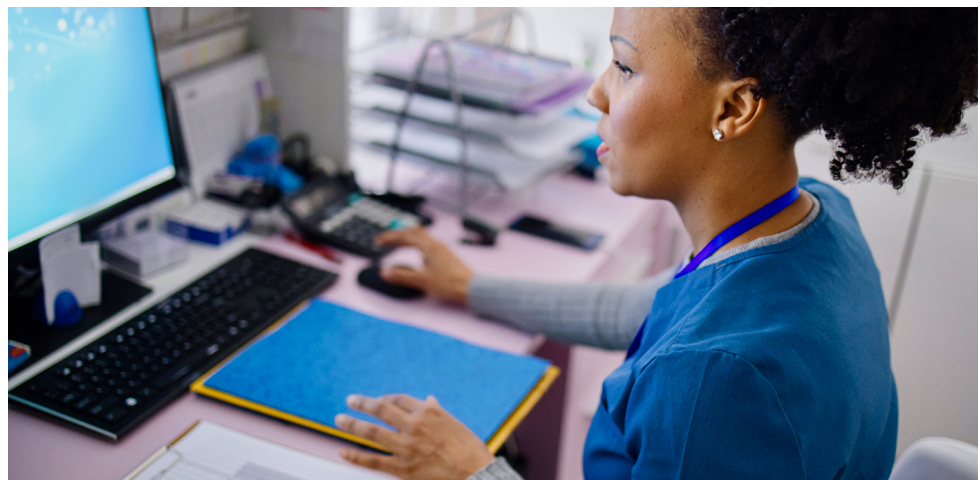


# National Health Security Strategy

# 2023 — 2026



**ASPR**  
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# Contents

<b>Introduction</b>	3
<b>Strategic Goals and Objectives</b>	5
<b>National Health Security Environment and Threat Landscape</b>	7
<b>Strategic Goal 1:</b> Strengthen health care and public health systems to prepare for and respond to concurrent health emergencies, including those that arise from unknown threats	15
<b>Strategic Goal 2:</b> Improve capabilities to safeguard and protect against an array of health security threats, including emerging and re-emerging infectious diseases, especially zoonotic diseases	19
<b>Strategic Goal 3:</b> Ensure a resilient and sustainable public health industrial base and supply chain that can rapidly develop and deploy safe medical countermeasures	22
<b>Conclusion</b>	25
<b>Appendix A: NHSS Statutory Requirements</b>	26
<b>References</b>	29

# INTRODUCTION

The United States continues to face diverse and ever-changing health security threats. Public health emergencies such as the Coronavirus Disease 2019 (COVID-19) pandemic, extreme weather events, the emergence and re-emergence of other infectious disease outbreaks, and gun violence have further exposed challenges in national security infrastructure and underscored the need for adaptable, reliable, and resilient health care, responsive scientific and medical research, and public health systems that enable effective response and recovery operations. Achieving health security requires a collective effort from health care, public health, biomedical research, emergency management, and animal, plant, and environmental health partners, including the federal government, state, local, tribal, and territorial (SLTT) governments, regional entities, the private sector, non-governmental organizations, and communities.

The nation's health security threats are significant and wide-ranging. Risks such as newly emerging and re-emerging infectious diseases, climate change, cyberattacks on health infrastructure, domestic and international terrorism and chemical, biological, radiological, and nuclear (CBRN) threats all have the potential to significantly disrupt and strain health care and public health (HPH) services. The United States must continue to strengthen domestic and global information sharing, cooperation, and surveillance capabilities to rapidly detect threats and launch an effective response. The nation must also expand HPH infrastructure capacity, including the workforce, supply chain, and ability to develop medical countermeasures (MCMs) on an accelerated timeline. Furthermore, these capabilities need to remain adaptable to effectively combat any of the potential threats being encountered.



The *National Health Security Strategy (NHSS), 2023-2026* provides a whole-of-nation approach to prepare for, protect from, respond to, and recover from the adverse health effects of public health emergencies and disasters. The NHSS promotes capability-based improvements to strengthen and adapt health care, public health, and emergency preparedness and response no matter the threat, and focuses on meeting the needs of at-risk individuals<sup>a</sup> and underserved communities.<sup>b</sup>

In addition to the *NHSS, 2023-2026*, the *NHSS, 2023-2026 Implementation Plan* forwards a framework to guide federal action and recommend implementation activities for SLTT partners, private industry, and communities. The *NHSS Evaluation of Progress, 2019-2022* captures progress made by federal entities between 2019 and 2022, as well as their activities with SLTT partners, and the private sector to meet the objectives of the 2019-2022 NHSS. The statutory requirements for these documents are detailed in Appendix A.

**NHSS VISION AND GUIDING PRINCIPLES**

## VISION

The nation works collaboratively across sectors to be secure, resilient, and adaptive in the face of emerging and evolving health security threats.

## GUIDING PRINCIPLES



**Partnerships**

Inclusive and strategic relationships with domestic and global partners should be pursued to bring together the best minds and resources to advance health security capabilities.



**Innovation**

The United States should foster an evidence-based, innovative environment to enable adaptive and nimble tools to protect the nation from health threats.



**Equity**

Health security solutions should be adapted to meet an array of community-specific needs and to advance health equity.



**Integrity**

Health care and public health decisions and communications should be transparent and based on the best available science and data.

<sup>a</sup> “At-risk individuals” means children, pregnant individuals, older adults and other individuals who may have access and functional needs during a public health emergency.

<sup>b</sup> According to Executive Order 13985, underserved communities refers to populations sharing a particular characteristic, as well as geographic communities, that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life, such as: Black, Latino, and Indigenous and Native American persons, Asian Americans and Pacific Islanders and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+) persons; persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality. Moreover, the HHS Equity Action Plan, issued pursuant to Executive Order 13985, identifies the need to provide language access services to individuals with Limited English Proficiency (LEP) as necessary in order to achieve equity in the provision of federally funded health programs and services.

# Strategic Goals and OBJECTIVES



## Strategic Goal 1:

**Strengthen health care and public health systems to prepare for and respond to concurrent health emergencies, including those that arise from unknown threats.**

**Objective 1.1:** Understand the complex needs of communities to prepare for and implement equitable and tailored response and recovery actions during public health emergencies and disasters.

**Objective 1.2:** Improve readiness of HPH systems and infrastructure to mitigate the adverse effects of concurrent threats and climate change impacts.

**Objective 1.3:** Strengthen the recruitment, retention, and preparedness of the HPH workforce to increase capacity and build expertise and flexibility during a response.

**Objective 1.4:** Improve the effectiveness and integration of risk communication systems to promote nimble, coordinated, accessible, and scientifically accurate public health messaging.



## Strategic Goal 2:

**Improve capabilities to safeguard and protect against an array of health security threats, including emerging and re-emerging infectious diseases, especially zoonotic diseases.**

**Objective 2.1:** Improve domestic and global integration of data within and from human, animal, plant, food, and environmental health surveillance systems to detect health security threats in a timely manner and inform emergency response.

