CDC provides critical support in the U.S. and abroad to protect people from antibiotic resistance.

ARinvestments.cdc.gov
## Brazil
Experts are conducting a survey of azole-resistant *Aspergillus fumigatus* throughout Latin America using the existing Latin American Medical Mycology Network (LAMMN), building a genetic background of resistant strains, establishing how resistance spreads, and informing interventions to improve patient outcomes, reduce death, and lower health care costs.

$748,893

## Chile
Experts are transforming surveillance for emerging infectious diseases in Chile, focusing on AR as a an ever-evolving health threat by improving human, laboratory, and bioinformatic capacities for detection, identification of AR drivers, and improving early response. These efforts will incorporate AR colonization surveillance in healthcare facilities, the community, and the environment to inform global containment of AR.*

$839,000

## Chile
Experts in Chile are building off their previous CDC-funded research to determine the genetic relatedness of multidrug-resistant organisms in hospitals and the community by performing whole genome sequencing to understand the relationship between colonization within hospitals and between hospitals and communities, helping inform public health interventions.

$401,000

## China
CDC experts are working in China to support the Chinese National Center for Tuberculosis Control and Prevention (NCTB) to scale-up and implement projects designed to strengthen TB surveillance, improve TB infection control in healthcare facilities, and build a quality TB laboratory network in China; CDC experts are also working to support the China Field Epidemiology Training Program (FETP) TB track.

$50,000

## Democratic Republic of the Congo
Experts will enhance detection and response to infectious disease threats, including AR, HAIs, and COVID-19, in healthcare facilities in the Democratic Republic of Congo by developing networks to implement prevention and containment strategies at local, national, and regional levels.*

$150,000

## Ethiopia
Experts are working in Ethiopia to provide technical support for improved coordination and monitoring of IPC response activities.*

$150,000

## Ethiopia
Experts are working in Ethiopia to conduct AR surveillance.*

$50,000

## Guatemala
Experts are developing and testing a period prevalence survey of multidrug-resistant organism colonization in communities and hospitals in Guatemala.*

$200,000

*This work was funded by COVID-19 supplemental appropriations, such as the American Rescue Plan or the CARES Act. The work funded through COVID-19 supplemental appropriations is also summarized on the FY21 AR Investment Map COVID-19 Fact Sheet.
India
CDC’s global work to combat AR prevents the importation of AR threats into the United States. CDC experts are working in India to conduct active household contact tracing for active and latent TB intervention; evaluate latent TB infection (LTBI) treatment for contacts of MDR-TB patients; expand infection prevention and control (IPC) and airborne infection control measures; develop and implement community score card to assess and improve uptake of TB and TB/HIV services.

India
Experts are working in India to build capacity and strengthen hospital infection control through detection, prevention, and response.*

India
Experts are implementing active and passive surveillance to detect and monitor emerging and known AR pathogens (carbapenem-resistant organisms and Candida auris) through culture and whole genome sequencing.*

India
Experts are evaluating routine clinical culture data from ICU patients for CRE surveillance and to monitor and guide infection prevention practices in two hospitals in India.*

India
Experts are working in India to implement and sustain laboratory-based AR detection and reporting of all eight World Health Organization (WHO) priority pathogens across the country.

India
Experts are working to find an effective, feasible and sustainable way to implement screening for CRE in hospitals in India, informing infection prevention efforts and helping healthcare facilities reduce death rates caused by CRE infections.

India
Experts are working in India to support laboratory networks, communities of practice and quality assurance systems through Stepwise Laboratory Improvement Process Towards Accreditation (SLIPTA)/Strengthening Laboratory Management toward Accreditation (SLMTA) activities for TB and multidrug-resistant TB (MDR-TB), Lab Extension for Community Healthcare Outcomes (ECHO) network, as well as continue Truenat External Quality Assessment (EQA).

Indonesia
Experts are working to improve capacity to detect and monitor emerging AR in bacterial respiratory pathogens, with a focus on Streptococcus pneumoniae, in Indonesia.

