare to Pennsylvanians,” said Dr. Rachel Levine, Pennsylvania's secretary of health. “Public health is an ever-changing landscape. ... We are committed to preparing for each of these concerns and also being aware of new potential issues that could affect the health of Pennsylvanians each day.”²³⁶

Just nine states (Alaska, Hawaii, Indiana, Nevada, New Hampshire, South Dakota, Texas, West Virginia, and Wyoming) received no accreditation from either body. (Nevada was previously accredited by the EMAP.) 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 may not have one.

TABLE 7: 41 States and the District of Columbia Accredited by the PHAB and/or EMAP
Accreditation status by state, November 2019

PHAB and EMAP			PHAB only	EMAP only	No Accreditation
Alabama	Iowa	New York	Delaware	Kentucky	Alaska
Arizona	Kansas	North Dakota	Georgia	Michigan	Hawaii
Arkansas	Louisiana	Ohio	Maine	North Carolina	Indiana
California	Maryland	Oklahoma	Minnesota	South Carolina	Nevada
Colorado	Massachusetts	Pennsylvania	Montana	Tennessee	New Hampshire
Connecticut	Mississippi	Rhode Island	Oregon	Virginia	South Dakota
District of Columbia	Missouri	Utah	Washington		Texas
Florida	Nebraska	Vermont			West Virginia
Idaho	New Jersey	Wisconsin			Wyoming
Illinois	New Mexico				
28 states + D.C.			7 states	6 states	9 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.²³⁷

INDICATOR 5: STATE PUBLIC HEALTH FUNDING TRENDS

KEY FINDING: Most states held their public health funding steady or increased it in fiscal year 2019, but 11 reduced funding.

Funding for public health programs that support the infrastructure and workforce needed to protect health—including the ability to detect, prevent, and control disease outbreaks and mitigate the health consequences of disasters—is a critical ingredient of preparedness. General public health capabilities—such as those pertaining to epidemiology, environmental hazard detection and control, infectious disease prevention and control, and risk communications—and targeted emergency response resources are necessary to ensure that officials maintain routine capabilities, and that surge capacity is readily available for emergencies. A trained and standing-ready public health workforce, and one that knows its community, is critical to the surge capacity that is so often necessary during an emergency.

According to the Public Health Activities and Services Tracking project at the University of Washington, state public health programming and services span six core areas:²³⁸

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 programming supports states' ability to carry out emergency responsibilities. 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.

Fortunately, most states (39) and the District of Columbia maintained or increased public health funding in fiscal year 2019. (See Table 8.) But 11 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. Nevertheless, this was a notable improvement over fiscal year 2018, when public health funding was cut in 17 states and the District of Columbia. (This indicator does not assess the adequacy of states' public health funding.)

TABLE 8: State Public Health Funding Held Stable or Increased in 39 states and DC
Public Health Funding, by state FY 2018 - 2019

State	Percentage Change
Alabama	-5%
Alaska	1%
Arizona	2%
Arkansas	-3%
California	10%
Colorado	3%
Connecticut	4%
Delaware	2%
District of Columbia	10%
Florida	1%
Georgia	2%
Hawaii	6%
Idaho	-3%
Illinois	16%
Indiana	5%
Iowa	-1%
Kansas	9%
Kentucky	4%
Louisiana	3%
Maine	3%
Maryland	2%
Massachusetts	10%
Michigan	17%
Minnesota	7%
Mississippi	8%
Missouri	1%
Montana	-3%
Nebraska	-4%
Nevada	40%
New Hampshire	-6%
New Jersey	3%
New Mexico	3%
New York	-1%
North Carolina	-2%
North Dakota	9%
Ohio	7%
Oklahoma	12%
Oregon	27%
Pennsylvania	2%
Rhode Island	9%
South Carolina	5%
South Dakota	2%
Tennessee	4%
Texas	8%
Utah	0%
Vermont	4%
Virginia	4%
Washington	1%
West Virginia	-2%
Wisconsin	0%
Wyoming	-6%



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Note: Nebraska's year-over-year change incorporates a modification to its accounting methodology—some funds were previously double-counted—that the state was unable to apply retroactively to fiscal 2018. North Dakota's fiscal 2019 funding combines funds for the Department of Health and the Department of Environmental Quality, which were separated, beginning in fiscal 2019. 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' public 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, and the EPA sets legal limits on contaminants in drinking water, including microorganisms, disinfectants and their by-products, chemicals, and radionuclides;²³⁹ the EPA also requires states to periodically report drinking-water quality information.²⁴⁰ 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.²⁴¹

The United States has one of the safest public drinking-water supplies in the world, but some communities, particularly low-income communities, are at greater risk for lack of 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, have been exposed to high levels of lead and other toxins.²⁴² In 2019, residents of Newark, New Jersey, had to rely on bottled water due to high levels of lead in their tap water.²⁴³ In children, even low levels of exposure can damage the nervous system and contribute to learning disabilities, shorter stature, hearing loss, and impaired formation and function

of blood cells.²⁴⁴ 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.

Other water-related emergencies and concerns in the United States include harmful algal blooms,²⁴⁵ which impact the safety of seafood, damage the economies of affected communities, increase the presence of toxic chemicals like per- and polyfluoroalkyl substances, and reduce the availability of clean water during power outages,²⁴⁶ 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.

