

NCEZID 2021 ACCOMPLISHMENTS

NATIONAL CENTER FOR
EMERGING AND ZOOONOTIC
INFECTIOUS DISEASES



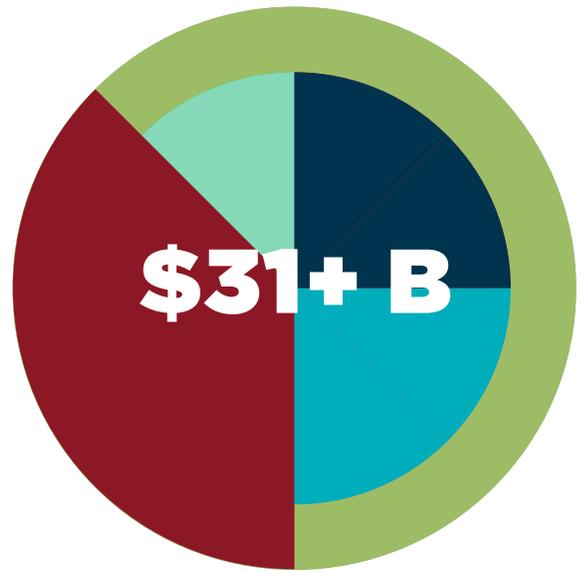
PERSISTING in the Battle Against COVID-19

For the National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) and for CDC overall, 2021 was a continuation of 2020: we remained heavily engaged in the COVID-19 response, while managing our mission-critical work and anticipating future needs. During 2021, we applied many relevant lessons learned from the COVID-19 response to strengthen other infectious disease areas.



FY 2019
(not to scale)

ELC funding awarded in 2021 was roughly **13,600%** more than the funding awarded in 2019 to 64 state, local, and territorial jurisdictions.



FY 2021

ELC funding 2021

Helping health departments tackle COVID-19

Each year, CDC awards millions of dollars through the [Epidemiology and Laboratory Capacity for Prevention and Control of Emerging Infectious Diseases \(ELC\) Cooperative Agreement](#). This funding helps state, local, and territorial health departments detect, prevent, and respond to emerging infectious diseases. When the COVID-19 pandemic began, the US government relied on the existing ELC platform to equip health departments with the funding needed to respond. In FY 2021, ELC distributed nearly \$31.6 billion, for a total of almost \$43 billion since April 2020 to 64 state, local, and territorial health departments to assist with COVID-19 response efforts. Much of this funding supports critical activities that slow the spread of COVID-19 in communities across the country, including:

- Testing
- Case investigation and contact tracing
- Improving disease surveillance systems
- Infection prevention and control
- Enhancing lab systems

CDC's ELC program partnered with other federal agencies to support priority populations and locations. The ELC program partnered with the US Department of Education to implement a \$10 billion initiative to support COVID-19 testing and other mitigation strategies in K–12 schools. Through a partnership with the US Department of Justice, ELC awarded \$700 million to detect and stop the spread of COVID-19 in correctional and detention facilities, like jails and prisons. And, most recently, in collaboration with the US Department of Housing and Urban Development, CDC awarded \$80 million to support COVID-19 detection and mitigation at service sites for people experiencing homelessness and at other congregate housing facilities.

This MATTERS because

ELC's distribution of nearly **\$31.6 billion** in FY 2021 provided critical funding to public health departments throughout the country to help detect and fight COVID-19.



AMD initiates knowledge transfer

During the COVID-19 pandemic, public health scientists put **advanced molecular detection** (AMD) technology to work to identify the virus that causes COVID-19 and its emerging variants.

To help public health departments use this technology, NCEZID's Office of AMD created the Technical Outreach and Assistance for States Team (TOAST). Through the agency's COVID-19 response, the program collates protocols and develops training materials to support genomic surveillance of SARS-CoV-2 in a wide range of public health laboratories across the US.

TOAST identifies what type of support is needed and where tools can have the greatest impact. The program places a high priority on reducing barriers in genetic sequencing and data analysis by providing resources to laboratories at the state, local, and territorial levels. TOAST collaborated with researchers from the Centre for Genomic Pathogen Surveillance to conduct a broad analysis of the bioinformatics capacity, data systems, and reporting processes of public health laboratories within strategically identified sites. The results will be used to transform complex data into actionable information for public health leaders.

This MATTERS because

Boosting the power of state and local laboratories to conduct genetic sequencing and data analysis is vital in tracking variants of SARS-CoV-2 and other emerging pathogens.

