



National Center for Emerging and Zoonotic Infectious Diseases
Strategic Plan: 2018–2025



NCEZID Strategic Plan: 2018–2025



VISION
A world where all people are protected from emerging and zoonotic infectious diseases
MISSION
To prevent illness and save lives through the prevention, early detection, and control of emerging and zoonotic infectious disease threats
VALUES
Trust and transparency Fairness and reciprocity Excellence Inclusion Stewardship Data-driven action Accountability and integrity

The National Center for Emerging and Zoonotic Infectious Diseases (NCEZID)

was established in 2010 with a mission and scientific activities that trace back to the earliest days of the Centers for Disease Control and Prevention (CDC). This early work included preventing and responding to infectious disease outbreaks, implementing public health prevention programs, and developing new and innovative public health solutions to address emerging infectious disease threats. This document is a strategic roadmap for the work necessary to realize the Center's vision of a world where all people are protected from emerging and zoonotic infectious diseases. NCEZID improves health, safety, and security and saves lives through the prevention, early detection, and control of infectious disease threats domestically and globally.

The Center is responsible for rare but deadly diseases, such as anthrax and Ebola virus disease, as well as more common illnesses, like foodborne disease, vector-borne diseases, and healthcare-associated and antibiotic-resistant infections. NCEZID has extensive experience leading efforts across CDC in planning for and responding to outbreaks in the United States and around the world, including those caused by emerging or reemerging infectious pathogens. This experience, along with numerous capabilities and capacities, positions NCEZID programs to quickly pivot and scale up efforts when large or unusual infectious disease outbreaks occur.

Our world-renowned scientific staff and programs also promote water, sanitation, and hygiene; protect the health of mobile

populations; combat antimicrobial resistance; advance One Health¹; and identify and control diseases transmitted by animals and people (e.g., rabies, brucellosis, salmonellosis), as well as ticks and insects (e.g., Zika, malaria, and Lyme disease). NCEZID is one of the agency's principal sources of epidemiologic, clinical, laboratory, veterinary, and pathology expertise for bacterial, viral, parasitic, and fungal pathogens, as well as prions and infectious diseases of unknown origin. The nation relies on NCEZID to protect the country from more than 800 dangerous pathogens. For example, NCEZID staff and programs played key roles across CDC's response to the COVID-19 pandemic, leading and supporting efforts on every response task force.

¹ <https://www.cdc.gov/onehealth/index.html>

Collaborations

NCEZID's ability to protect people from known and unknown infectious disease threats is contingent on trust and strong relationships with communities, colleagues, and partners. These entities help inform our scientific agenda, and their invaluable input and collaborations are critical to the success of our programs, emergency responses, research, and mission.

Collaborations with an ever-expanding network of partners help NCEZID identify mysterious illnesses, contain outbreaks, and prevent infections. Today's infectious disease challenges require collaboration and coordination across our agency, with other interagency partners, and a wide variety of organizations who are committed to preventing infectious diseases. Together, NCEZID and its multisectoral partners accomplish more than any one organization or institution can do alone. Our work would not be possible without the help and support of these partners. Our diverse programs are supported by a variety of valuable partnerships with organizations, including (but not limited to):

- ▶ State, tribal, local, and territorial government partners including health departments, departments of agriculture, and departments of wildlife management
- ▶ Professional and public health organizations
- ▶ National medical, veterinary, and environment associations
- ▶ Patient safety advocates and organizations
- ▶ Industry and businesses
- ▶ Academic institutions
- ▶ Federal agencies including those in the Department of Health and Human Services, Department of State, US Agency for International Development, Department of Homeland Security, and the Department of Defense
- ▶ Ministries of Health, Agriculture, and Environment; United Nations agencies; and other international organizations
- ▶ Domestic and global non-governmental and community-based organizations



Health Equity

NCEZID is committed to achieving health equity. We believe that all people deserve fair and just opportunities to achieve their full potential for health and wellbeing, free of inequitable risks and outcomes of emerging and zoonotic infectious diseases. We are committed to a systematic and intentional approach to understand and reduce health inequities and promote health equity across our center's portfolio of work. We recognize our roles in identifying and addressing the social, economic, and environmental factors that affect health risks and outcomes by prioritizing coordinated, collaborative efforts, including strengthening capacity; collecting, analyzing and disseminating actionable data; and planning, implementing, and evaluating equitable interventions that reach populations experiencing inequities.

