Streamlining and Strengthening the Disease Surveillance System in Tanzania

Disease Surveillance System Review, Asset Mapping, Gap Analysis, and Proposal of Strategies for Streamlining and Strengthening Disease Surveillance

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MCSP is a global USAID initiative to introduce and support high-impact health interventions in 25 priority countries to help prevent child and maternal deaths. MCSP supports programming in maternal, newborn, and child health, immunization, family planning and reproductive health, nutrition, health systems strengthening, water/sanitation/hygiene, malaria, prevention of mother-to-child transmission of HIV, and pediatric HIV care and treatment. MCSP will tackle these issues through approaches that also focus on household and community mobilization, gender integration, and digital health, among others.

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Abbreviations

AFP	acute flaccid paralysis
CHMT	council health management team
DHIS2	district health information system
eIDSR	electronic Integrated Disease Surveillance and Response
GHSA	Global Health Security Agenda
HMIS	health management information system
IDSR	Integrated Disease Surveillance and Response
IVD	Immunization and Vaccine Development
MCSP	Maternal and Child Survival Program
MOHCDGEC	Ministry of Health, Community Development, Gender, Elderly, and Children
NACP	National AIDS Control Program
NHLQATC	National Health Laboratory Quality Assurance and Training Centre
NMCP	National Malaria Control Program
PHEOC	Public Health Emergency Operations Centre
PORALG	President's Office for Regional Administration and Local Government
RHMT	regional health management team
SWOT	strengths, weaknesses, opportunities, and threats
TWG	technical working group
USAID	US Agency for International Development
VPD	vaccine-preventable disease
WHO	World Health Organization

Executive Summary

The Government of Tanzania adopted the Integrated Disease Surveillance and Response (IDSR) system as the platform for all disease surveillance activities in the country. Today, Tanzania's IDSR guidelines include surveillance and response protocols for 34 diseases and conditions of public health importance. They outline, in detail, necessary recording and reporting procedures and activities to be taken at all levels of the health system to achieve timely detection, investigation, and response to outbreaks and emergencies, and avert disease and mortality.

Over the years, IDSR procedures and the structures that support them have received significant government and external resources to maintain and strengthen detection, notification, reporting, and analysis of surveillance information. However, with the imminent phasing out of programs (such as the Global Polio Eradication Initiative program) that have supported vaccine-preventable disease (VPD) surveillance system strengthening and maintenance in the past, resources for surveillance will become more limited, and the government will need to identify additional resources to sustain the country's essential surveillance functions.

With this in mind, between February and August 2018, the Ministry of Health, Community Development, Gender, Elderly, and Children (MOHCDGEC) and the US Agency for International Development (USAID)-funded Maternal and Child Survival Program (MCSP) undertook activities to generate information upon which future plans to strengthen Tanzania's disease surveillance system can be based. Specifically, the MOHCDGEC and MCSP conducted:

- A desk review of the country's disease surveillance functions, operations, and activities at all levels of the health system, and identified the system's key strengths, weaknesses, opportunities, and threats (SWOT)
- Meetings with key stakeholders involved in surveillance activities
- A workshop where stakeholders discussed and developed strategies for streamlining and strengthening disease surveillance in the future
- An asset mapping exercise to identify assets (human, financial, and physical) currently available to support disease surveillance in Tanzania
- A stakeholders meeting to further discuss and agree on future strategies, activities, and roles to strengthen and streamline disease surveillance in Tanzania

This report documents outcomes of these activities.

Core functions for surveillance in the IDSR system include:

- Identifying cases of disease and relevant events
- Reporting suspected cases, conditions, or events to the next level of the health system
- Investigating and confirming suspected cases, outbreaks, and events
- Analyzing and interpreting findings for use
- Preparing and taking steps in advance of outbreaks or public health events so that teams can respond quickly and ensure essential supplies and equipment are available for immediate action
- Responding in a timely manner, coordinating, and mobilizing resources and personnel to implement an appropriate public health response
- Providing feedback to various levels of the health system

- Evaluating and improving the system by assessing the effectiveness of past surveillance and response actions

Fifteen disease-specific programs/sections in the MOHCDGEC are linked to the IDSR system, though the extent to which each program uses IDSR data varies.

Key strengths of and opportunities presented by the current surveillance system include:

- The government's adoption of the IDSR system
- Oversight of the IDSR system by the Epidemiology Unit of the MOHCDGEC
- The IDSR system being fully adaptable to support all disease surveillance
- Clear supervisory structures in place at regional and council levels
- At operational level, staff being full-time government employees and exhibiting competence, awareness of their responsibilities, dedication, and resourcefulness
- The entire surveillance program benefiting from government and external funding for disease-specific surveillance-related programs (e.g., funds for polio eradication and malaria program)

Weaknesses and threats related to the current system include:

- Disease-specific programs often requiring additional information and opting to set up parallel surveillance systems rather than integrating with the IDSR system
- Surveillance activities often not being considered a high priority at council level relative to curative service and/or surveillance not being a line item in Comprehensive Council Health Plan budgets
- Electronic data transmission platforms (e.g., SMS platform) not being able to support transmission of all electronic IDSR (eIDSR) system data, meaning that health facility data (including for diseases for immediate notification) may not get reported in weekly transmissions
- High turnover of surveillance staff and unsystematic orientation of newly deployed staff
- Discrepancies in reported health management information system (HMIS), the IDSR system, and disease-specific program data (e.g., number of cases of same specific diseases reported by different programs) indicating data quality issues

In terms of assets available for surveillance nationally in 2017, numbers of surveillance staff varied widely among programs at the time of survey. The national laboratory and the National AIDS Control Program (NACP) reported the highest number at council level (552 each), and the Immunization and Vaccine Development (IVD) Program had 390 people supporting IVD surveillance. (Numbers of staff at lower levels should be interpreted with caution, as double counting between programs is likely.) At the time of the survey, capital investments totalled $1,141,725 for core surveillance functions (detection, notification, investigation and confirmation, analysis, and response) and $3,882,173 for supportive surveillance functions (training, supervision, resource mobilization, guidelines and standards, and communications).

Finally, the working group on strategies for streamlining and strengthening of surveillance activities identified five key areas/activities that should be supported in the future:

1. Coordinating activities of all stakeholders involved in surveillance
2. Developing or advocating for an interoperable and harmonized reporting system through the district health information system (DHIS2) software that will accommodate the needs of the various disease and event surveillance programs
3. Promoting synergies at national level so that active surveillance is expanded as appropriate to other diseases and supports case-based surveillance
4. Building capacity of regional health management teams (RHMTs)/council health management teams (CHMTs) in leadership and management to manage human and financial resources and prioritize surveillance
5. Coordinating and strengthening disease and event surveillance at community level by having one trained focal person at the community for all disease surveillance

Chapter 5 provides additional detail on proposed activities to be conducted at various levels of the surveillance system. As an enabling environment for streamlining activities is already in place, these proposals do not require establishment of any new structures or functional bodies, just slight modification in the use of existing structures within the MOHCDGEC. The MOHCDGEC Epidemiology Unit should coordinate and develop appropriate plans to ensure implementation of proposed activities. Support from partners will be critical, as a number of the activities will require financial resources for full implementation.

Chapter 1. Introduction

The Government of Tanzania adopted the IDSR as the platform for all disease surveillance activities in the country. Today, Tanzania's IDSR guidelines include surveillance and response protocols for 34 diseases and conditions of public health importance. They outline, in detail, necessary recording and reporting procedures and activities to be taken at all levels of the health system.

Over the years, IDSR procedures and the structures that support them have received significant government and external resources to maintain and strengthen detection, notification, reporting, and analysis of surveillance information. However, with the imminent phasing out of programs (such as the polio eradication program and the Global Health Safety Agenda) that have supported IDSR system strengthening and maintenance in the past, resources for surveillance will become more limited, and the government will need to identify additional resources to sustain the country's essential surveillance functions.

With this in mind, between February and August 2018, the MOHCDGEC and MCSP undertook activities to generate information upon which future plans to strengthen Tanzania's disease surveillance system can be based. Specifically, the MOHCDGEC and MCSP conducted:

- A desk review of national disease surveillance functions, operations, and activities at all levels of the health system, and identification of the system's key SWOT (conducted February 2–24, 2018)
- Meetings and interviews with key leaders and personnel involved in surveillance activities at all levels (national, regional, council, health facility, and community); for convenience, subnational interviews/site visits were conducted in one region (Dodoma), one council (Bahi Council), one district hospital, and one health center (conducted February 2–24, 2018; see Annex 1 for complete list of people interviewed)
- A workshop in Dar es Salaam involving representatives from surveillance programs, institutions, partners, and other stakeholder organizations to discuss and develop locally appropriate strategies for streamlining and strengthening disease surveillance (conducted March 27–29, 2018)
- An asset mapping exercise involving relevant programs, institutions, and partner agencies identified by the MOHCDGEC and MCSP to identify assets (human, financial, and physical) currently available to support disease surveillance in Tanzania (conducted April–May 2018)
- A stakeholders' meeting to discuss and agree on future strategies, activities, and roles to strengthen and streamline disease surveillance in Tanzania (conducted August 13–14, 2018)

This report documents the outcomes of the above activities and proposes strategies, timelines, and next steps (including priority activities for immediate implementation) for streamlining and strengthening disease surveillance in Tanzania.

Chapter 2. Description of the Disease Surveillance System in Tanzania

Health Information and Data Management System in Tanzania

HMIS

The HMIS is the single largest routine data system under the MOHCDGEC. It generates data as an outcome of health-related administrative and operational activities. The HMIS collects information from over 7,000 health facilities, including data on patient morbidity and mortality, types of services delivered and drugs and commodities provided, the availability and quality of health services, and financial and administrative information (e.g., human resources, logistics, infrastructure, commodities, and financial flows). Most HMIS data are generated routinely in the day-to-day course of recording and reporting on services delivered. The HMIS also collects community-based data covering more than 10,000 villages in the country.

DHIS2

DHIS2 software is free, customizable, flexible software for collection, validation, reporting, analysis, and presentation of aggregated (statistical and anonymous) data to support health managers at any level. In Tanzania, the DHIS2 is used by the MOHCDGEC to collect, analyze, and report HMIS data. The DHIS2 allows for integration of various HMIS data sets, such as routine information from multiple health programs, and can be integrated with other computerized data sources through a standardized XML-based data exchange format or by using extract-transform-load (data integration) tools. The DHIS2 supports the MOHCDGEC's monitoring and evaluation processes in many ways, such as by providing user-defined indicators that allow for data comparisons across health facilities or geographical areas; supporting detailed analysis of data on any organizational level, from health facilities to the national level; and producing standardized reports and visual presentations. In 2017, national reporting rates of HMIS/DHIS2 data were 97% for completeness and 93% for timeliness.

