

# Costs of Malaria Treatment in the United States

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## Background

- Approximately 2,000 malaria cases are reported annually in the United States, with an increasing trend in recent decades.
- Most U.S. cases are diagnosed in travelers from malaria-endemic areas, and the U.S. Centers for Disease Control and Prevention recommends prevention strategies (e.g., chemoprophylaxis) for travelers, prior to departure.
- Few studies have reported costs associated with treatment of malaria in the United States.

**Objective:** To estimate **inpatient** and **outpatient** payments for **malaria treatment** among patients with private insurance and Medicaid in the United States.

## Methods

### Data Sources

- Oct 2015–Dec 2019 Merative® MarketScan® Database
  - Commercial Claims and Encounters database (private claims)
  - Multi-state Medicaid database (Medicaid claims)

### Study Population

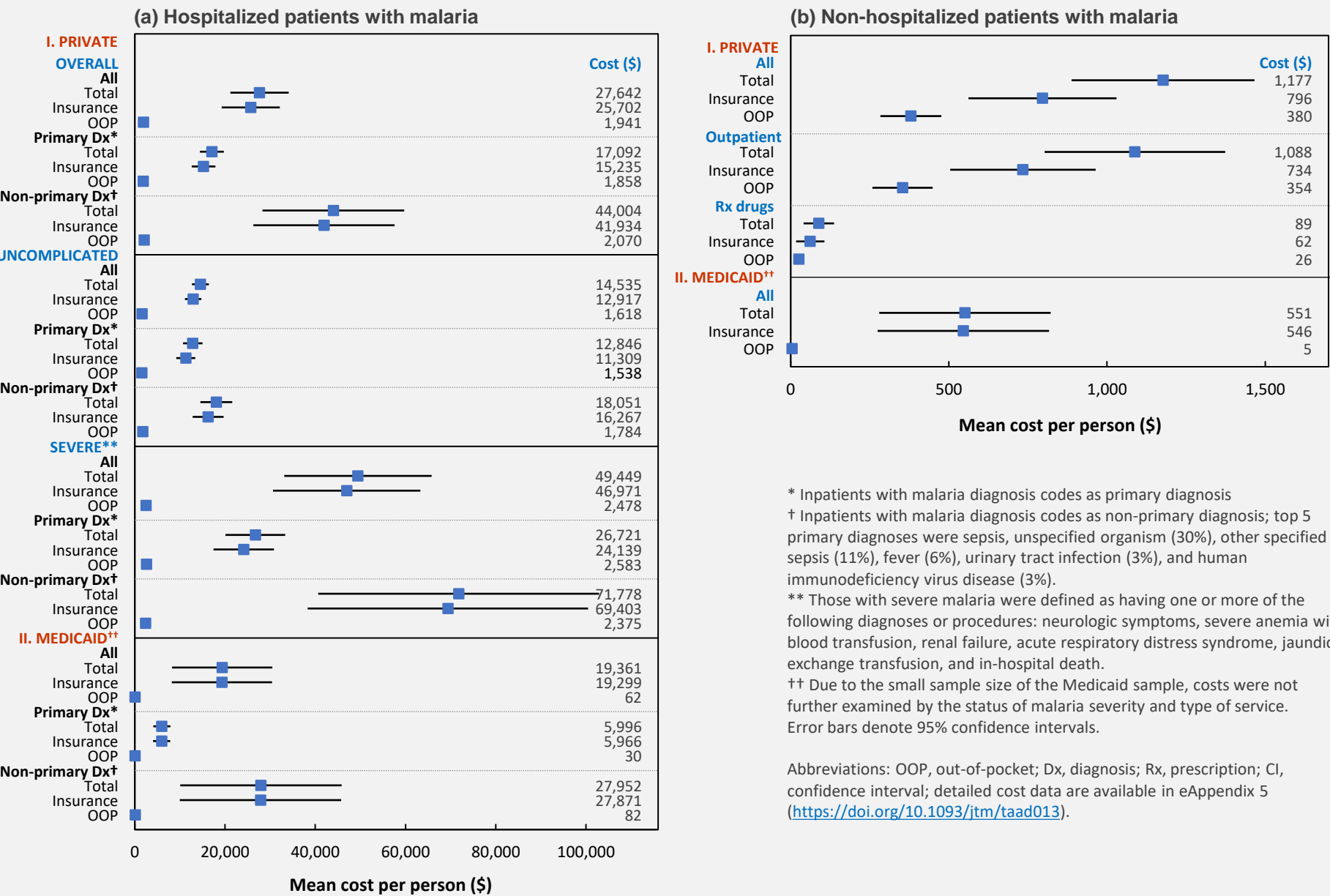
- Patients with a first diagnosis of malaria from Oct 1, 2015 to Dec 31, 2019
  - (1) those with private insurance and (2) those with Medicaid
    - Further categorized as hospitalized (primary & non-primary Dx) and non-hospitalized patients
- Exclusion criteria
  - Medicare enrollees, those with capitated insurance plans, or those who were not continuously enrolled between 30 days before and 90 days after the first diagnosis of malaria

### Outcomes: Mean total cost of malaria treatment per person

- Included an observation period of up to 120 days to include additional treatment costs associated with the initial malaria diagnosis for each patient
  - by source of payment: insurance, out-of-pocket
  - by type of service: inpatient, outpatient, outpatient Rx drugs
  - by disease severity: uncomplicated, severe malaria (inpatient)

## Results

**Figure. Estimated Mean Costs of Malaria Treatment Per Person among Those with Private Insurance and Those with Medicaid, Oct 2015–Dec 2019 (2019 USD)**



\* Plasmodium species were identified based on ICD-10-CM diagnosis codes: B50.0, B50.8, and B50.9 for falciparum malaria; B51.0, B51.8, and B51.9 for vivax malaria; B52.0, B52.8, and B52.9 for malariae malaria; B53.0 for ovale malaria; B53.1 for knowlesi malaria; B53.8 for other malaria, not elsewhere classified; and B54 for unspecified malaria.

## Discussion

- This is the first study to examine total inpatient and outpatient costs per malaria patient in the U.S.
- Most malaria patients (64-73%) were hospitalized, the costs for hospitalized patients were approximately 24 times higher than for patients treated as outpatient-only.
- The costs were lower for inpatients with primary diagnoses (vs. non-primary diagnoses), possibly due to more severe malaria cases presenting at a more advanced stage of illness among those with non-primary diagnoses.
- As intravenous artesunate has been commercially available since May 2020 in the U.S., future research may be undertaken to explore how this introduction will affect costs for hospitalized patients.
- Limitations: 1) non-representative sample of the U.S. or Medicaid populations, 2) excluded patients with Medicare or capitated plans, 3) incomplete capture of healthcare utilization, 4) modified definition of severe malaria, 5) potential misdiagnoses of malaria, and 6) costs estimated from reported payments

## Conclusion

- Our findings provide the most recent estimates of the U.S.-specific malaria treatment costs.
- This study furthers the literature by providing cost estimates for non-hospitalized patients and including Rx drugs, treatment, or management costs before and after the initial hospitalization.
- The cost estimates may provide important information for evaluating the cost-effectiveness of pre-travel prevention strategies aimed at preventing malaria associated morbidity in the U.S.

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