

BMJ Open Facilitators and barriers to malaria surveillance in community pharmacies and over-the-counter medicine sellers in sub-Saharan Africa's health sector: a scoping review protocol

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ABSTRACT

Introduction Malaria remains a serious public health issue, and sub-Saharan Africa (SSA) is still disproportionately burdened with the disease. Efficient disease tracking in both public and private healthcare points is required to consolidate elimination efforts. Considerable amounts of malaria cases in the private sector, especially community pharmacies, are not captured into routine surveillance systems. This scoping review aims to systematically collate the existing evidence on the facilitators and barriers to malaria surveillance in community pharmacies (CPs) and over-the-counter medicine sellers (OTCMS) in SSA.

Methods and analysis We will retrieve all relevant studies (published and completed but unpublished) through searches in PubMed, CINAHL, Scopus, Web of Science and Hinari from inception to 15 June 2026. Searches will be conducted without language restrictions; however, full-text inclusion will be limited to English-language publications due to resource constraints. Titles and abstracts of non-English articles will be thoroughly screened using online-assisted translation tools such as Google Translate to assess their potential eligibility. Potentially relevant non-English studies will be documented and reported in the appendices to allow for an evaluation of possible language bias, in accordance with Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) reporting guidelines. All the articles retrieved from the searches will be collated and deduplicated using EndNote. The deduplicated studies will then be screened and selected. Two reviewers will independently screen studies using a study selection flow chart developed from the pre-specified eligibility criteria. The data synthesis for this scoping review will be conducted using a narrative synthesis approach. The extracted data will be organised into a structured format, categorising information based on study characteristics, malaria surveillance activities, facilitators and barriers. **Ethics and dissemination** Formal ethical approval is not required as the review uses publicly available data. Findings will be published in an open-access peer-reviewed journal, presented at relevant conferences and

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This scoping review will follow a preregistered protocol based on the Arksey and O'Malley framework and Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines to ensure clarity, transparency and reproducibility.
- ⇒ A broad, systematic search across major databases, grey literature and reference lists will help capture all relevant evidence on malaria surveillance in community pharmacies and over-the-counter medicine sellers' settings in sub-Saharan Africa.
- ⇒ Screening, selection and data extraction will be done independently by at least two reviewers using Covidence and a piloted extraction tool, strengthening consistency and reducing selection bias.
- ⇒ Full-text inclusion will be limited to English-language publications due to resource constraints, which may result in missing relevant studies published in French, Portuguese or other local languages in the region.
- ⇒ Being a scoping review, it will not include a formal quality appraisal of included studies; interpretations will therefore be influenced by the quality and completeness of reporting in the included studies.

disseminated through policy briefs and infographics to the WHO, national malaria programmes and pharmacy councils.

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INTRODUCTION

Malaria infection is a global public health issue. The WHO estimates that 249 million malaria cases and 608 000 deaths from malaria occur in 85 malaria-endemic countries annually.¹ In 2023, the African continent accounted

for 94% of all malaria cases, and 96% of the global malarial deaths occurred in 29 countries, with four countries (Nigeria, Democratic Republic of the Congo, Uganda and Mozambique) in sub-Saharan Africa (SSA) alone contributing about 50% of the deaths.¹ SSA is still disproportionately burdened with malaria, requiring urgent measures to reduce infection prevalence to bearable levels. Several interventions such as Intermittent Preventive Treatment in Pregnant women, Indoor Residual Spraying, prompt diagnosis and treatment with artemisinin combination therapies (ACTs), distribution of insecticide treated bed-nets and deployment of seasonal malaria chemoprevention and malaria vaccines in children have been implemented.² Nevertheless, the rate of disease incidence (cases per 1000 population at risk) significantly differs among certain SSA countries, ranging from highest in Mozambique (315.3) to moderate in Ghana (171.1), lower in Zimbabwe (55.8) and lowest in South Africa (3.9).³ This suggests that malaria interventions have not universally reduced disease frequency, highlighting the value of tracking malaria cases and other indicators as a tool to monitor intervention impact and strengthen elimination strategies.