IDSR in Tanzania

Tanzania adopted the IDSR strategy based on World Health Organization (WHO) guidelines in 1998. The IDSR system aims to integrate surveillance functions at all levels of the health system. The first edition of the IDSR guidelines was developed in 2001 and included monitoring of 13 priority diseases (cholera, bacillary dysentery, measles, meningitis, plague, acute flaccid paralysis [AFP], polio, neonatal tetanus, pneumonia under 5, malaria, diarrhea under 5, rabies, and typhoid). In 2011, the second edition of the national IDSR guidelines was issued and included surveillance of 34 priority diseases and conditions (Table 1 shows diseases and conditions currently included in the IDSR system). The overall objectives of the IDSR system are to:

- Strengthen the government's capacity to conduct effective surveillance activities.
- Integrate multiple surveillance systems so that tools, personnel, and resources can be used more efficiently and effectively.
- Improve the use of information for decision-making.
- Improve the flow of surveillance information among and within levels of the health system.
- Improve laboratory capacity and involvement in confirmation of pathogens and monitoring of drug sensitivity.
- Increase involvement of clinicians in the surveillance system.
- Increase community participation in detection of and response to public health problems.

Table 1. Priority diseases and conditions in the Integrated Disease Surveillance and Response guidelines

Epidemic-Prone Diseases	Diseases Targeted for Eradication/Elimination	Diseases of Public Health Importance
1. Cholera 2. Bacillary dysentery 3. Plague 4. Yellow fever 5. Cerebral spinal meningitis 6. Rabies/animal bite 7. Anthrax 8. Viral hemorrhagic fever 9. Human influenza (new subtype) 10. Smallpox 11. Epidemic viral keratoconjunctivitis	1. Acute flaccid paralysis 2. Neonatal tetanus 3. Measles 4. Trachoma 5. Onchocerciasis	1. Diarrhea under 5 2. Pneumonia under 5 3. Malaria 4. Typhoid 5. Trypanosomiasis 6. Tick-borne relapsing fever 7. TB (multidrug-resistant/extensively drug-resistant) 8. HIV/AIDS (new cases) and sexually transmitted infections 9. Other neglected tropical diseases (NTDs)
	Noncommunicable Diseases	**Public Health Emergencies of International Concern**
	1. Diabetes mellitus 2. High blood pressure 3. Cataract 4. Maternal deaths 5. Road traffic accidents (RTAs) 6. Cancer	1. Infectious 2. Zoonosis 3. Food-borne 4. Chemical 5. Radio nuclear 6. Unknown conditions

Source. Epidemiology Unit, MOHCDGEC, Tanzania

Coordination of Disease Surveillance in Tanzania

The MOHCDGEC Epidemiology Unit coordinates all IDSR activities at national level. The unit is responsible for policy and guideline formulation, setting standards for surveillance and monitoring, capacity-building, and providing technical support to regions and districts. The unit has operating units within it that oversee disease-specific coordination functions (e.g., malaria prevention and control program, TB/leprosy program, HIV/AIDS program). The IVD Program is an operating unit within the Reproductive and Child Health Section of the MOHCDGEC, but when it comes to its vaccine-preventable disease (VPD) surveillance, it is integrated with the IDSR system. These disease-specific units (programs) design, prepare, and disseminate surveillance tools to all levels; harmonize and customize indicators to monitor program performance; and regularly review data obtained through the surveillance system. In addition to these programs, other special programs, such as the Global Health Security Agenda (GHSA) and the Public Health Emergency Operations Centre (PHEOC), support surveillance activities. Staff for surveillance activities at national level are full-time MOHCDGEC employees. Following Tanzania's decentralized health system management structure, most operational activities for all surveillance are conducted at the regional and council level. National-level operational activities are mainly during outbreaks and emergencies. The Epidemiology Unit works closely with the President's Office for Regional Administration and Local Government (PORALG) and regional and council medical offices to manage local surveillance activities.

Partner Agency Support for Surveillance

Partner agencies often support disease-specific surveillance activities by providing funding, technical support, and capacity-building. For example, the VPD Program receives support from WHO in the form of four epidemiologists (IVD/AFP surveillance officers) who are deployed in different geographical surveillance zones in the country for VPD surveillance, routine immunization strengthening, and outbreak response. For VPD/polio, national Stop Transmission of Polio teams are deployed to boost surveillance work in poor-performing districts at particular intervals. In the recent past, other disease-specific units also received external resources for operations to boost their surveillance activities. These resources include funding for supportive supervision (fuel and stipends for government surveillance officers who participate in field visits); funding for capacity-building activities, such as training; and support to install or upgrade information technology equipment and computers. An example of this last item is when partners supported introduction of national electronic data transfer for IDSR (eIDSR) and capacity-building for officers at all levels. Collaborating partners who provide regular support for surveillance activities include WHO, Amref Health Africa, MCSP, PATH, MEASURE Evaluation, and Health Link Initiatives.

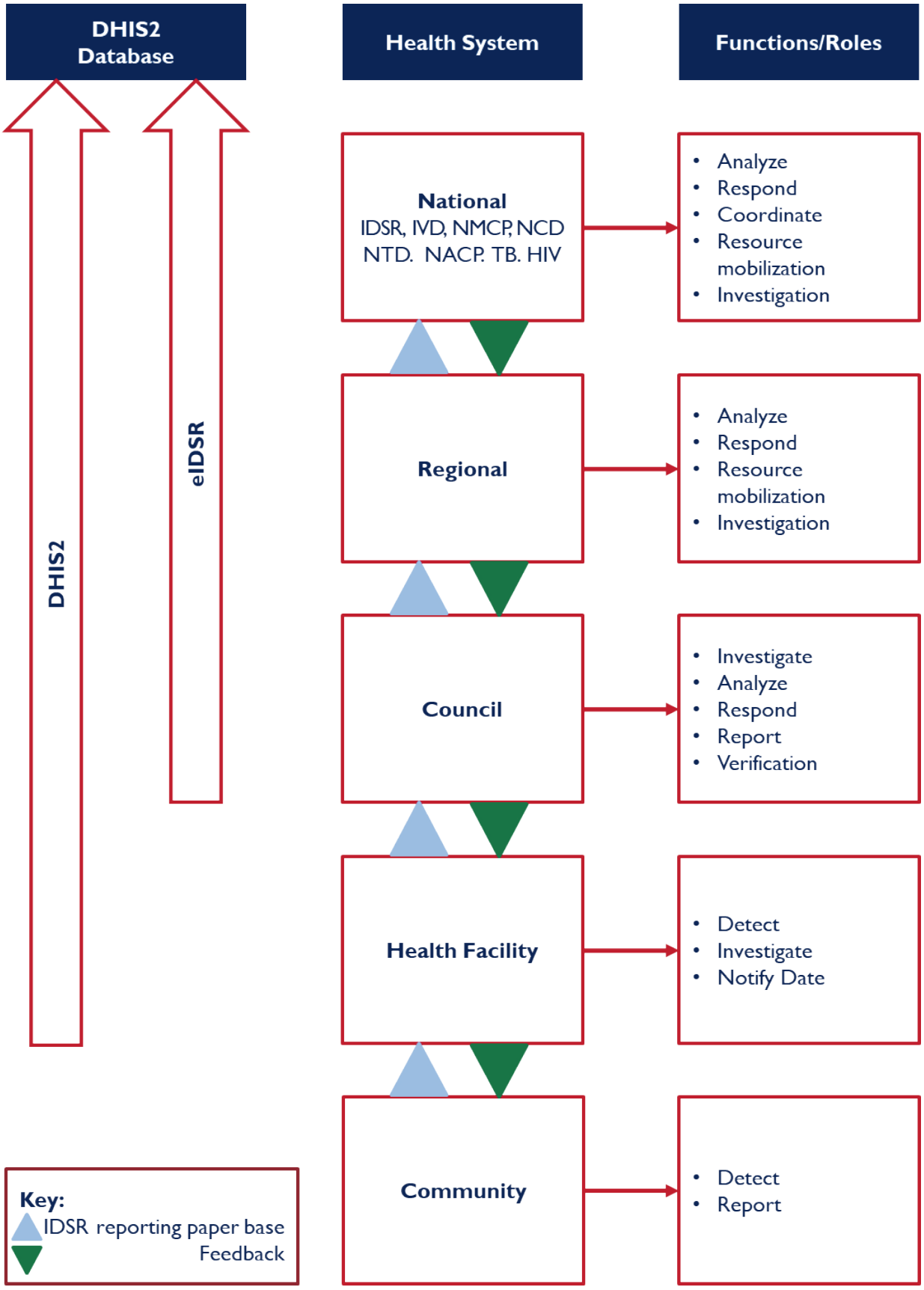
Core Surveillance Functions

The following are the core functions for surveillance in the IDSR system:

- **Identify** cases of disease and relevant events.
- **Report** suspected cases, conditions, or events to the next level of the health system.
- **Investigate** and **confirm** suspected cases, outbreaks, and events.
- **Analyze and interpret** findings for use.
- **Prepare and take steps in advance** of outbreaks or public health events so that teams can respond quickly, and essential supplies and equipment are available for immediate action.
- **Respond** in a timely manner, coordinate, and mobilize resources and personnel to implement an appropriate public health response.
- **Provide feedback** to the various levels of the health system.
- **Evaluate and improve the system** by assessing the effectiveness of past surveillance and response actions.

Figure 1 shows core functions of different levels of the surveillance system and the flow of data and reporting through the levels. Select disease-specific programs are shown at the national MOHCDGEC level.

Figure 1. Disease surveillance and information flow across levels of health system



Source: MCSP Tanzania

Surveillance Operations

The IDSR system is able to accommodate passive and active surveillance. Whereas monitoring of most diseases in the IDSR system is passive, a few diseases are monitored actively, and there are clear guidelines on which diseases (when cases are detected) require immediate notification. Passive reporting occurs on a weekly basis (reported through the IDSR system) and on a monthly basis through HMIS. Currently, both paper- and electronic-based data reporting systems are in place. Active surveillance information is disease specific, and not all information collected through such activities is in the IDSR system (e.g., AFP case investigation information is reported using a separate system).