According to the EPA, across the nation, 7 percent of state residents on average used a community water system in 2018 that failed to meet all applicable health-based standards, up slightly from 2017. That share was 0 to 1 percent in Arizona, Colorado, Delaware, Florida, Hawaii, Idaho, Illinois, Maine, Maryland, Minnesota, Missouri, Nevada, South Dakota, Vermont, Washington, and Wyoming. (See Table 9.) But in six states (Louisiana, New York, North Dakota, Oregon, Rhode Island, and West Virginia), more than 15 percent of residents used a community water system with health-based violations. These data do not include water safety on Indian reservations.

It is important to note that the EPA estimates that about 13 million American households get their drinking water from private wells.²⁴⁷ The data reported by this indicator do not reflect the quality of the drinking water used by those households.

TABLE 9: Few Americans Used Contaminated Community Water Systems
Percent of state populations who used a community water system in violation of health-based standards, 2018

States	Percent of Population
HI, MO, NV	0%
AZ, CO, DE, FL, ID, IL, ME, MD, MN, SD, VT, WA, WY	1%
IN, NC, OH, SC, UT, VA	2%
AL, CT, IA, MI, NE, NH, TN	3%
DC, WI	5%
AR	6%
AK, MS, TX	7%
GA, KS, MT, NM	8%
KY	10%
MA, NJ	11%
CA	12%
OK, PA	13%
LA, ND, OR, WV	16%
RI	38%
NY	45%

Note: Some state residents use private drinking-water supplies, rather than community water systems. These data do not capture private supplies. Only regulated contaminants are measured.

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.²⁴⁸



INDICATOR 7: ACCESS TO PAID TIME OFF

KEY FINDING: Just over half of workers in states, on average, had some type of paid time off (for example, sick leave, vacation, holidays) in 2019. Most states were closely clustered to that midpoint, with few outliers.

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. Similarly, when workers without paid leave have children who get sick, they face the choice of sending their sick child to school and potentially infecting others or, again, staying home with their child and losing pay or even their jobs. Furthermore, paid time off to care for a child has been associated with reductions in infant mortality, low birth weight, and premature birth. Therefore, paid time off, especially dedicated paid sick leave, can strengthen infection control and resilience in communities by reducing the spread of contagious diseases and bolstering workers' financial security. This is particularly important for industries and occupations that require frequent contact with the public. For example, people working in the food-service and childcare industries commonly have no paid sick leave.²⁴⁹ This often leads service employees to work throughout a bout of the flu or return to work before their symptoms have fully subsided, when one or two days off could have dramatically reduced workplace infections.^{250,251}

At a societal level, flu rates have been shown to be lower in cities and states that mandate paid sick leave.^{252,253} When employees who previously did not have access are granted paid or unpaid sick leave, rates of flu infections decreased by 10 percent.²⁵⁴

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.²⁵⁵ Lack of paid sick days can disproportionately impact lower-income workers.

In 2019, 55 percent of workers in states, on average, had 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.²⁵⁶ Connecticut (64 percent), the District of Columbia (65 percent), Oregon (63 percent), and Texas (68 percent) stood out as states where relatively high percentages of workers had such benefits, whereas fewer workers had them in Arkansas (45 percent), South Carolina (45 percent), South Dakota (44 percent), Utah (45 percent), and Wyoming (47 percent).²⁵⁷ (See Table 10.)

An important question is what policies lead to a higher percentage of workers having access to paid time off? More research is needed to fully answer this question, as no single explanation is known. For example, Connecticut and Maryland, two states in the top quadrant, have laws requiring paid sick leave.²⁵⁸ However, as of May 2019, Texas and Mississippi, also in the top quadrant (Texas ranking at the top), did not, though large cities such as Austin, Dallas, and San Antonio had enacted such requirements. Some states have a disproportionate number of employers who offer paid time off. For example, a large share of Mississippi's workforce is employed by the military or other government (federal, state and local) entities.²⁵⁹

**TABLE 10: 55 Percent of Workers, On Average,
Received Paid Time Off**
Percent of employed population with 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, ME, NC, ND, PA	51%
IN	50%
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. Data are estimated based on a survey of a sample of the general population.

Source: NHSPI analysis of data from the Annual Social and Economic Supplement of the Current Population Survey.²⁶⁰



INDICATOR 8: FLU VACCINATION RATE

KEY FINDING: Flu vaccination coverage rose for the 2018–2019 season, with a greater share of every age group analyzed receiving a vaccine. Overall, 49 percent of U.S. residents ages 6 months and older received vaccinations—still well below the overall target level of 70 percent of the population vaccinated annually.

Vaccination is the best prevention against the seasonal flu. The CDC recommends that, with few exceptions, everyone ages 6 months and older get vaccinated annually; yet, year after year, even with a steady increase among adults over the past three decades, coverage estimates indicate that less than half of Americans do.²⁶¹ *Healthy People 2020* sets federal 10-year benchmarks for improving the health of all Americans including an overall seasonal influenza vaccination-rate target of 70 percent annually.²⁶² The 2017–2018 flu season in the United States was the deadliest in nearly 40 years; it is estimated that more than 800,000 people were hospitalized, and about 61,000 people died—tragically underscoring the importance of annual vaccination.²⁶³

Vaccination is particularly important for people at high risk of severe flu-related

illnesses, including young children – especially those with special healthcare needs, pregnant women, people with certain chronic health conditions, and older adults. 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 a pandemic or disease outbreak.

Under the Affordable Care Act, all routine vaccines recommended by the Advisory Committee on Immunization Practices, including flu vaccines, are fully covered when provided by in-network providers, except in states that have not expanded their Medicaid programs in accordance with the law. Some barriers to flu vaccination may include a belief that the vaccine does



not work very well; misconceptions about the safety of the vaccine;²⁶⁴ or a belief that the flu does not carry serious risks.²⁶⁵ State laws may also make it more difficult for parents to get their children vaccinated by a pharmacist—three states do not allow children to get flu vaccines at a pharmacy and 23 states and the District of Columbia have age restrictions,²⁶⁶ while 12 states also require a physician’s prescription.

