

Malaria and Dengue Fever Infections Remain Uncommon in the United States

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Key Findings:

- Rates of new malaria and dengue fever diagnoses remain low and became even less frequent during 2020 and 2021 which could be correlated with reduced travel during the pandemic.
- In 2023, rates of malaria and dengue fever returned to pre-pandemic levels. Additionally, the proportion of malaria and dengue fever cases resulting in hospital admission has increased since 2020 and now exceed pre-pandemic rates.

In June 2023, the Centers for Disease Control and Prevention (CDC) issued a health advisory reporting two cases of malaria in the United States that were not related to travel. ¹ These were the first instances of locally acquired malaria in more than 20 years. ² In October 2023, the CDC reported a total of nine non-travel cases of malaria in the United States. ²

To gain a better understanding of the trends in mosquito-borne illnesses, we analyzed the incidence of new diagnoses of malaria and dengue fever in the United States between January 2015 and December 2023. Our findings revealed that rates of new malaria diagnoses were around 29 per million patients in 2015 and 2016 and trended down to the lowest rate of 10.0 cases per million patients occurring in 2020. This decrease might be correlated with reduced travel during the COVID-19 pandemic. However, the rate has since increased to 19.1 per million in 2022 and 23.0 per million patients in 2023, as shown in Figure 1. The rates of new dengue fever diagnoses were even less common, with rates of fewer than eight cases per million patients for all years studied, though the highest rate was observed in 2023.