Finding links from people to mink in the COVID-19 pandemic

The COVID-19 pandemic has had a surprising victim—mink. NCEZID staff and partners investigated mink deaths on farms in the US and found SARS-CoV-2 to be the culprit. The virus gives mink respiratory symptoms similar to those in humans. Investigations started in August 2020 with outbreaks on two farms in Utah, where staff from NCEZID's **One Health Office** teamed up with colleagues from Utah's departments of health and agriculture, CDC's **National Institute for Occupational Safety and Health**, and the US Department of Agriculture. They found that before the mink died, the animals had contact with mink farm workers who had COVID-19.

Many diseases spread between people, animals, animal products, and the environment. The One Health Office specializes in these disease pathways and is studying them to understand how SARS-CoV-2 spreads. The mink investigations have expanded to testing wildlife and other animals like dogs and cats on and around mink farms. Fortunately, there is no evidence that animals are a significant source of SARS-CoV-2 transmission to people.

This MATTERS because

With CDC's One Health Office in place, we can continue to learn how diseases spread between animals and humans to help prevent future pandemics.





PERSISTING in the Battle Against COVID-19



Planning travel in the time of COVID-19

People traveling around the US last year faced a series of decisions: Should I travel at all? How many infected people are at my destination? Will I need to be tested before I go? Will I need to wear a mask when I get there?

In response, CDC created the [Travel Planner](#) web portal. Users input their destination, or any stops along the way, and the portal provides information about travel restrictions or prevention policies the state, tribal, local, or territorial government has in place. Travelers have used the portal more than 1 million times to make informed decisions and reduce their risk of COVID-19 before, during, and after their trips.

The portal was designed in consultation with CDC partners, including the National Association of County and City Health Officials, the Council of State and Territorial Epidemiologists, the Association of State and Territorial Health Officials, and the Big Cities Health Coalition.

This MATTERS because

People traveling in the US accessed real-time information to better protect themselves from COVID-19 before, during, and after their trips.

Unifying data to monitor travelers at risk for infectious diseases

With millions of people traveling throughout the country daily, data about these travelers help CDC recognize the spread of dangerous infectious diseases that may be moving in, out, and around the country every day. But those data stretch across 20 large disparate systems. In 2021, CDC pulled all 20 data sets together into a single, secure platform called Synapse. This platform can be used to follow up with travelers who may have been exposed to concerning infectious diseases.

NCEZID's [Division of Global Migration and Quarantine](#) modernized information systems used to respond to disease outbreaks at US ports of entry, such as seaports and airports. These systems include a near real-time data portal to monitor the volume and demographics of over 400 million annual international travelers. NCEZID also created a contact information exchange that provides states and territories with contact information for arriving international travelers so that they may conduct public health follow up. To date, Synapse has delivered secure data for more than 3.7 million travelers who were present in countries at high risk during the COVID-19 pandemic and travelers from countries with [Ebola](#) outbreaks.

This MATTERS because

A robust and secure travel data system helps CDC and partners control the spread of infectious diseases.



Using valuable NHSN data collected from long-term care facilities

Early in the COVID-19 response, CDC's [National Healthcare Safety Network \(NHSN\)](#) developed a [Long-Term Care Facilities \(LTCFs\) COVID-19 module](#) that enabled LTCFs to report vital data in a systematic way. As a result, all 15,400 US nursing homes certified by the Centers for Medicare & Medicaid Services (CMS) must now report the COVID-19 vaccination status and other valuable data collected from their 1.2 million residents and 1.8 million-plus staff. CDC works closely with CMS to use that information for infection prevention and control.

Using NHSN data, CDC determined that both vaccination and infection prevention strategies contributed to a 97% reduction in COVID-19 case rates in nursing homes since the peak in late December 2020. A subset of these data is now available on CDC's [COVID-19 Data Tracker](#), where COVID-19 cases and deaths among nursing home residents and nursing home staff members at the national and state levels are updated weekly. These data also informed decision making about boosters in people residing in LTCFs as well as in the country at large.



This MATTERS because

Collecting data from long-term care facilities has been key to understanding how effective COVID-19 vaccines are at protecting people at increased risk for severe illness.



Detecting COVID-19 in wastewater

COVID-19 drove innovation across CDC. One result has been the development of wastewater testing as a bellwether for the spread of the disease.