Disease surveillance reporting includes the following:

- **Immediate reporting:** This applies to epidemic-prone diseases, diseases targeted for elimination/eradication, and other public health emergencies. Maternal deaths are reported in the eIDSR immediately.
- **Weekly IDSR reporting:** As of March 2018, 11 of the 26 regions in mainland Tanzania used a weekly, paper-based IDSR reporting system (the health facility reports to the district on Wednesday, the district to the region on Thursday, and the region to the national level on Friday). It is anticipated that by December 2018, all regions will use the eIDSR. The eIDSR weekly reports are transmitted to council, region, and national level every Monday.
- **Monthly HMIS reporting:** All disease surveillance data are included in monthly passive HMIS reporting. HMIS reports from the health facilities include other health information as well.

Responsibilities of Various Levels of the Surveillance System

National-Level Disease-Specific Programs

Fifteen disease-specific programs/sections in the MOHCDGEC are linked to the IDSR system, though the extent to which each program uses IDSR data varies. Information reported from the lowest operational level (health facility) is available to the programs for analysis. Disease-specific programs often receive funds to support their surveillance activities. The MOHCDGEC prioritized strengthening the overall surveillance system. Two examples of disease-specific programs include:

- **National Malaria Control Program (NMCP)**: Malaria surveillance consists of tracking confirmed cases, malaria inpatients, and malaria deaths at all public health facilities. The NMCP uses the IDSR and HMIS systems extensively, with all of its disease surveillance information available in the IDSR system. Detailed malaria surveillance data are directly input into eIDSR system at the health facility. Monthly HMIS data are also used by the NMCP for malaria surveillance.
- **IVD Program:** IVD actively monitors cases of AFP and measles through case-based surveillance with laboratory confirmation (i.e., detailed case investigation and specimen transportation and testing at designated network laboratories). Information from this system is not inputted into the IDSR system but is kept separately by IVD. IVD is a case-based syndromic surveillance system that satisfies the special needs for elimination and eradication. While the system is currently funded by resources earmarked for polio eradication, this funding is being phased out. In addition, IVD is a faster system that does not use information from the weekly passive IDSR surveillance or disease reports in the monthly HMIS. Resources for polio eradication have been utilized for capacity-building for AFP, measles, and neonatal tetanus surveillance and resources by national Stop Transmission of Polio teams that support active surveillance of AFP and fever and rash illness cases in poor-performing areas of the country or during surveillance intensification in case of polio threats from neighboring countries. All operational support for active surveillance at the local level is funded by councils from basket funds accessed by CHMTs. The impending withdrawal of support for polio eradication activities will affect surveillance-related technical support, capacity-building, national Stop Transmission of Polio operations, and specimen collection, transportation, and testing.

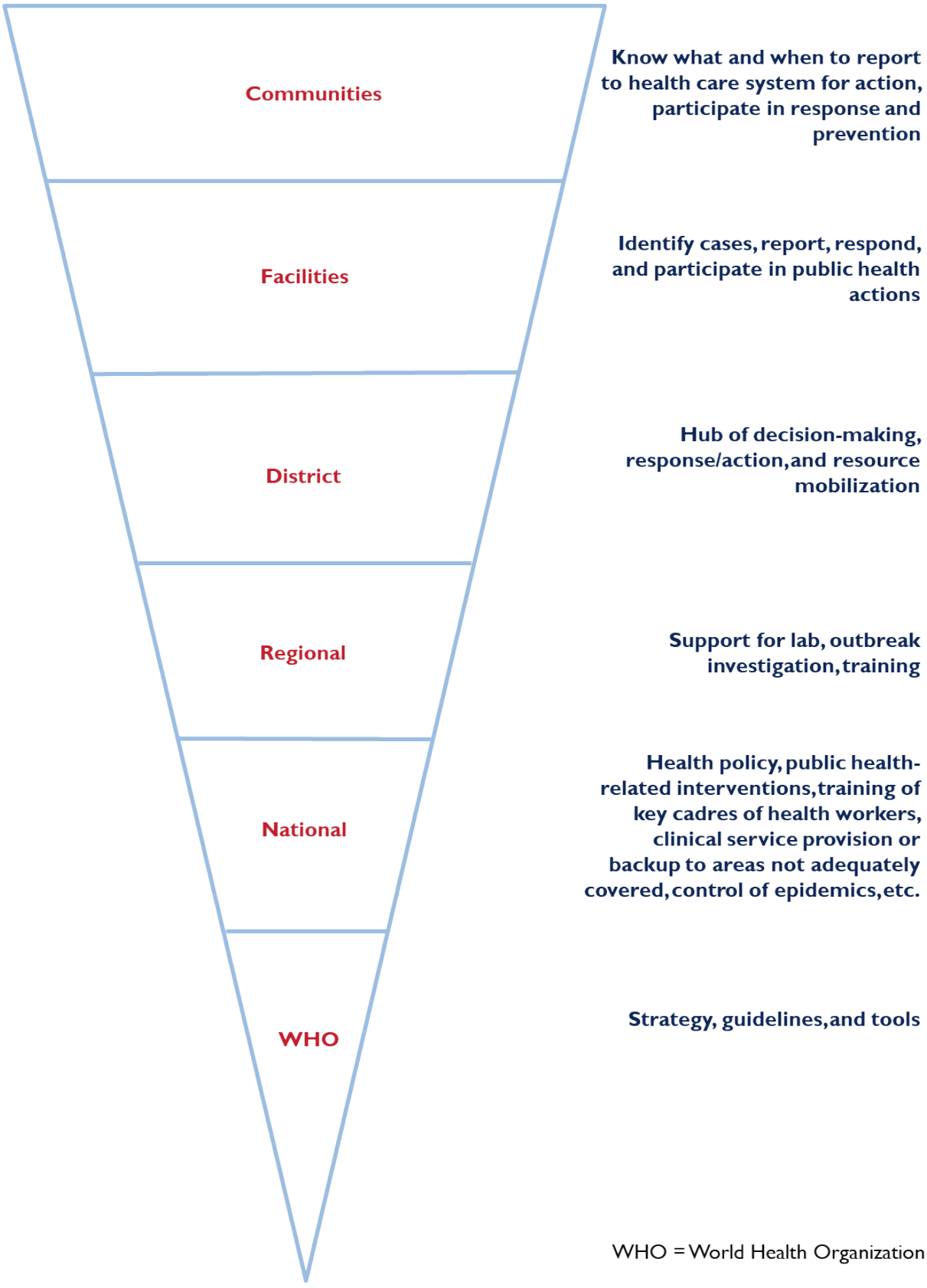
Surveillance Activities at Regional, Council, and Health Facility Levels

Within the regional medical office, regional-level IDSR staff primarily coordinate surveillance activities, mobilize resources, and provide technical support for activities occurring at lower levels, including case investigation, response activities, and follow-up. They collaborate with the Epidemiology Unit in capacity-building activities coordinated with the MOHCDGEC. Regional surveillance staff are employees of the regional administration. There is high turnover of staff at the regional level, and a number of positions remain unfilled.

Surveillance core functions of detection, notification, and investigation take place at council level. Surveillance staff at district/council level are full-time employees of the council administration and fall under the council health officer, who works under the council medical office. Designated focal people are responsible for conducting specific disease surveillance activities, including monitoring for cases of malaria, VPDs, HIV, TB, leprosy, and noncommunicable diseases. Staff follow up on notifications of IDSR diseases for immediate notification reported in health facilities and the community, perform other disease prevention and control functions, as well as conduct supportive supervision at health facilities. The frequency of supportive supervision visits, however, depends on availability of transport and fuel. Often, there are insufficient operational funds for fuel or travel stipends within CHMT budgets, so supervisory activities take place once per quarter rather than once per month, which is inadequate to meet most IDSR disease surveillance standards. Exceptions to this are when disease-specific programs (e.g., NMCP, IVD) provide additional national-level funds from to support more frequent supportive supervision visits and follow up with health facilities.

At the health facility (health center or dispensary), there is a designated focal person for the IDSR system—usually the medical officer or, in smaller facilities, a clinical officer. Every facility has a trained person who reports on immediately notifiable disease cases and prepares the weekly eIDSR report.

Figure 2. Surveillance-related responsibilities at various level of the health system in Tanzania



Source. Epidemiology Unit, MOHCDGEC, Tanzania

Laboratory Support for Surveillance

A national laboratory is equipped to do serology testing, bacteriology, and microbiological analysis of some but not all IDSR diseases. However, not all surveillance activities are connected to the laboratory, and the laboratory is underutilized. Information generated by the laboratory is not harmonized with or linked to the active and passive surveillance activities supported by different partners.

