

The National Health Security Preparedness Index

Summary of Key Findings

May 2019

PREPARED ✓
NATIONAL HEALTH SECURITY PREPAREDNESS INDEX


Robert Wood Johnson
Foundation

The United States experienced one of its most active and expensive years for disasters and emergency events in 2018, with total economic damages exceeding \$91 billion.¹ For an eighth consecutive year, Americans endured more than seven high-consequence natural disasters during the year that exceeded \$1 billion each. Hurricanes, storms, floods, fires, and extreme temperatures touched every region of the country. California's wildfires contributed to record losses from fire in 2018, totaling more than \$24 billion. Beyond natural disasters, the U.S. faced myriad other hazardous events in 2018, including widespread outbreaks of hepatitis A, surging numbers of measles cases, a continuing epidemic of opioid overdose deaths, and tragic episodes of community violence at schools, churches, and other public spaces. The nation's health security enterprise mobilized repeatedly to reduce the incidence of disease, injury, and death in the face of these and many other hazardous events.

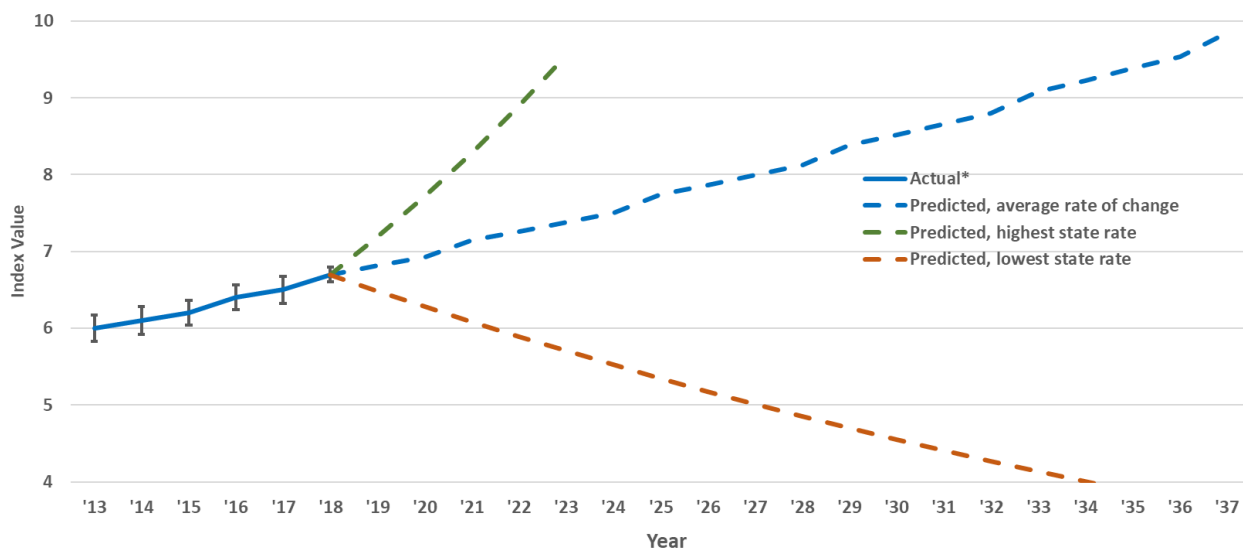
Rising Threats to Health Security

Health security is a condition in which the nation and its people are prepared for, protected from, and resilient to events that can adversely impact health status.² Hazardous events are unpredictable as to their location, timing, intensity, and geographic reach. For this reason, protections need to be available 'everywhere' in order to prevent disease and injury 'anywhere.'³ Many health security threats are increasing in frequency and intensity in the United States and globally due to a combination of factors:⁴

- Extreme weather events including storms, fires, floods, droughts, and temperature extremes
- Newly emerging and resurgent infectious diseases like Zika, MERS, and Ebola
- Growing antibiotic resistance among infectious agents
- Incomplete vaccination coverage
- Globalization in travel and trade patterns
- Political instability, violence, and terrorism risks
- Aging infrastructure for transportation, housing, food, water, and energy systems
- Cybersecurity vulnerabilities

Results from the 2019 release of the **National Health Security Preparedness Index** indicate that readiness for disasters, disease outbreaks, and other emergencies continued to improve in 2018, but current levels of health security remain far from optimal. The national Index reached 6.7 out of 10 in 2018, representing a 3.1 percent improvement over the prior year and a 11.7 percent improvement since 2013. Large differences in health security persisted across states and regions, with clusters of states in the South-Central, Upper Mountain West, Pacific Coast, and Midwest regions lagging significantly behind the rest of the nation. If current trends continue, the average state will require six additional years to reach health security levels currently found in the best-prepared states, and at least 10 more years to reach a strong health security level of at least 9.0 out of 10. Growth in the frequency and intensity of health security threats may outpace growth in the nation's health security protections in the years to come, resulting in greater risks to population health.

1 National health security improved consistently during 2013-2018, but at a modest rate of about 3 percent per year. At this pace, the United States will require at least 10 years to achieve a strong health security level of at least 9.0.



NOTE: Vertical lines indicate confidence intervals. *Five-year trend is statistically significant.

The Index tracks the nation’s progress in preparing for, responding to, and recovering from the health consequences of disasters, disease outbreaks, and other large-scale emergencies. Because health security is a responsibility shared by many different stakeholders in government and society, the Index combines measures from more than 60 sources and multiple perspectives to offer a broad view of protection.⁵ Aggregating large volumes of data from national household surveys, medical records, safety inspection results, and surveys of health agencies and facilities, the Index produces composite measures of health security for each U.S. state and the nation as a whole. The Index reveals strengths as well as vulnerabilities in the protections needed to keep people safe and healthy in the face of emergencies, and it tracks how these protections vary across the United States and change over time.

Key Findings

■ **Consistent Gains Across the United States:** The United States posted a sixth consecutive year of gains in health security nationally, with the Index reaching its highest level of 6.7 out of 10 in 2018 (**Figure 1**). This result represents a 3.1 percent improvement from 2017, and a 11.7 percent improvement from 2013. Health security improved in a total of 32 states and the District of Columbia in 2018, while it declined in four states and remained unchanged in 14 states.

■ **The Pace of Improvement Remains Modest:** The national Index increased by two percentage points in 2018 from the prior year (3.1%), and by seven percentage points since 2013 (11.7%). At this pace, the United States as a whole will require six additional years to reach the health security level enjoyed in the strongest state (Massachusetts’ 7.4 Index value), and at least 10 additional years to achieve a health security level of 9.0 out of 10. If the United States could achieve rates of improvement experienced in the fastest-improving states, national health security could reach a level of 9.0 in as few as six years (**Figure 1**). Conversely, if national rates regress to the negative rates of change observed among the lowest states, national health security could fall to its lowest level on record by 2022.