Genetic material from SARS-CoV-2 ends up in wastewater through the feces of infected people. Tracking the amount of virus in wastewater systems can give authorities advance warning of new outbreaks and reliable trends of COVID-19 cases in communities. CDC's [National Wastewater Surveillance System \(NWSS\)](#) is a unique collaboration among CDC, federal partners, state and local health departments, academic institutions, wastewater utilities, and private laboratories to help communities put this tool to work. By October 2021, test results for more than 22,000 wastewater samples were submitted to NWSS from systems that serve more than 41 million people.

Partners have used these data to confirm case spikes as the COVID-19 Delta variant surged across much of the US. In Ohio, for example, a statewide wastewater monitoring network now collects samples twice a week at 65 sewage-treatment plants and displays the results on its department of health website. CDC plans to expand the system to collect data on other infectious disease threats, such as antibiotic resistance and foodborne diseases.

This MATTERS because

Wastewater surveillance can detect evidence of COVID-19 in a community earlier than other surveillance methods.

ADVANCING NCEZID Core Work

In 2021, when NCEZID staff were not deployed to the COVID-19 response, they were directing the center's "core work"—protecting people from wide-ranging domestic and global health threats, including preparing for and responding to infectious disease outbreaks. Because the work was so extensive, we selected examples ("one big thing") to represent exceptional work to advance infectious disease preparedness in each of our priority areas.

ANTIBIOTIC RESISTANCE

Enhanced surveillance and analytic capabilities showed antibiotic resistance costs billions annually

In 2021, CDC released first-ever estimates showing that treating infections for six multidrug-resistant germs in health care contributes more than \$4.6 billion in US health care costs annually. This analysis, conducted with the University of Utah, shows infection prevention must be prioritized as a first line of defense to prepare for and respond to current and emerging threats.

In 2019, CDC showed that prevention measures reduced rates of certain **healthcare-associated infections** (HAIs). However, COVID-19 created the perfect storm for spreading healthcare-associated and antibiotic-resistant infections. CDC reported substantial increases in several HAIs during 2020, including MRSA (methicillin-resistant *Staphylococcus aureus*), which increased 41% over 2019 numbers. The pandemic's impact intensified the ongoing problem of **antibiotic resistance** (AR) in the US.

CDC has been focusing attention and resources on strengthening domestic and global efforts to curb AR across **One Health**. AR germs are a One Health problem—they can spread between people, animals, and the environment. Turning to 2022, CDC and its partners will forge ahead to empower the nation and world to comprehensively respond to AR threats and reduce disparities among disproportionately affected populations.

This MATTERS because

Infections from just 6 multidrug-resistant pathogens are estimated to cost more than \$4.6 billion annually.

MRSA increased 41% from 2019 to 2020.



Plague caused the skin on the man's hand pictured here to turn black and die. Although plague still causes disease in the US and around the world, it fortunately can be treated with antibiotics.

VECTOR-BORNE DISEASE

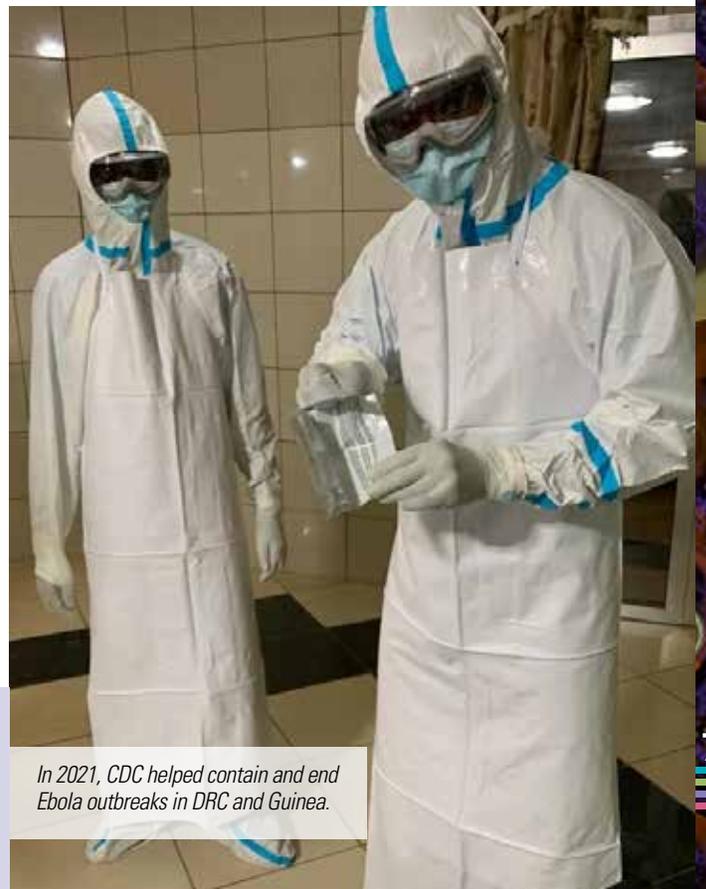
NCEZID issues critical updates for treating plague

Plague, also known as the Black Death, has killed millions worldwide and still causes disease in the US and around the world. A bioweapon attack with *Yersinia pestis*, the bacterium that causes plague, could potentially infect thousands – requiring rapid and informed decision making by clinicians and public health agencies to prevent illness and death.