Jordan
Experts are implementing a technical assistance program built on the capacity of the Jordanian healthcare system via the national Jordan HAI/AMR Surveillance and Prevention Network.*

*This work was funded by COVID-19 supplemental appropriations, such as the American Rescue Plan or the CARES Act. The work funded through COVID-19 supplemental appropriations is also summarized on the FY21 AR Investment Map COVID-19 Fact Sheet.
Kenya
Experts are working in Kenya to provide Project ECHO laboratory training and support an evaluation of the system.*
$75,000

Kenya
Experts are working to improve water, sanitation, and hygiene and environmental monitoring in Kenya to address drug-resistant enteric pathogen transmission.
$600,000

Kenya
Experts are working to improve the capacity to detect, monitor, and control emerging antibiotic-resistant Candida auris in Kenya’s healthcare settings. This work will enhance IPC strategies, improving patient outcomes and protecting the healthcare workforce.
$597,772

Kenya
CDC and experts are working in Kenya to assess the burden, molecular epidemiology, and drivers of resistant bacteria in humans through rigorous studies of people colonized with multidrug-resistant bacteria.
$250,000

Mexico
The U.S.-Mexico Foundation for Science (FUMEC) and the Mexican Ministry of Health are developing capacity and processes to inform the scale-up of TB diagnostics in Mexico for accurate and efficient diagnosis of LTBI, as well as strengthens TB surveillance and prevention outcomes. The project is based in two Mexican states along the U.S. border that have high rates of TB—Baja California and Sonora.
$407,727

Nigeria
Experts are building capacity in Nigeria for the Nigerian Centre for Disease Control IPC Unit to prevent transmission and respond to outbreaks of emerging infectious diseases, including AR and COVID-19, in health care.*
$200,000

Pakistan
Experts are working in Pakistan to implement their national AR surveillance plan and enhance IPC in healthcare facilities.*
$2,350,000

Pakistan
Experts are evaluating the connection between CRE, extended-spectrum β-lactamase-producing Enterobacterales, methicillin-resistant Staphylococcus aureus, and vancomycin-resistant Enterococcus samples taken from hospitalized patients and their household members, informing infection prevention strategies in the region to prevent spread.
$748,687

Pakistan
Experts are working to build local capacity to detect, track, and report antibiotic-resistant Candida auris and other antibiotic-resistant Candida species at Aga Khan University Hospital in Pakistan with an emphasis on a description of molecular mechanisms of AR. This work will inform the response when threats are detected and put into place the mechanisms for molecular detection of outbreaks.
$500,000

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Pakistan
$428,439
Experts are working to improve the capacity to detect, monitor, and control emerging antibiotic-resistant *Candida auris* in Pakistan healthcare settings. This work will enhance infection prevention and control strategies, improving patient outcomes, and protecting the healthcare workforce.

Sierra Leone
$100,000
Experts are working in Sierra Leone to provide IPC training and conduct monitoring and evaluation activities for AR and the COVID-19 response.

South Africa
$365,000
CDC experts are working in South Africa to expand whole genome sequencing capacity for the detection of drug-resistant TB and to look at the transmission patterns for drug-resistant TB.

South Africa
$350,000
Experts are building capacity in the National Department of Health in South Africa to support the efforts to control the spread of COVID-19, other emerging diseases, and AR in healthcare facilities.*

Tanzania
$150,000
Experts are working in select regions in Tanzania to provide technical support for strengthening IPC at prioritized facilities in support of the AR and COVID-19 response.*

Tanzania
$50,000
Experts are working in Tanzania to provide technical support for improved coordination and monitoring of IPC activities.*

Thailand
$100,000
Experts are working in Thailand to build capacity for a regional AR isolate referral network in the sub-national reference laboratory; conduct outbreak, AR quality improvement training, and scientific writing workshops; and conduct an AR surveillance system evaluation and IPC training on AR prevention.