Prompt diagnosis and treatment with ACTs is achieved through adherence to the WHO T3 strategy, which involves parasite detection by laboratory testing, treatment with appropriate antimalarials and tracking malaria cases through surveillance.⁴ Adherence to the T3 strategy demands that healthcare providers document and report on all malaria cases managed to national disease surveillance systems for efficient disease tracking, especially within the context of elimination.⁵ In most SSA countries, the national malaria surveillance systems are largely dependent on reports from government and faith-based health facilities, with a handful of private health facilities also contributing.^{6 7} For example, the level of private sector malaria data reporting to national surveillance systems is estimated at 15.3% in West Africa.⁷ Meanwhile, 28%–36% of febrile cases tend to seek care in the private sector.^{6 8 9} Even in African countries prioritising malaria elimination such as Botswana, Mozambique, Ghana, Namibia, South Africa, Swaziland and Zimbabwe, approximately 35% of individuals with malarial symptoms seek treatment at private healthcare facilities.^{6 8} Within this sector, community pharmacies (CPs) and over-the-counter medicine sellers (OTCMS) are the primary providers; notably, CPs alone account for 26.6% of the total 33.6% of care sought.¹⁰

Because elimination hinges on the ability to monitor every case in real-time, robust surveillance has become a non-negotiable intervention. Enhanced surveillance ensures comprehensive case detection and improves data disaggregation, which will consequentially strengthen the health information system (HIS) building block of the national health framework.¹¹ Therefore, facilitating the inclusion of CPs and OTCMS into national malaria surveillance activities would bridge existing data gaps and help consolidate efforts towards total disease elimination and health system strengthening.^{1 12}

Notwithstanding, practitioners in CPs and OTCMS in Africa report that adhering to the protocols of national surveillance programmes increases workload, delays service delivery, increases operational cost, adds extra financial burden to clients and reduces revenue.^{13–17}

And so, their commitment to malaria elimination activities is influenced by factors such as staff willingness, client request, clinical judgement, personal convictions, desire to treat feverish conditions and sociocultural orientation.^{13 14} A policy synthesis on private sector malaria case management proposes ways of improving practitioner involvement in malaria elimination drive, adducing to an integrated community case management approach, where in addition to malaria, drug retailers are trained to diagnose and manage other infections such as pneumonia and diarrhoea.¹⁸

Though this does not necessarily ensure commitment to report data to surveillance systems, Bennett and colleagues believe that adding an assessment component to partnership arrangements will help identify gaps in the scope and quality of testing and disease management and data reporting for strengthening.¹⁹ All the same, such reinforcement procedures involve comprehensive incentivised packages that offer training, subsidised testing tools and medicines and supportive supervision.²⁰ A more recent review indicates that although malaria reporting and surveillance systems are in place, their functionality remains suboptimal. The review highlights several persistent challenges, including limited awareness of reporting requirements among health providers, substantial administrative burden associated with reporting processes, low motivation to report cases and weak coordination between public and private sector actors. Collectively, these constraints undermine the completeness, timeliness and overall effectiveness of malaria surveillance systems.²¹ Furthermore, the facilitators and barriers to documentation and reporting in CPs have not been explored systematically. Various records exist for possible transmission to routine surveillance systems. Besides, factors that can influence prompt reporting of quality data have not been thoroughly studied.²² Further, very little is known about the types of malaria records and documentation available in the CPs and their extent of use in general. Likewise, scanty data exist on CPs and OTCMS' contribution regarding reporting of malaria cases, especially within malaria elimination settings.¹⁸

Rationale for the review

Despite significant efforts to monitor malaria cases globally, only 35% of febrile cases seek malaria care at facilities listed on routine surveillance systems in endemic areas.⁶ Effective malaria surveillance strategies necessitate comprehensive data collection from both public and private health facilities, including CPs and drug outlets as well as communities, with subsequent reporting into centralised systems. Analysis of surveillance systems across various regions, including the Greater Mekong subregion, southern Africa, Hispaniola and Central America,