■ **Inequities in Protection Persist:** The nation’s health protections are not distributed evenly across the United States, with a gap of 25 percent in Index values of the highest and lowest states in 2018. States in the South-Central, Upper Mountain West, Pacific Coast, and Midwest regions experienced significantly lower health security levels and smaller gains in health security over time compared to their counterparts in other regions (**Figure 2**). These below-average regions contain disproportionate numbers of low and moderate income residents and rural residents who have fewer personal and community resources to draw upon in the event of an emergency. State inequities in preparedness were largest in the Community Planning and Engagement domain, where

What the Index Measures

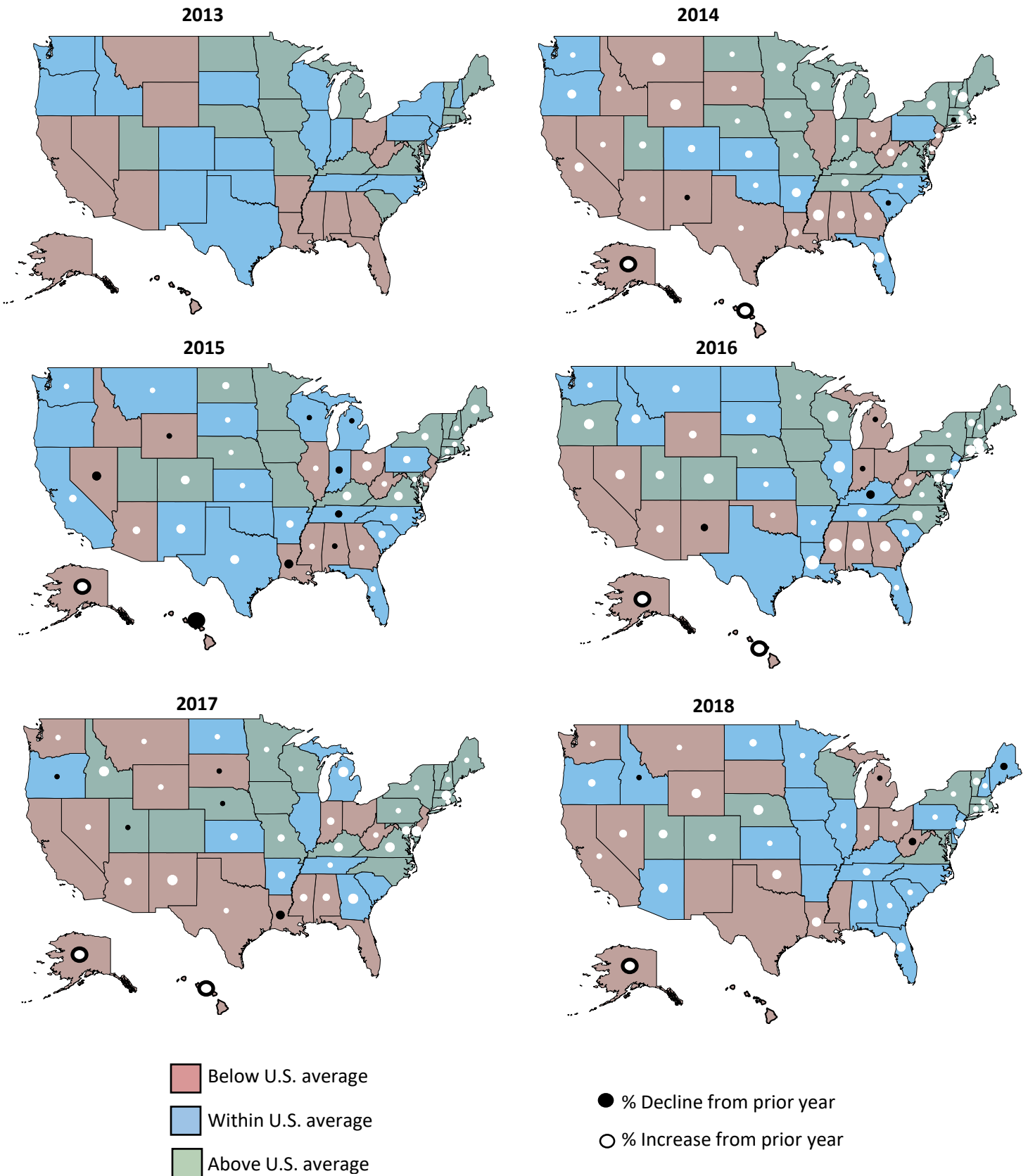
The Index includes 129 measures grouped into six broad domains of health security:

- **Health Security Surveillance:** detecting and monitoring health threats and identifying where hazards start and spread so that they can be contained rapidly;
- **Community Planning and Engagement:** maintaining supportive relationships among government agencies, community organizations, and individual households; and developing shared plans for responding to hazards;
- **Information and Incident Management:** deploying people, supplies, money, and information to the locations where they are most effective in protecting health and safety;
- **Healthcare Delivery:** ensuring access to high-quality medical services across the continuum of care during and after emergencies;
- **Countermeasure Management:** storing and deploying medical and pharmaceutical products that protect against diseases and toxic agents, including vaccines, prescription drugs, masks, gloves, and medical equipment;
- **Environmental and Occupational Health:** maintaining the security and safety of water and food supplies, testing for hazards and contaminants in the environment, and protecting workers and emergency responders from hazards while on the job.

What It Does Not Measure

The Index does not characterize the performance of individual state or local public health preparedness programs, health care preparedness programs, or other sector-specific initiatives. It measures **collective impact** in health security across multiple sectors.

2 | Geographic disparities in health security have become more pronounced over time. States in the South-Central, Upper Mountain West, Midwest, and Pacific Coast lag behind other regions.