**Objective 2.2:** Collect and integrate a wider variety of data into public health surveillance systems to readily identify and address inequities experienced by underserved communities and at-risk individuals.

**Objective 2.3:** Strengthen safeguards for agricultural production systems to reduce disease outbreaks and pandemics.

**Objective 2.4:** Promote HPH systems and technologies that are protected against and responsive to cybersecurity threats and safeguard patient privacy and medical device security.



### Strategic Goal 3:

**Ensure a resilient and sustainable public health industrial base and supply chain that can rapidly develop and deploy safe medical countermeasures.**

**Objective 3.1:** Expand domestic manufacturing capacity, supply chain diversity, and international partnerships with neighbors and allies to fortify a resilient and flexible public health supply chain.

**Objective 3.2:** Strengthen partnerships with MCM suppliers, manufacturers, and distributors to monitor supply chain vulnerabilities and address shortages during an emergency.

**Objective 3.3:** Promote innovation across the MCM development pipeline to accelerate the production and equitable deployment of agile, safe, and accessible MCMs.



# National Health Security Environment AND THREAT LANDSCAPE

## NATIONAL HEALTH SECURITY ENVIRONMENT

National health security depends on collaboration among many complex, global, and interconnected systems. Public health and medical preparedness efforts require an assessment of these existing capabilities to ensure that the United States is well positioned to respond to and recover from any health security threat. As demonstrated during the COVID-19 pandemic, there are significant challenges in the national health security environment, including supply chain vulnerabilities, disruptions in continuity of care, workforce shortages, equipment and infrastructure shortfalls, and health disparities.

## HPH SYSTEM RESILIENCE, CAPACITY, AND INFRASTRUCTURE

HPH systems play a vital role in maintaining national health security. However, shortages of HPH workers, insufficient surge capacity, and availability of training, especially in the nursing field, remain challenges.<sup>1</sup> Public health emergencies and disasters exacerbate these challenges, which affects overall resiliency of HPH systems. The HPH workforce is susceptible to staffing shortages due to high turnover and burnout.<sup>2</sup> During COVID-19, the public health and medical workforce also faced heightened personal security concerns, which worsened burnout. Insufficient supply of personal protective equipment (PPE) for essential workers can impede response operations and pose a health risk for emergency, health care, and public health personnel. Workforce shortages, coupled with inequitable patient access to telehealth technologies and limited provider services offered through telehealth, result in deficiencies in critical expertise and disruptions in continuity of care for chronic disease patients, people with disabilities, and underserved communities.

Effective health care delivery and hospital management during times of disaster is a challenge. The volume of patients can overwhelm the number of beds available in a hospital and managing patients' acute- and long-term care needs can strain hospital operations as

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An NIH study demonstrated that nearly 1 in 4 COVID-19 deaths was potentially attributable to hospitals strained by surging caseload. Despite improvements in COVID-19 survival between March and August 2020, surges in hospital COVID-19 caseload remained detrimental to overall patient survival and potentially eroded benefits gained from emerging treatments.

*– Association Between Caseload Surge and COVID-19 Survival in 558 U.S. Hospitals, March to August 2020*

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demand for PPE, hospital beds, and other supplies surges during a disaster.<sup>2</sup> Rural hospitals often face disproportionate operational challenges during public health emergencies and disasters due to pre-existing limited bed capacity, lack of specialty care, and financial constraints.<sup>2</sup>

Containment and/or mitigation of a novel disease requires rapid pathogen testing combined with immediate availability of PPE and laboratory supplies. High testing demand, coupled with staffing shortages, challenges with data availability, and regulatory requirements strains public health laboratories and can lead to delays in response.<sup>3</sup>

Additionally, aging data infrastructure and inconsistent capacity to manage data limits information sharing between the federal government and SLTT authorities.<sup>4</sup> The lack of interoperable datasets and surveillance systems and technology bottlenecks, including the inadequate linking of electronic health record data and other significant data sources with national syndromic surveillance systems, is a significant challenge that limits situational awareness, delays detection times, and negatively impacts patient care. This challenge leads to an incomplete national picture and slows response activities during public health emergencies and disasters that impact multiple geographic areas.

## **PUBLIC HEALTH SUPPLY CHAIN**

The public health supply chain<sup>c</sup> is vulnerable to disruptions during public health emergencies and disasters, leading to shortages in critical supplies and limiting the U.S. health care system's capacity to provide patient care. The United States has inadequate domestic manufacturing capacity and is dependent on foreign sourcing and manufacturing for critical materials and supplies.<sup>5</sup> Some critical materials are sourced from one geographic location or supplier. Pandemics and increasingly frequent extreme weather events can disrupt production in these areas, resulting in significant supply chain shortages during times of increasing demand. These challenges along with the potential for cyberattacks on the supply chain demonstrate the need for increased domestic production capacity and storage. The public health supply chain is also subject to exploitation by malicious actors who could intentionally surveil and deliberately attack U.S. supply chains, and by counterfeiters who could take advantage of increased consumer demand by selling substandard or non-approved products, putting the nation's health at risk.<sup>5</sup>

## **GLOBAL HEALTH SECURITY**

U.S. health security depends on the nation's ability to stop emerging and infectious disease outbreaks at their source, which along with other health threats are exacerbated by climate change. Inadequate global disease monitoring, scarce analytical and diagnostic capabilities to detect and characterize novel infectious disease threats where they occur, and barriers to international sharing data leaves the U.S. at an increased risk from emerging infectious diseases (EIDs). Limited global response governance, lack of clinical research capacity, and fractured resource allocation persist, hindering effective response to global health threats. Crop failures, conflicts over water, and population displacement caused by climate change can increase global migration and accelerate the pace of EIDs, introducing new health security risks to the nation.

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<sup>c</sup> The public health supply chain consists of drugs, biological products, personal protective equipment, clinical and research laboratory supplies, and medical devices – including diagnostic and testing devices – as well as ancillary supplies required to deliver these countermeasures.



## RISK COMMUNICATION

Clear, consistent, timely, and accessible public health information is vital to achieving situational awareness, increasing adoption of public health guidance, and reducing public panic during public health emergencies and disasters. Ineffective, one directional communication strategies can result in misunderstanding and mistrust of public health officials and data and non-compliance with mitigation measures.