Fortunately, plague is treatable with antibiotics. After a comprehensive review process, CDC developed plague treatment and prevention **recommendations** for clinicians and public health officials. These guidelines included several important updates and expanded antibiotic treatment options. The recommendations can inform treatment of patients infected with plague (most commonly through the bite of an infected flea) or in the aftermath of a bioterrorist attack.

This MATTERS because

If plague were part of a bioterrorist attack, clinicians and public health officials would immediately need up-to-date guidance on treatment options.



In 2021, CDC helped contain and end Ebola outbreaks in DRC and Guinea.

GLOBAL OUTBREAKS

New emergency response model helped CDC contain 2021 Ebola outbreaks

After helping to bring the world's second-largest outbreak of **Ebola** to an end in 2020, CDC successfully supported simultaneous efforts to contain and end two Ebola outbreaks in 2021.

In a joint effort, NCEZID and CDC's **Center for Global Health** responded to an outbreak in North Kivu Province, Democratic Republic of the Congo, where 12 cases and 6 deaths were reported. The Centers also supported a response in Guinea's N'Zérékoré Prefecture, where the outbreak recorded 23 cases and 12 deaths.

CDC deployers completed more than 25,000 hours supporting response and preparedness efforts in seven countries. Deployers provided technical assistance for epidemiologic investigations, contact tracing, laboratory testing, risk communication, community engagement, and vaccination. They also helped roll out rapid diagnostic testing programs for post-mortem surveillance.

These responses were smaller than the activations to combat COVID-19 and the 2018 eastern DRC Ebola outbreak and, notably, they were conducted while the COVID-19 pandemic dominated the world's attention and resources. However, despite challenges, both outbreaks were ended within months.

This MATTERS because

Smaller-scale mobilization to combat Ebola outbreaks proved effective in 2021 and prevented the spread of this deadly disease to neighboring countries.



ADVANCING NCEZID Core Work



WATERBORNE DISEASE ONE BIG THING

First-ever estimates show true burden of waterborne infections

Access to safe water and adequate sanitation is one of the most direct public health interventions experienced daily by Americans.

Providing widespread reliable and safe drinking water to homes and communities was one of the great public health successes of the early 20th century. Before that, **waterborne diseases** like cholera and typhoid were major causes of illness and death in the US. Despite the tremendous progress made in providing safe water, a new CDC report indicates that continued investment is needed to protect the public from waterborne disease. CDC's first estimates of waterborne disease in the US indicate that every year, waterborne pathogens cause 7,000 deaths, 120,000 hospitalizations, 7 million illnesses, and \$3 billion in healthcare costs. Increased recreational water use, aging drinking water infrastructure, a warming climate, and the increasingly complex ways that we use water help explain why controlling waterborne disease is still a challenge today.

The report also highlights the growing role that **biofilm** pathogens play in causing illness and death. Biofilm is a slimy mixture of water and microbes that can grow in pipes, plumbing, pools and hot tubs, and industrial water systems. The picture of waterborne illness in the US is changing, and this report is an important first step in better understanding how to direct prevention activities and set new goals to improve public health.

This MATTERS because

Every year, waterborne disease causes 7 million illnesses and \$3 billion in healthcare costs in the US.



One of the symptoms of monkeypox is a rash similar to the rash caused by the smallpox virus.

OUTBREAK RESPONSE

Well-executed response to traveler infected with monkeypox

Monkeypox is a rare viral disease, especially in the US, but outbreaks in Africa have killed up to 10% of infected people. Monkeypox is similar to smallpox but has milder symptoms. When a traveler infected with monkeypox flew into the US from Nigeria in July 2021, NCEZID sprang into action to keep the disease from spreading.

