Global Health Day

Using routine case data to quantify the protective efficacy of seasonal malaria chemoprevention under programmatic implementation in Burkina Faso

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The emergence of digitized routine health facility data in sub-Saharan countries with a high burden of malaria presents an opportunity to analyze the changes in malaria incidence using readily available incidence data with national spatial coverage and long temporal resolution. However, issues inherent to passively collected malaria data from health facilities brings bias to analysis which fails to control for these imperfections.

We aim to model the effect of seasonal malaria chemoprevention (SMC) therapy, one of the more recent preventive interventions used to combat malaria among children under 5 years old in high burden sub-Saharan African countries. SMC was first recommended by the WHO in 2012 for children under 5 years old, who are at highest risk for contracting moderate and severe malaria, and is given throughout the peak malaria transmission period, which corresponds to the rainy season each year. Meta-analysis of clinical trials analyzing SMC efficacy on clinical malaria have found a 75% decrease in disease incidence in the treatment group relative to the control group, although we expect some drop-off when moving to in country intervention campaigns. To model the effect of SMC under programmatic implementation, we use routine case data from the Burkina Faso Health Management Information System (HMIS), which, contrary to expectation, shows an increase in raw malaria incidence during the period of SMC deployment.

Using seasonal trend decomposition, we discovered that the apparent increase in raw incidence is driven by increases in treatment seeking, expansions to the HMIS network, and reporting inconsistencies and instead use the malaria share of outpatient visits as our response for intervention efficacy against clinical malaria as this controls for this incr. We quantify the protective efficacy of SMC against clinical malaria in children under 5 years old with generalized linear mixed-models in a difference-in-difference framework accounting for differences between health districts in the random effect components. There was a significant reduction in the malaria share of outpatient visits correlating with the intervention of SMC, account for a protective efficacy (PE) of 13.1% (95% CI [7.9%, 18.1%]) and 15.3% (95% CI [9.3%, 20.9%]) in the group of districts which initially received SMC in either 2016 or 2017.