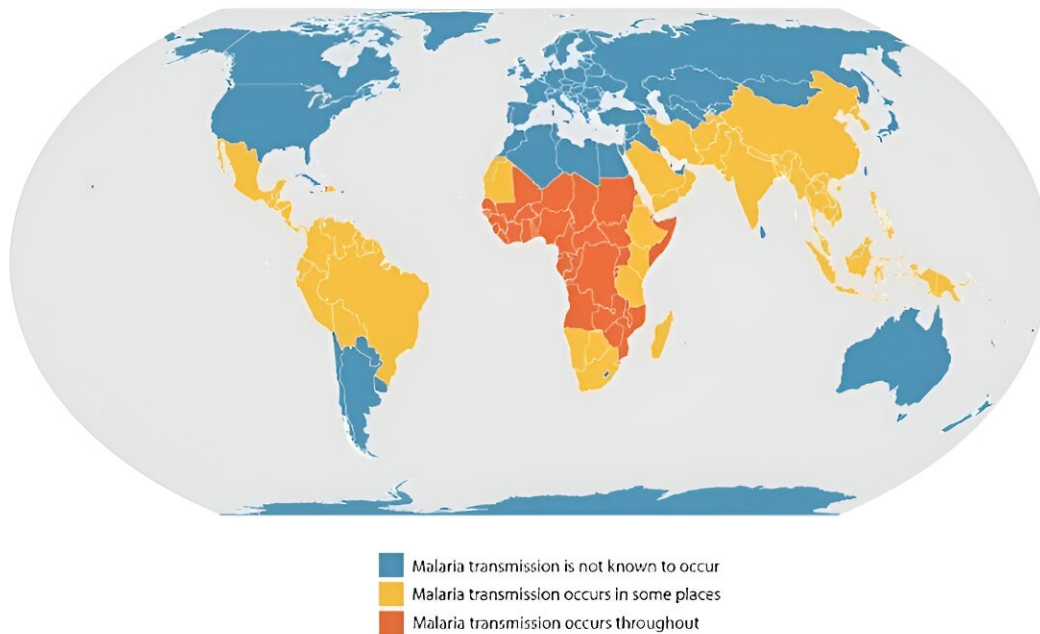


# The history of malaria in the United States

September 15 2023

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Malaria is transmitted in tropical and subtropical areas, where Anopheles mosquitoes can survive and multiply, and malaria parasites (*Plasmodium* spp.) can complete their growth cycle. Credit: CDC Public Health Image Library

Malaria, an infectious disease caused by parasites belonging to the *Plasmodium* genus and transmitted by infected mosquitoes, is responsible for mortality and morbidity [in more than 40% of the world](#), making it [one of the most devastating diseases in human history](#). In fact, the disease is thought to be responsible for between 2% and 5% of all

fatalities that occurred during the 20th century (between 150 million and 300 million deaths).

While [malaria infection](#) is still prevalent south of the Sahara and in parts of Oceania, such as Papua New Guinea, prior to the 1880s the [disease](#) was also endemic in areas that have no longer sustained transmission, including the United States. [Recent cases of malaria acquired in Southern U.S. states](#) have raised concerns about future outbreaks, [climate change](#) and the possibility of sustained transmission in areas where the disease is no longer considered to be endemic.

Peering into history can help put recent cases in context. How prevalent did the disease become, and how was it eventually eradicated in the U.S.? What lessons learned can be applied to other areas battling endemic malaria, and how should history guide surveillance and prevention efforts around the world?

## **Recent malaria outbreaks in the US**

The Texas Department of State Health Services (DSHS) recently reported a case of locally-acquired malaria in a Texas resident with a history of working outdoors in Cameron County. DSHS has been working with local health departments to follow up on the case and determine whether other people have been exposed. To date, no other locally-acquired malaria cases have been identified in Texas. However, there have been [seven locally-acquired cases of Plasmodium vivax malaria in Sarasota County, Florida](#). The Florida Department of Health has issued a statewide mosquito-borne illness advisory. As the disease is spread through the bite of infected female Anopheles mosquitoes, both states are advising everyone to take [precautions with respect to avoiding mosquito bites](#).