Annual Rates of Malaria and Dengue Fever Diagnoses

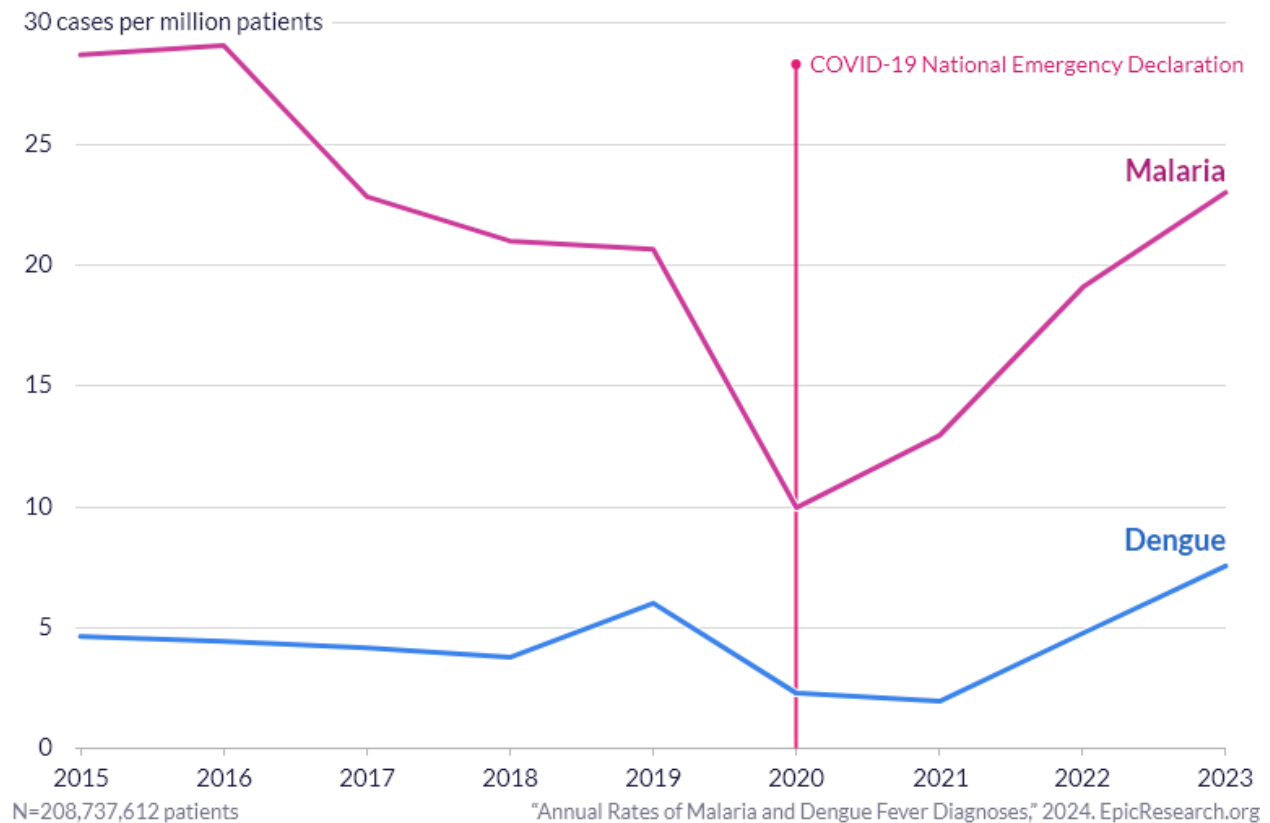


Figure 1. Annual rate of patients diagnosed with malaria and dengue fever in the United States from January 2015 to December 2023.

While overall rates of malaria and dengue fever remain low, the proportion of cases that result in a hospital admission has been increasing. For malaria, the pre-pandemic hospitalization rate was trending up, from 12.2% in 2015 to 25.2% in 2019, dropped down to 23.7% in 2020, and has since trended upward to 32.9% in 2023. Dengue fever has followed a similar trend, as shown in Figure 2.