Misinformation, disinformation, and malinformation (Mis-Dis-Mal information) disrupts effective risk communication and can be detrimental to health. Mis-Dis-Mal information can rapidly spread, intentionally and unintentionally, to broad audiences through traditional and social media and other online platforms.<sup>6</sup> During the COVID-19 pandemic, misinformation caused public confusion and led people to reject COVID-19 vaccines, overlook public health measures like masking and social distancing, and use unproven alternative treatments.<sup>7, 8</sup> Altogether, the proliferation of Mis-Dis-Mal information can prolong response time and diminish the efficacy of recovery operations.<sup>9</sup>

## COMMUNITY RESILIENCE AND HEALTH EQUITY

Community resilience plays a significant role in national health security.<sup>10</sup> Catastrophic events like pandemics, extreme weather, and mass casualty incidents can test the physical and mental wellbeing of a community. However, communities often face challenges that diminish resilience. Many communities have experienced an increase in substance use disorder in recent years. Public health emergencies and disasters often worsen a community's mental health, giving rise to other disaster-related mental health challenges that require culturally competent<sup>d</sup> mitigation strategies. In addition, the social determinants of health<sup>e</sup> affect the health of all communities and contribute to health disparities.

d Cultural competence is the integration and transformation of knowledge about individuals and groups of people into specific standards, policies, practices, and attitudes used in appropriate cultural settings to increase the quality of services.

e The Social Determinants of Health include economic stability, education access and quality, health care access and quality, neighborhood and built environment, and social and community context.

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**Misinformation** is false, but not created or shared with the intention of causing harm.

**Disinformation** is deliberately created to mislead, harm, or manipulate a person, social group, organization, or country.

**Malinformation** is based on fact, but used out of context to mislead, harm, or manipulate.

– *Cybersecurity & Infrastructure Security Agency*

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Many underserved communities face barriers to health care access and other resources needed to build and sustain resiliency before, during, and after a disaster. Structural racism, poverty, and other systemic inequities have led to health disparities, which marginalize individuals and increase the risk of morbidity and mortality from disasters, infectious diseases, non-communicable diseases, and the adverse health effects of climate change. Health disparities worsen overall health outcomes and diminish the resiliency of the nation.

### HEALTH CARE AND PUBLIC HEALTH PREPAREDNESS FUNDING

The emergence of COVID-19 and other significant health threats showed the need for sufficient and sustained funding of health care, medical research, and public health systems and personnel. Prior to COVID-19, funding for vital programs such as the Public Health Emergency Preparedness program and the Hospital Preparedness Program decreased from 2003 through 2019 (36% and 54% respectively).<sup>11</sup> State and local health departments continue to struggle with understaffing, antiquated data systems, and inadequate supplies of MCMs.<sup>12</sup> Since 2020, funding has increased through short-term supplemental appropriations. Increased and sustained investments in HPH infrastructure, staff, and supplies will be critical to further strengthen the nation’s preparedness.

### THREAT LANDSCAPE

As the nation continues to face the impacts of COVID-19, the United States remains vulnerable to newly emerging pathogens that could cause the next pandemic. Urbanization, deforestation, habitat encroachment, some agriculture and livestock practices, economic interdependence, and climate change can drive disease emergence and increase the threat to EIDs. Climate change acts as a threat multiplier, worsens health outcomes, and complicates response. As global temperatures rise and more extreme physical effects of climate change take place, there is an increased risk of global competition for resources and surges in international population displacement.<sup>13</sup> Additionally, human-caused threats like cyberattacks and geopolitical conflicts can cause significant disruption of supply chains, economies, and food security. The instability caused by disruptions like these has cascading impacts, which can exacerbate all health security threats.

Malicious actors remain a significant threat to the United States. Cyberattacks can disrupt critical infrastructure and put patient privacy and safety at risk. A cyberattack during another public health emergency or disaster can further complicate response efforts.

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“Health equity is the attainment of the highest level of health for all people. Achieving health equity requires valuing everyone equally with focused and ongoing societal efforts to address avoidable inequalities, historical and contemporary injustices, and the elimination of health and health care disparities.”

– *Healthy People 2030*

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According to the Office of the Director of National Intelligence, biosecurity remains essential and there is a risk of new biological weapon threats from adversaries inspired by the perceived weak global response to the pandemic.<sup>11</sup> Threat actors can leverage both mature and new technologies, such as biotechnology, to attack the United States and cause harm to the population.

The United States must continue to adapt and strengthen capabilities as these threats evolve and increase in frequency and severity.

## EMERGING INFECTIOUS DISEASES

EIDs, especially those with pandemic potential, are a significant threat to the United States, and outbreaks anywhere in the world may have the potential to become global pandemics. As demonstrated by SARS-CoV-2, pandemic pathogens can spread quickly, upend daily life, and have cascading health, social, economic, and political consequences. Zoonoses, diseases spreading from animals to people, are the origin of 3 out of every 4 infectious diseases in humans.<sup>14</sup> Zoonotic coronavirus outbreaks like Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS), and SARS-CoV-2, demonstrate the ever-present risk of zoonotic pathogens to human health and underscores the need for integrated surveillance, global and domestic clinical research networks, and international coordination. Vector-borne diseases like malaria and Zika virus are also an increasing global concern as vector territory changes due to climate change and urbanization.<sup>15</sup> In addition, climate change can increase the prevalence and geographic range of waterborne, airborne, and food-borne disease outbreaks, further threatening national health security.<sup>16</sup> Globalization and misuse of antibiotics in livestock further increase the risk of infectious disease spreading from animal and food sources to humans and becoming epidemics or pandemics.<sup>17</sup>

Antimicrobial resistance (AMR) continues to threaten human, animal, and environmental health as pathogens adapt to evade the current repertoire of drugs used to combat them. More than 2.8 million antibiotic-resistant infections occur in Americans each year which result in over 35,000 deaths.<sup>18</sup> While deaths due to antibiotic resistant infections have decreased by 18% since 2013, AMR is a sustained and growing threat. The Centers for Disease Control and Prevention (CDC) lists 18 urgent, serious, or concerning pathogens that pose significant risks to U.S. health security.<sup>16</sup> A 2022 CDC report shows antimicrobial-resistant infections and antibiotic use increased in hospitals during the first year of the COVID-19 pandemic. Data show significant surges in human antibiotic use, difficulty in following infection prevention and control guidance (like limited personal protective equipment, or PPE), and a resulting increase in health care-associated, antimicrobial-resistant infections in U.S. hospitals.<sup>19</sup> Treating AMR



infections also carries a significant economic burden. In 2021, CDC estimated that treating six antibiotic resistance threats contributes to more than \$4.6 billion in health care costs annually in the U.S.<sup>20</sup> At any given time in the country, 1 in 31 hospitalized patients has a health care-associated infection (HAI), including AMR infections.<sup>21</sup> HAIs significantly impact hospitalized patients, therefore an incident that increases the rate of hospitalization will also increase the risk of HAIs and associated AMR infections.<sup>22</sup> For example, the incidence of ventilator-associated HAIs increased in 2020, coinciding with increased ventilator use as part of the COVID-19 response.<sup>23</sup>

## CLIMATE CHANGE

Extreme weather events driven by climate change such as hurricanes, wildfires, droughts, winter storms, floods, and thunderstorms have increased in frequency and intensity in recent years. In 2020, multiple heat waves resulted in hundreds of recurrent wildfires on the U.S. west coast, burning twice as many acres as compared to 2019.<sup>24</sup> Moreover, the 2020 Atlantic hurricane season included a historic 30 named storms and seven major hurricanes.<sup>25</sup> In 2021, the United States saw unprecedented winter storms hit South-Central Texas and dangerous heat waves across the Pacific Northwest.<sup>26, 27</sup>

Extreme weather events directly affect HPH and other critical infrastructure and disrupt public health supply chains.<sup>28</sup> They also exacerbate chronic health conditions, mental health conditions, and health disparities, reducing community resilience and worsening health outcomes.<sup>29</sup> In addition, concurrent extreme weather events challenge response and recovery operations, strain surge capacity, and lead to competition for resources. The intersection of the physical impacts of climate change like rising temperatures and changing precipitation patterns with environmental degradation and pollution will create future challenges with food and water security and threaten health.