The response depended on swift coordination of public health authorities from 25 states and more than 70 NCEZID staff. The team monitored for signs of illness in more than 200 people who came into contact with the traveler. This included his family members, other airline passengers, his healthcare team, and lab scientists who processed his samples. Everyone completed monitoring without becoming ill. NCEZID staff also performed lab testing, developed monitoring guidance, and oversaw the first-ever use of TPOXX, a smallpox treatment stockpiled by the Strategic National Stockpile.

This MATTERS because

CDC's quick and coordinated action with state and local partners prevented a potential outbreak of monkeypox, a dangerous virus that can kill people it infects.

FOODBORNE DISEASE

Quick coordination quickly shuts down a *Listeria* outbreak

In January 2021, CDC, the US Food and Drug Administration (FDA), and state and local health departments rapidly investigated a multistate outbreak of *Listeria monocytogenes* infections linked to queso fresco. A total of 13 illnesses were reported from 4 states, resulting in 11 hospitalizations and 1 death.

Several well-executed actions set this outbreak response apart. It took just 21 days from outbreak identification by CDC's PulseNet to the announcement of a voluntary product recall. Since 2017, the median time between identifying an outbreak and a product recall for *Listeria* investigations has been 32 days. Prompt state response was also key. Within 10 days of opening the investigation, Connecticut and Maryland public health departments interviewed patients and sent teams to collect cheese for testing from stores where some of the sick people had shopped. They identified queso fresco as the culprit. Early sampling by state partners led to quick identification of the brands. Team members collaborated closely with FDA to present compelling investigational findings to the cheese producer and persuaded the company to halt production and recall these products from the five states where it had been distributed. Because Hispanic or Latino people, especially those who are pregnant, have been found to have higher risk of *Listeria* infections linked to soft cheeses, CDC ensured its outbreak updates were translated and rapidly posted online in Spanish.

This MATTERS because

Additional illnesses and deaths were prevented because of the swift, coordinated response of NCEZID and its partners.



ADVANCING NCEZID Core Work



Partnering to advance equitable prevention strategies

AIP nurses help Alaska's COVID-19 vaccination campaign

In early 2021, public health nurses from CDC's [Arctic Investigations Program \(AIP\)](#) helped Alaska earn bragging rights for vaccinating more people per capita against COVID-19 than anywhere else in the US. The staff volunteered at more than 14 clinics, which administered nearly 13,000 vaccine doses in the first 3 months of 2021. AIP nurses worked with a volunteer corps of healthcare professionals mobilized during public health emergencies, called Alaska Respond, to hold clinics at different locations in Anchorage and the Matanuska Valley, including at the Alaska Native Medical Center. By first serving as a vaccine hub, and by supporting vaccination clinics, NCEZID played an important role in the effort to administer hundreds of thousands of COVID-19 vaccines in Alaska.

An effective program to reduce Rocky Mountain spotted fever cases

Certain tribal communities in Arizona are highly impacted by the deadly tickborne disease [Rocky Mountain spotted fever \(RMSF\)](#) with rates of illness more than 150 times higher than the national average for spotted fever rickettsiosis. More than half of cases occur in children. Since 2018, NCEZID has supported Arizona tribal health authorities in strengthening RMSF prevention and control efforts. By using environmental pesticides and placing long-acting tick collars on dogs, like the one pictured left, health authorities have shown they can effectively reduce the incidence of RMSF by more than 40%. In 2021, NCEZID expanded their support by developing a direct-to-tribe funding opportunity open to all tribal communities in Arizona impacted by RMSF; two tribes applied and were awarded.





CLIMATE CHANGE



NCEZID studies raise concerns about health threats from climate change

Climate change is causing milder winters, warmer summers, and fewer frost days. This change in climate makes it easier for many animals, mosquitoes, ticks, and the infectious diseases they spread to expand into new geographic areas and infect more people. Scientists at CDC are conducting surveillance to study the impact of climate change and track the spread of infectious diseases, including Lyme disease and West Nile virus disease.

