



Summer 2021



World Mosquito Day 2021 (August 20): Bringing Attention to the World's Deadliest Animal

The mosquito. The long-legged insect that annoys, bites, and leaves you with an itchy welt is not just a nuisance—it's the [world's deadliest animal](#), spreading diseases such as [malaria](#) or disabling [lymphatic filariasis](#) (LF).

In 2019, 409,000 people died from malaria and millions more become ill each year, including about 2,000 returning travelers in the United States. Nearly half of the world's population is at risk of this preventable disease.

LF, a parasitic disease transmitted through repeated mosquito bites over a period of years, affects more

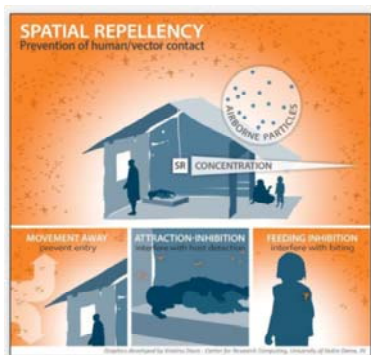
than 120 million people in 72 countries and is a leading cause of permanent disability worldwide.

World Mosquito Day marks the historic discovery on August 20, 1897, that female *Anopheles* mosquitoes transmit malaria. Now, new threats from [growing insecticide resistance](#) and [emerging urban mosquito vectors like *Anopheles stephensi*](#) require innovative approaches to fighting this deadly foe.

To learn more about how CDC is fighting mosquitoes, visit our World Mosquito Day [feature](#).

FEATURES

Spatial Repellents Offer Hope as a New Tool to Fight Back Against Disease-spreading Mosquitoes



While the global malaria burden has declined substantially as a result of the scale up of insecticide-treated bed nets (ITNs) and other interventions, [malaria remains a major public health problem](#), particularly in sub-Saharan Africa. CDC is working with the University of Notre Dame, the Kenya Medical Research Institute, and other partners in the [Advancing Evidence for the Global Implementation of Spatial Repellents \(AEGIS\) consortium](#), a 5-year [Unitaid](#)-funded effort* to determine the efficacy of a novel spatial repellent product in preventing mosquito-borne diseases.

Spatial repellents work by releasing chemicals into the air that interfere with the mosquito's ability to detect a host, or interfering with the mosquito feeding response. The program includes three clinical trials in different

countries: Kenya (where CDC is engaged), Mali, and Sri Lanka. Each trial will evaluate the efficacy and cost-effectiveness of a spatial repellent in reducing transmission and protecting against new infections of malaria (Kenya and Mali) and dengue (Sri Lanka). The AEGIS consortium will also conduct studies among displaced populations in other areas as part of case scenarios in programmatic settings.

The Kenya trial has completed its first step—four months of baseline work. Throughout this phase, the study team recruited participants and established the baseline of malaria infection in participants. Implementation of the spatial repellent intervention is set to begin at the beginning of September 2021.

* Unitaid is a global health agency engaged in finding innovative solutions to prevent, diagnose, and treat diseases such as HIV/AIDS, malaria, and tuberculosis more quickly, cheaply, and effectively in low- and middle-income countries. Unitaid is now applying its expertise to address challenges in advancing new therapies and diagnostics for the COVID-19 pandemic, serving as a key member of the Access to COVID-19 Tools (ACT) Accelerator. Unitaid is hosted by the [World Health Organization](#).

A Little Help, Please? Supporting Development of Diagnostic Tools for Malaria and NTDs

For decades DPDM has been providing technical support to the [World Health Organization](#) (WHO), the [Pan American Health Organization](#) (PAHO), and the [U.S. Agency for International Development](#) (USAID) to inform global public health guidance related to malaria and [neglected tropical diseases](#) (NTDs). DPDM houses three WHO Collaborating Centers related to malaria and NTDs.

DPDM has recently focused on improving lab capacity to aid in rapid diagnostic test (RDT) and outbreak/case investigation for malaria, and addressing surveillance gaps identified in the [Roadmap for Neglected Tropical Diseases 2021–2030](#). DPDM is currently evaluating three new malaria RDTs, as well as three SARS CoV-2 antigen detection RDTs. Reports on the findings are forthcoming.