Annual Rates of Malaria and Dengue Fever Hospitalizations

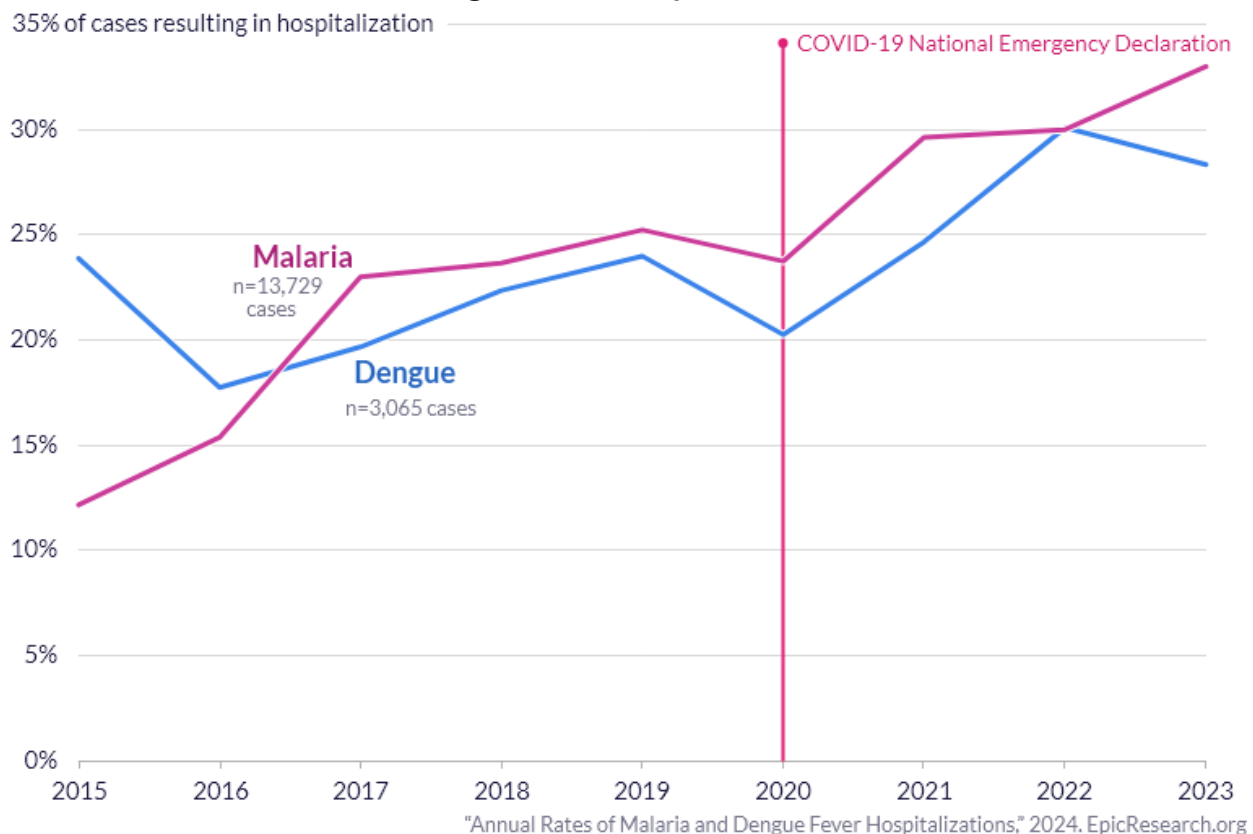


Figure 2. Annual percentage of patients diagnosed with malaria and dengue fever in the United States resulting in hospitalization from January 2015 to December 2023.

These data come from Cosmos, a collaboration of 222 Epic health systems representing more than 220 million patient records from 1,272 hospitals and more than 27,200 clinics from all 50 states and Lebanon. This study was completed by two teams that worked independently, each composed of a clinician and research scientists. The two teams came to similar conclusions. Graphics by Brian Olson.

References

1. Locally Acquired Malaria Cases Identified in the United States. Centers for Disease Control and Prevention. Published June 26, 2023. Accessed November 20, 2023.
<https://emergency.cdc.gov/han/2023/han00494.asp>
2. Locally acquired cases of malaria in Florida, Texas, Maryland, and Arkansas. Centers for Disease Control and Prevention. Published October 18, 2023. Accessed November 20, 2023.
https://www.cdc.gov/malaria/new_info/2023/malaria_US.html

Data Definitions

Term	Definition
Study period	1/1/2015 – 12/31/2023
Study population	Patients with a healthcare encounter each year.
Malaria diagnosis	An encounter or billing diagnosis with ICD-10-CM code B50*, B51*, B52*, B53*, or B54*.

Dengue diagnosis	An encounter or billing diagnosis with ICD-10-CM code A90 or A91.
Hospital admission	An encounter of type "Inpatient Admission," "Emergency to Inpatient," or "Hospital Outpatient Visit to Inpatient."

Table 1: Annual Rates of Malaria and Dengue Fever Diagnoses

Year	Dengue Cases per Million Patients	Malaria Cases per Million Patients
2015	4.6	28.7
2016	4.4	29.1
2017	4.2	22.9
2018	3.8	21.0
2019	6.0	20.7
2020	2.3	10.0
2021	1.9	13.0
2022	4.8	19.1
2023	7.6	23.0

Table 2: Annual Rates of Malaria and Dengue Fever Hospitalizations

Dengue					Malaria				
Year	Dengue Admission Rate	Number of Patients	Lower CI	Upper CI	Year	Malaria Admission Rate	Number of Patients	Lower CI	Upper CI
2015	23.8%	51	18.1%	29.5%	2015	12.2%	161	10.4%	13.9%
2016	17.7%	42	12.9%	22.6%	2016	15.4%	239	13.6%	17.2%
2017	19.6%	53	14.9%	24.4%	2017	23.0%	340	20.8%	25.1%
2018	22.3%	60	17.3%	27.3%	2018	23.6%	354	21.5%	25.8%
2019	23.9%	111	20.0%	27.8%	2019	25.2%	401	23.1%	27.3%
2020	20.2%	38	14.5%	26.0%	2020	23.7%	195	20.8%	26.6%
2021	24.6%	47	18.5%	30.7%	2021	29.6%	377	27.1%	32.1%
2022	30.0%	139	25.8%	34.2%	2022	30.0%	554	27.9%	32.1%
2023	28.3%	218	25.2%	31.5%	2023	32.9%	770	31.0%	34.9%