Table 1 Key prior reviews and gaps addressed by the proposed review

Prior review	Scope and focus	Geographic coverage	Key findings relevant to surveillance (documentation, reporting, integration)	Gaps relative to the proposed review
Dat <i>et al</i> ²¹	Systematic review of private healthcare participation in malaria prevention and elimination, including private clinics and pharmacies	Multicountry, global	Reports that private providers' participation in malaria reporting and surveillance exists but is limited and highlights barriers such as limited awareness of reporting, administrative burden, low motivation and weak public-private coordination.	Not SSA-focused and not CPs and OTCMS-specific. Does not map pharmacy-level documentation types, reporting channels or facilitators and barriers to routine surveillance specifically within CPs and OTCMS in SSA.
Potter <i>et al</i> ²⁰	Programmatic case studies on integrating private outlets into national surveillance through training, RDT use, supervision and reporting	Cambodia, Lao PDR, Myanmar, Vietnam	Demonstrates feasibility of generating private sector case data and integrating it into national surveillance systems when comprehensive support is provided.	Not SSA-focused. Does not synthesise barriers and facilitators in SSA CPs and OTCMS and focuses on supported programme contexts rather than routine practice.
Silverman <i>et al</i> ¹⁸	Policy synthesis on private sector malaria case management (drug stores, clinics, pharmacies), including approaches such as iCCM and digital innovations	Africa, with emphasis on SSA	Highlights data availability and quality as a challenge in private sector malaria management and notes weak incentives and inconsistent enforcement of reporting, with proposed opportunities for improved routine data capture through digital tools.	Not a systematic synthesis of surveillance functions. Does not focus specifically on facilitators and barriers to malaria documentation and reporting within CPs and OTCMS in SSA.
Bennett <i>et al</i> ¹⁹	Review of strategies for engaging the private sector in malaria surveillance in elimination settings (testing, treatment and reporting)	Multicountry, including elimination settings in Southeast Asia and southern Africa	Summarises approaches to improve private sector reporting and integration, including training, incentives, regulation and provider organisation, emphasising early engagement of private sector stakeholders.	Not specific to CPs and OTCMS in SSA and does not map routine documentation practices and pharmacy-level reporting workflows.

CPs, community pharmacies; HIS, Health Information System; iCCM, Integrated Community Case Management; Lao PDR, Lao People's Democratic Republic; OTCMS, over-the-counter medicine sellers; RDT, rapid diagnostic test; SSA, sub-Saharan Africa.

reveals that very few countries integrate data from the private sector into their malaria surveillance systems, with only three out of 16 countries achieving this integration.⁶

In SSA, the private health sector plays a crucial role in providing healthcare services, including malaria diagnosis and treatment. However, several barriers impede the CPs and OTCMS from documenting and reporting malaria data.^{20 21} Understanding these barriers and facilitators is essential to enhancing malaria surveillance in the private health sector.

Table 1 maps out the existing evidence on malaria surveillance in the private sector and key gaps in knowledge. While previous reviews provide foundational insights, they largely focus on the general private health facilities or global contexts, leaving a specific gap regarding the operational realities of CPs and OTCMS in SSA. This protocol addresses the underexplored component of malaria surveillance in SSA, specifically, the role of CPs and OTCMS medicine sellers within the private

health sector. The topic is timely, policy-relevant and aligned with current global priorities on strengthening surveillance and private sector engagement.

This scoping review aims to systematically collate the existing evidence on the documentation practices, facilitators and barriers to malaria surveillance in the private health sector in SSA. By identifying and synthesising this information, the review will provide valuable insights to inform policy and practice, ultimately contributing to more effective malaria elimination efforts in SSA and strengthened health systems.

Review questions

1. What are the current practices of malaria surveillance in CPs and OTCMS within the private health sector across SSA?
2. What are the facilitators and barriers to malaria surveillance activities in CPs and OTCMS in SSA?