During the 2018–2019 flu season, 49 percent of residents ages 6 months or older were vaccinated, according to the CDC. This rate was up substantially from 42 percent during the 2017-2018 flu season. The CDC cautioned that the increase might be due, in part, to limitations in its data collection process.²³⁷ Another possible explanation is the increased awareness of the public, clinicians, and public health officials about the importance of vaccination due to the high number of illnesses and deaths the year prior.

Across the country, states have taken noteworthy actions. For example, during the 2018-2019 flu season, the Tennessee Department of Health organized statewide Fight Flu TN events with vaccination clinics, and this year it launched a statewide media campaign.²⁶⁷ The state’s flu vaccination rate (age 6 months or older) increased from 36.4 percent during the 2017-2018 flu season to 48.2 percent during the 2018-2019 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.²⁶⁸ Indiana’s flu vaccination rate (6 months or older) improved from 37.0 percent for the 2017-2018 flu season to 47.9 percent for the 2018-2019 season.

Rhode Island (60 percent), Massachusetts (59 percent), Maryland (57 percent), and Connecticut (57 percent) had the highest coverage, while vaccination rates were lowest in Nevada (38 percent), Wyoming (41 percent), Florida (41 percent), Louisiana (42 percent), and Mississippi (42 percent). (Data were not available for the District of Columbia or New Jersey.) (See Table 11.)

Children, particularly young children, were more likely to receive vaccinations than were adults. Nearly 63 percent of those ages 6 months to 17 years received vaccinations in 2018–2019, compared with just 45 percent of adults.²⁶⁹

TABLE 11: Less than Half of Americans Received a Seasonal Flu Vaccination
States seasonal flu vaccination rates for people ages 6 months and older, 2018–2019

State	Vaccination Rate, Ages 6 Months or Older
Rhode Island	60.4
Massachusetts	58.9
Maryland	57.1
Connecticut	56.8
North Carolina	54.9
Iowa	54.8
Virginia	54.7
South Dakota	54.4
Nebraska	54.2
Pennsylvania	54.2
Washington	53.8
Minnesota	52.7
New Hampshire	52
New York	51.9
Vermont	51.9
Colorado	51.6
Oklahoma	51.3
North Dakota	51.1
Wisconsin	50.9
Delaware	50.7
Kansas	50.7
Ohio	50.4
Hawaii	50.2
Missouri	50
New Mexico	49.9
Kentucky	49.6
Arkansas	48.8
Maine	48.8
Montana	48.7
Alabama	48.3
Oregon	48.3
Tennessee	48.2
West Virginia	48.2
Indiana	47.9
Texas	47.9
California	47.4
South Carolina	46.8
Michigan	46.1
Utah	45.9
Arizona	45.6
Illinois	45.4
Alaska	44.1
Idaho	43.6
Georgia	43.1
Mississippi	42
Louisiana	41.6
Florida	40.9
Wyoming	40.7
Nevada	37.8
District of Columbia	No data reported
New Jersey	No data reported

Note: Data are calculated from a survey sample, with a corresponding sampling error. Adult data were not publicly reported for the District of Columbia or New Jersey.

Source: Centers for Disease Control and Prevention.^{270,271}

INDICATOR 9: PATIENT SAFETY IN HOSPITALS

KEY FINDING: On average, 30 percent of hospitals received an “A” grade in the fall 2019 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.^{272,273} 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 public health emergencies that put routine quality standards to the test.

The Leapfrog Group calculates the 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.²⁷⁴ These measures are especially critical for health systems’ readiness for emergencies and outbreak prevention and control, which includes workforce training and availability, surge capacity, and infection-control practices.

In the Leapfrog Group’s fall 2019 assessment, 30 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 Wyoming receiving the top score, to a majority of hospitals doing so in Maine (59 percent), Utah (56 percent), and Virginia (56 percent). (See Table 12.)

TABLE 12: Hospital Patient Safety Scores Vary Significantly by State
States percentage of hospitals with “A” grade, fall 2019

State	Percent of Hospitals
Maine	59%
Utah	56%
Virginia	56%
Oregon	48%
North Carolina	47%
Pennsylvania	46%
Idaho	45%
New Jersey	45%
Montana	44%
Rhode Island	43%
Illinois	43%
Massachusetts	42%
Michigan	41%
Ohio	39%
Wisconsin	38%
Texas	38%
Connecticut	38%
South Carolina	37%
Florida	37%
Colorado	36%
California	35%
Tennessee	34%
Delaware	33%
Vermont	33%
Washington	33%
Mississippi	31%
Louisiana	31%
New Hampshire	31%
Missouri	28%
Kansas	27%
Nevada	26%
Arizona	26%
Kentucky	26%
Georgia	26%
Hawaii	25%
Oklahoma	25%
Minnesota	23%
Alabama	23%
Maryland	23%
District of Columbia	20%
Indiana	17%
Arkansas	14%
Nebraska	13%
New Mexico	12%
South Dakota	10%
Iowa	9%
New York	7%
West Virginia	5%
Alaska	0%
North Dakota	0%
Wyoming	0%

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

Source: The Leapfrog Group²⁷⁵

INDICATOR 10: STATE PUBLIC HEALTH LABORATORY SURGE CAPACITY

KEY FINDING: Virtually every state reported having a plan in 2019 for a six- to eight-week surge in laboratory-testing capacity to respond to an outbreak or other public health event.

