July 2025

Assessment of Vaccine-Preventable Disease Surveillance Information Systems in Select African Countries

PATH

Overview

Strong surveillance systems are essential for preventing, detecting, and responding to outbreaks. When supported by sustainable financing, national integration, and global partnerships, digital vaccine-preventable disease (VPD) surveillance can improve cost-effectiveness and equity. Achieving this vision requires addressing several persistent barriers.

Essential data gaps
Limited access to reliable and actionable surveillance data across many African countries is impeding the ability to manage and respond to VPD outbreaks effectively.

Digital transformation hurdles
Despite the promise of digital health, many national systems lack the infrastructure, governance, and sustainable financing to implement robust digital VPD surveillance.

Ownership and coordination gaps
Many stakeholders view VPD surveillance as short-term projects, leading to low country ownership and fragmented partner coordination.

Systemic challenges
Barriers include low analytic capacity, poor data repositories, weak guidelines, and inadequate political and financial support.

Underutilized surveillance potential
Despite its importance, VPD surveillance remains inconsistently integrated into national health planning and lacks systemic evaluation.

Process continuity issues
VPD surveillance efforts often coincide with funding cycles, rather than being sustained through routine operations.

Objectives

The US CDC, University of Oslo, and others aim to standardize, support, and strengthen digital VPD surveillance systems for impact and sustainability. To support these efforts, PATH conducted a regional assessment with the following objectives:

01

Conduct a detailed landscape analysis of the information systems used for VPD surveillance in the 47 member states.

02

Conduct in-depth case studies to document the national VPD surveillance information system functionality and data flow.

03

Identify gaps, needs, and opportunities for addressing the fragmentation of surveillance systems across Africa.

Assessment scope

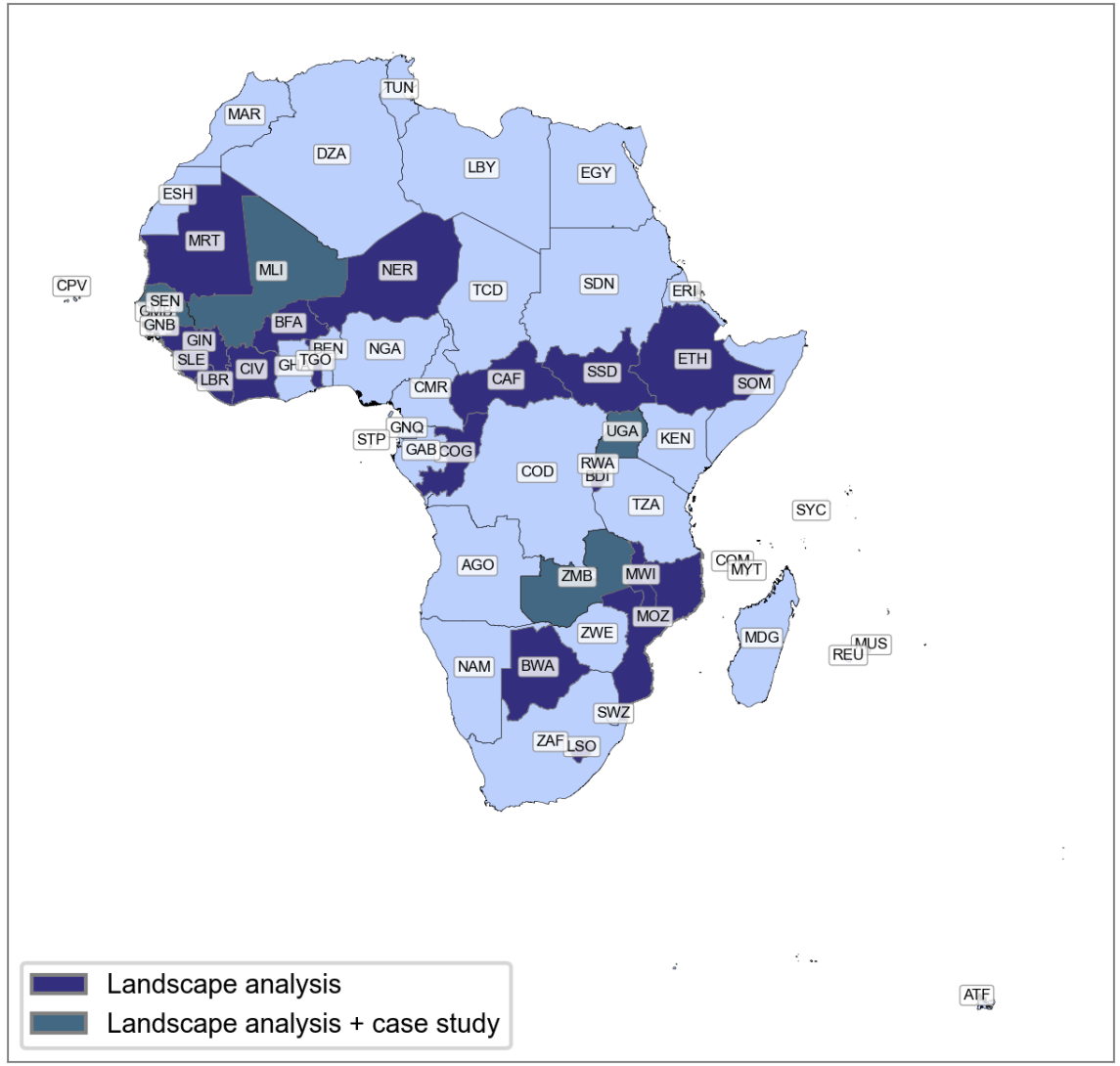
Multi-country Focus
Included 23 countries across sub-Saharan Africa, spanning West, East, and Southern Africa.

Evolving Systems
Examined how VPD surveillance systems have changed over time, highlighting shifts in system types and stages of implementation.

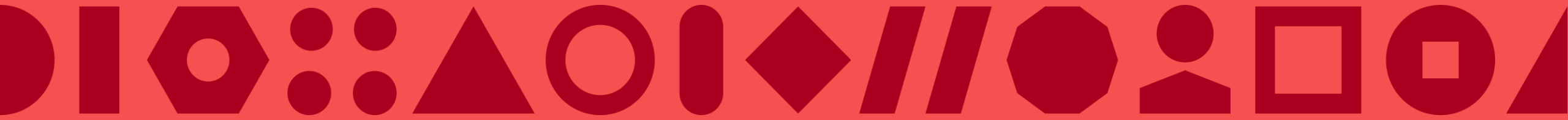
Systems Perspective
Applied a systems approach to map data flow from collection to decision-making, considering context-specific enablers and constraints.

Though primarily retrospective, the assessment provides cross-country insights to inform strategic future improvements.

VPD Surveillance Landscape Analysis & Case Studies Scope



- Methods



Methodology

1. Desk Review & Maturity Model

Structured review of systems and policies across **47 African countries.** Developed maturity scores using predefined criteria under 18 initial themes, later consolidated into 9:

1. Governance
2. Workforce Capacity
3. End-User Readiness
4. Infrastructure
5. Localization
6. Interoperability,
7. Data Quality
8. Reporting
9. Overall System Performance

2. Country Selection Criteria for Case Studies

Four countries selected for deep dive case studies based on:

- Geographic diversity (West, East, Central Africa)
- Desk review systems spectrum

3. Landscape-Level Analysis (23 Countries)

- Survey shared with countries.
- Aggregated scores by domain and subdomain per country.
- Thematic summaries generated for each domain.
- Synthesized country-level assessments from all domain scores.

4. Deep Dive Case Studies (4 Countries)

- In-depth qualitative analysis of semi-structured interviews.
- Thematic coding.
- Country-specific recommendations based on contextual insights and landscape analysis.

5. Synthesis & Reporting

- Standardized outputs across all countries.
- Validation of findings against raw data and policy documents.
- Final recommendations aligned to maturity model results.

Key assessment themes

01 Governance & strategic alignment

Evaluated leadership engagement, policy coherence, and alignment with national digital health strategies.

02 Workforce & technical capacity

Assessed the availability, skills, and retention of personnel needed to manage VPD surveillance systems.

03 End-user readiness

Measured the ability and willingness of field and program-level users to operate and benefit from the systems

04 Infrastructure

Covered the adequacy of hardware, connectivity, and facilities required to support surveillance systems

05 System lifecycle & localization

Analyzed how systems are developed, maintained, and adapted for local needs and contexts

06 Interoperability

Examined the ability of VPD systems to connect with other digital health and government platforms.

07 Data standards & quality

Reviewed adherence to data governance protocols, coding standards, and accuracy/ completeness of collected data.

08 Data use & reporting

Assessed how surveillance data is transformed into insights and applied in decision-making processes

Maturity levels (1)

	Foundational	Developing	Established
Governance and Strategic Alignment	No formal governing body; no national digital health strategy; no sustainable funding or equity considerations; no reporting to WHO AFRO regional platform	Governing structures or strategies exist but are not consistently implemented; partial alignment with equity policies or reporting requirements.	Strong governance with active oversight bodies; national strategy includes VPD; sustainable funding and equity infrastructure in place; consistent WHO AFRO reporting.
Workforce / Technical Capacity	Limited workforce capacity with no designated surveillance staff, insufficient staffing and training, no system monitoring procedures, and no in-house or contracted technical support for maintenance.	Workforce capacity is partial, with limited implementation of technical processes and inconsistent use of SOPs and tools. Software support exists, but critical issues may be unresolved, and capacity for complex integrations is limited.	Strong workforce capacity with a dedicated lead, trained staff, and fully implemented technical processes. The MOH has reliable support for software maintenance and can effectively manage system integrations.
End-User Readiness	No structured training provided; system rarely used or poorly understood by frontline workers; low confidence in system use.	End-user satisfaction with the VPD Surveillance System is generally high, supported by regular training on system use and updates.	End-user satisfaction is very high, with regular, well-assessed training provided and continuously improved based on feedback.
Infrastructure Readiness	Major gaps in availability of computers, power, internet, or mobile devices; no support for infrastructure maintenance.	Some gaps in availability of computers, power, internet, or mobile devices; limited support for infrastructure maintenance.	No gaps in availability of computers, power, internet, or mobile devices; strong support for infrastructure maintenance.

Maturity levels (2)

	Foundational	Developing	Established
System Lifecycle and Localization	System not yet deployed or only recently introduced; no localization support or language capabilities; no structured transition plan.	System not yet deployed or only recently introduced; no localization support or language capabilities; no structured transition plan.	System not yet deployed or only recently introduced; no localization support or language capabilities; no structured transition plan.
Interoperability	No integration with national HIS; absence of interoperability standards; no framework guiding system exchange.	Partial or pilot-level integration; limited use of standards (e.g., ADX, FHIR); draft interoperability policies.	Strong integration with HIS; national framework exists; system complies with international standards and supports real-time data exchange.
Interoperability	No integration with national HIS; absence of interoperability standards; no framework guiding system exchange.	Partial or pilot-level integration; limited use of standards (e.g., ADX, FHIR); draft interoperability policies.	Strong integration with HIS; national framework exists; system complies with international standards and supports real-time data exchange.
Interoperability	No integration with national HIS; absence of interoperability standards; no framework guiding system exchange.	Partial or pilot-level integration; limited use of standards (e.g., ADX, FHIR); draft interoperability policies.	Strong integration with HIS; national framework exists; system complies with international standards and supports real-time data exchange.

Annex 2 includes the full list of detailed maturity levels per sub theme

Assessment sub-themes (1)

1	**Governance and Strategic Alignment** 1. **Existence of a formal governing body:** Does a national oversight or coordination body exist to provide governance for VPD surveillance systems, including policy guidance and technical oversight? 2. **Existence of a Digital Health Strategy:** Is there a comprehensiveness national digital health strategy that includes surveillance systems? 3. **Sustainable funding:** Is there a long-term, predictable funding stream (domestic or donor-supported) for maintaining and upgrading VPD systems? 4. **Equity infrastructure:** Is the digital surveillance infrastructure (computers, power, connectivity) equitably distributed across rural and urban facilities? 5. **Equity policies (rural/urban):** Are there formal policies or operational guidelines to ensure surveillance equity across geographies? 6. **Submission to WHO AFRO regional system:** Does the country regularly submit surveillance data to WHO AFRO's regional system?
2	**Workforce / Technical Capacity** 1. **Dedicated VPD surveillance officer:** Is there is a clearly designated officer managing VPD surveillance at national level? 2. **Admin/monitoring team in place:** Is there a team responsible for overseeing routine system management and monitoring? 3. **Availability of monitoring tools/SOPs:** Are there standard tools and SOPs guiding monitoring and evaluation of surveillance data? 4. **Software maintenance team in place:** Is there is an in-house or contracted team responsible for system maintenance, including updates and troubleshooting? 5. **Integration/interoperability tech capacity:** Is there sufficient technical expertise to manage system integrations and data exchange?
3	**End-User Readiness** 1. **End-user satisfaction:** Do end-users report ease of use, confidence, and satisfaction with the surveillance system? 2. **End-user training:** What is the regularity, coverage, and quality of training for VPD surveillance data entry and reporting?

Assessment sub-themes (2)

4

Infrastructure Readiness

1. **Availability of computers:** Do health facilities have functional digital hardware for reporting?
2. **Mobile devices and mobile data access:** Do users have access to mobile devices and connectivity for surveillance tasks?
3. **Stable power/internet infrastructure:** Is the electricity and internet infrastructure stable and sufficient for system use.?
4. **Capacity to maintain infrastructure: I**s there local capacity to maintain and repair surveillance IT infrastructure?
5. **Infrastructure disparities:** Are there significant variations in digital infrastructure between urban and rural or central vs peripheral facilities?