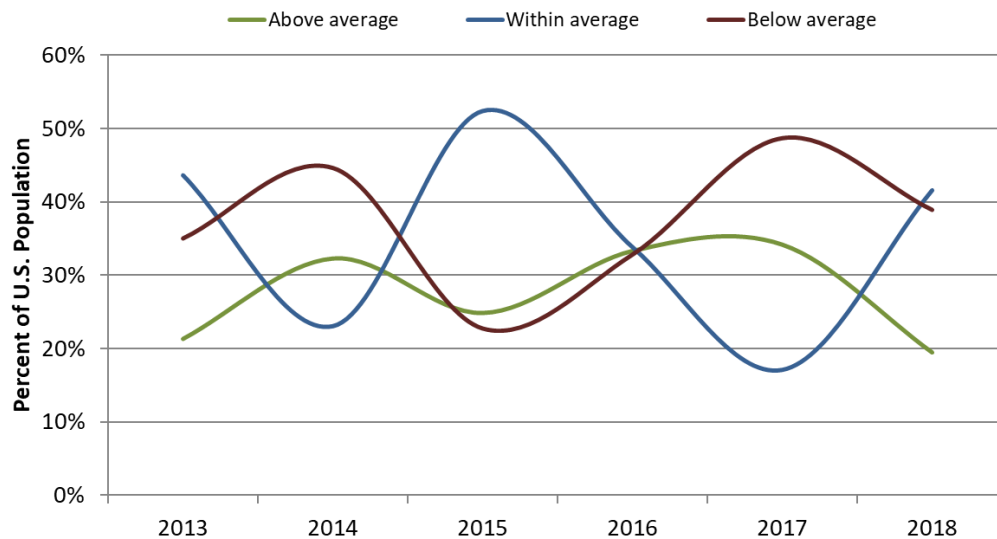


the leading state achieved a preparedness level nearly two times higher than the lowest state in 2018. Gaps between the highest and lowest states also approached a two-fold difference in the Countermeasure Management domain. Large differences in health security across states weaken the nation as a whole by limiting the ability of state, federal, and local stakeholders to work together and share information and resources, a function known as interoperability. These gaps are particularly troubling because they leave some communities more vulnerable to disasters and emergencies than others, contributing to inequities in population health and well-being. The Index results suggest a need for sustained national efforts focused not only on improving health security levels overall but also on closing gaps in preparedness across states and communities.

■ **Regional Clusters Become More Pronounced:** States that fall below the national average in health security levels generally share a border with other below-average states, and this geographic pattern continued in 2018 as Michigan joined neighboring states Ohio and Indiana in falling below the national average (**Figure 2**). Florida and Alabama moved from below-average to within-average in 2018, converging with the health security levels in neighboring states Georgia and Tennessee. Clusters of below-average states exist in the South-Central, Upper Mountain West, Pacific Coast, and Midwest regions. Above-average states cluster in the Northeast, Mid-Atlantic, Upper Midwest, and Central Rocky Mountain regions. Utah is now the only state west of the Continental Divide with above-average health security levels, while Virginia is the southern-most state with above-average levels. Geographic clustering of health security levels creates challenges for the nation by making it more difficult for states to offer mutual aid and assistance to neighboring jurisdictions when hazardous events occur. Above-average states have become more geographically isolated from below-average states over the past six years, complicating the task of mutual aid.

A total of 11 states and the District of Columbia had health security levels that were significantly above the national average in 2018, down from 22 jurisdictions a year earlier. Conversely, 17 states had health security levels that fell significantly below the national average, down from 20 states in 2017. (**Figure 2**).

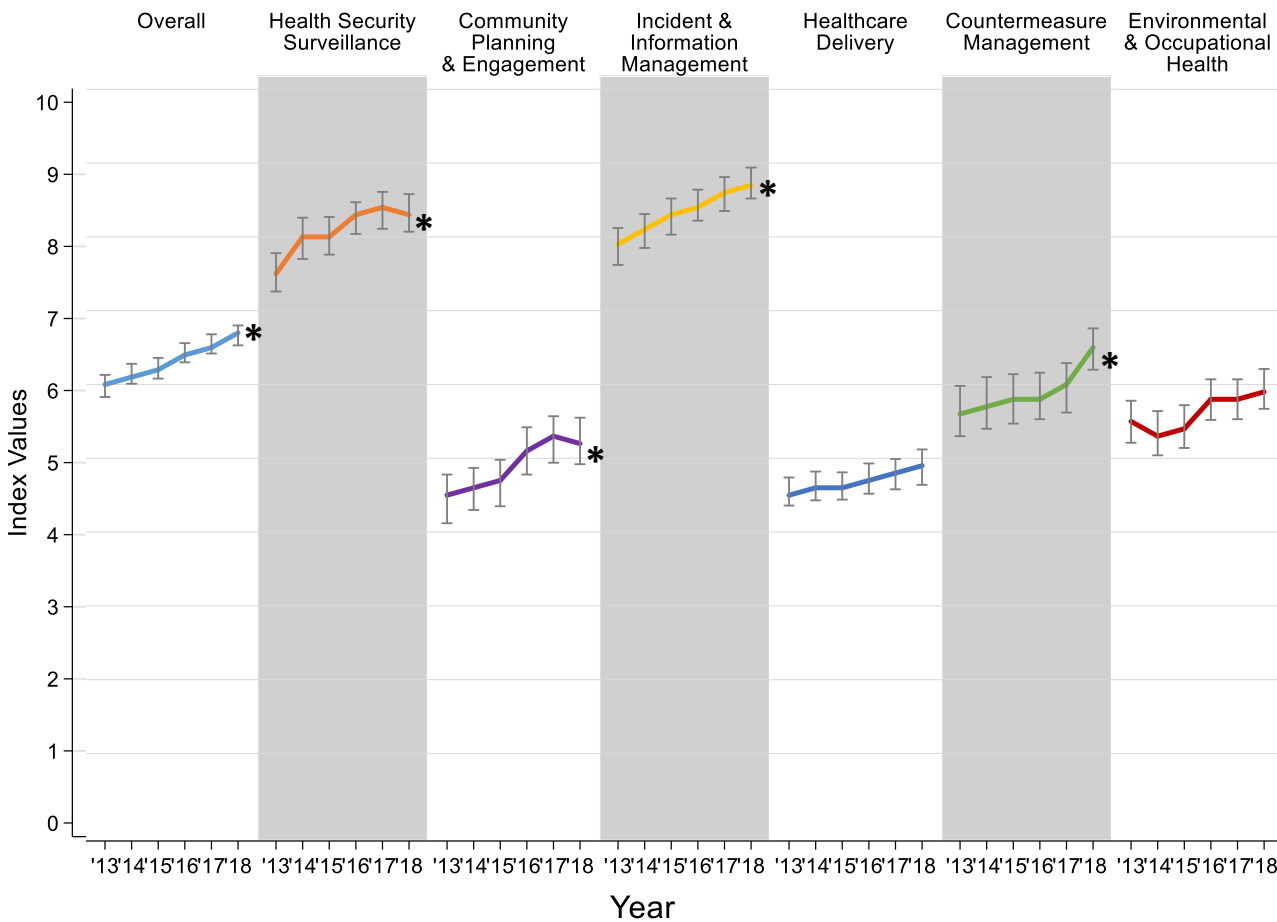
3 | The proportion of U.S. residents living in states with below-average health security declined in 2018, falling below the proportion of residents living in states with average health security.