Public health laboratories are essential to emergency response and effective disease surveillance systems. 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.²⁷⁶

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.”²⁷⁷ 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; personal protective equipment; and power supply.²⁷⁸

Some challenges to the effectiveness of public health laboratory preparedness include funding gaps, workforce shortages, a lack of standardized platforms to exchange data electronically, and a limited ability to detect radiological, nuclear, and chemical threats.²⁷⁹

In 2019, the District of Columbia and all states except Utah and Vermont 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 four since 2017 and 2018. (See Table 13.) This indicator tracks only the existence of a plan, not its quality or comprehensiveness, or the frequency in which it is used or tested.

TABLE 13: Nearly Every State Planned for a Laboratory Surge State public health laboratories had a plan for a six- to eight-week surge in testing capacity, 2019				
Had a Plan				No Plan
Alabama	Illinois	Montana	Rhode Island	Utah
Alaska	Indiana	Nebraska	South Carolina	Vermont
Arkansas	Iowa	Nevada	South Dakota	
Arizona	Kansas	New Hampshire	Tennessee	
California	Kentucky	New Jersey	Texas	
Colorado	Louisiana	New Mexico	Virginia	
Connecticut	Maine	New York	Washington	
Delaware	Maryland	North Carolina	West Virginia	
District of Columbia	Massachusetts	North Dakota	Wisconsin	
Florida	Michigan	Ohio	Wyoming	
Georgia	Minnesota	Oklahoma		
Hawaii	Mississippi	Oregon		
Idaho	Missouri	Pennsylvania		

Note: The last edition of Ready or Not (2019) reported on states’ plans in 2017. In 2018, Arkansas, Montana, Oregon, Utah, Vermont, and West Virginia reported that they did not have a plan for a six- to eight-week surge in testing capacity. Source: Association of Public Health Laboratories.²⁸⁰

Ready or Not 2020

Recommendations for Policy Actions

Saving lives during a disaster or disease outbreak requires a proactive approach. As public health emergencies become more frequent, it becomes more urgent for all jurisdictions to have the underlying capacity, policies and people in place to prepare for, mitigate and recover from such emergencies. Effective preparedness and response also require a multipronged, multisector approach. No single entity or agency will improve the nation's preparedness on its own: cross-sector coordination, ongoing investment, and community engagement need to be high priorities at the federal, state and local level. TFAH's policy recommendations are based on the organization's research and analysis, consultation with experts, and a review of progress and gaps in federal and state preparedness policies and programs.

TFAH offers the following recommendations for federal, state and local policymakers and other stakeholders to improve readiness:

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

Despite growing health risks from preventable outbreaks, emerging infectious diseases and extreme weather, investment in health security remains relatively stagnant. The Public Health Leadership Forum estimates a \$4.5 billion annual shortfall in the spending necessary to achieve comprehensive public health capabilities across the nation.²⁸¹ Funding for the Public Health Emergency Preparedness cooperative agreement, the main source of funding for health departments to build capabilities to effectively respond to a range of public health threats, has been

cut by over 20 percent since fiscal year 2010, adjusting for inflation.²⁸² The HPP, the only federal source of funding to help the healthcare delivery system prepare for and respond to disasters, has been cut by 46.5 percent over the same time period, after adjusting for inflation.²⁸³ Insufficient funding leads to higher public health workforce turnover and an inability to modernize to face new threats.²⁸⁴ The United States simply cannot sustain the level of preparedness its residents expect if the nation fails to adequately invest in its health security infrastructure every year.

RECOMMENDATIONS FOR FEDERAL GOVERNMENT:

- **Invest in cross-cutting public**

- health foundational capabilities and preparedness programs.**

Strong foundational capabilities would improve the protection of all communities during emergencies. However, a nationwide funding shortage prevents health departments from developing and maintaining these cross-cutting capabilities, and health departments receive very little funding that is not tied to specific diseases or categories. Congress should invest in cross-cutting public health capabilities and increase funding for specific programs that support health security, including the Public Health Emergency Preparedness cooperative agreement and the HPP. These state and local preparedness programs have demonstrated their value by saving lives, improving the speed and quality of response, and ensuring that local authorities can adequately respond to most local health emergencies and outbreaks without federal assistance.

- **Revamp public health data capabilities.**

One of the most foundational capabilities, affecting nearly every aspect of public health, is disease surveillance. Yet, some health departments are still dependent on 20th-century methods—such as phone and fax—for disease reporting.²⁸⁵ These archaic methods delay the identification of and response to outbreaks, endangering lives. A 21st-century public health data initiative is necessary to transform the systems and workforce into a state-of-the-art, secure, and fully interoperable system. Congress appropriated a down payment on data modernization in FY20 and should provide at least \$100 million in the next year to build upon these new investments to transform CDC, state, local, tribal, and territorial data systems and should increase funding for the Epidemiology and Laboratory Capacity Cooperative Agreement. Congress also directed CDC

to release a five-year budget plan: this plan should include a strategic vision and multiyear budget estimate for the funding needed to upgrade bio-surveillance capacity and interoperability, to reduce and integrate siloed surveillance systems, and to invest in state and local capacity to adapt to updated systems.

- **Accelerate crisis responses through a standing public health emergency response fund and faster supplemental funding.**

In public health emergencies, the response may overwhelm health departments and other response entities beyond existing resources, and there is often a lag between when resources are needed and the congressional approval of supplemental appropriations to provide such resources. In addition to stable core funding, the federal government needs readily available funds on hand to enable a rapid response while Congress assesses the need for supplemental funding. Congress should continue a no-year infusion of funds into the Public Health Emergency Rapid Response Fund 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 it 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. Some emergencies may also require emergency supplemental funding, as the H1N1 or Zika outbreaks did; Congress should take these public health emergencies seriously by quickly allocating supplemental funding when necessary for extraordinary events.