Staff also participate in disease-specific and cross-cutting subgroups of the NTD Diagnostic Technical Advisory Group. Staff additionally engage in the Onchocerciasis Technical Advisory Subgroup and in a variety of research projects to help develop the evidence required to support the WHO strategies and help country programs achieve their milestones. This work includes diagnostic discovery (such as identification of biomarkers for LF, onchocerciasis, and schistosomiasis) and the development of novel evaluation and surveillance strategies for various NTDs.

An Emerging and Troubling New Foe: *Anopheles stephensi*



There are more than 3,000 types of [mosquitoes](#)—not all created equal. Some bite people and some prefer cows; some live in forests while others prefer cities; and some cause itching and irritation, but others carry deadly diseases. In 2012, routine public health tracking activities first detected that a mosquito species called *Anopheles stephensi* (*An. stephensi*) had found its way from its native habitat in Southern Asia to Eastern Africa. Initially spotted in Djibouti, it has since been identified in neighboring Ethiopia (2016), Sudan (2019), and Somalia (2019).

While increases in the reported number of cases of malaria have not been noted in all areas where *An. stephensi* has been found, the results from Djibouti are particularly worrying. In 2012, approximately 2,000 malaria cases were reported annually; in 2019, over 49,000 cases were detected. Modeling has estimated that *An. stephensi* may result in an additional 120 million people being put at risk of malaria in Africa. It is therefore essential to understand the spread of *An. stephensi*, the risk it may cause, and the means for preventing its spread. DPDM recently provided funding to the Pan-African Mosquito Control Association to support community-based larval source management in Djibouti and to Baylor University in Texas to analyze *An. stephensi* mosquitoes from Ethiopia, Sudan, and Djibouti to better understand the population geography and movement of the species across the Horn of Africa.

Bridging Gaps in Health Equity



To increase healthcare provider knowledge and awareness of [Chagas disease](#), a parasitic disease that can cause severe heart and gastrointestinal problems, CDC funds three partners—Boston Medical Center, Albert Einstein College of Medicine, and Texas State University—to help develop new strategies, educational tools, materials, and guidelines for clinicians to help screen, diagnose, and treat Chagas disease. Collectively, these efforts have reached more than 9,200 healthcare providers nationwide. A new Chagas disease [Extension for Community Health Outcomes](#) (ECHO) program was also started through this funding opportunity.

As a result of educational sessions to improve Chagas disease management in the New York City area, Elmhurst Hospital in Queens has started a pilot project to screen patients at risk.

Until 2020, CDC also provided medications for U.S. physicians treating patients with Chagas disease. Now, the [two drugs used to treat Chagas disease](#) in the United States have FDA approval and are available with a prescription. CDC continues to provide diagnostic testing and 24/7 consultations to healthcare providers.

[Soil-transmitted helminth](#) (STH) infections were once prevalent throughout the southeastern United States. Environmental and socioeconomic conditions favorable to maintaining STH infections still persist in many areas of the American South. CDC is collaborating with state health departments in Alabama and Mississippi and university (University of Alabama at Birmingham, University of Mississippi Medical Center) partners to determine if STH infections persist among children in at-risk rural communities characterized

by poor sanitation, poverty, and environmental conditions conducive to maintaining STH infections. CDC and partners are in the process of conducting DNA extraction and laboratory testing of collected samples and analyzing information to inform appropriate public health interventions.

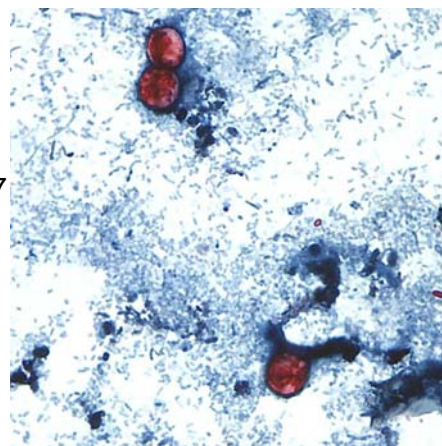
Name That Parasite

[Cyclosporiasis](#) is an intestinal illness caused by the microscopic parasite *Cyclospora cayetanensis*. People can become infected by consuming contaminated food or water.

