Improving Performance of IDSR at District and Facility Levels: Experiences in Tanzania and Ghana in Making IDSR Operational

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Prepared by:

Lynne Miller Franco, ScD
University Research Co. LLC

James Setzer, MPH
Abt Associates, Inc.

Kathryn Banke, PhD
Abt Associates, Inc.

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Mission

Partners for Health Reformplus is USAID’s flagship project for health policy and health system strengthening in developing and transitional countries. The five-year project (2000–2005) builds on the predecessor Partnerships for Health Reform Project, continuing PHR’s focus on health policy, financing, and organization, with new emphasis on community participation, infectious disease surveillance, and information systems that support the management and delivery of appropriate health services. PHRplus will focus on the following results:

- Implementation of appropriate health system reform.
- Generation of new financing for health care, as well as more effective use of existing funds.
- Design and implementation of health information systems for disease surveillance.
- Delivery of quality services by health workers.
- Availability and appropriate use of health commodities.

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Submitted to: Murray Trostle

and: Karen Cavanaugh, CTO
Health Systems Division
Office of Health, Infectious Disease and Nutrition
Center for Population, Health and Nutrition
Bureau for Global Programs, Field Support and Research
United States Agency for International Development
Abstract

Recognition of the need for effective disease surveillance and response is growing worldwide due to increased risks of infectious diseases associated with population mobility, globalization, and emerging and resurfacing diseases. The Integrated Disease Surveillance and Response (IDSR) strategy, promoted and supported by the World Health Organization (WHO) Regional Office for Africa (AFRO), has been adopted throughout the region’s 46 countries to strengthen surveillance systems such that they inform public health decisions and disease control actions. This document describes the efforts of the Partners for Health Reformplus (PHRplus) project in Ghana and Tanzania to support improvements in the performance of IDSR. Ghana and Tanzania sought to address concurrently the technical, organizational, and workforce issues that could impede IDSR performance. The most notable improvements were seen in reporting, analysis, and interpretation of surveillance data. Strengthening and maintaining IDSR performance, however, is also dependent on the following: ensuring ongoing supervision and follow-up; ensuring IDSR visibility and leadership at all levels; understanding the links between IDSR and health system decentralization; and addressing structural barriers to IDSR that are a function of the overall health system.
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<tr>
<td>CBS</td>
<td>Community-based surveillance</td>
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<tr>
<td>CCHP</td>
<td>Comprehensive Council Health Plan (Tanzania)</td>
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<td>CDC</td>
<td>Centers for Disease Control and Prevention</td>
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<td>CHMT</td>
<td>Council Health Management Team (Tanzania)</td>
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<tr>
<td>ComDAB</td>
<td>Communicable Diseases Analysis Book (Ghana)</td>
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<td>DHMT</td>
<td>District Health Management Team (Ghana)</td>
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<tr>
<td>DMO</td>
<td>District Medical Officer (Tanzania)</td>
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<td>EDCS</td>
<td>Epidemiology and Disease Control Section (Tanzania)</td>
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<tr>
<td>GFATM</td>
<td>Global Fund for AIDS, Tuberculosis and Malaria</td>
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<td>GHS</td>
<td>Ghana Health Service</td>
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<td>IDSR</td>
<td>Integrated Disease Surveillance and Response</td>
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<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
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<td>MOH</td>
<td>Ministry of Health</td>
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<td>NIMR</td>
<td>National Institute for Medical Research (Tanzania)</td>
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<td>NSU</td>
<td>National Surveillance Unit (Ghana)</td>
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<td>PHRplus</td>
<td>Partners for Health Reformplus project</td>
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<td>Regional Health Management Team (Ghana and Tanzania)</td>
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<td>RHO</td>
<td>Regional Health Officer</td>
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<tr>
<td>SCD</td>
<td>Standard Case Definition</td>
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<td>TOT</td>
<td>Training of Trainers</td>
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<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<td>WHO/AFRO</td>
<td>World Health Organization/African Regional Office</td>
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<td>ZTC</td>
<td>Zonal Training Centre (Tanzania)</td>
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The authors of this report would like to thank the following individuals who worked so hard to improve disease surveillance and response, who documented what happened and who provided moral and technical support along the way:

- Facility and district level personnel in the three northern regions of Ghana and 12 pilot districts in Tanzania who actually made use of the IDSR tools and strategies described in this report;
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A special thanks to Dr. Murray Trostle of USAID/Washington, whose perseverance and support made it possible for this work to come to fruition to help IDSR implementers in the field understand the importance of evidence based decisions for appropriate public health response.
Recognition of the need for effective disease surveillance and response is growing worldwide due to increased risks of infectious diseases associated with population mobility, globalization, emerging diseases such as avian influenza, and the resurgence of diseases such as tuberculosis. A strongly functioning surveillance system is essential to informing public health decisions and actions that can prevent and control these diseases. In response to this need, the World Health Organization (WHO) Regional Office for Africa (AFRO) developed, promoted and supported the adoption of the Integrated Disease Surveillance and Response (IDSR) strategy across the continent of Africa.

The IDSR concept is straightforward and calls for countries to strengthen surveillance of priority infectious diseases through: the use of simplified tools for data collection and analysis; integration of various channels for reporting and feedback; providing timely surveillance information for decision-making and public health action throughout the system; and strengthening district level capacity to generate and transform surveillance data into information that can inform public health action. WHO/AFRO, in collaboration with the U.S. Centers for Disease Control and Prevention (CDC), produced a number of tools to provide countries in the region with the technical elements necessary to strengthen their IDSR systems that included: a set of generic technical guidelines (CDC/WHO/AFRO, 2001); district IDSR training materials (WHO/AFRO, 2001c); a district analysis book developed in 2002 and revised in 2004 (CDC/WHO/AFRO, 2004); and priority monitoring and evaluation (M&E) indicators developed in 2002 and revised in 2004 (WHO/AFRO, 2004).

The guidelines and other tools developed by WHO/AFRO and CDC, when disseminated to the operational levels (district and facility), provided the basic technical information needed including generic standards, forms, and information flows that countries could adapt. Yet, implementing the IDSR strategy required countries (and their partners) to go beyond simply improving existing or developing new technical elements, the “norms and forms.” If their surveillance systems were to produce better data and more useful information, they would also need: sound technical standards; effective organizational structures and processes that support effective implementation of those standards; and a competent and motivated workforce. The technical determinants of IDSR performance include technical standards, information system design, data collection forms, data flow, availability of necessary technology and methods for analysis, reporting, and communicating feedback and monitoring and evaluating outcomes. Technical determinants are what people often think of first and foremost when trying to improve surveillance systems; past efforts to improve system performance have often been limited to addressing weaknesses in these determinants alone. The technical determinants, however, require functioning organizational processes and mechanisms at the workplace to ensure that information flows where it needs to (in both directions and to all those who can and should use it to make evidence-based decisions), that district and facility personnel have resources at their disposal and the responsibility and authority to make decisions based on available data, and that IDSR roles and responsibilities at all levels of the system are clear. System performance also depends on the performance of the workforce, i.e. the ability and willingness of all members of the IDSR workforce to fulfill their assigned roles and responsibilities.

Ghana and Tanzania were both early implementers of the IDSR strategy. Tanzania was the first country in the WHO/AFRO region, followed closely by Ghana, to conduct an assessment of its
existing infectious disease surveillance system and to develop an action plan. Both countries had completed assessments and developed national IDSR guidelines and action plans by 2002. In both countries, the focus of early IDSR implementation was in a limited geographical area: Ghana started in its three northern regions, while Tanzania began in 12 districts spread throughout the country. Both countries developed strategies and tools to concurrently address technical, organizational, and workforce issues. Technical strategies included: creating a set of technical guidelines that defined “norms and forms” for IDSR in general and for the specific priority diseases, clarifying standards for IDSR data analysis, and creating technical capacity to collect, manage, analyze and communicate data at national and district levels. Organizational strategies included: clarifying roles and responsibilities, budgeting for IDSR at local levels, outlining clear procedures for IDSR tasks, creating mechanisms for involving other actors in IDSR, resolving communications/reporting constraints, and strengthening supervision. Workforce strategies included the creation of training capacity and creating job aids for standard case definitions (detection and reporting), data interpretation, specimen collection and transport.

Monitoring and evaluation (M&E) data collected in 2004 and 2005 in Ghana and Tanzania were used to assess levels of IDSR performance. The M&E results showed a positive, but somewhat mixed picture of IDSR performance improvement. Some performance areas have not yet demonstrated their results, in some cases because more time is needed to evaluate interventions recently implemented, and in other cases because more remains to be done. However, both countries had significant improvements in completeness and timeliness of weekly and monthly disease reporting from facilities to districts, and from districts to regions. Improvements were also seen in the accuracy of data reported (due to better compilation). Data analysis was conducted more frequently at the district and facility levels, although there is still room for improvement at the facility level in Tanzania. Assessment of improvement in outbreak management was not possible, due to the low number of outbreaks, but performance appeared strong. Evidence of the use of IDSR data for planning, monitoring and budgeting IDSR activities was seen in both countries, although actual resource availability often hampered implementation. Areas still needing significant improvement included feedback and coordination and district level monitoring and evaluation of IDSR performance data.

The experiences in Tanzania and Ghana highlight the need to take conscious action to address technical, organizational and workforce determinants at various levels of the health system in order to improve performance. Although the technical components of the IDSR system are critical to its proper functioning, attention must be paid to the operational and workforce determinants that also govern how well IDSR functions. Training materials and job aids were developed to translate the technical elements of IDSR performance into methods that directly supported improved workforce performance. The situation analyses indicated that the technical elements of the system, as presented in the Technical Guidelines, needed to be broken down into concrete, specific tasks for the wide range of health system personnel involved in IDSR. The resources necessary to adequately bridge the gap between adequately defined technical standards and workforce capacity to implement them were often underestimated.

The IDSR teams in Ghana and Tanzania also recognized the critical importance of organizational determinants of system performance. IDSR activities are implemented as part of the broader health system and are affected by the system’s strengths and weaknesses. The workplace environment, the workforce itself, and local actors and communities all have a strong influence on how IDSR will function. How well a district can organize itself for its IDSR responsibilities depends on management capacity, effective access and authority over resources, infrastructure, and clarity on roles, responsibilities, and accountability. Resource, infrastructure, and accountability challenges beyond the scope of the technical assistance provided by PHRplus in Ghana and Tanzania limited the
The combined experiences in Ghana and Tanzania lead to the following conclusions that are valid for both countries and likely to be applicable to other countries as well:

- Many effective IDSR tools and strategies have been developed in Ghana and Tanzania, and their use should be expanded beyond the initial implementation areas. Other countries can take advantage of the investments in their development by adapting them to their own country contexts without “reinventing the wheel.”

- Supervision and follow-up are critical for performance improvement and sustainable results, and fostering accountability for implementation of IDSR tasks.

- More focus is needed on helping district and facility staff to advocate based on data, and to translate IDSR data results into effective action plans.

- Persons responsible for IDSR must engage stakeholders at all levels of the health system.

- It is important to understand IDSR performance within each country’s decentralization context to take advantage of decentralized powers while protecting critical centralized IDSR functions needed for effective surveillance and response to disease events that cross administrative boundaries.

- Governments and programs need to address structural barriers to IDSR -- both those exclusively in the IDSR domain and those that reflect broader health system issues -- such as resource availability, accountability, and reliable communication mechanisms.

- External technical assistance is limited in terms of the progress it can achieve in the absence of investments in broader health system improvements.

IDSR is a cross-cutting function that runs across a range of disease control programs. IDSR and the health system would both be well served by including IDSR in health system strengthening efforts because, if functional, IDSR can provide the data needed for evidence based decisions and resource allocation.
1. **Introduction**

Recognition of the need for effective disease surveillance and response is growing worldwide due to increased risks of infectious diseases associated with population mobility, globalization, emerging diseases such as avian influenza, and the resurgence of diseases such as tuberculosis. A strongly functioning surveillance system is essential to informing public health decisions and actions that can prevent and control these diseases.

The Integrated Disease Surveillance and Response (IDSR) strategy, promoted and supported by the World Health Organization (WHO) Regional Office for Africa (AFRO), has been adopted across the continent of Africa. This document describes efforts to strengthen surveillance through the implementation of the IDSR strategy by addressing technical, organizational, and workforce determinants at the district and facility levels in Tanzania and Ghana. Efforts in these two countries received technical and financial support from the United States Agency for International Development (USAID)\(^1\) and the WHO/United Nations Foundation (in Ghana). Hopefully the experience and lessons learned from these two countries can assist others, both in Africa and in other regions, who are engaged in strengthening their own disease surveillance and response systems. Although both countries were able to make progress in strengthening their surveillance systems, the existence of broader health systems constraints has left much work still to be done.

Section 2 of this document describes the development of the IDSR strategy by WHO/AFRO. Section 3 presents a practical framework for strengthening IDSR performance, particularly at the operational (district and facility) level. Section 4 describes IDSR implementation in both Tanzania and Ghana, showing how the concepts in this framework were applied. Section 5 presents specific strategies and tools developed and implemented in Tanzania and Ghana to strengthen IDSR performance at the regional, district and facility levels. These strategies and tools focused on overcoming the operational, workforce, and technical barriers to effective IDSR performance that were identified through critical assessment and problem solving by IDSR implementers. Section 6 presents IDSR performance levels (2004-2005) achieved in Tanzania and Ghana, as measured by key IDSR indicators. Section 7 summarizes the lessons learned and conclusions based on the results achieved in the two countries, and Section 8 discusses future directions for efforts to improve IDSR performance at the district and facility levels in Tanzania, Ghana and perhaps elsewhere.

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\(^1\) USAID/Washington and USAID missions in Tanzania and Ghana provided support through Partners for Health Reformplus (PHRplus) project. Additional support from USAID/Washington was provided through the Centers for Disease Control and Prevention (CDC) and the CHANGE project.
2. Integrated Disease Surveillance and Response In Africa: A Key Component of the WHO/AFRO Strategy to Reduce the Burden of Infectious Disease

In Africa, infectious diseases (both endemic and epidemic-prone) are still the most common causes of morbidity and mortality. To effectively control these diseases, health systems need access to complete, accurate and timely information so they can target scarce resources in the most effective manner. Integrated disease surveillance and response (IDSR) is a strategy to ensure the generation and provision of this information to decision makers at all levels of the health system, and to ensure that health officials can take informed and appropriate action to reduce morbidity and mortality from priority infectious diseases. IDSR was developed by the World Health Organization Regional Office for Africa and endorsed by all member countries in the region (WHO/AFRO, 2001a).

A series of major epidemics (particularly meningitis) in the 1990’s provided the impetus behind WHO/AFRO’s renewed efforts to improve surveillance. These epidemics led to considerable numbers of fatalities, due in part to the fact that effective early detection and response capabilities were not in place. The large number of potentially preventable cases and fatalities brought the surveillance systems’ weaknesses to the forefront, generating political will to strengthen surveillance systems throughout the region. Generally speaking, surveillance data in Africa were recognized as incomplete, not received in time to be used, and often of questionable validity. In addition, there were concerns about whether health system staff – particularly those at the facility and district levels – were able to analyze, interpret, and actually use surveillance data.

Disease surveillance has been described by WHO/AFRO as:

“...systematic data collection on the occurrence of diseases, disability and deaths; data organization [in a] meaningful way; basic data analysis in order to extract useful information; and timely and complete reporting. Based on the information generated, disease control programmes make judicious decisions and take appropriate action. Disease surveillance information is also useful for programme monitoring and evaluation.”


In the 1990’s the barriers to effective surveillance and response in Africa included surveillance system design issues, such as the existence of multiple, vertical systems that focused almost exclusively on providing data for managers higher up in the system. Frequently there were few links between those collecting and those analyzing the data, and between those responsible for data analysis and those responsible for decisions and planning related to public health response and/or routine service delivery. Surveillance systems also suffered from a general lack of resources and poor transportation and communications infrastructure. These infrastructure problems made reporting and
specimen transport difficult, if not impossible for peripheral health facilities – particularly during annual rainy seasons. Funds for recurrent expenditures in health facilities and districts were lacking for such basic supplies as pencils and paper as well as critical functions such as supervision and training. Laboratory capacity was generally weak and the role of the laboratory in public health surveillance was often poorly understood. There were few if any incentives for accurate and timely data collection, and often disincentives existed for raising alarm by reporting an outbreak.

The IDSR strategy was developed to respond to the weaknesses in existing African infectious disease surveillance systems; its objectives are outlined in Box 1. The key innovation presented by the IDSR strategy was the integration of multiple existing and often confusing and overlapping data collection forms and reporting mechanisms. A clear emphasis was placed on the need for surveillance systems to link data to analysis and response mechanisms within the health delivery system, particularly at the district level. Improving data availability alone would not be sufficient to make surveillance a strong and effective tool to address priority diseases and threats to public health.

**Box 1: Objectives of the WHO/AFRO IDSR Strategy**

- Strengthen the capacity of countries to conduct effective surveillance activities
- Integrate multiple surveillance systems so that forms, personnel and resources can be used more efficiently and effectively
- Improve the use of information for decision-making
- Improve the flow of surveillance information between and within levels of the health system
- Improve laboratory capacity in identification of pathogens and monitoring of drug sensitivity
- Increase the involvement of clinicians in the surveillance system
- Emphasize community participation in detection and response to public health problems
- Strengthen the involvement of laboratory personnel in epidemiological surveillance


The IDSR concept calls for countries to develop plans to strengthen surveillance of priority infectious diseases through:

- the use of simplified tools for data collection and analysis;
- integration of various channels for reporting and feedback;
- providing timely surveillance information for decision-making and public health action throughout the system; and
- strengthening district level capacity to generate and transform surveillance data into information upon which to take action.
WHO/AFRO recommended that countries focus their surveillance and response system strengthening efforts on a limited number of priority diseases, integrating systems both horizontally and vertically, simplifying forms and reporting, building laboratory capacity, and strengthening the role of the district in surveillance and response. The IDSR strategy seeks to render surveillance and response activities more efficient, more effective, and more relevant for those working at the operational level, and builds on the seven functions of effective surveillance systems shown in Box 2.

To assist countries in focusing and structuring their efforts in implementing the IDSR strategy, WHO/AFRO outlined a broad and basic implementation approach that included:

- sensitization of key stakeholders to the need to improve surveillance and response;
- assessment of the system;
- development of a plan of action;
- adaptation of the technical guidelines;
- adaptation of the training modules;
- training at the district level;
- dissemination of new IDSR tools; and
- monitoring and evaluation.

Countries were encouraged to adapt and implement the IDSR approach in order to strengthen surveillance and response. WHO/AFRO, with funding from the United Nations (UN) Foundation, financially and technically supported efforts in five countries: Ghana, Burkina Faso, Guinea, Mali and Southern Sudan. Other countries, such as Tanzania, worked directly with partners to identify resources necessary to implement their action plans.
3. A Practical Framework for Strengthening IDSR System Performance

It was clear from the start that IDSR implementation would require countries and their partners to do more than simply focus on the technical elements – the “norms and forms” of the surveillance system – to produce better data and more useful information. Surveillance system functioning depends on the interaction between many elements including sound technical standards; organizational structures that support effective implementation of those standards; the clear definition of roles, responsibilities and operational tasks; and organizational support to ensure that individual workers are capable of fulfilling their responsibilities, combined with an organizational culture that supports their motivation to do so. Figure 1 shows the interrelated nature of the technical, organizational, and workforce determinants of surveillance system performance.

The technical determinants of IDSR performance include technical standards, information system design, data collection forms, data flow, availability of necessary technology and methods for data analysis, reporting, and communicating feedback and monitoring and evaluating outcomes. Technical determinants are what people often think of first and foremost when trying to improve surveillance systems. Past efforts to improve system performance have often been limited to addressing technical weaknesses alone. The technical determinants, however, require functioning organizational processes and mechanisms at the workplace to ensure that information flows where it needs to (in both directions and to all those who can and should use it to make evidence-based decisions), that district and facility personnel have resources at their disposal and the responsibility and authority to make decisions based on available data, and that IDSR roles and responsibilities at all levels of the system are clear. System performance also depends on the performance of the workforce, i.e. the ability and willingness of all members of the IDSR workforce to fulfill their assigned roles and responsibilities.
When the IDSR strategy was adopted, many African infectious disease surveillance systems lacked the basic technical framework to adequately carry out the seven basic surveillance functions (See Box 2). Thus, WHO/AFRO and the Centers for Disease Control and Prevention (CDC) jointly developed a set of generic technical guidelines (CDC/WHO/AFRO, 2001) to provide a comprehensive framework for surveillance of 19 priority diseases in the region, focusing on the district as the crux of IDSR implementation. These guidelines contained both generic and disease-specific information for implementing the IDSR functions at the district and facility levels and provided much needed technical guidance. The guidelines responded to the need for standard case definitions and reporting and analysis protocols to improve system performance. Countries were to adapt these basic guidelines to meet their own needs and priorities. Appendix 1 presents the IDSR priority disease lists for Ghana and Tanzania.

WHO/AFRO and CDC also collaborated to produce additional tools to provide countries in the region with the technical elements necessary to strengthen their IDSR systems: a protocol for assessing national communicable disease surveillance and epidemic preparedness and response systems (WHO/AFRO, 2001b), district IDSR training materials (WHO/AFRO, 2001c), a district analysis book developed in 2002 and revised in 2004 (CDC/WHO/AFRO, 2004), and priority monitoring and evaluation (M&E) indicators also developed in 2002 and revised in 2004.

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2 Epidemic-prone: cholera, shigella, measles, meningitis, plague, viral hemorrhagic fevers, yellow fever; targeted for eradication or elimination: polio (acute flaccid paralysis), dracunculiasis, leprosy, neonatal tetanus; public health importance: pneumonia in children, AIDS, malaria, onchocerciasis, sexually transmitted infections, trypanosomiasis, tuberculosis.
(WHO/AFRO, 2005). These generic tools focused on defining tasks and providing the technical knowledge and skills needed by the IDSR workforce.

The guidelines and other tools developed by WHO/AFRO and CDC, when disseminated to the operational levels (district and facility), provided the basic technical information needed including generic standards, forms, and information flows that countries could adapt. The WHO/AFRO technical guidelines also presented a generic framework defining the roles and responsibilities for the various levels of the system: community, health facility, district, national and regional (i.e., WHO/AFRO).

Additional challenges not addressed by the above referenced WHO/AFRO guidelines and tools included the creation of organizational structures to support surveillance and the development and retention of a cadre of motivated and capable workers to implement the technical guidelines and tools required for effective surveillance. Another important consideration was the level and effectiveness of decentralization in any given country. IDSR emphasizes the district as the operational focus, because it is at this level that data analysis and timely local response can be effectively organized. Although every country has some health and administrative structures at the operational level, not all “districts” have the same attributes in terms of authority over resources. As countries modify the WHO/AFRO list of priority diseases to better fit their own local context, they will also need to adapt these technical instruments to their evolving decentralized health and administrative structures and be clear on the respective roles and responsibilities for IDSR at all levels of the system.

This document describes the efforts in Tanzania and Ghana to support improvements in the performance of IDSR. Both countries took the approach that all three categories of IDSR performance determinants (technical, organizational and workforce) must be addressed concurrently to make sustainable improvements in surveillance. However, as will be discussed later, the projects in both countries found (as is often the case for donor-funded projects) that they were able to make more progress strengthening the technical elements of IDSR than the organizational and workforce elements. The experiences of Ghana and Tanzania in developing a framework and tools for IDSR implementation that addressed all three types of determinants and obstacles to system performance provide some interesting insights that will be of value to other countries who are also attempting to improve the performance of their surveillance systems.
4. IDSR Implementation in Ghana and Tanzania: Applying the Framework

WHO/AFRO and CDC’s pioneering work in developing a generic set of technical guidelines with a focus on strengthening efforts at the district level was critical in creating country-level momentum to improve IDSR performance. Data on individual country progress in strengthening and integrating disease surveillance according to WHO/AFRO’s IDSR strategy indicate rapid adoption of the strategy and significant investments by member states. As of November 2005 (CDC, 2005), 43 of the 46 WHO/AFRO countries had conducted assessments, 39 had adapted the WHO/AFRO guidelines, 32 had conducted some level of IDSR training, and 16 reported having trained at least 60% of their districts. In addition, twenty-four countries reported producing a feedback bulletin at the national level.

Ghana and Tanzania were both early implementers of the IDSR strategy. Tanzania was the first country in the AFRO region, followed closely by Ghana, to conduct an assessment of its existing infectious disease surveillance system and to develop an action plan. This section briefly describes each country’s implementation of the WHO/AFRO IDSR strategy and describes how they, along with their partners, tried to address specific organizational, technical and workforce issues.

4.1 Ghana

Following the general implementation strategy outlined by WHO/AFRO, Ghana’s National Surveillance Unit (NSU) conducted an assessment of the existing infectious disease surveillance system in 2000 (GHS/MOH Ghana, 2000). The assessment was carried out collaboratively with input and assistance from WHO/AFRO and CDC. The NSU used the assessment results to create a 5-year Action Plan for implementing the IDSR strategic approach.

The UN Foundation (through WHO) and USAID (through PHRplus and the CDC) supported the initial steps in the Action Plan by providing assistance to create and/or adapt basic IDSR building blocks (guidelines, standard case definitions, etc.) and strengthen the capacity of the NSU to manage and use surveillance data. The generic WHO/AFRO/CDC IDSR guidelines were reviewed and adapted in 2001 to reflect Ghanaian epidemiology, disease priorities and programmatic needs. The “Technical Guidelines for Integrated Disease Surveillance and Response in Ghana” were published and distributed4 in 2002 (GoG/MOH/NSU, 2002). A separate, stand-alone pamphlet of standard case definitions for the 23 diseases targeted by the Ghanaian IDSR strategy was also produced and distributed to make the definitions more easily accessible to facility level and other clinical staff who were to use them as the basis for case recognition and reporting under IDSR. The WHO/AFRO training modules that focused primarily at the district level, were also adapted and printed (GHS/MOH/NSU, 2005). In 2002, with the Technical Guidelines and training modules developed and/or adapted, the responsibility for IDSR implementation shifted to the Regional Health

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3 CDC support was funded through USAID.
4 Due to limited funding, not all health facilities in the country received a copy of the national technical guidelines at that time.
Management Teams (RHMT), in accordance with the structures for implementation authority under the new Ghana Health Service. The NSU, with some UN Foundation support, began conducting training for district health management teams in one region. The NSU was responsible for technical oversight and direction, but did not have its own funds to support IDSR activities and needed to negotiate with the regions for the resources required to introduce and support IDSR.