■ **Fewer Americans Reside in Areas with Below-Average Protections:** 39 percent of the U.S. population resided in states with below-average health security levels in 2018, down from 49 percent a year earlier (**Figure 3**). Several states achieved relatively large gains in 2018 that moved them from below-average to within the U.S. average, including New Jersey, Florida, Arizona, and Alabama. (**Figure 2**). The proportion of the population living in states with above-average health security also fell in 2018, to 19 percent from 34 percent a year earlier, as a number of states moved from above-average to average levels, including North Carolina, Kentucky, Pennsylvania, Minnesota, and Iowa.

■ **Improvements Occurred in Many Different Domains of Activity:** Health security levels improved by a statistically-significant amount since 2013 in four of the six domains measured in the Index: Health Security Surveillance, Community Planning and Engagement, Incident and Information Management, and Countermeasure Management. For the two remaining domains of Healthcare Delivery and Environmental Health, health security trended upward in recent years but the trends were not large enough to be considered statistically significant. (Figure 4).

4 Health security trended upward in most domains during 2013-2018, particularly in community engagement, surveillance, and incident management.



■ **Capabilities in Distributing Supplies and Equipment Showed the Largest Gains:** The largest one-year gain in health security occurred in the Countermeasure Management domain, which rose by 8.3 percent in 2018 to reach a national average of 6.5. The activities measured in this domain focus on distributing protective supplies and equipment to the people and places that experience hazardous events. Since 2013, health security has improved by 16.1 percent in this domain. (Figure 4)

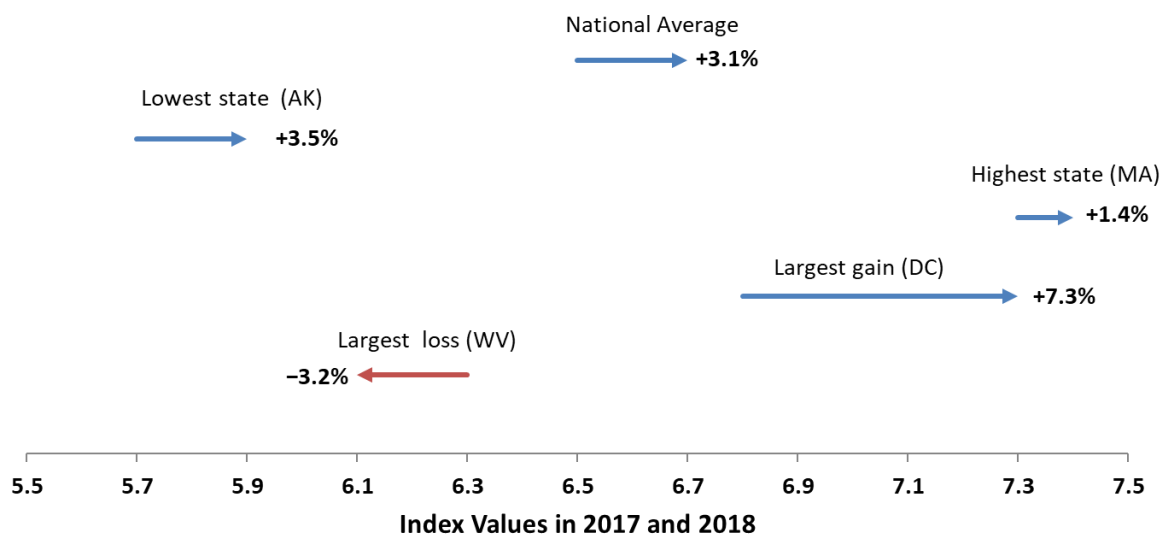
■ **A Downturn in Community Engagement Follows Large Gains in Previous Years:** Over the entire study period, the largest gains in health security occurred in the Community Planning and Engagement domain, which increased by 17.8% between 2013 and 2017 to reach a national average of 5.3. However, performance in this domain declined moderately in 2018 to 5.2. Relationships that connect people and organizations together make communities more resilient to disasters and can accelerate recovery after events occur. Historically, the United States experienced difficulties in developing supportive relationships among government agencies, community organizations, and individual residents and in engaging these stakeholders in planning for emergencies. This domain stood out as the nation’s weakest area of preparedness in the first Index released in 2013, but it improved by more than any other domain monitored in the Index through 2017 (Figure 4). The recent decline in this domain may provide an early warning about challenges that could spread to other areas of health security, because community engagement generates resources and expertise that are utilized in other domains of health security.

■ **Managing the Acute Phases of Emergencies Remains the Nation’s Core Strength:** Health security levels remained highest in the Incident and Information Management domain, which reflects the ability to follow a standardized approach in managing the acute phases of response to emergency events. Strong incident management can lead to faster response times, fewer errors, and more efficient use of resources when emergencies occur. Health security in this domain reached 8.7 in 2018, significantly higher than any other domain monitored in the Index and 1.2 percent higher than the prior year (**Figure 4**). These results reflect more than a decade of national focus on training government agencies, health professionals, and community leaders in the incident command process and in practicing these skills regularly through exercises, drills, and real events. Activities in this domain have improved by 10.1 percent since 2013.

■ **Health Care Preparedness Lags Behind but Shows Signs of Progress:** Health security levels remained lowest in the *Healthcare Delivery* domain, which reflects the ability of health care professionals and facilities to maintain high-quality medical care during and after emergency events. Health security in this domain remained flat during 2013-15 but trended up moderately by 6.5 percent since then, reaching a national average of 4.9 in 2018. (**Figure 4**)

