

Title: Do the Brazilian Federal Government's actions against illegal miners affect malaria morbidity in the Yanomami Indigenous lands?

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Background: The northern Brazilian state of Roraima has recently experienced an increase in malaria cases, mainly caused by illegal mining activities on indigenous lands. These activities mainly affect the Yanomami Indigenous people, whose territory accounts for nearly 30% of Roraima. In January 2023, the severity of the malaria outbreak led to a Public Health Emergency declaration in the Yanomami Indigenous Land (YIL) and prompted government intervention.

Aims: This study examines malaria trends before and after the 2023 federal government's response in the YIL.

Methods: A descriptive retrospective study was performed using secondary data from Brazil's Health Information System (HIS), covering reported malaria cases, hospitalizations, and deaths in Roraima from 2021 to 2024.

Results: Between January 2021 and December 2024, Roraima reported 117,214 indigenous malaria cases. After the federal intervention in the YIL in 2023, cases increased significantly (52,210 to 65,004; $p = 0.0005$), while hospitalizations decreased (787-638; $p = 0.0304$), and deaths remained steady (111 total; $p = 0.9089$). Throughout

the study, *Plasmodium vivax* was the dominant species. Cases were highest among men, Indigenous people, and the 20-39 age group. Post-intervention, case detection increased for all species but shifted from adults (20-59 years) to vulnerable groups (0-19, 60 + years). Indigenous cases rose sharply. Hospitalizations for *P. vivax*, declined after the intervention, especially in men and the 20-39 age group. Mortality was highest in children under 10 and Indigenous populations. Within the Yanomami Special Indigenous Health District (Yanomami-DSEI), cases decreased in Mucajaí, Iracema, and Caracaraí but increased in Alto Alegre in 2024. Exported cases from Roraima to Maranhão (- 95.5%), Pará (- 86.8%), and Amazonas (- 71.5%) dropped sharply.

Conclusion: After federal government intervention in the YIL, malaria case detection increased, hospitalizations decreased, and mortality stayed steady. Cases among the Yanomami in Alto Alegre rose, while exports to other states declined. Ongoing progress relies on strengthening primary care, enhancing surveillance, and fostering cross-border cooperation.