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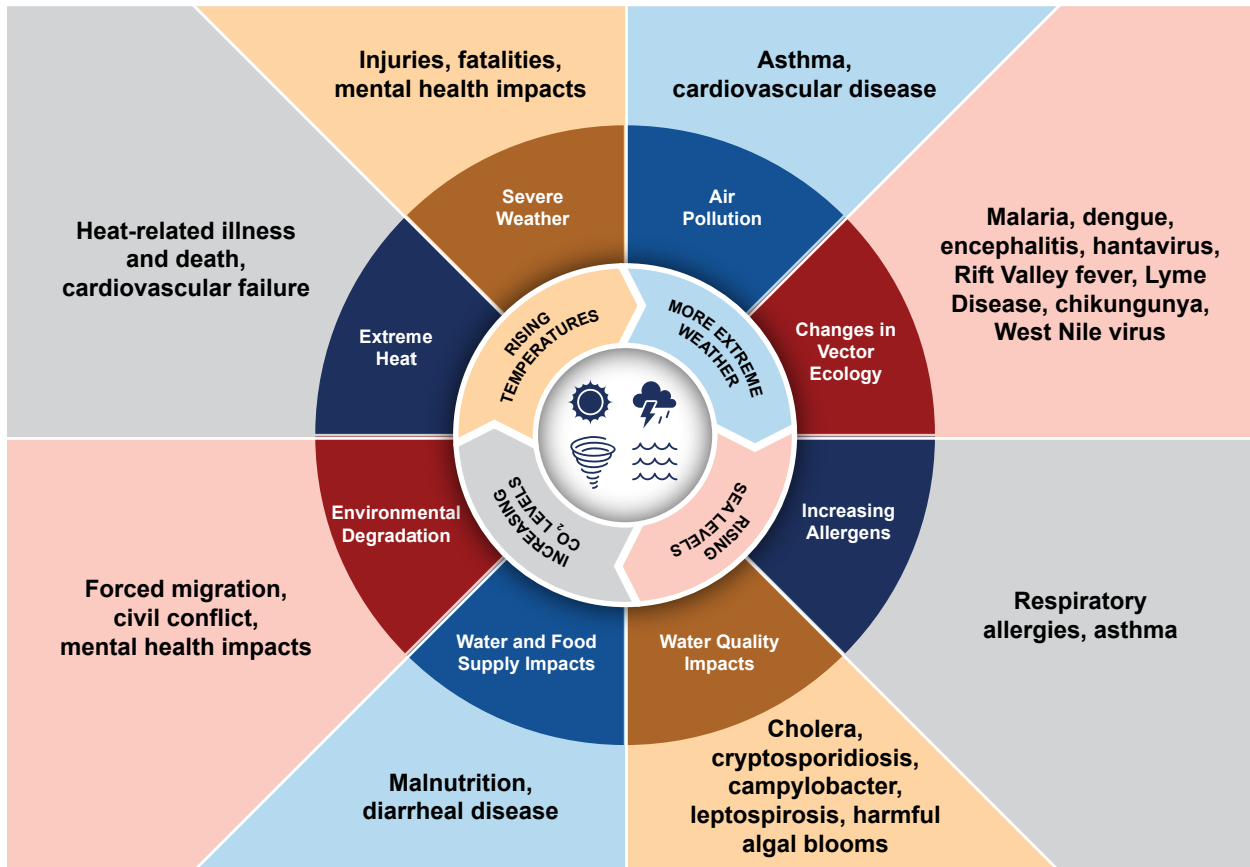
Extreme weather events are a top driver of forced population displacement. Migration and displacement will heighten humanitarian needs, increase the risk of political upheaval, exacerbate the risk of other health crises, and aid recruitment and radicalization by militant groups, particularly as COVID-19 strains global humanitarian response mechanisms.

*– 2022 Annual Threat Assessment of the U.S. Intelligence Community*

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Figure 1: Impact of Climate Change on Human Health<sup>30</sup>



## CBRN AND BIOTECHNOLOGY

The risk from intentional CBRN incidents has increased due to continued capability expansion, modernization, low yield weapons development, eroding international norms, information proliferation, emerging drone concerns, and increasing threat actor awareness. An uptick in the available information on and use of chemical weapons globally could pose greater risk to U.S. health security.<sup>31</sup> Additionally, non-state actors acquiring radiological and nuclear materials remains a risk.

Advancements in biotechnology, genomics and gene-editing platforms, and other legitimate-use technologies could be used deliberately to create biological weapons. The United States must also be prepared against malicious use novel technologies like artificial intelligence and machine learning that could enable the development of new bioweapons that complicate detection. Malicious actors have already shown interest in and some capacity to develop biological weapons.<sup>32</sup> Additionally, as use of biotechnologies to study high consequence pathogens increases, so too does the risk of accidental biological incidents and the risk of laboratory-acquired infections.<sup>33</sup>

## CYBERATTACKS

Cyberattacks from threat actors at home and abroad continue to threaten national health security and disrupt patient care. Cyber threats can disrupt federal and SLTT emergency response activities and exploit vulnerabilities in critical infrastructure systems.<sup>34</sup> Threat actors can target pharmaceutical, biologic, and medical device manufacturing and supply chains. Additionally, health care data breaches are increasing, putting electronic patient data at risk. In 2020, the health care sector experienced a 51% increase in the total volume of records exposed when compared with 2019.<sup>35</sup> Cyberattacks have resulted in cancelled or delayed surgeries and cancer treatments, closure of COVID-19 test collection sites, and disruption of electronic communications between hospitals.<sup>36</sup>

## UNKNOWN THREATS AND CONCURRENT PUBLIC HEALTH EMERGENCIES AND DISASTERS

The United States needs to prepare for and respond to simultaneous health security threats. For example, an extreme weather event causing mass population displacement is further complicated during a pandemic. Response to an extreme weather event is significantly complicated by physical infrastructure damage, migration, and mitigation efforts aimed at limiting the spread of infectious diseases. Concurrent incidents with negative health consequences strain the public health supply chain and response personnel, leading to economic instability and adverse impacts on patient care. Communities with chronic health disparities are especially vulnerable to compounding climate risks, such as a hurricane during an extreme heat wave.

