#797 Contextual factors associated with epidemiological coverage during mass drug administration for lymphatic filariasis across ten West African countries

Brian B Fuller[1], Vance Harris[2], Caleb Parker[2], Andres Martinez[2], Diana Stukel[3]
[1]Helen Keller International, Washington, DC, US [2]FHI 360 Durham, NC, US [3]FHI 360 Washington, DC, US

Aim

To explain MDA coverage across time and geographies in West Africa using sociological, environmental and programmatic factors.

Background

Effective mass drug administration (MDA) is the cornerstone in the elimination of lymphatic filariasis (LF) and a critical component in combatting all neglected tropical diseases for which preventative chemotherapy is recommended (PC-NTDs). Despite its importance, MDA coverage, however defined, is rarely investigated systematically over time and geography.

Most commonly, analysis of coverage is in reaction to low coverage or continued transmission despite treatment. These analyses tend to focus on a single year and health district. Such investigations omit more macro-level influences including sociological, environmental, and programmatic factors.

The USAID NTD database contains treatment coverage data from more than 3,880 district-level LF MDA campaigns over 14 years and across 10 West African countries. These data offer insights into the wider, contextual influences on MDA performance, measured through epidemiological coverage, calculated as persons treated divided by persons at risk.

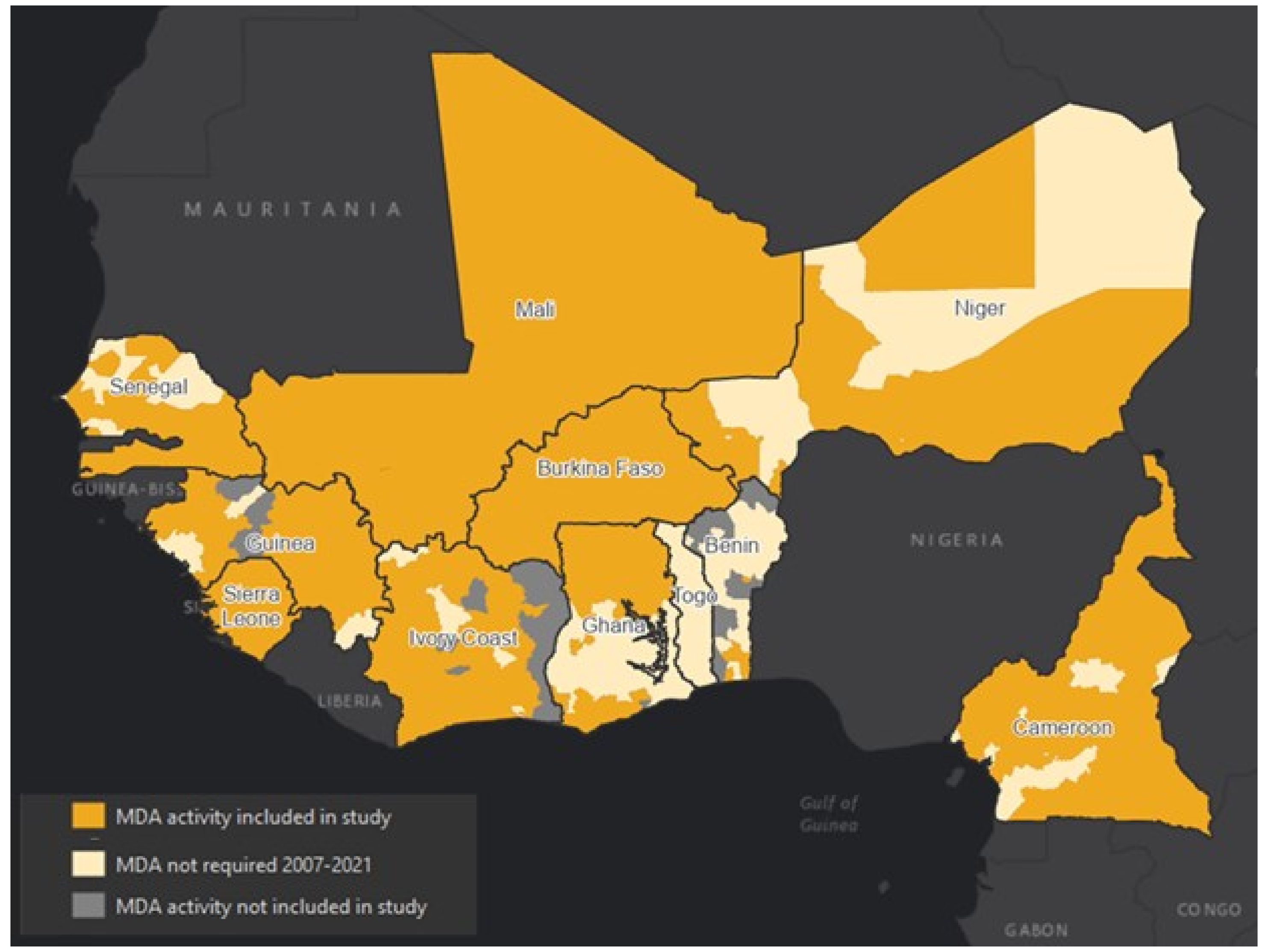

Figure 1 : Areas included in study

Methods

We linked epidemiological coverage data from 3,880 LF MDAs (2007 – 2020) with external data using location (each campaign was specific to a health district) and time (month and year of the MDA). External data included:

- Rainfall & temperature during month of MDA, compared to the month's climatological average (source: NOAA PSL)
- Events of violence and social unrest during the month of or prior to MDA (source: ACLED)
- Whether the MDA was concurrent with the COVID-19 outbreak and response.
- Based on month and location, we assigned a round *n* to each MDA, being the district's *n*th recorded MDA for LF.

We fit a hierarchical linear regression model with coverage as the dependent variable and performed sensitivity analyses to confirm the selection of the explanatory factors. The coefficients of these variables are displayed in the Results section.