Additionally, [Maryland's health department has reported a locally-](#)

[acquired malaria case](#) in a patient with a history of travel outside the country or to other states that have reported local cases this summer. The patient was initially hospitalized but is now recovering at home. In an Aug. 18, 2023, statement, the Maryland Department of Health said the patient lives in the North Capital region, which includes Frederick, Prince George's, Montgomery and Howard counties near Washington, D.C.

As of Aug. 24, 2023, these nine total cases [Fla, Texas and Md.] show no evidence to suggest that the cases in the three states are related. All patients were promptly treated at area hospitals and are recovering. The CDC issued a Health Advisory via the Health Alert Network to share information and notify clinicians, public health authorities and the public about the cases in both states.

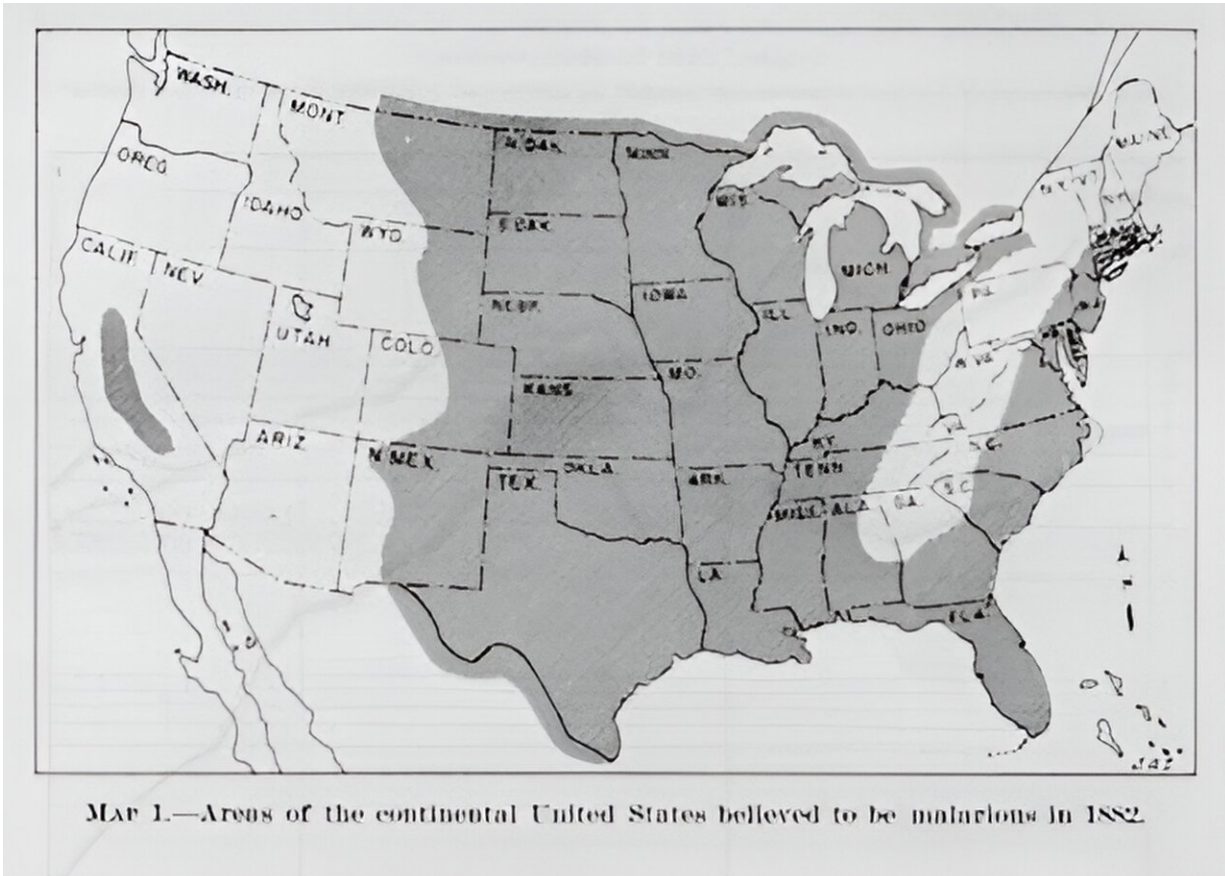
CDC reports that these locally-acquired cases of malaria are the first in the U.S. in the past two decades. Malaria typically resurfaces via imported cases in the U.S. after an individual travels to a malaria endemic region or country. However, locally-acquired malaria cases can occur, as the Anopheles mosquito vectors (which transmit this disease to humans) do exist throughout the U.S. Importantly, [with COVID-19 travel restrictions lifted](#), there is more opportunity for international travel. If an individual becomes infected in an endemic country, then there is a possibility for infected individuals (with or without symptoms) to seed local transmission. For example, in [2003 there were eight cases of locally-acquired P. vivax malaria identified in Palm Beach County, Fla.](#)