After an active [2020 cyclosporiasis season](#), with more than 1,200 cases reported to CDC, 2021 has gotten off to a notable start, with 687 laboratory-confirmed cases already reported by 31 states and New York City, [as of August 10, 2021](#).

To help combat *Cyclospora*, DPDM has used [advanced molecular detection \(AMD\)](#) methods to develop DNA fingerprinting to help distinguish among different strains of the parasite that cause cyclosporiasis. These tools help link cases to each other and to particular types of produce, which can help public health officials investigate and possibly prevent future outbreaks of *Cyclospora*.

This genotyping is now being adapted by the [U.S. Food and Drug Administration](#) (FDA) for a harmonized genotyping method. CDC is working to transition this novel genotyping tool from research into a CDC program service to improve food safety.



Happy 75th Anniversary, CDC



From its origins, CDC played a [critical role](#) in eliminating malaria from the United States. CDC's mission to end malaria began 75 years ago, with much of the early work done by CDC dedicated to the control and elimination of malaria in the United States. After that success, CDC switched its malaria focus to prevention, surveillance, and technical support both domestically and internationally. This is still the focus of CDC's malaria work.

Today, CDC works to eliminate the global burden of malaria and other mosquito-borne diseases by conducting [research](#) into new [tools](#) and [approaches](#) to better prevent, detect, and control these diseases.

Learn more about CDC's history through this [photo essay](#).

It's a Tough Job, but Someone Has to Do It

In 2020, [Artesunate for InjectionTM](#)—the first-line drug for treatment of severe malaria in the United States—was approved by the FDA and is now manufactured, distributed, and commercially available in the United States. DPDM continues to provide this life-saving treatment during the transition until it becomes widely accessible. Travel restrictions due to COVID-19 decreased the demand for IV artesunate in 2020: there were 99 releases of the drug in 2020 compared to 249 in 2019. However, as international travel picks back up, demand for



the drug is expected to increase, too.

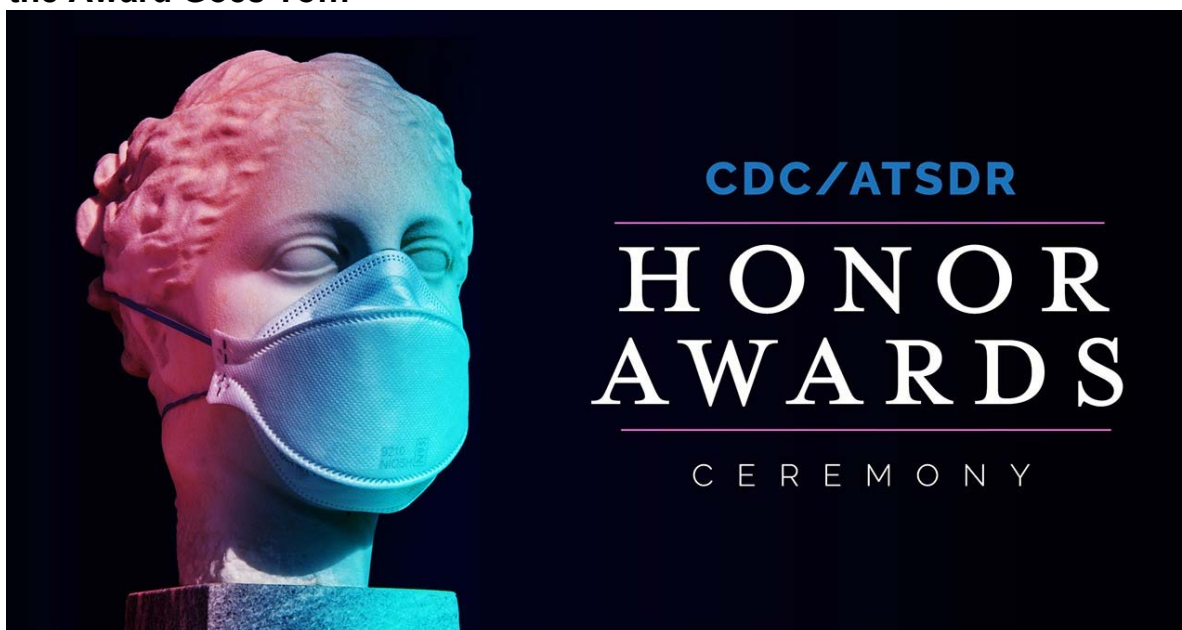
Getting to Zero in American Samoa and Haiti

Lymphatic filariasis, a debilitating NTD, continues to pose a health risk in the U.S. territory of American Samoa and in Haiti. Although the COVID-19 pandemic impacted health systems globally, DPDM's experts adapted.

