Improving effective adoption and use of health information systems for malaria control through enhanced DHIS2 functionality and operational guidance

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Executive Summary

Functioning health information systems are the backbone of malaria control and elimination programs worldwide, providing information on where parasites can be found in people, where transmission is occurring, how interventions should be targeted, and whether regions are progressing towards malaria control goals. In over 50 countries, including high malaria-endemic countries such as Nigeria, Uganda, and Kenya, DHIS2 is the de-facto health management information system (HMIS) and malaria surveillance platform used by policymakers nationally and sub-nationally to make programmatic decisions against a backdrop of decreasing resources. DHIS2 is an open source, generic, extensible, and proven platform used to collect, store, and analyze information across multiple domains, predominantly global health.

Landscape assessments of malaria surveillance systems and the Clinton Health Access Initiative (CHAI)'s ongoing work supporting national malaria programs reveal a number of challenges in operationalizing and optimizing use of DHIS2 to improve malaria programs, hampering evidence-based decision-making. As a system used primarily by the public sector, it has limited private sector data collected or analyzed within it. DHIS2 also focuses predominantly on the collection and analysis of routine aggregated and case data, limiting the collection and analysis of ad-hoc data such as quality assurance or supportive supervision data. Finally, while the system has easy-to-use dashboard and analysis capabilities, countries continue to struggle with designing and setting up user-appropriate dashboards.

With these limitations in context, CHAI has identified three key opportunities to augment DHIS2 functionality in response to the *Global Good Software Development and Support* announcement . These opportunities strengthen malaria data management across the spectrum from data collection, to data analysis to data use. This one year project will include the development of resources to help countries incorporate retail private sector data into DHIS2, new functionality for improved data analysis, and guidance on strengthening dashboard development and use. In addition to the development, configuration, and testing of features, the project will generate three documents that will provide operational guidance to countries interested in adapting these opportunities for malaria and/or other disease areas.

Project description

(A) **Expanding data collection:** Integrating data from the retail private sector into DHIS2, a growing priority in countries with a high febrile population that seeks care in this sector.

In high burden countries such as Nigeria, Uganda, and the Democratic Republic of Congo, almost half of the febrile population seeks care in the retail private sector, comprised primarily of drug shops and community pharmacists. Although providers in this sector can administer a malaria test and are encouraged to do so by the national malaria program, they are unable to report timely and quality data into DHIS2. Either data is not collected at all or is predominantly collected and analyzed by a partner that uses a parallel data platform not integrated with DHIS2. This prevents policymakers from analyzing surveillance data in totality as the data in DHIS2 is separate from data collected from the retail private sector. Moreover, by not systematically collecting and analyzing data from the retail private sector, malaria programs confront a knowledge gap that prevents them from effectively targeting interventions based on where the malaria burden actually is.

CHAI is currently working in Lagos State, Nigeria to enable drug shops to report data into DHIS2 and integrate it with supportive supervision data. Until recently, this integration has been a long and labor-intensive process conducted manually in MS Excel. As a first step, CHAI will demonstrate how private sector data can be collected and integrated directly within DHIS2, through the DHIS2 Tracker Capture application. This work will be done as part of an existing grant. In parallel, we will move the data analysis currently done on Excel to the DHIS2 platform and integrate it with the public sector DHIS2 data for comprehensive and improved analysis.

CHAI seeks funding to synthesize learnings from its ongoing pilots and lessons learnt from different countries and programs, in the form of operational guidance documentation. This documentation will support policymakers to make decisions on the optimal collection and integration of retail private sector data with DHIS2, including decisions on whether to invest resources in data collection, the modality of data collection (paper, SMS, USSD, mobile application, or web), and how to integrate this data with DHIS2, depending on country contexts, priorities, and resources.

(B) **Data analysis:** Developing new easy-to-use mobile functionality for using data from quality assurance interventions with routine surveillance data

The current DHIS2 data collection mobile applications focus on the collection of routine data reported from facilities in data registers, such as aggregated data (DHIS2 Data Capture application) or case-based data (DHIS2 Event Capture and Tracker Capture applications). This focus on routine data restricts the collection and effective analysis of data from other non-routine activities. For example, supportive supervision visits to providers by a health professional are a resource-intensive activity intended to assess a provider's quality of care. Across most health programs, supervisors will routinely visit providers equipped with checklists to collect data on provider performance. This data is then analyzed to inform additional programmatic interventions that would improve the quality of care (e.g., training, providing supplies, additional visits, etc.). However, this analysis is traditionally done independently of routine data collected through DHIS2 because functionality that enables integration between the two sources on the mobile application does not yet exist in DHIS2. This represents a significant missed opportunity. Using data on services provided, patients seen, supply chain data, etc. along with the supportive supervision data would allow for much better targeting and program improvement.