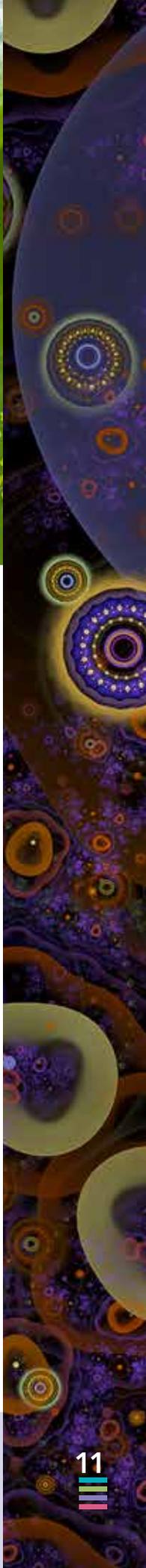
With increasing temperatures

- Animals that carry ticks, such as rodents, deer, and racoons, are expanding their habitats. The warming climate means that ticks emerge and start biting earlier in the season than ever before. NCEZID has increased support to states to improve tick surveillance and reporting. As of August 2021, 26 states are reporting tick surveillance data to CDC.
- Harmful algal blooms (HABs) that grow in fresh or salt water can have big impacts on the economy and environment. Toxins from HABs can make people and animals sick through seafood or water. In 2021, NCEZID released surveillance data on HABs and illnesses, using it to help educate the public and the medical community about this growing public health threat.
- Fungal diseases like Valley fever are spreading to northern areas of the US that were previously not suitable climates for fungi to survive. NCEZID houses one of the few public health groups in the world devoted to preventing and controlling fungal diseases. In 2021, NCEZID worked with partners to better understand where fungal diseases pose the biggest threats, how fungi are becoming resistant to drugs, and how they negatively affect the health of Americans.

NCEZID scientists are working to understand the harmful effects of climate change on the public's health and are poised to respond to this growing crisis.

This MATTERS because

NCEZID is part of a national effort to protect the public's health from the harmful effects of climate change on infectious diseases.



IN OUR SCOPE: 2022 and beyond

As we continue to work toward ending the COVID-19 pandemic in the year ahead, NCEZID is poised to advance infectious disease preparedness for the broad spectrum of diseases we cover. While keeping an ever-watchful eye on challenges that new variants of SARS-CoV-2 may present, we aim to apply many of the lessons learned from the largest infectious disease response in CDC history to fortify preparedness for future outbreaks and pandemics. As we move forward into what we hope soon will be a post-pandemic world, it is with keen understanding that we need to be ready to take swift action against all future outbreaks and public health threats.



Vector-borne disease

WHAT'S HAPPENING

NCEZID is spearheading the National Strategy for Vector-Borne Disease Prevention and Control in Humans. Under the direction of HHS and led by CDC, the strategy will be developed by five federal departments, the US Environmental Protection Agency, the National Aeronautics and Space Administration, and the National Oceanic and Atmospheric Administration.

WHY WE NEED IT

Everyone in the US is at risk from endemic and emerging diseases transmitted by ticks, mosquitoes, fleas, and other blood-feeding vectors. Certain groups, such as people who live in homes without air conditioning or window screens, are at even greater risk of contracting or experiencing adverse consequences from specific **vector-borne diseases**. Cases of **tickborne diseases** reported to CDC doubled from 2004 to 2018; epidemic mosquito-borne viruses, such as **dengue** viruses, are increasing; and the geographic habitat of disease-causing ticks and mosquitoes has expanded.

WHAT IT WILL DO

The Strategy will represent a coordinated federal implementation plan needed to reverse the current increasing vector-borne diseases threat. This plan will help identify gaps, prioritize research and development across the federal government, and guide the placement of federal investments for the future.



Advanced molecular detection

WHAT'S HAPPENING

Thanks to support provided by the [American Rescue Plan](#), CDC is investing \$1.7 billion to expand activities and strengthen the workforce for genomic sequencing, analytics, and disease surveillance of viruses (such as SARS-CoV-2) and other organisms. This funding established contracts with commercial laboratories to sequence samples from across the country. Additionally, CDC has and will continue to distribute critical funds to state and local jurisdictions to support national surveillance efforts.

WHY WE NEED IT

The COVID-19 pandemic and the emergence of SARS-CoV-2 [variants](#) have underscored the importance of genomic technologies in addressing infectious disease public health threats. The technology is reshaping infectious disease surveillance, allowing for earlier detection and more precise investigation of outbreaks across a spectrum of infectious diseases. The genomic data are used in developing molecular diagnostic tests, vaccines, and medical treatments.

WHAT IT WILL DO

Support from the American Rescue Plan will help CDC and US jurisdictions enhance their capacity to closely watch for SARS-CoV-2 mutations by conducting, expanding, and improving genomic sequencing activities. In 2022, CDC will establish Centers of Excellence in Genomic Epidemiology to help states and universities develop new tools and techniques while training the public health workforce of tomorrow. These centers will operate in tandem with state health departments and academic institutions, allowing all parties to share cutting-edge research. The funding will also develop a cloud-based national bioinformatics infrastructure for data sharing of SARS-CoV-2 and other current and future infectious disease threats.