Partners Supporting Disease Surveillance

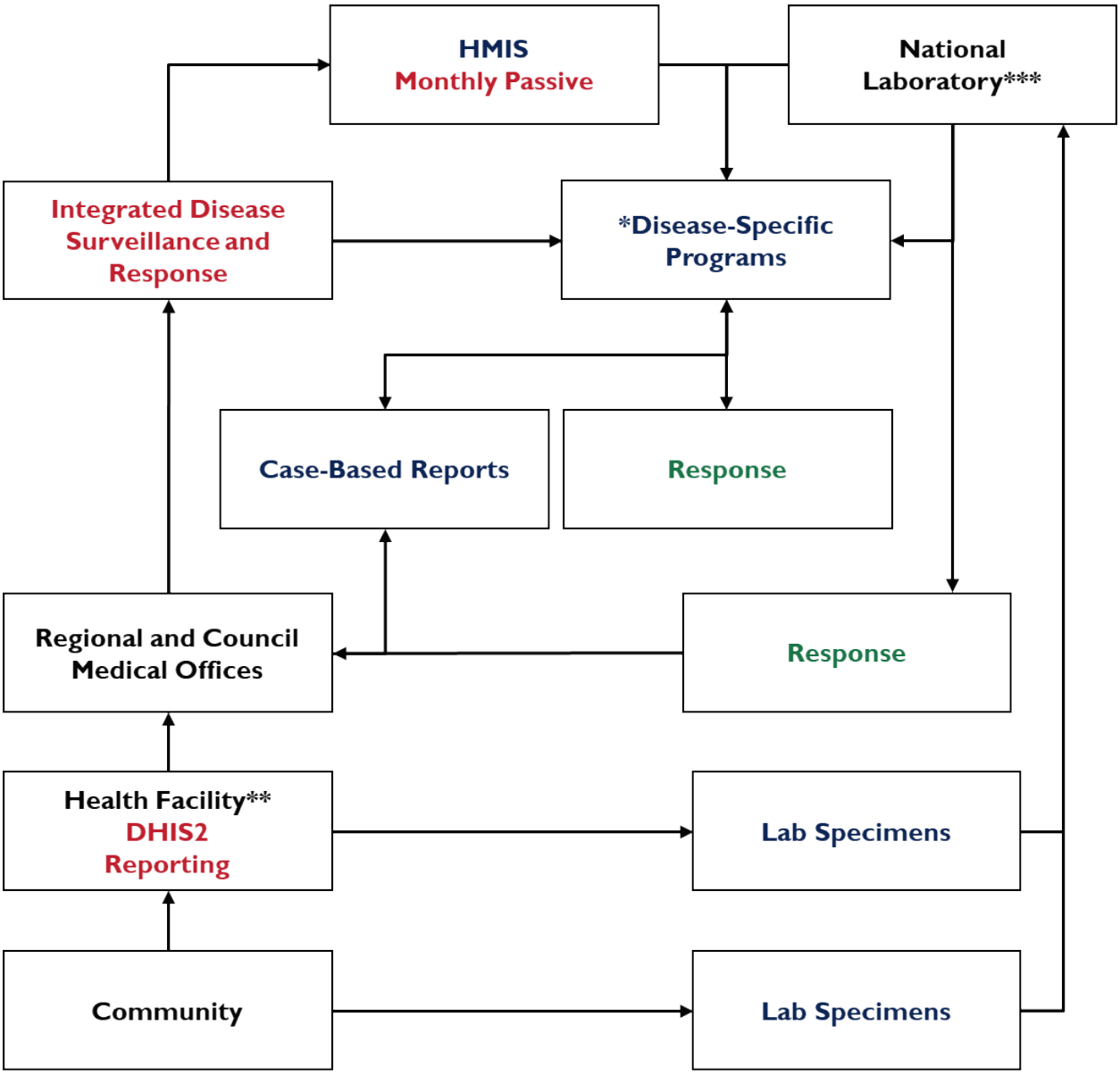
- **WHO** provided technical support and financial support for IDSR and all surveillance programs. With USAID, funding was used to initiate yellow fever and meningitis case-based surveillance, and will be used to implement environmental polio surveillance.
- **The World Bank** supported electronic reporting for the monthly HMIS.
- **MEASURE Evaluation**, funded by USAID, worked to strengthen health information systems by improving the capacity of the country to generate and use high-quality health information to make evidence-informed, strategic decisions at local, regional, and national levels. In Zanzibar, the project introduced a "trigger system" for malaria case reports as part of the IDSR system.
- **Amref Health Africa,** with funding from the US Centers for Disease Control and Prevention, supported community-based surveillance in select districts. Amref trained community informants to report and refer suspected cases of target diseases to health facilities and district health officials, who then conduct follow-up investigations.
- **The GHSA** is a collaborative, multi-sectoral initiative to accelerate and optimize global health security. The GHSA funded community-based surveillance performed by the US Centers for Disease Control and Prevention and by Amref. It also supported the rollout of the eIDSR system.
- **MCSP,** funded by USAID, supported strengthening and streamlining the surveillance system in the country, the rollout of the eIDSR system, and strengthening VPD surveillance in low-performing councils.
- **USAID** coordinated and provided funds to USAID-funded programs for surveillance.

Other Government Programs/Structures with Links to the Disease Surveillance System

Other programs or structures that have links to the disease surveillance system include the PHEOC, One Health Coordination, and Port Health. The PHEOC is directly under the chief medical officer and is responsible for monitoring and coordinating response to events of public health importance. Responsible personnel gather to coordinate operational information and resources for strategic and tactical management of these events and emergencies. The One Health Coordination desk links human and animal health activities of public health importance, and the Environmental Health Program (Port Health) conducts port-of-entry screening for travelers.

Figure 3 shows the relationships among the levels of the health system and disease-specific programs, and where the IDSR and HMIS systems come into play. Arrows indicate the separate reporting systems that do not directly feed into the IDSR system.

Figure 2. Disease-specific surveillance reporting in context of the Integrated Disease Surveillance and Response (IDSR) system, district health information system (DHIS2), and health management information system (HMIS), as of 2018



*Response is by disease-specific program.
**IDSR reporting is on a weekly basis from the health facility. ***Laboratory data are not linked to IDSR.

SWOT Analysis of the Surveillance System

A summary description of the disease surveillance system in Tanzania is provided in **Table 2**, categorized according to identified SWOTs in the system. Overall, the structures for a well-performing surveillance system appear to be in place. Key strengths/opportunities include:

- The government's adoption of the IDSR system
- Oversight of the IDSR system by the Epidemiology Unit
- The IDSR system being fully adaptable to support all disease surveillance

- Clear supervisory structures in place at regional and council levels</bl>
- At operational level, staff being full-time government employees exhibiting competence, awareness of their responsibilities, dedication, and resourcefulness
- The entire surveillance program benefiting from government and external funding for disease-specific surveillance-related programs (e.g., funds for polio eradication and malaria programs)

Weaknesses/threats include:

- Disease-specific programs often requiring additional information and opting to set up parallel surveillance systems rather than integrating with the IDSR system
- Surveillance activities often not being considered a high priority at council level (within CHMTs) relative to curative services and/or surveillance not being a line item in Comprehensive Council Health Plan budgets
- Data transmission platforms (e.g., SMS platform) not being able to support transmission of all eIDSR data, meaning that health facility data (including for diseases for immediate notification) may not get reported in weekly transmissions
- High turnover of surveillance staff and unsystematic orientation of newly deployed staff
- Discrepancies in reported HMIS, IDSR, and disease-specific program data (e.g., number of cases of specific diseases reported), indicating data quality issues

Table 2. Strengths, weaknesses, opportunities, and threats analysis of disease surveillance systems in Tanzania

Surveillance Aspect	Strengths	Weaknesses	Opportunities	Threats
Disease surveillance coordinated by the Ministry of Health, Community Development, Gender, Elderly, and Children under the Integrated Disease Surveillance and Response (IDSR) system	Policy and guidelines for surveillance are consistent.	Disease-specific activities receiving external funding take priority for implementation. Programs often not aware of what others are doing.	Streamlining and coordination among all stakeholders would be a more cost-effective way to sustain surveillance activities.	Responsibilities for surveillance sometimes not understood by various levels.

Surveillance Aspect	Strengths	Weaknesses	Opportunities	Threats
Partner agency support for surveillance activities	Technical and financial support strengthen the surveillance system as a whole.	Depending on external support is not sustainable.	A detailed asset map accompanied with costing would be a good advocacy tool to seek sustainable local support for surveillance operations.	Withdrawal of current technical and financial support from the Global Polio Eradication Initiative and other short-term goal programs will adversely affect long-term surveillance performance.
Disease-specific program surveillance activities	Officers who perform these functions at the local level are employees of the local administration; capacity-building and orientation forms basis for program implementation.	Weak management of human resources is a major constraint to maintaining required standards.	Introducing a regular scheme of orientation and briefing of supervisors done jointly by the various surveillance programs would be beneficial.	Any change in disease-specific surveillance performance will affect overall disease surveillance.
Surveillance for vaccine-preventable diseases (VPDs)	In principle, VPD surveillance is under IDSR and thus functions within an existing surveillance system.	Due to its special requirements (such as immediate follow-up for verification of acute flaccid paralysis, and fever and rash illness collection of stool and blood specimens), VPD surveillance is run as a separate program.	Eradication of polio is an opportunity to fully integrate the VPD surveillance into the IDSR system. VPD surveillance staff can be oriented to perform non-VPD surveillance tasks.	Decreasing resources will lead to nonperformance of essential surveillance tasks for polio and other VPDs.
Surveillance at local or operational level	Staff who conduct surveillance are full-time employees of the local administration. In principle, the local administration is responsible for providing operational resources.	Local administration does not consider surveillance activities as priorities. This leads to officers not performing some important tasks, such as field supervision and follow-up of suspected reported cases of disease.	Streamlining the surveillance system with review of staff responsibility and a program of capacity-building to reorient staff as a result of the ramp-down of polio activities is an opportunity to strengthen coordination of local activities.	Failure of managers to seize the opportunity that transition offers will weaken the system and the quality of disease surveillance in Tanzania.

Chapter 3. Asset Mapping of Programs and Institutions Involved in Disease Surveillance in Tanzania

To develop appropriate strategies for integration and strengthening of the disease surveillance system in Tanzania, it is essential to understand what assets (human resources, physical, and financial) exist in the country to support disease surveillance. For this assessment, the MOHCDGEC and MCSP sought to quantify currently available:

- **Human resources:** people who, during the course of their work, are involved in surveillance activities at any level of the health system. Each respondent indicated the numbers of staff at all levels who were involved in surveillance activity related to their program, irrespective of whether they were their program staff.
- **Physical assets:** material items (infrastructure, vehicles, equipment, generators, etc.) available to support surveillance work; also referred to as capital investments. As most respondents did not have information on the actual value of assets (current value reflecting depreciation), for consistency, they were asked to provide the purchase value of the physical assets in USD.
- **Financial resources:** allocated by each program for surveillance-related activities (amounts per annum, for the 2017 budget year).

In April–May 2018, the MOHCDGEC identified 28 government programs, institutions, and partners involved in disease surveillance. With the support of MCSP, a consultant was engaged to survey these stakeholders. Twenty-seven (96%) responded to the consultant's request for information (17 MOHCDGEC departments or units at national, regional, or council/community levels; six partner agencies; and four academic or research institutions). The one program that did not provide information was Port Health.

Results

Human Resources Supporting Surveillance

Table 3 summarizes the human resources supporting surveillance activities nationally by program/agency at the time of the survey. Of the 16 responding government programs, all except one—the Prime Minister's Office, Disaster Management Department—listed staff at national, regional, and/or council level. Among partners, MEASURE Evaluation indicated it had no staff involved in surveillance. Seven programs and units indicated they had staff at health facility and community levels (IVD, Epidemiology and Disease Control Section, HMIS, PORALG, Amref Health Africa, PATH, and Sokoine University of Agriculture/Southern African Centre for Infectious Disease Surveillance). At community level, respondents reported supporting 1,037 personnel, of whom 799 are supported by Amref Health Africa. It should be noted that double counting of people is likely, as many staff at council and health facility levels perform surveillance functions for multiple programs. Table 3 therefore, is likely an overestimate of the number of people performing surveillance activities in the country.

