Overview of the Malaria Surveillance Assessment Toolkit

May 2022

WHO & CHAI

Global **Malaria** Programme

World Health Organization

Objectives

1. To define **malaria surveillance assessments** and their benefits and limitations
2. Introduce potential users to the **malaria surveillance assessment toolkit ('Toolkit')** for identifying strengths and weaknesses of existing surveillance systems
3. To describe the characteristics, content, and methods for using the Toolkit
4. To present the expected outputs and outcomes of a malaria surveillance assessment conducted using the Toolkit

What is a malaria surveillance assessment?

What	**A systematic approach to measuring the performance of malaria surveillance systems, and identifying and evaluating the determinants of that performance.**
Where	All malaria endemic countries should carry out a surveillance system assessment. A national assessment for elimination settings is recommended when the country has fewer than 100 cases and in three years of reporting zero cases. For countries with more than 100 cases an elimination surveillance assessment can be carried out in areas with sub-national elimination activities.
Who	Implemented by **national malaria programmes** and partners interested in malaria surveillance strengthening.
When	Undertaken at any time but recommended as part of key NMP planning milestones such as a Malaria Programme Review (MPR) and National Strategic Plan (NSP) development. In elimination settings prior to certification and as part of the assessment for whether a programme is in place to prevent re-establishment.
Why	**To provide actionable and prioritized recommendations on how to strengthen surveillance systems for malaria control and elimination. In elimination settings; to prepare documentation and check quality of data prior to certification**

Why was there a need to develop a malaria surveillance toolkit?

- To date, malaria surveillance assessments have been implemented in multiple countries, using a variety of different tools and approaches to assess systems.
- The shared goal of these assessments has been to enable NMPs to improve surveillance system performance.

- However, **past approaches and tools have not been standardized across assessments**, making it difficult to compare results between countries, between regions within a country, or over time in any select geographical region.

To address this issue, a standardized Malaria Surveillance Assessment Toolkit was developed to conduct comparable and replicable malaria surveillance assessments across multiple countries and within the same country over time.

What is the Malaria Surveillance Toolkit?

The toolkit has the following characteristics:

Adaptable assessment framework:

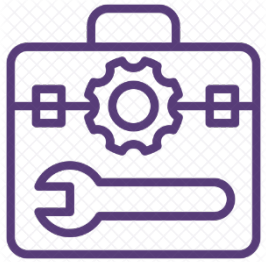
User can define the **assessment scope** by

1. choosing the transmission setting for surveillance of malaria cases and deaths (burden reduction and/or elimination)
2. selecting the malaria control interventions and strategies implemented in country
3. selecting the indicators to be included in the assessment.

Standardized package of tools:

Any malaria surveillance assessment conducted using the Toolkit will include a **minimum set of priority indicators** and **generate common and consistent expected outputs.**

What is the content of the Toolkit?

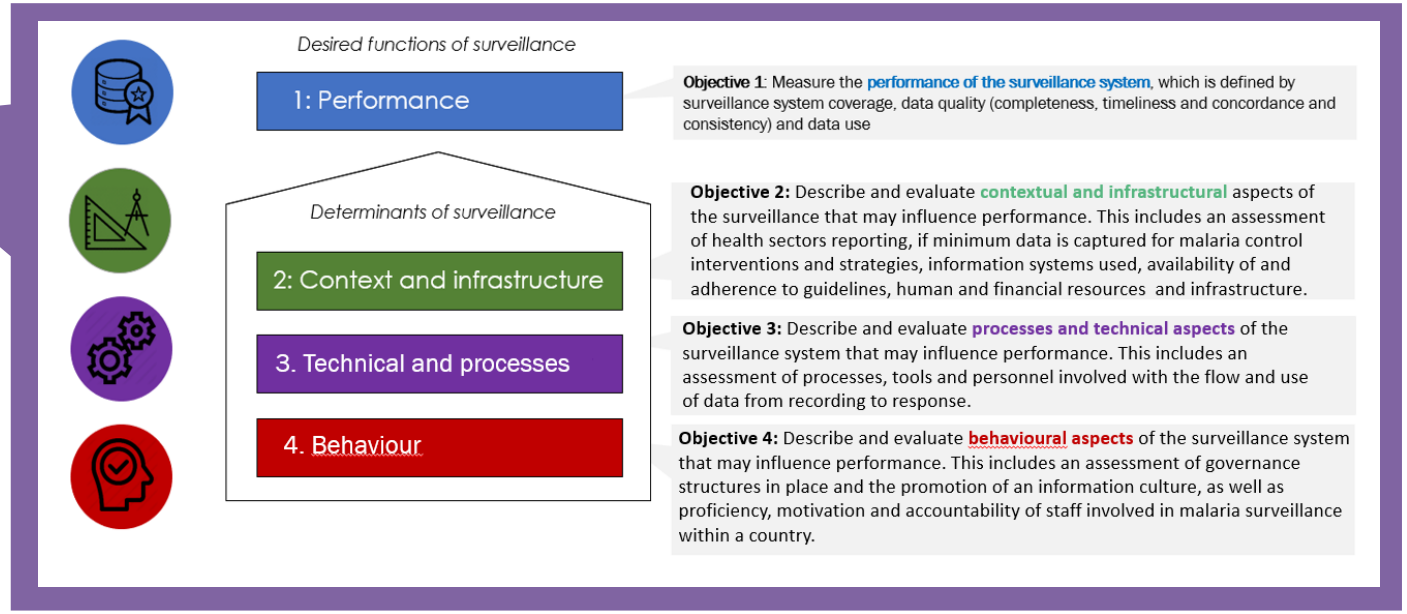


The Toolkit consists of eight tools (below) with different functions and an Implementation Reference Guide which is a step-by-step guide on how to carry out an assessment

Function	Tools		Description
Define scope	1	**Assessment framework tool**	A set of key objectives, sub-objectives, and indicators that can be used to quantify and/ or qualify strengths and weaknesses in the surveillance system. This tool should be used as the starting point in an assessment to define the scope of the assessment and the approach.
	2	**Concept note and protocol**	A template for the outline of a short concept note for refining the scope, methods, expected outputs and outcomes of an assessment and a more detailed protocol outline required for comprehensive assessments.
	3	**Surveillance assessment planning tool**	A budgeting template to assist countries in developing a costed plan to undertake a comprehensive assessment. Additionally, pilot summaries for Burkina Faso, DRC and Ghana have been included on key activities that required costing.
Collect & analyse data	4	**Desk review Tool**	A set of questions, tables, graphics and diagrams used to collect information and summarize what is known about malaria surveillance through document and data review, and optional interviews with surveillance programme staff and other relevant supporting partners.
	5	**Data Quality Assessment tools**	Tools and guidance for collecting and analysing data to specifically assess data quality at national, regional, district and service delivery levels.
	6	**Question Bank**	A library of questions which can be used to develop survey questionnaires for data collection at service delivery levels.
	7	**Analysis tools**	A set of shell tables in excel used to summarise the results of analysis from the survey.
Develop and prioritize recommendations	8	**Technical brief and Report outline**	A report template for organizing, visualizing, and interpreting results from the assessment. A technical brief is used to highlight a subset of priority results, whereas the complete report includes all assessment results.

What is the assessment framework of the Toolkit?

- The Toolkit builds on the PRISM (Performance of Routine Information System Management) model by having a framework based on four **objectives** that a surveillance assessment can address



- Under each objective is a set of defined **sub-objectives** that further detail what malaria surveillance performance is and what drives that performance

- Under each sub-objective is a set of qualitative and quantitative **indicators** that are used to assess each sub-objective and can be measured by one or more of the data collection tools within the Toolkit.
- A subset of indicators have been flagged as '**priority indicators**', representing the minimum set of metrics to be included in any malaria surveillance assessment conducted using the Toolkit. This allows the resulting standardised expected outputs to be comparable between countries and within the same country over time.