- **Enable efficient use of emergency funding.** Congress may allocate emergency funding following an event

to multiple federal agencies. However, differing agency policies and practices can impede the coordination of funding across agencies. This can lead to disconnected and less effective emergency responses on the ground. To prevent this inefficiency, policymakers should adopt practices that allow for braiding funding from various sources to support a single initiative or strategy at the state, community, or program level. Braided funds remain in separate and distinguishable strands for tracking purposes but can have coordinated application processes and funding cycles, jointly funded line items, and uniform reporting mechanisms. 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.

- **Demonstrate a long-term commitment to global health security.**

In September, the Global Preparedness Monitoring Board warned that the world is dangerously unprepared for a serious pandemic,²⁸⁶ and the Global Health Security Index found that none of the 195 nations assessed were fully prepared for pandemics or epidemics.²⁸⁷ The international donor community must help develop the core health security capacity of other countries to prevent and contain the threat of health emergencies. Congress should solidify America's role as a global health leader, commit to implementing the Global Health Security Strategy,²⁸⁸ and provide sustained annual funding for global health security programs across HHS, including CDC, and The U.S. Agency for International Development.

Priority Area 2: Prevent Outbreaks and Pandemics

Infectious diseases represent a threat to the health, safety, and economic and social stability of the country. A deadly pandemic could upend the nation's social fabric through lives lost and economic instability. Estimates show that pandemics are likely to cost \$6 trillion in the next century, with an expected annual loss of more than

\$60 billion for potential pandemics.²⁸⁹ And there is evidence that the threat of a global pandemic is growing due to urbanization, global travel, and environmental degradation.²⁹⁰ Yet, the nation's prevention of everyday outbreaks betrays weaknesses in the nation's defenses: seasonal influenza vaccination rates remain low, vaccine-

preventable outbreaks are becoming more frequent, and antibiotic resistance kills thousands of Americans every year. In order to save lives and prepare for the next pandemic, the United States must address preventable ongoing infectious disease threats through infrastructure, policy, and innovation.

RECOMMENDATIONS FOR FEDERAL GOVERNMENT, HEALTHCARE, AND AGRICULTURE:

- **Support the vaccine infrastructure.**

CDC's immunization program supports state and local immunization systems to increase vaccine 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. Funding has not kept up with needs as states have to spend immunization dollars to respond to outbreaks,²⁹¹ deal with increases in the numbers of residents who lack health insurance,²⁹² and attempt to manage the impact of vaccine underutilization, including HPV and flu vaccines. Congress should increase funding for CDC's immunization program, which supports state and local infrastructure, outbreak prevention, and response, as well as the seasonal influenza program. Congress should also provide needed resources to the HHS to study the causes of vaccine resistance and to educate clinical providers on methods for improving vaccine acceptance. Several legislative proposals, including the VACCINES Act²⁹³ and Lower Health Care Costs Act²⁹⁴ included such provisions in 2019 to better promote vaccine acceptance.

- **Ensure first-dollar coverage for recommended vaccines under Medicaid, Medicare, and commercial insurance.**

Public and private payers should ensure that 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.²⁹⁵ 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.²⁹⁶ 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.²⁹⁷

- **Significantly increase investments in public health initiatives to combat antimicrobial resistance.** Congress should increase funding for innovative methods of detecting and containing outbreaks supported by the Antibiotic Resistance Solutions Initiative at the CDC. CDC is investing in every state to strengthen lab capacity, track infections across healthcare systems, detect new threats and disrupt pathogens, coordinate prevention strategies, educate healthcare

providers on appropriate antibiotic use, and advocate for other innovations. These investments have already had an impact, helping contribute to an 18 percent reduction in deaths from resistant infections since 2013.²⁹⁸ However, progress varies across states. In addition, increases in funding are needed to build global capacity to prevent and detect resistant infections and combat this threat to national security.

- **Create incentives for discovery of new products to fight resistant infections.**

There should be robust public/private investment in antibiotic discovery science, diagnostics, early stage product development, and research through the Biomedical Advanced Research and Development Authority, Combating Antibiotic-Resistant Bacteria Biopharmaceutical Accelerator, and other programs. The HHS should enable additional Medicare reimbursement solutions that come closer to covering the cost of new antibiotics for patients who need them without posing hurdles for appropriate prescribing. Stakeholders, including payers, should continue to work toward decoupling antibiotic reimbursement from drug sales so that drug developers have an incentive to innovate, despite efforts to conserve antibiotics.

- **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,²⁹⁹ 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.³⁰⁰ 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.³⁰¹ 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.³⁰²

- **Modernize food safety practices and policies and work toward better coordination across agencies.** Congress and state lawmakers should devote sufficient funding to implementing

and enforcing the FDA's Food Safety Modernization Act to improve prevention and detection of outbreaks. Recent foodborne illness outbreaks have demonstrated challenges to the FDA's ability to quickly identify contaminated food products. The agency must do more to help establish effective food-product traceability systems, including guidance for the food industry.

- **Fund CDC to support state and local public health laboratories.** CDC should be sufficiently funded to support state and local public health laboratories at levels which would allow them to conduct active surveillance of foodborne pathogens; currently, the ELC grant is only funding approximately half of what is requested by laboratories and health department epidemiologists nationwide.