3. What evidence exists on the extent and nature of malaria data reporting by CPs and OTCMS to national malaria surveillance systems in SSA?

METHODS

Aim

This scoping review protocol is designed to systematically map the existing literature on facilitators and barriers to malaria surveillance in the private health sector across SSA. We will map the characteristics and findings of the available evidence and summarise them descriptively, as per the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) framework, and will not undertake a formal critical appraisal of included studies or assess intervention effectiveness.

The review will be conducted in accordance with the methodological framework proposed by Arksey and O'Malley.²³ The reporting of the review will follow the PRISMA-ScR²⁴ guidelines. This protocol has been registered with the Open Science Framework (registration link: https://osf.io/udwpm/overview?view_only=6e42bea8abb94f9cbc535b161ea329a6).²⁵ The scoping review is planned to be conducted between 01 June and 30 September 2026, including literature searching, screening, data extraction and synthesis.

Criteria for including studies in the review

Population

This scoping review will include studies focusing on CPs and OTCMS engaged in malaria-related activities within the private health sector. Eligible studies must specifically address individuals such as pharmacists, pharmacy technicians, OTCMS operators and other pharmaceutical support staff involved in malaria surveillance practices. Studies that focus exclusively on other healthcare providers, such as physicians, nurses or community health workers, will be excluded unless these providers are directly linked to CPs or OTCMS in the context of malaria surveillance.

For the purpose of this review, community pharmacies (CPs) and OTCMS will be defined using an operational approach applicable across SSA, recognising that terminology, licensing requirements and scope of practice vary by country. For each included study, we will extract and report the country-specific outlet terminology and regulatory description (as reported) and map these to the CPs and OTCMS categories used in this review.

Community pharmacies (CPs) are registered establishments operated by licensed pharmacists that provide pharmaceutical services directly to the public. These services typically include the dispensing of both prescription and non-prescription medicines, counselling on medication use, health promotion and, in some cases, point-of-care diagnostic testing (such as malaria rapid diagnostic tests).

OTCMS are licensed or registered outlets authorised to sell a limited range of non-prescription medicines, often

managed by individuals without a pharmacy degree but trained and certified to operate under national pharmaceutical regulations. OTCMS are typically located in both urban and rural settings and frequently serve as the first point of contact for individuals seeking treatment for common conditions such as malaria.

To distinguish these from other private outlets, studies focusing exclusively on unlicensed drug shops, informal medicine vendors or patent medicine vendors without regulatory authorisation to sell antimalarial medicines will be excluded. We anticipate heterogeneity in outlet classification across SSA. During synthesis, we will present findings by outlet type (CPs vs OTCMS) and, where feasible, by country or subregion and regulatory context. Where studies use mixed or unclear outlet categories, we will report this explicitly and extract pharmacy-specific data only where they are clearly disaggregated.

Concept

The primary concepts of interest for this review are the facilitators and barriers associated with malaria surveillance activities in CPs and OTCMS. Facilitators are defined as factors that promote or enable the implementation and routine conduct of malaria surveillance practices in CPs and OTCMS, such as the use of technology, training or supportive policies. Barriers are defined as obstacles or challenges that hinder these activities, including limited resources, lack of training or policy constraints. The review will also consider studies that describe the contributions of CPs and OTCMS to the broader malaria surveillance system, including their role in case detection, data reporting and integration into national programmes. Studies which do not address either facilitators or barriers or those that fail to provide relevant data on malaria surveillance activities will be excluded from this review.

Context

The context of this review is limited to the private health sector in SSA, specifically focusing on CPs and OTCMS. Studies must examine malaria surveillance practices within this geographical and institutional context. Research conducted outside SSA or focused solely on public health institutions, hospitals, clinics or other non-pharmacy-based settings will be excluded unless they provide comparative data that highlight the unique role or contributions of CPs and OTCMS. The review seeks to capture a regional understanding of malaria surveillance, recognising the diverse healthcare landscapes across SSA.