Four key objectives

Desired functions of surveillance

1: Performance

Determinants of surveillance

2: Context and infrastructure

3. Technical and processes

4. Behaviour

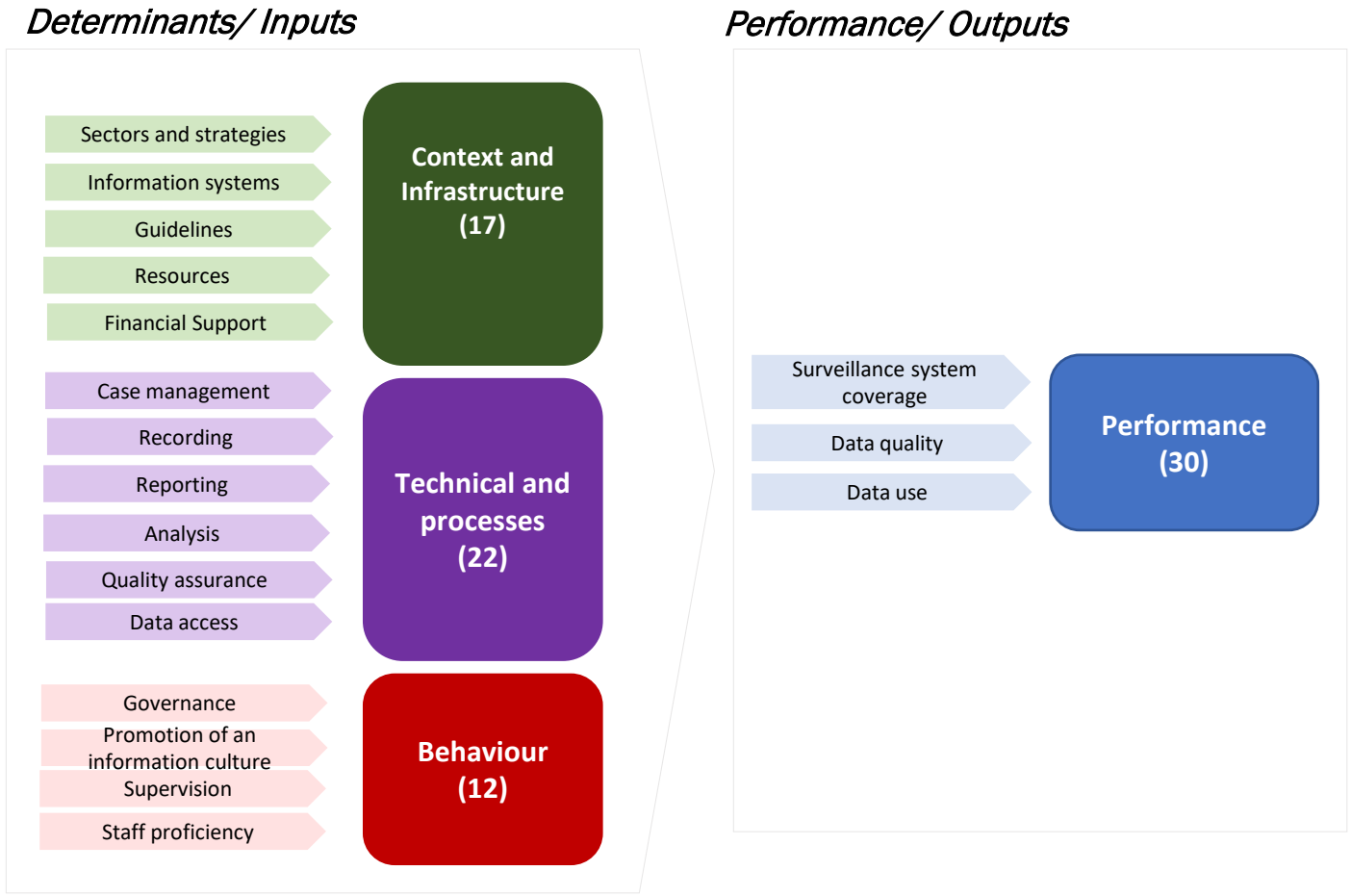
Objective 1: Measure the **performance of the surveillance system**, which is defined by surveillance system coverage, data quality (completeness, timeliness and concordance and consistency) and data use

Objective 2: Describe and evaluate **contextual and infrastructural** aspects of the surveillance that may influence performance. This includes an assessment of health sectors reporting, if minimum data is captured for malaria control interventions and strategies, information systems used, availability of and adherence to guidelines, human and financial resources and infrastructure.

Objective 3: Describe and evaluate **processes and technical aspects** of the surveillance system that may influence performance. This includes an assessment of processes, tools and personnel involved with the flow and use of data from recording to response.

Objective 4: Describe and evaluate **behavioural aspects** of the surveillance system that may influence performance. This includes an assessment of governance structures in place and the promotion of an information culture, as well as proficiency, motivation and accountability of staff involved in malaria surveillance within a country.

Sub-objectives and indicators (n)



Total indicators= 79

Total priority indicators=53

Priority for burden reduction settings= 40

Priority for elimination settings=49

Priority for all other malaria control interventions and strategies= 10

Define the scope of the assessment?

Surveillance of malaria cases and deaths and malaria control interventions and strategies

Surveillance of malaria cases and deaths
Burden reduction and/or elimination settings

Malaria control interventions and strategies
Chemoprevention: IPTp, IPTi, SMC, MDA
Vector control: ITNs distributed through routine channels and/or mass campaigns, IRS and larval source management
Commodity tracking
Entomological surveillance
Drug efficacy surveillance
Genomic surveillance (drug resistance and pfhrp 2/3 gene deletions)

Assessment Framework

Select indicators based on transmission setting
Review and select indicators based on interest/country context or priority/optional

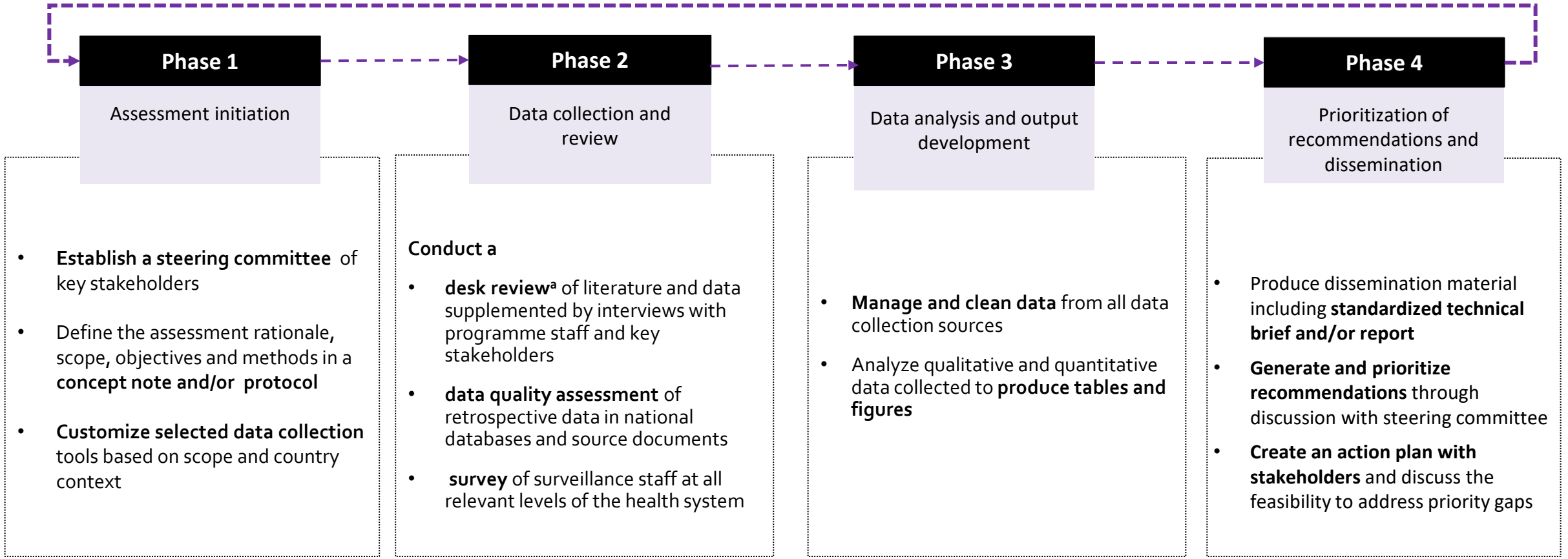
Priority indicators for other malaria control interventions and strategies are automatically selected. The goal of an assessment of these strategies is to understand what information is collected and how, and if it is integrated and used along with case surveillance data. The toolkit does not include data quality assessments for these strategies.

How is an assessment implemented using the Toolkit?

The scope will determine the assessment approach, which can be summarized in to 3 potential approaches:

	Rapid	Tailored	Comprehensive
Scope	Only *priority indicators* from all four objectives for surveillance of malaria cases and deaths by transmission setting and surveillance of all other malaria control interventions and strategies implemented in country and selected for assessment	*Priority indicators + user selected optional indicators of interest* from the four objectives surveillance of malaria cases and deaths by transmission setting and surveillance of all other malaria control interventions and strategies implemented in country and selected for assessment	*All indicators* from all four objectives for case surveillance and *priority indicators* for surveillance of malaria cases and deaths by transmission setting and priority indicators for all malaria control strategies implemented in country
Methods	Primarily limited to desk review only with few essential site visits	Desk review and surveys at different levels of the health systems (i.e., national, subnational, a sample of facilities and community healthcare workers)	Desk review and surveys at different levels of the health systems (i.e., national, subnational, a sample of facilities and community healthcare workers)
Estimated resource requirement	Low; 2-4 weeks	Medium/High; a minimum of 3 months up to 12 months depending on context	High: a minimum of 3 months up to 12 months depending on context
Suggested frequency	Once every 3-5 years in line with the MPR and NSP development or if necessary, once a year as part of the annual programme review. Annual in elimination settings.	Once every 3-5 years in line with the MPR and NSP development. Annual in elimination settings depending on need and resources.	Once every 3-5 years in line with the MPR and NSP development. Annual in elimination settings depending on need and resources.