At the request of the Ghana Health Services/Ministry of Health (GHS/MoH) in late 2002, USAID, through PHRplus, provided technical and financial support for training and supervision to improve IDSR performance in three northern regions of Ghana (Northern, Upper East and Upper West) that included a total of 24 districts (Figure 2).

Figure 2: Ghana initial intensive IDSR regions

Recognizing that efforts to address basic technical obstacles were but a first step in an ongoing process, Ghana adopted an approach of “continuous assessment and problem solving” as it began to implement specific improvements to IDSR in the three northern regions. This approach took advantage of existing opportunities and mechanisms for discussion and planning to examine, with key stakeholders, the fundamental (and not just technical) issues and constraints to IDSR performance. The RHMTs embraced the idea that every supervision visit was an opportunity for on-the-spot problem solving and that solutions could/should be shared with others facing the same or similar problems. A number of key opportunities for assessment and problem solving were created in Ghana including:

- Discussions at an initial IDSR regional planning workshop with regional and district teams on roles, responsibilities, strengths and weaknesses;
- Visits to the districts for additional information collection on capacity building needs of district and facility staff and other organizational issues;
- Discussions during capacity building and information sharing sessions on barriers faced and mechanisms to overcome them; and
- Obtaining information and integrating the problem-solving approach into supervision and follow-up visits.
Starting with the initial planning workshop in February 2003, strengths and weaknesses associated with the seven core functions of the existing surveillance system were outlined (see Appendix 2), and technical, organizational, and workforce determinants of performance were recognized and highlighted for attention. One clear conclusion drawn from this first collaborative assessment exercise was that many more people were directly involved in the operation of the system than had been previously recognized. At the facility level (the front lines of IDSR), many staff in addition to the surveillance officer -- nurses, midwives, data clerks, clinicians and others -- had roles to play in IDSR. Training and other capacity building efforts, therefore, would need to include all of these personnel. At this February workshop, participants from all levels of the system completed a task analysis (see Appendix 3) that confirmed this finding. It was immediately apparent that training materials would need to be developed specifically for the facility level, and that these materials would need to target skills and clarify roles and responsibilities for clinicians, data clerks, facility in-charges and disease control officers.

Five-day District Health Management Team (DHMT) level training was provided to all personnel in 24 districts in the three regions and an additional 12 districts in Brong Ahafo Region at the request of the GHS/MoH. Three-day training for facility level personnel was carried out to cover all health facilities in the three target regions. Technical support was also provided to strengthen supervision of surveillance and response activities. In addition, under the Quality Health Partners (QHP) project, subsequently funded by USAID, additional support will be provided to another 28 districts for IDSR implementation through 2009.

4.2 Tanzania

Tanzania conducted the continent’s first assessment of an existing infectious disease surveillance system in 1998, with funding from USAID and support from WHO/AFRO and CDC (Brown, Nsubuga and Eseko, 1999). Using the results of this assessment, a large group of stakeholders prepared an Action Plan (Brown, Eseko, and Nsubuga, 1999). To guide the rest of the IDSR implementation process, Tanzania established an IDSR taskforce in 2000. The taskforce was chaired by the MoH’s Chief Medical Officer and composed of representatives from the various disease control programs, the MoH Epidemiology and Disease Control Section (EDCS), WHO, USAID, the Tanzania Public Health Association, and other key partners. The IDSR taskforce offered an on-going organizational mechanism for the discussion of surveillance system performance, constraints to performance and the modification of tools and approaches. It should be noted, however, that the taskforce was not meeting consistently during 2004-2005.

With the creation of the IDSR taskforce, Tanzania sought to move ahead quickly with the development of technical guidelines for IDSR. Although the production of the generic WHO/AFRO/CDC Technical Guidelines was not complete, the Government of Tanzania wanted to take advantage of the existing momentum and decided to move ahead with development of its own technical guidelines (EDCS/MoH, 2001). The IDSR taskforce chose the 13 diseases that required weekly and monthly reporting under the existing system as priority diseases for IDSR strengthening. Tanzania’s Technical Guidelines contained revised forms for weekly, monthly and case-based reporting, standard case definitions, information about each of the priority diseases, general discussion of surveillance data analysis, and information on the elements of the IDSR strategy, all of which were generally similar but not identical to those advocated by WHO in their generic guidelines. It should be noted that Tanzania’s 2001 guidelines did not include all national disease priorities (such as tuberculosis, AIDS, viral hemorrhagic fevers), they did not outline specific roles and responsibilities of each level within the surveillance system, and there was no consistent format used across diseases in their presentation in the guidelines.
Although the Tanzania Assessment and Action Plan had created momentum for strengthening IDSR, lack of financial support slowed progress with IDSR implementation. The Tanzania technical guidelines were introduced and reviewed at a meeting of Regional Health Officers (RHOs) in 2002, but without specific funds available for training and dissemination, these RHOs were given the responsibility for implementing IDSR with whatever resources they could find. When the first versions of the IDSR training modules and the district analysis book were issued by WHO/AFRO in 2001, the EDCS facilitated the adaptation of these materials for Tanzania and subsequent endorsement by the MoH.

During 2002, USAID began to provide technical assistance to support to IDSR in Tanzania through three cooperating agencies: the PHRplus and CHANGE Projects and the CDC. The National Institute for Medical Research (NIMR) was contracted by PHRplus to be the local implementing partner at the request of the Ministry of Health. In collaboration with the Ministry of Health, PHRplus/NIMR and CHANGE focused on addressing operational challenges to IDSR strengthening in 12 pilot districts. The 12 districts were located in 8 of the 20 regions in the country, and were selected to represent a variety of epidemiological contexts, accessibility and infrastructure (See Figure 3). The expected results from this technical assistance were: 1) establishment of an effective IDSR system in the 12 districts; 2) replication to other districts; 3) data showing increased availability of quality information; and 4) increased evidence-based decision making and response. While the PHRplus and CHANGE projects were working in the 12 districts, the Ministry of Health also continued, as resources allowed, with IDSR implementation in the rest of the country.

Figures 3: 12 IDSR pilot districts in Tanzania

Appreciating the range of technical, organizational and workforce factors that would influence the success of IDSR implementation, the pilot implementation team (PHRplus, NIMR and CHANGE), in collaboration with the IDSR taskforce, initiated an in-depth situation analysis. The situation analysis was conducted in 2002 (Franco et al., 2003) in 2 of the 12 selected pilot districts

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5 NIMR was responsible for managing all local financial and technical support for IDSR in the 12 pilot districts.
6 The CDC worked mainly at the national level, developing epidemiological capacity (insertion of surveillance and epidemiological training into the Public Health training curriculum), national level feedback mechanisms, and strengthening of the laboratory network.
The situation analysis served as both an information collection activity and an opportunity for in-depth discussions with council (district) health management teams (CHMT)\(^7\) to analyze the realities of IDSR implementation, and to discuss performance expectations and possible performance improvement strategies. The situation analysis used record review, in-depth interviews with CHMT members, district officials and health workers, and focus group discussions with community leaders and members. It included a mapping of the IDSR process, data interpretation sessions, and planning. The situation analysis process took about 2 weeks for data collection in each district, with additional time for analysis and discussion of results.

The situation analysis revealed that MOH efforts in 2001 to disseminate and promote use of the IDSR technical guidelines through the individual initiatives of the RHOs were only partially successful. The Arusha RHO had been able to organize training for Babati district with Babati district funds, and 40 facility in-charges had received training and copies of selected portions of the guidelines. The new forms were being used by some of the facilities, but timeliness and completeness of reporting was still weak. In Dodoma Rural no training had taken place, neither CHMT members nor facility staff had a copy of the IDSR guidelines, and new forms were not yet in use. Overall, knowledge of the surveillance system and procedures was inadequate, and there was little clarity about specific responsibilities of various district and facility level staff. The situation analysis results provided guidance for determining priority actions for IDSR strengthening activities. The following broad areas for action were identified: improving competence of health personnel; improving district organizational capacity; improving support for IDSR within and beyond the health system; and improving communications technology and laboratory networking.

In Tanzania a “cascade” training strategy\(^8\) was employed in the 12 pilot districts with the dual purposes of: 1) improving workforce performance at the facility and district levels; and 2) developing in-country IDSR training capacity so that capacity building activities could be replicated beyond the pilot districts. An initial training of trainers (TOT) involved participants from the Tanzanian MOH Zonal Training Centers (ZTCs), as well as Regional Health Management Teams (RHMT) and the National Institute of Medical Research (NIMR). They in turn trained CHMT members, first in IDSR and then as trainers. Then, the CHMTs trained facility staff in their districts. The project’s training efforts left a core group of 51 trainers from the MOH, NIMR and ZTCs (28 of whom were members of RHMTs) competent to train IDSR content to district staff, and 32 district staff able to provide IDSR training to facility health workers. In total, 787 facility-level health workers from 591 facilities were trained in IDSR throughout the 12 pilot districts.

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\(^7\) This is equivalent to a District Health Management Team. Under the broad decentralization law, the district councils are responsible for local administration, including health.

\(^8\) This training strategy involves training trainers starting at higher levels of the health system who will in turn train others.
5. Approaches and Interventions: Improving IDSR Performance by Addressing Technical, Organizational and Workforce Determinants at the District and Facility Level

The framework of determinants of IDSR performance presented in Figure 1 can be used as a tool to insure that implementation and system strengthening efforts are not limited to the obvious technical determinants alone. By adopting the framework from the start, implementers are reminded that they must look for and resolve obstacles to performance in all three areas. This can be done by ensuring that assessment and ongoing support activities are designed to address all three types of determinants. By engaging stakeholders in the assessment process, a creative problem solving environment is created where assessment and resolution become an active process. Table 1 summarizes and synthesizes how assessment and action were linked to resolve problems in all three areas in both Ghana and Tanzania. This is followed by a description of the specific approaches and tools used in Ghana and Tanzania to address each of the three types of determinants. Although many tools and approaches actually address more than one determinant, they have been organized under their primary target.
<table>
<thead>
<tr>
<th>Constraint/Obstacle</th>
<th>How Identified</th>
<th>Proposed/Implemented Solution</th>
<th>Note(s)</th>
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</thead>
<tbody>
<tr>
<td>Lack of analysis and use of data at district and regional levels</td>
<td>Ghana: Initial WHO/AFRO assessment and visits to districts and facilities</td>
<td>Ghana: Develop and distribute Communicable Disease Analysis Book (ComDAB) for use by facilities to guide and instruct in required analyses for priority diseases. Develop analysis skills through training and on-the-job support.</td>
<td>Ghana: The ComDAB has only recently been printed and distributed. No assessment of its effectiveness has been possible.</td>
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<tr>
<td></td>
<td>Tanzania: Initial WHO/AFRO assessment and visits to districts and facilities, plus in-depth situation analysis</td>
<td>Tanzania: Develop analysis skills through training and post-training district quarterly meetings and other on-the-job support. Develop IDSR data analysis program for use at the district level, along with poster of minimum IDSR analysis standards and IDSR data interpretation guide.</td>
<td>Tanzania: Data analysis program implemented late in project, so adequate assessment of its effectiveness was not possible.</td>
</tr>
<tr>
<td>Lack of reliable communication capacity between health facilities and districts</td>
<td>Ghana and Tanzania: Initial WHO/AFRO assessment and visits to districts and facilities; follow-up/supervision visits</td>
<td>Ghana: Installation of two-way radios in facilities and corresponding districts (financed by UN Foundation). Creation of email accounts for RHMTs to facilitate electronic transmission of data. Tanzania: Problem-solving sessions during district quarterly meetings and follow-up/supervision visits to identify and implement creative solutions to improve communications and</td>
<td>Ghana: Resources were not sufficient to improve communications at all facilities nationwide and communications difficulties remain in some areas. Weak internet/email infrastructure in Ghana limited effectiveness of this solution. Tanzania: Some project districts budgeted for communications equipment in annual plans. Others engaged groups such as local bus services to deliver weekly and</td>
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<td>Constraint/Obstacle</td>
<td>How Identified</td>
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<tr>
<td>Limited data management capacity and use at all levels</td>
<td>Ghana and Tanzania: Initial WHO/AFRO assessment and discussions with national staff; ongoing supervision and follow-up visits</td>
<td>Ghana: Installation of local area network equipment at NSU offices and upgrade of computer hardware. Development of Epi-Info based programs to facilitate data management and routine analysis by NSU staff. Tanzania: Development of Microsoft Excel based program to facilitate electronic data management and routine analysis by district staff.</td>
<td>Tanzania: M&amp;E showed that data analysis at the facility level could use additional support.</td>
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</table>

**Organizational Determinants**

<table>
<thead>
<tr>
<th>Ghana: NSU had no resources to implement activities in direct support of IDSR system implementation or operation. All activities must be funded through regional, district or external donor budgets. Tanzania: National level had limited resources to support IDSR implementation.</th>
<th>Ghana: Discussions with NSU</th>
<th>Ghana: PHRplus strategy to focus support efforts in three regions (Northern, Upper East and Upper west) to implement IDSR.</th>
<th>Romania: After PHRplus ended, national level continued to have limited resources to support IDSR implementation in all districts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghana: NSU had no resources to implement activities in direct support of IDSR system implementation or operation. All activities must be funded through regional, district or external donor budgets. Tanzania: National level had limited resources to support IDSR implementation.</td>
<td>Ghana: Visits and discussions with regional and district teams</td>
<td>Ghana: Reinforce need to include as part of training and other capacity building activities and interactions. Tanzania: Worked with 12 project districts to incorporate IDSR activities in annual plans.</td>
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<tr>
<td>Ghana and Tanzania: Visits and discussions with national, regional and district teams</td>
<td>Ghana: PHRplus support focused in 12 districts to implement IDSR and develop tools and strategies to be used in other districts.</td>
<td>Tanzania: PHRplus support focused in 12 districts to implement IDSR and develop tools and strategies to be used in other districts.</td>
<td>Tanzania: After PHRplus ended, national level continued to have limited resources to support IDSR implementation in all districts.</td>
</tr>
<tr>
<td>IDSR must compete with a myriad of programs and priority activities for time. Limited attention and resources at district, regional and national levels</td>
<td>Ghana and Tanzania: Visits and discussions with national, regional and district teams</td>
<td>Ghana: No solution identified within the limits of IDSR system strengthening. Tanzania: Used training, follow-up and supervision visits with CHMTs to reinforce the importance of generating, analyzing, and using high quality IDSR data.</td>
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<td>Constraint/Obstacle</td>
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<tr>
<td>Districts and facilities did not have sufficient supplies and materials due to insufficient budgets and competing priorities and programs</td>
<td>Ghana and Tanzania: Supervision and support visits and follow-up discussions with regional and district teams</td>
<td>Ghana: No uniform solution identified within the limits of IDSR system strengthening. Tanzania: To the extent possible, worked with districts to budget for IDSR forms and basic materials in annual plans</td>
<td>Ghana: In one case, a region decided to retain allocated funds (rather than send to district) and print and distribute forms, etc., in effect re-centralizing this aspect of budgeting and management</td>
</tr>
<tr>
<td>Districts and regions did not receive allocated funds in a timely manner, creating difficulty in implementing IDSR activities and plans as scheduled</td>
<td>Ghana and Tanzania: Visits/discussions with regional and district teams</td>
<td>No solution identified within the limits of IDSR system strengthening</td>
<td>This is a problem which goes well beyond IDSR and must be addressed at the national level</td>
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<tr>
<td>Lack of accountability for performance at many levels of the health delivery system (not just IDSR)</td>
<td>Ghana and Tanzania: Visits/discussions with regional and district teams</td>
<td>No solution identified within the limits of IDSR system strengthening</td>
<td>This is a problem which goes well beyond IDSR and must be addressed at the national level</td>
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### Workforce Performance Determinants

<table>
<thead>
<tr>
<th>Lack of clear knowledge of IDSR roles and responsibilities for many different personnel categories, especially at the facility level</th>
<th>Ghana: Task analysis performed at workshop</th>
<th>Ghana: Development of training program specifically for facility level personnel; development of specific training programs targeting different types of personnel at each level; development of separate technical handbook for use by personnel at facility level; development of improved guidelines and methods for supportive supervision of IDSR activities Tanzania: Mapping roles and responsibilities; reinforcing these during training and follow-up; developing separate training materials for district and facility levels</th>
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<td></td>
<td>Tanzania: Initial discussions with national, regional and district staff; situation analysis</td>
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<tr>
<td>Constraint/Obstacle</td>
<td>How Identified</td>
<td>Proposed/Implemented Solution</td>
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<tr>
<td>Lack of skills and knowledge required for IDSR function among many personnel at</td>
<td>Ghana: Task analysis performed at workshop</td>
<td>Ghana: Developed training program specifically for facility level personnel; developed specific training programs targeting different types of personnel at each level; developed separate technical handbook for use by personnel at facility level; developed and distributed disease fact sheets to clinicians; developed IDSR protocols posters for use in health facilities; developed improved guidelines and methods for supportive supervision of IDSR activities</td>
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<tr>
<td>all levels and cadres</td>
<td></td>
<td>Tanzania: Developed training materials for district and facility staff; developed and disseminated tools and job aids</td>
<td></td>
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<tr>
<td></td>
<td>Tanzania: Initial discussions with national, regional and district staff;</td>
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<td>situation analysis</td>
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</table>
In both Ghana and Tanzania, even prior to the initial assessments in 1998 and 2000, the technical limitations to IDSR performance were already apparent: both countries lacked clear and consistent case definitions, reporting requirements and action thresholds, data management, analysis, and use capacity, and communications infrastructure for effective IDSR performance. This section describes efforts to address the identified technical constraints to surveillance system operation in each country. Technical guidelines were the first tool developed in each country, and they provided the framework for many of the other tools and approaches.

5.1.1 Ghana

Ghana’s efforts to strengthen the technical determinants of IDSR performance focused initially on developing consensus on the overall guidelines and clarifying requirements related to analysis and response.

**Technical Guidelines**: The first step taken during the technical guidelines adaptation process was to identify and engage key stakeholders to discuss, review and agree upon the basic technical parameters of the IDSR system. These stakeholders included regional and district service delivery/program managers and implementers who would ultimately be responsible for the operation of the system. The NSU worked effectively to coordinate the inputs of these stakeholders and developed a consensus around the basic technical elements of the system including: the list of priority diseases; standard case definitions for surveillance; reporting forms and requirements for all diseases; alert and action thresholds; analysis requirements; and indicators for monitoring and evaluating IDSR system performance. Achieving consensus required considerable negotiation and discussion that resulted in the production of the *Technical Guidelines for Integrated Disease Surveillance and Response in Ghana* (GoG/MoH/NSU, 2002).

**Standards for Analysis**: Surveillance system assessments in Ghana clearly identified the lack of analysis of disease data a constraint to effective use of those data for decision-making, planning and/or action. This was seen at all levels, from health facilities to regional health management teams. To define the requirements and methods for improved IDSR data analysis, the Communicable Disease Analysis Book (ComDAB) (GHS/MOH/NSU, 2005a) was developed based upon a generic template from CDC and WHO/AFRO (CDC/WHO/AFRO, 2004). ComDAB is a technical companion to the IDSR Technical Guidelines and provides greater detail and templates that define the types and frequency of analysis to be performed for each of the 23 priority IDSR diseases.
**Strengthening capacity to use technology:** The UN Foundation supported the establishment of email accounts for all of the regional offices to facilitate communication and electronic data transfer from the regional to national level. To provide the necessary structure and framework for routine data transmission, the NSU developed and installed Epi-Info based (Centers for Disease Control and Prevention, Atlanta, GA, USA) software for the entry of IDSR data at the RHMT offices. This software also provided a common file structure for data analysis at the regional and national levels. The effectiveness of this intervention at the time was limited by the weak electronic communications infrastructure in Ghana. Many of the regional capitals did not have reliable means of electronic communication with the NSU and had to use other methods to ensure timely data transmission.\(^9\) Networking hardware was also purchased and installed to increase management capabilities and data sharing and analysis among staff at the NSU headquarters.

**Radio communication technology for IDSR reporting:** Poor communication between levels within the health system was a clear obstacle to IDSR function and success. A functional IDSR system requires that all levels be able to communicate and transmit data effectively both as a routine function and in the event of an outbreak. With financial support from the UN Foundation, the NSU worked with regions and districts to install two-way radios in several facilities and districts to improve communication and the rapid flow of IDSR data.

### 5.1.2 Tanzania

**Technical guidelines:** As mentioned in Section 4.2, Tanzania initiated work on its Technical Guidelines prior to the publication of WHO/AFRO’s generic guidelines. Tanzania’s guidelines included definition of the steps in surveillance and response, standard case definitions, a section describing detection, confirmation, investigation and response measures for each of the 13 selected priority diseases, and a set of new forms to be used for weekly and monthly reporting, case investigation, etc. These guidelines were an attempt to clarify standards and unify information on these 13 diseases so that health staff at various levels of the system would know how to conduct surveillance and related activities.\(^10\)

**Standards and guidelines for district level IDSR analysis:** Analysis of IDSR data at the district level was consistently weak in all districts, as documented in both the initial assessment in 1998 and the situation analysis in 2003. Most districts were not producing any regular set of analyses to monitor disease trends, nor were they monitoring IDSR system performance. Although the Tanzania guidelines included a section on IDSR data analysis, they did not provide specific guidance on what kinds of analysis were expected from the districts on a regular basis. PHRplus and NIMR developed a summary table (See Appendix 4) detailing 24 standard IDSR-related analyses that should be produced regularly by each district. This job aid was intended to provide guidance for analysis and to serve as a reference for the person(s) responsible for IDSR data analysis. The analysis standards were also incorporated into the database discussed below.

**IDSR data management and analysis tool:** Difficulty with the management of files and data was frequently seen in Tanzania, and in many districts the facility reporting forms were not filed in an organized way. All 12 pilot districts had computers (many of whom had them prior to the IDSR strengthening project), but none were using them for IDSR data analysis. PHRplus developed a district-level IDSR data management and analysis tool based in Microsoft Excel and consisting of a

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\(^9\) However, over time, communications are improving and the system will become functional.

\(^10\) Certain limitations to these guidelines have been discussed in section 4.2 and are discussed in 5.2 and 5.3.
A series of linked spreadsheets used at the district level to create an electronic database of IDSR data from the facility reports. Information from the facility paper reports is stored electronically in an organized manner, and the tool provides rapid analysis of the data and automatically creates the tables, charts, and graphs described in the IDSR analysis standards poster. In addition, the tool contains a template for creation of quarterly feedback reports from the district to facilities. The database was installed in all 12 districts by NIMR staff, and at least one person in each district was trained in its use.

5.2 Organizational determinants of IDSR performance: making the system work

In both Ghana and Tanzania, following the initial assessments, development of action plans, and the adaptation of technical guidelines, the focus of support for system improvement activities shifted to the region, district and facility levels – to those on the front lines where diseases are detected, reported, and immediate action(s) taken. In both countries, technical guidelines and norms are set at the central level but the responsibility and the resources for implementing those norms and guidelines reside at the lower levels of the health system (regional and district levels in Ghana and district level in Tanzania). As a result, the central offices responsible for disease surveillance (the NSU in Ghana, or the MoH/ECDS in Tanzania) in both countries are forced to advocate and lobby the regions and districts to consider IDSR a priority for funding and implementation. While technically in both countries the central level oversees surveillance down to the regional and district levels, in reality there are no strong organizational nor institutional links between these levels, resulting in reduced accountability for the system as a whole.

A primary requirement for the successful functioning of any decentralized health system is the clear delineation of authority, roles and responsibilities at each level of the system. Although the Ghana Technical Guidelines, and to some extent the Tanzania guidelines, provided some general description/designation of staff roles and responsibilities, improved IDSR performance required the definition of functions, tasks and expectations for all involved personnel, with more specificity at the district and facility levels. The clear articulation of roles and responsibilities was a pre-requisite for the development of appropriate training materials (see section 5.3) as well as strategies to improve performance at both levels.
5.2.1 Ghana

The Ghana Technical Guidelines included a table that outlined surveillance activities by level of the health system. This served as a useful guide, but did not answer the question raised at the planning workshop for the three northern regions of “who specifically needs to do what.” The need to answer this question led to the development of a more detailed description of roles and responsibilities (See Appendix 3) as well as the development of tools and strategies to help individuals at both facility and district level fulfill these more clearly defined roles and responsibilities for IDSR. The tools and strategies developed are described below.

IDSR Handbook for Facility Level Staff: Although the task analysis clearly indicated a number of specific responsibilities for facility level staff, the procedures in the Technical Guidelines were more generally oriented to district level staff. The development of the “Integrated Disease Surveillance and Response: Handbook for Health Facility Workers in Ghana” (GHS/MOH, 2005) provided facility level staff with specific information on their own roles, responsibilities, tasks and performance expectations under IDSR. Using the Technical Guidelines as the base, the Handbook provided specifics for facility staff and added the following:

- specific information on facility level staff roles and responsibilities;
- explanations of the critical importance of facility IDSR tasks to the surveillance system;
- specific instructions on filling out all IDSR forms; and
- explanations of specific reporting requirements for IDSR and for the routine health information system.

The first draft of the Handbook for Facility Staff was developed prior to the facility level training and provided significant inputs for the training materials. Its official review, however, took longer and it was not available for full distribution until 2005 when it was adopted by the GHS/MOH for use and dissemination throughout the country. In addition to districts in the three northern regions, this Handbook has also been distributed in at least 28 other districts covered by the subsequent USAID-funded QHP project.

Strengthening supervision: Supportive supervision is essential to ensuring that IDSR roles and responsibilities are actually carried out and that procedural and/or resource issues are addressed. Ongoing supervision and follow-up are also key to reinforcing work skills and retaining motivated personnel. To strengthen supervisory support, efforts were made to ensure the existence of:

- clear and useful supervision and support guidelines to lead supervisors through an instructive and interactive visit with IDSR personnel (at health facility and district levels) based upon field experience in supporting IDSR performance in the three northern regions;
- resources to ensure that planned supervision activities were not delayed or canceled due to the lack of available (but often budgeted) funds, or postponed due to other programs and priorities communicated from above; and
- ongoing capacity building for supervisory personnel to strengthen their ability to provide supportive, on-the-job training and reinforcement of skills rather than the more familiar critical “inspections” that were often performed in the name of supervision.
Assuring resources -- budgeting for IDSR activities: Ghana’s budgeting and allocation system for district activities remains problematic for IDSR implementation. Budget allocations are small, but more importantly, the amounts actually received are often smaller than the amounts originally promised, and are often received late. However, at least one region developed a strategy for ensuring that adequate IDSR forms would be available—the region removed the amount for reproducing IDSR reporting forms from its districts’ budgets and then used the funds to produce and distribute the forms for all their districts, effectively centralizing this responsibility.