5

System Lifecycle and Localization

1. **Length of time system has been in use:** How long the current VPD surveillance system has been operational?
2. **Multilingual software maturity:** Do the systems support local languages or have multilingual capabilities?
3. **VPD surveillance system transition:** What is the state of transition from older systems (e.g., Epi Info) to integrated platforms like DHIS2?
4. **User support during system transition: A**re there adequate support mechanisms in place during system changes (e.g., retraining, data migration support)?

6

Interoperability

1. **Integration with WHO AFRO system:** To what degree are VPD surveillance systems integrated with national health information systems (e.g., DHIS2)?
2. **Integration with national HIS:** What is the level of adoption of recognized standards for data exchange?
3. **Interoperability standards use (FHIR, ADX):** To what extent have countries adopted and implemented recognized interoperability standards such as FHIR (Fast Healthcare Interoperability Resources) and ADX (Aggregate Data Exchange)?
4. **Existence of national interoperability framework:** Is there is a formal strategy or framework guiding interoperability?

Assessment sub-themes (3)

7	**Data Standards and Data Quality** 1. **Metadata dictionary:** What is the extent and completeness of metadata used for surveillance data elements? 2. **Org units structure:** What is the level of accuracy and granularity of health facility and organizational hierarchies? 3. **Compliance with WHO AFRO standardized indicators:** To what extent does the system align with WHO's regional reporting indicators? 4. **Data quality governance: Are there** Frameworks and activities for data validation, auditing, and review? 5. **Data entry/management training: Is** there sufficient training coverage for accurate data capture.?
8	**Data Use and Reporting** 1. **Data reporting needs:** Do the systems meet programmatic and stakeholder needs for reporting? 2. **Data sharing practices:** What is the extent and frequency of data sharing with WHO, partners, and between departments? 3. **Timeliness and quality of CBS data:** Is Case-based surveillance (CBS) data submitted on time and meets completeness standards? 4. **Timeliness and quality of aggregate data:** Is aggregate surveillance (CBS) data submitted on time and meets completeness standards? 5. **Case-based data security compliance:** Is there compliance with data protection policies for personally identifiable data?

Annex 3 includes the full list of detailed assessment questions and indicators

-Results

Maturity assessment

Overview (1)

Governance and strategic alignment

- Most countries are at a Developing or Foundational maturity level, indicating a need for further development of governance and strategy.
- A few countries are at an Established maturity level, indicating good progress in governance and strategic alignment.
- Digital health strategies are lacking in many countries, and governance structures are not well-defined or formalized in some cases.

Workforce/Technical Capacity

- Most countries have recognized the importance of dedicated VPD surveillance officers, indicating a willingness to invest in surveillance capacity.
- However, many countries lack sufficient capacity and resources to support effective surveillance, leading to inconsistent implementation and potential gaps in surveillance practices.
- The administrative and monitoring teams in many countries are incomplete, informal, or lacking in clarity, hindering effective support for the workforce and technical capacity.
- Monitoring tools and SOPs are often basic, incomplete, inconsistent, or not widely adopted, limiting the effectiveness of workforce and technical capacity management.

	Established
	Developing
	Foundational

Country	Governance and Strategic Alignment	Workforce/ Technical Capacity
Botswana		
Burkina Faso		
Burundi		
Central African Republic		
Congo		
Ethiopia		
Gambia		
Guinea		
Ivory Coast		
Lesotho		
Liberia		
Malawi		
Mali		
Mauritania		
Mozambique		
Niger		
Rwanda		
Senegal		
Sierra leone		
South Sudan		
Togo		
Uganda		
Zambia		
Overall		

Maturity assessment

Overview (2)

End-User Readiness

- Most countries in the region are at the Foundational or Developing maturity level, indicating that end-user training programs are evolving but not yet fully mature.
- A few countries have achieved an Established maturity level, indicating a well-integrated and standardized end-user training program.
- Most countries have gaps in end-user training, with inconsistent and ad-hoc practices, which may hinder end-user proficiency and satisfaction.

Infrastructure Readiness

- Many countries (16) are at the Foundational level, indicating that they are just starting to implement their infrastructure systems.
- Eight countries are at the Developing level, showing that they are evolving but not yet fully mature.

	Established
	Developing
	Foundational

Country	End-User Readiness	Infrastructure Readiness
Botswana		
Burkina Faso		
Burundi		
Central African Republic		
Congo		
Ethiopia		
Gambia		
Guinea		
Ivory Coast		
Lesotho		
Liberia		
Malawi		
Mali		
Mauritania		
Mozambique		
Niger		
Rwanda		
Senegal		
Sierra leone		
South Sudan		
Togo		
Uganda		
Zambia		
Overall		

Maturity assessment

Overview (3)

System Lifecycle and Localization

- Most countries (14) are at the Foundational maturity level, reflecting systems that are still evolving and lack maturity in key lifecyle domains.
- Only a few countries have progressed slightly out of the Foundational level, highlighting persistent challenges in establishing effective processes for creating and sustaining stable multilingual software for VPD surveillance.
- **Interoperability**
- Most countries are still in the early stages of developing their interoperability frameworks, with only a few having established a comprehensive and standardized approach.
- Integration with national health information systems (HIS) is a common challenge, with many countries lacking a basic level of connectivity.
- Integration with the World Health Organization's African Region (AFRO) system is also a significant gap, with only a few countries having established connections.
- Interoperability standards (FHIR, ADX) are not widely adopted or integrated into systems and processes, hindering seamless data exchange and sharing.

	Established
	Developing
	Foundational

Country	System Lifecycle and Localization	Interoperability
Botswana		
Burkina Faso		
Burundi		
Central African Republic		
Congo		
Ethiopia		
Gambia		
Guinea		
Ivory Coast		
Lesotho		
Liberia		
Malawi		
Mali		
Mauritania		
Mozambique		
Niger		
Rwanda		
Senegal		
Sierra leone		
South Sudan		
Togo		
Uganda		
Zambia		
Overall		

Maturity assessment

Overview (4)

Data Standards and Data Quality

- Two countries have established their data standards and quality governance frameworks, demonstrating consistent practices and adherence to recognized standards.
- In contrast, a larger group remain at the Developing level, highlighting ongoing challenges and opportunities for targeted improvement.
- The few countries at the developing maturity lack a comprehensive and standardized metadata dictionary, which can lead to inconsistencies and inaccuracies in data management.
- For these countries, organizational unit structures are not consistently defined or applied, leading to potential data quality issues and difficulties in data integration and analysis.
- Data entry and management training is often informal, inconsistent, or not regularly updated, resulting in varying levels of data quality and standards.

Data Use and Reporting

- Most countries have well-established processes for reporting data and sharing data with stakeholders, indicating a strong foundation for data use and reporting.
- However, there is a need for improvement in case-based data security compliance, with 15 countries having a Foundational or Developing maturity level in this area.
- The region's overall maturity level in data use and reporting is relatively high, with 8 countries having an Established maturity level.

	Established
	Developing
	Foundational

Country	Data Standards and Data Quality	Data Use and Reporting
Botswana		
Burkina Faso		
Burundi		
Central African Republic		
Congo		
Ethiopia		
Gambia		
Guinea		
Ivory Coast		
Lesotho		
Liberia		
Malawi		
Mali		
Mauritania		
Mozambique		
Niger		
Rwanda		
Senegal		
Sierra leone		
South Sudan		
Togo		
Uganda		
Zambia		
Overall		

Botswana

	Established
	Developing
	Foundational

Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	1.50	Strength – Has a well-established and stable funding model in place; Gap – Governance structure is informal, ad-hoc, or lacks clear roles and responsibilities, leading to inconsistent decision-making and limited strategic alignment.
Workforce/Technical Capacity	1.40	Strength – Recognition of the importance of having a dedicated VPD surveillance officer; Gap – Lack of sufficient resources, expertise, or clear roles and responsibilities for the admin/monitoring team.
End-User Readiness	1.00	Gap – lacks a structured approach to measuring and improving end-user satisfaction, leading to inconsistent and potentially unsatisfactory experiences.
Infrastructure Readiness	0.60	Gap – lacks a structured approach to infrastructure maintenance, leading to ad-hoc and reactive practices that may not ensure long-term reliability and efficiency..
System Lifecycle and Localization	1.00	Strength – has a well-established and reliable process for developing and maintaining multilingual software; Gap – lacks a structured approach to managing and optimizing the system's lifecycle, with a basic understanding of the system's age and its impact on localization.
Interoperability	0.00	Gap – No integration with WHO AFRO system and national HIS.
Data Standards and Data Quality	1.17	Strength – has established a well-established process for collecting and reporting data using standardized indicators from WHO AFRO, ensuring data quality and comparability across different programs and stakeholders; Gap – lacks a comprehensive and standardized approach to metadata, with limited implementation to specific projects or departments
Data Use and Reporting	1.00	Strength – has an established process for sharing data in a timely and secure manner; Gap – lacks a clear understanding of its data reporting needs, including what data is required, how it should be reported, and who is responsible for reporting it

Burkina Faso

	Established
	Developing
	Foundational

Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	2.00	Strength – Has well-established and implemented policies that address equity disparities between rural and urban areas, ensuring fair distribution of resources and opportunities; Gap – lacks a clear, comprehensive, and integrated digital health strategy that is aligned with its overall goals and objectives.
Workforce/Technical Capacity	1.60	Strength – Has a well-established and functional software maintenance team in place, with clear roles and responsibilities, and a demonstrated ability to maintain and update software systems effectively; Gap – Current practices and resources may not be sufficient to ensure consistent and effective surveillance.
End-User Readiness	2.00	Strength – End-users are consistently satisfied with the current state of the system or process, indicating that their needs are being effectively met; Gap – There are gaps in end-user training, which is not yet comprehensive, consistent, or effective in equipping end-users with the necessary skills and knowledge to fully utilize the system or technology.
Infrastructure Readiness	1.40	Strength – Has a well-established process in place to maintain its infrastructure, ensuring its reliability and effectiveness over time; Gap – The lack of a comprehensive strategy and infrastructure to support widespread adoption and effective use of mobile devices and mobile data access.
System Lifecycle and Localization	1.33	Strength – Has a well-established and standardized process for developing and maintaining multilingual software; Gap – The lack of clarity around the system's history and evolution may be hindering its optimization and improvement.
Interoperability	0.00	Gap – No integration with WHO AFRO system and national HIS.
Data Standards and Data Quality	1.83	Strength – Has a well-established process in place to ensure consistent and accurate reporting of data using standardized WHO AFRO indicators; Gap – Lacks a structured approach to training staff on data entry and management best practices, resulting in inconsistent and potentially inaccurate data entry and management processes.
Data Use and Reporting	1.50	Strength – Data sharing practices are well-established and standardized within; Gap – Data security compliance processes are not consistently applied or well-documented.

Burundi

Established
Developing
Foundational

Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	1.67	Strength – Has a well-established and reliable funding model in place, ensuring a stable financial foundation.
Workforce/Technical Capacity	0.60	Strength – Efforts are being made to assign dedicated VPD surveillance officers; Gap – Consistency, effectiveness, and sustainability of dedicated VPD surveillance officers are lacking, requiring improvement.
End-User Readiness	2.00	Strength – End-users are consistently satisfied with the current state of the system or process; Gap – The country is still in the early stages of developing training programs for end-users, which may not be consistently delivered or evaluated.
Infrastructure Readiness	0.80	Gap – Lacks a structured approach to maintaining its infrastructure, leading to ad-hoc and reactive maintenance practices.
System Lifecycle and Localization	1.33	Strength – Recognizes the importance of multilingual software; Gap – Inconsistent and unreliable documentation and knowledge of the system's history and evolution.
Interoperability	1.00	Gap – Limited or no integration with WHO AFRO system and national HIS, requiring further development and implementation to achieve seamless interoperability.
Data Standards and Data Quality	1.33	Strength – Has a well-defined and consistently applied organizational structure, which enables effective data management and quality control; Gap – Lacks a comprehensive and standardized approach to metadata, requiring further development and implementation to ensure consistency and accuracy.
Data Use and Reporting	1.20	Strength – Has an established process for sharing data, with clear guidelines and protocols in place, making data sharing a routine and integral part of their operations.

Central African Republic

	Established
	Developing
	Foundational

Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	1.83	Strength - Has a well-established process for submitting data to the WHO AFRO system; Gap – Lacks a clear, comprehensive, and well-defined digital health strategy that aligns with its overall goals and objectives.
Workforce/Technical Capacity	0.60	Strength – Basic, essential tools and standard operating procedures (SOPs) are in place, providing a foundation for monitoring and reporting; Gap – Insufficient capacity and resources to ensure effective and consistent implementation of VPD surveillance, requiring further development and investment.
End-User Readiness	0.00	Gap – The training program lacks structure, consistency, and scalability, leading to uneven and inadequate training experiences for end-users.
Infrastructure Readiness	0.60	Gap – Lacks a structured approach to infrastructure maintenance, leading to ad-hoc and reactive practices, which makes it vulnerable to outages and unreliable infrastructure.
System Lifecycle and Localization	0.67	Strength – Has some experience with the surveillance system, indicating a foundation for growth and development; Gap – Limited understanding of the system's history and evolution, leading to gaps in documentation and knowledge transfer.
Interoperability	0.25	Strength – A national framework or policy for interoperability exists; Gap – The framework is still in the early stages of development, implementation, or refinement, which may hinder its full operationalization and adoption.
Data Standards and Data Quality	1.50	Strength – Has a well-established process in place to ensure compliance with WHO AFRO standardized indicators; Gap – Lacks refinement, standardization, and scalability in metadata management, leading to varying levels of data quality and limited ability to manage data quality issues.
Data Use and Reporting	1.60	Strength – Has a well-established process for collecting, analyzing, and reporting aggregate data in a timely and high-quality manner.