Table 3. Estimated human resources supporting surveillance activities nationally, as of May 2018

Program/Institution	Level					
	National	Regional	Council	Health Facility	Community	Others (Specify)
Immunization and Vaccine Development	2	62	390	6,848	0	0
Epidemiology Unit	19	26	184	7,871	0	0

Program/Institution	Level					
	National	Regional	Council	Health Facility	Community	Others (Specify)
Port Health Unit*	-	-	-	-	-	-
National Malaria Control Program	3	26	184	0	0	0
National AIDS Control Program	6	78	552	0	0	0
Health Management Information System	14	26	184	7,350	26	Implementing partners
National TB and Leprosy Program	5	29	208	0	0	0
National Laboratory	15	94	552	0	0	0
Reproductive and Child Health	5	26	184	0	0	0
Neglected Tropical Disease	5	0	180	0	0	0
Emergence Operational Centre	2	0	0	0	0	0
President's Office for Regional Administration and Local Government	15	26	185	8,623	6	0
Prime Ministers' Office, Department of Disaster Management	0	0	0	0	0	0
Tanzania Food and Drugs Authority	6	70	462	-	-	-
Nutrition Section	5	26	184	0	0	0
Noncommunicable Diseases	4	26	184	0	0	0
National Eye Care Program	1	30	180	0	0	0
Health Quality and Assurance Department	15	0	0	0	0	0
Subtotal	**122**	**545**	**N/A****	**N/A****	**32**	**-**
Partners						
World Health Organization	2	3	0	0	0	0
Amref Health Africa	4	4	10	0	799	0
Maternal and Child Survival Program	7	3	0	0	0	0
PATH	4	2	14	719	0	0
MEASURE Evaluation	0	0	0	0	0	0
Health Link Initiatives	0	0	33	0	0	0

Program/Institution	Level					
	National	Regional	Council	Health Facility	Community	Others (Specify)
US Centers for Disease Control and Prevention	2	0	0	0	0	0
Association of Public Health Libraries	3	10	0	0	0	0
Subtotal	**22**	**22**	**57**	**719**	**799**	**-**
Academic and Research Institutions						
National Institute for Medical Research	4	5	5	0	18	0
Muhimbili University of Health and Allied Health Sciences	13	0	0	0	0	0
Ifakara Health Institute	3	4	0	5	10	0
Sokoine University of Agriculture/Southern African Centre for Infectious Disease Surveillance	0	0	8	30	178	10
Subtotal	**20**	**9**	**13**	**35**	**206**	**10**
Grand Total	**164**	**576**	**N/A****	**N/A****	**N/A****	
Notes: * Did not respond; **Individuals are likely double counted among programs and thus totals were not computed.						

Financial Resources Supporting Surveillance Operations

Financial resources available for surveillance program operations for 2017 are presented in **Tables 4, 5,** and **6**. Funding was divided into two categories: support for core surveillance functions and funds for surveillance support functions.

Table 4. Funds for core surveillance functions, 2017/2018 (summary)

Core Surveillance Function	Total Amount (USD)	Percentage of Total
Detection	$273,159	16.5%
Notification	$53,757	3%
Investigation and confirmation	$547,473	33%
Analysis	$654,028	39.5%
Response	$133,137	8%
Total	**$1,661,554**	

Under core functions, over 39% of available funds were dedicated to analysis, 33% to investigation and confirmation, and over 16% to detection. Under supportive surveillance functions, training made up the majority of spending (71%), and supervision accounted for 20%. Programs that contributed the most training funds in 2018 were MCSP ($745,332), HMIS ($700,000), epidemiology ($540,168), and the NACP ($280,434).

Table 5. Funds for supportive surveillance functions, 2017/2018 (summary)

Supportive Surveillance Function	Total Amount (USD)	Percentage of Total
Training	$3,918,519	71%
Supervision	$1,136,080	20%
Resource mobilization	$38,782	1%
Guidelines and standards	$293,062	5%
Communications	$159,547	3%
Total	**$5,545,990**	

Table 6. Funds for surveillance operations, 2017/2018 (detail)

Program/ Section/Unit	Total Funds	Core Functions					Supportive Functions				
		Detection	Notification	Investigation and Confirmation	Analysis	Response	Training	Supervision	Resource Mobilization	Guidelines and Standards	Communication
Immunization and Vaccine Development	$247,821	$2,381	$17,390	$0	$39,614	$0	$68,657	$79,779	$0	$40,000	$0
Epidemiology Unit	$864,322	$58,762	With detection	$56,062	With investigation	$0	$540,168	$179,107	$0	$29,581	$643
National Malaria Control Program	$442,857	$0	$0	$0	$0	$0	$442,857	$0	$0	$0	$0
National AIDS Control Program	$979,587	$0	$0	$177,443	$76,200	$0	$280,434	$318,271	$11,638	$54,417	$61,183
Health Management Information System	$965,000	$0	$0	$0	$150,000	$0	$700,000	$100,000	$0	$15,000	$0
National TB and Leprosy Program	$333,054	$0	$0	$0	$132,977	$0	$189,396	$10,681	$0	$0	$0
National Laboratory	$300,000	$50,000	$10,000	$120,000	$10,000	$0	$30,000	$50,000	$0	$30,000	$0
Neglected Tropical Disease	$952,590	$33,876	$11,367	$83,968	$89,504	$13,137	$497,892	$161,549	$2,548	$43,570	$15,179
Emergence Operational Centre	$180,000	$15,000	$15,000	$30,000	$0	$60,000	$22,500	$0	$0	$30,000	$7,500
Subtotal	**$5,265,231**	**$160,019**	**$53,757**	**$467,473**	**$498,295**	**$73,137**	**$2,771,904**	**$899,387**	**$14,186**	**$242,568**	**$84,505**
Partners											
World Health Organization	$385,000	$0	$0	$80,000	$15,000	$60,000	$120,000	$60,000	$0	$20,000	$30,000

Program/ Section/Unit	Total Funds	Core Functions					Supportive Functions				
		Detection	Notification	Investigation and Confirmation	Analysis	Response	Training	Supervision	Resource Mobilization	Guidelines and Standards	Communication
Amref Health Africa	$169,298	$11,997	$0	$0	$0	$0	$53,787	$68,887	$0	$3,313	$31,314
Maternal and Child Survival Program	$1,000,000	$0	$0	$0	$140,704	$0	$745,332	$67,822	$24,596	$21,546	$0
PATH	$80,146	$0	$0	$0	$0	$0	$28,449	$39,953		$5,635	$6,109
Subtotal	**$1,634,444**	**$11,997**	**$0**	**$80,000**	**$155,704**	**$60,000**	**$947,568**	**$236,662**	**$24,596**	**$50,494**	**$67,423**
Academia/Research											
Ifakara Health Institute	$104,762	$52,381	$0	$0	$0	$0	$52,381	$0	$0	$0	$0
Sokoine University of Agriculture/ Southern African Centre for Infectious Disease Surveillance	$203,108	$48,762	with detection	$0	$29	$0	$146,667	$31	$0	$0	$7,619
Subtotal	**$307,870**	**$101,143**	**$0**	**$0**	**$29**	**$0**	**$199,048**	**$31**	**$0**	**$0**	**$7,619**
Grand Total	**$7,207,545**	**$273,159**	**$53,757**	**$547,473**	**$654,028**	**$133,137**	**$3,918,520**	**$1,136,080**	**$38,782**	**$293,062**	**$159,547**

Capital Investments in Support of Surveillance

Table 7 presents programs' capital investments supporting surveillance activities at the time of the survey. Values indicated are actual purchase prices of equipment, and equipment age is not taken into account. Aside from Port Health, the National TB and Leprosy Program, the Nutrition Section, WHO, MCSP, PATH, the National Institute for Medical Research, and Muhimbili University of Health and Allied Health Sciences, the other 13 programs that responded have capital investments supporting surveillance.

Discussion

The largest investment of human resources is at the operational level (primarily health facility) where key surveillance activities take place. Numbers of surveillance staff varied widely between programs at the time of survey, with the national laboratory and NACP reporting the highest number at council level (552 each), and the IVD Program reporting 390 people supporting IVD surveillance. The total number of people supporting surveillance at lower levels should be interpreted with caution, as double counting among programs is likely. Double counting itself is an important finding, as it shows that streamlining surveillance activities at operational levels is possible, given that people's various surveillance activities can be integrated/combined across multiple programs at field level.

At the time of the survey, capital investments in support of surveillance appear rational and are aligned with disease program priorities. The high level of investment in the cold chain, as seen in the IVD Program and the national laboratory, appear consistent with the level of activities they support. However, information on the actual current value of the assets was not provided, as costs given were original purchase prices. The national laboratory, NACP, and IVD Program have the most vehicles for surveillance activities, mostly located at council level. The type of vehicles was not provided, but looking at purchase prices, it appears that models may not be the same across programs.

In terms of operational funds allocated by programs in 2017, funds available for disease detection, notification, and investigation appeared rational and modest. Among support functions, the majority of resources were dedicated to training.

Although the asset mapping exercise yielded useful information, limitations of the survey should be noted. In the human resources category, for example, double counting is an issue, and it is also unclear how many surveillance positions were vacant at the time of the survey (i.e., sufficiency of identified surveillance staff). As for capital investments, information in this report shows a snapshot in time and is not necessarily representative of future years. In addition, no information was provided on the age of equipment reported; this information is highly relevant, as many assets may soon require replacement. Data collected on financial resources is limited to the 2017/2018 fiscal year and may not reflect resources that could be available in future years. More reporting is needed to provide additional data on existing assets . The formation of the National Surveillance Technical Working Group (TWG) will provide updated information on how best to streamline information.