Updates

NCEZID's first strategic plan (2012–2017) was developed shortly after its inception as a Center. That strategic plan was updated in 2018 to restate and recalibrate priorities for five years, through 2023. In anticipation of an upcoming full-scale strategic planning endeavor that will build on expected agency-wide efforts, NCEZID leadership is updating its current strategic plan to extend to 2025. The plan considers lessons learned from recent outbreaks such as the unprecedented COVID-19 pandemic, multinational mpox outbreak, and multiple cholera, Ebola, West Nile virus, and Marburg outbreaks. In the intervening period, NCEZID will work across the Center and with internal and external partners to develop new strategies to drive the Center's activities in the years to come.

Scope

This Strategic Plan is not intended to be a comprehensive catalog for all NCEZID activities. Rather, it provides an outline of work that must be done to fulfill the Center's mission, and emphasizes special, urgent initiatives and activities that could have a significant impact on the health of the nation going forward. The plan intends to provide clear, consistent, and carefully considered actions focusing on Center efforts to prevent infections, protect people, and save lives.

The success of NCEZID's strategic plan requires continued leadership, partnership, and excellence in a wide range of diverse but interrelated areas that focus on infectious disease detection, prevention, response readiness, and response to outbreaks caused by infectious organisms through diverse approaches, including:

- ▶ Disease surveillance, epidemiology, laboratory science, behavioral and social science, clinical guidelines, and communications
- ▶ State-of-the-art and high-quality laboratory services and support for CDC's infectious disease laboratories
- ▶ Applied research for greater understanding of the contexts where diseases emerge, characterization of pathogens and disease pathogenesis, and solutions for preventing and stopping disease spread
- ▶ Predictive data science and rapid sharing of information
- ▶ Capacity building and training
- ▶ Discovery of new pathogens, development of medical countermeasures (e.g., treatments, vaccines, and diagnostics) and non-medical interventions, and investigation of undefined illnesses

Examples of infectious disease areas include:

- ▶ Advanced molecular detection, including next-generation sequencing and related technologies
- ▶ Antimicrobial resistance
- ▶ Emerging infectious diseases, including bacterial, viral, parasitic, prion, and fungal organisms
- ▶ Foodborne and waterborne diseases
- ▶ Health equity science and practice to understand and reduce infectious disease inequities in populations at higher risk of diseases and associated negative health outcomes
- ▶ Global health security, both domestic and global (e.g., preparedness and response against emerging infections and biotreats)
- ▶ Healthcare-associated infections
- ▶ High consequence but rare infectious diseases (e.g., anthrax, mpox, Ebola)
- ▶ Neglected tropical diseases
- ▶ One Health approaches and prevention of illness at the human-animal and -environment interfaces
- ▶ Traveler and refugee health
- ▶ Vaccine safety and vaccines for travelers
- ▶ Vector-borne diseases
- ▶ Zoonotic diseases (e.g., social media, web-based applications).



STRATEGIES

STRATEGY 1: Strengthen public health core capabilities

1.1: Improve infectious disease epidemiologic capacity domestically and globally

- ▶ Apply lessons learned from previous outbreak responses and advances in scientific methodologies to improve capacity for early disease detection and prevention, response readiness, and outbreak control.
- ▶ Enhance CDC surveillance to provide data to be used by CDC and our partners to prevent, control, and manage infectious diseases. This effort includes discovering new tools to monitor the emergence and re-emergence of infectious disease pathogens (e.g., wastewater surveillance).
- ▶ Discover and share what is known about the behavioral and social determinants of health that contribute to infectious diseases rates and offer insights into possible effective approaches and actions to prevent disease and improve quality of life.
- ▶ Increase capacity for health equity science and practice and use equity-centered approaches across NCEZID's programs.
- ▶ Foster innovation by leveraging cutting-edge technologies and multidisciplinary collaborations to develop novel strategies for detecting, preventing, and controlling infectious diseases.