Results

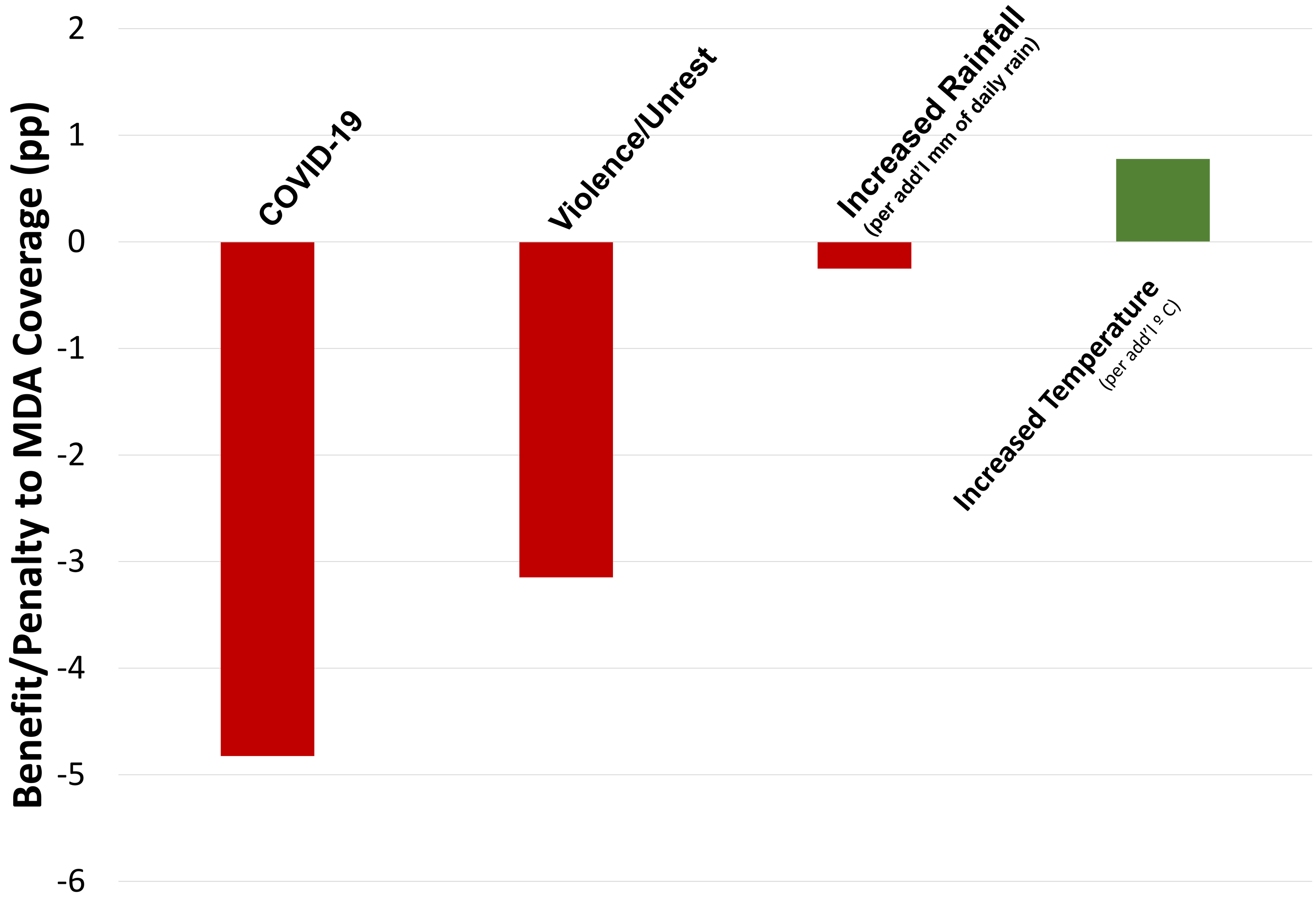

Figure 2: Contextual MDA factors and their association with coverage

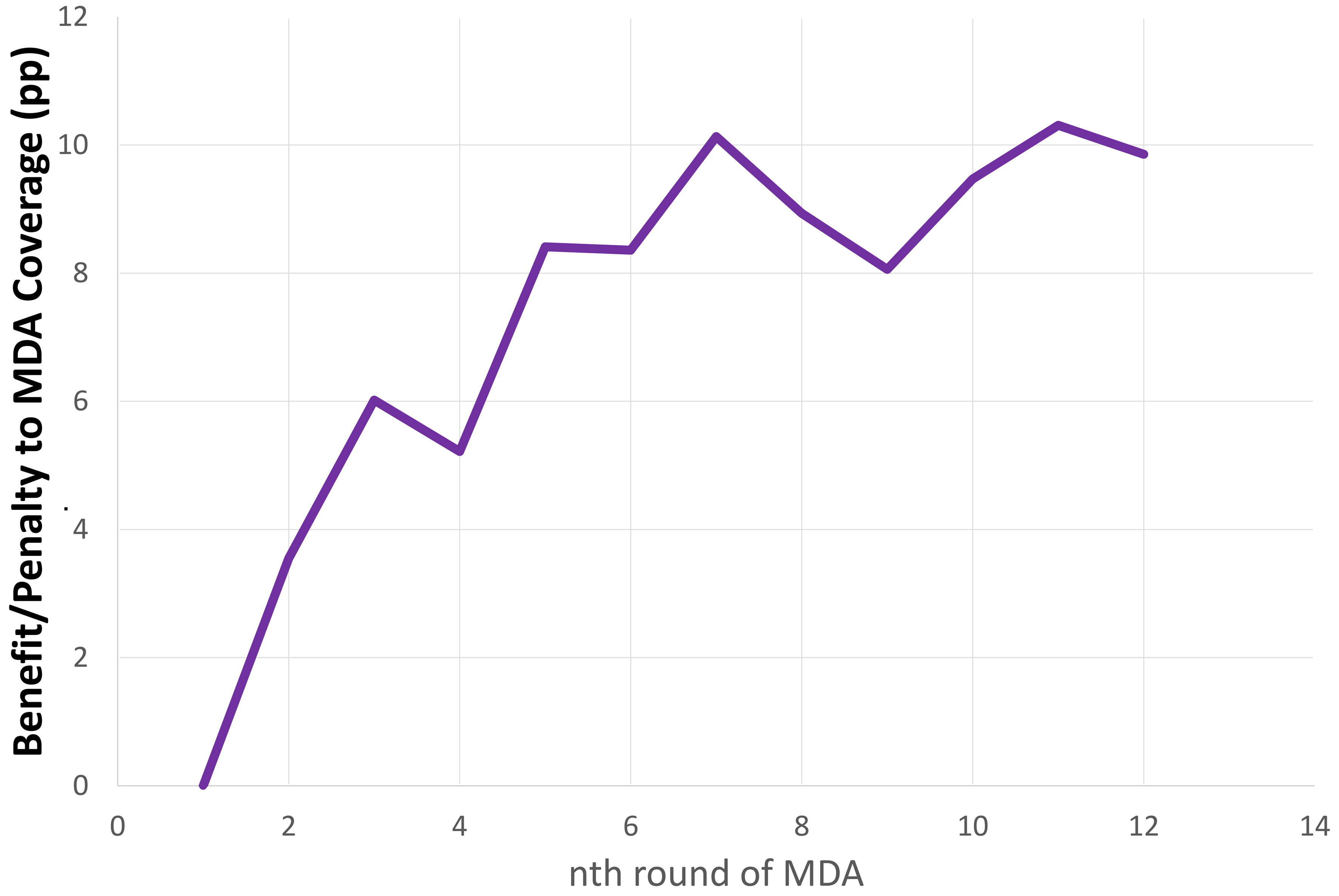

Figure 3: Measured increases in coverage with each additional MDA round

Interpretation

Sociological factors

The negative effect of COVID-19 may capture behavior change of the general public during the first year of the pandemic and/or implementers adapting to the operational burden of preventative measures taken during MDA.

Violence/unrest– when concurrent with an MDA—was associated with just over three percentage points lower coverage. This may capture the public's reticence to participate in activities and/or implementers leaving certain zones untreated due to insecurity.

Environmental factors

As expected, higher than normal rainfall during the month of MDA reduced coverage. Recorded rainfall was compared to the 30-year climatological average for each district.

Counterintuitively, higher than normal temperature (similarly compared to climatological average) was associated with increased coverage.

Programmatic factors

There is evidence of MDA coverage improving with experience, particularly in years 1-6, with a plateau around 9 percentage points above the first MDA. Districts undertaking 6 or more rounds of MDA did so due to historical lower coverage or measured persistent LF transmission.

All estimates in Figures 2 and 3 were significant at the 95% level.

Conclusion

Social context is important to consider when examining MDA performance, areas of persistent infection, and progress toward LF elimination. Results are applicable to other PC-NTDs (e.g. trachoma, onchocerciasis) and non-NTD service delivery (e.g., Vitamin A, bed nets) in as far as their context and service delivery efforts resemble those of LF studied here.

We encourage implementers to consider these findings particularly with respect to the timing of the MDA. Increased rainfall and temperature are relevant to forecasting such campaigns in light of climate change. Further examination is warranted into the association with increased temperature.

Acknowledgements

This study is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the sole responsibility of the Act to End NTDs | West program, led by FHI 360 in partnership with Helen Keller International, and do not necessarily reflect the views of USAID or the United States Government.

We would also like to acknowledge all the participants and national level coordinators of MDAs in these ten countries without whom neither MDA nor analysis of it would be possible.

USAID FROM THE AMERICAN PEOPLE | Act to End NTDs WEST | fhi360 THE SCIENCE OF IMPROVING LIVES | HELEN KELLER INTL