Congo

	Established
	Developing
	Foundational

Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	1.83	Strength – Established sustainable funding model, ensuring a consistent and reliable source of resources to support goals and objectives; Gap – Lack of clarity, consistency, and effectiveness in the governing body's role, leading to potential inefficiencies and inconsistencies in decision-making and strategic alignment.
Workforce/Technical Capacity	0.40	Gap – Current implementation of a dedicated VPD surveillance officer is still lacking consistency, clarity, or sufficient resources, hindering its effectiveness.
End-User Readiness	0.00	Gap – The training program lacks structure, consistency, and scalability, leading to uneven and inadequate training experiences for end-users.
Infrastructure Readiness	0.20	Gap – Lacks a structured approach to infrastructure maintenance and addressing infrastructure disparities, leading to ad-hoc and reactive practices that may not be effective or sustainable in the long term.
System Lifecycle and Localization	0.67	Strength – The VPD surveillance system in Congo is relatively new or has recently undergone significant changes, indicating a willingness to adapt and evolve to meet changing needs; Gap – Users are still adapting to the system's presence and may not have fully internalized its processes and procedures, which may lead to inefficiencies and errors.
Interoperability	0.75	Strength – Congo has a national interoperability framework in place; Gap – the integration with the WHO AFRO system is basic and lacks sophistication, requiring manual intervention or workarounds to achieve basic connectivity.
Data Standards and Data Quality	1.67	Strength – has a well-established process in place to ensure consistent and accurate reporting of data using standardized indicators; Gap – Lacks a structured approach to data quality governance, resulting in ad-hoc or inconsistent data quality management practices.
Data Use and Reporting	2.00	Strength – Has a well-established process for reporting data, with clear guidelines and procedures in place, ensuring timely and accurate data reporting to stakeholders.

Côte D'Ivoire

	Established
	Developing
	Foundational

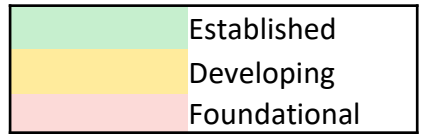
Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	1.50	Strength – Has a well-established and reliable funding model in place, ensuring a consistent flow of resources to support its goals and activities; Gap – Lacks a clear, comprehensive, and well-defined digital health strategy, which is integrated into its overall governance and strategic alignment.
Workforce/Technical Capacity	0.60	Strength – Has made efforts to assign a dedicated VPD surveillance officer, indicating a commitment to VPD surveillance; Gap – The dedicated VPD surveillance officer role lacks consistency, effectiveness, and sufficient resources.
End-User Readiness	1.00	Strength – Recognizes the importance of training end-users, indicating a willingness to invest in their capabilities; Gap – Lack of a structured approach to end-user training, leading to inconsistent and potentially ineffective programs.
Infrastructure Readiness	0.80	Gap – Lacks a clear understanding of the specific challenges and solutions required to mitigate infrastructure disparities, hindering its ability to develop targeted solutions and improve its infrastructure readiness.
System Lifecycle and Localization	0.33	Gap – Limited understanding of the system's lifecycle and localization may lead to inefficient resource allocation and inadequate preparation for future developments.
Interoperability	0.50	Gap – The system lacks integration with the WHO AFRO system, hindering sharing of data and information between the two systems.
Data Standards and Data Quality	1.17	Strength – Has a well-defined and consistent organizational structure, facilitating effective data management and quality control; Gap – Lacks a formalized framework or standardized procedures to ensure data quality and integrity.
Data Use and Reporting	2.00	Strength – “Established" maturity level for data use and reporting, indicating a well-established process for ensuring the timely and high-quality provision of data.

Ethiopia

	Established
	Developing
	Foundational

Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	1.67	Strength – Has a well-established and stable funding model, ensuring a consistent ability to secure funding to support its goals and objectives.
Workforce/Technical Capacity	1.40	Strength – Recognition of the importance of a dedicated VPD surveillance officer, indicating a willingness to invest in workforce capacity; Gap - Insufficient capacity and resources for effective surveillance, requiring further development to establish a consistent and reliable system.
End-User Readiness	0.50	Gap – The training program lacks structure, consistency, and scalability, leading to uneven and inadequate training experiences for end-users.
Infrastructure Readiness	0.40	Gap – The infrastructure lacks advanced features, redundancy, and scalability, which can impact its ability to support complex operations or growth.
System Lifecycle and Localization	0.67	Strength – The country has an established process for developing and maintaining multilingual software, indicating a high level of consistency and efficiency in its approach.
Interoperability	0.25	Strength – A national interoperability framework exists in theory, providing a foundation for future development; Gap – Implementation and effectiveness of the framework are still in the early stages, with potential gaps and inconsistencies hindering its full realization.
Data Standards and Data Quality	1.50	Strength – Has a well-established process for ensuring compliance with standardized indicators, with clear guidelines, procedures, and training in place for consistent data collection and reporting; Gap – The country's data management practices are still developing, with limited standardization and consistency in the country's unit structure, leading to potential data quality issues and difficulties in data integration and analysis.
Data Use and Reporting	2.00	Strength – Has well-established processes for reporting data, with clear expectations and procedures in place for collecting, analyzing, and disseminating data to stakeholders, enabling effective decision-making and accountability.

Gambia



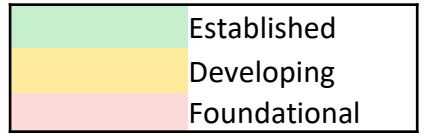
Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	2.00	Strength – Has a well-established equity infrastructure, enabling effective management and monitoring of equity initiatives; Gap – Lacks a clear, comprehensive, and well-articulated digital health strategy aligned with its overall goals and objectives.
Workforce/Technical Capacity	1.00	Strength – Has made some efforts to assign a dedicated officer to VPD surveillance, indicating a willingness to invest in this area; Gap – Inconsistent allocation of resources and varying levels of effectiveness in VPD surveillance, indicating a need for improved resource management.
End-User Readiness	1.00	Strength – Basic training is provided for end-users; Gap – The training is often inadequate, inconsistent, or not regularly updated, leading to end-users struggling to effectively use the system or technology.
Infrastructure Readiness	1.00	Strength – Has a well-established approach to addressing infrastructure disparities; Gap – Lacks a structured approach to infrastructure maintenance, resulting in ad-hoc and reactive practices.
System Lifecycle and Localization	0.67	Strength – The country is taking steps to establish a consistent and reliable approach to tracking and utilizing the age of its systems; Gap – Still lacks a standardized and reliable approach to tracking and utilizing systems, leading to potential gaps and inconsistencies in data collection and analysis.
Interoperability	0.50	Gap – Lacks integration with the WHO AFRO and national system, hindering the sharing of vital public health information and global health surveillance.
Data Standards and Data Quality	1.87	Strength – Has a well-established process in place for adhering to standardized indicators set by WHO AFRO; Gap – Lacks a comprehensive and standardized approach to metadata management, resulting in inconsistent or incomplete metadata documentation.
Data Use and Reporting	1.75	Strength – Has a well-established process for ensuring the timeliness and quality of CBS data, enabling informed decision-making and reporting; Gap – Data sharing practices for Indicator 35 and 36 are in their early stages, with limited or no established processes, policies, or infrastructure in place.

Guinea

	Established
	Developing
	Foundational

Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	2.00	Strength – Has a well-established and effective equity policy in place, ensuring fairness and equity in resource allocation; Gap – Lacks a clear, comprehensive, and well-articulated digital health strategy.
Workforce/Technical Capacity	1.00	Gap – The administration and monitoring team lacks necessary skills, resources, or coordination, hindering the effective implementation of VPD surveillance activities.
End-User Readiness	2.00	Strength – End-users are generally satisfied with the current state of the system or process; Gap – Inadequate, inconsistent, and non-tailored end-user training leads to limited understanding and adoption of the system or technology.
Infrastructure Readiness	1.40	Strength – Basic infrastructure is in place, with some awareness of infrastructure disparities; Gap – Power and internet infrastructure is still in the process of being established or improved, leading to potential disruptions or instability.
System Lifecycle and Localization	0.67	Gap – Has a basic process for developing and maintaining multilingual software, with guidelines, standardized tools, but limited training among team members.
Interoperability	0.75	Gap – Limited data exchange and integration capabilities with national health information systems.
Data Standards and Data Quality	2.00	Strength – Has a well-defined and consistently applied organizational structure and a formalized data quality governance framework in place, ensuring effective data management and quality control.
Data Use and Reporting	2.00	Strength – Has a well-established process for ensuring the timeliness and quality of its data, with clear procedures and standards in place; Gap – Case-based data security compliance processes are at a Foundational level, indicating inconsistent application and enforcement, and limited awareness or training among staff.

Lesotho



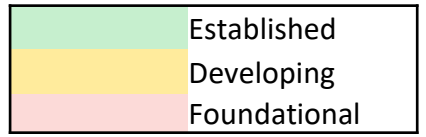
Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	1.17	Strength – Has a well-established process for submitting data and reports to the WHO AFRO system; Gap – Lacks a clear, comprehensive, and well-articulated digital health strategy, which may hinder its ability to effectively align its digital health initiatives and investments with its overall strategy.
Workforce/Technical Capacity	1.20	Strength – Recognition of the importance of a dedicated VPD surveillance officer; Gap – Insufficient capacity and resources to ensure consistent and effective surveillance activities.
End-User Readiness	0.50	Gap – The lack of a structured approach, clear goals, and measurable outcomes in end-user training programs indicates a need for standardization and formalization of training initiatives.
Infrastructure Readiness	0.40	Gap – Limited implementation of mobile devices and data access, which hinders the effectiveness and sustainability of infrastructure.
System Lifecycle and Localization	1.00	Strength – Has a well-established process in place for developing and maintaining multilingual software, with high consistency and efficiency in localization and translation efforts; Gap – Lacks a structured approach to tracking and utilizing the length of time the system has been in use, which hinders informed decision-making for system maintenance, upgrades, and retirement.
Interoperability	0.75	Gap – Lacks widespread adoption and has limited integration with national health information systems, as well as no integration with the WHO AFRO system, hindering data sharing and analysis.
Data Standards and Data Quality	1.33	Strength – Has a well-established process in place to ensure consistent and accurate reporting of data against standardized WHO AFRO indicators; Gap – The metadata dictionary is at a Foundational maturity level, lacking a standardized and comprehensive framework, which may lead to inconsistent data labeling and potential data quality issues.
Data Use and Reporting	1.20	Strength - Lesotho's VPD surveillance system has a well-established and consistently applied process for sharing data, which is integrated into its regular operations and widely understood and adopted by stakeholders.

Liberia

	Established
	Developing
	Foundational

Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	1.33	Strength – Basic system in place for securing and managing funding, ensuring long-term financial stability and sustainability. Gap – Lacks a clear, comprehensive, and well-defined digital health strategy, which is integrated into its overall governance and strategic alignment
Workforce/Technical Capacity	1.25	Strength - Recognition of the importance of dedicated surveillance officers; Gap – Limited investment and development in dedicated surveillance officers, hindering effective surveillance and response to VPD outbreaks.
End-User Readiness	1.00	Strength – Efforts are underway to improve end-user satisfaction, indicating a willingness to address user needs; Gap – There is still room for growth and refinement in improving end-user satisfaction, suggesting that more work is needed to fully understand and meet user needs.
Infrastructure Readiness	0.60	Gap – Limited implementation of mobile devices and data access, with potential gaps in infrastructure, policies, and training.
System Lifecycle and Localization	0.67	Gap – The system lacks maturity in terms of localization, potentially leading to difficulties in adapting to local contexts and needs.
Interoperability	0.75	Strength – A national framework for interoperability is already in place, providing a structured approach to ensuring data exchange and integration across different systems and organizations; Gap – Integration with WHO AFRO system and national HIS is still in its early stages, with limited or no established connections and limited functionality, respectively.
Data Standards and Data Quality	1.33	Strength – Has a well-established process in place for adhering to standardized indicators set by WHO AFRO; Gap – Lacks comprehensive, consistent, and widely adopted metadata standards, which may lead to data quality issues and difficulties in data integration and analysis.
Data Use and Reporting	2.00	Strength – Established data sharing practices allow for consistent and timely sharing of high-quality CBS data; Gap – Basic processes and policies for case-based data security compliance are established but lack consistent implementation and monitoring.

Malawi



Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	1.67	Strength – Has a well-established and reliable system in place for securing and managing funding, ensuring long-term financial stability and sustainability.
Workforce/Technical Capacity	1.00	Strength – Recognition of the importance of dedicated surveillance officers; Gap – Limited investment and development in dedicated surveillance officers, hindering effective surveillance and response to VPD outbreaks.
End-User Readiness	1.00	Strength – Recognizes the importance of training end-users, indicating a willingness to invest in their capabilities; Gap – Lack of a structured approach to end-user training, leading to inconsistent and potentially inadequate practices.
Infrastructure Readiness	0.60	Gap – Lacks a comprehensive and systematic approach to infrastructure maintenance, resulting in inconsistent and unreliable maintenance practices.
System Lifecycle and Localization	0.33	Gap – The system lacks maturity in terms of localization, potentially leading to difficulties in adapting to local contexts and needs.
Interoperability	1.25	Gap – Limited integration with the WHO AFRO system, hindering effective data exchange and collaboration.
Data Standards and Data Quality	1.50	Strength – Has a well-established process for ensuring consistent and accurate reporting of data using WHO AFRO standardized indicators; Gap – The country's data entry and management processes are still in the early stages of development, with limited training and guidance provided to staff, resulting in inconsistent data quality and potential errors.
Data Use and Reporting	0.8	Strength – Efforts are underway to establish and refine data sharing practices; Gap – Data sharing practices are not yet fully implemented or standardized, suggesting a lack of consistency and efficiency in data sharing.