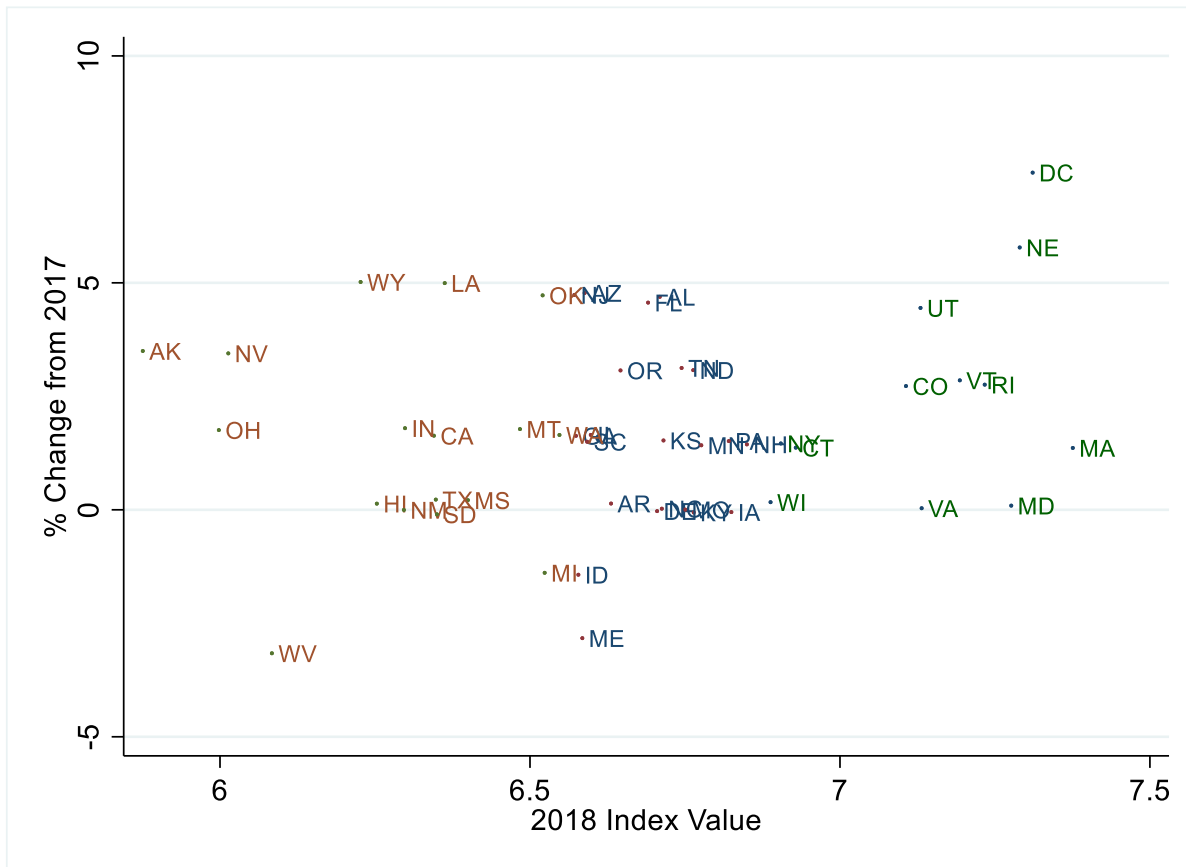
■ **Environmental Health Protections Continue to Gain Strength:** Measures in the Environmental and Occupational Health domain trended downward in 2013-14, but since then these activities collectively have posted four consecutive years of modest improvements (**Figure 4**). These measures reflect the nation’s ability to detect and correct risks in food, water, air, soil, and core infrastructure, while protecting the health and safety of workers and first responders when hazardous events occur. Continued improvements in this domain are needed to address future risks associated with climate change.

5 | Gains in state health security far surpassed losses between 2017 and 2018. Alaska’s gains moved it closer to the national average, while DC vaulted into to the top tier of states.



■ **State Gains in Health Security Far Exceed Losses:** Overall, gains in health security far surpassed losses among states between 2017 and 2018, indicating that many stakeholders found ways to improve their operations and respond to emerging hazards despite ongoing resource constraints (**Figure 5**). The District of Columbia experienced the largest one-year increase in health security at 7.3 percent, while the largest decline in health security during this period was only -3.2 percent in West Virginia. A total of 32 states and the District of Columbia experienced gains in health security in 2018, while only four states experienced losses (**Figure 6**). States experiencing the largest gains in health security were distributed relatively evenly across the United States and included states that both lead and trail the nation in overall levels of security. These results demonstrate that improvements are possible in many different circumstances, including states that have already acquired robust health security capabilities as well as states that have many unmet needs.

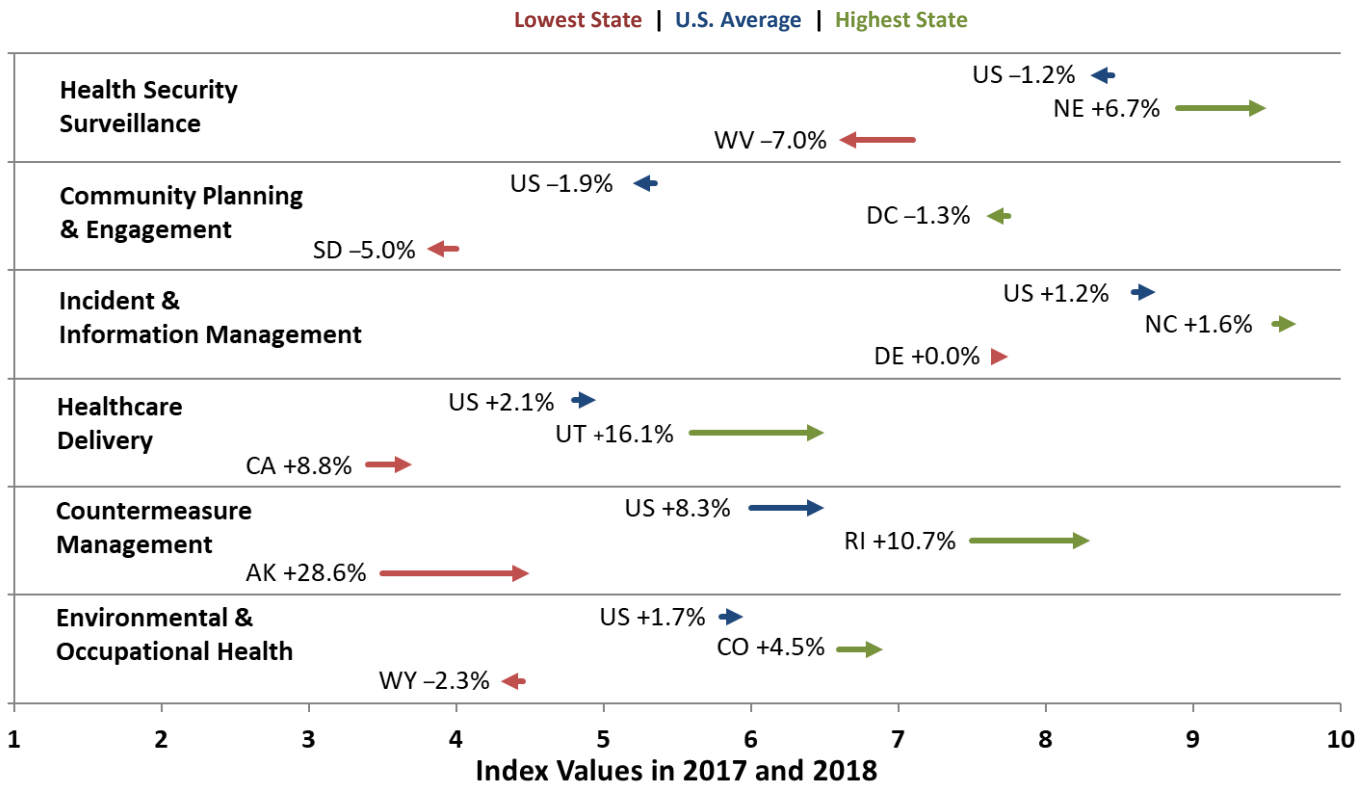
6 Improvements in health security occurred throughout the United States, including in states that both lead and trail the national average. However, four states lost ground in 2018.