5.2.2 Tanzania

Identification of organizational problems and strategies to address them began with the IDSR system assessment (1998) and the situation analysis (2003). The situation analysis provided the opportunity to discuss performance expectations and possible performance improvement strategies with the CHMTs. The following organizational questions were raised:

- Who was responsible for what?
- How could transportation for reporting be ensured?
- How could district officials and community leaders be engaged in both resource mobilization and effective response to outbreaks?
- What were the roles for the regional health offices and the laboratories?

More importantly, the situation analysis initiated the process of identifying IDSR teams and defining the respective roles of individual health workers in health facilities, districts, and laboratories. Appendix 5 shows the flow chart and task analysis for district level IDSR tasks resulting from the situation analysis.

IDSR is not solely the work of the health system—other actors have roles to play to ensure adequate case detection and response. Strategies were needed to engage district officials from outside the health sector as well as traditional healers. Presented below are strategies and tools that were developed by the PHRplus/NIMR IDSR strengthening team and used in some or all of the 12 pilot districts in Tanzania for addressing organizational/workplace determinants of IDSR performance.

Manual for outbreak management: Many different outbreak management guidelines existed in Tanzania—some in the Tanzania National IDSR Guidelines and some in other sources. Each guideline focused on its own disease content and used its own format, and few outlined specific district- or facility-level responsibilities. The PHRplus/NIMR team developed the Disease Outbreak Management: A Field Manual for Council Health Management Teams (URT/MoH, 2004) to compile the norms and standards from various sources into one comprehensive manual specifically targeted for district use. The manual outlines processes and procedures for districts to follow when conducting an outbreak investigation, as well as standardized disease-specific protocols for outbreak management and laboratory confirmation. The protocols for each disease include information on the standard case definition, action threshold, clinical features, modes of transmission, case management,
specific steps for control and prevention, and a list of supplies needed during an outbreak. The manual was distributed to all project districts as part of the IDSR training program.\(^{11}\)

**Assuring resources -- budgeting for IDSR activities:** Resource availability for IDSR was a key constraint for districts in Tanzania. However, because districts have access to basket funds\(^{12}\), they do have control over resource allocation. Several different strategies were used to ensure allocation of resources for IDSR activities. As a result of the situation analysis exercise and the ownership developed for IDSR, both Dodoma Rural and Babati districts included funding for specific IDSR activities in their annual Comprehensive Council Health Plans (CCHP) for 2004. A workshop for all 12 project districts on epidemic preparedness in 2004 led to inclusion of resources for supplies in the districts’ CCHPs. During district quarterly meetings and post-training follow-up visits, project staff reminded CHMTs of the importance of including IDSR-related activities and expenses in their budgets in the next district planning cycle.

**Improving communications:** Barriers to reporting were discussed during training sessions and during quarterly meetings. During these occasions, districts came up with a number of innovative and often low cost solutions to poor communications infrastructure. Box 5 shows some of the strategies implemented.

**District quarterly meeting and feedback formats:** Mechanisms and procedures for reviewing results and performance are critical to IDSR improvement. While training supported the districts to make positive changes to improve IDSR, structured post-training follow-up was required to address ongoing constraints and ensure sustainable improvements in each district. PHRplus/NIMR instituted the District Quarterly IDSR Meeting (DQM), a 2-day event based on the agenda shown in Box 6, designed to provide a forum for CHMT members to review IDSR indicators, work together on IDSR problem-solving, and to build rapport with other sectors for improved surveillance and response. The entire CHMT, plus CHMT co-opted members and some RHMT members, attended the first day and a half of each meeting. The afternoon of the second day also included district local officials (Heads of Water, Education, Agriculture Departments, etc.) and focused on improving the collaboration between these officials and the CHMT to improve IDSR performance. NIMR/PHRplus provided co-facilitation and some logistic support for one DQM in each project district, with the expectation that

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\(^{11}\) Future dissemination plans will be determined by the IDSR taskforce.

\(^{12}\) Basket funds are funds contributed to a many partners, pooled and then distributed to districts on a per capita basis. Use of these funds is dependent on approval of the Council (district) Comprehensive Health Plan and budget.
each CHMT would adapt the meeting format as required and continue on their own to hold semi-
regular meetings focused on IDSR.\(^{13}\)

Table 2 shows some examples of the kinds of problems and solutions discussed during these
quarterly meetings.

**Table 2: Solutions to Common Problems in IDSR Functioning in Tanzania**

<table>
<thead>
<tr>
<th>Common problems</th>
<th>Possible solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of uniformity/clarity among districts about days of the week on which to</td>
<td>The MOH will decide on days of the week that cases for weekly reports shall be based on and communicate</td>
</tr>
<tr>
<td>base IDSR weekly reports and on days for reporting to next level</td>
<td>to all districts [<strong>this information had not been included in technical guidelines</strong>].</td>
</tr>
<tr>
<td>Inconsistency in recording diagnosis by health workers (does not match standard</td>
<td>Health workers record the standard case definitions according to IDSR guidelines, putting their diagnosis</td>
</tr>
<tr>
<td>case definitions)</td>
<td>into brackets if they wish to add more clarification.</td>
</tr>
<tr>
<td>Modified IDSR forms need to be used in all project districts (many different</td>
<td>CHMTs and health facilities from the project districts agreed to use the modified forms</td>
</tr>
<tr>
<td>forms in use)</td>
<td></td>
</tr>
<tr>
<td>Verbally communicated weekly information not recorded at the receiving end</td>
<td>Verbal communication weekly reports will be recorded by the receiving end (district/region).</td>
</tr>
<tr>
<td>(districts)</td>
<td></td>
</tr>
<tr>
<td>Reports that arrive late from facilities after reporting to the region not used</td>
<td>Late reports should be stored and used for updating district data for compilation and analysis.</td>
</tr>
</tbody>
</table>

**IDSR District Local Officials package:** Preventing disease and combating outbreaks requires the involvement of other non-health system actors. The IDSR District Local Officials package was designed to help district local officials and other stakeholders understand IDSR, the diseases involved, and the kinds of specific actions they could take in the surveillance and response process, in collaboration with the CHMTs. The district local officials and other stakeholders targeted included District Commissioners, District Executive Officers, Councilors, Ward Executive Officers, District Education Officers, District Community Development Officers, District Water Engineers and District Agriculture & Livestock Development Officers. The package, distributed to district local officials during DQMs and other follow-up visits to districts, consists of four components:

- **A Call for Action** brochure (URT, 2005d) for district local officials and other stakeholders introduces the IDSR package and outlines the importance of district local officials taking part in disease surveillance and response. It provides brief background information on health service delivery in Tanzania and defines disease surveillance. Most importantly, the brochure explains why disease surveillance is important, why the involvement of local district officials (and the community) is critical, and what benefits they can draw from their participation.

- **Disease-specific fact sheets** (URT, 2005c) provide information about each of the 13 IDSR priority diseases in simple and clear terms (in both Kiswahili and English) that can be easily understood by people not involved in the health sector. The document describes specific diseases in terms of: definition; who gets the disease; how the disease spreads; peak transmission period; symptoms of the disease; interval between infection and when

\(^{13}\) Due to project timing constraints, the project was only able to support full DQMs in 8 of 12 districts. Modified (shorter) DQMs were held in the last 4 project districts.
symptoms appear; how long a person can spread the disease; treatment; complications associated with the disease; prevention; etc.

- **Action X Actors** (URT, 2005a) are one-page fact sheets to help district officials see what they can do concretely to support IDSR.

- **Communication for disease surveillance and response** (URT, 2005b): Communicating with various audiences about disease surveillance, prevention, outbreak, and response is one key function for district local officials. This document outlines different mechanisms that can be used to communicate the information and describes the elements of effective communication (i.e., Audience-focused; Action-oriented; Interactive; Regular; Factual and Appropriate).

**Working with Traditional Healers**\(^{14}\): Traditional healers play an important role in interpreting health events in the community. During 2004-2005, PHRplus worked in Mpwapwa, one of the project districts, to test a strategy to engage traditional healers actively in infectious disease detection and reporting. The strategy involved:

- Joint discussions between traditional healers and health personnel;
- Exchange between CHMTs from Mpwapwa and other districts that had worked more actively with traditional healers;
- Sharing with district officials and others the government’s national act regarding traditional healers (essentially, recognizing and legitimizing their role);
- Interactive workshop between traditional healers, health workers, and Ward Executive Officers;
- Orientation to traditional healers about the IDSR diseases; and,
- Introduction of a referral form and procedures for traditional healers to transfer their patients to health facilities in circumstances where the healers feel they cannot treat the patients effectively.

A review of reactions to these activities indicated that the traditional healers felt it improved the channels of communication with health personnel, making it easier for them to openly refer very sick patients. Health personnel appreciated the stronger relationship with traditional healers and felt it led to a decrease in dangerous delays in patients seeking care. The Assistant District Medical Officer in Mpwapwa stated in February 2005 that they were “…trying to empower healers. They know how to recognize outbreaks but didn’t know the proper response.” He stressed that establishing linkages with traditional healers was a “two-way cooperation. Normally we expected referrals from them, but not for us to refer and rely upon them.” Patients expressed increased confidence in traditional healers, feeling that the traditional healers’ efforts to refer them indicated sincere concern for their welfare. Although no formal evaluation was done, CHMT members observed traditional healers accompanying patients to health facilities and said that some traditional healers were coming to discuss problems with them now that had not done so before.

\(^{14}\) This intervention was supported by the CHANGE project and NIMR.
5.3 Improving workforce performance: capacity building and supportive follow-up

Several countries implementing the IDSR strategy utilized the WHO/AFRO set of generic training modules (WHO/AFRO, 2001c) that provide technically solid epidemiological content and relevant case examples. These modules target a large diverse audience. They were designed to be self-instructional (to reduce training costs) and thus do not include participatory, interactive adult-learning methods. Since they were developed to serve all countries in the region, they could not be country-specific; they focused on the “what” of disease surveillance rather than the “how.” WHO/AFRO recommended that these generic training modules be adapted to fit country and local epidemiological realities and to complement the specific protocols and procedures employed by country programs. To fully support the development of a competent IDSR workforce, training materials needed to be adapted to the local organizational context. Both Ghana and Tanzania took steps to develop capacity building strategies that recognized the differing responsibilities of facilities and districts and among various cadres within a single level of the health system.

Both Ghana and Tanzania utilized participatory training, group work, and exercises that built on participant experience to demonstrate the relevance of what was being taught to their daily on-the-job reality. Such adult learning techniques were new to many local trainers and they required either additional training or team-teaching in a “see one, do one, teach one” approach before they could implement these new training methodologies independently. In addition, both countries developed a series of simple job aids designed to be quick reminders of tasks to be accomplished and the procedures to be used. All tools were designed to support the technical IDSR norms and standards while helping staff carry out their tasks efficiently and properly and were, when possible, covered in the IDSR training.

5.3.1 Ghana

The IDSR capacity building strategy: Task analysis, assessment and discussions with local stakeholders in early 2003 at regional and district levels led to agreement on and development of a

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15 The following were suggested as the audience for these modules: clinical practitioners (doctors, nurses, clinical officers, and medical assistants), public health officers, environmental health workers, laboratory workers, data/record managers, and students (clinical, public health, environmental health and laboratory).
“bottom-up” training strategy for IDSR. In this approach, training was conducted first for facility level personnel, and then later for district and regional personnel. This “bottom-up” training strategy was chosen for two reasons:

1. the frequent failure of many top down training strategies where district staff are trained and expected to train lower level staff (without sufficient technical, organizational or financial support); and

2. the perception that it would be counterproductive to train district level personnel to use data that would not yet be flowing to them and to supervise activities that were not yet being carried out.

NSU, RHMT and DHMT stakeholders all agreed that it was better to start training personnel and initiating activities at the facility level and then build capacity at the district level to support facility level efforts and overall IDSR performance.

Another element of the capacity building strategy was a strategy of “see one, do one, teach one” and was organized by inviting district personnel to the facility level trainings conducted in their districts. This proved to be an effective way to familiarize the district staff with the newly clarified IDSR roles and responsibilities of facility personnel. A clear understanding of how the system should function at the facility level is essential if district personnel are to provide support and supervision. In the initial districts, the IDSR team from PHRplus and the NSU were lead trainers/facilitators, with district and regional staff participating as facilitators and observers. Key DHMT and RHMT members attended facility level trainings to receive an update on IDSR specific roles and responsibilities of facility level staff and become familiar with the training design and activities so they would become facilitators for subsequent facility level trainings in the future.

Because the WHO/AFRO training materials focused more heavily on district level tasks, PHRplus, with the NSU and the RHMTs in the three northern regions, developed specific materials for facility level staff (GHS/MOH/NSU, 2005c). The training package for facility level staff was created using the analysis of surveillance tasks to be performed at the health facility level by various personnel, the results of a rapid training needs assessment, and content from the Ghana-adapted training modules on IDSR for district health teams. The package included specific content for three types of facility level staff (See Box 8). The facility level training materials included a pre- and post-test and evaluation, post-workshop assignment, facilitator’s guide, participant’s guide, and the handbook for IDSR at the facility level.

When the facility level training was completed, training at the district level followed in the three northern regions and Brong Ahafo, focusing on outbreak investigation and analysis, response, supervision, and monitoring and evaluation (M&E) tasks. These trainings lasted five days and were attended by all of the DHMTs in the selected regions. RHMT staff participated as facilitators and, based on the experience they gained, the NSU subsequently used these RHMT staff to provide training support in other regions. Because Ghana had already adapted the WHO/AFRO training

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**Box 8: Ghana’s facility level IDSR training package**

- three days for in-charges and nurses
- one day for facility statistics officers (which was combined with one day of the training for in-charges and nurses)
- a special half-day session for clinicians

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16 Although IDSR district level training took place during the period 2003-2005 in several regions, only those in the three northern regions and Brong Ahafo used this approach.
modules for district level training and had begun using them in the Volta region, it was not necessary to develop a new set of materials. However, additional training materials (primarily presentation slides that addressed the why, how, by whom, etc. of the IDSR district level tasks) were developed to complement the self-guided WHO/AFRO modules (GHS/MOH/NSU, 2005b). These materials permitted a more interactive training format. Further review of materials will take place in 2006, supported by USAID’s Quality Health Partners project.

**Job aids to facilitate worker performance:** A number of job aids were developed to provide quick reference and, often, visual reminders/reinforcement of the roles, responsibilities and skills necessary for IDSR to succeed. The job aids included a wall poster with reporting requirements and deadlines; disease specific fact sheets with Standard Case Definitions (SCDs) and reporting requirements for clinicians; and the *Standard Case Definitions for 23 Priority Diseases: For Integrated Disease Surveillance and Response (IDSR)* pamphlet (GHS/MOH/NSU, 2004).

### 5.3.2 Tanzania

**Capacity building strategy:** Several challenges were encountered during the development of a capacity building strategy in Tanzania. The *Tanzania National IDSR Guidelines* were developed prior to the WHO/AFRO guidelines, and did not correspond to the IDSR functions that formed the basis of the WHO/AFRO generic training modules. The strategy for the 12 project districts built upon findings from the situation analysis, capacity building literature, other capacity building materials used in Tanzania, the WHO/AFRO generic training modules, and input from key stakeholders. Because the Tanzania technical guidelines did not contain a clear delineation of responsibilities across levels, the training materials were developed with a particular emphasis on helping district and facility staff to:

- identify their specific job responsibilities related to IDSR ("what");
- understand the importance of doing these tasks ("why"); and
- acquire the knowledge and skills needed to perform these tasks well ("how").

Capacity building interventions addressed job expectations, performance feedback, motivation, skills, and knowledge. Two complete packages of training materials were developed, including participant manuals, instructor/facilitator manuals and TOT materials for both district and facility level staff (URT, 2004b,c,d,e). Appendix 6 outlines the steps taken to develop the capacity building package, and summarizes topics addressed in the district and facility level packages.

Training sessions used a participatory, interactive approach based on adult learning methods that drew on and supported participants’ own experiences. For most participants, this was a significantly different approach compared to previous trainings they had attended. To ensure the relevance of training, each module concluded with an “application planning” section, in which participants worked in teams to identify district-specific problems and develop strategies to resolve these problems that they could apply after returning to their own real world work situations.

17 The facility level modules have been endorsed by the IDSR taskforce, but there is still work ahead in harmonizing the district modules with the existing MOH modules adapted from WHO/AFRO. The IDSR taskforce will address this activity in the near future.
In addition to developing training materials, there remained the challenge of creating local capacity to provide training. The MOH’s original goal in having 12 project sites was to generate effective training, tools, and strategies, and to create the capacity to replicate this package of interventions and improve IDSR performance in other regions and districts throughout Tanzania. In 2004, when the country-specific IDSR training materials were being developed, Tanzania had 6 Zonal Training Centers (ZTC), each covering 4 regions, to meet the training needs of districts and regions. Capacity and performance of these ZTCs varied considerably, and staff members from the three strongest ZTCs were selected to participate actively in the IDSR training for the 12 project districts. ZTC staff were engaged in reviewing training materials and provided with an update on adult learning/participatory training methods. With support from NIMR/PHRplus and RHMT members, the ZTC staff members were subsequently responsible for training regional and district trainers, coaching and mentoring new trainers, and supervising and supporting facility level training.

After the formal IDSR training sessions, PHRplus/NIMR staff visited the districts to further support IDSR implementation and to identify and try to reduce obstacles to successful implementation.

**Job aids:** Several job aids were developed and distributed to project districts: laboratory job aids for specimen collection and transport, a poster of standard case definitions for all 13 priority IDSR diseases, and a guide for IDSR data interpretation. These job aids were developed in response to findings from the situation analysis and other initial pilot district assessment activities. For example, laboratory data to support IDSR were weak, with inadequate quality and quantity of specimens, incomplete documentation and missing or late laboratory data reports. Several underlying causes were identified, such as shortages in supplies and reagents, a lack of trained staff, and a lack of standard procedures. Health workers also had varying perceptions of their roles and responsibilities related to laboratory confirmation of epidemic-prone diseases. Because specimen collection and preparation for transport is often a rare task for facility and district health workers, job aids were important in helping them to perform this task correctly. CDC, in collaboration with NIMR and PHRplus, developed a series of job aids (sample shown in Appendix 7) for health facility and district staff preparing specimens and for referral laboratory staff receiving specimens, providing feedback to districts, and reporting results. The laboratory job aids were presented in a condensed, user-friendly format, based on the accepted standards and norms. All job aids developed, tested and implemented in Tanzania have been compiled by CDC and produced as a *Compilation of Job Aids for Laboratory Confirmation* (URT and CDC, 2005) and disseminated to international partners and donors.

In addition to the laboratory job aids, a laminated poster showing the standard case definitions for the 13 priority diseases was produced and distributed to health facilities in the project districts. Some health facility staff photocopied the job aid and either hung it on the wall or put it on their office tables for reference. Many health facilities also reported that the SCD job aid was being used by other staff at their health facilities who did not attend the IDSR training.

A 2-page data interpretation guide was developed as a job aid to accompany the district IDSR data management and analysis software tool described earlier. The guide was produced as a 2-sided laminated reference card to aid the IDSR focal person (or District Health or Medical Officer, as applicable in each district) to interpret graphs produced by the software. The guide included an

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18 These job aids were submitted for technical review by national and regional (WHO/AFRO) laboratory specialists, followed by a pre-test with regional and district health workers in Tanzania. They were adopted for national use after additional review and national meetings of stakeholders.
overview of general data interpretation issues and steps, as well as questions to ask when reviewing morbidity, mortality, and reporting timeliness and completeness data (see Appendix 8).
6. Performance in Ghana and Tanzania

This section reviews measures of IDSR system performance in both Ghana and Tanzania during 2004-2005. The data presented pertain specifically to those districts supported throughout the PHR plus project. It should be noted that these data were not collected simultaneously in other non-intervention districts and, in some areas, the first data collection did not represent a true baseline. As the interventions were designed and implemented as part of a full “package” of support to districts, it is not possible to use these data to attribute measured changes in performance to any specific intervention or strategy.

Monitoring and evaluation (M&E) of performance is one of the seven functions of surveillance systems and is a key element of the IDSR strategy. WHO/AFRO provided a list of suggested indicators for districts to monitor as part of the generic guidelines, and later developed a more specific and detailed set of indicators for districts (WHO/AFRO, 2005). Districts are expected to regularly collect data related to these indicators, analyze results, and use the information to improve performance for routine services as well as epidemic response. This section presents results for selected “routine” IDSR M&E indicators, as well as additional data collection done in focus districts and regions (7 districts in 2 of the northern regions in Ghana and all 12 project districts in Tanzania). The additional indicators (shown in the bottom half of Table 3) were chosen to complement the WHO/AFRO indicators, and to provide additional insight into improvements in system performance. Data were collected in both countries during two periods, once in 2004 and once in 2005, and complete data are also available in Gueye et al. 2005 and 2006, Ghana internal monitoring and evaluation reports.

Table 3: Indicators used to evaluate IDSR performance in Ghana and Tanzania

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Ghana</th>
<th>Tanzania</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WHO/AFRO Indicators:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timeliness of weekly and monthly reporting (facility-district; district-region)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Completeness of weekly and monthly reporting (facility-district; district-region)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Routine analysis of data (facility, district)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Appropriate investigation of suspected outbreaks</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Effective laboratory confirmation process</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Appropriate response to confirmed outbreaks</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Quality of case management during outbreaks (case fatality rate)</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Additional Indicators:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy of reporting (facility-district; district-region)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Reporting of priority diseases using case-investigation forms (district)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Surveillance monitoring (district, region)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Planning and monitoring based on IDSR data (district)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Investigation and response to outbreaks (region)</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Outbreak preparedness (district)</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Evaluation of outbreak management (district)</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
The specific results for Ghana and Tanzania include the availability of tools described in Section 5, and the following key aspects of IDSR performance: reporting, data analysis, outbreak management, use of IDSR data, feedback and coordination.19

### 6.1 Ghana – IDSR Performance

Two rounds of monitoring and evaluation data collection were conducted with support from the PHRplus project. Data were collected in a sample of seven districts (Bole, Nanumba, Tolon, Wa, Nadowli, Gushegu and Tamale) in the Northern and Upper West Regions. Data collection took place during July-August of 2004 and during July-August of 2005. At the time of the first round of data collection, facility level staff in 4 of the 7 districts had received training, while district staff in only 2 of the 7 districts had received training. By the second round of data collection all districts had completed IDSR training for both facility and district level staff. As a result, the data collected reflect the level of IDSR performance at two points in time but do not represent a true “before and after” scenario. In particular, improvements at the facility level (where many had already received training prior to the 2004 data collection) can be attributed in part to the effects of the intensive, post-training supportive supervision that was carried out during that period.

It should also be noted that there was significant staff turn-over in these districts between the two rounds of data collection. In spite of having staff members from all health facilities in all of the project districts during the period between May 2003 and August 2005, only 20-25% of staff interviewed in 2005 had been trained in IDSR.

**Availability of tools and job aids:** Availability of tools, forms and job aids necessary for IDSR improved between 2004 and 2005. There were large increases in the availability of the Standard Case Definitions pamphlet (54% to 80%), the Facility Level IDSR Handbooks (0% to 60%), and the Log Book of Rumors and Investigations (10% to 50%).20 Although the models for case investigation forms are available in the National Guidelines for IDSR and training modules, they are not centrally produced and distributed to districts. The districts are supposed to make copies from the above mentioned documents but due to lack of funds, rareness of outbreaks, inadequate supervision, and/or lack of feedback from the referral laboratories, these case investigation forms have not been adequately used and submitted.

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19 Full M&E reporting, including methods and samples for Tanzania (Gueye et al., 2005); (Gueye et al., 2006) are available on the PHRplus website (www.phrplus.org).
20 Although the models for case investigation forms are available in the National Guidelines for IDSR and training modules, they are not centrally produced and distributed to districts. The districts are supposed to make copies from the above mentioned documents but due to lack of funds, rareness of outbreaks, inadequate supervision, and/or lack of feedback from the referral laboratories, these case investigation forms have not been adequately used and submitted.
The increased availability of most forms was due to NSU efforts to distribute them widely through RHMT and DHMT channels as well as being distributed to participants at all IDSR training sessions. The Facility Level Handbook and the Log Book of Rumors and Investigations had not yet been distributed widely at the time of the 2004 data collection exercise. These two tools were distributed primarily through supervision visits to facilities or district level review and information exchange meetings that the districts organized periodically. The system was fairly effective in communicating important technical information down to the facility level through existing communication and support channels.

**Reporting:** The completeness (i.e. the percentage of expected reports received) and timeliness (i.e. the percentage of expected reports received on time) of the weekly and monthly IDSR reports submitted from facilities to districts and districts to regions improved between 2004 and 2005, as seen in Figure 4 below. One RHMT member from the Northern region remarked, “*When we visit a health center we can quickly tell whether the staff have received IDSR training from the way their files and work are organized and completed.*”

**Figure 4: Completeness and Timeliness of weekly and monthly IDSR Reporting in Ghana (7 districts in 2 northern regions)**

Data accuracy is critical to IDSR as a tool for public health action. The accuracy of data included in the IDSR weekly and monthly reports improved at the district level (i.e. reports sent by districts to the regions accurately reflected the data contained in the facility level reports received and aggregated), rising from 46% in 2004 to 85% in 2005. Improvements at the facility level (i.e. the facility level reports accurately reflected the data contained in the clinic/facility registers) were relatively minor (82% to 86%), but the level of accuracy was already quite high at the time of the first round of data collection (NB: many of the facility staff had already received training at the time of the 2004 data collection).
### Table 4: Improvements in IDSR Data analysis in Ghana

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>District level:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any analysis for IDSR diseases</td>
<td>57%</td>
<td>100%</td>
</tr>
<tr>
<td>Analysis current</td>
<td>0%</td>
<td>86%</td>
</tr>
<tr>
<td><strong>Facility level:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any analysis for IDSR diseases</td>
<td>41%</td>
<td>78%</td>
</tr>
<tr>
<td>Analysis current</td>
<td>2%</td>
<td>70%</td>
</tr>
</tbody>
</table>

**Data analysis:** Data analysis improved significantly, with both districts and facilities analyzing their IDSR data and having analyses up-to-date (See Table 4). Most districts were up-to-date with respect to required analyses for malaria (86%) and between 42-57% had current analyses for measles, meningitis and guinea worm. Among facilities, 70% had current malaria analysis, although fewer had performed analysis for measles, meningitis and guinea worm.

