AR Solutions *In Action*

CDC's Investments to Combat Antibiotic Resistance Threats

FISCAL YEAR 2021

CDC'S GLOBAL AR PROJECTS

$39,435,077

Funding for AR Activities
Fiscal Year 2021

HIGHLIGHTS

Five local CDC experts across India, Sierra Leone, Kenya, and Vietnam

SINGLE-COUNTRY AR PROJECTS

$300,000

Bangladesh

CDC and experts are working in Bangladesh to asess the burden, molecular epidemiology, and drivers of resistant bacteria in humans through rigorous studies of people colonized with multidrug-resistant bacteria.

$593,000

Botswana

Experts are establishing a network of organizations (Botswana Ministry of Health and Wellness (MOHW), the University of Botswana (UB), the University of Pennsylvania, the Children's Hospital of Philadelphia (CHOP), and University of British Columbia (UBC)) to support the Ministry of Health and Welfare in Botswana in strengthening the detection, response, and containment of AR and HAIs in healthcare facilities.*

$451,533

Botswana

Experts are building off their previous CDC-funded work to determine the genetic mechanisms of resistance and relatedness of multidrug-resistant Gram-negative extended-spectrum cephalosporin-resistant Enterobacterales (ESCrE) and carbapenem-resistant Enterobacterales (CRE) in Botswana through whole-genome sequencing, helping to determine prevalence and new testing strategies to decrease ESCrE and CRE in the area.

$400,000

Brazil

Experts are working to expand the Brazilian Antimicrobial Resistance Surveillance System (BR-GLASS) to improve monitoring of antibiotic-resistant *Candida* species in Brazil. This work will expand and enhance infection control and prevention (IPC) strategies, improving patient outcomes and protecting the healthcare workforce.

$447,000

Brazil

Experts are working in Brazil to reinforce actions in the context of Brazil's Global Antimicrobial Resistance Surveillance System (BR-GLASS) at a country level.*

$300,000

Brazil

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

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This data represents CDC's largest funding categories for AR. It shows extramural funding that supports AR activities from multiple funding lines.

COVID-19: coronavirus disease 2019
AR: antibiotic resistance **HAI:** healthcare-associated infection

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

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GLOBAL AR Projects (cont.)

$748,893

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.

$839,000

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.*

$401,000

Chile

Experts in Chile are building off their previous CDC-funded research to determine the genetic relatedness of multidrug-resistant organisms 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.

$50,000

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.

$835,000

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.*

$50,000

Ethiopia

Experts are working in Ethiopia to conduct AR surveillance.*

$200,000

Guatemala

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

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GLOBAL AR Projects (cont.)

$475,000

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.

$505,000

India

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

$1,119,000

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.*

$1,391,000

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.*

$400,000

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.

$641,687

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.

$100,000

India

CDC 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).

$500,000

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.

$831,000

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.*

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GLOBAL AR Projects (cont.)

$75,000

Kenya

Experts are working in Kenya to provide Project ECHO laboratory training and support an evaluation of the system.*

$600,000

Kenya

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

$597,772

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.

$250,000

Kenya

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

$407,727

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.

$200,000

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.*

$2,350,000

Pakistan

Experts are working in Pakistan to implement their national AR surveillance plan and enhance IPC in healthcare facilities.*

$748,687

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.

$500,000

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.

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GLOBAL AR Projects (cont.)

$428,439

Pakistan

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.

$100,000

Sierra Leone

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

$365,000

South Africa

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.

$350,000

South Africa

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.*

$150,000

Tanzania

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.*

$50,000

Tanzania

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

$100,000

Thailand

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.

$400,000

Thailand

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.*

$150,000

Vietnam

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.

$125,000

Vietnam

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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$200,000

Vietnam

Experts are strengthening health care in Vietnam through capacity building and quality improvement.*

$512,000

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.*

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**.

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GLOBAL AR Projects (cont.)

$323,947 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.

$287,501 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.

$2,202,541 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.

$175,707 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 multidrug-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.

$600,000 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.*

$1,200,000 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**.*

$801,000 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.*

$1,477,000 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**.*

$963,000 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**.*

$750,000 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.*

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GLOBAL AR Projects (cont.)

$4,235,000 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.*

$694,000 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.*

$288,000 Experts are working in **Southeast Asia** to expand the AR surveillance system and provide support to AR surveillance laboratories to meet baseline standards.

$400,000 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.*

$600,000 Experts are working to enhance global laboratory capacity in **Mexico** and **Brazil** to detect, assess, and respond to emerging AR in *Bordetella pertussis*.

$600,000 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**.

$788,175 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.**

Learn more about CDC's work to combat antibiotic resistance globally:

www.cdc.gov/DrugResistance
www.cdc.gov/InfectionControl
www.cdc.gov/GlobalHIVTB

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