RECOMMENDATIONS FOR FEDERAL AND STATE GOVERNMENT:

- **Provide job-protected paid sick leave.** Earned paid sick leave is an important infection-control measure, protecting both workers and customers. Workers without earned sick leave are less likely to use preventive healthcare services, such as flu vaccinations, and workers are more likely to go to work or send their children to school when sick.³⁰³ Congress should pass a federal paid sick days law, and states should ensure effective implementation by passing paid sick days laws and/or removing preemption exemptions.

- **Provide comprehensive syringe-access programs.** Congress and states should fund comprehensive syringe-service programs, which are among the most

effective and scientifically based methods for reducing the rate of infectious diseases like Hepatitis B, Hepatitis C, and HIV.^{304,305} All states should authorize syringe-access programs and remove barriers to those programs like drug-paraphernalia laws. Experts estimate that there would be a return on investment of as much as \$7.58 for every \$1 spent on syringe-access programs due to averted HIV treatment costs.³⁰⁶

- **Minimize state vaccine exemptions for schoolchildren and 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.³⁰⁷ 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 in order to protect staff and patients, assure continuity of operations in the event of an outbreak, and achieve necessary healthcare infection control. Healthcare facilities should ensure access to vaccines for all staff and contractors and should remove barriers to staff receiving vaccines.

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 are able to recover. Addressing underlying inequities and intentionally and meaningfully engaging with the people and communities most likely to be impacted throughout the emergency planning process are critical to reducing vulnerability and

ensuring that all receive appropriate services, regardless of circumstance. Policymakers and public health officials cannot assume that preparing for the entire community means applying a uniform approach to all neighborhoods and members of the community. Some communities have taken steps to integrate principles of equity throughout public health emergency activities,³⁰⁸ but more needs to be done.



RECOMMENDATIONS FOR FEDERAL, STATE, AND LOCAL GOVERNMENT

- **Invest in policies and capacity to address the social determinants of health.** People at highest risk during disasters and those who have the hardest time recovering are often those with unstable housing, those with limited access to transportation, and those who live in low-socioeconomic-status communities.³⁰⁹ State and local emergency planners should consult tools like the Social Vulnerability Index to understand

and mitigate disparities that place some people at greater risk during disasters.³¹⁰

- **Empower communities to enhance equity and resilience before, during, and after an event.** Federal grant makers and states should ensure that grants and sub-awards reach the grassroots level and communities most in need. Such funding and technical assistance should focus

on capacity building for community-based organizations, 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 ensuring that data collection reflects social determinants and demographic factors and that data are available for all communities.

RECOMMENDATIONS FOR STATE AND LOCAL GOVERNMENT AND COMMUNITY LEADERS:

- **State and local governments should build health equity leadership and adopt strategies to incorporate equity into preparedness.** All state and local governments, including health departments, should build up internal infrastructure to drive equity, including identifying a chief health equity or health resilience officer. Health equity and emergency preparedness officials should work across programs to incorporate equity issues and goals into preparedness policies and plans;³¹¹ to improve staff capacity to understand how the legacies of discrimination, current-day racial trauma, and other structural inequities affect disaster resilience and recovery; and to collect and leverage data to identify unique community assets and advance equity before and during events.
- **Address behavioral health resource gaps and incorporate mental health first-aid and long-term behavioral health treatment into disaster response and recovery strategies.** Emergencies can exacerbate existing mental and

behavioral health concerns, disrupt access to ongoing care, increase risk for domestic violence, and cause long-term anxiety, post-traumatic stress, and other issues. Young children and people with pre-existing mental disorders are at particular risk for mental health issues following a disaster.³¹² State and local emergency and public health planners should incorporate immediate and long-term behavioral health needs into disaster plans, as required by the Pandemic and All-Hazards Preparedness and Advancing Innovation Act.³¹³

- **Ensure access to care for people at disproportionate risk.** States, insurers, and HHS should employ waivers when needed to ensure all residents who need care are able to access it following a disaster, regardless of proof of insurance or if evacuations force a resident out of network over state lines. All localities should undertake community and subpopulation risk- and asset-assessment training before an emergency happens and invest resources in communities at the

greatest risk. Additionally, localities should ensure that staffing and protocols are such that they reflect the diversity of and are relevant to the community they serve.

- **Plan with communities, not for them.** Local emergency planners must conduct meaningful engagement (such as by ensuring response teams mirror and are engaged with the community) as well as ongoing inclusion and hiring of community members (especially from communities typically at higher risk in disasters) in emergency planning. Officials should establish relationships with services and organizations that serve these populations before emergencies take place. Health departments and emergency management agencies should rely on the expertise 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.

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

Perhaps more important than any technology or invention is the presence of trained, experienced people, from

the frontline responder to the top of government. Effective crisis response requires coordination, cooperation, and

leadership—elements that governments must build and sustain over time.

RECOMMENDATIONS FOR FEDERAL GOVERNMENT:

- **The White House should ensure the success of federal preparedness strategies.** The implementation of the Pandemic and All-Hazards Preparedness and Advancing Innovation Act;³¹⁴ the National Biodefense Strategy, which directs biodefense priorities and goals for multiple agencies; and the Executive Order on Modernizing Influenza Vaccines³¹⁵ will only be successful if they are backed by adequate funding and programmatic support, meaningful stakeholder engagement, and involvement of relevant public health and related agencies. The White House should ensure senior advisors to the president have a strong background in public health and/or biodefense, and they should ensure that senior-level interagency cooperation is progressing before, during, and after public health emergencies, including through regular meetings of the Biodefense Steering Committee and Biodefense Coordination

Team.³¹⁶ The White House should release a more detailed implementation plan of the National Biodefense Strategy and the Modernizing Influenza Vaccines executive order, including assigned roles and responsibilities, milestones, opportunities for stakeholder feedback, and an integrated biodefense budget.^{317,318}

- **HHS, the CDC, the Office of the Assistant Secretary for Preparedness and Response (ASPR), DHS, and FEMA should clarify roles and address gaps within the government's emergency support functions.** HHS and DHS agencies should continue to clarify roles and responsibilities to improve the efficiency and effectiveness of responses and to ensure no community or population group falls through the cracks during a response. The ASPR and the CDC should coordinate and align their preparedness and response activities, including by communicating effectively with stakeholders about

roles and guidance, engaging with private-sector and volunteer organizations, maintaining systems and policies that are working well, avoiding duplicative efforts, and keeping experts connected to key functions.

