Digital Solutions for Malaria Elimination

Software Requirements Document v1.1
Appendix B: Implementation Considerations

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APPENDIX B: IMPLEMENTATION CONSIDERATIONS

In each of the discovery countries visited, there were a number of operational challenges reported around malaria surveillance programs and programs that leveraged technology such as DHIS2. This appendix provides a high-level review of commonly reported challenges to be considered before implementation of the digital solutions described in this document. These challenges will be or are currently being worked through by NMCPs, CHAI, and other implementing partners in countries where they were observed. They should be taken into consideration by both partners and developers to make configurations and implementations easier for country teams.

Capacity and Funding Gaps

Gaps in staff or funding resources were reported as the barrier for completion of a number of activities, including but not limited to digitizing historical data, managing version upgrades, monitoring usage of server resources, managing devices, managing user credentials, and conducting data validation.

In some countries, lack of community-based staff members was also cited as a reason for poor surveillance coverage in some districts. Finally, concerns were raised over the staff's capacity to maintain functionality in technology systems — for example, in keeping relationships between data points up to date, such as case to foci and household to intervention.

- **Key Takeaway Point:** While capacity and funding gaps will likely continue to be a reported problem, it will be key to ensure that the digital tools developed do not require labor-intensive maintenance. In addition, initial implementation should budget for resources that can jump-start a system to transition into a technology platform. Such resources might include a strong mobile device management platform, staff members to manage version upgrades and server resources, and digitization of historical data that may be necessary for a digital database to be considered complete.

Infrastructure Gaps

Poor internet bandwidth in communities, facilities, and district offices was reported as a common challenge across all discovery countries. Additionally, field-based staff indicated spotty coverage in some locales. In some countries, power was noted as a challenge for managing digital systems. And in one country, it was noted that the solar panels that were provided were not powerful enough to keep devices such as tablets charged.

- **Key Takeaway Point:** As with any technology project in low-resource settings, developers and implementers should keep in mind that internet access may not be

stable or widely available. Technology should be built to function and to sync data in low connectivity contexts. Operational workarounds should be put in place to ensure a surveillance system can remain operational despite gaps in network access or power.

Duplicative Reporting

Some countries reported a multiplicity of malaria systems. Reporting of the same data points may be captured digitally in a case-based surveillance system, a weekly disease surveillance system, and a monthly aggregate system — in addition to a paper register that is completed in parallel for each of these systems. Duplicity of systems also exists across disease areas, with different case-based systems for different disease areas such as malaria, TB, and HIV.

- ❖ **Key Takeaway Point:** Digital tools should aim to facilitate system integrations and minimize duplication in reporting. Additionally, implementation planning should consider phasing out paper reporting where appropriate and institute measures to prevent or monitor duplicate data, so the reporting burden is decreased and data is consistent across systems.

Barriers to Technology Uptake

The following challenges were commonly noted as barriers to technology uptake:

- **Language settings:** Users were uncertain how to change settings to the local language.
- **Number of data points:** Forms were missing data points that would be collected separately on paper, and forms were either too long or required too many clicks to get to the right data point.
- **Free-text data fields vs. drop-downs:** Free-text data fields were reported to cause spelling errors and inconsistencies, and drop-down options were too limited or required too many clicks. For example, in some settings it was noted that units for treatment dosages were not comprehensively covered in drop-downs.
- **Form navigation:** In many settings, it was reported that the form setup or sequence did not always align with workflow. For example, some data points were captured in one form, whereas others were captured in another form, despite there only being one user and one setting to capture both data points. This leads to the need to toggle between forms when conducting data entry.
- **Analytics systems:** In some countries that received DHIS2 trainings, staff remained uncertain on how to set up dashboards or charts or how to use DHIS2 for analysis, particularly pivot tables and reports. They tended to reply on technical systems just

for data entry. A number of these items had been previously addressed with training, however continued gaps in knowledge led to reliance on help lines for simple questions. Furthermore, despite multiple trainings, some staff would switch back to paper forms due to discomfort with the technology.

- ❖ **Key Takeaway Point:** Each of these examples illustrate a need for a thoughtful UI to help make digital tools more intuitive. Additionally, training and capacity building for long-term configuration, administration, and maintenance of systems will be important during implementation, coupled with tools to support ongoing learning after initial trainings. These measures should be taken in addition to a strong help desk and local resources to encourage technology uptake.

Surveillance Process Gaps

General challenges with surveillance were reported during discovery visits. These included:

- **Process compliance:** Variations in surveillance processes between national malaria programs and facility-level activities were common. There were also variations among sub-districts, despite their being in the same administrative unit, in conducting vector control activities such as larviciding and on the threshold of triggering a case investigation.
- **Coverage gaps or duplication:** In areas with high case loads, prioritization of tasks was noted as a challenge, leading to surveillance coverage gaps. In other areas, it was noted that one case may undergo duplicate investigations if team members were not properly coordinated.
- **Health systems challenges:** Broader health systems challenges such as stock availability and delivery were noted. Additionally, delays in receiving lab results were reported as a common reason for incomplete case investigations. (Note: This, in itself, is a variation from global policy to accept an RDT result in place of lab results.)

- ❖ **Key Takeaway Point:** Stronger supervision and effective trainings are needed to improve surveillance, regardless of any technology that is rolled out. Fortunately, digital tools could help ease the process of supervision and identify gaps more quickly to target resources for improvement.