While the University of Oslo is working on a new generation DHIS2 mobile application with improved user interfaces, workflows, and analytics, the new app will still not include the advanced algorithm and data integration functionality needed to combine different data sources in a way that can effectively inform supportive supervision plans. CHAI will work with DHIS2 to develop new easy-to-use functionality that will collect data from quality assurance interventions such as supportive supervision and integrate it with routine surveillance data to inform future interventions (e.g., additional visits, trainings) on the app. This will include the development of a customized algorithm that will enable ranking of providers by performance so supervisors can then target the quantity and focus of their visits based on this ranking.

Although the test case for this functionality will be malaria-focused, CHAI will develop the features in a program-agnostic manner, and supplement this with operational guidelines that any health program can use to introduce this functionality. These guidelines will offer a framework for how a health program can combine data from different sources, such as supportive supervision checklists, into DHIS2 and ensure DHIS2 includes analytical capabilities that can inform programmatic decisions leveraging these different sources.

(C) **Data use:** Developing and using dashboards on DHIS2 for programmatic decision making

As malaria programs across countries focus on improving the quality, timeliness, and reporting rates of data collection on DHIS2, they are prioritizing approaches to use DHIS2 data in an effective and user-friendly manner for programmatic decision making. However, while the creation of dashboards and analyses in DHIS2 is fairly straightforward, each country is spending significant time and resources on designing, testing, and iterating on dashboards, with similar technical, operational, and data use challenges encountered in each country. CHAI has been supporting Ministries of Health across disease areas and countries to develop indicators, charts, and dashboard visualizations, and institute management processes for the use of data. CHAI proposes the creation of standardized resources for the development and utilization of effective dashboards on DHIS2 based on learnings across countries and disease areas.

This guidance documentation will include (1) Technical and managerial scoping: understanding potential user(s) of the data and their decision making needs and responsibilities, mapping available data (within and outside of DHIS2), and defining with users and Ministries of Health the outputs – indicators, visualizations, notifications – that will best facilitate easy and effective decision making, (2) Development: easy-to-use training materials and guidelines for developing dashboards on DHIS2, and guidelines for testing and incorporating feedback from users to these developed dashboards, (3) Institutionalization: instituting a well-functioning ecosystem of management practices and processes that

optimize the use of dashboards, including guidelines for mapping data management responsibilities and guidelines for data review processes.

Consortium team

The Clinton Health Access Initiative (CHAI)'s global malaria program works to support government malaria programs in over 20 countries around the world. The program's technical and managerial competencies and a unique core model of day-to-day operational support to malaria programs in focus countries have helped CHAI build strong relationships over the years to become a trusted partner for governments.

CHAI's long established partnerships with country governments and implementing partners enable CHAI to support the deployment of information systems for data collection and management, patient tracking, electronic medical records, health surveillance, laboratory management, and supply chain management in 22 countries and across disease areas, including maternal and newborn health, reproductive health, vaccines, HIV/AIDS, and malaria. Through this work, CHAI has developed deep technical expertise in health information systems, system architecture, and system interoperability, in addition to its operational experience building the capacity of government decision makers to use data for decision-making, CHAI has recently conducted assessments of the strengths and weaknesses of malaria surveillance systems across several high endemic countries with the aim of helping their governments to develop and implement feasible solutions to overcome identified challenges and improve disease intelligence.

If this concept note is approved, CHAI will reach out to and work closely with the University of Oslo (UiO) to execute the proposed work. CHAI has an existing close relationship and partnership with UiO, through a recently approved 'Digital Solutions for Malaria Elimination' grant, which funds updates to DHIS2's data model and data analytics in the context of malaria elimination use cases. CHAI will leverage this relationship to discuss, further refine, and deliver the proposed activities in this concept note.

Supporting Documents: digital_square_concept_note_chai_19jan18.pdf