Table 7. Capital investments available to support surveillance nationally (as of May 2018)

Program/ Section	Asset	Level Supported											
		National		Regional		Council		Health Facility		Community		Others (Specify)	
		Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity/ Unit	Cost
HMIS	Vehicles	2	$80,000										
	Motorcycles					150	$300,000						
	Computers, scanners, camera	14	$26,000	26	$52,000	184	$368,000	900	$180,000	52	$104,000		
	TOTAL		**$106,000**		**$52,000**		**$668,000**		**$180,000**		**$104,000**		
MCSP	Computers, scanners, camera	7	$7,000	3	$3,000								
	TOTAL		**$7,000**		**$3,000**		**$0**		**$0**		**$0**		
IVD	Vehicles	1	$69,022	27	$1,863,580	82	$1,432,950	0	$0	0	$0		$0
	Motorcycles	0		0		40	$83,680						
	Generators	1	$43,478	26	$1,130,434	0							
	Computers, scanners, camera	2	$1,739	26	$22,609	184	$160,000						
	Laboratory equipment	0		0		390							
	Bicycles	0		0		0		1000	$85,000				
	Infrastructure (Buildings)	1		27		184		6000					
	TOTAL		**$114,239**		**$3,016,623**		**$1,676,630**		**$85,000**		**$0**		
NTD	Laboratory equipment	2											
	TOTAL		**$0**		**$0**		**$0**		**$0**		**$0**		
AMREF	Computers, scanners, camera	2	$2,835										
	TOTAL		**$2,835**		**$0**		**$0**		**$0**		**$0**		
SUA/ SACIDS	Computers, scanners, camera									298	$38,400		

Program/ Section	Asset	Level Supported											
		National		Regional		Council		Health Facility		Community		Others (Specify)	
		Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity/ Unit	Cost
	TOTAL		**$0**		**$0**		**$0**		**$0**		**$38,400**		
EPIDEMI-OLOGY	Vehicles	3	$150,000										
	Computers, scanners, camera	6	$12,381										
	TOTAL		**$162,381**		**$0**		**$0**		**$0**		**$0**		
NATIONAL LAB	Vehicles	4	$70,000										
	Cold chain equipment	1	$20,000	208	$650,000	184	$2,024,000	0	$0	0	$0		$0
	Laboratory equipment	85		35									
	TOTAL		**$90,000**		**$650,000**		**$2,024,000**		**$0**		**$0**		
Nutrition Unit	Vehicles	2		26									
	Computers (10), scanners (2), printers (5)	17											
	TOTAL		**$0**		**$0**		**$0**		**$0**		**$0**		
NACP	Vehicles	2	$95,238	26	$1,238,095	84	$4,000,000						
	Generators	1	$2,381										
	Computers, scanners, camera	6	$571										
	Satellite dish	1	$381										
	Infrastructure (Buildings)	1											
	TOTAL		**$98,571**		**$1,238,095**		**$4,000,000**		**$0**		**$0**		
EOC	Computers, scanners, camera	16	$100,000										
	TOTAL		**$100,000**		**$0**		**$0**		**$0**		**$0**		

Program/ Section	Asset	Level Supported											
		National		Regional		Council		Health Facility		Community		Others (Specify)	
		Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity/ Unit	Cost
NCD	Vehicles	2											
	Motorcycles	1											
	Computers, scanners, camera	1		7		27							
	Satellite dish									1			
	Infrastructure (Buildings)	1											
	TOTAL		**$0**		**$0**		**$0**		**$0**		**$0**		
IHI	Vehicles			1	$40,000					1	$40,000		
	Motorcycles							4		10			
	Generators							1					
	Computers, scanners, camera							10				30	
	TOTAL		**$0**		**$40,000**		**$0**		**$0**		**$40,000**		
NMCP	Vehicles	5	$194,286	26									
	Motorcycles					224	$5,025						
	Computers, scanners, camera	3		15	$12,107								
	Satellite dish			62	$12,548	62							
	Laboratory equipment							739	$118,571				
	TOTAL		**$194,286**		**$24,655**		**$5,025**		**$118,571**		**$0**		
NTD	Laboratory equipment	2											
	TOTAL		**$0**		**$0**		**$0**		**$0**		**$0**		

Program/ Section	Asset	Level Supported											
		National		Regional		Council		Health Facility		Community		Others (Specify)	
		Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity/ Unit	Cost
WHO	Vehicles	1	$60,000	4	$240,000								
	Computers, scanners, camera	3	$9,000	4	$16,000								
	Laboratory equipment	2											
	TOTAL		**$69,000**		**$256,000**		**$0**		**$0**		**$0**		
NTLP	Vehicles	4	$60,144,000	25	$375,900,000								
	Motorcycles			261	$1,002,075								
	TOTAL		**$60,144,000**		**$376,902,075**		**$0**		**$0**		**$0**		
RCH	Vehicles	2											
	Computers, scanners, camera	7											
	TOTAL		**$0**		**$0**		**$0**		**$0**		**$0**		
HLI	Computers, scanners, camera	8											
	TOTAL		**$0**		**$0**		**$0**		**$0**		**$0**		
PATH	Computers, scanners, camera			2	$5,000	14	$35,220						
	TOTAL		**$0**		**$5,000**		**$35,220**		**$0**		**$0**		**$0**
MUHAS	Computers, scanners, camera	3											
	Laboratory equipment	2											
	TOTAL		**$0**		**$0**		**$0**		**$0**		**$0**		**$0**

Program/ Section	Asset	Level Supported											
		National		Regional		Council		Health Facility		Community		Others (Specify)	
		Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity/ Unit	Cost
GRAND TOTAL FOR ALL PROGRAMS	Vehicles	28	$60,862,546	135	$379,281,675	166	$5,432,950	0	$0	1	$40,000	0	$0
	Motorcycles	1	$0	261	$1,002,075	414	$388,705	4	$0	10	$0	0	$0
	Generators	2	$45,859	26	$1,130,434	0	$0	1	$0	0	$0	0	$0
	Computers, scanners, camera	92	$159,526	83	$110,716	409	$563,220	910	$180,000	350	$142,400	30	$0
	Satellite dish	1	$381	62	$12,548	62	$0	0	$0	1	$0	0	$0
	Cold chain equipment	1	$20,000	208	$650,000	184	$2,024,000	0	$0	0	$0	0	$0
	Laboratory equipment	91	$0	35	$0	390	$0	739	$118,571	0	$0	0	$0
	Bicycles	0	$0	0	$0	0	$0	1000	$85,000	0	$0	0	$0
	Infrastructure (Buildings)	4	$0	27	$0	184	$0	6000	$0	0	$0	0	$0
	TOTAL		**$61,088,312**		**$382,187,448**		**$8,408,875**		**$383,571**		**$182,400**		**$0**

Chapter 4. Strategies for Streamlining and Strengthening Disease Surveillance

The MOHCDGEC convened a workshop on streamlining Tanzania's disease surveillance system from March 27–29, 2018. This workshop provided an opportunity for all surveillance stakeholders to develop a road map for building a more sustainable and streamlined disease surveillance system.

Objectives and Workshop Methods

Objectives of the workshop were to provide an understanding of the objectives of the disease surveillance system in Tanzania and insight into how disease-specific surveillance activities are implemented; review the programs, functions, and operations supporting surveillance, and propose appropriate strategies for streamlining the system; provide recommendations and a road map for a strengthened surveillance system; and develop strategies for increasing advocacy, resource mobilization, and sustainability of surveillance activities. The workshop was divided into four sessions. Session 1 provided an introduction and background to the workshop. Session 2 was a plenary, where an overview of the different surveillance programs in the country was provided. Session 3 divided participants into working groups covering three thematic areas: policies, roles and responsibilities of surveillance officers, and strategies for advocacy, resource mobilization, and sustainability.

Results

Policies and Guidelines Working Group

The group was tasked with answering the following key questions:

- What are the linkages and gaps between government disease-specific policies (international health regulations, African Declaration on Immunization, GHSA, VPD-Polio, VPD-Measles, and IDSR in general)?
- Are the current organograms, terms of reference of personnel, and work plans of the various surveillance programs appropriate for each organization and stakeholder?
- What should be done to achieve integration and cost-effectiveness while preserving disease-specific objectives?
- What policies or enabling structures should be put in place or followed (if they already exist) to promote country and regional ownership of the surveillance system?

The following are summary points from the discussions:

- Programs and units involved in disease surveillance include HMIS, the IDSR system, noncommunicable diseases, the national laboratory, disease-specific surveillance systems, and the PHEOC. Except for the HMIS and noncommunicable diseases, all programs are in the same directorate in the MOHCDGEC and have organograms, specific objectives, terms of reference for personnel, and work plans. Programs that have activities at subnational level have clear roles and organograms, and work within the framework of the regional and council/district administrations. The responsibilities of the units at various levels are clear.
- Gaps noted were that a number of disease programs (HIV, TB, leprosy, and some programs like the PHEOC and laboratory surveillance) are not linked (or links are not clear) to the IDSR system or other disease surveillance programs. Furthermore, the eIDSR system does not accommodate all events, diseases of public health importance, and zoonotic diseases. Except for in capacity-building activities, research and other academic institutions are only passively linked to the IDSR system. At operational level, parallel systems overload health workers, which may compromise data quality; data are not analyzed and used at source or at other levels; and there are no formal or regular meetings among key individuals in relevant units or programs.

- The group also noted that in 2017, there was a comprehensive analysis for the GHSA, which outlined some of the gaps in surveillance and proposed a work plan. It is essential that the efforts to strengthen and streamline disease surveillance resulting from recommendations of this workshop are complementary to what were identified as priorities for the GHSA. Some of the identified gaps and recommendations noted in GHSA assessment in 2017 (and were discussed during the stakeholders meeting) included:
    - An inadequate coordination system for the different stakeholders in the health security implementation in Tanzania; weaknesses in real surveillance leading to delays in detection, notification, and response; and weak coordination of International Health Regulations 2005 implementation: It was recommended that a coordinating structure for one health approach, a harmonized response from the national level to the community, and formation of a national TWG with key internal and external partners be developed. The TWG would develop plans for funding and implementation.
    - Inadequate laboratory surveillance information sharing in the IDSR system: This mean lab data do not feed into the surveillance system. It was recommended that the central system for integrating data between clinical case reporting and the lab should be improved and the feedback system strengthened.
    - Inadequate knowledge and skills in real-time surveillance: It was recommended that the WHO standard IDSR guidelines and training materials be disseminated, especially to district levels and newly established regions.
    - Inadequate interoperable system: It was recommended that a formal sharing of information/data across ministries and sectors be improved. There is a need to establish and sustain interoperable, interconnected electronic reporting systems.
    - Community surveillance: It was recommended that surveillance links and events detection be strengthened.
- Policies that govern specific program operations need to be updated to accommodate linkages with other surveillance activities and promote an integrated approach. It is essential to establish TWGs for surveillance and data use at all levels (national, regional, and district). The stakeholders meeting proposed that these working groups be chaired by the IDSR focal person, with the HMIS focal person serving as secretary. These working groups would also assist in prioritizing surveillance activities to be streamlined in health plans and budgets.