Implementation of a malaria surveillance assessment occurs in four phases



[a]the desk review may begin in phase 1 to inform the protocol or concept note

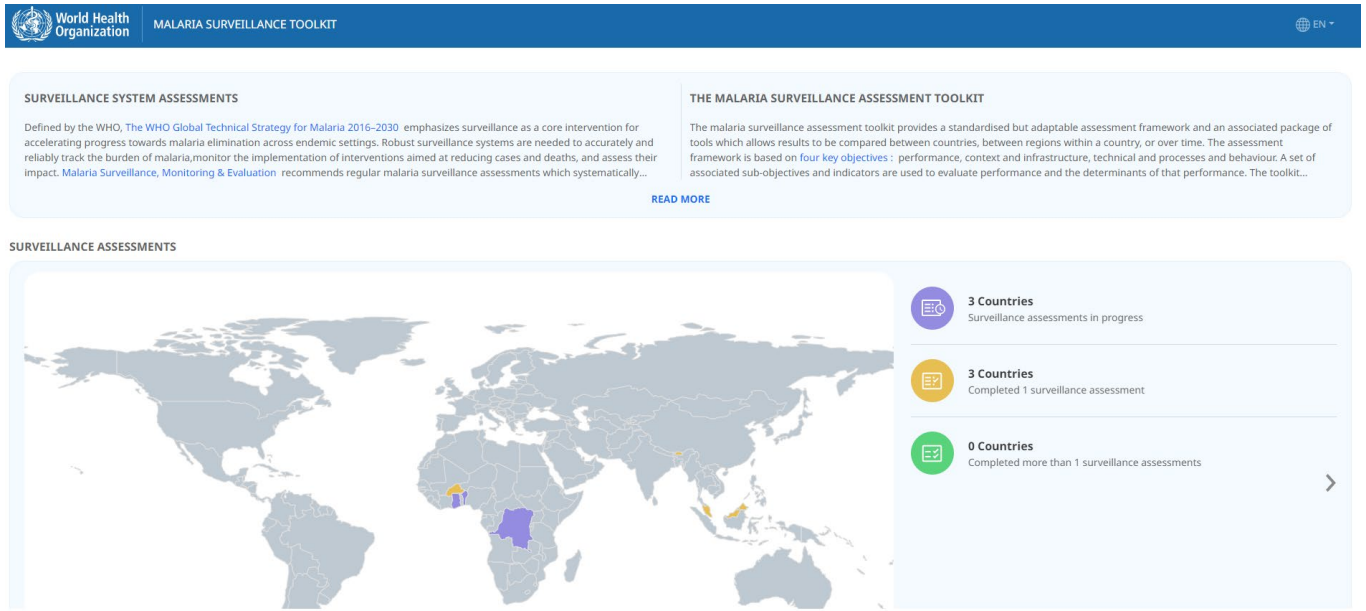
What is the methodology of an assessment conducted using the Toolkit?

A surveillance assessment conducted using the toolkit has two methods of data collection: Desk review and a Survey.

Data collection method	Implementation level	Tools	Process
Desk review	National	Desk review tool	**Compile documents and data** at the national level to review and describe surveillance system(s). Conduct **key informant interviews** at national and subnational levels where appropriate.
		Desk level DQA tool and DHIS2 dashboard*	**Initial DQA on retrospective data** from national surveillance system (s)
Survey	Service delivery	Question bank	Carry out **interviews using questionnaires** for each unit/level to be surveyed
		DQA service delivery level tool*	**Primary data collection from registers** and **compare with aggregate reports** from the national/subnational level (s)

* In elimination settings the DQA tools are combined

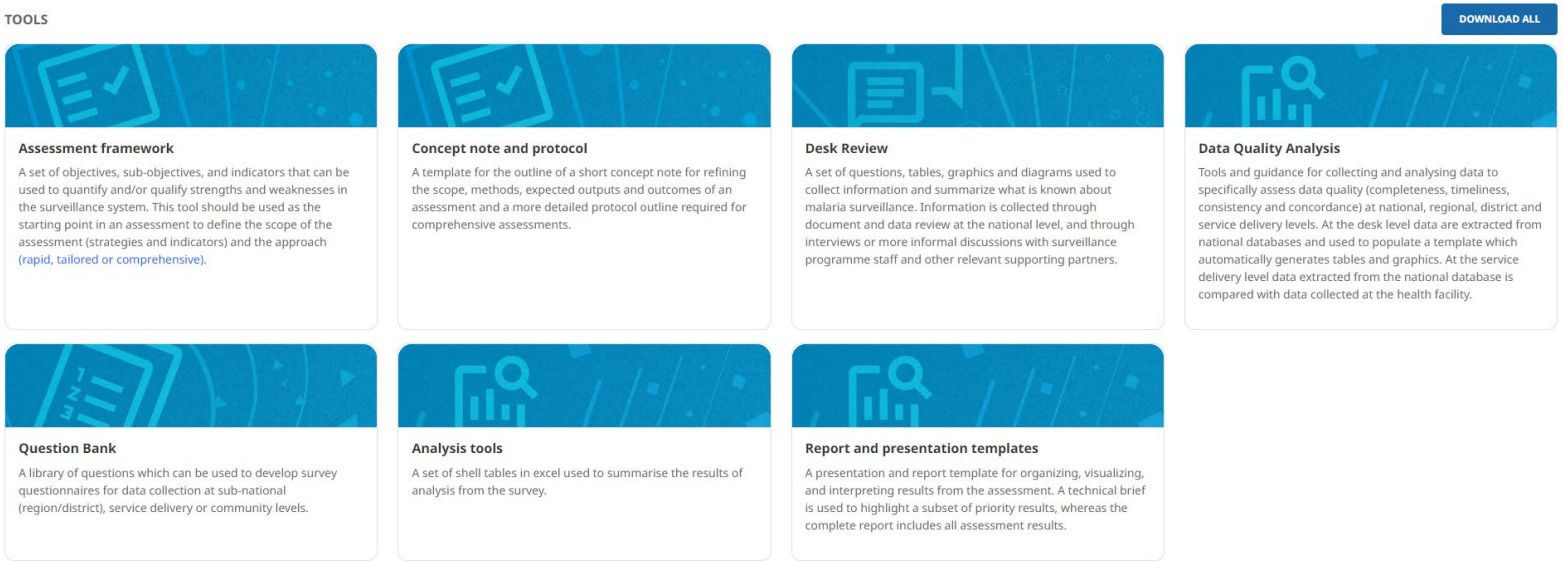
Malaria surveillance toolkit



[Welcome to Malaria Toolkit (who-malaria-uat.azurewebsites.net)](http://who-malaria-uat.azurewebsites.net/)

http://who-malaria-uat.azurewebsites.net/

An overview of the toolkit and a summary of surveillance assessments



Tools can be downloaded in English and in French

How is information for data collection selected?

1. Choose indicator from assessment framework tool

1.3			**DATA USE**	**Number of indicators=7** **Data use is defined in the context of this toolkit as: "instances where data are reviewed to inform programmatic action."**	**Desk review and survey**
1.3	Priority	1.3.1	**Data used for strategic, policy and operational processes**	Data was used to inform strategic, policy and operational processes* within the last 36 months **Question format:** What decision-making or strategic and policy processes have been informed by surveillance data in the previous 36 months? **strategic planning process may be:* *-develop or revise NSP or other health program strategy or work plan* *-develop subnational operational plans* *-stratification for targeting and prioritising of interventions* *-develop or revise a malaria policy* *-advocate for a policy or programme* *- monitor program performance/progress towards achieving national targets* *-allocation or reallocation resources from national level* *- distribution of commodities* *-subnational or national elimination certification (elimination settings)* *-routine review of data from proactive and reactive case detection to determine whether the approach is efficient and useful (elimination settings)*	Desk review + survey

2. Indicator is selected in the Desk review tool and data is collected in a standardized graphic or table

Table 1.3.1. Evidence of data use for strategic, policy and operational planning

Data use	Evidence found at national level	Details	Add links or screenshots as relevant
National strategic planning	√ or ×		
Sub-national strategic planning	√ or ×		
Stratification and prioritization of interventions	√ or ×		
Malaria policy	√ or ×		
Advocate for policy or programme	√ or ×		
Monitor program performance	√ or ×		
Allocation of resources	√ or ×		
Distribution of commodities	√ or ×		
Subnational or national elimination cer	√ or ×		
Proactive and reactive case detection	√ or ×		

If survey is carried out at servuce delivery level duplicate table to capture results. Table can be modified to capture results by geographical area.