Study types

The review will include primary research articles, grey literature, reports and conference proceedings that provide qualitative or quantitative data relevant to the review objectives. Eligible studies may include observational studies, case studies, mixed-methods research and programme evaluations. Editorials, opinion pieces and commentaries that lack empirical data or systematic analysis will be excluded.

Language and timeframe

Internet-based searches will be conducted without language restrictions to ensure a holistic capture of available literature. However, full-text inclusion will be limited to English-language publications due to resource constraints in relation to expert translation services, which can affect the feasibility of synthesis. To minimise bias, titles and abstracts of non-English articles identified during the electronic search will be screened using online translation tools such as Google Translate to evaluate their probable eligibility.

We will document potentially relevant non-English studies (number, language, titles and reason for exclusion) by listing them in the appendices to allow for an evaluation to inform interpretation, in accordance with PRISMA reporting guidelines and report this to inform interpretation. No restrictions will be applied to the publication date to ensure the inclusion of both historical

and contemporary perspectives on malaria surveillance practices in CPs and OTCMS.

Search methods for identification of studies

Database searches

We will retrieve all relevant studies (published and completed but unpublished) through searches in PubMed, CINAHL, Scopus, Web of Science and Hinari, from inception to 15 June 2026. Searches will be conducted without language restrictions; however, full-text inclusion will be limited to English-language publications as described in the prespecified eligibility criteria. The search terms will include a combination of the key terms; 'malaria surveillance,' 'malaria data documentation/reporting', 'malaria referral', 'malaria monitoring,' 'private health sector,' 'CPs, OTCMS/Chemical Sellers Shop', along with all applicable alternate terms (see [table 2](#) for further details). The names of the 48 countries

Table 2 PubMed search strategy (to be tailored to other databases)

Search	Query
#1	Search: (malaria(MeSH Terms)) OR (malaria(Title/Abstract))
#2	Search: (((((((((((((((((((surveillance(Text Word)) OR (monitor*(Text Word))) OR (report*(Text Word))) OR ("case reporting"(Text Word))) OR ("data collection"(Text Word))) OR ("case report"(Text Word))) OR (tracking(Text Word))) OR (evaluation(Text Word))) OR (audit*(Text Word))) OR (document*(Text Word))) OR ("test record"(Text Word))) OR (testing(Text Word))) OR (record*(Text Word))) OR (prescri*(Text Word))) OR (manage*(Text Word))) OR ("case management"(Text Word))) OR ("case load"(Text Word))) OR ("case detection"(Text Word))) OR (notif*(Text Word))) OR ("disease notification"(Text Word))) OR ("rapid testing"(Text Word))) OR ("rapid test"(Text Word))) OR ("data reporting"(Text Word))) OR (referral(Text Word))) OR ("referral system"(Text Word))) OR ("rapid diagnostic test"(Text Word))) OR ("rapid testing"(Text Word))) OR ("disease reporting"(Text Word)))
#3	Search: (#1) AND (#2)
#4	Search: (((((((((((((((((((("community-based pharmacies"(Text Word)) OR ("community-based pharmacy"(Text Word))) OR ("community pharmacy"(Text Word))) OR ("community pharmacist"(Text Word))) OR ("over-the-counter medicine sellers"(Text Word))) OR ("over the counter medicine sellers"(Text Word))) OR (OTCMS(Text Word))) OR ("retail healthcare providers"(Text Word))) OR ("retail health care providers"(Text Word))) OR ("community-based outlets"(Text Word))) OR ("private health sector"(Text Word))) OR ("private health facility"(Text Word))) OR ("private health facilities"(Text Word))) OR ("private medicine retailers"(Text Word))) OR ("private medicine sellers"(Text Word))) OR ("chemical sellers"(Text Word))) OR (pharmacy(MeSH Terms))) OR ("over-the-counter"(Text Word))) OR ("over the counter"(Text Word)))
#5	Search: (#3) AND (#4)
#6	Search: (((((((facilitator*(Text Word)) OR (enabler*(Text Word))) OR (enhance*(Text Word))) OR (barrier*(Text Word))) OR (challenge*(Text Word))) OR (obstacle*(Text Word))) OR (impediment*(Text Word)))
#7	Search: (#5) AND (#6)
#8	Search: (((((((((((((((((((("sub-Saharan Africa") OR (Africa(MeSH Terms))) OR (SSA)) OR (Angola)) OR (Benin)) OR (Botswana)) OR ("Burkina Faso")) OR (Burundi)) OR (Cameroon)) OR ("Cape Verde")) OR ("Central African Republic")) OR (Chad)) OR (Comoros)) OR (Congo)) OR ("Cote d'Ivoire")) OR (Djibouti)) OR ("Equatorial Guinea")) OR (Eritrea)) OR (Ethiopia)) OR (Eswatini)) OR (Gabon)) OR ("The Gambia")) OR (Ghana)) OR (Guinea)) OR ("Guinea-Bissau")) OR (Kenya)) OR (Lesotho)) OR (Liberia)) OR (Madagascar)) OR (Malawi)) OR (Mali)) OR (Mauritania)) OR (Mauritius)) OR (Mozambique)) OR (Namibia)) OR (Niger)) OR (Nigeria)) OR (Rwanda)) OR ("Sao Tome and Principe")) OR (Senegal)) OR (Seychelles)) OR ("Sierra Leone")) OR (Somalia)) OR ("South Africa")) OR (Sudan)) OR (Swaziland)) OR (Tanzania)) OR (Togo)) OR (Uganda)) OR (Zaire)) OR (Zambia)) OR (Zimbabwe))
#9	Search: (#3) AND (#8)
#10	Search: (#5) AND (#8)
#11	Search: (#7) AND (#8)
MeSH, Medical Subject Headings.	