1.2: Continually improve laboratory quality, safety, and capacity

- ▶ Establish a center-wide plan for laboratory test readiness, which includes a roadmap to ensure that all tests are fully validated according to their intended use; assess priority pathogens to be considered for pre-EUA or deployment; and assess and establish diagnostic platforms for priority pathogens and tests.
- ▶ Create innovative, practical, and cost-effective laboratory tests (e.g., culture-independent and point-of-service laboratory tests), especially for use outside of the healthcare setting, to diagnose infectious diseases faster, and to stop transmission earlier.
- ▶ Improve the ability to rapidly translate diagnostic laboratory information into effective public health action.
- ▶ Embrace a culture of continuous quality improvement in NCEZID laboratories to ensure that they continue to serve as nationally and internationally-recognized reference laboratories that always produce high-quality reference diagnostic tests.
- ▶ Support a network of state, tribal, local, territorial, federal, and international laboratories that adhere to strict policies of safety and security and provide rapid testing capacity to respond to known and unknown biological threats and other public health emergencies.
- ▶ Establish the Laboratory Assay Readiness (LASR) Office to support and coordinate a move towards standardization of laboratory test development and enhance test readiness across the center.

STRATEGY 1: Strengthen public health core capabilities



1.3: Strengthen state, tribal, local, and territorial public health systems

- ▶ Strengthen collaborations and identify opportunities with public health partners to bolster state and local public health program fundamentals and equitable program delivery, including through workforce development.
- ▶ Provide effective leadership and assistance for NCEZID's cooperative agreements (e.g., the Epidemiology and Laboratory Capacity for Infectious Diseases (ELC), the Emerging Infections Program (EIP), Office of Advanced Molecular Detection (OAMD), and the National Wastewater Surveillance System (NWSS) to support epidemiologic investigations, laboratory infrastructure and expertise, surveillance, and prevention and intervention strategies for state, tribal, local, and territorial health departments.
- ▶ Enhance data quality, dissemination, and use to identify, understand, prevent, and reduce infectious disease inequities.
- ▶ Improve capacity of state and local health departments to assess and communicate impact, objectives, and accomplishments.
- ▶ Use targeted approaches in partnership with healthcare and community organizations to enhance public health capacities and efficiencies, including responding to outbreaks and other public health emergencies.
- ▶ Provide guidance and support to healthcare systems and public health partners to prevent and treat infections (e.g., infection control guidance, laboratory guidance, and clinical guidance).

1.4: Develop partnerships, policy, and effective communication messaging to protect the public's health

- ▶ Work with public and private partners to identify broad-based solutions to public health problems at the federal, state, and local levels, including addressing health inequities.
- ▶ Conduct high-level policy analysis to inform decision-making and forecast the impact of focused public health actions.
- ▶ Employ clear communications principles and appropriate mass media channels to ensure that NCEZID science is rapidly and effectively translated for the public to prevent and control disease through broad public awareness and action.
- ▶ Develop novel, behavioral, and social science-based health communication strategies that address infectious disease threats using electronic communications tools (e.g., social media, web-based applications).

1.5: Attract, grow, and retain a highly skilled, dedicated, and representative workforce to fulfill the mission of NCEZID

- ▶ Establish and sustain commitment to diversity, equity, inclusion, belonging, and accessibility within the NCEZID workforce and across its programs.
- ▶ Develop equitable recruitment approaches that effectively identifies highly qualified candidates from a wide-ranging, diverse talent pool, fostering effectiveness and excellence throughout NCEZID.
- ▶ Strengthen the development of staff interpersonal, leadership, and technical skills, including serving in public health responses.
- ▶ Strengthen the resilience of staff by supporting their physical and emotional well-being.
- ▶ Prioritize continuous organizational improvement by regularly monitoring and evaluating workforce and workplace culture, exemplifying values of trust and transparency, fairness and reciprocity, excellence, power sharing and inclusion, and accountability and integrity.
- ▶ Proactively plan for staff succession by analyzing workforce trends, and implementing impactful talent development, knowledge management, and recruitment and retention strategies.