Mali

	Established
	Developing
	Foundational

Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	1.67	Strength – Has a well-established and stable funding model in place, enabling it to sustain its operations and initiatives over time.
Workforce/Technical Capacity	1.80	Strength – Awareness of the importance of having a dedicated VPD surveillance officer and an administrative and monitoring team in place; Gap – Inconsistent implementation of dedicated VPD surveillance officer and administrative and monitoring team.
End-User Readiness	2.00	Strength – End-users are generally satisfied with the current state of affairs.
Infrastructure Readiness	0.60	Gap – Lacks a robust and scalable infrastructure to support widespread adoption and effective use of mobile devices and mobile data access.
System Lifecycle and Localization	1.25	Strength – Has established a process for developing and maintaining multilingual software with standardized tools and procedures; Gap – Lacks a standardized approach to tracking and utilizing the age of their systems, leading to potential inconsistencies and inefficiencies in data collection and analysis.
Interoperability	1.00	Limited or no integration with the WHO AFRO and national HIS system, requiring significant further work to achieve seamless connectivity.
Data Standards and Data Quality	1.83	Strength – Has a well-defined and widely adopted structure for its organizational units, enabling effective data management and quality control across; Gap – Lacks a comprehensive and well-maintained metadata dictionary, resulting in inconsistent or incomplete metadata documentation across datasets.
Data Use and Reporting	2.00	Strength – Has well-established and standardized processes in place for sharing data, both internally and externally, enabling efficient and effective collaboration and decision-making.

Country Spotlight: Mali VPD Surveillance

Enablers

Clear and accessible user documentation

- Software was widely viewed as well-structured and easy to understand
- Improves system adoption and minimizes data entry errors
- Enhances autonomy, particularly for health workers in low-resource settings
- Supports digital literacy and operational efficiency

Prioritization of facility-level data capture

- Health facility-level data collection is critical for VPD surveillance
- Enables timely and accurate surveillance data capture
- Strengthens the case for targeted investments in frontline capacity-building and digital tools

Support for offline functionality

- System allows continued reporting in low-connectivity areas
- Ensures uninterrupted data collection, enabling adaptability in rural or underserved environments
- Promotes equity in surveillance coverage and is an essential component of system resilience

Barriers

Data quality and completeness challenges

- Persistent gaps in data quality, with frequent missing and inconsistent entries
- Limited capacity for routine data quality assessments
- Insufficient technical support for data validation and audits

System Interoperability Constraints

- Lack of well-documented APIs and standardized data exchange protocols
- Heavy reliance on external partners for system integration limits national ownership and hinders sustainable scalability

Infrastructure and Human Resource Gaps

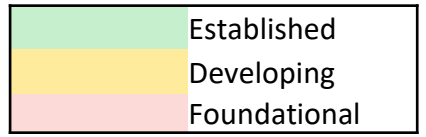
- Shortage of Ministry staff to maintain IT infrastructure, including hardware and network systems
- Inadequate support for health worker training on the DHIS2 Tracker leads to underuse and reduced system performance

Mauritania

	Established
	Developing
	Foundational

Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	0.67	Strength – Has a well-established process for submitting data and reports to the WHO AFRO system, with minimal issues or delays; Gap – Is still in the process of establishing a stable and reliable funding model, with some efforts underway to secure resources, but with room for improvement and potential instability in the long term.
Workforce/Technical Capacity	0.60	Strength – Awareness of the importance of dedicated VPD surveillance officers; Gap – Inconsistent or limited implementation of dedicated VPD surveillance officers.
End-User Readiness	0.50	Gap – Ad-hoc and inconsistent training that may not be tailored to the specific needs of end-users.
Infrastructure Readiness	0.60	Strength – Basic mobile devices and data access capabilities are available; Gap – Limited reliability and connectivity of mobile devices and data access capabilities, impacting the overall infrastructure readiness.
System Lifecycle and Localization	0.33	Gap – The VPD surveillance system lacks a comprehensive and systematic approach to tracking and utilizing its history, resulting in limited insights and potential for improvement.
Interoperability	0.50	Gap – The current integration with WHO AFRO system is basic and limited, leading to potential manual workarounds and hindering seamless data exchange.
Data Standards and Data Quality	1.33	Strength – Has a well-established process for ensuring consistent and accurate reporting of data against standardized indicators; Gap – Lacks consistency, completeness, and widespread adoption of its metadata dictionary, hindering data standards and quality.
Data Use and Reporting	1.50	Strength – Has well-established processes and systems in place to meet its data reporting needs, with clear expectations and standards for data quality, frequency, and format.

Mozambique



Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	1.33	Strength – Has a well-established approach to securing sustainable funding, ensuring long-term sustainability and strategic goals. Gap – The digital health strategy is not fully integrated into the overall governance and strategic alignment
Workforce/Technical Capacity	1.40	Strength – Has a well-established and functional software maintenance team in place, ensuring effective maintenance and updates; Gap – The admin/monitoring team is at a Foundational level, lacking cohesion and effectiveness, which may lead to inefficiencies and limited capacity to monitor and manage projects.
End-User Readiness	1.50	Strength – End-users are generally satisfied with the current situation, indicating a positive foundation for user experience; Gap – End-user training lacks a structured approach, resulting in inconsistent and ad-hoc practices that may not effectively equip end-users with necessary skills and knowledge.
Infrastructure Readiness	0.80	Gap – Limited access to reliable and stable mobile devices and data, hindering the ability to fully utilize digital services.
System Lifecycle and Localization	0.75	Strength – The VPD surveillance system is still in its early stages of implementation, allowing for flexibility and adaptability to emerging needs; Gap – Limited experience and data are available to inform the system's ongoing development and refinement, hindering its growth and effectiveness.
Interoperability	0.25	Strength – A national framework for interoperability exists in theory, providing a foundation for future development; Gap – Implementation and practical application of the national framework are still in the early stages, with significant gaps and challenges to be addressed
Data Standards and Data Quality	1.83	Strength – Has a well-established process for ensuring compliance with WHO AFRO standardized indicators; Gap – lacks a comprehensive and standardized metadata management framework, resulting in inconsistent and incomplete metadata management.
Data Use and Reporting	1.50	Strength – Has well-established and standardized processes for sharing data, both internally and externally, which are consistently applied across .

Niger

	Established
	Developing
	Foundational

Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	1.50	Strength – Has a well-established process for submitting data and reports to the WHO AFRO system; Gap – Lacks a formal, established governing body with clear roles and responsibilities.
Workforce/Technical Capacity	1.00	Strength – Recognition of the importance of a dedicated VPD surveillance officer; Gap – Inconsistent and ineffective allocation of resources to the dedicated VPD surveillance officer.
End-User Readiness	1.00	Strength – Has a well-established and effective training program in place for end-users, ensuring they can effectively utilize the system or technology.
Infrastructure Readiness	1.40	Strength – Has a well-established process and sufficient resources in place to regularly inspect, maintain, and repair its infrastructure, ensuring its reliability and integrity; Gap – The country's power and internet infrastructure is still in the process of being established or improved, with potential disruptions or instability likely to occur.
System Lifecycle and Localization	0.33	Gap – The VPD surveillance system lacks sufficient data and history to inform its ongoing maintenance and evolution, hindering its ability to adapt to changing needs and improve its performance over time.
Interoperability	1.50	Strength – The national HIS is showing initial signs of integration with the VPD surveillance system; Gap – The current state of integration with WHO AFRO system is basic and initial, with limited or no automated exchange of data between systems.
Data Standards and Data Quality	1.67	Strength – Has a well-established process for ensuring compliance with standardized indicators, ensuring high consistency and accuracy in data collection and reporting; Gap – The country's structure is somewhat disorganized, with unclear or inconsistent definitions of organizational units, leading to data inconsistencies and difficulties in data integration and analysis.
Data Use and Reporting	2.00	Strength – Well-established processes and policies for data sharing with stakeholders ensure transparency and accountability.

Rwanda

	Established
	Developing
	Foundational

Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	2.00	Strength – has a well-established and effective system for securing and managing sustainable funding sources.
Workforce/Technical Capacity	1.25	Strength – Recognition of the importance of a dedicated VPD surveillance officer and an administrative team in place; Gap – Insufficient capacity and resources to ensure effective and consistent surveillance.
End-User Readiness	1.50	Strength – End-users are generally satisfied with the current state of affairs; Gap – Limited or no formal training programs are in place, resulting in users requiring significant support and guidance to effectively utilize the system.
Infrastructure Readiness	1.20	Strength – Has a well-established understanding of infrastructure disparities, which informs its strategies and decision-making processes; Gap – Lacks a comprehensive strategy and infrastructure to support widespread adoption and effective use of mobile devices and data access.
System Lifecycle and Localization	1.00	Strength – has a well-established and reliable process for developing and maintaining multilingual software; Gap – The system is still in the early stages of adoption, with a lack of longevity established, which may impact system reliability, maintenance, and user familiarity.
Interoperability	0.75	Strength – Awareness of interoperability standards (FHIR, ADX) at a foundational level; Gap – Lack of comprehensive and integrated approach to implementing interoperability standards in practice.
Data Standards and Data Quality	1.83	Strength – Has a well-established process for adhering to standardized indicators and a defined data quality governance framework in place; Gap – Lacks a structured and comprehensive approach to data entry/management training, which may lead to inconsistent and inaccurate data management practices.
Data Use and Reporting	1.25	Strength – Has a well-established process for reporting data, with clear guidelines and protocols in place; Gap – Data sharing practices are in their early stages, with limited or no established processes, policies, or cultural norms in place.

Senegal

	Established
	Developing
	Foundational

Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	1.50	Strength – Has a well-established process for submitting data and reports to the WHO AFRO system, with minimal issues or delays; Gap – Lacks a comprehensive and well-defined digital health strategy, leading to fragmented and ad-hoc implementation.
Workforce/Technical Capacity	0.60	Strength – Recognition of the importance of a dedicated VPD surveillance officer; Gap – Limited development and refinement of the dedicated surveillance officer role, potentially impacting effective surveillance and response to VPD outbreaks.
End-User Readiness	1.00	Strength – Basic training is being provided; Gap – Training is likely ad-hoc, inconsistent, and not tailored to specific end-user needs.
Infrastructure Readiness	1.20	Strength – The country is actively working to improve the stability and resilience of its power and internet infrastructure; Gap – Limited resources, processes, and personnel are in place for infrastructure maintenance, requiring significant investment and development.
System Lifecycle and Localization	0.67	Strength – None explicitly mentioned; Gap – Lack of clear documentation, standardization, and optimization of processes for the system, leading to inefficiencies and potential risks.
Interoperability	1.25	Strength – A national framework for interoperability exists, providing a foundation for future development; Gap – The integration with the WHO AFRO system is still in its early stages, with limited functionality and data exchange capabilities.
Data Standards and Data Quality	1.67	Strength – Has a well-defined and consistently applied data quality governance framework in place, with clear roles, responsibilities, and processes for ensuring data quality, accuracy, and integrity.
Data Use and Reporting	2.00	Has a well-established and standardized process for sharing data, ensuring collaboration and transparency.

Country Spotlight: Senegal VPD Surveillance

Enablers

System interoperability and integration

- Integrated VPD surveillance with DHIS2 and other national platforms
- Promotes seamless data flow, reduces fragmentation, and supports informed decision-making at all levels of the health system

Strategic policy alignment and health equity

- National strategies for health equity address rural-urban disparities in health service delivery
- Centralized policy ensures coordinated investment in infrastructure and surveillance capacity across regions

Use of disaggregated data

- Routine data disaggregation by location enables targeted interventions and responses
- Strengthens equity-focused and evidence-based program management

Barriers

Limited digital infrastructure and security

- No formal data encryption policy or locally hosted system
- Weak digital foundations limit scalability, sustainability, and data protection

Weak data quality assurance

- Ongoing issues with CBS data accuracy and reliability
- Insufficient training for surveillance personnel on data validation, interpretation, and corrective action protocols

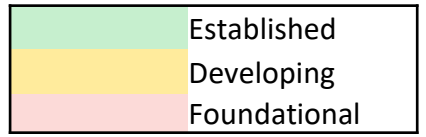
Gaps in workforce capacity and role clarity

- Inadequate training on data quality assessment
- No designated security focal point for VPD surveillance system
- Challenges in workforce development and the institutionalization of key technical roles at national and subnational levels

Urban-rural infrastructure disparities

- Rural facilities face staffing shortages, lack digital infrastructure, and mobile reporting tools
- Undermines equitable participation and data representativeness

Sierra Leone



Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	1.83	Strength – Has well-established and consistently implemented policies and practices that address the needs of both rural and urban areas, promoting equity and fairness in its operations; Gap – Lacks a clear, comprehensive, and well-defined digital health strategy that integrates digital health initiatives across .
Workforce/Technical Capacity	1.00	Gap – Lacks a consistently defined and resourced dedicated VPD surveillance officer role, as well as sufficient training and experience among the admin/monitoring team, which hinders effective surveillance activities and program administration.
End-User Readiness	1.50	Strength – End-users have some basic needs met, indicating a foundation for future growth; Gap – End-user training lacks depth, consistency, and scalability, leading to limited understanding and adoption of the system or technology.
Infrastructure Readiness	1.00	Gap – Lacks a comprehensive and sustainable approach to infrastructure maintenance, requiring significant improvement.
System Lifecycle and Localization	1.33	Strength – Has a well-established and standardized process for developing and maintaining multilingual software, ensuring high consistency and efficiency in localization and translation efforts; Gap – Lacks a clear plan for managing the system's lifecycle and localization needs, indicating a need for establishing a baseline understanding of the system's age and its impact on operations.
Interoperability	1.00	Strength – The VPD surveillance system has made some efforts to establish connections with national health information systems; Gap – The system lacks seamless and standardized integration with national health information systems, indicating a need for further development and refinement.
Data Standards and Data Quality	1.67	Strength – Has a clear data quality governance framework in place; Gap – The metadata dictionary and org units structure are not yet standardized, leading to inconsistencies and inaccuracies in data management.
Data Use and Reporting	1.20	Strength – Established maturity level in "Data sharing practices" under the domain "Data Use and Reporting", indicating standardized processes for sharing data with stakeholders; Gap – Limited understanding and implementation of relevant regulations and standards for case-based data security compliance, leaving vulnerable to potential data breaches.