in SSA²⁶ will be included as additional search terms, nested with the appropriate Boolean logic to create a comprehensive search strategy. The searches will also be extended to Google Scholar, African Journals Online, preprint databases (eg, MedRxiv), grey literature sources (including conference proceedings) and dissertation/theses databases (EBSCO Open Dissertations).

For Google Scholar, results will be sorted by relevance. We will screen the first 200 results and then continue screening in blocks of 50 until no potentially eligible study is identified in two consecutive blocks. A detailed search strategy developed for PubMed (table 2) will be adapted for the searches in the other databases (online supplemental file 1). For search #8 (SSA countries) we will resort to the World Bank's list of SSA countries.

Additional searches

The reference lists of all relevant studies (including systematic, scoping and literature reviews) will be hand-searched to identify potentially relevant studies. For global systematic reviews where SSA has been considered a subgroup, the included studies will be reviewed and those missed by our searches will be retrieved for assessment and inclusion. Experts in the field will also be contacted via email for any knowledge about potentially relevant publications missed by our searches.

Screening and selection of studies

All the articles retrieved from the searches will be collated and deduplicated using EndNote. The deduplicated studies will then be exported to Covidence,²⁷ where studies will be screened and selected. Two reviewers will independently screen studies using a study selection flow chart developed from the prespecified eligibility criteria for considering studies for inclusion in the review, using a two-phase approach. First, the titles and abstracts of all retrieved studies will be screened to exclude irrelevant studies using the pretested study selection flow chart. Regarding articles with non-English abstracts, reviewers will use online translation tools to assess their preliminary eligibility. In the second phase, the full texts of potentially relevant studies will be retrieved and subjected to further screening. Articles meeting the inclusion criteria after full-text screening will be included in the review. Conflicts in eligibility decisions between reviewers will be resolved through discussion. The study selection process and the respective decisions for inclusion and exclusion of studies will be summarised and presented using the PRISMA flow diagram. All studies excluded at the full-text stage will be listed in a table, and the reason(s) for exclusion will be provided.