Areas of Declining and Stagnant Health Security Require Attention: A total of 18 states experienced stagnant or declining levels of health security between 2017 and 2018, even as the nation as a whole gained strength (Figure 6). Seven of these states also fall below the national average level of health security, indicating that they are falling further behind over time. With the exception of Hawaii, these states are located in interior regions of the U.S., and most have large rural populations. Fortunately, each of these challenged states is located in proximity to similar states that have leading and/or improving levels of health security, suggesting possibilities for overcoming regional difficulties through peer learning and cooperation. Stakeholders in West Virginia and Kentucky, for example, have fellow Appalachian states Tennessee, Virginia, and Maryland as strong regional partners, while Texas and New Mexico have neighboring states like Oklahoma and Arizona as sources of support.

Many other states failed to make progress in specific domains such as Healthcare Delivery and Environmental Health, even when they achieved improvements in other domains. The direction and magnitude of change in health security varied widely across states and domains (Figure 7), indicating a need for heightened attention to specific geographic areas and functional capabilities that show signs of vulnerability. Because each state’s portfolio of strengths and weaknesses is relatively unique, individual states need to develop tailored approaches to health security priority-setting and improvement. The Index is a tool that states can use to identify and prioritize areas for improvement.

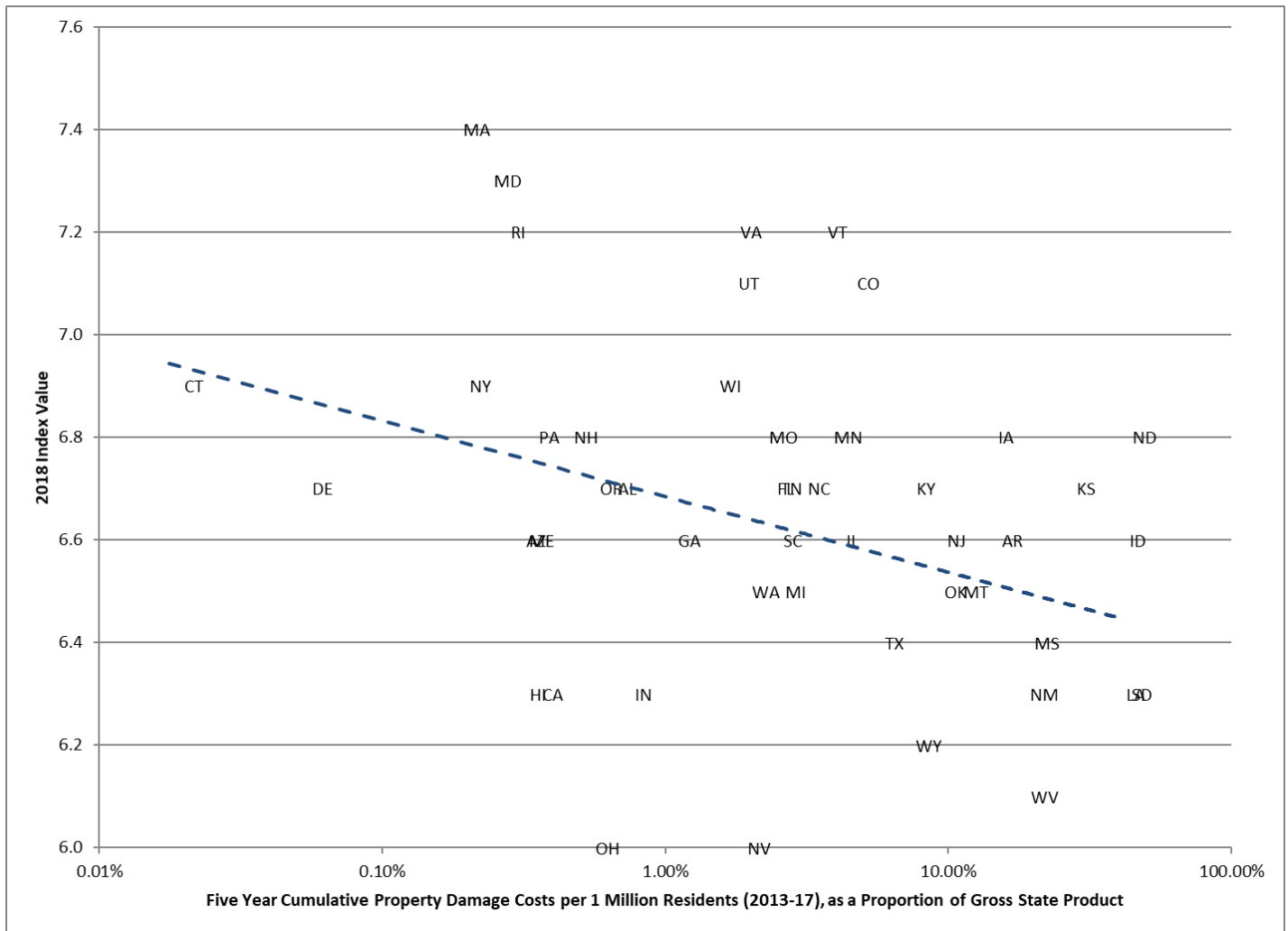
7 Changes in health security levels between 2017 and 2018 varied widely across states and domains. Alaska, Utah, and Rhode Island experienced large gains in selected domains.



■ **Geographic Disparities Widen in Surveillance, Health Care, and Environmental Health:** Differences in health security between leading and trailing states became more pronounced in several domains between 2017 and 2018 (**Figure 7**). For surveillance activities, the top state of Nebraska improved by 6.7 percent, while the lowest state of West Virginia declined by 7.0 percent, bringing the national average down by 1.2 percent. For healthcare delivery activities, the leading state of Utah improved by almost twice as much as the trailing state of California. The gap between leading and trailing states also grew in environmental health, as Colorado improved by 4.5 percent while Wyoming declined by 2.3 percent. Conversely, the health security gap declined significantly for countermeasure management, driven by Alaska’s large gain of 28.6 percent, pushing the national average higher by 8.3 percent.