NCEZID also issued research awards as part of the [SARS-CoV-2 Sequencing for Public Health Emergency Response, Epidemiology, and Surveillance](#) (SPHERES) Initiative. The awards are collaborative projects intended to expand the agency's innovative responses to the COVID-19 pandemic and accelerate the application of SARS-CoV-2 sequencing for genomic epidemiology and pandemic response. Examples include the University of California, San Francisco's (UCSF) quest to create a real-time network by using rapid viral sequencing to monitor the evolution and spread of SARS-CoV-2 in California and communicate data back to public health agencies to inform public health responses. UCSF's genomic sequencing efforts detected the first confirmed case of COVID-19 caused by the Omicron variant detected in the US, with support from CDC and California's Department of Public Health.

Food safety

WHAT'S HAPPENING

NCEZID's [food safety](#) program is paving the way for quicker and better [outbreak](#) detection, which involves developing and piloting new methods in states.

WHY WE NEED IT

Newer foodborne disease diagnostics, called culture-independent diagnostic tests (CIDTs), are good for patients and clinicians because they are faster and less expensive than older, culture-based tests. However, CIDTs do not produce a bacterial isolate that our current public health surveillance systems, like [PulseNet](#), need. PulseNet collects genomic fingerprints from bacteria isolated from stool samples by using a culture-based approach, and the loss of isolates is increasingly weakening our foodborne outbreak surveillance by reducing sampling. We need a new process for genomic fingerprinting that lets public health laboratories skip the bacteria isolation step but still get the genomic data needed to detect outbreaks and to track strains of particular concern.

WHAT IT WILL DO

NCEZID's foodborne disease experts developed a new metagenomic approach using highly multiplexed amplicon sequencing (HMAS) to help identify bacteria and take PulseNet to the next level. It enables public health laboratories to more easily process and upload samples (including subtyping them) into the surveillance systems and bypass the bacterial culture step entirely. This new approach gives more detailed profiles of the pathogen culprits, expediting public health response during outbreaks. Currently, there is a pilot program with the Colorado and Minnesota state laboratories that will test the HMAS method.



IN OUR SCOPE: 2022 and beyond



Infection prevention

WHAT'S HAPPENING

CDC will continue investing more than \$2.1 billion from the [American Rescue Plan](#) to expand efforts that protect Americans from COVID-19 infections and other emerging infectious diseases across healthcare settings.

WHY WE NEED IT

The COVID-19 pandemic placed tremendous stress on the healthcare sector—from hospitals to nursing homes—and exposed gaps and disparities in infection prevention and control. By preventing or stopping the spread of [infections in healthcare settings](#), we save lives and protect patients and healthcare workers. The pandemic also showed us the importance of the connection and coordination between clinical and public health labs for the detection of emerging threats and public health and healthcare responses.

WHAT IT WILL DO

The funding helps CDC strengthen and equip state, local, and territorial public health departments and other partner organizations with the resources needed to better detect and fight infections in US healthcare facilities, including COVID-19 and other health threats such as [antibiotic resistance](#). These funds will also support a critical public health workforce in health departments that investigate and respond to outbreaks of COVID-19 in nursing homes, hospitals, and other healthcare facilities throughout the pandemic.

Antimicrobial resistance

WHAT'S HAPPENING

NCEZID launched the [Global Antimicrobial Resistance \(AR\) Laboratory and Response Network](#) in late 2021 to combat AR worldwide. CDC recently awarded \$22 million to nearly 30 organizations in more than 50 countries that are leading these efforts.

WHY WE NEED IT

Each year in the US, 2.8 million people get an antibiotic-resistant infection, and 35,000 of them don't survive it. The Global AR Lab and Response Network builds off the success of CDC's domestic [AR Lab Network](#) by filling critical detection and response gaps globally that were identified in CDC's [2019 AR Threats Report](#). The collaborative network will also inform global prevention strategies to ensure AR threats are stopped when and where they emerge.

WHAT IT WILL DO

Every country is an importer and exporter of resistance. The Global AR Lab and Response Network helps public health experts more rapidly identify new types of resistance (resistance genes or pathogens), while also responding to antibiotic-resistant threats and invasive bacterial and respiratory pathogens in communities. This work includes CDC's newly launched [Global Action in Healthcare Network](#)—a global network of countries, institutions, and partners working to detect and respond to healthcare-associated pathogens.