**Outbreak management and preparedness:** Appropriate management of suspected outbreaks is essential to minimize morbidity and mortality. In 2004, five of the seven districts reported a suspected outbreak of an epidemic-prone disease within the previous three months. In the 2005 round of data collection, no district reported a suspected outbreak. The 2004 data indicated an average score of 76% (i.e. completing 76% of expected tasks) on outbreak investigation. The two districts having already received training performed better than the districts where training had not yet been completed (86% vs. 70%, respectively), primarily because they recorded the suspected outbreak in a logbook at the district and analyzed and interpreted case-based data collected during the investigation.

**Feedback and Coordination:** Despite efforts to strengthen and improve support and supervision to facilities and districts, the levels of feedback reported did not improve. Feedback from regions to districts, as reported by districts, did not improve significantly over time (remaining around 65% as an overall score); feedback from districts to facilities only improved slightly from 51% to 63% (measured as the proportion of facilities reporting feedback from the district). This increase was noted in district feedback on the quality of reports (54% to 80%) and on aggregated or comparative data (22% to 57%).

**Planning and use of IDSR data:** Planning for IDSR activities and planning based on IDSR data are two important components of system performance. By 2005 all of the seven districts used IDSR data to describe the existing health situation in their annual plans, and six of the seven used data as a justification for activities contained in their 2005 plans. All seven districts included core IDSR activities such as training and supervision in their plans. Six districts had included IDSR review meetings as part of the previous year’s (2004) plan and indicated that those activities had actually taken place. All seven districts had included IDSR training in their 2004 annual or quarterly action plans and all seven documented that these trainings had actually taken place.

### 6.2 Tanzania – Results of IDSR Performance

PHRplus also supported two rounds of monitoring and evaluation data collection in Tanzania. A baseline assessment was carried out in early 2004 (Gueye et al., 2005), followed by a second round of data collection during May-June 2005 (Gueye et al., 2006). For both rounds, data collection was done in all 12 districts, including a sample of 109 health facilities (one hospital, two health centers
and 15 percent of dispensaries in each district). Data collection included record reviews, group interviews, an individual survey of attitudes and motivation, and an assessment of IDSR knowledge and skills (second round only). Baseline data were collected prior to any training events at the district and facility levels. High staff turnover (as seen in Ghana) was evident. Only 60% of those interviewed in the 2005 round of data collection had participated in IDSR training. Turnover was particularly high in facilities, with a range of 21%-73% of facility staff interviewed in 2005 having participated in the IDSR training. It should also be noted that some of the tools were not introduced until 2005 (e.g., analysis standards, IDSR database, and interpretation guide), and so there was insufficient time to evaluate their effects before the project ended.

**Availability of tools and job aids:** The two M&E surveys revealed little difference in the availability of case investigation forms and registers. However, availability improved for the revised weekly (65% to 91%) and monthly (76% to 90%) reporting forms. At the second data collection, case investigation forms were available in fewer than 20% of facilities overall. The new weekly and monthly data sheets were available in about half the facilities. It should be noted that the districts were responsible for making and distributing copies of all of these forms. By 2005, half the facilities had a copy of the standard case definition poster. At the district level, only 5 of 12 districts had the laboratory confirmation job aids. However, all had received the Disease Outbreak Management Field Manual, the data analysis standards, database, and interpretation guides.

**Reporting:** Timeliness and completeness of weekly and monthly reports increased substantially at follow-up, with a few districts exceeding performance targets (80%) and most of the rest steadily approaching these targets. The overall results for timeliness and completeness of reporting are shown in Figure 5. One RHO commented on this dramatic improvement in the project district in his region compared to his other districts: “While other [non-project] districts were reporting at approximately 50% completeness, the project district (Masasi) was over 90% complete every month.” Moreover the RMO said he “can believe reports from Masasi – not so from other districts.”

**Figure 5: Completeness and Timeliness of Weekly and Monthly IDSR Reporting from Facilities and Districts in Tanzania (12 project districts)**

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21 In some cases, this was because the persons to whom these tools were distributed (in trainings or follow-up visits) decided to keep the tools for themselves rather than leaving them accessible for colleagues.
The 4 districts that were trained during the last round of training, however, continued to lag behind. The facilities in these districts received only 2 days of training (instead of 4 days in the other districts), and, due to the close-out of the PHR+ project, they received fewer post-training support visits from NIMR staff to reinforce what they had learned in the IDSR training and to solve IDSR implementation problems. Table 9 shows differences in timeliness and completeness of weekly and monthly reports for the first 8 districts trained and the last 4 districts trained, corroborating the notion that on-going support is needed to achieve the desired results.

Table 5: Comparison of facility level timeliness and completeness results between 8 districts trained in first two rounds and 4 districts trained last

<table>
<thead>
<tr>
<th></th>
<th>First 8 districts</th>
<th>Last 4 districts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Baseline</td>
<td>Final</td>
</tr>
<tr>
<td>TIMELINESS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekly reports</td>
<td>4%</td>
<td>68%</td>
</tr>
<tr>
<td>Monthly reports</td>
<td>30%</td>
<td>72%</td>
</tr>
<tr>
<td>COMPLETENESS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekly reports</td>
<td>17%</td>
<td>80%</td>
</tr>
<tr>
<td>Monthly reports</td>
<td>40%</td>
<td>85%</td>
</tr>
</tbody>
</table>

Data accuracy for reported cases (facility reports compared to district reports) improved slightly for all diseases at follow-up. The range of agreement for frequent conditions between facility registers with numbers in facility reports submitted varied from 13-52% in the baseline, while in the follow-up it had improved to a range of 35-66%. Due to their small numbers, rare diseases were more likely at both baseline and follow-up to be in agreement. Accuracy, however, still remains a problem.

Table 6: Improvements in IDSR Data analysis in Tanzania

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>District level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any malaria trend analysis</td>
<td>17%</td>
<td>75%</td>
</tr>
<tr>
<td>Analysis current</td>
<td>0%</td>
<td>33%</td>
</tr>
<tr>
<td>Facility level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any malaria trend analysis</td>
<td>28%</td>
<td>42%</td>
</tr>
<tr>
<td>Analysis current</td>
<td>3%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Data analysis: Analysis of malaria data was used as an indicator for routine analysis of IDSR data. Between 2004 and 2005, significant improvements were seen in the percentages of districts and facilities analyzing malaria trends, although there was still room for improvement, particularly at the facility level. It should be noted that the IDSR databases to facilitate analysis were installed only shortly before the evaluation in 2005. One health facility staff member said:

“...Even about data analysis, in the past, even if they managed to deliver [the reports], people at the health facilities felt as if it was a report for the district office only... But we didn’t see that they were reports or data that were helping us here, in checking our situation...” [Eisele et al., 2006]
A CHMT member reported:

“We bring [the analysis report] to the CHMT meeting and read it. We also look at the annual trends...how is it compared to the past year. We see where we need to put more effort depending on the data we have...we can see if in one place there is an increased prevalence of a certain disease.” [Eisele et al., 2006]

In order to improve handling and analysis of IDSR data, computer software was developed and installed in the pilot districts. The May 2005 analysis and response (A&R) Research Final Survey (Eisele et al., 2006) found:

- 72% (8/11) of districts were entering data on completeness and timeliness
- 45% of districts were up-to-date on data entry
- Trained personnel in 11 districts said the database tool made data entry easier. Other benefits included: “improved data management,” “more accurate and reliable data”, “decreased workload”, and “data accessible to all CHMT.”

Box 9 shows availability and use of the data interpretation guide shown in Appendix 8.

**Application and Retention of Knowledge and Skills:** The results in Table 7 for district and facility level training pre- and post-tests (and the subsequent 2005 evaluation) show considerable gains in knowledge, particularly for staff at the facility level. Data collected during the 2005 M&E survey showed that although there was some training decay at the district level, trained personnel were more knowledgeable than non-trained personnel. Weaknesses noted were related to data analysis and M&E. At the facility level the M&E survey showed no indication of training decay.

**Table 7: Improvement in overall scores during IDSR training in Tanzania**

<table>
<thead>
<tr>
<th></th>
<th>During Training</th>
<th>2005 Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre test</td>
<td>Post test</td>
</tr>
<tr>
<td>District staff</td>
<td>67%</td>
<td>82%</td>
</tr>
<tr>
<td>Facility staff</td>
<td>39%</td>
<td>64%</td>
</tr>
</tbody>
</table>
Training had an immediate and dramatic impact on weekly and monthly reporting, as seen in the example from Masasi district (Figure 6). Similar patterns were evident in all 12 project districts. One CHMT member stated:

“But after this training it has helped very much, even at the health centers. All of them have realized that it is their responsibility, it is their responsibility even if there is no specific person…everyone has to see that he has the responsibility of giving the required report. Also even here at the district, right now if you ask about the district team everybody can explain to you quite well how these diseases and their reports are being followed up.” [Eisele et al., 2006]

Outbreak management and preparedness: Five outbreaks were recorded in project districts from January through March 2005. Outbreak management performance was generally strong (average score of 83% of outbreak management tasks), as it had been at the baseline (where 10 districts reported outbreaks). The response component remained basically stable over time. High case fatality rates in 2005 for cholera and meningitis, however, suggest the need for improved case management for these diseases.

Feedback and Coordination: Feedback from the regions to the districts actually declined somewhat from baseline levels, while feedback from districts to facilities improved slightly. Districts continued to perform quite strongly in coordinating and communicating with partners and stakeholders. Some districts used creative, inexpensive ways to provide feedback on timely and complete reporting, such as sending a summary sheet of facility timeliness and completeness to all facilities or posting it at the district office for all facility staff to see when they came for their monthly salary collection.

Monitoring and Evaluation of IDSR performance by Districts and Regions themselves: Districts are supposed to monitor their own IDSR performance. Although staff in 9 of the 12 districts knew the IDSR indicators, only 5 districts showed any evidence in 2005 of calculating their values (timeliness and completeness of reporting, analysis of data, outbreak response and case fatality rate)
and taking action on the findings. Only 4 districts met to review their IDSR performance data after the first DQM organized post-training.

**Planning and use of IDSR data:** All districts reported having used data to plan and monitor, and were able to provide examples. This did not represent a significant change from the baseline. The challenge going forward will be to continue improving the accuracy, timeliness and completeness of IDSR data so that districts can be confident that they are using high quality data in their planning and monitoring activities.
7. Conclusions

7.1 Summarizing the Experience

The triangle in Figure 1, presented in simplified form in Figure 7, outlines the technical, organizational, and workforce determinants related to IDSR performance. Both the successful and less successful experiences in Tanzania and Ghana highlighted the need to take conscious action to address all three determinants at various levels of the health system in order to improve performance. Although the technical components of the IDSR system are critical to its proper functioning, equal if not greater attention must be paid to the organizational and workforce determinants that also govern how well IDSR functions.

Figure 7: Simplified Framework of Factors for IDSR Improvement

Both countries made a conscious effort to address a wide range of technical, organizational and workforce issues to strengthen IDSR. Many of the initial efforts (training, materials and job aids development) recognized the need to transfer technical IDSR information in order to improve workforce performance. The situation analyses had indicated that the technical elements of the system, as presented in the Technical Guidelines, needed to be broken down into concrete, specific tasks for the wide range of health system personnel involved in IDSR.

The IDSR teams in Ghana and Tanzania also recognized the critical importance of the organizational context and its impact on IDSR performance. Because IDSR is embedded into the broader health system, it is affected by the health system’s strengths and weaknesses. The workplace environment, the workforce itself, and local actors and communities have a strong influence on how IDSR will function and all are affected by the complex interplay of factors in the overall health system.

The M&E results presented in the previous section show a positive, although sometimes mixed, picture of IDSR performance improvement. Some areas showed definite improvements, as can be
seen in reporting at the facility and district levels. Other areas have not yet demonstrated improvement, in some cases because more time is needed to evaluate interventions recently implemented, and in other cases because more remains to be done. In many cases, resource and infrastructure limitations created limitations on IDSR performance results. Tackling these issues requires addressing broader systems issues of decentralization, resource generation and allocation, accountability, management capacity at the district level, and existence of IDSR champions at national, sub-national and local levels. The combined experiences in Ghana and Tanzania lead to a series of general conclusions that are valid for both countries and are likely to be applicable to others as well. This section highlights some conclusions about the specific interventions introduced to improve IDSR performance and about a variety of broader systems issues that influence that performance.

7.2 Future of the tools and strategies developed in Ghana and Tanzania

One measure of the impact of work done in project districts is the replication of the work in other parts of both countries. There are already examples of interest expressed by districts that neighbor project districts in Tanzania to take up training and other reforms: Arusha Region has already begun instituting training and IDSR reforms introduced in neighboring Dodoma, and Mtwara Region, aware of the project in its district of Masasi, has asked for IDSR training materials to initiate training in its other districts. In Ghana, IDSR support has been taken up by another project (Quality Health Partners) which is using materials and tools developed and used in the three northern regions and expanding implementation to another 28 districts in the 7 remaining regions of the country. Table 8 shows how the tools and materials have been used by other areas or as national tools.

Table 8: Adoption and use of IDSR materials in other areas of the countries, as of January 2006

<table>
<thead>
<tr>
<th>Tools and Materials</th>
<th>Adopted officially by government</th>
<th>Being used in other areas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tanzania</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>District Training Materials</td>
<td>IDSR task force will harmonize with existing district training materials</td>
<td>X</td>
</tr>
<tr>
<td>Facility Training Materials</td>
<td>Endorsed by IDSR task force</td>
<td>X</td>
</tr>
<tr>
<td>Outbreak Management Manual</td>
<td>Endorsed by IDSR task force</td>
<td>X</td>
</tr>
<tr>
<td>Laboratory Confirmation Job Aids</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Analysis standards and interpretation job aid</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>District Local Official’s IDSR Package</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Package for working with traditional healers</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ghana</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous problem solving and learning method</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>District Training Materials (additional materials)</td>
<td>Will be reviewed in 2006</td>
<td>X</td>
</tr>
<tr>
<td>Facility Training Materials</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Facility level Handbook</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Supervision guides</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>IDSR Wall poster</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Standard Case Definition booklet</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Communicable Disease District Analysis Book</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>IDSR disease fact sheets</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
In both countries, the strengthened IDSR systems have been used as a starting point for addressing the concern about how to promptly detect and respond to avian influenza. In Tanzania, USAID has funded a cooperative agreement that will provide additional resources to develop and test approaches to adding influenza-like illness to the existing IDSR system. The tools and strategies developed through PHRplus for strengthening IDSR can be easily modified or expanded to include both avian influenza and other emerging infectious disease threats.

7.3 Recommendations for strengthening IDSR performance at the district and facility level

This section presents recommendations on what districts and facilities can do to improve their IDSR performance, based on the PHRplus experiences in Ghana and Tanzania.

Use existing tools and strategies: Many tools and strategies exist that countries can use to strengthen IDSR, either because these strategies are already in place for uses other than IDSR or because they have been tested as part of IDSR strengthening in other countries, such as these examples from Ghana and Tanzania. There is often no need to “reinvent the wheel” – however, there is a need to adapt “the wheel” to the operational context in which it will be used. When applying existing tools and mechanisms, it is important to address the following questions:

- Do standards and norms exist and are they available in formats that are easy for workers to understand and use?

- How are the roles and responsibilities for implementing these norms distributed across levels of the system (sub-national, district, facility, community) and which specific cadre is responsible for implementing them? Are roles and responsibilities documented and clear?

- Are there organizational factors that prevent individuals from fully carrying out their roles and responsibilities?

- Is additional capacity building needed?

- How will this capacity building be carried out and reinforced over time?

Although the capacity building materials developed in Ghana and Tanzania were oriented to their specific health systems, the materials could be easily adapted for other countries. Much of the content will be valid generically, and the methods used to build capacity are supported by both research and experience (see Appendix 6). Successful adaptation of these materials to a different country context would require a local task analysis to determine and document IDSR roles and responsibilities at all levels, and modification of the training materials to match this local task analysis. Similarly, many of the local innovations to solve operational problems could be modified for each novel country situation, and the job aids adapted to the setting, priority diseases, and norms.

Ensure supervision and follow-up for improvement and sustainable results: The results from both Ghana and Tanzania showed that guidelines themselves were not sufficient, and that, while training had an important impact, it was not sufficient on its own to ensure sustained capacity and implementation over time. Supervision and follow-up are key to maintaining and improving IDSR performance. In Ghana, the impact of supervision and follow-up was demonstrated by improvements
between two post-training periods in terms of reporting and data analysis at the facility level. In Tanzania, districts that received less follow-up showed less improvement than those receiving more follow-up.

Frequent supervision and follow-up provide an opportunity to update skills, encourage accountability, address problems and constraints, and motivate workers. In both Ghana and Tanzania, tools and strategies (facilitative supervision guides in Ghana and district quarterly meetings and supervision visits in Tanzania) were used to structure this follow-up so that capacity building and problem-solving would take place. District and regional IDSR staff in both Ghana and Tanzania, however, experienced difficulties in carrying out adequate and sustainable follow-up and supervision, due to resource constraints at district, sub-national and national levels.

More work is needed on really making use of data for decision-making: Over the several years of work described in this document, the majority of efforts were focused on the creation and analysis of data, with somewhat less attention on the decision-making processes operating in these contexts. Although obtaining data and transforming it through analysis into information are key steps in the appropriate use of data for decision-making, more attention needs to be paid to the decision-makers themselves and the decision-making processes. In reality, there are still many barriers to effective use of information, including the lack of resources and clear authority to take action at the local level. In some cases, there are also political factors that may impede use of data to inform public health action.

In both Ghana and Tanzania some evidence was seen of IDSR data analysis and interpretation in district and regional plans, and some individual IDSR focal persons were extremely active in using their information to advocate for action with various decision makers. This appeared to be related more to individual personality and drive than indicative of a general tendency in the majority of districts. Many of the IDSR staff in both countries often had strong technical skills, but few had been trained as health managers. IDSR staff often had difficulty translating the results of data analysis into action planning and effective implementation, as well as in knowing how to use data to advocate for more resources or for specific decisions at higher levels. Future work on strengthening IDSR needs to focus on building capacity to advocate, using data, and to translate results into implementation of action planning. This should be a major focus of supervision and follow-up, and actions in this arena will need to be integrated with general district level strengthening activities under decentralization.

### 7.4 Conclusions on broader health systems issues and their impact on IDSR performance

IDSR is a set of functions and activities and its performance is influenced by many broader health systems issues. The following conclusions focus on the interactions between IDSR and the broader health system.

**Engage stakeholders at various levels from the beginning:** IDSR strengthening, like any system strengthening activity, needs champions. Experiences from both Ghana and Tanzania show that where and when leadership and direction did not exist, progress was limited. Support is not limited to central level support, but also support from sub-national and district levels. IDSR performance requires a sustained effort both for improvement and for maintaining improvement in the timely flow of information and action over time.

Stakeholders include more than the IDSR staff (or those who carry out some IDSR tasks) at the district and facility levels. RHMT engagement in training efforts in Ghana and Tanzania, and the use
of Zonal Training Centers in Tanzania, helped ensure broader knowledge and therefore support to IDSR. At the district level, stakeholders included local officials who provided material and moral support to IDSR, as well as having specific tasks. When all these stakeholders were actively engaged, IDSR functioned better.

Strengthening IDSR performance requires leadership. At the national level, this means someone who calls attention to the need to strengthen IDSR, who can clearly show why it is important, and who motivates others to put effort into its improvement. Improving IDSR performance in many cases means actually changing the way people work – so that they believe in the utility of the data being collected, they examine that data to see what it says about what is happening, and they are convinced that they can and should act on what the data tells them. Monitoring and evaluation of IDSR inserts notions of accountability for what people do, because the IDSR performance data tell them clearly whether they are performing up to standards. However, these types of changes in the “organizational culture” need leadership and positive support.

Examine and seek to understand IDSR performance within the country’s decentralization context: Both Ghana and Tanzania, as well as many other countries are in the process of decentralizing their health sectors and overall local administration. The locus of decision-making and authority over resources shifts with decentralization from the central level to the periphery. The IDSR strategy itself calls for a shift in action/responsibility from the central to the district level. IDSR also supports an integration of surveillance systems and more efficient use of resources to counteract the top-heavy, vertical programs’ parallel systems in which data mostly flowed upward through the system with little analysis and use at the district and/or facility levels.

Like most other health activities, IDSR requires national and intermediate level input related to norms and standards (e.g., guidelines), capacity building, and follow-up. However, IDSR also requires more active involvement at these higher levels for response to outbreaks or changing epidemiological situations. While decentralization generally promotes a shift of resources to lower levels, there still is a need to protect IDSR budgets at the national and intermediate levels.

The effects of decentralization in Ghana, for example, have left the National Surveillance Unit (NSU) with extremely limited resources and no authority over the regional level. The NSU can only use its influence to try to get regions and districts to conduct training, use materials and tools, and do supervision and follow-up. Currently there is no entity with direct authority over the regions and districts that can hold them accountable for their IDSR performance.

In Tanzania, decentralization and empowerment of the districts have left the regions with extremely limited resources. In fact, in 2003, they had no budget from which they could fund their travel to participate in outbreak investigations or to support districts in any IDSR activities beyond those for routine RHMT supervision activities. Districts were left with financial responsibility for IDSR, often without adequate budgets to cover activities or with resources coming in that were late and/or inadequate. Accountability for IDSR was often somewhat unclear.

Need to recognize and address resource constraints to IDSR performance: The availability of adequate resources that have been allocated and budgeted for IDSR is critical to improved IDSR performance. In numerous situations, implementation of IDSR technical guidelines does not occur due to the lack of these resources. For example, Ghana’s initial IDSR assessment identified the lack of effective and reliable communication among many facilities in remote areas as a constraint to system operation and performance. The need for rapid communication of data with respect to several IDSR diseases is clearly spelled out in the technical guidelines. The lack of a reliable means of communication posed a major obstacle to remote facilities in their ability to follow the technical
guidelines. Although in both Ghana and Tanzania, some creative solutions were found to address communication constraints in certain districts, adequate resources were not available to address this problem.

One key IDSR constraint is inadequate funding at the local level. This constraint is not specific to IDSR, but adequate funds are needed in decentralized budgets as well as at the central level to provide capacity building and supervision, technical updates, and response support. Resource allocations are often inadequate. The small amounts of funding allocated must be split among several programs and priorities at the regional and district levels, and as a result, IDSR is often shortchanged or overlooked. Despite this challenge, regions and districts are still responsible for covering all of the operational costs related to their IDSR responsibilities (e.g. reporting, managing outbreaks, etc.). Due to these funding issues, many district teams were not able or willing to budget or actually spend funds to support IDSR operation. Without basic inputs such as forms, the system’s performance/integrity was in jeopardy. This is a danger faced by centrally structured programs like IDSR in a highly decentralized system.
8. Summary and Recommendations for Future Directions in Improving IDSR Performance: the Need for Health Systems Strengthening

8.1 Summary

The Ghanaian and Tanzanian experiences in strengthening IDSR performance show that much has been done and much remains to be done to ensure that districts and facilities throughout a country are collecting, reporting, analyzing, interpreting, and making use of surveillance data to make public health decisions. Many of the tools and strategies used in these two countries could be easily adapted by other countries. However, as described in the previous section, these tools and strategies are not enough on their own. They need a functional system with sufficient resources for implementation (forms, communication mechanisms, etc.) and for supervision and follow-up, as well as accountability and support from strong leadership at all levels. Future directions for IDSR strengthening need to address many of these broader issues.

The experiences in Ghana and Tanzania validate the notion that IDSR strengthening efforts will have limited results if they focus solely on technical issues and do not also address key organizational and workplace issues and constraints. In both countries the greatest amount of time, energy and resources were spent addressing technical barriers to improved surveillance. This was a logical starting point in each country; at the start of IDSR strengthening efforts, the surveillance systems in both Ghana and Tanzania were technically weak and were generating data of dubious quality. The IDSR teams recognized the need to strengthen the technical foundations first, and donor-supported activities tend to have a comparative advantage in the technical realm.

While IDSR strengthening activities were weighted towards strengthening the technical aspects of surveillance operations, some inroads were made in addressing organizational and workforce determinants. The IDSR teams conducted task analyses and defined and documented IDSR roles and responsibilities at various levels of the system. Using continuous assessment and problem-solving approaches and creating job aids, the IDSR teams helped to build workforce capacity to carry out these IDSR responsibilities. The results demonstrate success in improving reporting, data accuracy, and data analysis. However, in both Ghana and Tanzania, IDSR teams recognized the limits to improvements they could achieve, given the existence of larger organizational and workforce issues that were beyond their managerial control.

A number of organizational and workforce constraints hampered IDSR systems improvement, including: lack of sufficient/dedicated funding for staff salaries, materials, transportation for supervision, etc; lack of adequate communications and transportation infrastructure; and a general lack of accountability for systems performance within the overall context of health system operations. A lack of demand for information produced by IDSR systems is one constraint to creating accountability for its operation and performance. The lack of demand appears to be in part due to the
fact that while systems appear to be decentralized, the lack of adequate funding effectively limits decision-making authority at the district and regional levels.

The lack of accountability for IDSR operation is also linked to the decentralized environment in which many surveillance systems currently function, as well as to an apparently insufficient demand for information for planning at higher levels of the health system. In the decentralized settings found in both Ghana and Tanzania, each district is responsible for managing its own surveillance activities using its own funding and basing activities on an annual plan. As a result, there is frequently a substantial amount of variation in the priority placed on surveillance activities among districts. Even when surveillance activities are included in district plans and budgets, funds are not always made available in a timely fashion in order to support implementation of these plans. This can be particularly disruptive to ongoing surveillance activities that require consistent adherence to clearly defined protocols, norms, and standards. The absence of promised funds for planned IDSR activities creates long periods without supervision, training and support for the system’s operation. These funding constraints are typically systemic and affect all health services and activities in a similar way.

District level constraints are amplified in the absence of a strong centralized surveillance system structure that sets standards, provides guidance and support, and offers a means of quality control to ensure that surveillance in all districts throughout the country is conducted using similar methods and resources. In Ghana and Tanzania, the central level did not have the resources to ensure proper and consistent application of the technical norms and guidelines that were established, nor did they have the authority to ensure that districts budgeted their funds to ensure that certain surveillance-related activities took place. The central level surveillance units ended up functioning more as technical advisors that needed to convince regions and districts to implement the systems, while their ability to support implementation was limited. In such an environment IDSR must compete with a myriad of other programs and services that also require the time, attention and (most importantly) resources of the regions and districts. The ability of the central level to ensure that the IDSR system provides consistent, high-quality outputs that can be used to guide public health actions and policy at all levels of the system is limited to this advisory/advocacy role. The threat to system performance in such an environment is clear. The need for districts to have adequate autonomy to set priorities in line with their own specific needs and to use surveillance data to make locally-relevant decisions is consistent with the need for a strong centralized system at the national level to provide quality control and the structure and support required to improve surveillance in all districts.