Data extraction

At least two reviewers will conduct data extraction independently to ensure the accuracy and consistency of the extracted information. A standardised data extraction form will be used to capture relevant data from each included study. Before full-scale data extraction, the form

will be pretested using a subset of studies to refine the process and ensure uniformity between reviewers. Data extraction will be informed by the WHO malaria surveillance framework, capturing information across surveillance stages (case detection, documentation, notification, reporting and feedback) and key surveillance system attributes, including completeness, timeliness, acceptability and representativeness. The information to be extracted has been presented in table 3. For studies lacking sufficient information, efforts will be made to contact the authors directly via email to obtain the necessary data. Any missing data and the reasons for their absence will be documented. If the study involves data from multiple countries and the country-specific data cannot be disaggregated, the study will be presented as a whole, with appropriate citations of the included countries. The reviewers will verify all extracted data independently, and discrepancies will be resolved through discussion to ensure reliability and completeness.

Data synthesis

The data synthesis for this scoping review will be conducted using a narrative synthesis approach. The extracted data will be organised into a structured format, categorising information based on study characteristics, malaria surveillance activities, facilitators and barriers. A descriptive summary of each included study will be provided, highlighting key aspects such as the study design, setting, participants and main findings. The narrative synthesis will involve identifying patterns and themes across the included studies by systematically reviewing the extracted data and grouping similar findings. Key themes will be identified for both facilitators and barriers to malaria surveillance. To strengthen interpretation, we will situate findings within concepts from routine HISS and public health surveillance, including the generation, flow, reporting and use of malaria data.^{27–33}

The findings will be compared with highlight similarities and differences across studies, examining how various factors influence malaria surveillance activities in different contexts and identifying any discrepancies or unique insights.

Where quantitative data are reported, we will summarise them descriptively (eg, reported proportions of outlets documenting or reporting malaria data and reported reporting channels). These findings will be used to complement the qualitative themes. We will not pool estimates across studies.

A thematic framework will be developed to organise findings from the included sources into coherent themes, each clearly defined and supported by evidence from the included studies.

The results will be presented in a structured narrative format, using both textual descriptions and illustrative examples from the studies. Tables and figures will be used where appropriate to summarise key findings and enhance the clarity of the presentation. The synthesised findings will be discussed in the context of

Table 3 Data extraction framework (adapted to WHO malaria surveillance guidance)

Domain/Variables	Data items to be extracted
Study characteristics	
Publication details	Author(s); year; publication type (peer-reviewed/grey literature).
Study context	Country; malaria context (control/elimination; transmission level if stated).
Study design	Qualitative, quantitative, mixed-methods, programme evaluation; data collection methods.
Setting	Urban/rural/peri-urban; level of health system engagement (district/regional/national).
Participants	Cadre (pharmacists, pharmacy staff, OTCMS operators, regulators); number of outlets/providers.
Outlet classification	Terminology used (community pharmacy, drug shop, chemical seller, medicine vendor); licensing/regulatory status.
Surveillance processes and performance	Case detection, case documentation, data reporting, data quality control, data analysis and use.
Case detection and testing	Availability and use of RDTs/microscopy; criteria for suspected/confirmed cases; referral practices.
Case recording and data quality	Type of registers (paper/electronic); data elements captured (test result, treatment, referral); completeness of documentation; evidence of data validation or supervision.
Case notification and reporting	Whether cases are formally reported; reporting channels (paper forms, SMS, digital platforms); reporting frequency; timelines (timeliness).
Feedback and data use	Presence of feedback mechanisms; supervision; whether data are reviewed or used for public health action.
System performance attributes	Evidence relating to: completeness (proportion reporting, missing data), timeliness (delays), accuracy (errors/verification), representativeness (integration of CPs/OTCMS into national systems), acceptability (provider willingness), simplicity (perceived reporting burden) and stability (continuity of reporting systems).
Implementation determinants	Regulation and policy framework, availability of standard operating tools, training on malaria surveillance, access to digital reporting systems, use of manual reporting systems, incentive mechanisms, public-private partnerships, reporting compliance to national reporting systems.
Facilitators	Training, digital tools, supervision, incentives, regulatory enforcement, integration into routine workflow.
Barriers	Limited awareness of reporting requirements; workload; administrative burden; lack of tools/registers; costs (airtime/data); weak public-private coordination; lack of feedback.
Key findings	
Study conclusions	Authors' main findings specific to malaria documentation/reporting in CPs/OTCMS.
Recommendations	Policy or programme recommendations for strengthening surveillance integration.
CPs, community pharmacies; OTCMS, over-the-counter medicine sellers; RDT, rapid diagnostic test; SMS, short message service; SSA, sub-Saharan Africa.	