3. A set of associated questions are selected in the question bank to be asked at different levels of the health system as part of a questionnaire

Indicator Number	Indicator	Burden reduction settings	Elimination settings	Subnational level surveillance office/unit	Service delivery level	Community level	Name	Question	Response Options
1.3.1	**Data used for strategic, policy and operational processes**	Burden reduction	Elimination	yes	no	no	datause_1	What strategic and operational processes have been informed by surveillance data in the previous 12 months?	a. Develop work plan b. Develop subnational operational plans c. Stratification for targeting and prioritising of intervention d. Advocate for a policy or program e. Monitor program performance/progress towards achieving national targets f. Distribute commodities g. None h. Don't know i. Other, specify:-
1.3.1	**Data used for strategic, policy and operational processes**	Burden reduction	Elimination	no	yes	no	datause_2	What operational processes have been informed by surveillance data in the previous 12 months?	a. Advocate for a policy or program b. Monitor program performance/progress towards achieving national targets c. Distribute commodities d. None e. Don't know f. Other, specify:-
1.3.1	**Data used for strategic, policy and operational processes**	-	Elimination	yes	yes	no	datause_3	Is there routine review of data from proactive and reactive case detection to determine whether the approach is efficient and useful?	a.Yes b.No c.Don't know

Desk review and scorecard

Indicator	Description	How to assess the indicator	Suggested documents/data for review or interview with staff
Service-delivery reporting rate	**Proportion of service-delivery points included in the system that report routinely (e.g. for >80% of the months in 1 year)** **Numerator:** Number of points of care that routinely report* **Denominator:** Number of points of care included in the surveillance system (determined from the MFL or otherwise) OR number of points of care that have ever reported (and are still active) **Reporting includes zero cases (zero reporting)*	Determine the proportion of service-delivery points included in the system that report* routinely (e.g. for >80% of the months in 1 year). This indicator can be disaggregated by health sector (public/private). *Reporting includes zero cases (zero reporting)	**Documents:** Master Facility List or other government documents **Data:** Number of health facilities that have reported to surveillance. This could be extracted from an electronic system. This can be calculated when assessing data quality indicator 1.2.1 on reporting completeness.

Service-delivery reporting rate	95%	90%	100%

Met	Service-delivery reporting rate is considered; **Met** >=80% **Partially met** 50-79% **Not met** <50%

Go to selected indicator
Detail on how to assess
Suggested documents, data or interview with staff is indicated

Capture data in standardized output table or graphic

Determine whether indicator has been met, partially met or not met based on criteria given for priority indicators

Scorecard

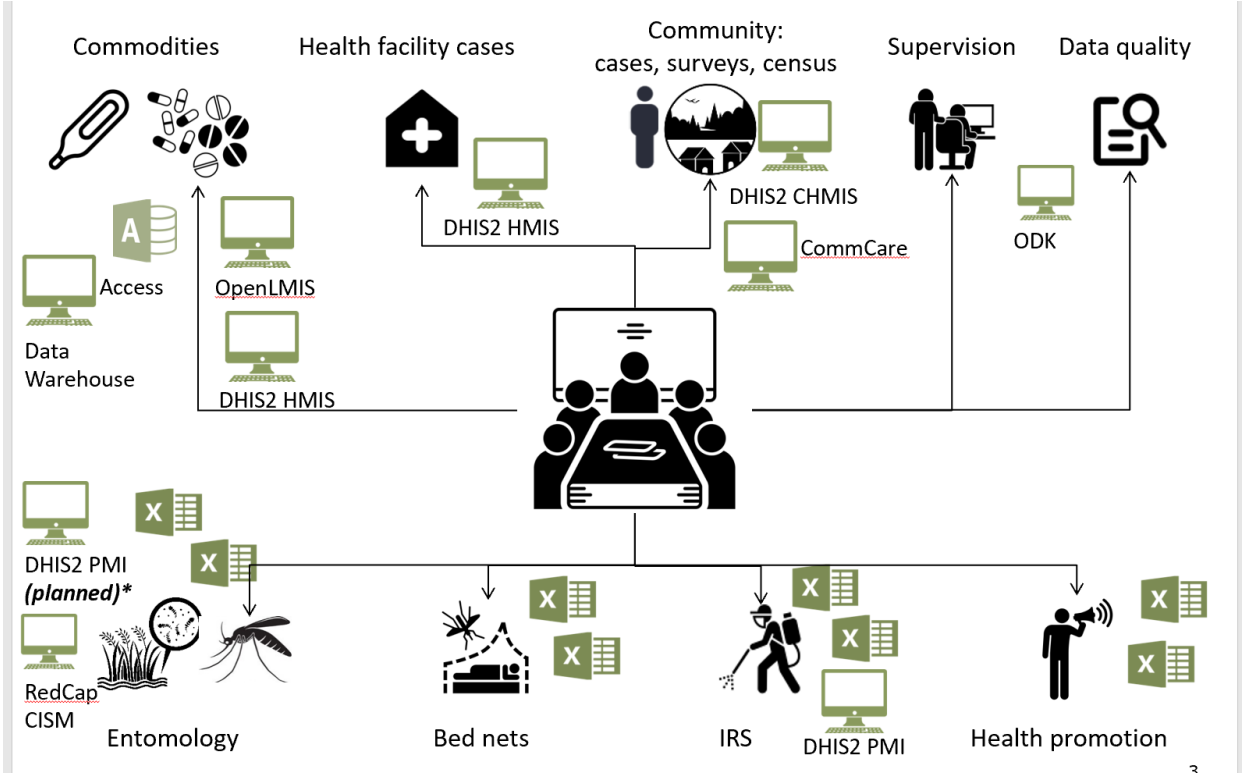
Each priority indicator is given a score of 2=Met, 1=Partially met, 0=Not met and - =not assessed
A composite score is calculated for each sub-objective and objective
Countries can record the reason for the score given and provide a recommendation for surveillance system strengthening
Results can be compared within a country over time or between countries

Objective	Score (%)	Number of indicators met	Total number of indicators
Objective 1 Performance	69%	8	16
Objective 2 Context and Infrastructure	75%	7	12
Objective 3 Technical and Process	72%	6	9
Objective 4 Behaviour	50%	0	3

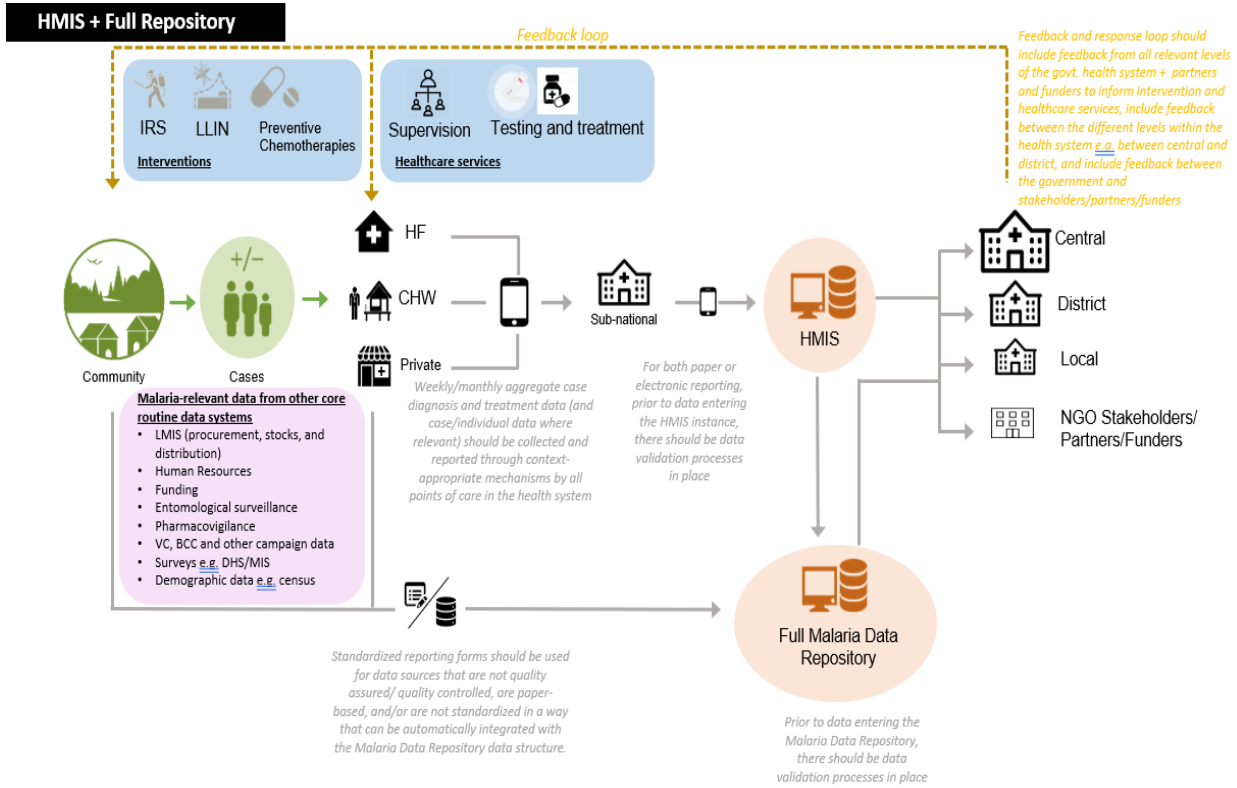
Sub-objective	Score by sub-objective (%)	Indicator No.	Indicator	Score for each indicator	Reason for score (e.g details on achievements, challenges and weaknessess)	Recommendation
Objective 1 Performance						
1.1 Surveillance System Coverage	83%	1.1.2	Proportion of suspects tested	2		
		1.1.3	Service-delivery participation rate	2		
		1.1.4	Service-delivery reporting rate	2		
		1.1.7	Vital registration system has high national coverage and quality	1		
		1.1.8	Therapeutic Efficacy Studies (TES) have been carried out to monitor drug resistance	1		
		1.1.9	Molecular analysis is carried out for monitoring resistance	2		