Health care and public health emergency response operations can be further complicated by a concurrent threat such as a cyberattack or geopolitical conflict that disrupts critical infrastructure supply chains, and health care facilities.<sup>37</sup>

The nation must also be prepared to respond to unknown threats to national health security. The need for threat-agnostic, rapidly deployable MCMs is clear. In addition to MCM development, unknown threats require a well-equipped and well-trained HPH workforce that can readily respond to new threats. Applying evidence-based practices from previous health security events will allow for a more adaptable and flexible response.

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A cyberattack in February 2020 to a Florida water treatment plant increased the amount of sodium hydroxide to unsafe levels, posing risk to human health if the breach was left unmitigated. The hack was immediately reversed. Following the Florida incident, several state's issued alerts for cyber threats to water treatment plants.<sup>40</sup>

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# Strategic GOALS



## Strategic Goal 1:

**Strengthen health care and public health systems to prepare for and respond to concurrent health emergencies, including those that arise from unknown threats**

*HPH systems play a vital role in maintaining national health security during both steady state and emergency response. As seen during the COVID-19 pandemic, health care facilities and public health departments were overwhelmed due to surges in patients, workforce shortages, and supply scarcity. Underserved communities are disproportionately impacted by emergencies while still facing challenges accessing health care. Additionally, extreme weather, infectious disease spread, and cyberattacks can occur simultaneously, further stressing HPH infrastructure and workforce. A bolstered and diverse health workforce along with resilient and adaptable health infrastructure can strengthen the nation's preparedness, response, and recovery capabilities and capacity.*

### **1.1 Understand the complex needs of communities to prepare for and implement equitable and tailored response and recovery actions during public health emergencies and disasters**

Significant events like the COVID-19 pandemic, extreme weather events, and mass casualty disasters can test the wellbeing of a community and disproportionately impact underserved communities. These events occurring in communities with a history of chronic stress, trauma experienced across generations, marginalization, and structural inequity can lead to worsened health outcomes.<sup>38</sup> Engaging communities on improving overall wellness, promoting healthy behaviors, and supporting mental health, will reduce health disparities and improve community resilience before, during, and after disasters.

The specific needs of a community should be understood and addressed before, during, and after emergencies to foster resilience, equity, and effectively implement response and recovery actions. All communities, including diverse population groups, should be engaged throughout the entire preparedness cycle, from evaluating specific needs, designing response and recovery plans, and exercising those plans. Community leaders should focus on empowering social connectedness, engaging underserved populations, integrating physical and mental wellness into emergency preparedness, and promoting access to mental health and social services. Health officials should continue to build partnerships with trusted community leaders and tailor preparedness efforts at the local level to ensure that diverse community perspectives are considered.

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## 1.2 Improve readiness of HPH systems and infrastructure to mitigate the adverse effects of concurrent threats and climate change impacts

Disruptions in critical infrastructure and an influx of patients can hinder access to and delivery of health care, especially for people in underserved communities. The nation's health systems and infrastructure will continue to be stressed as extreme weather becomes more severe and diseases continue to emerge. Response activities can divert resources otherwise needed for delivery of routine care for chronic disease patients and persons with disabilities. These interruptions in health care access and delivery for underserved communities can further undermine efforts to ensure health equity.

Resilient and adaptive HPH infrastructure and data systems, including national clinical research capacities, that are ready to respond to public health emergencies and disasters, no matter the threat, will ensure continuous access to health care for all populations. Incorporating multiple threats and climate change considerations into preparedness, mitigation, response, and recovery planning can improve the readiness of HPH systems. Additionally, promoting infectious disease mitigation strategies such as indoor air filtration, ventilation, and air disinfection technologies can further protect patients in health care settings.

Emergency planning should include tiered networks that coordinate national expertise with regional, state, and local capabilities and capacity to increase access to specialty care and surge capacity, including for pre-hospital emergency medical services and post-hospital health care and social services. By expanding agreements permitting providers to offer care outside their licensed jurisdiction during emergencies, states and territories can increase assistance. Standardized guidance and a common platform with resources on liability protection and crisis standards of care implementation can streamline deployment of health workers during an emergency.

Additional resources for HPH infrastructure to strengthen their physical resilience to climate change will improve readiness for the impact of extreme weather events. During a disaster, impacted patients could face barriers to health care access due to their geographical spread, mobility concerns, and transportation needs. To address this, expansion of emergency-use strategies for telehealth, including extended payment benefits for in-home visits, and coordinated development of deployable, telehealth critical care systems to ensure equitable care are necessary to ease the burden of a potential surge on health care facilities and public health infrastructure.





Expanding health system capabilities and capacity also need to reach at-risk individuals and underserved communities. Reaching those populations before a disaster occurs will allow public health authorities to better understand the consequences of emergencies on the most vulnerable and prioritize their health needs in emergency response and recovery planning. Additionally, mental and behavioral health should be integrated into emergency preparedness, response, and recovery plans with dedicated resources aimed towards recovery and long-term resilience.

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### **1.3 Strengthen the recruitment, retention, and preparedness of the HPH workforce to increase capacity and build expertise and flexibility during a response**

Public health emergencies and disasters continue to strain the HPH workforce. They have caused staffing shortages and workforce burnout, resulting in shortfalls during response and longer-term recovery efforts, limitations in critical expertise, disruptions in care for chronic disease patients, and diminished preparedness against future threats. Due to these challenges, additional resources are needed to recruit, train, and retain HPH workers who are embedded in communities and have the expertise to respond to a wide array of threats.

A robust and well-resourced health care, research, and public health workforce will ensure the U.S. can respond rapidly to national health security threats and maintain the health of communities. Incentivizing public health and medical careers can expand employment opportunities. This expansion should aim to diversify the workforce by actively recruiting underrepresented racial, ethnic, and disability groups and increasing placement in rural and underserved communities. Furthermore, developing worker resilience strategies (e.g., flexible work schedules, wellness training, self-care) can mitigate burnout during emergencies and promote higher retention.

In addition to workforce expansion, current and future health workers should receive training in disaster preparedness and emergency response, including standard and transmission-based precautions, emergency response research support, use of personal protective equipment for high-risk infectious diseases, and responding to multiple threats simultaneously.

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### **1.4 Improve the effectiveness and integration of risk communication systems to promote nimble, coordinated, accessible, and scientifically accurate public health messaging**

Ineffective emergency risk communication can prolong response time, diminish the efficacy of recovery operations, and sow societal mistrust of public health and medical response measures. During emergencies, information rapidly evolves, and inconsistent information is often shared in the news media and on social media platforms. Without comprehensive data about how a national health security threat is impacting diverse communities, delivering plain language communications that are tailored to health literacy levels and other specific needs is a challenge.