STRATEGY 2: Implement high-impact prevention and intervention approaches

2.1: Use effective strategies to reduce the burden and long-term consequences of foodborne and waterborne diseases

- ▶ Apply new technologies to more quickly and effectively detect and respond to foodborne and waterborne disease outbreaks.
- ▶ Identify opportunities for prevention and intervention by expanding scientific information on the incidence, trends, burden, source attribution, and characteristics of foodborne and waterborne pathogens and infections.
- ▶ Use what is learned from outbreaks, inspections, and monitoring systems to develop new and improve existing strategies for preventing foodborne and waterborne disease.
- ▶ Improve identification of antimicrobial resistance mechanisms and best practices to slow the spread of resistance in enteric and fungal pathogens, including in animal and food production.
- ▶ Strengthen efforts and partnerships to prevent water-, sanitation-, and hygiene (WASH)-related diseases domestically and globally, particularly to slow the spread of cholera.

2.2: Conduct research and implement proven methods to prevent and control unknown, emerging, and re-emerging high-consequence pathogens

- ▶ Improve domestic and global efforts to detect, prevent, and control emerging, high-consequence pathogens, including biothreat agents.
- ▶ Understand when, where, how often, and how people are exposed to high-consequence pathogens.
- ▶ Develop and test laboratory methods and models to rapidly evaluate vaccine and therapeutic ability to neutralize high-consequence pathogens.

- ▶ Study disease patterns and pathogenesis to understand how to best control disease transmission and to develop more effective non-medical and medical countermeasures, including diagnostic tests, vaccines, and therapeutics.
- ▶ Support the development, approval, and use of countermeasures, including diagnostic tests, vaccines, and therapeutics.
- ▶ Enhance and expand CDC's work on developing innovative diagnostic and surveillance technology, such as ePathology, laboratory reporting networks, and wastewater surveillance.

2.3: Develop and implement strategies to prevent, detect, and control vector-borne pathogens

- ▶ Identify and detect vector-borne pathogens and diseases causing illness in people.
- ▶ Understand when, where, how often, and how people are exposed to vector-borne pathogens.
- ▶ Prevent exposure to vector-borne pathogens and mitigate consequences of infection.
- ▶ Implement vector-borne disease diagnostics, surveillance, control and prevention programs in collaboration with international and domestic partners.
- ▶ Study the global public health impact of and evaluate the tools needed to address invasive vector species, such as *Anopheles stephensi*.

STRATEGY 2: Implement high-impact prevention and intervention approaches

2.4: Slow the development of new antimicrobial resistance, prevent the resistance that already exists from spreading, and promote safety and quality in healthcare delivery systems and patient care

- ▶ Enhance state, local, and regional public health capacity to prevent, detect, and respond to new and emerging antibiotic resistance faster (e.g., state/local health department capacity, Antibiotic Resistance Lab Network).
- ▶ Continue to prevent healthcare-associated infections and other adverse health events using data-driven, tailored approaches to aggressively target prevention implementation in states and facilities with high infection rates.
- ▶ Promote CDC's guidelines for infection control and enhance infection control in high-risk facilities (e.g., skilled nursing homes).
- ▶ Improve antibiotic use and implement antibiotic stewardship programs in all healthcare settings.

2.5: Systematically and intentionally conduct and promote health equity science and practice to identify, eliminate, and prevent infectious disease inequities in the United States and globally

- ▶ Enhance workforce diversity, skills, and resources and support a multidisciplinary approach to advance health equity science and practice.
- ▶ Collect, analyze, and disseminate data on inequities to understand patterns and underlying contributors and translate this information into actions that reduce inequities.
- ▶ Partner to plan, implement, and evaluate interventions that reach populations experiencing inequities.
- ▶ Enhance internal collaboration to plan, implement, and evaluate health equity-related activities for capacity strengthening, actionable data, and equitable interventions.

2.6: Control and prevent parasitic diseases in the United States and worldwide

- ▶ Ensure prevention, diagnosis, and treatment of parasitic diseases in the United States through guidance, consultation, drug distribution, diagnostic test services, training, education, and research to advance public health interventions.
- ▶ Reduce the global burden of malaria as co-implementor of the US President's Malaria Initiative through optimizing current and developing new interventions, including malaria vaccine implementation, vector control methods, and mass drug administration.
- ▶ Advance laboratory and epidemiologic methods to measure programmatic impact.
- ▶ Reduce the global burden of neglected tropical diseases (NTDs) by developing better diagnostic tests, developing and strengthening implementation of tools and strategies to control NTDs, and measuring impact of control programs.