Thailand
$400,000
Experts are working in Thailand to strengthen AR surveillance through the development of a national AR reporting and response system to monitor and control AR.*

Vietnam
$150,000
CDC experts are working in Vietnam to improve the diagnosis and surveillance of MDR and extensively drug-resistant (XDR) TB through Rifampin resistance surveillance and establishing rapid XDR TB diagnosis and treatment; and to support the Vietnam National TB Reference Laboratory (NRL) to become a TB supranational reference laboratory.

Vietnam
$125,000
CDC experts are working in Vietnam to engage and leverage the Public Private Interface Agency Model to rapidly expand public-private mix for TB diagnosis, care, and prevention.

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AR Solutions In Action
CDC’s Investments to Combat Antibiotic Resistance Threats

GLOBAL AR Projects (cont.)

Vietnam
Experts are strengthening health care in Vietnam through capacity building and quality improvement.*
$200,000

Vietnam
Experts are working to implement IPC activities in the Vietnam Ministry of Health’s IPC model hospital network, including monitoring healthcare workers for COVID-19 and improving triage practices through quality improvement approaches in support of AR and the COVID-19 response.*
$512,000

MULTI-COUNTRY AR PROJECTS

$200,000
CDC experts are working in Botswana, Lesotho, Malawi, Eswatini, Tanzania, and Uganda to optimize approaches for the diagnosis and prevention of tuberculosis (including multi-drug resistant tuberculosis) in adults and children living with HIV. This includes new diagnostic and prevention tools, molecular diagnostics, Computer Aided Detection (CAD), artificial intelligence (AI), and a new drug regimen.

$400,000
Experts are recruiting IPC champions from at least 10 healthcare facilities in four East African countries to participate in an international network/community of practice to respond to AR and COVID-19.*

$200,000
Experts are assessing capacity for detection of AR in the Eastern Mediterranean Region.*

$867,000
Experts will conduct a multifaceted assessment of IPC activities in Latin America.*

$886,000
Experts are working in Latin America to implement national policy, guidelines, and tools to strengthen IPC capacities to decrease HAI burden and contain communicable diseases in healthcare facilities. The Pan American Health Organization is supporting countries to establish national AR surveillance systems to report laboratory and epidemiology information to the WHO.*

$60,000
Experts are translating and implementing IPC guidelines, standard operating procedures, and tools in Latin America to support the AR and COVID-19 response.*

$386,832
Experts are working in Iraq, Jordan, Palestine, Libya, Morocco, Egypt, Sudan, Pakistan and Lebanon to collect, analyze, and upload Salmonella Typhi sample data to the National Center for Biotechnology Information, establish surveillance platforms through training to demonstrate the quality and quantity of data generated from a surveillance program, informing how Salmonella Typhi spreads in these countries.

$500,000
Experts are working to improve the detection and response to antibiotic-resistant Meningococcal disease in Burkina Faso and Togo.

*This work was funded by COVID-19 supplemental appropriations, such as the American Rescue Plan or the CARES Act. The work funded through COVID-19 supplemental appropriations is also summarized on the FY21 AR Investment Map COVID-19 Fact Sheet.
Experts are working in Ghana, the United Kingdom, Peru, Japan, and Europe to build a CDC International Antibiotic-Resistant Gonorrhea Isolate Bank to include diverse *Neisseria gonorrhoeae* strains based on geography, genomics, and antibiotic susceptibility profiles. This Bank will provide complementary data to CDC’s AR Lab Network and help experts understand the emergence and spread of resistant gonorrhea, informing treatment, diagnostics, and prevention activities globally.

Experts are working in Guatemala, Panama, Ecuador, and Argentina to assess current IPC practices, evaluate the healthcare worker perspective on IPC, and identify challenges to implementing effective IPC in hospitals, informing a future toolkit to help other countries facing similar challenges.