8 | The costs of disasters vary widely across states, as a share of total state economic activity. States that incur higher economic costs show lower levels of health security.



■ **Economic Losses Linked to Lower Health Security Levels:** States that experienced higher economic losses from past disasters showed lower overall levels of health security in 2018 (**Figure 8**). The reasons for this relationship are not fully understood, but research demonstrates that disasters can dampen subsequent economic activity in local communities, potentially constraining the public and private resources available to invest in future health security capabilities.⁶ Resources received during post-disaster periods may be allocated primarily for recovery needs, rather than being invested in preparing for future hazardous events. These findings suggest that states and regions incurring large disaster-related economic losses may require targeted assistance to improve health security capabilities, alongside the assistance provided for recovery activities.

Implications for Policy and Practice

The nation's health protections have grown significantly stronger over time, generating six consecutive years of improvement. These gains occurred during a period of constrained government resources, more frequent and costly hazardous events, and many competing priorities and uncertainties within the U.S. health system. This analysis cannot support definitive conclusions about the reasons for these improvements, but contributing factors are likely to include an updated National Health Security Strategy, clearly defined capabilities for key sectors involved in health security and preparedness, community-engaged planning and protocol development, and regular testing of plans and protocols through exercises, drills, and responses to real events. Health security professionals are well positioned to learn from and build upon the successes achieved over the past six years.

Unfortunately, the gains achieved to date are not sufficient to keep all communities safe and healthy in the face of rising risks of disasters and emergencies. Health security is improving at a relatively slow and uneven pace across the United States, leaving large segments of the American population under-protected. Several states are losing strength in health security, and many others are failing to keep pace with advances in policy and practice. Closing current gaps and inequities in health security will require new and more coordinated actions by government and the private sector, particularly given the likelihood of continued growth in the frequency and intensity of hazardous events.

Stakeholders involved in the policy and practice of health security should consider a number of strategies for accelerating the pace of progress. The Trust for America's Health recently produced the **2019 Ready or Not** report that articulates a series of priorities and recommendations for strengthening the nation's preparedness for public health emergencies.³ This report focuses on a subset of 10 priority indicators from the National Health Security Preparedness Index that are rated as highly important and highly actionable by health security and preparedness professionals across the U.S. In the sections below, we describe several strategies for improving health security based on the recommendations of the *Ready or Not* report and the full constellation of measures included in the 2019 release of the Index:

■ **Maintain and Enhance Multi-Sector Networks and Coalitions:** Multi-sector networks and coalitions focused on health and social issues are growing steadily across the United States, including health care preparedness coalitions that specialize in health security issues.⁹ This growth has contributed to rising Index values over time, but the recent decline in Index measures related to Community Engagement and Planning indicate that greater attention is needed to maintain and expand network capabilities in health security. Many community networks that have formed outside the preparedness field lack awareness about health security needs in their communities and lack knowledge about strategies for building health security through community collaboration. Research demonstrates these multi-sector networks have profound effects on population health status over time.¹⁰ Health security professionals should work to connect disparate networks and focus their activities on improving health security in geographic and functional areas where gaps and disparities exist. Multi-sector networks are uniquely positioned to leverage existing resources and expertise available in the public and private sectors.

■ **Develop and Promote Multi-Sector Leadership Capabilities:** Using a broad constellation of metrics, the Index demonstrates that many different sectors contribute to health security at state and national levels. Key sectors include public health, medical care, emergency management, public safety, nonprofit and voluntary organizations, businesses, the faith community, and others. Due to this complexity, even seasoned professionals may not be fully aware of health security resources and needs that lie outside their immediate control and responsibility. For these reasons, every state and community needs individuals who are empowered to monitor the **health security enterprise as a whole** and to convene, mobilize, and coordinate collective actions across the public and private sectors that strengthen this enterprise. The **chief strategist role** for a state or community requires strong leadership and communication skills, savvy political awareness, entrepreneurial instincts, and systems thinking. These skills are particularly central to the capability of Community Preparedness as defined in the national Public Health Preparedness Capabilities developed by the U.S.

Centers for Disease Control and Prevention.¹¹ State and federal stakeholders should work together to develop training, mentoring, and career development opportunities that focus on establishing and enhancing this role in every state and community across the United States

■ **Enhance Data Sources, Information Systems, and Metrics:** The Index uses the best available data sources and measures to characterize health security levels across the United States, but many gaps in data and measurement exist. Most existing data systems focus on structural capacities such as people, institutions, policies, and programs that are easily observed and counted. Such measures are necessary but not sufficient for fully characterizing how resources are used within the health security enterprise, including measures of effectiveness, efficiency, and equity. Moreover, existing data systems are infrequently shared outside the individual sectors being measured, and they are rarely linked with other data sources relevant to health security. The Index represents an initial platform for multi-sector health security data sharing and linkage, but more extensive initiatives are needed to ensure that health security leaders have the information needed to function effectively as chief health strategists. To this end, state and federal stakeholders should create processes for identifying unmet data and measurement needs across the U.S. health security enterprise and for developing data acquisition and exchange platforms that can address unmet needs.

■ **Allow for Flexibility in the Allocation and Use of Resources:** Index results demonstrate that each state's health security strengths and weaknesses are unique and influenced by local socioeconomic, demographic, and environmental circumstances. For this reason, individual states and communities need to develop tailored approaches to health security priority-setting and improvement. Health security funding mechanisms should allow states the flexibility to allocate and use their resources in ways that are responsive to local needs and circumstances.

■ **Engage the Private Sector in the Business of Health Security:** The Index demonstrates that key elements of national health security lie within the purview of private sector employers and businesses. Human resource policies involving paid leave and telecommuting options have the potential to boost health security while improving employee productivity, recruitment, and retention.⁸ Similarly, employer support for health insurance coverage and household financial planning among their workers can strengthen employee productivity and health security. For these reasons, health security professionals should collaborate with the business community through entities like chambers of commerce and economic development councils to expand the adoption and use of beneficial workforce policies for health security.

■ **Expand Preparedness Planning, Training, and Reporting Across the Health Care System:** Healthcare Delivery remains the weakest domain of health security measured in the Index, although there recent signs of progress in several key measures. The U.S. Centers for Medicare & Medicaid Services (CMS) recently implemented a set of new preparedness standards that apply to all types of health care providers participating in Medicare and Medicaid.¹² The standards require all providers to conduct an assessment of their risks and vulnerabilities to emergency events, develop an emergency response plan based on these risks, develop a communications plan to coordinate care in the event of emergencies, and conduct regular trainings and tests of the emergency plans. Federal and state officials should monitor the implementation of these new preparedness standards across the U.S. health system, and provide regular feedback to healthcare providers on their progress. Importantly, federal stakeholders should produce and publicly disseminate timely measures of healthcare system compliance with the CMS emergency preparedness rule.

