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Scoping Review: Analytical Approaches to Estimating Malaria Intervention Effectiveness and Impact

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Abstract

Context: Ministries of Health and National Malaria Control
Programs need simple approaches to be able to regularly estimate the effectiveness and impact of malaria interventions. Traditionally, this has been done by analyzing data from post-intervention campaign surveys or periodic nationally-representative surveys, or estimated by complex mathematical modelling. As health management information systems collecting routine programmatic data are maturing, there increasingly is an opportunity to use these data to measure effectiveness and impact of interventions more continuously and readily. The objective of this scoping review is to map and summarize the different analytical approaches for estimating the effectiveness and impact of malaria interventions using routine surveillance and health management information system data.

Methods: We will follow the PRISMA-ScR (Preferred Reporting
Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews) to conduct and report this scoping review.

Attachments

DOCX

PMI-004 SCOPING REVI...

21KB

Troubleshooting

Rationale

1 Malaria is an acute febrile illness caused by a parasitic infection transmitted by Anopheles mosquitoes. Human malaria is caused by five different Plasmodium parasites, with P. falciparum being the predominant species in sub-Saharan Africa (SSA) [1]. In the past 15–20 years, the combined efforts of Ministries of Health (MOHs) and National Malaria Control Programs (NMCPs), and their partners, including PMI, have made tremendous progress against malaria. This progress resulted from the massive scale-up of various malaria prevention and control interventions, including facility and community-based confirmatory testing and treatment of malaria cases, intermittent preventive treatment in pregnancy (IPTp), and seasonal malaria chemoprevention (SMC), along with indoor residual spraying (IRS) and insecticide-treated nets (ITNs).
MOH / NMCPs use programmatic intervention coverage and effectiveness data to regularly monitor impact of interventions; modify intervention implementation approaches (e.g., if coverage estimates are sub-par) or switch interventions altogether (e.g., if effectiveness is observed to be lower than expected). Intervention coverage and effectiveness has traditionally been assessed by post-intervention campaign surveys or periodic nationally-representative surveys (e.g., Demographic and Health Surveys [DHS], Malaria Indicator Surveys [MIS], Multiple Indicator Cluster Surveys [MICS]), or estimated by complex mathematical modelling. The limitations of surveys are that—while generally robust—they only occur every 2–5 years; take time; require significant human, logistical and financial resources and capabilities; and may not be powered sufficiently enough to provide sub-national intervention estimates. Similarly, mathematical modelling may be limited by the available data and the significant technical expertise needed to develop and run the models, let alone run them continuously. Additionally, neither surveys or modeling may avail necessary estimates at key strategic moments in the malaria programming planning, implementation and monitoring cycle, such as the development of national strategies or design of necessary donor documents (e.g., Global Fund Concept Notes or PMI Malaria Operational Plans).
Countries health management information systems (HMIS) have been dramatically strengthened in the past few years, with countries being able to consistently and fully report on outpatient, inpatient and other programmatic data—much of this progress has been made by adopting, piloting and rolling out the district health management information system 2 (DHIS2), an open-source data-system software specifically developed to capture health data in lower-and-middle income countries. Because of their sheer volume across space and time, data collected and reported through

HMIS like DHIS2 complement and even offer an alternative to nationally representative and other ad hoc surveys to assess health intervention coverage and effectiveness, and ultimately impact on health outcomes. [2–4]

Objectives

2 The objective of this scoping review is to map and summarize different analytical approaches for estimating the impact and effectiveness of malaria interventions using routine surveillance and health management information system data. To our knowledge, such review has not been conducted. A preliminary search for existing scoping and systematic reviews on the topic was conducted on December 15, 2023, using PubMed and no similar reviews were found. We will follow the PRISMA-ScR (Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews) to conduct and report this scoping review [5].

Information Sources

3 A systematic search of PubMed was conducted on January 2, 2024, to identify studies and analyses that had used routine surveillance and health management information systems data to assess the effectiveness of malaria interventions. A detailed search strategy was designed and piloted to identify the optimal combination of keywords used.

Search Strategy

4 We examined the available electronic databases using combination searches of the following Boolean terms: “Malaria” AND “Intervention” AND “effect*” OR “impact*” AND “System” OR “Surveillance.” Other key terms for such as "routine” or “information systems” control were not included in the search strategy to have a more comprehensive search and will be used during abstract and full text screening.

Study Records

5 All identified studies will be imported into Rayyan, a systematic review management software, to screen (title, abstract, and full text) and manage the results of the search. Two reviewers will independently assess the titles and abstracts of the included articles based on the inclusion criteria. In the event of discordance between the two reviewers, a third reviewer will review the titles and abstracts and will come to a final decision. From the included articles, the two reviewers will identify relevant publications by reviewing the full text. Any discordance will again be resolved by a third reviewer. A

PRISMA flow diagram will be used to report final numbers of articles that are included and excluded at each stage.

Eligibility Criteria

6 We limited inclusion to studies and analyses that were conducted in the past decade (i.e., 2014), which we purposefully chose as a time point when countries' routine health management information systems had begun to substantially mature, with data reported by these systems progressively becoming more robust.

Data Items

7 From the included articles, each reviewer will work independently to extract data from the articles following a pre-specified extraction sheet. The following data will be extracted from each paper into an MS Excel spreadsheet: (1) author; (2) year of publication; (3) geography; (4) study design; (5) study period / time period covered; (6) intervention(s) for which effectiveness and impact was measured; (7) approach to measure effectiveness and impact; (8) health information system platform used for analyses; (9) indicator variables included in the analyses; (10) target population; (11) key findings; and (12) items from the Template for Intervention Description and Replication (TIDieR) checklist. TIDieR is a 12-item checklist that includes the brief name, why, what (materials), what (procedure), who provided, how, where, when and how much, tailoring, modifications, how well (planned), how well (actual) of a program.

Data Synthesis

8 The proposed scoping review will outline the approaches to estimate the effectiveness of malaria interventions using routine surveillance and health management information systems data. The scoping review does not involve data on human subjects and ethical approval is not required.

Protocol references

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