

# Trends in malaria morbidity and mortality rates in Uganda: A four-year retrospective study

John Baptist Bwanika,<sup>1</sup> Emily Goodwin,<sup>1</sup> Ruth Kigozi,<sup>1</sup> Patrick Bukoma,<sup>1</sup> Thomson Ngabirano,<sup>1</sup> Sam Siduda Gudoi,<sup>1</sup> Mame K.Niang,<sup>2</sup> Kassahun Belay,<sup>2</sup> Gloria Sebikaari,<sup>3</sup> and James K Tibenderana.<sup>4</sup>

<sup>1</sup> U.S. President's Malaria Initiative (PMI), Malaria Action Program for Districts (MAPD), Uganda

<sup>2</sup> PMI, United States Agency for International Development (USAID), Uganda

<sup>3</sup> PMI, Malaria Branch, Centers for Disease Control and Prevention, United States

<sup>4</sup> Malaria Consortium

## Introduction

Approximately 40 percent of outpatient attendance and over 20 percent of hospital admissions in Uganda are reported as malaria-related. The USAID MAPD program supports the reduction of malaria morbidity and mortality through improving the implementation of core interventions, including service delivery improvements informed by clinical and mortality audits — an approach not widely adopted in Uganda. This study compared trends in severe morbidity and mortality attributable to malaria in program and non-program districts.

## Methods

- Between January 2016 and December 2019, we collected health-facility data through the health management information system from 52 MAPD districts. These data were pooled and compared with data from 84 non-MAPD districts, by year.
- We assessed three outcomes:
  - proportion of confirmed malaria cases classified as severe
  - proportion of malaria deaths in relation to malaria cases (case fatality rate)
  - malaria mortality (malaria deaths per 100,000 population).
- To study the differential effect, we computed a difference-in-differences (DID) estimator in mortality.

## Results

- We observed no statistically significant differences in data reporting rates between the two areas over time.
- The proportion of confirmed severe malaria cases was similar in both areas (3–5 percent) in 2016–2018. However, in 2019, frequent malaria upsurges saw this increase to 12.41 percent in the program area (but remain at 5.24 percent in non-MAPD districts).
- The malaria case fatality rate declined significantly in both areas from 2016 to 2019: from 10.26 to 4.29 percent in MAPD districts, and 8.59 to 4.90 percent in non-MAPD districts.
- Malaria mortality decreased steadily in MAPD districts from 16 per 100,000 in 2016 to 14 in 2017, seven in 2018 and four in 2019. In non-MAPD districts, however, mortality dropped from 10 to four in 2016–2018, but rose to six in 2019. This resulted in a DID estimator for mortality of 2.35.

## Conclusion

This study suggests that MAPD districts were more likely to reduce malaria mortality than non-MAPD districts, despite malaria upsurges. Program interventions contributed to reductions in malaria mortality and could be relevant for other parts of the country with high malaria mortality.

## Acknowledgements

This study and poster were made possible by USAID and MAPD and do not reflect the views of USAID or the United States Government.

Core malaria interventions, including service delivery improvements informed by clinical and mortality audits, are likely to reduce mortality attributable to malaria