Information systems and data flow diagrams

Key outputs from the desk review



Examples are given as part of the toolkit



Data quality assessment desk level tool for burden reduction settings

Populate a standardized template with aggregate data for core variables extracted from the national surveillance system (minimum 3 years of data)

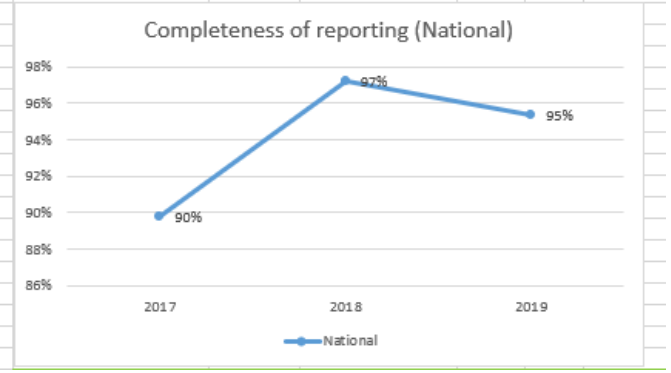
A. Database - Health Facility (HF) data from HMIS or MIS

Province	District	Health Facility	Public / Private	year	month	Report On Time	Report receiv	Expect Report	Variables – priority											
									Total malaria cases (confirm + presumed)	Confirmed malaria cases	Microscopy tested	RDT tested	Microscopy positive	RDT positive	All cases outpatients	All cases inpatients	All cases dead	Malaria inpatients	Malaria inpatient dead	Confirmed malaria cases treated with 1st line treatment cases (1a + ACT)
Province A	District 1	Health Facility 1	Public	2017	1	1	1	1	1450	1237	408		242	995	2389	1283	63		1	1135
Province A	District 1	Health Facility 1	Public	2017	2	0	1	1	1039	1043	577	119	259	730	2177	1977	160		24	963
Province A	District 1	Health Facility 1	Public	2017	3	0	1	1	1052	1052	275	202	152	900	2390	889	117		7	1027
Province A	District 1	Health Facility 1	Public	2017	4	1	1	1	1022	793	636	167	131	602	2820	1091	203		4	684
Province A	District 1	Health Facility 1	Public	2017	5	1	1	1	1102	829	815	279	289	540	1324	673	154		15	659
Province A	District 1	Health Facility 1	Public	2017	6	1	1	1	1036	894	523	242	233	661	1113	660	128		12	798
Province A	District 1	Health Facility 1	Public	2017	7	1	1	1	908	671	372		93	578	1791	647	175		24	536
Province A	District 1	Health Facility 1	Public	2017	8	1	1	1	1015	935	885	143	121	814	1180	680	140		11	858
Province A	District 1	Health Facility 1	Public	2017	9	1	1	1	977	685	439	93	229	456	1344	1054	132		23	672
Province A	District 1	Health Facility 1	Public	2017	10	0	1	1	1038	797	772	171	120	677	1451	1330	226		11	698
Province A	District 1	Health Facility 1	Public	2017	11	1	1	1	1110	902	356	237	250	652	1814	1996	166		21	737
Province A	District 1	Health Facility 1	Public	2017	12	1	1	1	519	331	869	292	120	211	1930	909	294	86	1	257
Province A	District 1	Health Facility 1	Public	2018	1	1	1	1	265	150	987	964	74	76	1616	1241	109	159	9	97
Province A	District 1	Health Facility 1	Public	2018	2	1	1	1	424	362	449	298	101	261	2253	1052	168	231	15	347
Province A	District 1	Health Facility 1	Public	2018	3	1	1	1	381	222	635	354	154	68	2554	732	62	124	9	168
Province A	District 1	Health Facility 1	Public	2018	4	1	1	1	514	253	300	813	78	175	1789	620	151	257	10	94
Province A	District 1	Health Facility 1	Public	2018	5	1	1	1	577	369	238	795	145	224	2684	1221	237	185	12	194
Province A	District 1	Health Facility 1	Public	2018	6	1	1	1	546	409	304	908	184	225	2118	743	278	145	28	296
Province A	District 1	Health Facility 1	Public	2018	7	1	1	1	362	362	661	577	119	243	2058	1026	50	155	3	190
Province A	District 1	Health Facility 1	Public	2018	8	1	1	1	684	416	510	923	189	227	1009	1051	143	261	4	390
Province A	District 1	Health Facility 1	Public	2018	9	1	1	1	725	518	845	793	276	242	1375	1981	281	133	7	329
Province A	District 1	Health Facility 1	Public	2018	10	1	1	1	448	296	73	537	55	241	1099	765	51	153	10	263
Province A	District 1	Health Facility 1	Public	2018	11	1	1	1	664	411	265	721	184	227	2908	1668	80	144	17	304
Province A	District 1	Health Facility 1	Public	2018	12	1	1	1	486	277	360	382	186	91	2776	1514	228	77	23	87
Province A	District 1	Health Facility 1	Public	2019	1	1	1	1	647	535	690	74	256	279		1459	235	144	11	442
Province A	District 1	Health Facility 1	Public	2019	2	1	1	1	514	360	611	505	248	112		1444	86	262	7	288
Province A	District 1	Health Facility 1	Public	2019	3	1	1	1	628	448	622	622	214	234		1142	192	275	4	309
Province A	District 1	Health Facility 1	Public	2019	4	1	1	1	503	371	530	355	82	289		1022	153	218	22	177
Province A	District 1	Health Facility 1	Public	2019	5	0	1	1	285	232	642	535	62	170		936	191	88	26	213
Province A	District 1	Health Facility 1	Public	2019	6	1	1	1	367	313	777	270	95	218		1276	255	245	19	200
Province A	District 1	Health Facility 1	Public	2019	7	1	1	1	459	373	232	296	185	188		1133	137	70	1	299
Province A	District 1	Health Facility 1	Public	2019	8	1	1	1	439	150	296	643	80	70		601		109	11	
Province A	District 1	Health Facility 1	Public	2019	9	1	1	1	576	391	439	912	120	271		768		145	2	329

Summary national data quality estimates		
	National level results	National level target
Completeness of reports	95%	80%
Timeliness of reporting	86%	80%
Completeness of core variables within reports	84%	80%
Consistency between core variables	82%	80%
Concordance of key variables between two reporting systems	73%	80%
Consistency over time for core indicators	Consistent trend (Yes/No)	
1. Proportion of malaria outpatients	Yes	
2. Proportion of malaria inpatients	No	
3. Proportion of malaria inpatient deaths	Yes	
4. Test positivity rate	Yes	
5. Slide positivity rate	Yes	
6. RDT positivity rate	No	
7. Proportion of suspects tested	Yes	

Tables and graphs automatically generated at all health system levels for completeness and timeliness of reports, completeness of core variables, consistency between variables and concordance between two systems capturing malaria cases or deaths

Country (Name)	Completeness of reporting 2017	2018	2019
National	90%	97%	95%



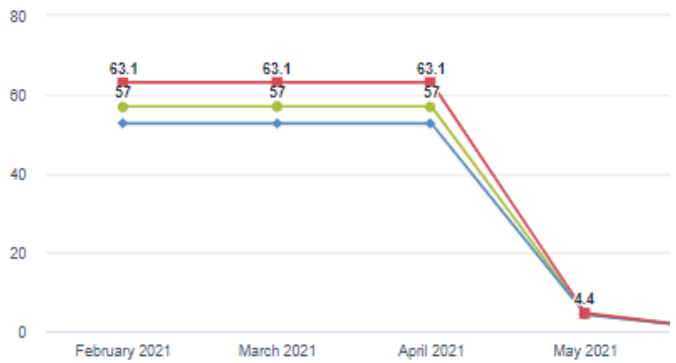
A summary results table is automatically populated

Final results should also be captured in the desk review which will populate the scorecard

Data quality dashboard in DHIS2

WHO data quality dashboard which is part of the standard malaria module package for burden reduction settings.
The dashboard can be installed in DHIS2 with or without the malaria module and data elements can be mapped.
Once installed the dashboard can be used as part of routine DQA in country.