These issues – funding, communications, and accountability – fall into the organizational and workforce determinants of IDSR performance. Working in these areas is a challenge for donor-funded projects that are external to the health system and requires a different strategy from the typical technical assistance project. Addressing system-wide issues is the responsibility of a variety of national ministries which have the authority to implement changes. Donor-funded projects must initiate dialogue with these ministries and support them to take on these challenges to complement investments in technical assistance.

8.2 Recommendations for donor assistance

Donor funded activities must initiate dialogue with the various ministries and support them to take on the above challenges to complement investments in IDSR technical issues.

**IDSR is a key component of the health system and should be included in broader system strengthening activities:** IDSR is a cross-cutting function that runs across a range of disease control programs. Besides the technical guidelines, more general capacity is needed to ensure
communications mechanisms exist and are usable, especially at the district and facility levels. IDSR and the health system would both be well served by including IDSR in health system strengthening agendas, because if functional, it can provide the data needed for rational decisions and resource allocation choices. Examples of ways to do this include preparing integrated health system strengthening proposals to the Global Fund for AIDS, Tuberculosis and Malaria, the Global Alliance for Vaccines and Immunization (GAVI), and other sources of funding. These proposals should be designed to create and strengthen the infrastructure and general capacity to produce and analyze disease data, and use it for decision-making.

**Introduce and support more accountability into the system:** Lack of clear accountability is not a problem related only to IDSR. Most health systems do not yet have in place mechanisms to ensure accountability for resource use and appropriate public health action. Some districts in Tanzania tried to implement a system in which salaries would not be paid until reports have been submitted. This caused considerable turmoil, because workers felt this was not fair, and that district staff did not have the right to impose this system. Although unsuccessful, this was one local attempt to introduce accountability. While training and job aids can help the workforce know what they are responsible for doing, if no one holds them accountable for doing it, it is unlikely that they will change their practices and fulfill all job responsibilities. Supervision, follow-up and feedback are critical elements of an effective accountability system. Future IDSR strengthening efforts must build in accountability for IDSR performance, as part and parcel of building accountability into the health system overall.
Appendix 1: Comparison of Priority Diseases

Table 1: Comparison of selected priority diseases for IDSR: WHO/AFRO, Ghana, Tanzania

Based on information in published IDSR guidelines

N.B. It should be noted that WHO/AFRO provides a recommended list of 19 diseases and suggests that countries adopt a list that reflects their epidemiological situation.

<table>
<thead>
<tr>
<th>Priority Disease List</th>
<th>WHO/AFRO</th>
<th>Ghana</th>
<th>Tanzania</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Epidemic Prone Diseases</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cholera</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Diarrhea with Blood (Shigella)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Measles</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Meningitis</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Plague</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viral Hemorrhagic Fevers</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow Fever</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Diseases Targets for Eradication and Elimination</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute Flaccid paralysis (AFP)/polio</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Dracunculiasis</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leprosy</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neonatal Tetanus</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td><strong>Other Diseases of Public Health Importance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumonia in children under 5 years</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>New AIDS cases</td>
<td>X</td>
<td></td>
<td>HIV/AIDS</td>
</tr>
<tr>
<td>Malaria</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Onchocerciasis</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexually transmitted infections (STI)</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Trypanosomiasis</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diarrhea in children under 5 years</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Buruli ulcer</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lymphatic Filariasis</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viral Hepatitis</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schistosomiasis</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trachoma</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yaws</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rabies/Animal bites</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Typhoid</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL Number of Priority Diseases</strong></td>
<td>19</td>
<td>23</td>
<td>13</td>
</tr>
</tbody>
</table>
## Appendix 2: Results of first assessment of Factors in Ghana

### Table 2: Results of Ghana Continuous learning and problem solving approach, Wa Workshop, February 2003

<table>
<thead>
<tr>
<th>CORE FUNCTIONS</th>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
<th>BUT WHY? COMMENT</th>
</tr>
</thead>
</table>
| 1. Identify    | Human resources  
• Clinicians  
• Community-based Surveillance Volunteers  
Teaching, Regional, and District hospitals/clinics equipped with tools/laboratories | Inadequately trained, poorly motivated staff  
Inadequate resources for logistics/planning  
Lack of supervision  
Volunteer fatigue | Poor remuneration and working conditions for staff  
Overworked/understaffed (not enough doctors)  
Insecurity  
Time constraints  
Lack of funds for equipment and staff development |
| 2. Report      | Knowledge about system and what happenings should be reported  
Report forms are available for various activities | Lack of communication/documentation system  
Poor reporting system  
• Timeliness  
• Completeness  
• Vertical reporting  
• Poor supervision  
Poorly trained personnel  
Inaccessibility and inadequacy of transportation | Poor infrastructure development  
• Electricity, telephone, computers, and accessories (e-mail, fax, mobile phones, etc.)  
Inequitable distribution of skilled personnel  
No standard way of reporting  
Inadequate staff and heavy workload  
Natural hard-to-reach areas  
• Floods, vast terrain and poor roads/vehicles |
| 3. Analyze and Interpret | Some human resources and knowledge/skills in IDSR are available | Lack of computer/other skills to analyze and interpret data  
Lack of basic logistics/supplies such as calculators  
Poor documentation | Staff not trained in data management  
Time constraints due to having to fill in multiple reporting forms  
Lack of feedback |
<table>
<thead>
<tr>
<th>CORE FUNCTIONS</th>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
<th>BUT WHY? COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Investigate</td>
<td>Some available resources, relevant skills (lab scientists and clinicians) All of the districts and sub-districts have disease surveillance teams and regional level SCD forms, PHRL, PDRU/Lab</td>
<td>Inadequate number of lab scientists/other staff with relevant skills Inadequate lab facilities, equipment, and capacity to carry out detailed logistics/transportation Difficult terrain/populations to access because of dispersed settlements, incorrect addresses, and often the communities are difficult to work with</td>
<td>Inadequate funding for hiring and training of staff, to motivate staff, purchase supplies/enhance facility, or to facilitate necessary activities Disparity between the motivation and skill level of staff Insecurity due to tribal conflicts</td>
</tr>
<tr>
<td>5. Respond</td>
<td>Systems in place that work well to enhance communication and team work so that districts can respond quickly The technical competence is present, and IEC materials, drugs, and other materials are usually available if needed District epidemic management committee, as well as staff available from other decentralized agencies, NGOs, volunteer community members</td>
<td>Slow transfer of funds from the regional to district and sub-district level Non-functional District epidemic management committee (DEMC) because the roles aren’t clearly defined Lack of regular interaction between health staff and community members, brings about apathy Low level of awareness of importance of surveillance activities</td>
<td>Lack of motivation and poor attitude of staff and health workers Lack of understanding and differences between cultural beliefs and values, educational and poverty levels, continue to be a source of contention between communities and the staff at the health centers</td>
</tr>
<tr>
<td>6. Provide feedback</td>
<td>Districts hold quarterly, monthly, and weekly meetings, as well as Durbars (community gatherings/dialogues) with surrounding community to get good feedback Monitoring and supervision</td>
<td>Irregularity of monitoring and supervision activities at all levels Poor sensitization to new reporting forms Inadequate resources and poor communication systems result in late/no</td>
<td>Workload is too much for the few staff members and there are too many workshops that distract them from supervision activities State of emergency in parts of the region or poor infrastructure makes accessing some communities impossible</td>
</tr>
<tr>
<td>CORE FUNCTIONS</td>
<td>STRENGTHS</td>
<td>WEAKNESSES</td>
<td>BUT WHY? COMMENT</td>
</tr>
<tr>
<td>----------------</td>
<td>-----------</td>
<td>------------</td>
<td>-----------------</td>
</tr>
<tr>
<td></td>
<td>activities carried out at all levels</td>
<td>feedback</td>
<td>Unreliable funding of surveillance activities</td>
</tr>
<tr>
<td>7. Evaluate</td>
<td>DHMT and SDHT hold quarterly monitoring and supervision activities, therefore the potential for good supervision exists</td>
<td>No standardized supervision or evaluation checklist</td>
<td>Lack of adequate funds set aside for supervision activities</td>
</tr>
<tr>
<td></td>
<td>Staff at all levels are given performance reviews</td>
<td>Logistical constraints</td>
<td>Heavy workload places a burden on unmotivated and poorly trained staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Staff have limited skills in leading effective monitoring and supervision activities</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix 3: IDSR task analysis for Ghana

### Table 3: Example of Task analysis for health facility level for Ghana

<table>
<thead>
<tr>
<th>Steps</th>
<th>Desired performance</th>
<th>Tasks</th>
<th>Person responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify case</td>
<td>-Diagnose correctly using standard case definition</td>
<td>-Take history and carry out physical examination</td>
<td>Clinician (Doctor (MO), Medical Assistant (MA), Nurse)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Make a diagnosis based on findings</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Match with standard case definition</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Record information about case</td>
<td>-Record completely and accurately case information on patient OPD card and in consulting room (CR) register</td>
<td>-Record history, physical examination findings, diagnosis on the OPD card</td>
<td>Clinician</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Transcribe information from OPD card into the CR register</td>
<td>Clinician/CR nurse</td>
</tr>
<tr>
<td>3. Collect and send specimen to laboratory</td>
<td>-Collect right quantity of specimen at the right time with the appropriate container</td>
<td>-Make a request for the appropriate test</td>
<td>Clinician</td>
</tr>
<tr>
<td></td>
<td>-Transport specimen under right conditions</td>
<td>-Complete laboratory request form</td>
<td>Clinician/Lab scientist</td>
</tr>
<tr>
<td></td>
<td>-Test specimen using the standard operating procedures</td>
<td>-Label the specimen container</td>
<td>Lab scientist</td>
</tr>
<tr>
<td></td>
<td>-Confirm diagnosis using standard procedures/guidelines</td>
<td>-Send specimen to laboratory</td>
<td>Lab scientist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Send lab results to requesting clinician</td>
<td>Lab scientist</td>
</tr>
<tr>
<td>4. Manage case and/or identify case for referral</td>
<td>-Manage case using standard case management guidelines</td>
<td>-Manage case</td>
<td>Clinician</td>
</tr>
<tr>
<td></td>
<td>-Refer case to the right place at the right time with proper referral notes (accurate history, results of any tests and treatment given)</td>
<td>-Identify case for referral</td>
<td>Clinician</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Refer case (if any)</td>
<td>Clinician</td>
</tr>
<tr>
<td>5. Report immediately to DHMT office (in case of immediately reportable disease)</td>
<td>-Report case-based information of suspected case using the fastest possible means (telephone, fax, email, radiophone)</td>
<td>-Notify DHMT</td>
<td>Facility-in-charge</td>
</tr>
<tr>
<td></td>
<td>-Follow-up with written report using case based reporting form or line listing form</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Compile routine summary</td>
<td>-Compile weekly, monthly, quarterly</td>
<td>-Compile weekly, monthly, quarterly</td>
<td>Facility biostatistics officer</td>
</tr>
<tr>
<td>Steps</td>
<td>Desired performance</td>
<td>Tasks</td>
<td>Person responsible</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>reports</td>
<td>summary according to guidelines summary</td>
<td>-Report summary data according to guidelines at the right time</td>
<td>Facility-in-charge</td>
</tr>
<tr>
<td>7. Report summary data to DHMT</td>
<td>-Report summary data according to guidelines at the right time</td>
<td>-Report summary data to DHMT</td>
<td>Facility-in-charge</td>
</tr>
<tr>
<td></td>
<td>-Take part in case management, case search, and other activities as required by the DHMT</td>
<td>-Take part in case management, case search, and other activities</td>
<td>Facility-in-charge</td>
</tr>
<tr>
<td>8. Participate in investigation of</td>
<td>-Take part in case management, case search, and other activities as required by the DHMT</td>
<td>-Take part in case management, case search, and other activities</td>
<td>Facility-in-charge, Other staff</td>
</tr>
<tr>
<td>reported outbreaks</td>
<td>-Prepare and periodically update tables, charts, and graphs according to guidelines</td>
<td>-Prepare tables, graphs and charts</td>
<td>Facility biostatistics officer</td>
</tr>
<tr>
<td>9. Analyze and interpret data</td>
<td>-Prepare and periodically update tables, charts, and graphs according to guidelines</td>
<td>-Prepare tables, graphs and charts</td>
<td>Facility biostatistics officer</td>
</tr>
<tr>
<td>10. Act/respond based on analyzed data</td>
<td>-Share information with facility staff, community members, and DHMT -Carry out public health response in collaboration with DHMT -Mobilize community involvement in response</td>
<td>-Share information -Carry out response</td>
<td>Facility in charge</td>
</tr>
<tr>
<td>11. Provide feedback</td>
<td>Give feedback to health staff, community members about outcome of reported cases and prevention activities</td>
<td>-Give feedback</td>
<td>Facility-in-charge</td>
</tr>
</tbody>
</table>
### Purposes:
1. Measure and track magnitude of disease burden (cases and deaths) in the district, detect outbreaks
2. Monitor and evaluate surveillance system performance indicators, identify areas needing strengthening, take appropriate action
3. Use data for planning (setting targets, planning interventions, evaluating interventions)
4. Share data with relevant stakeholders (previous feedback reports and summaries)

#### Measures of IDSR performance (core indicators)

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
<th>Type of Analysis</th>
<th>Frequency</th>
<th>Data Source</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Complete IDSR reporting in the district</td>
<td>Proportion of facilities that have received a feedback newsletter from the district at least once</td>
<td>Quarterly</td>
<td>District IDSR database</td>
<td>Monitor and evaluate overall district IDSR performance.</td>
</tr>
<tr>
<td>2.</td>
<td>Reporting of IDSR</td>
<td>Proportion of facilities that have received feedback reports</td>
<td>Quarterly</td>
<td>District IDSR database</td>
<td>Monitor and evaluate overall district IDSR performance, identify areas needing assistance with data analysis</td>
</tr>
</tbody>
</table>

#### Measures of IDSR performance (additional indicators)

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
<th>Type of Analysis</th>
<th>Frequency</th>
<th>Data Source</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>3(a)</td>
<td>IDSR is used to detect outbreaks and notify authorities</td>
<td>Proportion (bar chart)</td>
<td>Monthly or annually</td>
<td>District IDSR forms (2a &amp; 2b)</td>
<td>Monitor and evaluate overall district IDSR performance, identify areas needing assistance with data analysis</td>
</tr>
<tr>
<td>3(b)</td>
<td>IDSR is used to monitor outbreak response</td>
<td>Proportion (bar chart)</td>
<td>Monthly or annually</td>
<td>District IDSR forms (2a &amp; 2b)</td>
<td>Monitor and evaluate overall district IDSR performance, identify areas needing assistance with data analysis</td>
</tr>
</tbody>
</table>

#### Measures of Disease Burden

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
<th>Type of Analysis</th>
<th>Frequency</th>
<th>Data Source</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Proportion of expected weekly facility reports received by the district (all facilities)</td>
<td>Proportion (bar chart)</td>
<td>Monthly and quarterly</td>
<td>District IDSR forms (2a &amp; 2b)</td>
<td>Monitor and evaluate overall district IDSR performance with respect to completeness of weekly reporting; monitor and evaluate changes over time</td>
</tr>
<tr>
<td>2.</td>
<td>Proportion of expected monthly facility reports received by the district (all facilities)</td>
<td>Proportion (bar chart)</td>
<td>Monthly and quarterly</td>
<td>District IDSR forms (2a &amp; 2b)</td>
<td>Monitor and evaluate overall district IDSR performance with respect to completeness of monthly reporting; monitor and evaluate changes over time</td>
</tr>
<tr>
<td>3.</td>
<td>Proportion of expected quarterly facility reports received by the district (all facilities)</td>
<td>Proportion (bar chart)</td>
<td>Monthly and quarterly</td>
<td>District IDSR forms (2a &amp; 2b)</td>
<td>Monitor and evaluate overall district IDSR performance with respect to completeness of quarterly reporting; monitor and evaluate changes over time</td>
</tr>
</tbody>
</table>

### Appendix 4: Norms and Standards for IDSR Data Analysis in Tanzania

#### Feedback reports

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
<th>Type of Analysis</th>
<th>Frequency</th>
<th>Data Source</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Quarterly summary report to be sent to the regional level, facilities, and other stakeholders</td>
<td>Proportion (bar chart)</td>
<td>Quarterly</td>
<td>District IDSR forms 2a &amp; 2b</td>
<td>Communicate district data to relevant level, facilities, and other stakeholders</td>
</tr>
</tbody>
</table>

#### Outbreak-related indicators

<table>
<thead>
<tr>
<th>Area</th>
<th>Description</th>
<th>Type of Analysis</th>
<th>Frequency</th>
<th>Data Source</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Number of OPD cases reported during outbreaks</td>
<td>Proportion (bar chart)</td>
<td>Monthly</td>
<td>District IDSR forms (2a &amp; 2b)</td>
<td>Monitor and evaluate overall district IDSR performance with respect to completeness of IDSR documentation of outbreaks; set targets, monitor changes, evaluate interventions</td>
</tr>
</tbody>
</table>

#### Conclusion

The measures outlined above provide a comprehensive framework for monitoring and evaluating the IDSR system's performance, ensuring that it remains effective in detecting outbreaks, notifying authorities, and providing feedback to health facilities, ultimately contributing to improved public health outcomes.
Appendix 5: Example of Task analysis for District level in Tanzania

Figure 2: Flow chart of IDSR steps at district level in Tanzania

Flow chart for IDSR Steps at District (CHMT) level

- A. Decision to investigate/respond
- B. Notify appropriate person/level
- C. Compile weekly summary report and send to region
- D. Investigate (outbreak investigation and case confirmation)
- E. Outbreak Response
- F. Communicate outbreak to border districts
- G. Compile monthly summary report and send to region
- H. Analyze Data
- I. Evidence based action
- J. Feedback to stakeholders through supervision mechanism
- K. Feedback to facilities through supervision mechanism
- L. Feedback to region on operations and info
- M. Notification to appropriate person/level
- N. Monthly reports from facilities
- O. Results and information from labs
- P. Reports from treatment camps during/after outbreak
- Q. Feedback from region on operations and info
- R. Weekly reports rec'd from facilities
- S. Immediate communication rec'd from facilities or border districts
- T. Compilation of reports from treatment camps during/after outbreak
- U. Feedback from region on operations and info
- V. Monthly reports from facilities
- W. Results and information from labs
- X. Reports from treatment camps during/after outbreak
<table>
<thead>
<tr>
<th>Steps</th>
<th>Desired Performance</th>
<th>Tasks</th>
</tr>
</thead>
</table>
| **A. DECISION TO INVESTIGATE/ RESPOND** | • Rapid decision to investigate based on incoming information is made  
• Rapid decision to communicate to appropriate person or higher level is made | • Receive weekly reports from facilities, immediate notifications and case – based information from facilities or other districts, and rumours  
• Recognize outbreak potential (including cross-facility outbreaks)  
• Decide whether to investigate based on incoming information  
• Decide whether extra support is needed from higher level (or different person) |
| **B. NOTIFY APPROPRIATE PERSON OR HIGHER LEVEL** | • Information is rapidly communicated to appropriate person or higher level          | • Rapidly communicate to appropriate person and/or level  |
| **C. COMPILE WEEKLY SUMMARY REPORT AND SEND TO REGION** | • Completed weekly report is communicated to region on time                          | • Compile weekly summary report from facilities  
• Send weekly summary report to region on time  |
| **D. INVESTIGATE (OUTBREAK INVESTIGATION)** | • District performs outbreak investigation according to disease specific outbreak investigation protocol | • Inform and assemble investigation team (as in guidelines)  
• Prepare for outbreak investigation at district level  
• Mobilize resources for outbreak investigation  
• Complete outbreak investigation form on suspected cases (data on patient information, patient history, potential source of infection collected)  
• Analyse/interpret data to determine appropriate response  
• Search for other cases based on obtained information  
• Produce investigation report and send to national level |
| **E. D. INVESTIGATE (CON’T) (CASE CONFIRMATION)** | • District send specimens to appropriate lab  
• Cases of suspected outbreak are confirmed | • Prepare for outbreak confirmation at district level according to protocol (including requesting supplies from lab)  
• Collect specimens according to protocol for all potential disease aetiologies  
• Fill out lab form requesting test(s) (including susceptibility) and supplying patient information |
<table>
<thead>
<tr>
<th>Steps</th>
<th>Desired Performance</th>
<th>Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• Send specimen to appropriate level lab immediately</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Receive test results from lab within expected time (test-specific) to confirm epidemic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Receive susceptibility information</td>
</tr>
<tr>
<td>F. OUTBREAK RESPONSE</td>
<td>▪ Appropriate treatment and preventive measures to control suspected or confirmed outbreak</td>
<td>• Convene multi-sectoral epidemic response team</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Prepare for response at district level according to protocol</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Mobilise resources for outbreak response</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Treat cases according to treatment guidelines</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Initiate control measures according to outbreak protocols (including prevention and community mobilisation)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Prepare outbreak response report and sent to national level</td>
</tr>
<tr>
<td>G. FEEDBACK TO SITE OF OUTBREAK/COMMUNICATE OUTBREAK TO BORDER DISTRICTS</td>
<td>▪ Feedback of outbreak is communicated to site of outbreak and districts at risk</td>
<td>• Communicate results of outbreak investigation and summary of actions to stakeholders (including to those at site(s) of outbreak)</td>
</tr>
</tbody>
</table>
| H. COMPILE MONTHLY SUMMARY REPORT AND SEND TO REGION | ▪ Summary data are updated based on information on lab data and treatment camps  
▪ Completed monthly report is communicated to region | • Compile monthly data from facilities |
<p>|       |                     | • Review data and verify questionable data |
|       |                     | • Update data based on cases external to facilities (e.g. treatment camps) |
|       |                     | • Send completed report to region on time with supplementary information based on lab results or other information as appropriate |
| I. ANALYSE DATA | ▪ Analysis of data according to analysis protocols and needs | • Assess availability of data for denominators |
|       |                     | • Perform analyses according to analysis protocols (including trends and forecasting, geographic and demographic comparisons, incidence rates, case fatality rates, etc). |
|       |                     | • Perform analyses on operations (timeliness and completeness performance from facilities, supplies, managerial) |</p>
<table>
<thead>
<tr>
<th>Steps</th>
<th>Desired Performance</th>
<th>Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>J. EVIDENCE</td>
<td>Address routine IDS decision making (adjusting resources, strategies for prevention and control programs)</td>
<td>• Use data for decisions and action in addressing routine IDS decision making (adjusting resources, strategies, programs)</td>
</tr>
<tr>
<td></td>
<td>Planning for surveillance and input into CCHP</td>
<td>• Use data for planning</td>
</tr>
<tr>
<td></td>
<td>Monitor surveillance and response operations</td>
<td>• Use data for decisions and action in monitoring district operations (supplies, communications, needs, etc) including when needing extra resources (e.g. human, drugs)</td>
</tr>
<tr>
<td></td>
<td>Address quality of incoming data</td>
<td>• Use data for decisions and action in addressing quality of incoming data (including facility information, timeliness, completeness, lab information, denominator data)</td>
</tr>
<tr>
<td></td>
<td>Identify additional inquiries (requiring further study)</td>
<td>• Use data for identifying additional inquiries (requiring further study)</td>
</tr>
<tr>
<td></td>
<td>Advocacy</td>
<td>• Use of data for advocacy</td>
</tr>
<tr>
<td>K. FEEDBACK</td>
<td>Feedback of disseminated analysed data and actions to stakeholders, including facilities and communities</td>
<td>• Communicate interpretations of analysed data and summary of actions to stakeholders (including facilities and communities)</td>
</tr>
</tbody>
</table>
Appendix 6: Process of developing the Tanzania IDSR capacity building package and content of training

Training package development process

1. Obtained and reviewed existing training materials, i.e, Tanzania Expanded Program on Immunization training materials for vaccine-preventable diseases; IDSR training materials from Ghana, and other countries.
2. Created and built a consensus on a list of priority IDSR actions and tasks with staff from the MOH and CHMTs.
3. Developed a succinct list of determinants of IDSR actions from findings of situation analysis. Determinants included both external factors (dealing with systems and logistics barriers) and internal factors (knowledge and skills, but also motivation, consequences, accountability, self-efficacy, social norms). These embrace technical issues, systems factors and behavioral aspects.
4. Engaged relevant personnel and institutions to help develop and conduct training: worked with potential trainers (Zonal Training Centers) to develop a shared understanding of the IDSR goals and ensure that they acquired an understanding of IDSR issues and of how the approach to be used in this training needed to achieve and contain adequate content on technical, systemic, and behavioral information and issues. Their technical skills, practical experiences and understanding of socio-cultural, attitudes and practices of health personnel in Tanzania were fundamental contributions in refining of materials for the effective training.
5. Outlined a mix of capacity building interventions that together lead to adoption and performance of the IDSR steps: group training, one-on-one instruction or on-the-job training, peer counseling, tailored supervisory visits, incentives/positive consequences for good performance, performance feedback protocols, reference materials and job aids and guidance on which ones to use and when. A single method like group training alone would not be sufficient or appropriate as a channel for adequately building capacity in all IDSR actions. For job aids, the team developed clear guidance for health workers on when and how to use them.
6. Developed draft materials and approaches by MOH, NIMR, PHRplus, CHANGE and Zonal Training Centers through following the above steps developed a draft training materials and approaches.
7. Pilot-tested draft materials and developed evaluation mechanisms for training: Pilot-testing through pre/posttests of participants and other qualitative assessments. Training assessments included a baseline prior to training, follow-up evaluation immediately after training and subsequent follow-up during additional post-training visits.
8. Refined monitoring and evaluation tools, based on the experience in the pilot, and recommended tools for ongoing monitoring and evaluation of the capacity-building interventions.
9. Finalized a capacity building “package” - Package includes materials and guides for all interventions (training, supervisory visits, reference materials, job aids, etc), and monitoring tools for ongoing assessment of the capacity of health staff and of their performance. The capacity building package includes three training programs: Training of Trainers, District IDSR training, and Facility IDSR training. Each program includes a facilitator’s guide and participants’ manual.
## IDSR Training Topics at District and Facility Levels in Tanzania

<table>
<thead>
<tr>
<th>District: 5-day training</th>
<th>Facility: 4-day training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview of the IDSR Strategy</td>
<td>Introduction to IDSR</td>
</tr>
<tr>
<td>Detect and Report Priority IDSR Diseases</td>
<td>Detect and Record Priority Diseases Using Standard Case Definitions</td>
</tr>
<tr>
<td>Analyze Data on IDSR Priority Diseases</td>
<td>Report Priority Diseases</td>
</tr>
<tr>
<td>Interpret and Use Data to Respond to Priority Diseases</td>
<td>Analyze and Interpret Data for Action</td>
</tr>
<tr>
<td>Investigate and Respond to Suspected Outbreaks</td>
<td>Investigate and Respond to Outbreaks/Epidemics</td>
</tr>
<tr>
<td>Prepare for Disease Outbreaks</td>
<td>Successful Community Relations for Surveillance</td>
</tr>
<tr>
<td>Supervise and Provide Feedback</td>
<td>Application Planning</td>
</tr>
<tr>
<td>Build Support for Successful Surveillance and Response</td>
<td></td>
</tr>
<tr>
<td>Monitor and Evaluate Performance of IDSR Implementation</td>
<td></td>
</tr>
<tr>
<td>Develop an Action Plan</td>
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</tbody>
</table>
Appendix 7: List and examples of laboratory confirmation job aids for Tanzania

Table 5: Disease-specific and specimen-specific laboratory confirmation job aids in Tanzania

<table>
<thead>
<tr>
<th>Disease-specific job aids</th>
<th>Specimen-specific job aids</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFP for facilities/districts</td>
<td>How to collect blood</td>
</tr>
<tr>
<td>Bacillary dysentery for facilities/districts</td>
<td>How to collect CSF</td>
</tr>
<tr>
<td>Bacillary dysentery for referral labs</td>
<td>How to perform a skin snip</td>
</tr>
<tr>
<td>Cholera for facilities/districts</td>
<td>How to collect bubo-aspirate</td>
</tr>
<tr>
<td>Cholera for referral laboratories</td>
<td>How to use Cary Blair transport medium</td>
</tr>
<tr>
<td>Meningitis for facilities/districts</td>
<td>How to obtain serum from whole blood</td>
</tr>
<tr>
<td>Meningitis for referral laboratories</td>
<td>How to take a rectal swab and transfer to transport medium</td>
</tr>
<tr>
<td>Measles for facilities/districts</td>
<td>Triple packaging system to maintain ambient temperature</td>
</tr>
<tr>
<td>Measles for referral laboratories</td>
<td>Triple packaging system to maintain cold chain</td>
</tr>
<tr>
<td>Plague for facilities/districts</td>
<td>Labeling specimens</td>
</tr>
<tr>
<td>Plague for referral laboratories</td>
<td>Using trans-isolate transport media for CSF</td>
</tr>
<tr>
<td>VHF for facilities/districts</td>
<td></td>
</tr>
<tr>
<td>Yellow fever for facilities/districts</td>
<td></td>
</tr>
<tr>
<td>Yellow fever for referral laboratories</td>
<td></td>
</tr>
</tbody>
</table>
United Republic of Tanzania
Ministry of Health

Job Aid for Laboratory Confirmation
(for health facilities and districts)

ACUTE FLACCID PARALYSIS

Description
This job aid presents the protocol for collection and processing of specimens for laboratory confirmation of acute flaccid paralysis (AFP). It is primarily intended for health facilities and district-level staff to use during an outbreak investigation or when the action threshold has been reached.