South Sudan

	Established
	Developing
	Foundational

Domain/Theme	Score	Key areas of strength and gaps
Governance and Strategic Alignment	1.33	Strength – Has a well-established process for submitting data and reports to WHO AFRO; Gap – Lacks a clear, comprehensive, and well-defined digital health strategy, leading to inconsistent or ad-hoc approaches to digital health initiatives.
Workforce/Technical Capacity	0.60	Strength – Recognition of the importance of having a dedicated officer for VPD surveillance; Gap – Insufficient capacity and resources to ensure effective and consistent implementation of VPD surveillance activities.
End-User Readiness	0.00	Gap – Limited or unavailable end-user training hampers system understanding and adoption.
Infrastructure Readiness	0.40	Gap – The capacity to maintain infrastructure is still in its early stages, with limited resources, processes, and personnel in place.
System Lifecycle and Localization	0.67	Strength – The VPD surveillance system has been in use for some time, indicating a level of stability and familiarity; Gap – The system's ability to adapt to changing needs and environments is limited, which may hinder its effectiveness in the long run.
Interoperability	1.00	Strength – Initial efforts towards integration with national health information systems (HIS) are being made; Gap – Limited or no integration with the WHO AFRO system, hindering seamless connectivity.
Data Standards and Data Quality	1.17	Strength – Has a well-established process for adhering to standardized indicators (WHO AFRO), ensuring consistent and accurate data collection and reporting; Gap – Lacks a comprehensive and standardized metadata dictionary, which may lead to inconsistent data management practices and data quality issues.
Data Use and Reporting	1.00	Strength – Has a well-defined and consistently implemented process for reporting data, with clear expectations and standards in place for data quality, frequency, and format; Gap – Data sharing practices are still in the early stages of development, with limited or no standardized processes in place, and data sharing is often ad-hoc, informal, or not well-documented.

Togo

	Established
	Developing
	Foundational

Domain/Theme	Score	Key areas of strength and Gaps
Governance and Strategic Alignment	1.67	Strength – Has a well-established and reliable funding model in place; Gap – lacks a formalized and well-established governing body.
Workforce/Technical Capacity	1.00	Strength – Recognition of the importance of a dedicated VPD surveillance officer; Gap – Insufficient capacity and resources to support the dedicated VPD surveillance officer, potentially leading to gaps in surveillance effectiveness.
End-User Readiness	1.00	Strength – Recognizes the importance of training end-users; Gap – Lack of a structured approach to end-user training leading to inconsistent and potentially inadequate practices.
Infrastructure Readiness	0.80	Gap – Lacks a structured approach, resources, and personnel to ensure reliable and efficient maintenance of its infrastructure, leading to ad-hoc and reactive maintenance practices.
System Lifecycle and Localization	1.00	Strength – Has a well-established process for developing and maintaining multilingual software, ensuring effective localization and translation; Gap – Lacks a clear understanding of the impact of system longevity on system performance and maintenance, and may not have established processes to track and analyze system age.
Interoperability	0.75	Gap – Limited or no integration with the national HMIS and the WHO AFRO system, hindering seamless interoperability.
Data Standards and Data Quality	1.83	Strength – Has a well-defined and consistently applied data quality governance framework in place, ensuring that data is managed, monitored, and improved across ; Gap – lacks a consistent and reliable system for collecting and reporting data.
Data Use and Reporting	2.00	Strength – Has well-established and standardized procedures for sharing data, both internally and externally, which enables efficient and effective data dissemination and utilization.

Uganda

	Established
	Developing
	Foundational

Domain/Theme	Score	Key areas of strength and Gaps
Governance and Strategic Alignment	1.83	Strength – Has a well-established process for submitting data and reports to the World Health Organization's African Region (AFRO) system, with minimal errors and delays; Gap – Lacks a clear, comprehensive, and well-defined digital health strategy, which may hinder its ability to effectively leverage digital technologies to support its surveillance system.
Workforce/Technical Capacity	1.60	Strength – Recognition of the importance of a dedicated VPD surveillance officer and an administrative team in place; Gap – Insufficient capacity and resources to support the dedicated VPD surveillance officer, leading to potential gaps and inefficiencies in surveillance activities.
End-User Readiness	2.00	Strength – Has a well-established and effective end-user training program; Gap – Struggling to consistently meet the needs and expectations of its end-users, resulting in low end-user satisfaction.
Infrastructure Readiness	0.60	Gap – lacks robustness, scalability, and reliability in its power and internet infrastructure, leading to potential inefficiencies and inequalities.
System Lifecycle and Localization	1.33	Strength – Has a well-established process for developing and maintaining multilingual software, with high consistency and efficiency in localization and translation efforts; Gap – The system is still relatively new or has undergone recent changes, leading to users still adapting to its presence, with potential inconsistencies and inefficiencies emerging as a result.
Interoperability	1.75	Strength – A national framework or policy for interoperability exists, indicating a foundation for future development; Gap – The system lacks a basic level of integration with the WHO AFRO system, indicating a significant gap in global connectivity.
Data Standards and Data Quality	2.00	Strength – Has a well-defined and consistently applied data quality governance framework in place, ensuring that data is accurate, complete, and reliable throughout its lifecycle; Gap – Lacks a standardized and comprehensive metadata dictionary, resulting in inconsistent and potentially inaccurate data descriptions.
Data Use and Reporting	1.20	Strength – Has well-established processes and procedures for sharing data; Gap – The country lacks a structured approach to ensuring consistent application and monitoring of data security compliance measures across .

Country Spotlight: Uganda VPD Surveillance

Enablers

Flexible and program-responsive reporting tools

- Customizable reporting features enable users to generate targeted outputs aligned with evolving surveillance and program priorities, supporting evidence-based decision-making at national and subnational levels.

Structured Capacity Building for End Users

- Consistent, role-specific training improved system navigation, data quality, and user confidence. Institutionalized capacity-building frameworks enhanced adoption and long-term sustainability.

User-Centered Documentation

- Clear, context-specific guidance in plain language empowered users to operate the system independently, resolve routine issues, and reduce reliance on central support, especially at facility and district levels.

Barriers

Infrastructure and connectivity constraints

- Unreliable internet, power outages, and limited hardware hinder real-time system functionality and reliability, especially at the subnational level.

Training and Support Gaps

- Limited access to expanded training programs in data management, system administration and data use for decision making. Additionally, a lack of ongoing mentorship and supervisory support reduces user confidence and effective system use.

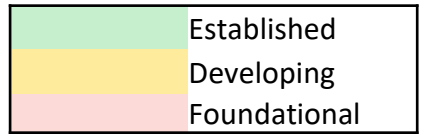
Lack of Technical Maintenance Structures

- Absence of formal maintenance agreements and limited in-house capacity affect system sustainability and responsiveness.

Geographic Disparities

- Rural facilities face greater barriers in system access, transport, and digital capacity, undermining equity in surveillance performance.

Zambia



Domain/Theme	Score	Key areas of strength and Gaps
Governance and Strategic Alignment	2.00	Strength – Has a well-established and reliable funding model for long-term financial stability and enabling strategic decisions to be made with confidence; Gap – lacks a clear, comprehensive, and well-articulated digital health strategy that aligns with its overall goals and objectives.
Workforce/Technical Capacity	1.50	Strength – Efforts are being made to assign a dedicated officer to VPD surveillance, indicating a commitment to improving surveillance capacity; Gap – Administrative and monitoring structures are incomplete, informal, or lacking in clarity, hindering effective support for the workforce and technical capacity.
End-User Readiness	1.50	Strength – End-users report high levels of satisfaction with the system or process, indicating a positive user experience; Gap – The lack of comprehensive, consistent, and widely adopted training programs may hinder end-users' ability to use the system effectively.
Infrastructure Readiness	1.00	Gap – Lacks a reliable and robust infrastructure, including unstable power and internet connections, which can lead to frequent disruptions and outages.
System Lifecycle and Localization	1.00	Strength – Has a well-established process for developing and maintaining multilingual software; Gap – Inconsistencies in tracking and utilizing systems, which could impact the overall effectiveness of the system lifecycle and localization processes.
Interoperability	0.25	Gap – Lack of a comprehensive and standardized approach to integration with national health information systems, leading to limited data exchange and potential inconsistencies.
Data Standards and Data Quality	1.50	Strength – Has a well-established process for collecting and reporting data using standardized indicators, ensuring consistency and accuracy; Gap – Inconsistent or incomplete organizational unit structures, leading to potential data quality issues and difficulties in data integration and analysis.
Data Use and Reporting	1.40	Strength – Established process for reporting data with clear guidelines and protocols in place, ensuring timely and accurate reporting; Gap – Limited standardization, inconsistent processes, and lack of clear policies and procedures for data sharing, leading to inefficient and unreliable data sharing.

Country Spotlight: Zambia VPD Surveillance

Enablers

Digital tool integration and mobile adaptation

- Use of DHIS2 and IDSR enabled real-time data entry, analysis, and reporting within the system.
- Frontline workers leveraged personal mobile devices in the absence of government-issued equipment and backup power in urban and high-volume settings to maintain continuity and reporting efficiency, highlighting innovation and system adaptability.

Structured communication and coordination

- Formal channels between national technical teams, district-level epidemiology units, and IT support teams improved feedback loops, responsiveness, and coordination, strengthening data quality and overall program performance.

Barriers

Inadequate Digital Infrastructure

- Unstable internet, frequent network outages, and limited access to ICT tools significantly impedes effective VPD surveillance, especially in rural areas, contributing to uneven adoption of the IDSR and delays in data entry, transmission, and use.

Delays from Paper-Based Reporting

- Continued reliance on manual data collection at the facility level leads to reporting delays. Long distances to submit forms and lack of digitization impede timely VPD case notifications and public health response.

Weak Data Quality Assurance

- Limited capacity for verification, inconsistent data entry, and minimal data use at subnational levels undermine the accuracy and reliability of surveillance data, reducing its value for decision-making.

-Overall Recommendations

Overall recommendations (1)

Governance and strategic alignment

Countries showing strong performance or gaps:

- Countries with strong performance include Burkina Faso, Gambia, Guinea, Rwanda, and Zambia, which are nearing Established mature systems.
- Countries with significant gaps include Burundi, Uganda, Mali and Sierra Leone, which are still developing their systems.
- Countries with limited digital health strategies include Mauritania, Lesotho and South Sudan which need to prioritize this area.

Strategic Recommendation

- ❑ Develop clear digital health strategies and formalized governance structures to guide digital health initiatives and investments.
  - Developing a clear, comprehensive, and well-defined digital health strategy is a critical area for improvement in many countries.
  - Strengthening governance structures and ensuring effective decision-making and oversight is essential for many countries.
  - Establishing a comprehensive and integrated approach to equity infrastructure is a key area for improvement in many countries.

Overall recommendations (2)

Workforce & technical capacity

Countries showing strong performance or gaps:

- Countries with strong performance include those nearing Developing maturity, which have established software maintenance teams, including Burkina Faso, Uganda, and Mozambique; and those with clear plans for dedicated VPD surveillance officers, including Lesotho and Rwanda.
- Countries with significant gaps include those with incomplete or informal administrative and monitoring structures, including Central African Republic, Congo, and Zambia, and those with limited capacity and resources to support surveillance activities, including Gambia, Guinea, and Liberia.

Strategic Recommendation

- ❑ Strengthen workforce and technical capacity, including dedicated VPD surveillance officers and robust administrative and monitoring teams.
  - Establishing clear, complete, and formal administrative and monitoring structures to support the workforce and technical capacity.
  - Developing and standardizing monitoring tools and SOPs to ensure consistency and effectiveness.
  - Providing training and capacity-building opportunities for the dedicated VPD surveillance officer and administrative team to enhance their skills and knowledge.
  - Implementing measures to ensure consistency and standardization in workforce and technical capacity management to reduce inefficiencies and potential errors.

Overall recommendations (3)

End-user readiness

Countries showing strong performance or gaps:

- Mali, Uganda, Burundi and Burkina Faso are nearing or have achieved an Established maturity level, indicating strong performance in end-user training.
- Countries such as Zambia and Guinea have Developing maturity level, indicating that end-user training programs are evolving but not yet fully mature.
- Countries such as Congo, South Sudan and Central African Republic have a Foundational maturity indicating that end-user training programs are just starting to be implemented.

Strategic Recommendation

- ❑ Implement structured end-user training and support programs to ensure effective understanding and adoption of VPD surveillance systems.
  - Implementing comprehensive, consistent, and widely adopted end-user training programs to improve end-user proficiency and reduce knowledge gaps.
  - Conducting regular user feedback sessions to identify and address end-user needs and expectations.
  - Developing and implementing user-centered design approaches to ensure that the system or technology meets the end-users' needs and expectations.
  - Establishing feedback mechanisms to allow end-users to provide input and suggestions for improving the system or technology.