MAL - DQ - Reporting completeness



MAL - DQ - Reporting completeness in public and private sector

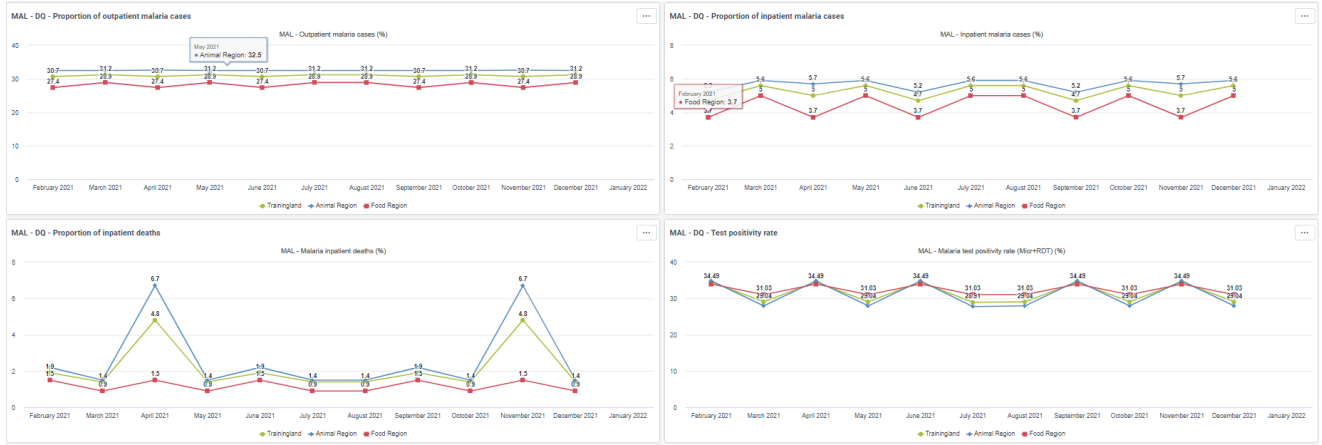
	Data	MAL - Reporting Completeness (%)				
Organisation unit	Ownership / Period	2017	2018	2019	2020	2021
Trainingland	Public	0	4.3	62.4	61	19.2
	Private	0	11.9	83.3	76.2	19.2
	Subtotal	NaN	6.7	68.9	65.7	19.2
Trainingland / Animal Region	Public	0	1.6	52.5	51.2	16
	Private	0	17.4	104.3	93.5	21.4
	Subtotal	NaN	6	66.7	62.8	17.5
Trainingland / Food Region	Public	0	9.4	81.3	79.7	25.3
	Private	0	5.3	57.9	55.3	16.7
	Subtotal	NaN	7.8	72.5	70.6	22.1

MAL - DQ - Completeness of variables in reports received (%)

Organisation unit	Period / Data	MAL - All malaria cases (%)	MAL Confirmed malaria cases (%)
Animal Region	February 2021	30.6	61.2
	March 2021	30.6	61.2
	April 2021	36.7	61.2
	May 2021	375	750

MAL - Consistency between variables

Organisation unit	Period / Data	MAL - RDT tested>/=RDT positive	MAL - Microscopy tested>/=Microscopy positive
Animal Region	August 2021	43 748	44 169
	September 2021	26 536	56 958
	October 2021	43 748	44 169



Graphs and tables for reporting completeness and timeliness, completeness of core variables, consistency between variables and consistency over time for core indicators.

Data can be reviewed at all administrative levels and by public/private.

Service delivery DQA for burden reduction settings

Data Quality Audit: 1.2.12 Concordance — **Validation period start date:** 1-Dec-2019

Name of Health Facility: — District:

Name of Validator: — Date:

Data Validation by month

No.	Core variable	HMIS M1	HMIS M2	HMIS M3	HMIS M4	HMIS M5	HMIS M6	HMIS M7	HMIS M8	HMIS M9	HMIS M10	HMIS M11	HMIS M12	Notes
1	Total malaria cases (confirmed + presumed)													
2	Confirmed malaria cases													
3	Microscopy tested													
4	RDT tested													
5	Microscopy positive													
6	RDT positive													
7	All cause outpatients													
8	All cause inpatients													
9	All cause deaths													
10	Malaria inpatients													
11	Malaria inpatient deaths													

Data Quality Audit: 1.2.12 Concordance; 1.2.13 Error in data sources — **Validation period start date:** 1-Dec-2019

Name of Health Facility: — District:

No	Core variable	Total Source	Total HMIS	Match between data sources	% months reporting each core variable	% months concordance for each core variable	Error in data sources	Comments
1	Total malaria cases (confirmed + presumed)	10	10	Yes	100%	100%	0	HMIS=Source
2	Confirmed malaria cases	10	10	Yes	100%	100%	0	HMIS=Source
3	Microscopy tested	20	10	No	100%	0%	10	HMIS has less cases than the source
4	RDT tested	20	10	No	100%	0%	10	HMIS has less cases than the source
5	Microscopy positive	5	10	No	100%	0%	-5	HMIS has more cases than the source
6	RDT positive	5	10	No	100%	0%	-5	HMIS has more cases than the source
7	All cause outpatients	10	10	Yes	100%	100%	0	HMIS=Source
8	All cause inpatients	10	10	Yes	100%	100%	0	HMIS=Source
9	All cause deaths	10	10	Yes	100%	100%	0	HMIS=Source
10	Malaria inpatients	10	10	Yes	100%	100%	0	HMIS=Source
11	Malaria inpatient deaths	10	10	Yes	100%	100%	0	HMIS=Source

Color key for error columns and value difference for each core variable: red cells indicate underreporting and blue cells indicate overreporting of data into the HMIS

Color key for match between data sources: red cells indicate core variable values do not match between registers and reports and green cells indicate core variable values match between registers and reports

Color key for other data quality indicators: red cells indicate less than 80%, yellow cells indicate 80%-95%, and green cells indicate more than 95%

Data Quality Indicators

Reporting	100%	% of months for which data has been audited that at least one core variable was reported into the HMIS
Concordance (Month)	0%	% of months for which all core variable values matched between HMIS and source data
Concordance (Core variable)	64%	% of all core variables reported where values matched between HMIS and source data
Completeness	100%	% of months for which there were no core variables missing in HMIS reports

Data from aggregate reports are extracted from the national surveillance system and compared with the source data (patient registers) for the same time period and geography

Indicators on completeness, concordance and error between data sources are automatically calculated and summary results are generated

Service delivery DQA results for the most recent year: 2019

1.2.11 Completeness of core variables within registers	National level results		
Total	75%		
Sex	100%		
Age	50%		
Diagnosis	100%		
1.2.12 Concordance of core variables between registers and aggregated reports **1.2.13 Error in data sources (The value difference for each core variable between data source one (D1) and data source 2 (D2))**	**% months concordance for each core variable**	**Error in data sources****	
Overall concordance for core variables	64%		
Total malaria cases (confirmed + presumed)	100%	0	HMIS=Source
Confirmed malaria cases	100%	0	HMIS=Source
Microscopy tested	0%	10	HMIS has less cases than the source
RDT tested	0%	10	HMIS has less cases than the source
Microscopy positive	0%	-5	HMIS has more cases than the source
RDT positive	0%	-5	HMIS has more cases than the source
All cause outpatients	100%	0	HMIS=Source
All cause inpatients	100%	0	HMIS=Source
All cause deaths	100%	0	HMIS=Source
Malaria inpatients	100%	0	HMIS=Source
Malaria inpatient deaths	100%	0	HMIS=Source