■ **Ensure Core and Surge Funding for Health Security Capabilities:** Historically, federal and state health officials have lacked an effective mechanism for rapidly deploying resources to address newly emerging health emergencies soon after they are detected, when hazards are easiest to contain. Recent U.S. experiences with hurricanes, fires, and disease outbreaks demonstrate that emergency response times can be slowed considerably by administrative and political processes that must be followed in requesting new funding and in redirecting existing funding to combat new health threats. A dedicated and adequately resourced health security emergency response fund can circumvent these delays by allowing federal and state health officials to rapidly obtain funding for newly emerging health threats.

■ **Identify Costs and Funding Requirements for Sustainable and Equitable Health Security Infrastructure:** Health security requires resources not only for responding to disasters when and where they occur, but also for robust pre-

event surveillance, planning, training, communication, and preparation activities in all states and communities. Federal funding for pre-event health security activities has declined steadily over the past two decades, and the resulting gaps in funding are particularly problematic for low-resource and rural regions. The federal government should consider a phased approach for (1) estimating the costs required to establish a robust health security infrastructure across the United States; and (2) increasing federal, state, and local funding contributions to levels that meet these cost estimates. Intergovernmental matching funds requirements can be used to address inequities in resource availability across states and communities based on socioeconomic status and the rural-urban continuum.

■ **Target Assessment, Assistance and Peer Support to Regions that Are Falling Behind:** The Index shows that 18 states experienced stagnant or declining levels of health security between 2017 and 2018, even as the nation as a whole gained strength. Seven of these states also fall below the national average level of health security, indicating that they are falling further behind over time. These areas should receive special consideration as training, technical assistance, and peer learning opportunities are developed and enhanced over time. Conducting detailed assessments of how health security resources are acquired, allocated, and used in these states during the pre-event, response, and recovery phases of emergency events is likely to yield new insight about ways of reducing geographic disparities in health security.

About the Index

The 2019 Index release is the sixth in a series of annual releases of data and analysis on national health security and preparedness. The initial Index releases in 2013 and 2014 were supported by the U.S. Centers for Disease Control and Prevention and developed through a collaborative effort of more than 30 organizations led by the Association of State and Territorial Health Officials, the Oak Ridge Associated Universities, the University of Pittsburgh Medical Center, and Johns Hopkins University. This work generated broad stakeholder input that shaped the Index's overall design and structure and demonstrated the overall utility of the Index concept. In January 2015, responsibility for the Index transferred to the Robert Wood Johnson Foundation, and key enhancements were made to the Index measures and methodology to extend its utility as a measurement tool. Results from the 2019 release of the Index are not directly comparable to prior releases of the Index; however, this Index release includes results for five consecutive annual periods dating back to 2013, thereby allowing for valid comparisons over time.

Index Content and Structure

The 2019 Index release measures 129 individual capabilities that research and experience have shown to be important in protecting people from the health consequences of disasters, disease outbreaks, and other large-scale hazards and emergencies. Because no single agency or organization has the ability to support all of the protections necessary to keep people safe and healthy in the face of these events, the Index reflects preparedness as a responsibility shared by many different stakeholders in government and society. Correspondingly, the Index combines measures from more than 60 different data sources and from multiple sectors in order to offer a broad view of the health security levels achieved for the nation as a whole and for individual U.S. states.

The Index measures are grouped into one of six domains representing broad areas of preparedness activity:

1. **Health Security Surveillance:** actions to monitor and detect health threats and to identify where hazards start and spread so that they can be contained rapidly;
2. **Community Planning and Engagement:** actions to develop and maintain supportive relationships among government agencies, community organizations, and individual households; and to develop shared plans for responding to disasters and emergencies;
3. **Information and Incident Management:** actions to deploy people, supplies, money, and information to the locations where they are most effective in protecting health and safety;
4. **Healthcare Delivery:** actions to ensure access to high-quality medical services across the continuum of care during and after disasters and emergencies;
5. **Countermeasure Management:** actions to store and deploy medical and pharmaceutical products that prevent and treat the effects of hazardous substances and infectious diseases, including vaccines, prescription drugs, masks, gloves, and medical equipment; and
6. **Environmental and Occupational Health:** actions to maintain the security and safety of water and food supplies, to test for hazards and contaminants in the environment, and to protect workers and emergency responders from health hazards while on the job.

The Index further divides these six domains into a total of 19 subdomains reflecting specific areas of practice and policy. Individual measures are used to calculate measures for each of the 19 subdomains and then combined into summary measures for each of the six domains and an overall Index composite measure. All summary measures are scaled along a range from zero to 10, with 10 representing the highest level of preparedness. The Index produces summary measures for each of the 50 U.S. states and the District of Columbia individually and for the nation as a whole. In this sixth annual release, the 2019 Index release includes annual results for the years 2013 through 2018.

Index Methodology

Construction of the 2019 Index began with a pool of more than 200 individual measures identified by stakeholders involved in prior releases of the Index, and supplemented by a public call for new measures held annually thereafter. We used a series of measurement validity and reliability tests to eliminate redundant measures and measures lacking a strong empirical association with the Index domain and subdomain areas. Measures for which updated data could not be obtained at least every three years for each U.S. state were also eliminated from the Index. The resulting set consists of 140 individual measures, including a group of 19 measures defined as Foundational Capabilities because they reflect activities that are firmly ingrained in practice in all U.S. states and do not vary across states or over time.

We convened expert panels to determine how much weight to give to each individual measure when combining them into composite measures for subdomains, domains, and the overall Index score. Experts rated each measure based on its importance to health security capacities and capabilities represented in each Index subdomain and domain. Before combining measures, each measure was standardized to a common scale using the min-max normalization method, and missing values were imputed using a regression-based multiple imputation method. Weighted averages were used to construct summary measures at the subdomain, domain, and overall Index levels for each state and each year. Foundational Capability measures were constructed as constants and averaged into the domain and overall summary measures using expert panel weights. State measures were then averaged to construct summary measures for the nation as a whole, giving each state equal weight in the national results. All summary measures are scaled along a range from zero to 10, with 10 representing the highest level of preparedness. Confidence intervals were estimated around each national summary measure in order to identify which states fall above, below, or in-line with the national measures.

**For more information and full Index results,
visit the National Health Security Preparedness Index website at:
www.nhspi.org**

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