Overall recommendations (4)

Infrastructure readiness

Countries showing strong performance or gaps:

- Niger and Burkina Faso, which are nearing the Developing maturity demonstrate a higher levels of infrastructure readiness above others, with moderately reliable systems in place.
- Zambia, Gambia, and Senegal which are just beyond the Foundational level, show some progress in infrastructure development, with a focus on improving mobile device and data access.

Strategic Recommendation

- ❑ Invest in infrastructure readiness, including robust, scalable, and reliable infrastructure, and address disparities in infrastructure access and quality.
  - Prioritize infrastructure development and maintenance, focusing on building robust and reliable systems.
  - Invest in training and capacity building for employees to ensure effective maintenance and upkeep of infrastructure.
  - Implement systematic approaches to infrastructure maintenance and upkeep, including allocation of resources and personnel.
  - Conduct thorough assessments of infrastructure disparities and develop mitigation strategies to address these gaps.
  - Leverage technical assistance and training to improve infrastructure readiness and support surveillance system operations.

Overall recommendations (5)

System lifecycle and localization

Countries showing strong performance or gaps:

- Burkina Faso, Uganda and Mali are nearing Developing maturity.
- Botswana, Burundi, Lesotho, Togo, and Rwanda which are at just beyond the Foundational maturity level, indicating a need for improvement.

Strategic Recommendation

- ❑ Develop and implement standardized approaches to tracking and utilizing systems and promote adoption of interoperability standards.
  - Implementing standardized approaches to tracking and utilizing the age of systems, including regular reviews and updates to ensure data quality and consistency.
  - Developing and refining multilingual software processes to ensure consistency and efficiency in localization and translation efforts.
  - Providing training and capacity building for staff to ensure effective system utilization and maintenance.
  - Conducting regular assessments and evaluations to identify areas for improvement and optimize system performance.

Overall recommendations (6)

Interoperability

Countries showing strong performance or gaps:

- Uganda and Niger are the only countries nearing the Developing maturity indicating some progress towards integrating with national HIS and the WHO AFRO system.
- Senegal, Mali, and Malawi have shown awareness of interoperability standards and have made initial attempts to integrate with national HIS.

Strategic Recommendation

- ❑ Support countries to establish seamless connectivity with national systems and ensure consistent data sharing practices.
  - Prioritize the development and implementation of interoperability frameworks that address gaps and inconsistencies.
  - Focus on establishing connections with national HIS to facilitate data sharing and collaboration.
  - Implement and widely adopt interoperability standards (FHIR, ADX) to facilitate seamless data exchange and sharing.
  - Provide training and capacity building for healthcare professionals and IT staff on interoperability standards and their implementation to ensure a consistent and standardized approach.
  - Monitor and evaluate the effectiveness of interoperability efforts to identify areas for improvement and optimize data exchange and analysis.

Overall recommendations (7)

Data standards and data quality

Countries showing strong performance or gaps:

- Guinea, Mali, Mozambique, Togo, and Burkina Faso are the top-performing countries, with established data standards and quality governance frameworks.
- Rwanda, Niger, and Sierra Leone show some strengths in data standards and quality governance but still require improvement in areas such as metadata management and data entry and management training
- Botswana and Mauritania have significant gaps in data standards and quality governance, requiring urgent attention and improvement.

Strategic Recommendation

- ❑ Develop comprehensive data quality governance frameworks and provide training and capacity building for staff on data security and compliance.
  - Develop and standardize metadata dictionaries to ensure consistency and accuracy across the organization.
  - Establish clear and consistent organizational unit structures to facilitate data integration and analysis.
  - Integrate data quality governance processes into daily operations to ensure consistent and accurate data management.
  - Provide comprehensive and standardized data entry and management training to staff to ensure data accuracy and consistency.
  - Implement data quality dashboards or reporting systems to monitor and track data quality metrics and identify areas for improvement.

Overall recommendations (8)

Data use and reporting

Countries showing strong performance or gaps:

- Togo, Senegal, and Mali have an Established maturity level in data use and reporting, indicating a strong foundation for data sharing and reporting.
- Lesotho, Mauritania, Mozambique, and Congo have a Developing maturity level, indicating a need for improvement in this area.
- Rwanda, Botswana, Malawi, and Uganda have a Foundational maturity level in data security compliance, indicating significant gaps in data sharing and reporting practices.

Strategic Recommendation

- ❑ Conduct regular data security audits and monitoring data sharing practices to identify areas for improvement and ensure ongoing compliance with required standards.
  - Implementing standardized data sharing processes and procedures to ensure consistency and reliability.
  - Strengthening case-based data security compliance processes to ensure consistency, visibility, and robustness.
  - Providing training and capacity-building programs for staff on data sharing and security best practices.
  - Exploring opportunities to leverage technology to enhance data sharing and reporting practices.

Annexes

Annex 1: References

1. Kanters, S., Park, J. K., Chan, K., Socias, M. E., Forrest, J. I., Franke, M. F., Bangsberg, D. R., & Mills, E. J. (2021). "Comparative Analysis of Surveillance Data Systems for Vaccine Preventable Diseases in Low-Income Countries." Global Public Health Journal, 16(2), 234-245
2. Chaulagai, C. N., Moyo, C. M., Koot, J., Moyo, H. B., Sambakunsi, T. C., Khunga, F. M., & Naphini, P. D. (2005). "Design and implementation of a health management information system in Malawi: issues, innovations and results." Health Policy and Planning, 20(6), 375-384
3. Ali, M., Qazi, U., & Saeed, H. (2020). "The Integration of Health Information Systems for Strengthening Health System Governance: A Systematic Review." *Journal of Global Health Science*, 2(1), e12.
4. World Health Organization (2021). "Immunization Agenda 2030: A Global Strategy to Leave No One Behind." World Health Organization. Available at: https://www.who.int/publications/i/item/immunization-agenda-2030.
5. World Health Organization (WHO). (2022). *Advancing Digital Health in Africa: Achievements and Challenges*. Available at: https://www.who.int/africa
6. Kebede, S., et al. (2021). *Digital Health in Sub-Saharan Africa: Present and Future*. BMC Public Health, 21(1), 1-12.
7. Kafando, M., et al. (2022). *Case-Based Surveillance for Vaccine-Preventable Diseases: A Case Study of Rwanda and Ghana*. Vaccine, 40(15), 2025-2030.
8. Ibrahim, J., et al. (2021). *Data Quality Challenges in Vaccine-Preventable Disease Surveillance in Africa*. Journal of Global Health, 11(4), 123-135.
9. Chikumba, M., et al. (2022). *Health Information Exchange in Africa: Opportunities for Improving VPD Surveillance Systems*. *African Journal of Public Health*, 15(3), 456-468.
10. Centers for Disease Control and Prevention (CDC). (2022). *Transitioning from Epi Info to DHIS2 for Disease Surveillance: Challenges and Lessons Learned*. CDC Report. Available at: https://www.cdc.gov
11. World Health Organization (WHO). (2023). *Mobile-Based Surveillance for Vaccine-Preventable Diseases in Uganda*. WHO Country Office Report. Available at: https://www.who.int/uganda
12. Mukamba, N., et al. (2021*).* Implementation of DHIS2 in the Democratic Republic of Congo: Processes and challenges. *Journal of Health Informatics in Africa*, 7(2), 35-49.
13. Ministry of Health Kenya. (2021). Kenya Health Information System Review Report. Nairobi: Government Press
14. Health Data Ecosystem Mapping. Scaling the Use of Digital Tools for Vaccination Planning, Deployment, and Monitoring. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. https://static1.squarespace.com/static/59bc3457ccc5c5890fe7cacd/t/66a152c5db32ed725aabab2a/1721848518459/REPORT+Malawi+ecosystem+mapping+DIPC.pdf
15. Murekatete, G., et al. (2021). Mobile Health Solutions in the context of DHIS2 in Rwanda: Improving data quality for immunization programs. *Journal of Health Informatics in Africa*, 6(2), 89-98.
16. Uwizeye, G., et al. (2020). DHIS2 implementation in Rwanda: Successes and challenges in routine health information system strengthening. *Health Information Journal*, 25(3), 194-203
17. Ngoma, J., et al. (2019). DHIS2 implementation in Tanzania: Successes and challenges in decentralized health data management. *Journal of Global Health Informatics*, 5(2), 64-70.
18. Kamadjeu, R., et al. (2018). Addressing the fragmentation of surveillance systems in sub-Saharan Africa: The Tanzanian experience with DHIS2. *Public Health Informatics Journal*, 12(1), 102-109.
19. Ouma, G., et al. (2020). Mobile health innovations for real-time data entry in DHIS2: Experiences from Uganda. Digital Health, 6, 56-67.
20. WHO (2021). Uganda DHIS2 Implementation: Overcoming challenges and leveraging mobile health solutions for better health data management. Health Information Systems Africa Report, 4(2), 101-108
21. Chali Mulenga | Zambia Daily Mail | June 5, 2015 Zambian Minister Says Open Source DHIS2 Is Vital for Healthcare
22. Fredrick Mumba - 2024 DHIS Academy Using data for impact: Improving newborn programming through revised indicators on the customizable and adjustable DHIS2 platform
23. EDM https://academic.oup.com/oodh/article/doi/10.1093/oodh/oqae013/7676529
24. DHIS230 Nov 2020 https://dhis2.org/burkina-faso-malaria/
25. Prof. Joel S Mtebe 2020. *Factors influencing District Health Information System usage in Sierra Leone: A study using the Technology-Organization- Environment Framework*

Annex 2: Maturity model

Maturity level: Vaccine Preventable Disease Surveillance Systems

Domain/Theme	Sub domain	Indicator Number	Foundational/ Not yet established	Developing/ In progress	Established/ Fully operational
Governance and strategic alignment	Existence of a formal governing body	8	No formal governing body exists to oversee VPD surveillance information system implementation, development, or maintenance.	A formal governance body is planned or being established but is not yet functional.	A formal governance body is fully established and operational, overseeing system implementation, development, and maintenance.
	Existence of a Digital Health Strategy	9	There is no national digital strategy for HMIS.	A draft national digital strategy for HMIS exists but has not yet been approved.	A national digital strategy for HMIS is approved and actively guiding implementation.
	Sustainable funding	10,11,12,65	The VPD surveillance system is funded by a single source, with no long-term financial sustainability plan.	The VPD surveillance system is funded by multiple sources, but funding may be ad hoc or lack a costed workplan.	The VPD surveillance system has a costed workplan and is funded by multiple sources, including dedicated funding for software maintenance.
	Equity policies (rural/urban)	44,45	Significant disparities exist in infrastructure, mobile device access, and/or staffing levels between urban and rural areas, negatively affecting system effectiveness. There are no policies, guidelines, or strategies in place to promote equitable access to VPD surveillance services across rural and urban areas.	Some disparities remain in infrastructure, mobile device access, or staffing between urban and rural areas, which partially affect system performance. Draft or preliminary policies exist that aim to address equity in VPD surveillance access, but they are not yet approved, implemented, or widely applied.	Infrastructure, mobile device access, and staffing levels are equitably distributed across urban and rural areas, with no significant impact on system effectiveness. Approved and implemented policies or strategies are in place to ensure equitable access to VPD surveillance in both rural and urban settings.
	Submission to WHO AFRO regional system	7,57	VPD surveillance data is not available for submission to the WHO AFRO region system.	VPD surveillance is available for submission to the WHO AFRO region system through a manual entry process.	VPD surveillance is available for submission to the WHO AFRO region system automatically through system integration.

Domain /Theme	Subdomain	Indicator Number	Foundational/ Not yet established	Developing/ In progress	Established/ Fully operational
Workforce /Technical Capacity	Dedicated VPD surveillance officer	1	There is no designated individual responsible for managing VPD case surveillance at the national level.	Responsibility for managing VPD case surveillance at the national level is shared across multiple individuals or departments, with no clear focal point.	A dedicated individual is formally assigned and actively responsible for managing VPD case surveillance at the national level.
	Admin/monitoring team in place	13,14,17, 18	There are no MOH personnel responsible for system administration and monitoring of the VPD Surveillance system, or staffing levels are insufficient. Training needs are likely unmet.	Sufficient MOH personnel are in place for system administration and monitoring, but key technical processes such as backup, restore, disaster recovery, or monitoring tools are not yet implemented or are insufficiently addressed. training needs may not be adequately addressed.	There are sufficient, trained MOH personnel responsible for system administration and monitoring. All key technical tools and processes—including backup, restore, disaster recovery, and system monitoring—are fully in place.
	Availability of monitoring tools/SOPs	15,16	There is no system monitoring tools or processes, and no standard operating procedures (SOPs) for backup and restore processes.	Some system monitoring processes and/or tools are in place, and SOPs for backup and restore exist, but may not yet be tested or routinely followed.	System monitoring tools and processes are fully operational, and backup and restore procedures are in place and tested periodically to ensure readiness.
	Software maintenance team in place	19,20,21	The MOH lacks in-house staff for maintaining the VPD Surveillance System software, and there is no formal service-level agreement (SLA) with a third-party provider for its maintenance	The MOH either has in-house staff responsible for maintaining the VPD Surveillance System software or has a formal service-level agreement (SLA) with a third-party provider for its maintenance. However, high-priority software issues are not always effectively dealt with.	The MOH either has in-house staff responsible for maintaining the VPD Surveillance System software or has a formal service-level agreement (SLA) with a third-party provider for its maintenance. High-priority software issues are effectively dealt with.
	Integration/interoperability tech capacity	59,60,61	No MOH person/team responsible for integrations; MOH team is reliant on external parties to manage or provide support for integrations	MOH team exists with some skills and limited resources but not to a level that can manage all integrations.	MOH team is confident they have the requisite skills and resources to manage all integrations between systems.