Most of the following recommendations from the discussion were similar to recommendations after the GHSA assessment conducted in 2017:

- TB/leprosy and HIV surveillance should be included in to the IDSR system on monthly basis.
- IDSR guidelines should be updated to accommodate key disease-specific surveillance needs and events of public health importance.
- The Directorate of Preventive Services should facilitate regular monthly meetings of technical surveillance staff from different programs to share and review data.
- The MOHCDGEC should collaborate with PORALG to form surveillance TWGs at regional and local levels.
- Ensure all events reported by PHEOC are also included in the IDSR system. If lab specimens are involved, include those in the IDSR system.
- Laboratory surveillance activities should be included in the IDSR system.

Roles and Responsibilities of Surveillance Officers Working Groups

The working group was tasked with reviewing the roles and responsibilities of surveillance officers at all levels, and reaching consensus on how roles can be streamlined and integrated. The group addressed the following questions:

- What strategies can be used to change the mind set of surveillance officers at all levels from operating in disease-specific modalities to an integrated single/common platform while maintaining disease-specific objectives?
- Which functions/best practices from different surveillance systems can be immediately streamlined into the IDSR system and HMIS? Is the malaria surveillance system a best practice model?
- Which operational challenges commonly faced by surveillance systems can be addressed through an integrated approach?
- Which organizational and managerial integration challenges need to be addressed at council level to enable surveillance roles and responsibilities to be streamlined?

Summary points from the discussion:

- The group recognized that there are different focal people for programs at all levels, operating vertically without a common avenue for coordination. It is essential to identify what can be integrated (e.g., transportation of specimens, some reporting and notification) and what cannot.
- To achieve integration, establishing a forum/TWG would facilitate sharing of information and plans. Best practices/tools from different surveillance systems (malaria, HMIS, IVD) could be streamlined.
- National Stop Transmission of Polio teams can be used for other diseases surveillance purposes. In addition, geographic mapping of cases using Open Data Kit and standard operating procedures for responding to VPDs is also a best practice. Community-based surveillance, where a person (community health worker) is selected from the community as a focal point for identifying conditions, could be expanded to all diseases with proper orientation and supervision.
- Challenges in introducing an integrated surveillance approach include lack of appropriately trained staff at all levels, a joint coordination platform for surveillance including the laboratory, and harmonized tools for surveillance of diseases, including standard case definitions. In addition, to facilitate integration, RHMTs/CHMTs need to strengthen and build their leadership to better manage and coordinate surveillance activities. Collaboration among the MOHCDGEC, PORALG, and other key sectors is needed to ensure that available resources are used in a cost-effective manner.

Recommendations from the discussion, also similar to recommendations made during the GHSA assessment, included:

- At national level, the surveillance TWG should be used as a platform for coordination and include all stakeholders and partners (such as WHO) that are involved in surveillance. The IDSR Task Force should be reactivated. At regional and council level, surveillance subcommittees should be formed under regional and council TWGs. Terms of Reference (TORs) should be developed and TWGs operationalized.
- Advocate for interoperability of different surveillance reporting systems and DHIS2, harmonize electronic reporting and data management, and create dashboard indicators for each program in DHIS2.
- Promote synergies to expand active surveillance, as appropriate, to other diseases and coordinate transportation of specimens to the laboratory for all case-based surveillance when possible.
- Build capacity of RHMTs/CHMTs in human and financial resources leadership and management and in surveillance prioritization.

- Coordinate and strengthen disease and event surveillance at community level by having one trained focal person for all disease surveillance.

Advocacy, Resource Mobilization, and Sustainability Working Group

This group addressed the following:

- Define a strategy for data use locally for local ownership and local, evidence-based actions.
- Define appropriate strategies to ensure long-term sustainability of surveillance functions at national, regional, and local levels. and estimate the level of resources needed.
- Propose a resource mobilization strategy to support strengthening and integration of surveillance activities in the country.

Summary points from the discussions:

- To promote data use locally for ownership and local, evidence-based actions, discussions of IDSR and other surveillance data, including the HMIS, should be part of the permanent agenda during health management meetings at health facility, district, and regional levels. For community health workers, there should be a link with health facilities so that ownership increases and community health workers are familiar with disease data being reported by the health facility. Health facilities should have simple analyses of surveillance data displayed covering, at a minimum, the 10 diseases/conditions recorded on their catchment population.
- Other ways of using data for action include creating IDSR performance monitoring tools and charts, as is done for the immunization program (e.g., templates for defaulter tracing). Performance-based financial incentives could be considered for health facilities. At the council and regional level, disease surveillance data should be linked with laboratory test results, and prompt feedback should be provided to health facilities. Surveillance data should be used to advocate for resources and plan priority surveillance activities in the district/council.
- Community linkages with nonhuman health programs (such as livestock/veterinary services, wildlife, and the recently-launched One Health Initiative) will promote community ownership.
- To avoid duplication of effort in terms of future asset mapping exercises, it is important to have results of existing/previous mapping activities so that new mapping exercises are complementary and linked to the Global Health Security Agenda (GHSA) surveillance component. A determination should be made if this/previous assessments accurately assessed laboratory assets and functions, and, if not, identify remaining gaps.
- To mobilize resources needed to strengthen and integrate surveillance activities in the country, the Government of Tanzania should be the main source of financial support (health and finance ministries and PORALG through the regional and council administrations).
- Recent resource mobilization activities (for example, the National Action Plan for Health Security, developed based on findings of the joint external evaluation by the GHSA and International Health Regulations 2005) should be leveraged. Those findings form a good starting point for a future business plan, and building off of it will foster integration of the surveillance program with other priority programs in the country.
- Priority should also be given to developing specific proposals for certain areas of surveillance. All surveillance proposals should incorporate best practices as a basis for improving activities for which support is sought. Emphasis should be placed on how support will promote integration at all levels and enhance sustainability of surveillance functions.

Recommendations from the Discussion

- Disease surveillance issues should be a permanent agenda item in monthly meetings at all levels.
- A surveillance TWG should be established at the national level and surveillance subcommittees at regional and council level.
- Strengthen capacity and capability for data analysis and use of data in decision-making at all levels.
- Use existing disease-specific and surveillance program best practices to streamline future disease surveillance systems.

Chapter 5. Operationalizing Strategies for Streamlining and Strengthening Disease Surveillance

The working group on strategies for streamlining and strengthening of surveillance activities in Tanzania identified five key areas/activities that should be supported. All five strategies complement what was recommended after the GHSA assessment in 2017 (coordination, developing an interoperable and harmonized reporting system through DHIS2, building capacity for health workers, coordinating and strengthening disease and community disease and event surveillance):

1. Coordinating activities of all stakeholders involved in surveillance
2. Developing or advocating for an interoperable and harmonized reporting system through DHIS2 that will accommodate the needs of the various disease and event surveillance programs
3. Promoting synergies at the national level so that active surveillance is expanded, as appropriate, to other diseases and supports case-based surveillance
4. Building capacity of RHMTs/CHMTs in leadership and management to manage human and financial resources and prioritize surveillance
5. Coordinating and strengthening disease and event surveillance at community level by having one trained focal person for all disease surveillance programs

Table 8 presents proposed activities for streamlining and strengthening surveillance activities at various levels of the surveillance system. As an enabling environment for streamlining activities is already in place, these proposals do not require establishment of any new structures or functional bodies, just modification in the use of existing structures within the MOHCDGEC. The Epidemiology Unit should coordinate and develop appropriate plans to ensure implementation of the proposed activities. Support from partners will be critical, as a number of the activities will require financial resources for full implementation. (See Annex 2 for details and timelines.)

Table 8. Summary of proposed activities and interventions for integrating and streamlining disease surveillance

Level	Proposed Activities
Ministry of Health, Community Development, Gender, Elderly, and Children	**Coordinating** • Surveillance technical working group (led by Epidemiology Unit) to provide technical advice, and coordinate and monitor implementation of assessment recommendations. • All programs with a surveillance component to meet on a regular basis to promote synergies through collaborative program activities and joint planning. At these meetings, also review health management information system (HMIS) information to inform action planning.
HMIS	**Promoting synergies** • Collaborate with the Integrated Disease Surveillance and Response • (IDSR) system and disease-specific programs during capacity-building activities.
Disease-specific programs/national laboratory	**Operational changes/considerations** • Promote synergies among programs. • Integrate laboratory data into the IDSR system. • Use IDSR system for all case-based reporting. • Use IDSR system for supplementary, disease-specific surveillance data.

Level	Proposed Activities
IDSR	**Strengthening IDSR platform** Harmonize reporting. Support an intraoperative system. Expand case-based reporting.
Regional medical offices	**Capacity-building** • Collaborate with the President's Office for Regional Administration and Local Government for ongoing capacity-building for regional surveillance staff. • Organize technical subcommittees for surveillance at regional level to support national Surveillance Technical Working Group.
Council medical offices	**Capacity-building for surveillance operations** • Build capacity for human resources and financial management. • Hold regular orientation for surveillance staff. • Organize technical subcommittees for surveillance at council level to support national Surveillance Technical Working Group.
Health facility	**Capacity-building for health facility personnel** • Train and reorient personnel on integrated reporting in the IDSR system and HMIS. • Support in-service and continuous education program for health facility surveillance focal people.
Community	**Capacity-building and orientation** • Provide refresher training for community health workers on disease detection and referral.
Partners	**Technical support, funding, and resource mobilization**

Annex 1. People Interviewed during Surveillance System Assessment, February 2–24, 2018

	Person Contacted	Title	Organization
1	Ssanyu Nyinondi	Immunization and Health Information System Team Lead	John Snow Inc. (JSI) – Maternal and Child Survival Program (MCSP)
2	John George	Project Director	MCSP
3	Caroline Akim	Senior National Immunization Technical Officer	JSI – MCSP
4	Green Sadru	National Immunization Technical Officer	JSI – MCSP
5	Raz Stevenson	Senior Maternal and Child Health Advisor	US Agency for International Development (USAID)
6	Miriam Kombe	Project Management Specialist – Maternal, Newborn, and Child Health	USAID
7	Janet Mgamba	Acting Director, Preventive Services/Assistant Director, Epidemiology	Ministry of Health, Community Development, Gender, Elderly, and Children (MOHCDGEC)
8	George Cosmas	National Integrated Disease Surveillance and Response (IDSR) Coordinator	Epidemiology – MOHCDGEC
9	Rogath Kishimba	IDSR Officer	Epidemiology – MOHCDGEC
10	Azma Simba	Ag. Head, Epidemiology	Epidemiology – MOHCDGEC
11	Ally Nyanga	Emergence Operational Centre Focal Person	Public Health Emergency Operations Centre – MOHCDGEC
12	Alex Mphuru	Program Officer	Immunization and Vaccine Development (IVD)
13	Nyaki Santarabi	Surveillance Officer	IVD
14	Frank Chacky	Surveillance Officer	National Malaria Control Program (NMCP)
15	Anna Maendeka	Monitoring and Evaluation	NMCP
17	Zainabu Chaula	Deputy Permanent Secretary - Health	President's Office of Regional Administration and Local Government (PORALG)
18	Boniface Nguhuni	Global Fund Coordinator	PORALG
19	Rashid Maftaa	Acting Director of Health Services	PORALG