In American Samoa, in addition to providing [virtual trainings on implementing impact assessments](#), DPDM also supported the American Samoa Department of Health (ASDOH) in carrying out morbidity management and disability prevention activities. With DPDM support, treatment coverage has surpassed WHO targets for the last two years and preparations for 2021 are underway. Future work will include laboratory testing of samples collected during the impact assessment and investigation of individuals who continue to have parasites identified in their blood despite treatment. Thanks to this work, American Samoa remains on track to eliminate LF by 2025, despite the hurdles presented by the pandemic.

In Haiti, DPDM has been providing ongoing support to the Ministry of Public Health and Population (MSPP) and partners to achieve the elimination of LF as a public health problem. DPDM provided technical assistance to complete projects exploring the cost effectiveness of delivering MDA medication through door-to-door delivery vs. at distribution posts in Milot, Haiti. DPDM worked with several internal and external partners to create data collection tools and strategies; design and execute statistical analysis procedures; identify and address challenges and issues in real time; and report the results to appropriate partners for timely action.

And the Award Goes To...



Kudos to our DPDM staff who received CDC/ATSDR Honor Awards! These coveted awards highlight notable and significant achievements within CDC over the past year. DPDM staff were recognized for:

Excellence in Program Delivery: National Artesunate for Severe Malaria Program

This award recognizes significant accomplishments in public health program delivery.

Excellence in Public Health Protection: Guinea Worm Eradication Team

This award recognizes significant contributions in protecting public health through some mitigating

approach.

CDC Director's Award for Innovation: Mike Green, PhD, Entomology Branch

This award recognizes individuals and groups who generate great ideas and display the tenacity to transform those ideas into tangible realities that add value and help advance CDC's mission. It recognizes both new innovations and unusual, creative applications for an existing product, process, or service.

Dr. Green has been likened to the 'Professor' from Gilligan's Island, due to his ability to adapt chemical tests for use in resource-limited field settings that detect defective antimalarial drugs and insecticide-treated bed nets using low-tech, easily accessible materials.

Congratulations for your well-deserved recognition!

DPDM LEADERSHIP UPDATES



[CAPT Paul Cantey, MD, MPH](#) is the new Chief of DPDM's Parasitic Diseases Branch



Ephantus "Juma" Muturi, PhD joins as the lead of the Insecticide Resistance and Vector Control Team in DPDM's Entomology Branch

NOTABLE PUBLICATIONS

- [Cross-Reactivity of Two SARS-CoV-2 Serological Assays in a Setting Where Malaria Is Endemic.](#) *Journal of Clinical Microbiology*. June 2021.
- [Stable high-density and maternally inherited Wolbachia infections in *Anopheles moucheti* and *Anopheles demeilloni* mosquitoes.](#) *Current Biology*. June 2021.
- [The Immediate Effects of a Combined Mass Drug Administration and Indoor Residual Spraying Campaign to Accelerate Progress towards Malaria Elimination in Grande-Anse, Haiti.](#) *Journal of Infectious Diseases*. May 2021.
- [Chagas disease: Implementation of screening to benefit mother and infant.](#) *Clinics in Perinatology*. June 2021.
- [An Evaluation of Water, Sanitation, and Hygiene Status and Household Assets and Their Associations with Soil-Transmitted Helminthiasis and Reported Diarrhea in Nueva Santa Rosa, Guatemala.](#) *Journal of Water, Sanitation and Hygiene Development*. February 2021.
- [Correction to: An update on the distribution, bionomics, and insecticide susceptibility of *Anopheles stephensi* in Ethiopia, 2018–2020.](#) *Malaria Journal*. July 2021.



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