STRATEGY 3: Enhance preparedness, outbreak detection, and outbreak response

3.1: Improve public health laboratory capacity for diagnostic readiness and response

- ▶ Enhance capacity of federal, state, local, and other partners to prepare for, detect, respond to, and prevent infectious disease threats, including those associated with bioterrorism (e.g., anthrax), to protect the health of all people in the United States.
- ▶ Increase the nation's laboratory capability to identify infectious disease threats, including by developing, manufacturing, and distributing diagnostic test kits.
- ▶ Design and develop novel diagnostic laboratory tests for biological threats and emerging infectious diseases for internal CDC capacity, as well as to support state, tribal, local, territorial, federal, and international laboratories.
- ▶ Support the strengthening of domestic and international laboratory systems to enhance biosecurity, for timely detection and characterization of biothreat agents.
- ▶ Maintain surge laboratory testing capacity at CDC for outbreak response and emergency support.

3.2: Strengthen outbreak prevention, management, and response in collaboration with internal and external partners

- ▶ Develop, evaluate, and update medical countermeasures and nonmedical mitigation strategies. Enhance and expand operational, data, and laboratory readiness of NCEZID programs for public health responses.
- ▶ Support the CDC Ready Responder program initiative.
- ▶ Support building capacity at state, tribal, local, and territorial health departments to detect, investigate, control and prevent infectious diseases and outbreaks.
- ▶ Respond rapidly in the investigation of state, tribal, local, territorial, national, and international outbreaks of diseases.
- ▶ Provide scientific and programmatic leadership to CDC's public health preparedness and responses, including centralized scientific resources for CDC's infectious disease laboratories.
- ▶ Support and lead interagency activities focused on readiness and response planning for emerging and re-emerging infectious diseases threats.
- ▶ Develop and evaluate non-medical mitigation strategies to assess individual and community factors that support their adoption.
- ▶ Encourage public acceptability of proposed medical and nonmedical mitigation strategies during future emergencies by examining psychological, structural, and cultural factors that contribute towards cooperation.
- ▶ Operationalize CDC's Graduated Response Framework for program and Center-led responses.

STRATEGY 3:

Enhance preparedness, outbreak detection, and outbreak response

3.3: Strengthen global capacity to prevent, detect, and respond to international outbreaks of public health concern that cross borders

- ▶ Provide leadership and scientific support for surveillance, preparedness, outbreak response, and mitigation efforts globally to prevent cross-border spread of infectious diseases, including Tier 1 select agents and toxins.
- ▶ Improve planning and operational preparedness through lessons learned from prior emergency responses involving imported infectious diseases.
- ▶ Advance the adoption and implementation of 2005 International Health Regulations (IHR) core capacities and other global health policies in collaboration with other US and international partners.
- ▶ Prevent and control infectious diseases through cross-Departmental initiatives, including the US President's Malaria Initiative.
- ▶ Advance the prevention of diseases by developing and implementing mitigation and control measures, such as infection prevention and control, vector control, and WASH (water, sanitation, and hygiene).
- ▶ Strengthen clinical and wastewater surveillance and information sharing across public health, agriculture, wildlife, and other sectors.
- ▶ Develop tools to strengthen the ability to forecast changes in patterns related to globally mobile populations and disease outbreaks.

3.4: Detect and respond to infectious diseases spread through the movement of people, animals, and cargo

- ▶ Strengthen infectious disease detection, response, surveillance, and prevention efforts for globally mobile populations.
- ▶ Provide recommendations to safeguard the health of US residents traveling internationally or living abroad.

3.5: Improve international collaboration and capacities for emerging infectious disease prevention, surveillance, control, and research

- ▶ Improve global infection prevention and control practices to stop outbreaks in healthcare facilities.
- ▶ Conduct research and science and integrate epidemiology, surveillance, laboratory, and mitigation measures to enhance prevention, detection, and response.
- ▶ Use a One Health approach to address infectious disease threats at the human-animal-plant-environment interface, including preventing transmission of zoonotic and emerging infectious diseases.
- ▶ Provide consultation and training to domestic and global partners to bolster their readiness to respond to infectious diseases and build workforce capacity.
- ▶ Serve as a World Organisation for Animal Health (WOAH) Collaborating Center for Emerging and Re-emerging Zoonotic Diseases.
- ▶ Contribute to international collaborations such as the One Health Joint Plan of Action (OH JPA) and the Tripartite Zoonoses Guide to support countries to take a One Health approach to address zoonotic diseases and related health threats.