An effective risk communication system that delivers plain language and consistent evidence-based messages can reduce confusion and restore trust in public health interventions. Effective and

unified public health communications during an emergency should emphasize transparency with the public in how public health decisions are made, using plain language messaging. These communication campaigns should follow the [National Standards for Culturally and Linguistically Appropriate Services in Health and Health care](#) and be made accessible to persons with disabilities and individuals with Limited English Proficiency. Messaging and communications should be adapted at the local level with bidirectional input from diverse community representation. Communication outreach that incorporates the specific ethnic and socioeconomic needs of each community will further support effective public health messaging. Federal and SLTT public health officials should partner with trusted messengers within communities to promote community trust in non-pharmaceutical interventions, MCMs, and other public health interventions.

During an emergency that is constantly evolving, real-time changes to information coupled with partisan distortion of data can make it difficult for the public to determine which information is accurate and what sources should be trusted. Having mechanisms in place to identify, track, and counteract Mis-Dis-Mal health information can reduce confusion and increase uptake of critical public health measures. Health Mis-Dis-Mal information should be viewed as a whole-of-society problem requiring unified action by government stakeholders, commercial entities, medical organizations, and community leaders and other segments of civil society.

HPH stakeholders should partner with emergency management authorities, trusted community leaders, and media organizations to provide the public with guidance on how to identify reliable information and what to consider when deciding to share information. Technology platforms can partner with the HPH organizations to build additional tools and processes to monitor and eliminate health mis-dis-mal information. Finally, stronger collaboration between the public health sector and communication and behavioral health experts can improve understanding of the public's susceptibility to health mis-dis-mal information and how people consume information during crisis situations.





## Strategic Goal 2:

**Improve capabilities to safeguard and protect against an array of health security threats, including emerging and re-emerging infectious diseases, especially zoonotic diseases**

*Siloed human, animal, plant, food, and environmental health surveillance systems can reduce data sharing capacity and hinder response. By modernizing these surveillance systems, the United States can facilitate swifter, more seamless electronic data exchange and implement a more rapid emergency response. Furthermore, expanding the collection of demographic data would allow U.S. public health surveillance systems to better capture health impacts on underserved communities and at-risk individuals.*

### **2.1 Improve domestic and global integration of data within and from human, animal, plant, food, and environmental health surveillance systems to detect health security threats in a timely manner and inform emergency response**

Modernized disease surveillance systems that are interoperable within and across health sectors (e.g., human, animal, food, plant, environmental) and capable of electronically sharing, integrating, and securely exchanging analytical information in real-time is vital to rapid disease detection. The United States can work towards standardizing its surveillance systems to have a common data infrastructure capable of electronically sharing and integrating cross-system data. Modernized infrastructure will allow data to be transferred from multiple data sources closer to real-time. Recruiting and training more workers with the technical expertise needed to manage surveillance system interoperability, analyze data, and ensure electronic surveillance data is shared securely will aid in modernizing U.S. surveillance systems.

Identifying and monitoring infectious disease outbreaks in foreign countries is crucial to preventing potential epidemics from spreading to the United States. Leveraging U.S. leadership and international partnerships, in addition to sustained political, financial, and technical support, can enhance global health security capacities. Expanding international data sharing agreements and situational awareness can improve rapid detection and early warning of global threats. The United States will continue to support initiatives such as the Global Health Security Agenda to strengthen global health surveillance capacities of partner countries.

These actions will not only facilitate surveillance data sharing within human health sectors but can also be applied to integrate surveillance data across the human, animal, plant, and environmental interface. While these modernization activities may rely on steady and sustained funding sources, they will greatly enhance disease detection using a One Health approach to further protect U.S. health security.<sup>f</sup>

<sup>f</sup> One Health is a collaborative, multisectoral, and transdisciplinary approach — working at the local, regional, national, and global levels — with the goal of achieving optimal health outcomes recognizing the interconnection between people, animals, plants, and their shared environment.

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## **2.2 Collect and integrate a wider variety of data into public health surveillance systems to readily identify and address inequities experienced by underserved communities and at-risk individuals**

Health security threats expose and worsen health disparities, diminish overall population health, create negative economic impacts, and reveal weaknesses that need to be addressed at multiple levels of preparedness, planning, and response. The limited collection and reporting of demographic data created an incomplete picture of COVID-19's disproportionate impact on underserved populations. Without nationally representative data that accounts for the specific lived experiences of all populations, response actions, decision making, and allocation of resources can be ineffective.

Establishing standardized and inclusive demographic data elements that crosscut public health surveillance systems can enhance preparedness, response, and recovery for underserved communities and at-risk individuals. Public health surveillance data should better represent these socioeconomic and demographic groups to better assess and understand the full scope of health impacts. Expanding research on social determinants of health and incorporating those data (e.g., limited income and lack of accessible primary health care) into surveillance systems will provide greater insight into the disparities that underserved communities face. The U.S. government, HPH sectors, and community partners can work together to ensure uniform collection and reporting of race, ethnicity, disability status, and other demographic and socioeconomic data indicators to enhance reporting, create new analysis tools, and strengthen response. In addition, working with underrepresented communities with a focus on data transparency and ensuring privacy will build trust in data-driven decision making.

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## **2.3 Strengthen safeguards for agricultural production systems to reduce disease outbreaks and pandemics**

Agricultural expansion and changes in land use can lead to negative impacts to both human and animal health, including exposure to pathogens and emergence of new diseases. Encroachment on wildlife habitat and wet markets are prime locations for pathogen spillover events. Furthermore, the use of antibiotics in livestock also poses the potential to give rise to new antibiotic resistant pathogens.

Continued investment in animal and plant health diagnostic tools, implementation of more sustainable land and antibiotic use practices, and closer monitoring of domestic and international animal trade can better protect agricultural production systems, food production workers, and reduce disease outbreaks. Innovative animal and plant health diagnostic technologies, standards, and other surveillance measures are critical to detecting and preventing animal and plant diseases prior to human infection. By strengthening domestic and international partnerships with agricultural and environmental stakeholders, the United States can expand surveillance, detection, and reporting capacity in wildlife, livestock, companion animals, and other animals with high spillover

risk. In addition, dedicating greater resources and expanding international cooperation to increase enforcement of wildlife trade regulations, including at points of entry, can also mitigate the risk of spillover events and diseases entering U.S. territory.

Promoting sustainable agricultural practices can protect the health of plant and animal populations while also improving U.S. food safety and food security. One potential line of effort is to increase investment in applied research of locally relevant interventions that increase the health of animals and reduce the incidence of infections along the food value chain.