	Person Contacted	Title	Organization
20	Baltazar Kibola	Director of Information and Communications Technology	PORALG
21	Charles P. Kiologwe	Regional Medical Officer	Regional Health Management Team (RHMT) – Dodoma
22	Mzee M. Nassor	Acting Regional Medical Officer	RHMT – Dodoma
23	Faraja Lyamuya	Epidemiologist	RHMT – Dodoma
24	Kaale Lyimo	Regional Health Officer	RHMT – Dodoma
25	Richard Rukeja	Regional IDSR	RHMT – Dodoma
26	Paul Mageni	Regional Immunization and Vaccines Officer	RHMT – Dodoma
27	Iyulu Mohamed	Regional AIDS Control Coordinator	RHMT – Dodoma
28	Mary Shadrack	Regional Reproductive and Child Health Coordinator	RHMT – Dodoma
29	Mwanaharusi Kabika	Regional HMIS	RHMT – Dodoma
30		District Medical Officer	Council Health Management Team (CHMT) – Bahi
31	Ramadhani Nyenzi	District Immunization And Vaccine Officer	CHMT – Bahi
32	Seleman Yondu	District Health Officer	CHMT – Bahi
33	James Migunga	District TB and Leprosy Coordinator	CHMT – Bahi
34	Situmai Kheri	District School Health Coordinator	CHMT – Bahi
35	Emmnuel C. Makassy	District Nursing Officer	CHMT – Bahi
36	Maria Lerise	District Pharmacist	CHMT – Bahi
37	Fortunatus Nkane	District Laboratory Technician	CHMT – Bahi
38	Restituta Gama	District Malaria and Integrated Management of Childhood Illness Focal Person	CHMT – Bahi
39	Savera Lesangwa	District Mental Health Coordinator	CHMT – Bahi
40	Julius Shesaa Francis	District Community Home-Based Services Coordinator	CHMT – Bahi
41	Mathew Kamwa	World Health Organization (WHO) Country Representative	WHO
42	Anthony Kazoka	Surveillance Officer	WHO
43	Grace Saguti	Disease Prevention and Control	WHO

	Person Contacted	Title	Organization
44	Rita Njau	Malaria Focal Person	WHO
45	Bhavin Jani	HIV/AIDS Focal Person	WHO
46	Allen Garimo	Data Manager/Immunization	WHO
47	Irene Mwoga	Data Focal Person	WHO
48	Marry Kessy		WHO
49	Alphoncina Nanai	Neglected Tropical Disease Focal Person	WHO
50	Nemes Ilia	Maternal and Child Health Focal Person	WHO
51	Hassan Mtenga	Information Technology	PATH
52	Said Sheuya	Senior Program Officer	PATH
53	Willis Odek	Chief of Party	MEASURE Evaluation
54	Ritta Willilo	Monitoring and Evaluation Advisor	MEASURE Evaluation
55	Deo Mtasiwa	Independent Consultant	Independent Consultant
56	Peter Mmbuji	Global Health Security Agenda Program	US Centers for Disease Control and Prevention
57	Marcelina Mponella	Global Health Security Agenda Program	US Centers for Disease Control and Prevention
58	Serafina Mkuwa	Program Manager, Reproductive and Child Health	Amref Health Africa
59	Lusungu Petro	Community Surveillance	Amref Health Africa
60	Peter Shinji	Health Facility In-Charge	Mpamantwa Disp – Bahi
61	Halima Yahya	IDSR Focal Person	Mpamantwa Disp – Bahi
62	Rehema Salum	Reproductive and Child Health	Mpamantwa Disp – Bahi
63	Kasimu Kolowa	Clinician	Bahi Health Center
64	Anna Ngoyi	Reproductive and Child Health	Bahi Health Center

Annex 2. Proposed Surveillance Work Plan

Level Of Support		Intervention and Activities	Responsible for Coordination	Also Responsible	Timeline																
					2018					2019											
					Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1. Strengthening coordination system at all levels																					
Coordination at national level	**1.1 Establishment of National Technical Working Group (TWG) for Surveillance**																				
	1.1.1	Develop draft terms of reference for the TWG.	Epidemiology	Other Programs, Agencies, and Partners																	
	1.1.2	Disseminate the draft terms of reference to the proposed members of the national TWG for validation.	Epidemiology	Other Programs, Agencies, and Partners																	
	1.1.3	Officially launch the TWG.	Epidemiology	Other Programs, Agencies, and Partners																	
	1.1.4	Mobilize resources for operationalization of the TWG.	Epidemiology	Other Programs, Agencies, and Partners																	
Coordination in regions and councils	**1.2 Establishment of Regional and District Surveillance Subcommittees**																				
	1.2.1	Develop draft terms of reference for the regional and district surveillance subcommittees.	Epidemiology and Immunization and Vaccine Development (IVD)	President's Office for Regional Administration and Local Government (PORALG), Partners, and Other Programs																	
	1.2.2	Disseminate the draft terms of reference to the regional and district representative for validation.	PORALG	Partners and Other Programs																	
	1.2.3	Conduct advocacy and sensitization meetings with key stakeholders, including PORALG, on the operationalization on the subcommittee.	PORALG, Partners, and Other Programs																		

Level Of Support	Intervention and Activities		Responsible for Coordination	Also Responsible	Timeline																	
					2018					2019												
					Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	1.2.4	Hold follow-up visit on the establishment of the subcommittees.	Ministry of Health, Community Development, Gender, Elderly, and Children (MOHCDGEC) and PORALG	Partners and Other Programs																		
	1.2.5	Continue to monitor the implementation of the subcommittees.	PORALG	MOHCDGEC and Partners																		
2. Strengthening of Laboratory and Integrated Disease Surveillance and Response (IDSR) Linkage																						
	2.1 Strengthen IDSR Platform																					
	2.1.1	Provide IDSR system access to key stakeholders.	Epidemiology																			
	2.1.2	Hold stakeholders meeting to review the reporting system and accommodate demands for case-based analysis	Epidemiology	All Programs, Agencies, and Partners																		
	2.1.3	Hire consultant to design an interoperative system.	Epidemiology	World Health Organization (WHO)																		
	2.1.4	Review existing IDSR guideline and incorporate other program needs.	Epidemiology	All Programs, Agencies, and Partners																		
	2.2 Strengthen National laboratory																					
	2.2.1	Establish surveillance unit in the National Health Laboratory Quality Assurance and Training Centre (NHLQATC).	MOHCDGEC	Epidemiology																		
	2.2.2	Develop terms of reference for lab surveillance focal people.	Epidemiology	NHLQATC																		

Level Of Support	Intervention and Activities		Responsible for Coordination	Also Responsible	Timeline																	
					2018					2019												
					Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	2.2.3	Orient lab surveillance focal people on their terms of reference.	Epidemiology																		
	2.2.4	Integrate laboratory data into IDSR system.	Epidemiology	NHLQATC																	
3. Building Capacity on IDSR at All Levels																					
National level	**3.1 Human Resource Planning**																				
	3.1.1	Plan and identify human resources available for surveillance at all levels.	TWG																		
	3.1.2	Ensure link with the surveillance human resources at the academic institutions.	TWG																		
	3.2 Ensure Availability and Use of Surveillance Tools																				
	3.2.1	Review and identify gaps in the existing surveillance tools used by specific disease programs and IDSR system.	Epidemiology and IVD																		
	3.2.2	Update the integrated surveillance tools.																			
	3.2.3	Disseminate the tools.																			
	3.3 Ensure Availability and Skill Development of National Training of Trainers																				
	3.3.1	Identify, train, and update inventory of national surveillance training of trainers.	Epidemiology and IVD																		
Regional medical offices	**3.4 Collaborate with PORALG for Ongoing Surveillance activities**																				
	3.4.1	Strengthen leadership, management, mentorship, and resource mobilization for surveillance functions among regional and council health management teams.	Director of Preventive Services	Epidemiology, Programs, and Partners																	
	3.5 Capacity-Building for Regional Surveillance Staff																				
	3.5.1	Provide regional and council staffs with computers.	PORALG	MOHCDGEC and Partners																	

Level Of Support	Intervention and Activities		Responsible for Coordination	Also Responsible	Timeline																	
					2018					2019												
					Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	3.5.2	Monitor surveillance performance through integrated supportive supervision.	TWG																			
Council medical offices	**3.6 Build Capacity for Human Resources and Financial Management**																					
	3.6.1	Plan and identify human resources.	Regional and Council Technical Committee																			
	3.7 Regular Orientation for Surveillance Staff																					
	3.7.1	Offer regular and refresher training.	Regional and Council Technical Committee																			
	3.7.2	Build capacity on preparedness and response.	Regional and Council Technical Committee																			
	3.7.3	Train staff microplanning and financial management.	Regional and Council Technical Committee																			
Health facility	**3.8 Training and Reorientation on Integrated Reporting in IDSR System and HMIS**																					
	3.8.1	Train staff on microplanning for surveillance and financial management.	Council Technical Committee																			
	3.8.2	Train and reorient staff on integrated reporting in IDSR system and HMIS.	Council Technical Committee																			
Community	**3.9 Support In-Service and Continuous Education Program for Health Facility Surveillance Focal People**																					
	3.9.1	Support in-service and continuous education for health facility surveillance focal people.	Council Technical Committee																			
	3.9.2	Offer refresher training for community health workers on disease detection and referral.	Council Technical Committee																			
	3.9.3	Review best practices.	Council Technical Committee																			
	3.9.4	Develop a refresher training package on surveillance for community health workers.	Council Technical Committee																			
	3.9.5	Conduct regular refresher training.	Council Technical Committee																			