Experts are evaluating current antibiotic stewardship practices, needs, and implementation successes and challenges in healthcare facilities in Latin America, South and Southeast Asia, and Southeast Africa, identifying gaps and context-specific factors associated with implementation to improve antibiotic use.

Experts in Spain are working to build off CDC-funded work to determine the mobile genetic elements and AR genes involved in the emergence and spread of mult drug-resistant *Shigella sonnei* and XDR *Salmonella* Typhi to develop bioinformatic pipelines (technology that helps store, analyze, and share biological data), informing when and where AR bacteria that are harmful to human health might emerge in the future.

Experts are using validated tools to assess current antibiotic stewardship programs, practices, and needs in hospital networks in four lower and upper middle-income countries in Asia to target stewardship interventions to reduce and improve overall antibiotic use.*

Experts are training healthcare workers in Pakistan on COVID-19 triage and supervising improvements. Experts are also evaluating the effectiveness of CDC’s Best Practices for Environmental Cleaning in Low-Resource Settings Toolkit in southern Africa by measuring antibiotic use and AR infection changes in southern Africa and South America as well as enhancements to healthcare worker COVID-19 symptom monitoring and reporting in central and east Africa.*

Experts are establishing a network of healthcare facilities and reference laboratories within Ethiopia and eastern Africa to rapidly detect, respond, and prevent infectious disease threats. Experts will strengthen, develop, and support IPC programs, antibiotic stewardship programs, and laboratory quality assurance and capacity of the network through guideline development, training, mentoring, and monitoring and evaluation.*

Experts are working with stakeholders in Botswana, South Africa, and Zimbabwe to assess antibiotic stewardship practices, identify IPC needs at the national and hospital levels, and gain a deeper understanding of factors that influence antibiotic stewardship program implementation. Experts are creating an antibiotic stewardship implementation toolkit to build capacity across stakeholders in Botswana.*

Experts are developing a multinational project to improve genomic surveillance of resistance, identify risk factors for resistant Gram-negative bacilli bloodstream infections, enhance training in IPC and antibiotic stewardship, and strengthen laboratory capacity for AR detection in Greece.*

Experts are designing and implementing a pilot study to describe healthcare service reductions due to COVID-19 and the potential contribution of IPC disruptions to service reductions in Kenya and Cameroon. They are also conducting a webinar series focused on practical advice and implementation considerations for IPC in healthcare settings globally.*
Experts are building strong healthcare networks within Brazil, Indonesia, and the Philippines to integrate interventions to prevent, detect, and respond to infectious disease threats, including AR, HAIs, and COVID-19.*

Experts are working in South America to assess the implementation of carbapenem-resistant organisms control policies in ICUs in select facilities, to assess the impact of widespread transmission of COVID-19 on antibiotic use and prevalence of multidrug-resistant organisms in adult intensive care units, and to pilot an IPC assessment tool in neonatal ICUs.*

Experts are working in Southeast Asia to expand the AR surveillance system and provide support to AR surveillance laboratories to meet baseline standards.

Experts are working in Southeast Asia to evaluate the effectiveness of CDC’s Best Practices for Environmental Cleaning in Low-Resource Settings Toolkit, evaluate enhancements to healthcare worker symptom monitoring and reporting in the context of the COVID-19 pandemic, and evaluate changes in antibiotic use and AR infections.*

Experts are working in Southeast Asia to enhance global laboratory capacity in Mexico and Brazil to detect, assess, and respond to emerging AR in Bordetella pertussis.

Experts are working across Australia, Bangladesh, China, Hong Kong, India, Japan, Korea, Malaysia, New Zealand, Philippines, Taiwan, Thailand, Vietnam to improve the detection of enteric (gut) pathogens, including those that are resistant to antibiotics, in PulseNet International by expanding data collection in Southeast Asia.

Experts are working to strengthen global and national surveillance systems of Neisseria gonorrhoeae through the Enhanced Gonococcal Antimicrobial Surveillance Programme (eGASP) in Thailand, Philippines, Cambodia, and South Africa.