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#### **2.4 Promote HPH systems and technologies that are protected against and responsive to cybersecurity threats and safeguard patient privacy and medical device security**

The increased reliance on technology makes HPH systems and data vulnerable to cybersecurity threats. Cyberattacks on health care Information Technology (IT) can cause providers to lose access to vital patient information, disrupt delivery of care, and cause medical devices to malfunction. The potential breach of health care data, including electronic health records, could put patient privacy at risk.

A U.S. health system that cultivates cybersecurity resilience, establishes minimum standards of security, and maintains evidence-based cybersecurity solutions will help minimize risks and vulnerabilities to cybersecurity breaches. Collaboration between HPH systems and IT partners can establish and govern feasible security standards for technology, data systems, and medical devices used at health care facilities. As telehealth continues to be expanded, health care and IT partners should work in conjunction to safeguard patient privacy. Developing a one-stop platform maintaining guidance and cyber hygiene practices for meeting those standards will further assist health care facilities with safeguarding their technology. There also needs to be increased investment in resources and preparedness activities that increase cybersecurity (programs, personnel, upgrading or securing legacy systems). Promoting mitigation and response plans for cybersecurity breaches or attacks in the health sector can foster a healthy cybersecurity environment across HPH organizations.





### Strategic Goal 3:

**Ensure a resilient and sustainable public health industrial base and supply chain that can rapidly develop and deploy safe medical countermeasures**

*The COVID-19 pandemic exposed vulnerabilities in the nation’s ability to provide public health supplies critical to mitigating the spread of SARS-CoV-2 and reduce morbidity and mortality. Many of these supply chain challenges are not unique to the COVID-19 pandemic. Offshore manufacturing and just-in-time supply chain practices can disrupt the U.S. public health supply chain in the event of extreme weather, shifting geopolitical forces, global competition for resources – especially in times of high demand – and other factors, including concerns related to ethical production. These challenges illustrate the need to build more sustainable domestic manufacturing capacities that are resilient to shifting demand, can be adapted for new and emerging health security threats, and can meet the health needs of the whole population, especially during public health emergencies and disasters.*

#### **3.1 Expand domestic manufacturing capacity, supply chain diversity, and international partnerships with neighbors and allies to fortify a resilient and flexible public health supply chain**

The public health supply chain is a vital component of U.S. national health security and preparedness and response efforts. However, the United States has inadequate domestic manufacturing capacity to meet U.S. demand for all needed public health supplies, especially during public health emergencies and disasters. In addition, the United States is dependent on foreign sourcing and offshore manufacturing for some critical public health supplies. In some cases, critical supplies are sourced from or manufactured in one location. Given that the public health supply chain is driven by the private sector, incentivization and coordination can help expand domestic manufacturing capacity.

A diversified supply chain with built in redundancies along with increased domestic manufacturing capacity, diversified distribution outlets, and a skilled supply chain workforce<sup>g</sup>



<sup>g</sup> The public health supply chain workforce includes manufacturing, stockpiling, and distribution workforces, as well others vital to the end-to-end public health supply chain.

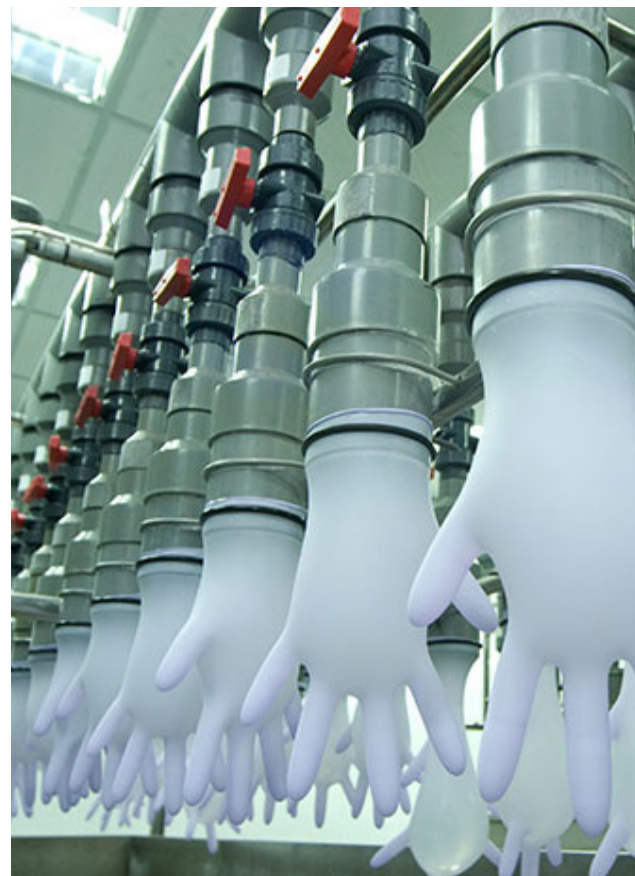
will lead to a more flexible and scalable public health supply chain that is able to meet increased demand during large-scale emergencies. Implementing regulatory policies requiring greater supplier diversity, incentives—such as production subsidies and tax incentives—and continued investment in innovation to mitigate vulnerabilities of single-sourced materials is vital to having a nimble supply chain structure. Rapidly produced and accurate standards for quality assurance can increase domestic manufacturing to ensure products not only meet demand but are of sufficient quality to meet the purpose. For example, fast production of standards for diagnostic tests could speed production of at home-testing kits to reduce the strain on the health care system while providing the quality control needed to prevent costly false positives/negatives or wasting supplies in high demand due to product failures.

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### **3.2 Strengthen partnerships with MCM suppliers, manufacturers, and distributors to monitor supply chain vulnerabilities and address shortages during an emergency**

The public health supply chain is a multifaceted, dynamic, and interdependent system that produces and delivers critical public health supplies, including PPE, diagnostics, and other medical devices; as well as pharmaceuticals – therapeutics, biologics, and vaccines. To identify vulnerabilities, anticipate challenges, and prevent or mitigate disruptions, the U.S. Government should strengthen its industry partnerships to gain more insight and visibility into this complex system.

Robust, streamlined, and real-time information and data sharing between the U.S. Government and industry enables increased visibility into the public health supply chain. This can lead to better coordination between the public and private sectors when challenges occur. Greater visibility can also inform where additional capacity and capability investments may be needed, stockpiling requirements – including distribution needs during public health emergencies and disasters – and effective strategies to build resilience. The U.S. Government can leverage existing stakeholder engagement mechanisms across the interagency to strengthen its industry partnerships. There is also opportunity to expand the programs and tools developed during the COVID-19 pandemic to increase communication with industry and transparency into all components of the public health supply chain.



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### **3.3 Promote innovation across the MCM development pipeline to accelerate the production and equitable deployment of agile, safe, and accessible MCMs**

Newly emerging threats without existing diagnostics and treatments will require rapid MCM research and development pipelines. MCM development for unknown threats is a challenge in the United States and globally. MCM preparedness involves rapid development of standards and clinical research response to ensure that the candidate vaccines, therapeutics, and diagnostics are both safe and effective for all populations, including at-risk individuals. This requires standing global and domestic clinical research capacities in the form of integrated networks capable of rapidly pivoting to regulatory-level clinical trials. Sustained public and private funding for basic, translational, and clinical research to develop innovative technology is crucial to building MCM pipelines that are commercially viable and can be easily adapted to combat and mitigate an emerging infectious disease or unknown threat.