Laboratory capacity

WHAT'S HAPPENING

In 2022, we expect to break ground for a new high-containment laboratory building, where we can continue to safely work with some of the world's deadliest pathogens.

WHY WE NEED IT

CDC's existing high-containment laboratories have begun to show their age. The new laboratory will replace and enhance CDC's high-containment laboratory capacity, with six **biosafety level (BSL)-4** and two BSL-3 laboratories. BSL-4 is the highest level of biological safety and these labs allow CDC to work with especially dangerous pathogens that have few vaccines or treatments. Pathogens such as **Ebola virus** and **smallpox virus** remain a threat and emerging diseases continue to be discovered as well.

WHAT IT WILL DO

This updated laboratory space will allow CDC to continue safely handling the world's most dangerous pathogens and expand the agency's ability to conduct research and participate in the development and evaluation of life-saving vaccines, treatments, and diagnostic tests. This would enable CDC to contribute to the full pipeline of medical countermeasures development to ensure we are fully prepared to detect and respond effectively to outbreaks and ultimately prevent them from occurring.

Global health

WHAT'S HAPPENING

NCEZID places zoonotic and infectious disease experts in different areas around the world (like the South-East Asia region and targeted high-risk countries) to combat emerging infectious disease threats.

WHY WE NEED IT

Strategically placed staff give us eyes and ears on the ground that we need to keep one step ahead of infectious disease outbreaks. This helps us better coordinate outbreak response and address needs like monitoring disease threats to the US, bolstering public health and laboratory workforce capacity, and improving regional and national public health surveillance systems.

WHAT IT WILL DO

Specialized expertise in pandemics and emerging and zoonotic disease threats sets CDC apart. Infectious disease prevention and control experts in the South-East Asia Region, will

- Provide high-level technical support to detect, prevent, and respond to emerging infectious disease threats, including healthcare-associated infections and zoonotic infections.
- Facilitate technical collaboration between NCEZID programs and country ministries of health, public health institutions, academia, WHO, and non-governmental organizations.

Disease outbreak response and preparedness

WHAT'S HAPPENING

NCEZID is strengthening our ability to produce timely data and lab results during a quickly moving pandemic and provide data that can be used for clinical management of cases.

WHY WE NEED IT

The sudden onset of COVID-19 highlighted the need for a triage laboratory at CDC that can be quickly set up during an emergency to provide real-time data. We also need to expand our genomic sequencing capacity to help produce data that clinicians can use to diagnose and treat patients.

WHAT IT WILL DO

A new triage laboratory provides CDC with the infrastructure to quickly process large volumes of diagnostic samples for testing during outbreaks. This additional capacity will deliver the flexibility that CDC and state and local health departments will need to make rapid, informed decisions when the next outbreak hits.

Also expanding our Genomic Sequencing Lab (GSL) means improving our ability to perform genetic sequencing for outbreaks, public health research, and clinical applications (eg, characterizing antibiotic resistance genes). The enhanced GSL will be able to test patient samples so the data can assist state public health labs with tracking emerging strains and clinical management of patients. These necessary improvements to the GSL are timely because genomics have emerged to become a cornerstone of public health response.

2021: Our year in **NUMBERS**.....

155	Multistate clusters of enteric infections investigated (107 <u>salmonellosis</u> , 31 <u>E. coli</u> infections, 17 <u>listeriosis</u>)
100 K	Afghan evacuees resettled into the US during <u>Operation Allies Welcome</u> , using NCEZID guidance to protect against infectious diseases. This work involved 239 staff who worked more than 15,000 hours
476 K	Americans diagnosed and treated for <u>Lyme disease</u>
300	Cases of <u>unexplained illnesses and deaths</u> investigated
367	Investigations of SARS-CoV-2 cases spread between people and animals, and 12 field deployments
18 K	Requests from healthcare settings for assistance with possible infectious disease outbreaks (eg COVID-19, <u>AR</u> threats)
9.5M	People enrolled in <u>v-safe</u> , CDC's smartphone-based tool for quickly reporting any side effects after getting a COVID-19 vaccine
48.5 K	<u>ELC</u> -funded staff in state, territorial, and local health departments to respond to the COVID-19 pandemic
2.1 M	SARS-CoV-2 viruses sequenced in the US
110 K	COVID-19 specimens received and triaged for testing, including 25K specimens that were sequenced at CDC

CDC's National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) protects people from domestic and global public health threats. NCEZID helps lead efforts across CDC to prepare for and respond to infectious disease outbreaks.

www.cdc.gov/ncezid

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