DQA tools for elimination settings: Desk level

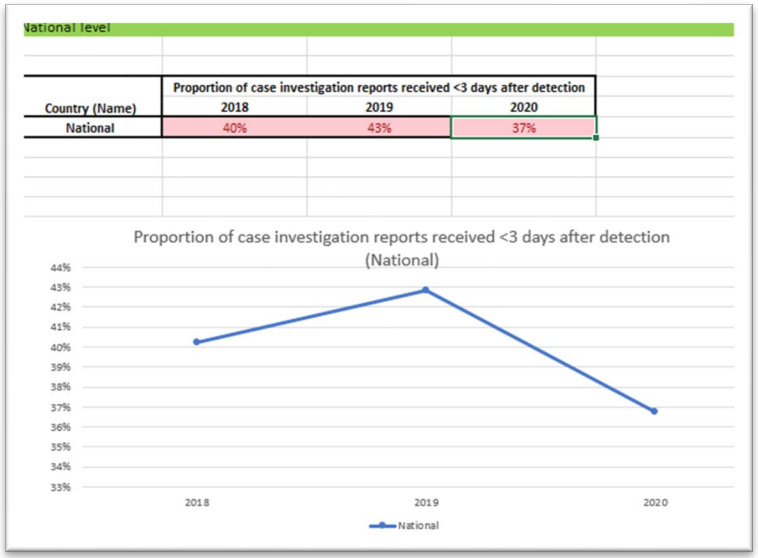
Populate a standardized template with case-based data extracted from the national surveillance system

Patient details									Location of Treatment Facility		
od of case detection	Patient ID/ System ID	Family name	First name	Date of Birth	Age	Sex	Nationality	Location of patient residence (village, suburb)	Healthy Facility	District	Province
ive case detection	10284676	LAY	Ludwig	1987-07-11	33	Male	Yemeni	2 Cockburn St, Seaham, County Durham	Health Facility 1	District 1	Province A
ive case detection	10262172	KLEIN	Aron	1964-09-25	56	Male	Argentinian	57254 Brickell Ave #372, Worcester, Worcester	Health Facility 1	District 1	Province A
	10265843	POPE	Garland	1982-07-17	38	Female	Moroccan	4298 E Drinker St, York, ON	Health Facility 1	District 1	Province A
	10253510	NELSON	Burl	1967-10-28	53	Female	Australian	33 Vipond St, Woodhall Farm Ward, Hertfordshire	Health Facility 1	District 1	Province A
	10231899	JORDAN	Wendell	1954-01-06	66	Male	Bulgarian	75 Elm Rd #1190, Barton, ACT	Health Facility 1	District 1	Province A
ive case detection	10294008	CONWAY	Ward	1979-04-15	41	Male	Vietnamese	17 Jersey Ave, Englewood, Arapahoe	Health Facility 1	District 1	Province A
active case detecti	10212076	HEDRICK	Verl	1983-12-16	37	Male	South Kore	2094 Ne 36th Ave, Worcester, Worcester	Health Facility 1	District 1	Province A
ive case detection	10232270	LADNER	Maynard	1955-03-25	65	Male	Swazi	73 Robert S, Westerway, TAS	Health Facility 1	District 1	Province A
ive case detection	10255078	CORNETT	Amon	1974-09-20	46	Female	Cameroonia	3068 N Interstate 35, Winnipeg, MB	Health Facility 1	District 1	Province A
ive case detection	10297936	CLEVELAND	Birt	1957-05-01	63	Male	British	762 S Main St, Madison, Dane	Health Facility 1	District 1	Province A
active case detecti	10240153	LANDRY	Hobson	1971-08-05	49	Male	French	136 W Grand Ave #3, Delhi, ON	Health Facility 1	District 1	Province A
ive case detection	10200430	ELDER	Seward	1964-04-09	56	Male	Croat	2 Global Rd, Cambridge, ON	Health Facility 1	District 1	Province A
ive case detection	10259115	HARRISON	North	1987-05-21	33	Male	Polish	62 Margaret St, Royal Hospital Ward, Greater London	Health Facility 1	District 1	Province A
ive case detection	10263313	DODSON	Thaddeu	1961-12-26	59	Male	Libyan	22 Delamere St, Hereford, Hereford and Worcester	Health Facility 1	District 1	Province A

Tables and graphs are automatically generated for completeness of variables, timeliness of case notification and case and foci investigation, consistency between variables and consistency over time for core indicators at all administrative levels

National level

Country (Name)	Proportion of case investigation reports received <3 days after detection		
	2018	2019	2020
National	40%	43%	37%



Tables of aggregate numbers are used to compare cases and deaths between different systems capturing information e.g HMIS, IDSR, Lab, CRVS

Year	Month	Region	District	Health facility Name	Aggregate data (e.g HMIS)	Case-based data- PCD (e.g MIS)

A summary results table is automatically populated

ummary of national level results	
	National level results (% or indicator met (Yes/No)
.2.1 Completeness of reporting	Yes
.2.2 Completeness of case investigation reports	27%
.2.4 Timeliness of case notification reports	27%
.2.5 Timeliness of case investigation reports	37%
.2.6 Timeliness of foci investigation reports	82%
.2.7 Completeness of core variables within reports	75%
.2.8 Consistency between core variables	25%
.2.9 Consistency over time for core indicators*	
	Consistent trend (Yes/No)
. Number of confirmed malaria cases notified	Yes
. Number of confirmed malaria cases investigated	No
. Number of confirmed malaria cases classified	Yes
. Number of confirmed malaria cases classified as local (indigenous + introduced)	No
. Number of confirmed malaria cases classified as indigenous	Yes
. Number of confirmed malaria cases classified as introduced	Yes
. Number of confirmed malaria cases classified as imported	No
. Number of malaria cases due to P.f	Yes
. Number of malaria cases due to P.k	Yes
0. Number of malaria cases due to P.m	Yes
1. Number of malaria cases due to P.o	Yes
2. Number of malaria cases due to P.v	Yes
.2.10 Concordance of key variables between two reporting systems	Yes
.2.11 Completeness of core variables within registers	96%
.2.12 Concordance of core variables within registers	60%

World Health Organization

DQA tools for elimination settings: Service delivery level

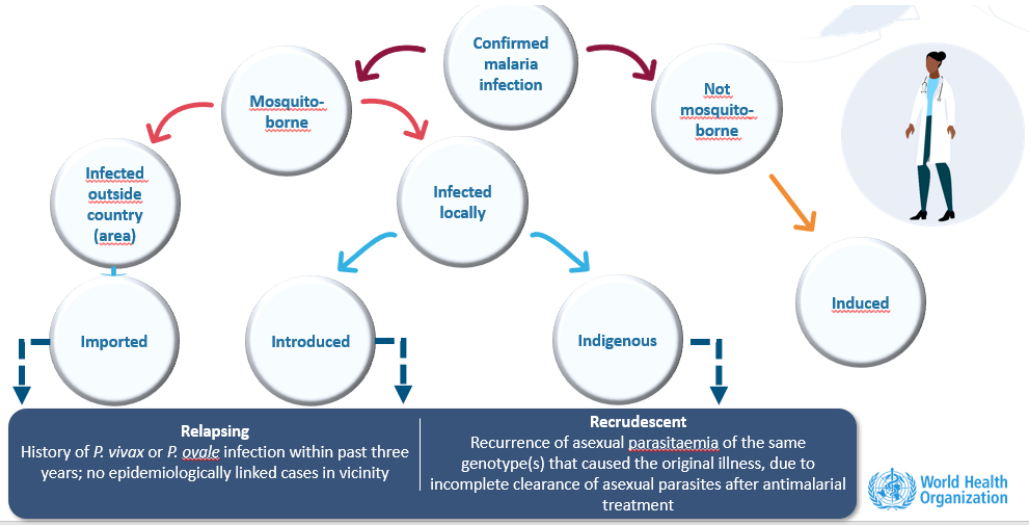
Populate a standardized template with case-based data extracted from the national surveillance system.

Patient details									Location of treatment facility			Diagnosis and Treatment									
Method of case detection	Patient ID/ System ID	Family name	First name	Date of Birth	Age	Sex	Nationality	Location of patient residence (village, suburb)	Healthy Facility	District	Province	Date of symptom onset (dd/mm/yy)	Date of diagnosis (dd/mm/yy)	Diagnosis confirmation method	Species identified	Date of treatment initiation (dd/mm/yy)	Treatment prescribed	Outcome of illness	Date of case notification (dd/mm/yy)	Recent travel within the country (Y/N Red response if YES)	Region/ district name, Town/village name of travel destination

Compare data on cases, case investigations and foci investigations from national level with data in source documents (registers and case investigation forms) at health facilities, labs and districts/provinces.