Domain /Theme	Subdomain	Indicator Number	Foundational / Not yet established	Developing / In progress	Established / Fully operational
End-User Readiness	End-user satisfaction	22	The level of end-user satisfaction with the VPD Surveillance System is currently unknown or is low.	The overall level of end-user satisfaction with the VPD Surveillance System is mostly satisfied.	The overall level of end-user satisfaction with the VPD Surveillance System is very satisfied.
	End-user training	23,24	End users do not receive regular training on the VPD Surveillance Information System	End users receive regular training (when they start using the system or when new system features are introduced)	End users receive regular training (when they start using the system or when new system features are introduced) and training is assessed and improvements made based on the assessment findings.
Infrastructure Readiness	Availability of computers	49	Sites that are capturing or using VPD surveillance data are not sufficiently equipped with computers.	Some sites that are capturing or using VPD surveillance data are equipped with computers.	All or most sites that are capturing or using VPD surveillance data are equipped with computers.
	Mobile devices and mobile data access	51,52	There are not sufficinent mobile devices for use with the VPD surveillance system.	End users must use their own mobile devices and/or have to pay for mobile data in order to use the VPD Surveillance system.	End users are provided with computers or mobile devices with mobile data that enables use of the VPD Surveillance system.
	Stable power/internet infrastructure	53	In the majority of sites, the system infrastructure is not stable enough for the users to be able to submit the VPD data when required.	The majority of sites have stable infrastructure but there are major disparities between urban/rural sites or different regions.	In the majority of sites, the system infrastructure is stable enough for the users to be able to submit the VPD data when required.
	Capacity to maintain infrastructure	54	No, there are no MOH staff to maintain hardware and infrastructure at the majority of sites.	There are MOH staff available but not in sufficient numbers and they may not have access to all the skills training or resources they need to be able to effectively maintain the hardware and infrastructure at sites.	There are sufficient MOH staff with the requisite skills and resources to be able to maintain and provide support for the VPD surveillance system at sites.
	Infrastructure disparities	44	There are major disparities in infrastructure, mobile device usage and/or staffing levels between urban and rural areas that impact system effectiveness.	There are some disparities in infrastructure, mobile device usage and/or staffing levels between urban and rural areas that impact system effectiveness.	There are no disparities in infrastructure, mobile device usage and/or staffing levels between urban and rural areas that impact system effectiveness.

Domain /Theme	Subdomain	Indicator Number	Foundational / Not yet established	Developing / In progress	Established / Fully operational
System Lifecycle and Localization	Length of time system has been in use	4	Digital VPD surveillance has been in operational use for less than 1 year.	Digital VPD surveillance has been in operational use for 1 to 3 years.	Digital VPD surveillance has been in operational use for over 3 years.
	Multilingual software maturity	56	VPD surveillance system's user interface (UI) and documentation is not available in your preferred languages.	VPD surveillance system's user interface and some documentation is available in your preferred languages.	VPD surveillance system's user interface and all documentation is available in your preferred languages.
	VPD surveillance system transition	55	The system is not currently in transition.	The VPD surveillance system is currently in the process of transitioning from a paper-based system to a digital system.	The VPD surveillance system has completed the transition or is currently in the process of transitioning from one digital system to another digital system.
Interoperability	Integration with WHO AFRO system	57	VPD surveillance system is not integrated with the WHO AFRO regional system.		VPD Surveillance system is integrated with the WHO AFRO regional system
	Integration with national HIS	58	VPD surveillance system is not integrated with any other information systems.	VPD surveillance system is integrated with one other information systems.	VPD surveillance system is integrated with two or more information systems.
	Interoperability standards use (FHIR, ADX)	62	VPD surveillance system does not use any data exchange standards.		VPD surveillance system uses HL7 FHIR, ADX or another standard to exchange data with other systems.
	Existence of national interoperability framework	63	No national interoperability framework or guidance currently exists.	Draft framework or guidance exists but is not yet approved or is approved but not yet fully implemented.	National interoperability framework or guidance is fully implemented.

Domain /Theme	Subdomain	Indicator Number	Foundational / Not yet established	Developing / In progress	Established / Fully operational
Data Standards and Data Quality	Metadata dictionary	25	Do not know if a metadata dictionary exists for VPD surveillance data OR there is no metadata dictionary.		A metadata dictionary does exist for VPD surveillance data.
	Org units' structure	26	The state of the facility organization hierarchy information is not known.	The facility organization hierarchy information is not up to date.	The facility organization hierarchy information is mostly up to date.
	Compliance with WHO AFRO standardized indicators	27	Use of WHO AFRO surveillance indicators is unknown or None of the WHO AFRO surveillance indicators are included in the VPD surveillance system.	Some of the WHO AFRO VPD surveillance indicators are included in the VPD surveillance system.	All of the WHO AFRO VPD surveillance indicators are included in the VPD surveillance system.
	Data quality governance	29,30	There is no dedicated person responsible for data quality management for VPD surveillance data at the national or sub-national level. No formal data quality assurance (QA) framework exists.	There is a dedicated person responsible for data quality management for VPD surveillance data at the national or sub-national level. No formal data QA framework exists, or it is still being drafted.	There is a dedicated person responsible for data quality management for VPD surveillance data at the national or sub-national level and formal data quality assurance (QA) framework exists and has been implemented.
	Data entry/management training	31,32	Staff responsible for data entry and management do not receive regular training on data quality.	Staff responsible for data entry and management do receive regular training on data quality.	Staff responsible for data entry and management receive regular training and training is assessed and improvements made based on the assessment findings.
Data Use and Reporting	Data reporting needs	33,34	The VPD surveillance system does not produce the reports and dashboards needed by the VPD surveillance program at national level.	The VPD surveillance system does produces some of the reports and dashboards needed by the VPD surveillance program at national level.	The VPD surveillance system produces all the reports and dashboards needed by the VPD surveillance program at national level and this information is demonstrably used in the planning and resource-allocation processes.
	Data sharing practices	35,36	No VPD surveillance data is shared with other ministries or international partners.	Data sharing agreements are under negotiation.	VPD surveillance data is shared with other ministries or international partners in accordance with the data sharing agreements in place.
	Timeliness and quality of CBS data	39	There are known issues with data quality and timeliness of the CBS data.	There are some known issues with data quality and/or timeliness of the CBS data.	There are no major issues with data quality and timeliness of the CBS data.
	Timeliness and quality of aggregate data	41	There are known issues with data quality and timeliness of the aggregate data.	There are some known issues with data quality and/or timeliness of the aggregate.	There are no major issues with data quality and timeliness of the aggregate data.
	Case-based data security compliance	38	VPD surveillance data is not case based.	VPD CBS data is not fully compliant with national regulations and policies for data security and privacy for personal identifiable information (PII).	VPD CBS data is hosted on secure servers that are compliant with national regulations and policies for data security and privacy for personal identifiable information (PII).

Annex 3: Evaluation questions and indicators

Thematic Area	Evaluation question	Question #	Question	Indicator #	Maturity Indicator	Indicator description
General	**Is there a digital VPD surveillance information system in current use in the country?**	1.1	Is there a dedicated person responsible for managing VPD case surveillance at the national level?	1	Presence of a dedicated VPD surveillance officer	Defines if there is a designated person responsible for overseeing VPD surveillance activities at the national level.
		1.2	What type of VPD surveillance system is used in the country? Is it paper-based, digital or a mix of both?	3	Type of surveillance	Determines whether the VPD surveillance is case-based, aggregate, or both.
		1.3	For digital systems, are there one or more VPD surveillance systems currently in use? Please state the number.			
		1.4	How frequently should VPD surveillance data be reported to the national level?	6	Frequency of data reporting	Measures how often VPD data is reported from health facilities to national or regional authorities.
		1.5	Are the VPD surveillance reports available at the specified time intervals noted above?	6	Frequency of data reporting	Measures how often VPD data is reported from health facilities to national or regional authorities.
		1.6	Does the country provide data to the WHO AFRO regional system?	7	Availability of data for submission to WHO AFRO regional system	Determines whether the VPD surveillance data is available for submission to the WHO AFRO regional system.
			For each one of the digital VPD surveillance systems currently in use, please state:			
		1.7	The name of the digital VPD surveillance system (eg: DHIS2, EpiInfo, SORMAS, other)? If other, please provide the name of the software and the name of the software vendor/curator.			
		1.8	How many years (or months) has the digital VPD surveillance system been in use?	4	Length of time system has been in use	Defines how long the digital VPD surveillance system has been in use.
		1.9	Does the digital VPD surveillance system record case-based data, aggregated data, or a mix of both?			
		1.10	Is the data in the digital VPD surveillance system entered at community, facility, district, sub-national or national level or a mix of levels?	5	Level at which data is captured	Determines at which level of data captured in the surveillance system.

Leadership and governance	Is there a governing body overseeing the VPD Surveillance Information System implementation, development and maintenance?	2.1	Is there a formal governing body in place?	8	Existence of a governing body	Measures whether a formal body or committee exists that is responsible for overseeing and prioritizing the development and maintenance of VPD case surveillance system within a country.
Strategy and investment		3.1	Is there a national digital strategy for HMIS?	9	Existence of a national digital health strategy	Indicates whether a comprehensive digital strategy that includes Health Management Information Systems (HMIS) exists at the national level.
		3.2	What is the primary source of funding for the digital VPD surveillance system?	10	Primary source of funding	Measures the extent to which sustainable funding sources have been secured to support the ongoing operation and maintenance of the HMIS.
		3.3	Is there a costed work plan for the digital VPD surveillance system?	11	Availability of a costed work plan	Assesses the presence of a work plan for HMIS that includes detailed budgeting and costing for implementation and maintenance activities.
		3.4	Is there dedicated funding for the software maintenance and further development of the digital VPD surveillance system?	12	Existence of funding dedicated for VPD surveillane system software maintenance	Assess whether there is dedicated funding for the software maintenance and further development of the digital VPD surveillance system.
		3.5	Is there dedicated funding for power and connectivity infrastructure and hardware, including maintenance, repair and replacement costs?	65	Existence of funding dedicated for VPD surveillane system software maintenance	Assess whether there is dedicated funding for power and connectivity infrastructure and hardware, including maintenance, repair and replacement costs

Capacity: MOH	**Is there a MOH technical team dedicated to system administration and monitoring of the VPD surveillance information system at the national level?**	**4.1**	Does the MOH technical team have personnel responsible for system monitoring and server management of the VPD surveillance informaiton system?	13	Presence of MOH system administration and monitoring personnel	Assesses whether personnel responsible for managing and maintaining VPD case surveillance system are in place.
		4.2	Is the number of staff in the current MOH technical team sufficient to handle the volume of work and system needs?	14	Adequate numbers of MOH system administration and monitoring personnel	Assesses whether the number of MOH personnel responsible for system administration and monitoring of the VPD case surveillance system are sufficient.
		4.3	Are there processes and tools in place for monitoring system performance and uptime?	15	Availability of system monitoring processes and tools	Evaluates whether there are processes and tools in place for monitoring system performance and uptime.
		4.4	Are there documented backup, restore and disaster recovery processes and tools in place?	16	Availability of system backup, restore and disaster recovery SOPs	Evaluates whether there are documented backup, restore and disaster recovery SOPs.
		4.5	Are training needs for the MOH technical team identified and addressed regularly?	17	Identification of training needs addressed for the MOH system administration and monitoring team	Assesses whether training needs are identified and addressed for VPD case surveillance system users at various levels of the health system.
		4.6	Are training assessments carried out to evaluate the effectiveness of training approaches for system admin staff?	18	Evaluation and improvement of training for system administration team	Measures the regularity and effectiveness of evaluations conducted to improve VPD case surveillance system training programs and outcomes for end users.

Capacity: Technical team	**Who is responsible for the software maintenance of the VPD surveillance system (i.e. bug fixes, change requests, minor and major enhancements, technical dependencies management, security updates)?**		If more than one digital VPD surveillance system is in use, please repeat for each system:			
		5.1	Does the MOH technical team have in-house personnel responsible for system software maintenance of the VPD surveillance system?	19	Presence of software maintenance personnel in the MOH	Assesses whether the MOH technical team have in-house personnel responsible for system software maintenance of the VPD surveillance system.
		5.2	If no, does the MOH have a formal Service Level Agreement with the entity responsible for the software maintenance of the VPD surveillance information system?	20	Presence of formal agreement with an external entity to provide software maintenance	Assesses whether the MOH has a formal Service Level Agreement with another entity responsible for the software maintenance of the VPD surveillance information system.
		5.3	If no SLA is in place, how are software maintenance issues dealt with (e.g., by the MOH submitting bug reports and new feature requests via the open community process for the VPD surveillance system)?			
		5.4	Are software issues (e.g., bug fixes, enhancements or change requests) resolved within a reasonable time that does not significantly impact the use of the system?	21	Effectiveness of the software maintenance team	Assesses the effectiveness of the software maintenance team to address high priority issues.
Capacity: End users	Are end users adequately trained to use VPD Surveillance Information System? Are end users satisfied using the system?		If more than one digital VPD surveillance system is in use, please repeat for each system:			
		6.1	Do end-users feel satisifed (comfortable) using the system?	22	Satisfaction of end users	Assesses the satisfaction levels of end users who use the VPD case surveillance system.
		6.2	Do end users receive regular training (e.g., when they start using the system or when new system features are introduced) on the VPD surveillance information system?	23	Training coverage for end users	Assesses whether end users have received regular training on how to use VPD case surveillance system.
		6.3	Are training assessments carried out to evaluate the effectiveness of training approaches for end users and results used to improve training?	24	Evaluation and improvement of training for end users	Measures the regularity and effectiveness of evaluations conducted to improve VPD case surveillance system training programs for end users and outcomes.