- **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 such a workforce, including one with experience in public health informatics, laboratory science and epidemiology. Governments should also fund investment in workforce development and retention programs, such as student loan repayment and other incentives. Public health schools should incorporate health equity and cultural competency into their preparedness curricula.

RECOMMENDATION FOR STATE GOVERNMENT:

- **Update personnel policies to allow for expedited emergency responses.** State policymakers should review and update hiring policies to facilitate the rapid hiring of emergency response workers when a disaster strikes.



egdigital

Priority Area 5: Accelerate Development and Distribution of Medical Countermeasures

An effective medical countermeasure (MCM) enterprise 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. The short time window for responding to many public health threats—such as an anthrax attack—demonstrates the urgency of the right-product/right-time equation. The nation must reinforce the discovery of new products, including novel vaccines, antibiotics, and diagnostics, and be accompanied by the development, practice with and maintenance of appropriate distribution and dispensing capabilities.



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 would offer more certainty to the biotechnology industry and researchers and would strengthen public-private partnerships. The United States should grow its investment in innovative, flexible technologies and capabilities that will enable faster production of products for a range of biothreats.³¹⁹
- **Evaluate and ensure success of the Public Health Emergency Medical Countermeasures Enterprise and the Strategic National Stockpile operations.** The Pandemic and All-Hazards Preparedness and Advancing Innovation Act codified the Public Health Emergency Medical Countermeasures Enterprise,³²⁰ and administration of the Strategic National Stockpile moved from the CDC to

the ASPR in 2018.³²¹ As HHS formalizes these transitions, the agency must strive to improve the programs by evaluating the impact of the transition of Strategic National Stockpile on procurement, replenishment, efficiencies of contracts, and state and local MCM capabilities; enabling regular input of state and local public health officials, as required by the Pandemic and All-Hazards Preparedness and Advancing Innovation Act, as well as the input of private-sector supply-chain partners into the Public Health Emergency Medical Countermeasures Enterprise process; aligning with CDC's support of state and local MCM dispensing capabilities; improving transparency with state, local, tribal, and territorial partners; clarifying roles between the CDC and the ASPR in day-to-day activities and incident response; avoiding administrative duplication and delay; and restoring necessary funding and staff to the CDC that were lost due to the transition.

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

- **Prioritize the distribution and**

dispensing of MCMs. It is important that MCMs reach the right person at the right time during emergencies, but gaps remain if a mass vaccination or dispensing were needed, according to the CDC's MCM Operational Readiness Review.^{322,323} The HHS and 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. The CDC and ASPR should continue to assess and improve the training of state and local personnel to ensure well-coordinated MCMs deployments from the Strategic National Stockpile and from the private sector, as recommended by the Bipartisan Commission on Biodefense.³²⁴

- **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 and local and tribal partners to develop standardized guidance for dispensing MCMs to

children, older adults, people with disabilities, and people who are homebound. Officials should also take additional target groups, such as pregnant and postpartum women and infants, into consideration. Guidance should include dosing instructions for those who cannot swallow pills. And HHS and state, local, tribal, and territorial 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

A major shortfall persists in the nation's healthcare readiness, especially medical surge capacity, for the tremendous number of patients likely to result from a pandemic or other large-scale biological event. The NHSPI has consistently found that healthcare delivery readiness scores are in the lowest levels among preparedness domains measured, with little progress in the past five years.³²⁵ Recent events—like lives lost in a nursing facility following Hurricane Irma,³²⁶ the need for extensive federal medical response during Hurricanes Irma and Maria,³²⁷ and the surge of patients from seasonal flu in 2018³²⁸—have illustrated that much remains to be done to prepare the healthcare system for ongoing scenarios, let alone a major event.

A gap analysis by the Center for Health Security concluded that the United States is fairly well prepared for small-scale events, but less well prepared for large-scale and complex disasters, such as mass shootings, and poorly prepared for catastrophic health events, such as severe pandemics.³²⁹ Existing programs—such as the HPP and the CMS Preparedness Rule—have created preparedness structures that would not have otherwise been built, but many states have not provided enough incentive to create true engagement of healthcare leadership, surge capacity and training, cooperation across the healthcare systems and across the spectrum of providers, and collaboration and integration of the



healthcare system with emergency response. Many emergency departments see shortages of critical medicines on a day-to-day basis and report that they are not fully prepared for a disaster or mass-casualty incident.³³⁰ Some emergency preparedness entities, including healthcare coalitions and public health departments, lack situational awareness of the healthcare delivery system in a disaster, and states and territories continue to depend on federal assets such as the National Disaster Medical System during disasters, rather than building mutual support within a region. Policymakers need to strengthen existing systems and consider long-term mechanisms to create sustainable healthcare readiness.