Diagnostic facility/<specify name>		Level conducting investigations			From the source document *(original registers or data forms)*													
Patient found in lab register? (y/n)	Patient case notification form found? (y/n)	Case notification form found? (y/n)	Patient case investigation form found? (y/n)	Focus investigation form found? (y/n)	Date of symptom onset (dd/mm/yy)	Date of diagnosis (dd/mm/yy)	Date of treatment (dd/mm/yy)	Documented follow-up at day 28 (or 42)?	Complete treatment documented? (y/n)	Date of case investigation (dd/mm/yy)	Date of focus investigation (dd/mm/yy)	Classification	Is classification appropriate? (y/n)	Explain why classification is or is not appropriate	Date of focus investigation (initiation) (dd/mm/yy)	Focus investigation complete? (y/n)	Elements of focus investigation	Case notification form found? (y/n)

Assess whether cases have been classified appropriately.



Assess whether all cases have been reported to each administrative level.

Table 2	Data source*			
Number of cases in 2017-2019, by parasite species	National	State/Region	District	Facility
P. falciparum				
P. vivax				
P. malariae & others				
Mixed (P. falciparum and P. vivax)				
P. knowlesi				

* *Cases here are represented by numbers*

Question bank, questionnaires and shell tables

Select questions to include from the question bank. Questions required to assess a chosen indicator must be included.

Indicator Number	Indicator	Burden reduction settings	Eliminatio n settings	Subnational level surveillance office/unit	Service delivery level	Communi ty level	Name	Question	Response Options
1.3.1	Data used for strategic, policy and operational processes	Burden reduction	Elimination	yes	no	no	datause_1	What strategic and operational processes have been informed by surveillance data in the previous 12 months?	a. Develop work plan b. Develop subnational operational plans c. Stratification for targeting and prioritising of intervention d. Advocate for a policy or program e. Monitor program performance/progress towards achieving national targets f. Distribute commodities g. None h. Don't know i. Other, specify:-
1.3.1	Data used for strategic, policy and operational processes	Burden reduction	Elimination	no	yes	no	datause_2	What operational processes have been informed by surveillance data in the previous 12 months?	a. Advocate for a policy or program b. Monitor program performance/progress towards achieving national targets c. Distribute commodities d. None e. Don't know f. Other, specify:-
1.3.1	Data used for strategic, policy and operational processes	-	Elimination	yes	yes	no	datause_3	Is there routine review of data from proactive and reactive case detection to determine whether the approach is efficient and useful?	a.Yes b.No c.Don't know

Instructions are included on how to generate questionnaires for respondents at region/district, service delivery or community levels.

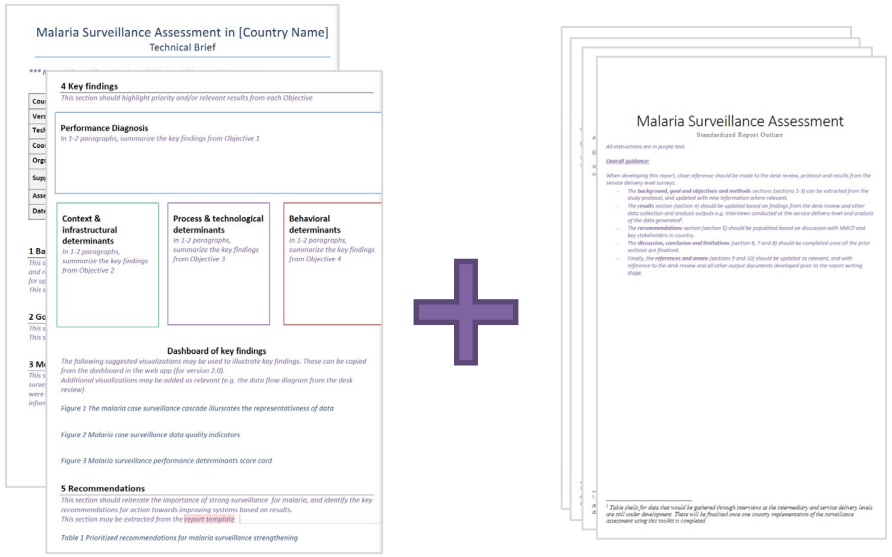
1.3	DATA USE	
1.3.1	Data used for strategic, policy and operational processes	datause_1

What strategic and operational processes have been informed by surveillance data in the previous 36 months?			Subnational level Region/district 3		Subnational level Region/district 4	
	N	%	N	%	N	%
a. Develop subnational operational plans		#DIV/0!		#DIV/0!		#DIV/0!
b. Stratification for targeting and prioritising of interventions		#DIV/0!		#DIV/0!		#DIV/0!
c. Advocate for a policy or programme		#DIV/0!		#DIV/0!		#DIV/0!
d. Monitor program performance/progress towards achieving national targets		#DIV/0!		#DIV/0!		#DIV/0!
e. Distribution of commodities		#DIV/0!		#DIV/0!		#DIV/0!
None		#DIV/0!		#DIV/0!		#DIV/0!
Don't know		#DIV/0!		#DIV/0!		#DIV/0!
Other		#DIV/0!		#DIV/0!		#DIV/0!
Total						

Capture analysis results in shell tables provided which can be presented at national and sub-national levels as well as for public, private and community.

Expected outputs

- To facilitate comparability between assessments over time and across geographies, a set of **results expected from all assessments** conducted using the Toolkit should include:
  - Key tables and figures from the desk review
  - Information systems and data flow diagrams
  - Data quality assessment tables and graphs
  - A scorecard for each priority indicators
  - Results from the survey questionnaire presented as tables, graphs or maps
  - These outputs provide a high-level understanding of or first glance at the context, infrastructure, process, and technical and behavioural aspects that may be driving the surveillance system's poor or good performance.



- The **in-depth findings** from the malaria surveillance assessment can be presented in a **Technical Brief** ("2-pager) of key findings and/or a comprehensive **Report,** which includes a summary of the methods, a more in-depth description of the assessment results, and recommendations for surveillance strengthening actions based on key findings.
- A debrief presentation should also be prepared which includes the methodology, results and suggested recommendations for surveillance system strengthening.

Expected outputs

Upon completion of an assessment, recommendations should be developed based on the assessment results and prioritized in a consultation between the NMP and other stakeholders based on their impact and feasibility for strengthening the surveillance system.

Criteria	Criteria definition/ categories	Rank Definitions		
		High (green)	Medium (yellow)	Low (red)
Impact	Impact on surveillance performance *Where performance is surveillance system coverage, data quality and data use*	Significant improvement in performance	Some improvement in performance	Little to no improvement in performance
	Impact on system attributes *e.g., simplicity of the system*	>50% system attributes will improve	10-50% of system attributes will improve	<10% of system attributes will improve
Feasibility	Time *required for start-to-end implementation*	Short term - within 3 months	Medium term- 3-12 months to implement	Long term- >1 year to implement
	Resources required *e.g., staff, funds, infrastructure*	Resources currently available to implement	Resources not in place however can be sourced with current budget	Resources are currently unavailable, and finding is required

Prioritized recommendations should be used to inform the national strategic plan and detailed sub-operational activity plans which may include;

- Delegating and costing activities to roll out a new information systems or revise surveillance guidelines during NSP formulation
- Using assessment recommendations to advocate for additional funding or resources (e.g. Global Fund grants)
- Track progress in malaria surveillance outputs and outcomes over time

Conclusions

- Regular or routine malaria surveillance assessments can be used to inform surveillance strengthening activities and track progress

- The Toolkit includes a standardized and adaptable framework and set of tools to conduct malaria surveillance assessments

- Selected indicators from the toolkit may be assessed **routinely** every year **at minimum cost** and requiring **minimum expertise**, while **baseline (comprehensive) assessments** can be implemented **every 3-5 years at higher cost** and requiring **specific expertise**

- To date, an earlier version of the Toolkit has been used effectively in Burkina Faso, DRC and Ghana . Additional pilots are ongoing.

- Currently tools are being digitalized on a web platform with a planned release of September 2022.

CDC
Centers for Disease Control and Prevention

Clinton Health Access Initiative

The Global Fund
To Fight AIDS, Tuberculosis and Malaria

ICF

JSI

London School of Hygiene & Tropical Medicine

malaria consortium
disease control, better health

MEASURE Evaluation

PMI Measure Malaria

PATH

psi

PMI | U.S. President's Malaria Initiative

RTI International

Swiss TPH
Swiss Tropical and Public Health Institute
Schweizerisches Tropen- und Public Health-Institut

Tulane University

UCSF University of California San Francisco

Bill & Melinda Gates foundation

Programme National de Lutte contre le Paludisme
PNLP

PNLP
Programme National de Lutte contre le Paludisme

Rep. Dem. du Congo
PNLP
Programme National de Lutte contre le Paludisme
Ministère de la Santé

Ghana Health Service
GHS
Your Health · Our Concern

e-Zest

Global **Malaria** Programme

World Health Organization