Data standardization: Metadata and facility organization hierarchy (org units) and WHO AFRO indicators		**7.1**	Is there a metadata dictionary that defines the data, including: use of data in indicators, periodicity, geographical designations (urban/rurual) etc?	25	Presence of metadata dictionary	Evaluates whether there is a metadata dictionary for the VPD case surveillance system.
		7.2	Is the health facility organizational hierarchy used for reporting (i.e. org units) up to date? Are all facilties represented or are some missing? Is the location hierachy (district/region or province) correct?	26	Accuracy of organizational unit hierarchy	Assesses the accuracy and structure of the organizational unit hierarchy within VPD case surveillance system, which is crucial for accurate data reporting and analysis.
		7.3	Does the VPD surveillance system use the WHO AFRO standardized indicators?	27	Compliance with WHO AFRO standardized indicators	Assesses whether the VPD surveillance system uses the WHO AFRO standardized indicators.
Population profile	How is population (denominator) data used within the VPD Surveillance Information System?	8.1	What is the source of the population data (denominator data) needed for VPD surveillance to calculate indicators (e.g., census, survey, CRVS system)?	28	Availability and accuracy of population data	Assesses the availability and accuracy of population data and denominators used in VPD case surveillance system for health reporting and analysis.
		8.1.1	If other, please specify.			
		8.2	Are there known inaccuracies or discrepancies in the population data?			
		8.3	If yes, how are these inaccuracies or discrepancies addressed?			
Data quality processes	Are there quality assurance processes in place to ensure the reliability of the data captured and reported by the VPD Surveillance Information System?	9.1	Is there a formal data quality assurance (QA) framework in place for the VPD surveillance system?	29	Presence of a data QA framework ithe VPD surveillance data	Is there a formal data QA framework in place for the VPD surveillance system?
		9.2	Is there a dedicated person responsible for overseeing data quality management at the national or sub-national level?	30	Presence of a dedicated data quality officer for VPD surveillance data	Is there a dedicated person or team responsible for overseeing data quality management at the national or sub-national level?
		9.3	Are training sessions on data quality conducted regularly (e.g., at least once a year) for staff responsible for data entry and management?	31	Regularity of training sessions conducted for data quality	Assess whether training sessions on data quality are conducted regularly (at least once a year) for staff responsible for data entry and management.
		9.4	Are training assessments carried out to evaluate the effectiveness of training approaches for MOH staff responsible for system integrations?	32	Evaluation and improvement of training on data quality	Measures the regularity and effectiveness of evaluations conducted to improve VPD case surveillance system training on data quality.

Data management and use	**Is the data produced by the VPD surveillance information system able to be used effectively?**	10.1	Does the VPD surveillance system produce the reports and dashboards needed by the VPD surveillance program at national level?	33	Availability of VPD surveillance reports	Assesses whether the VPD surveillance system produces the reports and dashboards needed by the VPD surveillance program at subnational and national level.
		10.2	Does the VPD surveillance system produce the reports and dashboards needed by the VPD surveillance program at sub-national level?			
		10.3	Are there data sharing agreements in place with other ministries or other partners/organisations?	35	Presence of data sharing agreements	Assesses whether there are data sharing agreements in place with other ministries or other partners/organisations.
		10.4	Is VPD surveillance data shared with other ministries or international partners?	36	Presence of data shared with other entities	Assesses whether VPD surveillance data is currently shared with other ministries or international partners.
		10.5	Is the information provided by the VPD surveillance system demonstrably used in the planning and resource-allocaiton processes at national level?	34	Use of VPD surveillance data for planning and resource allocaiton	Assesses whether information provided by the VPD surveillance system is demonstrably used in the planning and resource-allocaiton processes at national level.
Individual data - Case-based VPD surveillance	Is the case-based surveillance system (CBS) for VPD Surveillance effectively implemented?		Is CBS in operation anywhere in the country?			
		11.1	Is VPD CBS data limited to specific programs/diseases?	37	Limitation of VPD CBS data	Determines whether the CBS data is limited to specific programs/diseases.
			If yes, please describe.			
		11.2	Is VPD CBS hosted on secure servers that are compliant with national regulations and policies for data security and privacy for personal identifiable information (PII)?			
		11.3	Are there data quality issues with the data provided by the CBS system (e.g., partial or missing data, incorrect data, missing codes)?	38	Security and compliance of CBS hosting	Determines whether the CBS data within VPD surveillance system is hosted on servers that meet security and compliance standards. for PII.
		11.4	Are there timeliness issues with the data provided by the CBS system (e.g., data is only available weeks/months after the case is identified)?	39	Data quality of CBS data	Assesses whether there are data quality issues and/or timeliness issues with VPD CBS data.

Aggregate data - VPD Surveillance (IDSR)	Is the aggregated data for VPD Surveillance effectively implemented ?		Is data aggregated for VPD surveillance in operation anywhere in the country?			
		12.1	Is the aggregated VPD surveillance data limited to specific programs/diseases?	40	Limitation of aggregated VPD surveillance data	Determines whether the aggregated VPD surveillance data is limited to specific programs/diseases.
			If yes, please describe.			
		12.2	Are there data quality issues with the aggregated data for VPD surveillance (e.g., partial or missing data, incorrect data, missing codes)?	41	Data quality of aggregated VPD data	Assesses whether there are data quality issues and/or timeliness issus with aggregated VPD data.
		12.3	Are there timeliness issues with the aggregated data for VPD surveillance (e.g., data is only available weeks/months after the case is identified)?			
Equitable access	Is the VPD Surveillance Information System accessible and functioning uniformly across both rural and urban areas, ensuring equitable data collection and reporting?	13.1	How many rural health facilities have access to the VPD surveillance system out of the total number of rural health facilities?	42	Measures the percentage of rural health facilities with VPD surveillance system access	Determines the percentage of rural health facilities have access to the VPD surveillance system out of the total number of rural health facilities.
		13.2	How many urban health facilities have access to the VPD surveillance system out of the total number of urban health facilities?	43	Measures the percentage of urban health facilities with VPD surveillance system access	Determines how many urban health facilities have access to the VPD surveillance system out of the total number of urban health facilities.
		13.3	Are there infrastructure disparities (e.g., power, internet connectivity, hardware availability) between rural and urban areas that affect data entry and reporting?	44	Assesses the disparities between rural and urban health faciities related to infrastucture, staffing and mobile device use	Assesses the level of infrastructure disparities (e.g., power, internet connectivity, hardware availability) between rural and urban areas that affect system effectivesness such as data collection and reporting.
		13.4	Is mobile device usage for data entry different between rural and urban areas?			
		13.5	Is there a difference in staffing levels (e.g., system administrators, data clerks) between rural and urban regions that impacts the system's effectiveness?			
		13.6	Are there specific policies or strategies aimed at ensuring equitable access to VPD surveillance for both rural and urban areas?	45	Presence of policies or strategies to address disparities in VPD system access between rural and urban health facilties	Identifies whether there are specific policies or strategies aimed at ensuring equitable access to VPD surveillance for both rural and urban areas.

System security and compliance	Are there adequate security measures in place for the VPD Surveillance Information System?	14.1	Is there a senior-level person in the MOH responsible for VPD Surveillance Information System security?	46	Presence of security officer for VPD surveillance system	Indicates whether a senior-level individual has been designated to oversee the implementation of security policies related to VPD case surveillance system.
		14.2	Is there a documented security policy for VPD surveillance information systems?	47	Existence of a documented security policy	Determines whether there is a formal, documented security policy in place that outlines procedures and protocols for securing VPD case surveillance system data and systems.
		14.3	Is there a documented incident response plan for data breaches?	48	Existence of a documented incident response plan in case of VPD data breach	Assesses whether there is a documented incident response plan for data breaches of VPD surveillance data.
Infrastructure	Is the infrastructure (power, internet connectivity, computer hardware, mobile devices) sufficient to support the operational use of the VPD surveillance information system?	15.1	What percentage of sites where VPD surveillance has been implemented use computers for data entry into VPD surveillance information system?	49	Use of computers for data entry	Measures the extent to which sites use computers to enter data directly into VPD case surveillance system, bypassing paper-based systems.
		15.2	What percentage of end users working on VPD surveillance use mobile devices for data entry into the system?	50	Use of mobile devices for data entry	Measures the extent to which health facilities use mobile devices to enter data directly into VPD case surveillance system.
		15.3	Are end users provided with mobile data?	51	Provision of mobile data	Assesses whether end users are provided with mobile data to use for the VPD surveillance system.
		15.4	Are end users provided with mobile devices?	52	Provision of mobile devices	Assesses whether end users are provided with mobile devices to use for the VPD surveillance system.
		15.5	In the majority of sites, is the system infrastructure (e.g., power and internet connectivity) stable enough for the users to be able to submit the VPD data as per the required intervals (daily, weeky, monthly, quarterly)?	53	Stability of the infrastructure to enable submission of VPD reports	Assesses whether in the majority of sites, the system is stable enough for the users to be able to submit the VPD reports as per the required intervals (weeky, monthly, quarterly).
		15.6	Are there enough MOH staff with the necessary skills and resources to maintain the hardware (computers/mobile devices) and infrastructure (networks, connectivity) at the facilities / sites where VPD surveillance information system is used? (troubleshoot and fix hardware issues, install and apply antivirus updates, keep networks up and running, etc.)	54	Presence of sufficient MOH staff to maintain infrastructure and hardware	Assesses the presence of sufficient MOH staff to maintain infrastructure and hardware at sites where the VPD surveillance system is installed.

VPD surveillance system transition		16.1	Is the VPD surveillance system currently in the process of transitioning from a paper-based system to a digital system?	55	State of system transition	Identifies whether the VPD surveillance system has or is in the process of transitioning from a paper-based system to a digital system or from one digital system to another digital system, and whether end users receive adequate support.
			If yes, please describe which one/s.			
		16.2	Is the VPD surveillance system in the process of transitioning from one digital system to another digital system (e.g., EpiInfo to DHIS2, EpiInfo to SORMAS)?			
			If yes, please describe which one/s.			
		16.3	If yes to any of the above, were users adequately prepared and supported during the transition?			
VPD surveillance software multingual maturity	What is the software multilingual capabilities of the VPD surveillance information system ?		If more than one digital VPD surveillance system is in use, please repeat for each system.			
		17.1	Is the VPD surveillance system's user interface available in your preferred language/s (e.g., English, French, Portuguese)?	56	VPD surveillance software product multilingual maturity	Assesses whether the VPD software product supports preferred languages in the UI, end user and technical documentation.
		17.2	Is the software user documentation (user manuals, training guides, etc.) available in your prefered languages?			
		17.3	Is the software technical documentation (installation guides, troubleshooting guides, etc.) available in your prefered languages?			
		17.4	What is your preferred language?			
		17.4.1	Please specify.			

VPD systems interoperability	Does the VPD Surveillance system support interoperability using appropriate data exchange standards?	18.1	Does the system use excel/csv data files to import or export data?	57	State of VPD surveillance system's current integration with WHO AFRO regional system	Determines whether the VPD surveillance system is intergrated and exchanging data with the regional WHO AFRO system.
		18.2	Is the VPD surveillance system intergrated with the regional WHO AFRO system?	58	State of VPD surveillance system's current integration with other health information systems	Determines whether the VPD surveillance system is currently integrated and exchanging data with any other health information systems.
		18.3	Is the VPD surveillance system currently integrated with any other health information systems?			
		18.4	Are the MOH technical team responsible for maintaining the integrations or interoperability workflows sufficiently trained? Do they feel confident that they have the neccessary skills and resources to develop and maintain system integrations?	59	MOH technical team responsible for integrations	Assesses whether the MOH technical team responsible for maintaining the integrations or interoperability workflows are sufficiently trained so they feel confident that they have the neccessary skills and resources to develop and maintain system integrations.
		18.5	Are training needs for the MOH technical team responsible for developing and maintaining integration/interoperability, identified and addressed regularly?	60	Identification and training needs addressed for the MOH system integration personnel	Assesses whether training needs are identified and addressed for VPD case surveillance system users at various levels of the health system.
		18.6	Are training assessments carried out to evaluate the effectiveness of training approaches for MOH staff responsible for system integrations?	61	Evaluation and improvement of training for MOH system integration personnel	Measures the regularity and effectiveness of evaluations conducted to improve VPD case surveillance system training programs and outcomes for end users.
		18.7	Does the VPD surveillance system use HL7 FHIR, ADX or any other data exchange standard to exchange data with other infomation systems?	62	Use of interoperability standards	Does the VPD surveillance system use HL7 FHIR, ADX or any other data exchange standard to exchange data with other infomation systems?
		18.8	Is there a national interoperability framework or interoperability guidelines for health informaiton systems?	63	Existence of national interoperability framework or guidance	Determines whether there is a national interoperability framework or interoperability guidelines for health information system.
Overall assessment	Overall level of satisfaction	19.1	Are you satisfied with the VPD surveillance information system?	64	Overall satisfaction with the VPD surveillance system	Assesses the level of overall satisfaction with the VPD surveillance information system.
		19.2	What is your long-term vision for the VPD surveillance system?			
		19.3	Is there anything else you would like to note with regards to the VPD surveillance information system?			