RECOMMENDATIONS FOR FEDERAL GOVERNMENT AND HEALTHCARE:

- **Strengthen the HPP.** In the near term, Congress and HHS should reinforce the HPP to build strong healthcare coalitions capable of engaging and supporting members during disaster responses. These models help ensure members have the equipment, supplies, information, and personnel to respond to disasters and the federal government must support them. Congress must provide more robust annual funding—which it has cut in half over the past decade. HHS and awardees should ensure healthcare leaders take the lead on HPP planning and implementation to the extent possible, with support and coordination from public health, emergency management, and others, and 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. Congress should provide additional funding for a tiered regional disaster system to coordinate across coalitions and states, as authorized by the Pandemic and All-Hazards Preparedness and Advancing Innovation Act,³³¹ to map specialized disaster care (such as burn or pediatric care) across the country and to leverage those assets in a coordinated way.³³² Additional funding is also needed to sustain progress made in establishing Ebola and other high consequence pathogen treatment centers and training.³³³

- **Strengthen CMS Preparedness Standards and improve transparency.** An external review by the Government Accountability Office or a similar entity should assess how CMS preparedness standards have affected overall healthcare readiness, and HHS should begin tracking progress on preparedness

measures over time. CMS should also strengthen preparedness standards by adding medical surge capacity and other capabilities, stratified by facility type, as a necessary requirement within the next iteration of the rule.³³⁴

- **Create incentives and ramifications to build sustainable preparedness and surge capacity across healthcare systems.** In a serious large-scale event, such as a pandemic, there will likely be shortages of beds, healthcare personnel, and equipment, requiring cooperation among healthcare entities, across systems, and across geographic borders. Although there has been progress in developing healthcare coalitions in many regions and 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.³³⁵ In addition to strengthening healthcare preparedness grants and CMS standards, Congress and HHS should consider long-term sustainability for building healthcare readiness across the system, including meaningful incentives and disincentives:

- 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.³³⁶
- Payment incentives could sustain preparedness, surge capacity, regional disaster partnerships, and reward facilities that maintain specialized disaster care.

RECOMMENDATIONS FOR STATE GOVERNMENT AND HEALTHCARE:

- **Integrate healthcare delivery into emergency preparedness and response.** States should remove barriers to participation of the healthcare sector in emergency 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.
- **Strengthen state policies regarding disaster healthcare delivery.** States should review credentialing standards to ensure healthcare facilities can receive 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,³³⁷ the Uniform Emergency Volunteer Health Practitioners Act,³³⁸ emergency prescription refill laws and protocols, and implementation and education of providers regarding crisis standards of care guidelines.^{339,340} Governors should work with public health officials to incorporate public health considerations and messaging into all emergency declarations, including clarification of emergency waivers around healthcare.

Priority Area 7: Prepare for Environmental Threats and Extreme Weather

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. Increasingly, states have found that unsafe water³⁴¹ and changes in disease vectors, such as mosquitos,³⁴² require emergency response capacity. At the same time, climate impacts on health—including extreme weather events, flooding, droughts, and food-, water-, and vector-borne diseases—are growing.³⁴³ Climate change can exacerbate health disparities and intensify threats. Environmental hazards impact communities differently, with people living in poverty, people of color, people with underlying health conditions, and children and older people at particular risk.³⁴⁴



RECOMMENDATIONS FOR FEDERAL AND STATE GOVERNMENT:

- **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 2008.³⁴⁵ Climate-informed health interventions include identifying likely climate impacts, potential health effects associated with these impacts, and the most at-risk populations and locations.³⁴⁶ 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.** All states should include water security and sewage removal in their preparedness plans, and they should build relationships between 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. Measures to protect a safe water supply include: addressing the ongoing problem of lead, per- and polyfluoroalkyl substances, and other toxins in drinking water, and taking steps, such as those in the EPA's Clean Water Rule, to reduce the potential for waterborne illnesses and to increase protection against potential acts of biological and chemical terrorism on America's drinking and agricultural water.

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.

Ready or Not 2020

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](#).³⁴⁷

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 into the NHSPI and that most closely meet TFAH's criteria. There is one exception: a measure of state public health funding-level trends, which the NHSPI does not track.

TFAH wishes to more directly track readiness for extreme weather, which nearly all experts expect to worsen and become more frequent due to global climate change. *Ready or Not* did not include such a measure this year, but TFAH expects to release a separate report in 2020, in partnership with Johns Hopkins University, that addresses these issues in depth.



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 2019 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 used states' publicly available funding documents. With assistance from the Association of State and Territorial Health Officials, TFAH provided data to states for review and verification. 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 fiscal year 2018.) 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 performance across the 10 indicators, and beginning in 2019, 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.
 - At the mean, or 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.
 - At the mean, or 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.
 - At the mean, or 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.
- At the mean, or 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.

Flu vaccination data for the 2018–2019 season were not available for the District of Columbia or New Jersey. TFAH imputed their scores by comparing their average rates from 2010–2011 to 2016–2017 (District of Columbia) or 2017–2018 (New Jersey) with the average vaccination rate over that period in the 50 states and the District of Columbia.

- 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.
- At the mean, or 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 18th-highest and 34th-highest in the middle tier. TFAH placed states whose scores ranked between 35th-highest and 51st-highest in the low-performance tier. (Ties in states’ scores prevented an even distribution across the tiers.)

This year, states in the high tier had scores ranging from 5.75 to 6.75; states in the middle tier had scores ranging from 5.25 to 5.5; and states in the low tier had scores ranking from 3.5 to 5.

Assuring data quality

Several rigorous phases of quality assurance were conducted 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, respondents were contacted and given the opportunity to complete or correct their funding data.

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