Background
Acute flaccid paralysis (AFP) is the hallmark of poliomyelitis, a disease caused by poliovirus serotypes 1, 2, and 3. The Polio Eradication Program has nearly halted ongoing wild-type poliovirus; however, serotypes 1 and 3 still circulate in several African countries. In 1994, Tanzania began polio eradication activities such as routine oral polio vaccine immunization, national immunization days, and active surveillance for AFP. The last case of polio in Tanzania was identified in 1996.

Poliovirus is transmitted from person-to-person by ingesting faecally-contaminated materials. Polio infection occurs almost exclusively among children. Paralytic polio, though not fatal, has devastating social and economic consequences for affected individuals. Only 1% of those infected have paralysis and the remaining cases suffer from a milder form of the disease. Immuno-compromised persons may shed virus for several years. Risk factors for poliomyelitis include non-vaccination and exposure to faecally-contaminated materials.

Standard case definition

For community level
Any sudden lameness in a child less than 15 years of age.

For facility level
Any child less than 15 years of age with sudden onset of paralysis including Guillain-Barré syndrome. Or any person at any age with paralytic illness in whom the medical practitioner suspects poliomyelitis.

Action threshold
A single case at a defined locality or health facility according to standard case definition is considered a suspected outbreak. Specimens should be collected immediately for laboratory confirmation.

Sampling strategy
Collect two specimens from each suspected case.

Specimen to be collected
Stool

Confirmatory tests
Isolation and identification of poliovirus

Why laboratory confirmation is important
A stool positive for poliovirus type 1, 2 or 3 on one or more cases will allow health officials to declare an outbreak and to take appropriate action.

National Surveillance Officer
Expanded Programme for Immunizations (EPI)
Ministry of Health
Mabibo External Area
Nelson Mandela Road
P.O. Box 9083
Dar es Salaam, Tanzania
Attention: National Surveillance Officer

This job aid was prepared through a partnership of the Tanzania MOH, NIMR, MUCHS, PHRPlus, AFRO and CDC.
For health facilities and districts

JOB AID FOR LABORATORY CONFIRMATION: ACUTE FLACCID PARALYSIS

1. DOCUMENTATION

Supplies needed:
- Specimen label
- Marker (water resistant)
- Case investigation form
- Pen
- Patient register book

Steps:
1.1 Complete a label with patient name, specimen number, specimen type, date and time of collection, health facility and district. (See Job Aid for Labeling Specimens).

1.2 Fill in a case investigation form completely with the patient information. Make a duplicate form.

1.3 Locate the patient entry in the register book, and record the date and specimen type to be collected.

2. COLLECTION & HANDLING

Supplies needed:
- Gloves
- Leak proof screw-capped container

Steps:
2.1 Collect 5 to 10 grams (the size of a thumb nail) of fresh stool. Place stool in a leak proof screw-capped container.

2.2 Adhere a label to the specimen container.

2.3 Keep the specimen at 4-8°C.

If the stool cannot reach the National Surveillance Officer for EPI within 72 hours, freeze at -20°C.

2.4 Safely dispose of all contaminated materials.

3. TRANSPORTATION

Supplies needed:
- Gloves
- Triple packaging system
  (See Job Aid for Triple Packaging System to maintain cold chain)
- Four ice packs
- National Surveillance Officer contact information

Steps:
3.1 Transport the specimen to the National Surveillance Officer for EPI as follows:
- Pack the specimen using a triple packaging system with a solid cold box and ice packs (See Job Aid for Triple Packaging System to maintain cold chain).
- Contact the IDSR* focal person in the district to arrange transport of the package. Ensure that: National and international regulations for shipping diagnostic specimens are strictly followed.
  - Specimen remains at 4-8°C (or at -20°C if specimen is frozen) throughout transport.
  - Package reaches referral laboratory within 72 hours of specimen collection.

3.2 Keep the duplicate case investigation form at the district.

4. TESTING & DOCUMENTATION

Testing and documentation are done by laboratory staff according to standard operating procedures.

5. REPORTING

National Surveillance Officer for EPI should verbally communicate results to the IDSR focal person in the district within 14 to 28 days after receiving the specimen. Written communication should follow.

Steps:
5.1 IDSR focal person at the district should communicate results to clinician and the local laboratory staff.

5.2 Clinician and local laboratory staff should record results in their register book. Also record the date and time the results were received and by whom.

*Integrated Disease Surveillance and Response
Description
This job aid presents the protocol for the collection and processing of specimens for laboratory confirmation of bacillary dysentery. It is primarily intended for health facilities and district-level staff to use during an outbreak investigation or when the action threshold has been reached.

Background
Bacillary dysentery is an acute disease producing bloody diarrhoea and abdominal pain, most commonly caused by the bacterium *Shigella*. It occurs in both endemic and epidemic forms. *S. dysenteriae* type 1 (SD1) has caused most of the large bacillary dysentery epidemics that have occurred across Africa. Epidemics in Rwanda and Burundi in the early 1990's spread to western Tanzania via refugee migration. Isolates of SD1 from these epidemics were resistant to commonly used drugs, but susceptible to nalidixic acid.

Bacillary dysentery is transmitted by from person-to-person through the ingestion of faecally-contaminated food or drink. Infection due to SD1 is often more severe in young children and the elderly in which the case fatality rate can exceed 2%. Antimicrobial resistance occurs more frequently among SD1 than in other *Shigella* serogroups. Risk factors for bacillary dysentery include overcrowded conditions with poor sanitation and unsafe water supplies. Refugee populations are at high risk.

Standard case definition

- **For community level**
  Any person with diarrhoea and visible blood in stool.

- **For health facility level**
  Any person with diarrhoea and visible blood in stool and abdominal pain.

Action threshold

Two or more suspected cases at a defined locality or health facility according to the standard case definition in a week is considered a suspected outbreak. Specimens should be collected immediately for laboratory confirmation.

Sampling strategy

Collect specimen from the first 5 to 10 suspected cases. If any are positive, then collect every tenth case during the outbreak.

Specimen to be collected

Stool, or rectal swab, if patient is not able to pass stool.

Presumptive diagnostic tests

- Macroscopy and microscopy

Confirmatory tests

- Isolation, identification and serogrouping.
- Antimicrobial susceptibility.

Why laboratory confirmation is important

A stool culture positive for *Shigella dysenteriae* type 1 (SD1) on one or more cases in a week will allow health officials to declare an outbreak and to take appropriate action.

Antimicrobial susceptibility data will be used to monitor resistance. These data will provide information for the MOH to develop a treatment policy for the organism.

Referral Laboratory

(available for performing the confirmatory tests)

- Name of laboratory: 
- Contact person: 
- Postal address: 
- Phone: 
- Email: 

This job aid was prepared through a partnership of the Tanzania MOH, NIMR, MUCHS, PHRPlus, AFRO, and CDC.
### 1. DOCUMENTATION

**Supplies needed:**
- Specimen labels
- Case investigation form
- Patient register book
- Marker (water resistant)
- Pen

**Steps:**

1.1 Complete a label with patient name, specimen number, specimen type, date and time of collection, health facility and district. (See Job Aid for Labeling Specimens).

1.2 Fill in a case investigation form completely with the patient information. Make a duplicate form.

1.3 Locate the patient entry in the register book, and record the date and specimen type to be collected.

---

### 2. COLLECTION & HANDLING

**Supplies needed:**
- Gloves
- Leak proof screw-capped container
- Sterile cotton-tipped applicators (swabs)
- One tube of Cary Blair transport medium
- Adhesive tape

**Steps:**

2.1 Collect a fresh stool including portions with blood and/or mucus. Place stool in a leak proof screw-capped container. Do not let stool dry out.

*If patient is not able to pass stool, take a rectal swab (See Job Aid for How to Take a Rectal Swab and Transfer to Transport Medium).*

2.2 Transfer a small amount of the stool *(or the rectal swab)* to a tube of Cary Blair transport medium (See Job Aid for Using Cary Blair Transport Medium).

2.3 Adhere a label to the specimen container and tube of Cary Blair.

2.4 Keep the tube of Cary Blair at 4-8°C.

2.5 Safely dispose of all contaminated materials.

---

### 3. TRANSPORTATION

**Supplies needed:**
- Gloves
- Triple packaging system
- Referral lab contact information
- Four ice packs

**Steps:**

3.1 Hand carry the stool to the local laboratory (for macroscopy and microscopy).

   Transport the tube of Cary Blair to the referral laboratory as follows:

   - Pack the specimen using a triple packaging system with a solid cold box and ice packs (See Job Aid for Triple Packaging System to maintain cold chain).

   - Contact the IDSR* focal person in the district to arrange transport of the package. Ensure that:
     - National and international regulations for shipping diagnostic specimens are strictly followed.
     - Specimen remains at 4-8°C throughout transport. Do not freeze.

   Package reaches referral laboratory within 48 hours of specimen collection.

3.2 Keep the duplicate case investigation form at the district.

---

### 4. TESTING

Testing and documentation are done by laboratory staff according to standard operating procedures.

---

### 5. RECORDING & REPORTING

Referral laboratory should verbally communicate results to the IDSR focal person in the district within two to four days after receiving the specimen. Written communication should follow.

**Steps:**

5.1 IDSR focal person at the district should communicate results to clinician and the local laboratory staff.

5.2 Clinician and local laboratory staff should record results in their register book. Also record the date and time the results were received and by whom.

---

*Integrated Disease Surveillance and Response*
BACILLARY DYSENTERY

Description

This job aid presents the protocol for processing and testing specimens for laboratory confirmation of bacillary dysentery. It is intended for referral laboratories capable of performing the confirmatory tests. Referral laboratories should use this job aid upon receiving specimens from health facilities and districts. The job aid does not address the technical procedures for performing laboratory confirmation tests. It should be used in conjunction with the standard operating procedures (SOP) for confirming bacillary dysentery.

Background

Bacillary dysentery is an acute disease producing bloody diarrhoea and abdominal pain, most commonly caused by the bacterium *Shigella*. It occurs in both endemic and epidemic forms. *S. dysenteriae* type 1 (SD1) has caused most of the large bacillary dysentery epidemics that have occurred across Africa. Epidemics in Rwanda and Burundi in the early 1990s spread to western Tanzania via refugee migration. Isolates of SD1 from these epidemics were resistant to commonly used drugs, but susceptible to nalidixic acid.

Bacillary dysentery is transmitted by from person-to-person through the ingestion of faecally-contaminated food or drink. Infection due to SD1 is often more severe in young children and the elderly in which the case fatality rate can exceed 2%. Antimicrobial resistance occurs more frequently among SD1 than in other *Shigella* serogroups. Risk factors for bacillary dysentery include overcrowded conditions with poor sanitation and unsafe water supplies. Refugee populations are at a high risk.

Sampling strategy for suspected outbreaks

Health facilities or districts collect specimens from the first 5 to 10 suspected cases. If any are positive, every tenth case will be sampled throughout the outbreak.

Specimen to be tested

Stool or rectal swab

Confirmatory tests to be done

Isolation, identification and serogrouping. Antimicrobial susceptibility.

Why laboratory confirmation is important

A stool culture positive for *Shigella dysenteriae* type 1 (SD1) on one or more cases in a week will allow health officials to declare an outbreak and to take appropriate action.

Antimicrobial susceptibility data will be used to monitor resistance. These data will provide information for the MOH to develop a treatment policy for the organism.

Referral laboratories should keep updated contact information for the health facilities and districts in their catchment areas.

This job aid was prepared through a partnership of the Tanzania MOH, NIMR, MUCHS, PHRPlus, AFRO, and CDC.
1. RECEIVING

Upon receiving specimens for laboratory confirmation of bacillary dysentery, the laboratory must be able to start testing immediately.†

<table>
<thead>
<tr>
<th>Supplies needed:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Laboratory register</td>
</tr>
<tr>
<td>• Gloves</td>
</tr>
<tr>
<td>• Pen or marker</td>
</tr>
</tbody>
</table>

Note: Gloves should be worn when opening package, and when handling specimen and contaminated materials. Work should be done in the laboratory.

Steps:

1.1 Log in the sender's name and address in the laboratory register.

1.2 Locate the case investigation form and the tube of Cary Blair transport medium containing the swab.

1.3 Assess the condition of the tube and the documentation as follows:

- Tube should be labeled. Information on tube label and case investigation form should match.
- Tube should be intact and not leaking.
- Tube should be cold, but not frozen.

Record the findings in the laboratory register and on case investigation form. Reject unsuitable specimens.†

1.4 Log in the patient information, the specimen information, and the date and time of receipt in the laboratory register. File case investigation form for later use.

1.5 Keep tube at 4-8°C. Immediately prepare for testing.

If any *Shigella* species are isolated, determine antimicrobial susceptibility pattern according to the SOP.

2.2 Throughout the testing, safely dispose of all waste and contaminated materials.

3. RECORDING & REPORTING

<table>
<thead>
<tr>
<th>Supplies needed:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Laboratory register</td>
</tr>
<tr>
<td>• Case investigation form</td>
</tr>
</tbody>
</table>

Note: Results should be communicated within two to four days of receiving the specimen. If communication is by email or other indirect means, request confirmation that the results were received.

Steps:

*Isolation, identification, and serogrouping*

3.1 Record the isolation, identification, and serogrouping results in the laboratory register and on the case investigation form. Communicate the results (positive or negative) immediately to the IDSR* focal person at the district and at your level.

*Susceptibility*

3.2 Record the antimicrobial susceptibility results in the laboratory register and on the case investigation form. Communicate the results immediately to the IDSR focal person at the district and at your level.

3.3 Send the original case investigation form to the IDSR focal person at the district.

4. STORAGE

Steps:

4.1 Store one or two representative isolates from the outbreak.

4.2 Dispose remaining isolates according to the SOP.

†If laboratory cannot start testing immediately or if specimen is not suitable, contact the Integrated Disease Surveillance and Response (IDSR) focal person at your level.

*Integrated Disease Surveillance and Response*
Cerebrospinal Meningitis (CSM) is an acute infection of the central nervous system caused by viruses, bacteria, fungi, or protozoa. The most common aetiologial agents are bacteria including Neisseria meningitidis, Streptococcus pneumoniae, and Haemophilus influenzae. In Africa, large epidemics are caused by N. meningitidis serogroup A and to a lesser extent, groups C and W-135. Outbreaks may occur from November to May in sub-Saharan Africa in the meningitis belt extending from Ethiopia to Gambia where the incidence may be greater than one case per 1,000 population. Tanzania is just south of the meningitis belt and small outbreaks have been reported year round, especially along the northern and western borders.

CSM is transmitted from person-to-person by airborne respiratory droplets. The case fatality rate should be less than 10% if there is prompt access to health care and proper management, and in the absence of highly virulent pathogens. Risk factors for CSM include non-vaccination and overcrowding.

### Standard case definition

**For community level**

Any person with fever and altered consciousness.

**For facility level**

Any person with sudden onset of fever (higher than 38.5°C per rectal or 38°C axillary) and any one of the following: neck stiffness, altered consciousness, and bleeding under the skin.

### Action threshold

A single suspected case at a defined locality or health facility according to standard case definition is considered a suspected outbreak. Specimens should be collected immediately for laboratory confirmation.

### Sampling strategy

Collect specimen from the first five suspected cases. If any are positive, then collect every tenth case throughout the outbreak.

### Specimen to be collected

Cerebrospinal fluid (CSF), or blood, if lumbar puncture is contraindicated or cannot be performed.

### Presumptive diagnostic tests

Gram stain and biochemistry. Latex agglutination.

### Confirmatory tests

Isolation, identification and serogrouping. Antimicrobial susceptibility periodically throughout the outbreak.

### Why laboratory confirmation is important

Confirmation of N. meningitidis in CSF or blood of one or more cases will allow health officials to declare an outbreak and to take appropriate action. Based on serogroup identification of N. meningitidis, health officials can decide if a vaccination campaign is needed to prevent further cases. Periodic antimicrobial susceptibility data will be used to monitor resistance.

### Referral Laboratory

(capable of performing the confirmatory tests)

<table>
<thead>
<tr>
<th>Name of laboratory:</th>
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</thead>
<tbody>
<tr>
<td>Contact person:</td>
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<tr>
<td>Postal address:</td>
<td></td>
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<tr>
<td>Phone:</td>
<td></td>
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<tr>
<td>email:</td>
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</tbody>
</table>

This job aid was prepared through a partnership of the Tanzania MOH, NIMR, MUCHS, PHRPlus, AFRO, and CDC.
**JOB AID FOR LABORATORY CONFIRMATION: CEREBROSPINAL MENINGITIS**

### 1. DOCUMENTATION

**Supplies needed:**
- Specimen label
- Case investigation form
- Patient register book
- Marker (water resistant)
- Pen

**Steps:**

1. Complete a label with patient name, specimen number, specimen type, date and time of collection, health facility and district. (See Job Aid for Labeling Specimens).
2. Fill in a case investigation form completely with the patient information. Make a duplicate form.
3. Locate the patient entry in the register book, and record the date and specimen type to be collected.

### 2. COLLECTION & HANDLING

**Supplies needed:**
- Sterile gloves
- Sterile gown
- Sterile towels
- Sterile swabs
- Povidone iodine (10%)
- Local anesthetic
- Sterile needle and syringe
- Alcohol (70%)
- Sterile lumbar puncture needle
- Adhesive plaster
- Three small, sterile, screw-capped tubes
- Sterile gauze pad
- Sterile needle and syringe
- One vial of trans-isolate (T-I) transport medium
- Safe box for sharps

**Steps:**

1. Collect three tubes† of CSF (1ml per tube) by lumbar puncture. For additional guidance, see Job Aid for How to Collect CSF.

   The tubes of CSF should be handled as follows:
   - **Tube 1** is for staining. Keep at 4-8°C.
   - **Tube 2** is for biochemistry. Keep at 4-8°C.
   - **Tube 3** is for isolation and identification. Transfer CSF from tube 3 into a vial of T-I transport medium (See Job Aid for Using Trans-Isolate Transport Medium for CSF). Keep at ambient temperature.

   *If lumbar puncture is contraindicated or cannot be performed, collect blood for culture and transfer to blood culture bottle (See Job Aid for How to Collect Blood).*

2. Adhere labels to the tubes and vial of CSF.
3. Safely dispose of all contaminated materials.

†If only one tube of CSF can be obtained, it should be used for isolation and identification.

### 3. TRANSPORTATION

**Supplies needed:**
- Gloves
- Insulated box
- One ice pack
- Triple packaging system
  (See Job Aid for Triple Packaging System to maintain ambient temperature)
- Referral lab contact information

**Steps:**

1. Hand carry tubes 1 and 2 (for staining and biochemistry) to the local laboratory in an insulated box with ice pack.

   Transport the vial or blood culture bottle (for isolation and identification) to the referral laboratory as follows:
   - Pack the specimen using a triple packaging system (See Job Aid for Triple Packaging System to maintain ambient temperature).
   - Contact the IDSR* focal person in the district to arrange transport of the package. Ensure that:
     - National and international regulations for shipping diagnostic specimens are strictly followed.
     - Specimen remains at ambient temperature throughout transport.
     - Package reaches referral laboratory within 24 hours of specimen collection.

2. Keep the duplicate case investigation form at the district.

### 4. TESTING

Testing and documentation are done by laboratory staff according to standard operating procedures.

### 5. RECORDING & REPORTING

Referral laboratory should verbally communicate results to the IDSR focal person in the district within two to four days after receiving the specimen. Written communication should follow.

**Steps:**

1. IDSR focal person at the district should communicate results to clinician and the local laboratory staff.
2. Clinician and local laboratory staff should record results in their register book. Also record the date and time the results were received and by whom.

*Integrated Disease Surveillance and Response*
Description

This job aid presents the protocol for processing and testing specimens for laboratory confirmation of cerebrospinal meningitis. It is intended for referral laboratories capable of performing the confirmatory tests. Referral laboratories should use this job aid upon receiving specimens from health facilities and districts. The job aid does not address the technical procedures for performing laboratory confirmation tests. It should be used in conjunction with the standard operating procedures (SOP) for confirming cerebrospinal meningitis.

Background

Cerebrospinal meningitis (CSM) is an acute infection of the central nervous system caused by viruses, bacteria, fungi, or protozoa. The most common aetiological agents are bacteria including Neisseria meningitidis, Streptococcus pneumoniae, and Haemophilus influenzae. In Africa, large epidemics are caused by N. meningitidis serogroup A and to a lesser extent, groups C and W-135. Outbreaks may occur from November to May in sub-Saharan Africa in the meningitis belt extending from Ethiopia to Gambia where the incidence may be greater than one case per 1,000 population. Tanzania is just south of the meningitis belt and small outbreaks have been reported yearly, especially along the northern and western borders.

CSM is transmitted from person-to-person by airborne respiratory droplets. The case fatality rate should be less than 10% if there is prompt access to health care and proper management, and in the absence of highly virulent pathogens. Risk factors for CSM include non-vaccination and overcrowding.

Sampling strategy for suspected outbreaks

Health facilities and districts collect specimens from the first five suspected cases. If any are positive, every tenth case will be sampled throughout the outbreak.

Specimen to be tested

Cerebrospinal fluid (CSF) or blood

Confirmatory tests to be done

Isolation, identification and serogrouping. Antimicrobial susceptibility periodically throughout the outbreak.

Why laboratory confirmation is important

Confirmation of N. meningitidis in CSF or blood of one or more cases will allow health officials to declare an outbreak and to take appropriate action. Based on serogroup identification of N. meningitidis, health officials can decide if a vaccination campaign is needed to prevent further cases.

Periodic antimicrobial susceptibility data will be used to monitor resistance.

Referral laboratories should keep updated contact information for the health facilities and districts in their catchment areas.

This job aid was prepared through a partnership of the Tanzania MOH, NIMR, MUCHS, PHRPlus, AFRO, and CDC.
1. RECEIVING

Upon receiving specimens for laboratory confirmation of cerebrospinal meningitis, the laboratory must be able to start testing immediately.†

**Supplies needed:**
- Gloves
- Laboratory register
- Pen or marker

Note: Gloves should be worn when opening package and when handling specimen and contaminated materials. Work should be done in the laboratory.

**Steps:**

1.1 Log in the sender’s name and address in the laboratory register.

1.2 Locate the case investigation form and the vial of trans-isolate (T-I) transport medium (or blood culture bottle) inoculated with cerebrospinal fluid (CSF).

1.3 Assess the condition of the vial and the documentation as follows:
   - Vial should be labeled. Information on vial label and case investigation form should match.
   - Vial should be intact and not leaking.
   - Vial should be at ambient temperature.

1.4 Log in the patient information, the specimen information, and the date and time of receipt in the laboratory register. File case investigation form for later use.

1.5 Keep vial at ambient temperature. Immediately prepare for testing.

2. TESTING

**Supplies needed:**
- Standard operating procedures (SOP), reagents, and supplies for isolation, identification and serogrouping, and antimicrobial susceptibility for confirming cerebrospinal meningitis

**Steps:**

2.1 According to the SOP, perform testing for isolation and identification for confirming cerebrospinal meningitis.

Perform testing for serogrouping of *N. meningitidis*. Periodically throughout the outbreak, determine the antimicrobial susceptibility pattern of any *N. meningitidis* species isolated.

2.2 Throughout the testing, safely dispose of all waste and contaminated materials.

3. RECORDING & REPORTING

**Supplies needed:**
- Laboratory register
- Case investigation form

Note: Results should be communicated within two to four days of receiving the specimen. If communication is by email or other indirect means, request confirmation that the results were received.