STRATEGY 4: Innovate to stop emerging and zoonotic infections

4.1: Optimize innovative ways to capture, analyze, and visualize critical public health data for decision making

- ▶ Identify and implement innovative approaches to eliminate healthcare-associated infections.
- ▶ Validate and support the use of new surveillance strategies for emerging threats, such as wastewater surveillance.
- ▶ Develop and validate new tools and tests to aid laboratory detection and identification of new, unknown, emerging, or bioterror disease threats.

4.2: Develop, implement, and evaluate innovative methods and tools to better prevent and control emerging and zoonotic infectious diseases and their long-term consequences domestically and globally

- ▶ Advance a One Health approach to prevent, detect, and respond to emerging and zoonotic infectious diseases.
- ▶ Strengthen collaborations to prevent spread of zoonotic infections by promoting best practices for environmental health and animal health, including livestock, pets, and wildlife.
- ▶ Develop and lead implementation of emerging technologies in laboratory, epidemiology, communications, and information technology.
- ▶ Implement the Containment Strategy² as an important approach to detect, identify, and stop pathogens with unusual antibiotic resistance before they spread.
- ▶ Conduct vector-borne disease community prevention trials (e.g., for the prevention of Lyme disease and dengue virus) in collaboration with state, tribal, local, and territorial partners.
- ▶ Strengthen global laboratory capacity for monitoring effectiveness of insecticides and prophylactic drugs, such as antimalarials.

4.3: Accelerate development and application of novel diagnostic methods and technology, including advanced molecular detection

- ▶ Develop practical applications of DNA sequencing technology to support public health priorities.
- ▶ Integrate practical applications of DNA sequencing into routine public health practice while continuing to look for and adapt other, related technologies with the potential to benefit public health.
- ▶ Accelerate the development of metagenomic technologies to enable faster diagnosis of infectious diseases and to solve looming public health problems related to culture independent diagnostic technologies.
- ▶ Ensure that CDC and state public health laboratories have the resources and workforce capacity to implement methods and technologies to detect and prevent new and emerging antimicrobial resistant threats.
- ▶ Develop and evaluate innovative technologies to improve detection, surveillance, and diagnosis of infections and their long-term sequelae, as well as the understanding of pathogenesis.

4.4: Identify and deploy innovative clinical and public health approaches through collaborations with healthcare systems, state and local health departments, academia, healthcare, and the private sector

- ▶ Identify opportunities for greater public health impact by expanding collaboration across existing CDC-funded partners and programs.
- ▶ Explore opportunities to transfer diagnostic and intervention technologies to private sector for large scale application.
- ▶ Identify innovative vector control solutions through collaborations with state and local public health departments, academia, and the private sector.
- ▶ Strengthen partnerships with those with lived experience, including patients and patient advocates.

4.5: Conduct and invest in innovative research to identify and combat antimicrobial resistance

- ▶ Invest in extramural and intramural innovation to address critical questions related to healthcare-associated infections and antimicrobial resistance.
- ▶ Look for new ways to identify and evaluate strategies to combat antibiotic resistance and improve prevention interventions in both healthcare and community settings.
- ▶ Continue to build the Antibiotic Resistance Isolate Bank in collaboration with FDA to advance the development of diagnostic tests to identify and characterize resistant bacteria, and to accelerate research and development for new antibiotics.
- ▶ Inform and foster research to understand resistance mechanisms in animal agriculture and food production to advance development of new vaccines, improve prevention and control interventions, and identify new approaches to improve appropriate antibiotic and antifungal use.
- ▶ Explore unanswered questions about antimicrobial resistance and humans, animals, plants, and the environment (e.g., water and soil).
- ▶ Enhance the capacity on the African continent to generate antimalaria drug efficacy data, conduct molecular surveillance for resistance markers, and perform all associated laboratory work for resistance monitoring through the Partnership for Antimalarial Resistance Monitoring in Africa (PARMA).

PREVENT INFECTIONS

PROTECT PEOPLE

SAVE LIVES