Stronger partnerships between research institutions, government, academia, private industry, and community-based philanthropies, along with innovative, adaptable, and scalable MCM development technologies, can facilitate rapid development of new MCMs to combat emerging threats. Promoting the development of innovative technologies and streamlining manufacturing processes can create more agile MCM pipelines that can scale up production quickly. Investing in MCMs that have other commercial applications can enable manufacturers to quickly repurpose existing products and pivot research and development to combat a new or emerging threat. In addition, producing safe and effective MCMs while improving regulatory capacity will further advance and modernize the MCM development process.

AMR is one of the major threats to the health care, veterinary, and agriculture sectors, and remains a concern as antibiotics are overprescribed and misused globally, fueling the evolution of resistant pathogens. Fewer new antibiotics are getting to market due to a lack of financial incentives, new economic models to incentivize antibiotic development and product approval are required. Many infectious diseases are becoming more difficult and expensive to treat as antibiotics become less effective.

Adopting strong antibiotic stewardship strategies and increasing the development of new treatment courses can combat the threat of drug-resistant organisms. Health care, public health, and private industry delivering collaborative communication and education on responsible antibiotic use can improve infection prevention and control. Increased research and development of new antibiotics, novel combination therapies, and new rapid diagnostics to detect AMR bacteria in clinical settings are vital to addressing the AMR threat. These strategies will require collaboration with the private industry to ensure a sustainable antibiotic market and sufficient quality of and access to treatments for everyone in need.



# CONCLUSION

The nation's HPH systems continue to be tested in extraordinary ways. As significant health threats and challenges evolve, so must our capabilities. Preparing and responding to these challenges requires a collective effort from the federal government, SLTT authorities, non-governmental organizations, the private sector, communities, and international partners.

The United States must continue to build strategic partnerships, spur innovative solutions, rely on evidence-based decision making, and promote equity to effectively prepare for, respond to, and recover from COVID-19 and future threats. By working together, investing in comprehensive preparedness, and remaining vigilant and adaptable, the United States will be able to effectively meet future health security challenges.



# Appendix A

## NHSS STATUTORY REQUIREMENTS

Every four years, Congress directs HHS to prepare three documents: the NHSS Strategy, Implementation Plan, and Evaluation of Progress of the previous NHSS. The Strategy document and accompanying Implementation Plan are required to describe potential emergency health security threats and identify the process for achieving the preparedness goals of the Public Health Service (PHS) Act, and to identify and respond to such threats.<sup>39</sup>

### PHS ACT PREPAREDNESS GOALS

1. **Integration:** Integrating public health and public and private medical capabilities with other first responder systems, including through –
  - a. The periodic evaluation of Federal, State, local, and tribal preparedness and response capabilities through drills and exercises, including drills and exercises to ensure medical surge capacity for events without notice; and
  - b. Integrating public and private sector public health and medical donations and volunteers.
2. **Public health:** Developing and sustaining Federal, State, local, and tribal essential public health security capabilities, including the following:
  - a. Disease situational awareness domestically and abroad, including detection, identification, investigation, and related information technology activities.
  - b. Disease containment including capabilities for isolation, quarantine, social distancing, decontamination, relevant health care services and supplies, and transportation and disposal of medical waste.
  - c. Risk communication and public preparedness.
  - d. Rapid distribution and administration of medical countermeasures.
  - e. Response to environmental hazards.

- 3. Medical:** Increasing the preparedness, response capabilities, and surge capacity of hospitals, other health care facilities (including pharmacies, mental health facilities, and ambulatory care facilities and which may include dental health facilities), and trauma care, critical care, and emergency medical service systems, with respect to public health emergencies (including related availability, accessibility, and coordination), which shall include developing plans for the following:

  - a. Strengthening public health emergency medical and trauma management and treatment capabilities.
  - b. Fatality management.
  - c. Coordinated medical triage and evacuation to appropriate medical institutions based on patient medical need, taking into account regionalized systems of care.
  - d. Rapid distribution and administration of medical countermeasures.
  - e. Effective utilization of any available public and private mobile medical assets (which may include such dental health assets) and integration of other Federal assets.
  - f. Protecting health care workers and health care first responders from workplace exposures during a public health emergency or exposures to agents that could cause a public health emergency.
  - g. Optimizing a coordinated and flexible approach to the emergency response and medical surge capacity of hospitals, other health care facilities, critical care, trauma care (which may include trauma centers), and emergency medical systems.
- 4. At-risk individuals:**

  - a. Taking into account the public health and medical needs of at-risk individuals, including the unique needs and considerations of individuals with disabilities, in the event of a public health emergency.
  - b. For the purpose of this chapter, the term “at-risk individuals” means children, pregnant women, senior citizens and other individuals who have access or functional needs in the event of a public health emergency, as determined by the Secretary.
- 5. Coordination:** Minimizing duplication of, and ensuring coordination between, Federal, State, local, and tribal planning, preparedness, and response activities (including the State Emergency Management Assistance Compact and other applicable compacts). Such planning shall be consistent with the National Response Plan, or any successor plan, and National Incident Management System and the National Preparedness Goal.
- 6. Continuity of operations:** Maintaining vital public health and medical services to allow for optimal Federal, State, local, and tribal operations in the event of a public health emergency.

7. **Countermeasures:** Promoting strategic initiatives to advance countermeasures to diagnose, mitigate, prevent, or treat harm from any biological agent or toxin, chemical, radiological, or nuclear agent or agents, whether naturally occurring, unintentional, or deliberate.
8. **Medical and public health community resiliency:** Strengthening the ability of States, local communities, and tribal communities to prepare for, respond to, and be resilient in the event of public health emergencies, whether naturally occurring, unintentional, or deliberate by –
  - a. Optimizing alignment and integration of medical and public health preparedness and response planning and capabilities with and into routine daily activities; and
  - b. Promoting familiarity with local medical and public health systems.
9. **Zoonotic disease, food, and agriculture:** Improving coordination among Federal, State, local, Tribal, and territorial entities (including through consultation with the Secretary of Agriculture) to prevent, detect, and respond to outbreaks of plant or animal disease (including zoonotic disease) that could compromise national security resulting from a deliberate attack, a naturally occurring threat, the intentional adulteration of food, or other public health threats, taking into account interactions between animal health, human health, and animals' and humans' shared environment as directly related to public health emergency preparedness and response capabilities, as applicable.
10. **Global health security:** Assessing current or potential health security threats from abroad to inform domestic public health preparedness and response capabilities.

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