Read more

<http://bit.ly/MC-ASTMH-MAPD>

## Supplementary visuals

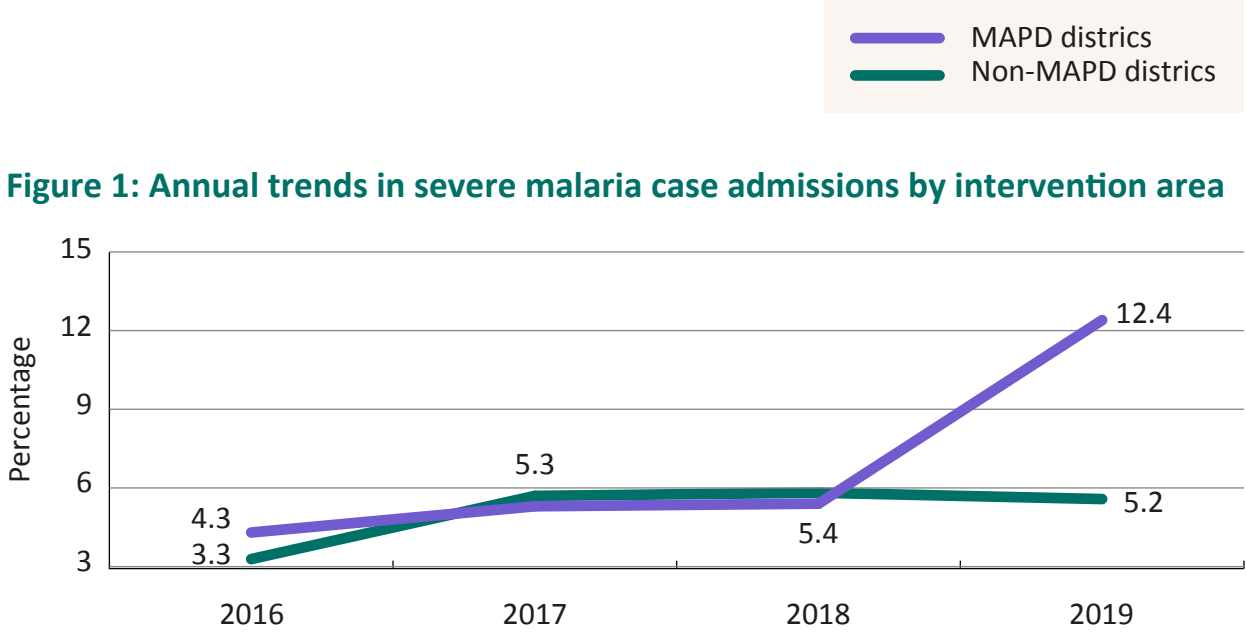


Figure 1: Annual trends in severe malaria case admissions by intervention area

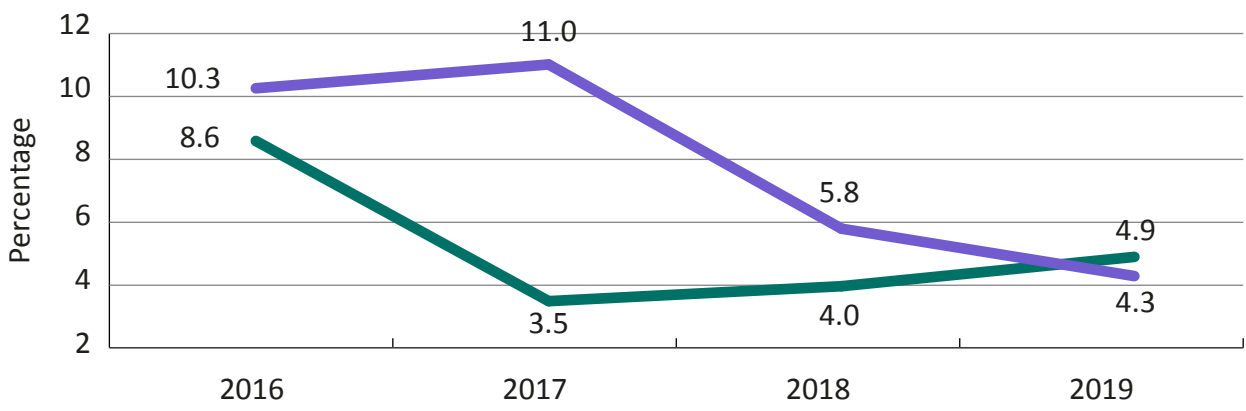


Figure 2: Annual trends in malaria case fatality rate by intervention area

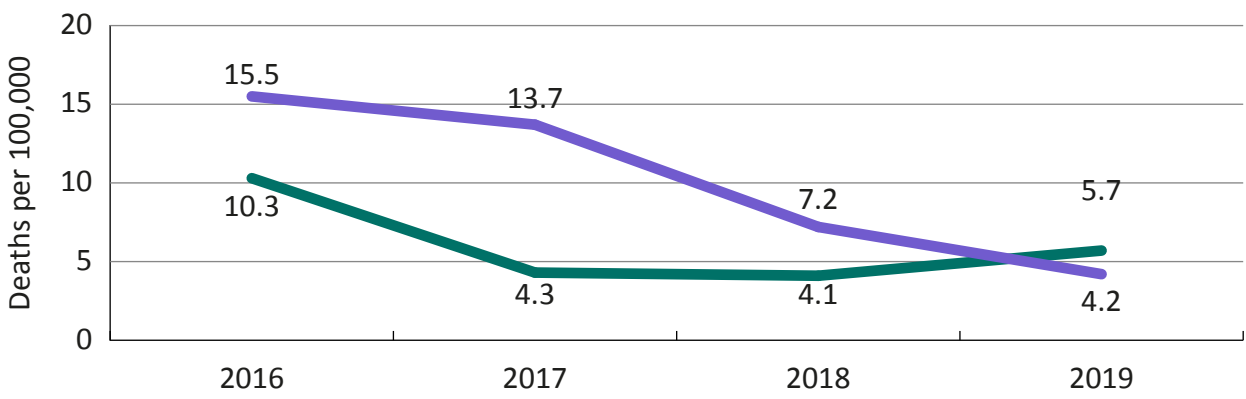


Figure 3: Annual trends in malaria mortality by intervention area

Outcome by area	Estimate (95 percent confidence interval)			
	2016	2017	2018	2019
Proportion of confirmed malaria cases that were classified as severe				
MAPD districts	4.28 (4.27, 4.30)	5.37 (5.35, 5.39)	5.38 (5.35, 5.40)	12.41 (12.38, 12.44)
Non-MAPD districts	3.33 (3.31, 3.34)	5.30 (5.28, 5.32)	5.28 (5.26, 5.30)	5.24 (5.23, 5.26)
Malaria case fatality rate				
MAPD districts	10.26 (9.85, 10.68)	11.02 (10.56, 11.49)	5.80 (5.46, 6.15)	4.29 (4.00, 4.59)
Non-MAPD districts	8.59 (8.26, 8.92)	3.49 (3.29, 3.71)	3.97 (3.73, 4.23)	4.90 (4.66, 5.15)
Mortality attributable to malaria per 100,000 population				
MAPD districts	15.51 (14.86, 16.18)	13.74 (13.14, 14.37)	7.19 (6.76, 7.64)	4.21 (3.72, 4.73)
Non-MAPD districts	10.35 (9.94, 10.77)	4.25 (4.00, 4.53)	4.14 (3.89, 4.41)	5.70 (5.41, 6.00)