existing literature, highlighting the implications for policy and practice. The discussion will also identify gaps in the current evidence base and suggest areas for future research. The narrative synthesis process will be iterative, with regular discussion among the reviewers to ensure accuracy and comprehensiveness.

Patient and public involvement

Patients or members of the public were not directly involved in the design, conduct or planning of this scoping review, as it synthesises the existing published and grey

literature. However, community pharmacists and OTCMS representatives from Ghana were consulted informally during the development of the review questions to ensure that the objectives reflect real-world challenges faced by private-sector providers in malaria surveillance.

Ethics and dissemination

No formal ethics approval is needed for review. The findings will be published as an open-access, peer-reviewed article and summarised in a policy brief and infographics aimed at the WHO, national malaria programmes and

pharmacy councils. Results will also be presented at major regional conferences.

This scoping review protocol is reported in accordance with the PRISMA-ScR) checklist (see online supplemental file 2).

DISCUSSION

Successful malaria elimination requires integration of surveillance data from both public and private points of care, including CPs and OTCMS.^{18 34} This scoping review will map how CPs and OTCMS contribute to malaria surveillance in SSA, focusing on documentation practices, reporting pathways and the barriers and facilitators that influence routine capture and transmission of malaria data to national systems. Findings will be interpreted in relation to the WHO malaria surveillance framework,²⁸ routine HIS functioning,^{35–37} public health surveillance practice^{6 38} and implementation processes,^{39 40} relevant to embedding reporting behaviours in private sector settings. The WHO framework conceptualises malaria surveillance as a continuous process that includes case detection and confirmation, recording and reporting and feedback and data use, alongside key system attributes such as completeness, timeliness, data quality, acceptability and representativeness. To support interpretation and comparability across diverse settings, findings will be organised using a multilevel implementation lens, grouping factors at the individual provider level (knowledge, perceptions, workload), outlet level (staffing, workflows, tools, record systems) and system level (regulation, supervision, incentives, reporting infrastructure, data feedback). This will enable identification of where barriers and facilitators cluster along the surveillance pathway, including case detection and confirmation, documentation, notification, reporting and feedback, and how these factors may influence surveillance performance attributes, particularly completeness, timeliness and acceptability.

We anticipate heterogeneity across SSA in outlet classification, regulatory scope of practice, malaria epidemiology and national surveillance architecture. During synthesis, we will present findings by outlet type (CPs vs OTCMS) and, where feasible, by country or subregion, malaria control versus elimination contexts and reporting platform characteristics. Where studies use mixed private sector categories or do not disaggregate data for CPs or OTCMS, this will be reported explicitly, and pharmacy-specific findings will be extracted only where clearly attributable. The mapped evidence will inform policy and practice by clarifying feasible entry points for integrating CPs and OTCMS into routine surveillance. Potential implications include simplifying reporting tools and workflows, aligning reporting requirements with pharmacy practice realities, strengthening supportive supervision and feedback mechanisms, clarifying regulatory expectations and identifying practical incentive structures that support consistent documentation and reporting.

We anticipate that limiting full-text inclusion to English-language publications, heterogeneity in outlet definitions and reporting metrics across studies and limited disaggregation of findings specific to CPs and OTCMS may affect the comprehensiveness and comparability of the mapped evidence. In addition, as a scoping review, this work will not formally appraise study quality, and findings will therefore be interpreted as a descriptive map of available evidence rather than an assessment of effectiveness.

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