## History of malaria in the US

Due to limited research of America prior to colonization by European explorers, the origin of how malaria came to the U.S. is unclear. Studies show, however, that [when European explorers enslaved people from](#)

[Africa and brought them to the U.S., the problem of malaria was exacerbated.](#) It is believed that *Plasmodium falciparum*, one of the parasites that causes malaria, was carried by the people from Africa that were enslaved and brought to the new world between 1500 and the 1800s.

Additionally, symptomatic and asymptomatic travelers from colonizing nations like Spain and Portugal are thought to also have carried the *Plasmodium* parasites with them. When they arrived at their new destination, *Anopheles* mosquitoes were already there to meet them. Feeding on the blood of the infected travelers, these local mosquitoes picked up the parasite and transmitted it to new hosts. [The presence of competent mosquito vectors](#) and a population of people in the new world who had never had malaria before gave rise to a widespread explosion of disease. The disease [spread through the Jamestown settlement in the early 1600s](#) and infected settlers and indigenous peoples across the colonies. By 1750, malaria had spread across the inhabited territories of what is now the U.S.



Areas of the continental United States believed to be malarious in 1882. Credit: AMEDD Center of History & Heritage

Prior to the development of the Germ Theory in the 1850s, malaria (like other infectious diseases) was believed to be caused by molecules in the air. Malaria owes its name to the medieval Italian words "mal aria," which mean "bad air." While many speculated that the cause of the disease was somehow associated with warmer weather and proximity to water, it was not until the French physician, Alphonse Alveran, [observed Plasmodium parasites in the blood of malaria patients](#) that an infectious microorganism was identified as the cause. Then, in 1898, a group of Italian scientists successfully demonstrated that mosquitoes transmitted

the parasite that causes malaria.

Prior to eradication of malaria in the U.S., the spread of malaria and the efforts that evolved to control it were tightly bound with conflict and war. Once malaria transmission was better understood, prevention mechanisms were established to reduce the spread of disease. At the time, the primary purpose of preventing the spread of malaria was to ensure that soldiers and workers were healthy enough to support multiple conflict-driven initiatives, including building the Panama Canal and both World Wars. Massive [prevention efforts](#) began during World War I, such as [building appropriate housing, elimination of the parasite reservoir, reduction of mosquitoes \(e.g., fumigation, traps, screening, etc.\) and drug prophylaxis \(quinine\)](#), in U.S. military locations to protect soldiers and ensure they could train year-round without falling ill from malaria. Despite the enormous expense associated with these efforts, they were relatively unsuccessful and demonstrated the need for more economical approaches to malaria prevention.