**Steps:**

Isolation, identification, and serogrouping

3.1 Record the isolation, identification, and serogrouping results in the laboratory register and on the case investigation form. Communicate the results (positive or negative) immediately to the IDSR* focal person at the district and at your level.

Susceptibility

3.2 Record the antimicrobial susceptibility results in the laboratory register and on the case investigation form. Communicate the results immediately to the IDSR focal person at the district and at your level.

3.3 Send the original case investigation form to the IDSR focal person at the district.

4. STORAGE

**Steps:**

4.1 Store one or two representative isolates from the outbreak.

4.2 Dispose remaining isolates according to the SOP.

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† If laboratory cannot start testing immediately or if specimen is not suitable, contact the Integrated Disease Surveillance and Response (IDSR) focal person at your level.

*Integrated Disease Surveillance and Response*
**Job Aid for Laboratory Confirmation**  
*(for health facilities and districts)*

### Description

This job aid presents the protocol for collection and processing of specimens for laboratory confirmation of cholera. It is primarily intended for health facilities and district-level staff to use during an outbreak investigation or when the action threshold has been reached.

### Background

Cholera is a disease that can produce profuse watery diarrhoea, caused by *Vibrio cholerae* bacteria serogroups O1 and O139. In Africa, cholera may cause rapidly progressive epidemics, usually between January and April. In endemic areas, small outbreaks may occur as well as sporadic cases that account for less than 5% of all non-outbreak-related diarrhoea cases. In Tanzania, cholera occurs mostly in the rainy season, usually caused by serogroup O1, biotype El Tor.

Cholera is transmitted from person-to-person through the ingestion of faecally-contaminated food or drink. It can cause severe dehydration in a few hours; in untreated patients, the case fatality rate (CFR) may exceed 50%. If patients are properly managed, the CFR is usually less than 1%, but can exceed 5%. At least 90% of the cases are mild and remain undiagnosed. Risk factors for cholera include lack of continuous access to safe water, attending large gatherings such as weddings or funerals, or contact with persons who died of cholera.

### Standard case definition

**For community level**

Any person five years of age or older passing a great amount of watery diarrhoea or who dies after passing a great amount of watery diarrhoea.

**For facility level**

Any person five years of age and older who develops severe dehydration or who dies from acute watery diarrhoea.

### Action threshold

A single case at a defined locality or health facility according to standard case definition is considered a suspected outbreak. Specimens should be collected immediately for laboratory confirmation.

### Sampling strategy

Collect specimen from the first five to 10 suspected cases. If any are positive, then collect every tenth case during the outbreak.

**Specimen to be collected**

Stool, or rectal swab, if patient is not able to pass stool.

### Presumptive diagnostic tests

Macroscopy and microscopy

### Confirmatory tests

- Isolation, identification and serogrouping.
- Antimicrobial susceptibility.

### Why laboratory confirmation is important

A stool culture positive for *Vibrio cholerae* serogroup O1 on one or more cases will allow health officials to declare an outbreak and to take appropriate action.

Antimicrobial susceptibility data will be used to monitor resistance. These data will provide information for the MOH to develop a treatment policy for the organism.

### Referral Laboratory

*(capable of performing the confirmatory tests)*

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<td>Phone:</td>
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<td>email:</td>
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*This job aid was prepared through a partnership of the Tanzania MOH, NIMR, MUCHS, PHRPlus, AFRO and CDC.*
For health facilities and districts

**JOB AID FOR LABORATORY CONFIRMATION: CHOLERA**

### 1. DOCUMENTATION

**Supplies needed:**
- Specimen labels
- Case investigation form
- Patient register book
- Marker (water resistant)
- Pen

**Steps:**

1.1 Complete a label with patient name, specimen number, specimen type, date and time of collection, health facility and district. (See Job Aid for Labeling Specimens).

1.2 Fill in a case investigation form completely with the patient information. Make a duplicate form.

1.3 Locate the patient entry in the register book, and record the date and specimen type to be collected.

### 2. COLLECTION & HANDLING

**Supplies needed:**
- Gloves
- Leak proof screw-capped container
- Sterile cotton-tipped applicators (swabs)
- One tube of Cary Blair transport medium
- Adhesive tape

**Steps:**

2.1 Collect a fresh stool. Place stool in a leak proof screw-capped container.

*If patient is not able to pass stool, take a rectal swab* (See Job Aid for How to Take a Rectal Swab).

2.2 Transfer a small amount of the stool (*or the rectal swab*) to a tube of Cary Blair transport medium (See Job Aid for Using Cary Blair Transport Medium).

2.3 Adhere a label to the specimen container and tube of Cary Blair.

2.4 Keep the tube of Cary Blair at 4-8°C.

2.5 Safely dispose of all contaminated materials.

**Note:** Collect specimens from suspected cases during the acute stage (two to four days after onset) and before antimicrobial treatment.

### 3. TRANSPORTATION

**Supplies needed:**
- Gloves
- Triple packaging system
  (See Job Aid for Triple Packaging System to maintain cold chain)
- Four ice packs
- Referral lab contact information

**Steps:**

3.1 Hand carry the specimen to the local laboratory (for macroscopy and microscopy).

Transport the tube of Cary Blair to the referral laboratory as follows:

- Pack the specimen using a triple packaging system with a solid cold box and ice packs (See Job Aid for Triple Packaging System to maintain cold chain).

- Contact the IDSR* focal person in the district to arrange transport of the package. Ensure that:
  - National and international regulations for shipping diagnostic specimens are strictly followed.
  - Specimen remains at 4-8°C throughout transport. Do not freeze.
  - Package reaches referral laboratory within 48 hours of specimen collection.

3.2 Keep the duplicate case investigation form at the district.

### 4. TESTING

Testing and documentation are done by laboratory staff according to standard operating procedures.

### 5. RECORDING & REPORTING

Referral laboratory should verbally communicate results to the IDSR focal person in the district within two to four days after receiving the specimen. Written communication should follow.

**Steps:**

5.1 IDSR focal person at the district should communicate results to clinician and the local laboratory staff.

5.2 Clinician and local laboratory staff should record results in their register book. Also record the date and time the results were received and by whom.

*Integrated Disease Surveillance and Response*
Job Aid for Laboratory Confirmation
(for referral laboratories)

CHOLERA

Description

This job aid presents the protocol for processing and testing specimens for laboratory confirmation of cholera. It is intended for referral laboratories capable of performing the confirmatory tests. Referral laboratories should use this job aid upon receiving specimens from health facilities and districts. This job aid does not address the technical procedures for performing laboratory confirmation tests. It should be used in conjunction with the standard operating procedures (SOP) for confirming cholera.

Background

Cholera is a disease that can produce profuse watery diarrhoea, caused by Vibrio cholerae bacteria serogroups O1 and O139. In Africa, cholera may cause rapidly progressive epidemics, usually between January and April. In endemic areas, small outbreaks may occur as well as sporadic cases that account for less than 5% of all non-outbreak-related diarrhoea cases. In Tanzania, cholera occurs mostly in the rainy season, usually caused by serogroup O1, biotype El Tor.

Cholera is transmitted from person-to-person through the ingestion of faecally-contaminated food or drink. It can cause severe dehydration in a few hours; in untreated patients, the case fatality rate (CFR) may exceed 50%. If patients are properly managed, the CFR is usually less than 1%, but can exceed 5%. At least 90% of the cases are mild and remain undiagnosed. Risk factors for cholera include lack of continuous access to safe water, attending large gatherings such as weddings or funerals, or contact with persons who died of cholera.

Sampling strategy for suspected outbreaks

Health facilities or districts collect specimens from the first 5 to 10 suspected cases. If any are positive, every tenth case will be sampled throughout the outbreak.

Specimen to be tested

Stool or rectal swab

Confirmatory tests to be done

Isolation, identification and serogrouping. Antimicrobial susceptibility.

Why laboratory confirmation is important

A stool culture positive for Vibrio cholerae serogroup O1 on one or more cases will allow health officials to declare an outbreak and to take appropriate action.

Antimicrobial susceptibility data will be used to monitor resistance. These data will provide information for the MOH to develop a treatment policy for the organism.

Referral laboratories should keep updated contact information for the health facilities and districts in their catchment areas.

This job aid was prepared through a partnership of the Tanzania MOH, NIMR, MUCHS, PHRPlus, AFRO, and CDC.
1. RECEIVING

Upon receiving specimens for laboratory confirmation of cholera, the laboratory must be able to start testing immediately.†

**Supplies needed:**

- Gloves
- Laboratory register
- Pen or marker

Note: Gloves should be worn when opening package, and when handling specimen and contaminated materials. Work should be done in the laboratory.

**Steps:**

1. Log in the sender's name and address in the laboratory register.
2. Locate the case investigation form and the tube of Cary Blair transport medium containing the swab.
3. Assess the condition of the tube and the documentation as follows:
   - Tube should be labeled. Information on tube label and case investigation form should match.
   - Tube should be intact and not leaking.
   - Tube should be cold, but not frozen.
   - Record the findings in the laboratory register and on case investigation form. Reject unsuitable specimens.†
4. Log in the patient information, the specimen information, and the date and time of receipt in the laboratory register. File case investigation form for later use.
5. Keep tube at 4-8°C. Immediately prepare for testing.

2. TESTING

**Supplies needed:**

- Standard operating procedures (SOP), reagents, and supplies for isolation, identification and serogrouping, and antimicrobial susceptibility of *Vibrio cholerae*

**Steps:**

1. According to the SOP, perform testing for isolation, identification, and serogrouping of *Vibrio cholerae.*

If any *Vibrio cholerae* serogroup O1 are isolated, determine antimicrobial susceptibility pattern according to the SOP.

2.2 Throughout the testing, safely dispose of all waste and contaminated materials.

3. RECORDING & REPORTING

**Supplies needed:**

- Laboratory register
- Case investigation form

Note: Results should be communicated within two to four days of receiving the specimen. If communication is by email or other indirect means, request confirmation that the results were received.

**Steps:**

**Isolation, identification and serogrouping**

1. Record the isolation, identification, and serogrouping results in the laboratory register and on the case investigation form. Communicate the results (positive or negative) immediately to the IDS* focal person at the district and at your level.

**Susceptibility**

2. Record the antimicrobial susceptibility results in the laboratory register and on the case investigation form. Communicate the results immediately to the IDS* focal person at the district and at your level.

3.3 Send the original case investigation form to the IDS* focal person at the district.

4. STORAGE

**Steps:**

1. Store one or two representative isolates from the outbreak.
2. Dispose remaining isolates according to SOP.

†If laboratory cannot start testing immediately or if specimen is not suitable, contact the Integrated Disease Surveillance and Response (IDSR) focal person at your level.

*Integrated Disease Surveillance and Response
United Republic of Tanzania  
Ministry of Health

Job Aid for Laboratory Confirmation  
(for health facilities and districts)

Description

This job aid presents the protocol for the collection and processing of specimens for laboratory confirmation of measles. It is primarily intended for health facilities and district-level staff to use during an outbreak investigation or when the action threshold has been reached.

Background

Measles is a febrile rash illness caused by the paramyxovirus *Morbillivirus*. In Africa, large outbreaks occur every few years in areas with low vaccine coverage (<85-90%), and in areas where there is an accumulation of persons who have never been infected or vaccinated. In Tanzania, the ministry of health is implementing an accelerated measles control strategy with case-based surveillance and documentation of vaccination.

Measles is transmitted from person-to-person via airborne respiratory droplets. It is among the most transmissible of human infections among children and non-immune adults. The true incidence of measles far exceeds reported cases. In most African countries, measles is the fourth leading cause of death in children less than five years of age. The acceptable case fatality rate should be less than 1% of all reported cases and less than 5% of hospitalized cases. Risk factors for measles include non-vaccination, overcrowding, and exposure to infected individuals.

Standard case definition

For community level
   Any person with fever and rash.

For facility level
   Any person with history of fever, skin rash and any of the following: cough, running nose, and red eyes.

Action threshold

A single suspected case according to standard case definition in a week at a defined locality or health facility is considered a suspected outbreak. Specimens should be collected immediately for laboratory confirmation.

Sampling strategy

Collect specimen from each suspected case.

Specimen to be collected

Blood

Confirmatory tests

Serology for IgM antibodies to measles virus

Why laboratory confirmation is important

Confirmation of measles IgM antibodies in serum of two or more cases will allow health officials to declare an outbreak and to take appropriate action. Health officials can decide if a vaccination campaign is needed to prevent further cases.

Referral laboratory

(designed laboratory for confirmation of measles)
National Virology Laboratory  
Department of Microbiology/Immunology  
P.O. Box 65001  
Dar es Salaam, Tanzania  
Phone: 022 2 15 0304

This job aid was prepared through a partnership of the Tanzania MOH, NIMR, MUCHS, PHRPlus, AFRO, and CDC.
For health facilities and districts

**JOB AID FOR LABORATORY CONFIRMATION: MEASLES**

### 1. DOCUMENTATION

**Supplies needed:**
- Specimen label
- Marker (water resistant)
- Case investigation form
- Pen
- Patient register book

**Steps:**

1. Complete a label with patient name, specimen number, specimen type, date and time of collection, health facility and district. (See Job Aid for Labeling Specimens).
2. Fill in a case investigation form completely with the patient information. Include the date of the last measles vaccination, the date of rash onset, and the date of specimen collection. Make a duplicate form.
3. Locate the patient entry in the register book, and record the date and specimen type to be collected.

### 2. COLLECTION & HANDLING

**Supplies needed:**
- Gloves
- Tourniquet
- Sterile gauze pads
- Alcohol (70%)
- Sterile needle and vacutainer
- Sterile test tube (5-10ml), if a sterile needle and syringe are used
- Adhesive plaster
- Sterile pipette
- Sterile, screw-capped tube (glass or plastic)
- Centrifuge tubes for balancing

**Additional supplies if health facility has a centrifuge:**
- Centrifuge tubes for balancing

**Note:** Collect specimens from suspected cases at the first contact with the health facility.

**Steps:**

1. Collect blood by venepuncture into sterile syringe or tube (See Job Aid for How to Collect Blood).
2. Adhere a specimen label to tube of blood.
3. Keep the blood at ambient temperature. Do not freeze.
4. Separate the serum from the blood clot (See Job Aid for How to Obtain Serum from Whole Blood).
5. Adhere a specimen label to tube of serum.
6. Keep the serum at 4-8°C.
7. Safely dispose of all contaminated materials.

**Volume of blood to collect**

<table>
<thead>
<tr>
<th></th>
<th>Adults</th>
<th>Children</th>
<th>Infants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>5-10ml</td>
<td>2-5ml</td>
<td>0.5-2ml</td>
</tr>
</tbody>
</table>

### 3. TRANSPORTATION

**Supplies needed:**
- Gloves
- Triple packaging system
- Four ice packs
- Referral lab contact information

**Steps:**

1. Transport the serum to the National Virology Laboratory as follows:
   - Pack the serum using a triple packaging system with a solid cold box and ice packs (See Job Aid for Triple Packaging System to maintain cold chain).
   - Contact the IDSR* focal person in the district to arrange transport of the package. Ensure that: National and international regulations for shipping diagnostic specimens are strictly followed.
   - Specimen remains at 4-8°C throughout transport.
2. Keep the duplicate case investigation form at the district.

### 4. TESTING

Testing and documentation are done by laboratory staff according to standard operating procedures.

### 5. RECORDING & REPORTING

Referral laboratory should verbally communicate results to the IDSR focal person in the district within seven days after receiving the specimen. Written communication should follow.

**Steps:**

1. IDSR focal person at the district should communicate results to clinician and the local laboratory staff.
2. Clinician and local laboratory staff should record results in their register book. Also record the date and time the results were received and by whom.

*Integrated Disease Surveillance and Response*
Description

This job aid presents the protocol for processing and testing specimens for laboratory confirmation of measles. It is intended for referral laboratories designated by the ministry of health for confirmation of measles. Referral laboratories should use this job aid upon receiving specimens from health facilities and districts. The job aid does not address the technical procedures for performing laboratory confirmation tests. It should be used in conjunction with the standard operating procedures (SOP) for confirming measles.

Background

Measles is a febrile rash illness caused by the paramyxovirus Morbillivirus. In Africa, large outbreaks occur every few years in areas with low vaccine coverage (<85-90%), and in areas where there is an accumulation of persons who have never been infected or vaccinated. In Tanzania, the ministry of health is implementing an accelerated measles control strategy with case-based surveillance and documentation of vaccination.

Measles is transmitted from person-to-person via airborne respiratory droplets. It is among the most transmissible of human infections among children and non-immune adults. The true incidence of measles far exceeds reported cases. In most Africa countries, measles is the fourth leading cause of death in children less than five years of age. The acceptable case fatality rate should be less than 1% of all reported cases and less than 5% of hospitalized cases. Risk factors for measles include non-vaccination, overcrowding, and exposure to infected individuals.

Sampling strategy for suspected outbreaks

Health facilities and districts collect specimens from each suspected case.

Specimen to be tested

Serum

Confirmatory tests to be done

Serology for IgM antibodies to measles virus

Why laboratory confirmation is important

Confirmation of measles IgM antibodies of two or more cases will allow health officials to declare an outbreak and to take appropriate action. Health officials can decide if a vaccination campaign is needed to prevent further cases.

Referral laboratories should keep updated contact information for the health facilities and districts in their catchment areas.

This job aid was prepared through a partnership of the Tanzania MOH, NIMR, MUCHS, PHRPlus, AFRO, and CDC.
1. RECEIVING

Upon receiving specimens for laboratory confirmation of measles, the laboratory must be able to start testing immediately.†

**Supplies needed:**
- Gloves
- Laboratory register
- Pen or marker

Note: Gloves should be worn when opening package and at all times when handling specimen and contaminated materials. Work should be done in the laboratory.

**Steps:**

1.1 Log in the sender’s name and address in the laboratory register.

1.2 Locate the case investigation form and the tube of serum.

1.3 Assess the condition of the tube and the documentation as follows:
   - Tube should be labeled. Information on tube label and case investigation form should match.
   - Tube should be intact and not leaking.
   - Tube should be cold.

   Record the findings in the laboratory register and on the case investigation form. Reject unsuitable specimens.†

1.4 Log in the patient information, the specimen information, and the date and time of receipt in the laboratory register. File case investigation form for later use.

1.5 Keep tube at 4-8°C. Immediately prepare for testing.

2. TESTING

**Supplies needed:**
- Standard operating procedures (SOP), reagents, and supplies for serologic testing for measles IgM antibodies

**Steps:**

2.1 According to SOP, perform testing for IgM antibodies to measles.

2.2 Throughout the testing, safely dispose of all waste and contaminated materials.

3. RECORDING & REPORTING

**Supplies needed:**
- Laboratory register
- Case investigation form

Note: Results should be communicated within seven days of receiving specimen. If communication to the district level is by email or other indirect means, request confirmation that the results were received.

**Steps:**

3.1 Record results in the laboratory register and on the case investigation form. Communicate the results (positive or negative) immediately to the IDSR* focal person at the district and at your level.

3.2 Send the original case investigation form to the IDSR focal person at the district.

4. STORAGE

**Steps:**

4.1 Store one or two samples from the outbreak.

4.2 Dispose remaining samples according to the SOP.

†If laboratory cannot start testing immediately or if specimen is not suitable, contact the Integrated Disease Surveillance and Response (IDSR) focal person at your level.

*Integrated Disease Surveillance and Response
Description

This job aid presents the protocol for the collection and processing of specimens for laboratory confirmation of plague. It is primarily intended for health facilities and district-level staff to use during an outbreak investigation or when the action threshold has been reached.

Background

Plague is a zoonotic infectious disease caused by the bacterium Yersinia pestis. Plague is endemic in many African countries including Tanzania where the disease is presently active in Lushoto and Karatu districts.

Plague is a natural infection of wild rodents and is transmitted to other rodents and human beings by the infective flea. Plague is also transmitted by direct exposure to infectious materials and respiratory droplets. Initial cases in an outbreak are usually bubonic and subsequent cases present as pneumonic. The case fatality rate (CFR) in untreated bubonic cases may exceed 50%, and in untreated pneumonic or septicemic cases, it may approach 100%. With good management, the CFR should be <5%.

The risk factors for plague include exposure to wild rodents and their fleas, and exposure to infected individuals.

Standard case definition

For community level
Any person with sudden fever and painful swelling under the arms or in the groin area.

For facility level
Any person with sudden onset of fever and a history of exposure to rodents, their fleas, or patients with plague, and one of the following:
- painful swelling of inguinal or axillary lymph nodes (bubonic presentation), or
- cough with blood stained sputum (pneumonic presentation), or
- signs of severe bloodstream infection, such as prostration, shock (septicemic presentation)

Action threshold

A single case at a defined locality or health facility according to the standard case definition is considered a suspected outbreak. This is the threshold for action. Specimens should be collected immediately for laboratory confirmation.

Contact the focal person for plague at the national level to request assistance with collecting specimens.

Sampling strategy

Collect specimen from the first 5 to 10 suspected cases.

Specimen to be collected

Bubo aspirate for bubonic plague, sputum for pneumonic plague, or blood for septicemic plague.

Presumptive diagnostic tests

Wayson or Gram stain.

Confirmatory tests

Dipstick detection of F1 antigen.

Isolation and identification of Y. pestis.

Why laboratory confirmation is important

Confirmation of Y. pestis of one or more cases will allow health officials to declare an outbreak and to take appropriate action.

Referral Laboratory

(capable of performing the confirmatory tests)

Name of laboratory: _______________________
Contact person: _______________________
Postal address: _______________________
Phone: _______________________
email: _______________________

This job aid was prepared through a partnership of the Tanzania MOH, NIMR, MUCHS, PHRPlus, AFRO, and CDC.
For each presentation of plague, there is a separate protocol for the collection and processing of specimens.

- For bubonic presentation, see Job Aid for Laboratory Confirmation: Bubonic Plague.

- For pneumonic presentation, see Job Aid for Laboratory Confirmation: Pneumonic Plague.

- For septicaemic presentation, see Job Aid for Laboratory Confirmation: Septicaemic Plague.
1. DOCUMENTATION

**Supplies needed:**
- Specimen label
- Case investigation form
- Marker (water resistant)
- Pen
- Patient register book

**Steps:**
1.1 Complete a label with patient name, specimen number, specimen type, date and time of collection, health facility and district. (See Job Aid for Labeling Specimens).
1.2 Fill in a case investigation form completely with the patient information. Make a duplicate form.
1.3 Locate the patient entry in the register book, and record the date and specimen type to be collected.

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2. COLLECTION & HANDLING

**Supplies needed:**
- Gloves
- Alcohol (70%)
- Sterile gauze pads
- Sterile needle (18-22G) and syringe
- Sterile saline
- Calibrated tube (1ml)
- Sterile cotton-tipped applicators (swabs)
- One tube of Cary Blair transport medium
- Sterile tube

**Steps:**
2.1 Inject 0.1-0.5ml sterile saline into bubo. Aspirate at least 0.2ml fluid. (See Job Aid for How to Collect Bubo Aspirate).
2.2 Divide the diluted specimen as follows:
   - Transfer 0.2ml into calibrated tube.
   - Absorb a few drops onto the cotton-tip of the sterile swab. Insert the swab into the Cary Blair transport medium (See Job Aid for How to Use Cary Blair Transport Medium).
   - Transfer the rest of the diluted specimen into the sterile tube.
2.3 Adhere a specimen label to each tube.
2.4 Keep the specimens at ambient temperature.
2.5 Safely dispose of all contaminated materials.

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3. TRANSPORTATION

**Supplies needed:**
- Gloves
- Insulated box
- Triple packaging system (See Job Aid for Triple Packaging System to maintain ambient temperature)
- Referral lab contact information

**Steps:**
3.1 Hand carry the calibrated tube (for dipstick test) and the tube of diluted aspirate (for staining) to the local laboratory.

Transport the tube of Cary Blair to the referral laboratory as follows:
- Pack the specimens using a triple packaging system (See Job Aid for Triple Packaging System to maintain ambient temperature).
- Contact the IDSR* focal person in the district to arrange transport of the package. Ensure that:
  - National and international regulations for shipping diagnostic specimens are strictly followed.
  - Specimens remains at ambient temperature throughout transport.
  - Package reaches referral laboratory within 24 hours of specimen collection.
3.2 Keep the duplicate case investigation form at the district.

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4. TESTING

Testing and documentation are done by laboratory staff according to standard operating procedures.

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5. RECORDING & REPORTING

Laboratory should verbally communicate results to the IDSR focal person in the district within seven days after receiving the specimen. Written communication should follow.

**Steps:**
5.1 IDSR focal person at the district should communicate results to clinician and the local laboratory staff.
5.2 Clinician and local laboratory staff should record results in their register book. Also record the date and time the results were received and by whom.

*Integrated Disease Surveillance and Response
1. DOCUMENTATION

**Supplies needed:**
- Specimen label
- Case investigation form
- Patient register book
- Marker (water resistant)
- Pen

**Steps:**

1.1 Complete a label with patient name, specimen number, specimen type, date and time of collection, health facility and district. (See Job Aid for Labeling Specimens).

1.2 Fill in a case investigation form completely with the patient information. Make a duplicate form.

1.3 Locate the patient entry in the register book, and record the date and specimen type to be collected.

2. COLLECTION & HANDLING

**Supplies needed:**
- Gloves
- Alcohol (70%)
- Sterile container with snap cap
- Sterile needle (18-22G) and syringe
- Sterile saline (1.0ml) in tube
- Calibrated tube (1ml)
- Sterile, cotton-tipped applicators (swabs)
- One tube of Cary Blair transport medium

**Steps:**

2.1 Ask patient to spit out sputum (not saliva) into sterile plastic container.

2.2 Using the sterile needle and syringe, aspirate 0.5ml sputum. Expel the sputum into the tube of 1.0ml sterile saline. Draw liquid into syringe several times to mix.

2.3 Divide the diluted specimen as follows:
- Transfer 0.2ml into calibrated tube.
- Absorb a few drops onto the cotton-tip of the sterile swab. Insert the swab into the tube of Cary Blair transport medium (See Job Aid for How to Use Cary Blair Transport Medium).
- Transfer the rest of the diluted sputum back into the tube.

2.4 Adhere a specimen label to each tube.

2.5 Keep the specimen at ambient temperature.

2.6 Safely dispose of all contaminated materials.

3. TRANSPORTATION

**Supplies needed:**
- Gloves
- Insulated box
- Triple packaging system (See Job Aid for Triple Packaging System to maintain ambient temperature)
- Referral lab contact information

**Steps:**

3.1 Hand carry the calibrated tube (for dipstick test) and tube of diluted sputum (for staining) to the local laboratory.