Following World War I, studies on rural malaria control technology and entomologic and parasitology studies were increased by the U.S. Public Health Service. Throughout the 1930s and early 1940s, federal relief organizations dedicated funding and workers to the malaria control effort by improving drainage across the country. It is estimated that over nearly seven years, 33,655 miles of ditches were dug, effectively eliminating over half a million acres of Anopheles mosquito breeding areas. Advancement and modernization of sanitation played a significant role in nearly eliminating malaria from the U.S. in the 1930s. Still the impact of the Great Depression on sanitation efforts took a toll, and cases spiked again.

In 1942, public health centers known as [Malaria Control in War Areas \(MCWA\)](#) were established around military bases in the southern U.S., where malaria was still a major problem. This initiative aimed to prevent



the re-introduction of malaria to the public via traveling soldiers and to train state and local public health officials in malaria control strategies. A branch of MCWA known as the Communicable Disease Center, which focused primarily on malaria control and prevention, [would later become the U.S. Centers for Disease Control and Prevention \(CDC\) known today](#). Once the spread of malaria was significantly reduced, primarily through drainage implementation and the use of insecticides, CDC changed its focus to surveillance and technical support for domestic and international areas experiencing malaria outbreaks, as well as the prevention and control of other infectious diseases. [Malaria was officially eradicated from the U.S. in 1951](#).

## **The impact of COVID-19 on malaria**

Malaria control and elimination programs have shown important success in lowering the global malaria burden, but this success and progress has slowed and stalled in the past several years. The COVID-19 pandemic has resulted in major morbidity, mortality and widespread societal disruption, due to lockdowns and other restrictions implemented to try to control disease transmission, and like many other infectious diseases, malaria treatment, prevention and control have been affected by the global pandemic.

As mentioned previously, successful control and prevention of malaria has always been affected by funding constraints, disruption by war, disaster or conflict. COVID-19 has amplified the impact (worldwide) in the following manner:

- Slowing or stopping the distribution of insecticide-treated nets with regular renewal.
- Reducing attendance at health facilities. People stopped visiting the doctor out of fear of exposure to COVID-19 or due to financial constraints.

- Limiting supply and distribution of personal protective equipment (PPE).
- Interrupting the distribution of supplies for diagnostics and drugs, which is compounded by production of substandard and falsified medicines and diagnostics.

## Considerations for the future

If history has taught us anything, the impact of forgetting the lessons learned on the control and prevention of infectious diseases is substantial—undermining established programs that address HIV, tuberculosis, malaria, AMR, vaccination and most major public health strategies. The recent COVID-19 and mpox global outbreaks have reminded us that public health infrastructure must be maintained, the pipeline for laboratory scientists and researchers must be supported and innovative and affordable access to treatment must be prioritized in the face of competing health priorities and the context of severely constrained resources. Sustainable public health and health care funding are critical to combat infectious diseases globally.

Those in the global malarial community are at a perilous tipping point; the progress made prior to COVID-19 has stalled, and the countries hardest hit by the disease are facing multiple fronts of the infectious disease war. Likewise, [the ongoing climate changes occurring around the world](#), which impact the ability of vectors (mosquitoes, ticks, flies, etc.) to expand their geographic range into areas of susceptible populations to malaria and other infectious diseases, continue to create ongoing and [new regions for the spread of vector-borne disease](#).

As explored in the [2021 World Malaria Report](#), the world is in an urgent need of a "shift in mindset for truly innovative and collaborative approaches to malarial control." There is an opportunity for the global community to adopt lessons learned from the pandemic, especially the



possibility to embrace a collective determination and resilience to combat a common goal. Those countries that are most affected by the scourge of [malaria](#) must lead control efforts, but need coordination and cooperation from donors, partners and governments from around the world. The recent vaccine development, alongside ongoing innovative research and improved surveillance, will transform policy and practice.

Provided by American Society for Microbiology

Citation: The history of malaria in the United States (2023, September 15) retrieved 2 May 2024 from <https://medicalxpress.com/news/2023-09-history-malaria-states.html>

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