Transport the tube of Cary Blair to the referral laboratory as follows:

- Package the specimen using a triple packaging system (See Job Aid for Triple Packaging System to maintain ambient temperature).
- Contact the IDSR* focal person in the district to arrange transport of the package. Ensure that:
  - National and international regulations for shipping diagnostic specimens are strictly followed.
  - Specimen remains at ambient temperature throughout transport.
  - Package reaches referral laboratory within 24 hours of specimen collection.

3.2 Keep the duplicate case investigation form at the district.

4. TESTING

Testing and documentation are done by laboratory staff according to standard operating procedures.

5. RECORDING & REPORTING

Laboratory should verbally communicate results to the IDSR focal person in the district within seven days after receiving the specimen. Written communication should follow.

**Steps:**

5.1 IDSR focal person at the district should communicate results to clinician and the local laboratory staff.

5.2 Clinician and local laboratory staff should record results in their register book. Also record the date and time the results were received and by whom.

*Integrated Disease Surveillance and Response
JOB AID FOR LABORATORY CONFIRMATION: SEPTICAEMIC PLAGUE

1. DOCUMENTATION

Supplies needed:
- Patient register book
- Specimen label
- Case investigation form
- Marker (water resistant)
- Pen

Steps:
1.1 Complete a label with patient name, specimen number, specimen type, date and time of collection, health facility and district. (See Job Aid for Labeling Specimens).

1.2 Fill in a case investigation form completely with the patient information. Make a duplicate form.

1.3 Locate the patient entry in the register book, and record the date and specimen type to be collected.

2. COLLECTION & HANDLING

Supplies needed:
- Gloves
- Touriquet
- Sterile gauze pads
- Alcohol (70%)
- Sterile needle and syringe
- Two blood culture bottles
- Calibrated tube (1ml)
- Adhesive plaster

Steps:
2.1 Collect blood by venepuncture into sterile syringe (See Job Aid for How to Collect Blood).

2.2 Divide the blood as follows:
   - Inoculate each blood culture bottle with blood to yield a ratio of 1 part blood to 5 parts culture broth. Consult laboratory for additional guidance.
   - Transfer 0.2ml blood into calibrated tube.

2.3 Keep specimens at ambient temperature.

2.4 Adhere a specimen label to each specimen container.

2.5 Safely dispose of all contaminated materials.

3. TRANSPORTATION

Supplies needed:
- Triple packaging system (See Job Aid for Triple Packaging System to maintain ambient temperature)
- Gloves
- Insulated box
- Referral lab contact information

Steps:
3.1 Hand carry the specimen (for dipstick test) to the local laboratory.

Transport the blood culture bottles to the referral laboratory as follows:

- Pack the specimen using a triple packaging system (See Job Aid for Triple Packaging System to maintain ambient temperature).

- Contact the IDSR* focal person in the district to arrange transport of the package. Ensure that National and international regulations for shipping diagnostic specimens are strictly followed.

Specimen remains at ambient temperature throughout transport.

Package reaches referral laboratory within 24 hours of specimen collection.

3.2 Keep the duplicate case investigation form at the district.

4. TESTING

Testing and documentation are done by laboratory staff according to standard operating procedures.

5. RECORDING & REPORTING

Laboratory should verbally communicate results to the IDSR focal person in the district within seven days after receiving the specimen. Written communication should follow.

Steps:
5.1 IDSR focal person at the district should communicate results to clinician and the local laboratory staff.

5.2 Clinician and local laboratory staff should record results in their register book. Also record the date and time the results were received and by whom.

*Integrated Disease Surveillance and Response
Description

This job aid presents the protocol for processing and testing specimens for laboratory confirmation of plague. It is intended for referral laboratories to use upon receiving specimens from health facilities and districts. The job aid does not address the technical procedures for performing laboratory confirmation tests. It should be used in conjunction with the standard operating procedures (SOP) for confirming plague.

Background

Plague is a zoonotic infectious disease caused by the bacterium *Yersinia pestis*. Plague is endemic in many African countries including Tanzania where the disease is presently active in Lushoto and Karatu districts.

Plague is a natural infection of wild rodents and is transmitted to other rodents and human beings by the infective flea. Plague is also transmitted by direct exposure to infectious materials and respiratory droplets. Initial cases in an outbreak are usually bubonic and subsequent cases present as pneumonic. The case fatality rate (CFR) in untreated bubonic cases may exceed 50%, and in untreated pneumonic or septicaemic cases, it may approach 100%. With good management, the CFR should be <5%.

The risk factors for plague include exposure to wild rodents and their fleas, and exposure to infected individuals.

Sampling strategy for suspected outbreaks

Health facilities or districts collect specimens from the first 5 to 10 suspected cases.

Specimen to be tested

Bubo aspirate for bubonic plague, sputum for pneumonic plague, or blood for septicaemic plague.

Confirmation tests to be done

Isolation and identification of *Y. pestis*.

Why laboratory confirmation is important

Confirmation of *Y. pestis* of one or more cases will allow health officials to declare an outbreak and to take action.

Referral laboratories should keep updated contact information for the health facilities and districts in their catchment areas.

This job aid was prepared through a partnership of the Tanzania MOH, NIMR, MUCHS, PHRPlus, AFRO, and CDC.
1. RECEIVING

Upon receiving specimens for laboratory confirmation of plague, the laboratory must be able to start testing immediately.†

Supplies needed:

- Gloves
- Laboratory register
- Pen or marker

Note: Gloves should be worn when opening package and at all times when handling specimen and contaminated materials. Work should be done in the laboratory.

Steps:

1. Log in the sender’s name and address in the laboratory register.
2. Locate the case investigation form and the specimen container.
3. Assess the condition of the tube blood culture bottle and the documentation as follows:
   - Containers should be labeled. Information on container label and case investigation form should match.
   - Container should be intact and not leaking.
   - Container should be at ambient temperature.
   - Record the findings in the laboratory register and on the case investigation form. Reject unsuitable specimens.†
4. Log in the patient information, the specimen information, and the date and time of receipt in the laboratory register. File case investigation form for later use.
5. Keep tube at 4-8°C. Immediately prepare for testing.

2. TESTING

Supplies needed:

- Standard operating procedures (SOP), reagents, and supplies for isolation and identification of Y. pestis.

Steps:

1. According to SOP, perform testing for isolation and identification of Y. pestis.
2. Throughout the testing, safely dispose of all waste and contaminated materials.

†If laboratory cannot start testing immediately or if specimen is not suitable, contact the Integrated Disease Surveillance and Response (IDSR) focal person at your level.

3. RECORDING & REPORTING

Supplies needed:

- Laboratory register
- Case investigation form

Note: Results should be communicated within seven days of receiving specimen. If communication to the district level is by email or other indirect means, request confirmation that the results were received.

Steps:

1. Record isolation and identification results in the laboratory register and on the case investigation form. Communicate the results (positive or negative) immediately to the IDSR* focal person at your level.
2. Send the original case investigation form to the IDSR focal person at your level.

4. STORAGE

Steps:

1. Store one or two isolates from the outbreak.
2. Dispose remaining samples according to the SOP.

*Integrated Disease Surveillance and Response
United Republic of Tanzania
Ministry of Health

Job Aid for Laboratory Confirmation
(for health facilities and districts)

VIRAL HEMORRHAGIC FEVERS

Description
This job aid presents the protocol for collection and processing of specimens for laboratory confirmation of viral hemorrhagic fevers (VHFs). It is primarily intended for health facilities and district-level staff to use during an outbreak investigation or when the action threshold has been reached.

Background
The term viral hemorrhagic fever (VHF) refers to a syndrome that affects multiple organ systems in the body and causes damage to the vascular system. Several different viruses can cause the VHF syndrome in Africa, including Ebola-Marburg, Lassa, Rift Valley and Congo-Crimean hemorrhagic fever viruses. An outbreak of Rift Valley Fever occurred in Tanzania and neighboring countries in the late 1990s. Although no cases of Ebola have been reported in Tanzania, outbreaks of this disease have occurred in neighboring countries since 2000.

VHF is transmitted through direct exposure to infectious material and respiratory droplets. Many of the VHF viruses cause severe, life-threatening disease, while some cause relatively mild illness. Only a minority of cases have hemorrhage or bleeding. Among those with hemorrhage, the case fatality rate is from 15% to 90%. Risk factors for VHF include touching ill or deceased infected persons or their secretions, or having direct contact with infected animals. Health care workers are at risk when standard barrier precautions are not taken.

Standard case definition
For community level
Any person who has an unexplained illness with fever and bleeding or who died after an unexplained severe illness with fever and bleeding.
For facility level
Any person with severe illness, fever, and at least one of the following signs: bloody stools, vomiting blood, or unexplained bleeding from gums, nose, vagina, skin, or eyes.

Action threshold
A single suspected case according to standard case definition is considered a suspected outbreak.

The district should immediately report any suspected case to the regional and national levels and request assistance for collection of specimens and management of the situation.

Sampling strategy
Because of the potential for explosive outbreaks of some VHFs, it is not recommended that health facility and district staff collect specimens from live cases. If the suspected case is deceased, district staff may collect a skin snip, provided blunt instruments are used.

Specimen to be collected
Skin snip from nape of the neck of deceased case.

Confirmatory tests
Immunohistochemistry

Why laboratory confirmation is important
A skin snip testing positive for VHF virus on one or more cases will allow health officials to declare an epidemic and to take appropriate action.

Referral laboratory
(designated by the MOH for confirmation of VHFs)
National Health Laboratory Services
National Institute for Communicable Diseases
1 Modderfontein Road
Sandringham, South Africa
Attention: Dr. J. Pawska
email: nicdmail@nicd.ac.za

This job aid was prepared through a partnership of the Tanzania MOH, NIMR, MUCHS, PHRPlus, AFRO and CDC.
JOB AID FOR LABORATORY CONFIRMATION: VIRAL HEMORRHAGIC FEVERS

1. DOCUMENTATION

**Supplies needed:**
- Specimen label
- Case investigation form
- Patient register book
- Marker (water resistant)
- Pen

**Steps:**

1.1 Complete a label with patient name, specimen number, specimen type, date and time of collection, health facility and district. (See Job Aid for Labeling Specimens).
1.2 Fill in a case investigation form completely with the patient information. Make a duplicate form.
1.3 Locate the patient entry in the register book, and record the date and specimen type to be collected.

2. COLLECTION & HANDLING

**Supplies needed:**
- Bucket for disinfectant
- 10 litres of water
- Liquid bleach (3 - 5% active chlorine)
- Punch biopsy tool
- Tweezers
- Blunt scissors
- Vial of formalin (20ml)
- Plastic bag
- Hand soap

**Additional supplies for personal protection:**
- Boots
- Latex gloves
- Gown
- Plastic apron
- Heavy-duty gloves
- Mask
- Goggles

**Notes:**

*Collect specimens as soon as possible following death of patient.*

**Steps:**

2.1 Collect a skin snip from the nape of the neck of the deceased patient (See Job Aid for How to Perform a Skin Snip). Place the skin snip in a vial of formalin.
2.2 Adhere a label to the vial.
2.3 Keep the specimen at ambient temperature. Do not freeze.
2.4 Safely dispose of all contaminated materials.

*Refer to the manual *Infection Control for Viral Haemorrhagic Fevers in the African Health Care Setting* (WHO/EMC/ESR/98.2) for information about using protective clothing.

3. TRANSPORTATION

**Supplies needed:**
- Gloves
- Referral lab contact information
- Triple packaging system (See Job Aid for Triple Packaging System to maintain ambient temperature)

**Steps:**

3.1 Transport the specimen to the referral laboratory as follows:
- Pack the specimen using a triple packaging system. (See Job Aid for Triple Packaging System to maintain ambient temperature).
- Contact the referral laboratory for guidance on labeling package as “Dangerous Goods in Excepted Quantities.”
- Contact the IDSR* focal person in the district to arrange transport of the package. Ensure that National and international regulations for shipping diagnostic specimens are strictly followed.
- Specimen remains at ambient temperature throughout transport.
- Package reaches referral laboratory within 24 hours of specimen collection.

3.2 Keep the duplicate case investigation form at the district.

4. TESTING & DOCUMENTATION

Testing and documentation are done by laboratory staff according to standard operating procedures.

5. RECORDING & REPORTING

Referral laboratory should verbally communicate results to the IDSR focal person in the district within seven days after receiving the specimen. Written communication should follow.

**Steps:**

5.1 IDSR focal person at the district should communicate results to clinician and the local laboratory staff.

5.2 Clinician and local laboratory staff should record results in their register book. Also record the date and time the results were received and by whom.

*Integrated Disease Surveillance and Response
**Description**
This job aid presents the protocol for the collection and processing of specimens for laboratory confirmation of yellow fever. It is primarily intended for health facilities and district-level staff to use during an outbreak investigation or when the action threshold has been reached.

**Background**
Yellow fever is an acute infectious disease caused by an arthropod-borne flavivirus. Sporadic cases can occur regularly in endemic areas. Large scale outbreaks occur every 3 to 10 years in villages or cities where yellow fever is prevalent. Since the mid-1980’s, there has been a resurgence of yellow fever in Africa; however, no new cases have been reported in Tanzania since 1954. Due to reports of yellow fever in neighboring countries, Tanzania remains a potential transmission area and active surveillance is conducted.

Yellow fever is transmitted from person-to-person by *Aedes* mosquitoes (in urban cycle) or by forest mosquito species or forest primate reservoirs (in sylvatic cycle). True incidence far exceeds reported cases. While only a minority of the cases is severe, case fatality rates may be 25-50% among patients with the syndrome of hemorrhage, jaundice, and renal disease. Risk factors for yellow fever include non-vaccination, or living or working in a location near woods or where monkeys are numerous.

**Standard case definition**

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**For community level**
Any person with fever and yellowing of eyes or skin.

**For facility level**
Any person with sudden onset of fever, followed by jaundice within two weeks of first symptoms with a history of traveling from an endemic area.

**Action threshold**
A single suspected case according to standard case definition is considered a suspected outbreak. Specimens should be collected immediately for laboratory confirmation.

**Sampling strategy**
Collect specimens from all sylvatic cases. In urban epidemics, collect specimens from the first 5 to 10 suspected cases, then from every tenth case.

**Specimen to be collected**
Blood

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**Confirmatory tests**
Serology for yellow fever IgM antibodies.

**Why laboratory confirmation is important**
Confirmation of yellow fever IgM antibodies in the serum of one or more cases will allow health officials to declare an outbreak and to take appropriate action. Health officials can decide if a vaccination campaign is needed to prevent further cases.

**Referral laboratory**

*(designated laboratory for confirmation of yellow fever)*
National Virology Laboratory
Department of Microbiology/Immunology
Muhimbili University College of Health Sciences
P.O. Box 65001
Dar es Salaam, Tanzania
Phone: 022 2 15 0304

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*This job aid was prepared through a partnership of the Tanzania MOH, NIMR, MUCHS, PHRPlus, AFRO, and CDC.*
For health facilities and districts

**JOB AID FOR LABORATORY CONFIRMATION: YELLOW FEVER**

1. **DOCUMENTATION**

**Supplies needed:**
- Specimen label
- Case investigation form
- Patient register book
- Marker (water resistant)
- Pen

**Steps:**
1.1 Complete a label with patient name, specimen number, specimen type, date and time of collection, health facility and district. (See Job Aid for Labeling Specimens).
1.2 Fill in a case investigation form completely with the patient information. Include the date of disease onset and the date of specimen collection. Make a duplicate form.
1.3 Locate the patient entry in the register book, and record the date and specimen type to be collected.

2. **COLLECTION & HANDLING**

**Supplies needed:**
- Gloves
- Tourniquet
- Sterile gauze pads
- Alcohol (70%)
- Sterile needle and vacutainer or sterile needle and syringe
- Sterile, ordinary test tube (5-10ml), if a sterile needle and syringe are used
- Adhesive plaster
- Sterile pipette
- Sterile, screw-capped tube (glass or plastic)

**Additional supplies** if health facility has a centrifuge:
- Sterile centrifuge tubes for balancing

**Steps:**
2.1 Collect blood by venepuncture into sterile syringe or tube (See Job Aid for How to Collect Blood).
2.2 Adhere a specimen label to tube of blood.
2.3 Keep the blood at ambient temperature. Do not freeze.
2.4 Separate the serum from the blood clot (See Job Aid for How to Obtain Serum from Whole Blood).
2.5 Adhere a specimen label to tube of serum.
2.6 Keep the serum at 4-8°C.
2.7 Safely dispose of all contaminated materials.

3. **TRANSPORTATION**

**Supplies needed:**
- Gloves
- Triple packaging system to maintain cold chain
- Four ice packs
- Referral lab contact information

**Steps:**
3.1 Transport the specimen to the National Virology Laboratory as follows:
   - Package the specimen using a triple packaging system with a solid cold box and ice packs (See Job Aid for Triple Packaging System to maintain cold chain).
   - Contact the IDSR* focal person in the district to arrange transport of the package. Ensure that National and international regulations for shipping diagnostic specimens are strictly followed.
   - Specimen remains at 4-8°C throughout transport.
   - Package reaches referral laboratory **within 72 hours** of specimen collection.
3.2 Keep the duplicate case investigation form at the district with the IDSR focal person.

4. **TESTING**

Testing and documentation are done by laboratory staff according to standard operating procedures.

5. **RECORDING & REPORTING**

Referral laboratory should verbally communicate results to the IDSR focal person in the district within seven days after receiving the specimen. Written communication should follow.

**Steps:**
5.1 IDSR focal person at the district should communicate results to clinician and the local laboratory staff.
5.2 Clinician and local laboratory staff should record results in their register book. Also record the date and time the results were received and by whom.

*Integrated Disease Surveillance and Response*
Description

This job aid presents the protocol for processing and testing specimens for laboratory confirmation of yellow fever. It is intended for referral laboratories designated by the ministry of health for confirmation of yellow fever. Referral laboratories should use this job aid upon receiving specimens from health facilities and districts. The job aid does not address the technical procedures for performing laboratory confirmation tests. It should be used in conjunction with the standard operating procedures (SOP) for confirming yellow fever.

Background

Yellow fever is an acute infectious disease caused by an arthropod-borne flavivirus. Sporadic cases can occur regularly in endemic areas. Large scale outbreaks occur every 3 to 10 years in villages or cities where yellow fever is prevalent. Since the mid-1980’s, there has been a resurgence of yellow fever in Africa; however, no new cases have been reported in Tanzania since 1954. Due to reports of yellow fever in neighboring countries, Tanzania remains a potential transmission area and active surveillance is conducted.

Yellow fever is transmitted from person-to-person by *Aedes* mosquitoes (in urban cycle) or by forest mosquito species or forest primate reservoirs (in sylvatic cycle). True incidence far exceeds reported cases. While only a minority of the cases is severe, case fatality rates may be 25-50% among patients with the syndrome of hemorrhage, jaundice, and renal disease. Risk factors for yellow fever include non-vaccination, or living or working in a location near woods or where monkeys are numerous.

<table>
<thead>
<tr>
<th>Sampling strategy for suspected outbreaks</th>
<th>Why laboratory confirmation is important</th>
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<tr>
<td>Health facilities and districts collect specimens from all sylvatic cases. In urban epidemics, specimens will be collected from the first 5 to 10 suspected cases, then from every tenth case.</td>
<td></td>
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<tr>
<td>Confirmation of yellow fever IgM antibodies in serum of one or more cases will allow health officials to declare an outbreak and to take appropriate action. Health officials can decide if a vaccination campaign is needed to prevent further cases.</td>
<td></td>
</tr>
</tbody>
</table>

Specimen to be tested

Serum

Confirmatory tests to be done

Serology for yellow fever IgM antibodies

Referral laboratories should keep updated contact information for the health facilities and districts in their catchment areas.

This job aid was prepared through a partnership of the Tanzania MOH, NIMR, MUCHS, PHRPlus, AFRO, and CDC.
1. RECEIVING

Upon receiving specimens for laboratory confirmation of yellow fever, the laboratory must be able to start testing immediately.†

**Supplies needed:**
- Gloves
- Laboratory register
- Pen or marker

Note: Gloves should be worn when opening package and at all times when handling specimen and contaminated materials. Work should be done in the laboratory.

**Steps:**

1.1 Log in the sender’s name and address in the laboratory register.

1.2 Locate the case investigation form and the tube of serum.

1.3 Assess the condition of the tube and the documentation.
   - Tube should be labeled. Information on tube label and case investigation form should match.
   - Tube should be intact and not leaking.
   - Tube should be cold.

Record the findings in the laboratory register and on the case investigation form. Reject unsuitable specimens.†

1.4 Log in the patient information, the specimen information, and the date and time of receipt in the laboratory register. File case investigation form for later use.

1.5 Keep tube at 4-8°C. Immediately prepare for testing.

†If laboratory cannot start testing immediately or if specimen is not suitable, contact the Integrated Disease Surveillance and Response (IDSR) focal person at your level.

2. TESTING

**Supplies needed:**
- Standard operating procedures (SOP), reagents, and supplies for serologic testing for yellow fever IgM antibodies

**Steps:**

2.1 According to SOP, perform testing for yellow fever IgM antibodies.

2.2 Throughout the testing, safely dispose of all waste and contaminated materials.

3. RECORDING & REPORTING

**Supplies needed:**
- Laboratory register
- Case investigation form

Note: Results should be communicated within seven days of receiving specimen. If communication to the district level is by email or other indirect means, request confirmation that the results were received.

**Steps:**

3.1 Record results in the laboratory register and on the case investigation form. Communicate the results (positive or negative) immediately to the IDSR* focal person at the district and at your level. *If results are negative on specimens collected within seven days of disease onset, ensure that a convalescent specimen is sent.

3.2 Send the original case investigation form to the IDSR focal person at the district.

4. STORAGE

**Steps:**

4.1 Store one or two representative samples from the outbreak.

4.2 Dispose remaining samples according to the SOP.

*Integrated Disease Surveillance and Response
Specimen-specific job aids

- How to collect blood
- How to collect bubo aspirate
- How to collect CSF
- How to obtain serum from whole blood
- How to perform a skin snip
- How to take a rectal swab and transfer to transport medium
- How to use Cary Blair transport medium
- Labeling specimens
- Triple packaging system to maintain ambient temperature
- Triple packaging system to maintain cold chain
- Using trans-isolate transport media for CSF
JOB AID: HOW TO COLLECT BLOOD

This provides guidance on how to collect blood by venepuncture.

For safety, all of the supplies used to collect the blood are for single use only. Do not reuse.

**Supplies needed:**
- Gloves
- Tourniquet
- Sterile gauze pads
- Alcohol (70%)
- Sterile needle and vacutainer or sterile needle and syringe
- Sterile test tube (5-10ml), if a sterile needle and syringe are used
- Adhesive plaster
- Safe box for sharps

**Before beginning the procedure, obtain consent from the patient.**

1. Sterile gloves should be worn when performing venepuncture and when handling the specimen.

2. Place a tourniquet above the venepuncture site. Palpate and locate the vein.

3. Disinfect the skin at the puncture site with alcohol (70%). Allow the area to dry.

4. Do not touch the disinfected puncture site with ungloved hands.

5. Perform venepuncture using a sterile vacutainer or sterile needle and syringe.
   
   If using a needle and syringe, transfer the blood to sterile test tube.

6. Remove the tourniquet. Apply pressure to site with sterile gauze pad until the bleeding stops. Apply adhesive plaster, if desired.

7. Adhere a specimen label to tube of blood.

8. Safely dispose of all contaminated materials.

9. Do not recap used sharps. Discard directly into a safe box for sharps.

**Volume of blood to collect**

- Adults: 5-10ml
- Children: 2-5ml
- Infants: 0.5-2ml
This provides guidance on how to collect aspirate from suspected buboes. It should be performed under sterile conditions by a medical officer or clinician experienced in the procedure.

For safety, all of the supplies used to collect the bubo aspirate are for single use only. Do not reuse.

### Supplies needed:
- Gloves
- Alcohol (70%)
- Sterile gauze pads
- Sterile saline
- Sterile needle (18-22G) and syringe
- Safe box for sharps

### Before beginning the procedure, obtain consent from the patient.

1. Sterile gloves should be worn when performing the bubo aspiration and when handling the specimen.

2. Disinfect the skin at the bubo site with alcohol (70%). Allow the area to dry.

3. Do not touch the disinfected bubo site with ungloved hands.

4. Inject a small amount of (0.1-0.5ml) of sterile saline into the bubo site using a sterile syringe with a wide bore needle (18-22G). Aspirate at least 0.2ml of fluid from the bubo.

5. Safely dispose of all contaminated materials.

6. Do not recap used sharps. Discard directly into a safe box for sharps.
This provides guidance on how to collect cerebrospinal fluid (CSF) by lumbar puncture. Lumbar puncture is an invasive technique. It should be performed under sterile conditions by a medical officer or clinician experienced in the procedure. For instructions on performing lumbar puncture, consult the *Oxford Handbook of Clinical Medicine*.

### Supplies needed:
- Sterile gloves
- Sterile gown
- Sterile towels
- Sterile swabs
- Povidone iodine (10%)
- Local anesthetic
- Sterile needle and syringe
- Alcohol (70%)
- Sterile lumbar puncture needle
- Small, sterile, screw-capped tube
- Adhesive plaster
- Safe box for sharps

### Before beginning the procedure, obtain consent from the patient.

1. Sterile gloves and gown should be worn when performing lumbar puncture and when handling the specimen.

2. Locate the space between L3,4 or L4,5 vertebrae. Follow the practice of your health facility in giving local anesthetic.

3. Disinfect the skin at the puncture site with povidone iodine (10%). Wipe off excess iodine with alcohol (70%). Allow the area to dry.

4. Do not touch the disinfected puncture site with ungloved hands or nonsterile items.

5. Perform lumbar puncture using a sterile spinal needle. Collect CSF by allowing the fluid to flow directly into the sterile tube. Do not aspirate CSF. Recap the tubes tightly.

   *If CSF will be used for microscopy, biochemistry, and culture, collect 1 ml for each of these tests in separate tubes.*

6. Aseptically recap the tube tightly.

7. Safely dispose of all contaminated materials.

8. Do not recap used sharps. Discard directly into a safe box for sharps.
This provides guidance on how to process whole blood to separate the serum from the blood clot.

### Supplies needed:
- Gloves
- Sterile pipette
- Sterile, screw-capped tube (glass or plastic)
- Specimen label

### Additional supplies if health facility has a centrifuge:
- Centrifuge tubes for balancing

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gloves should be worn at all times when handling the specimen.</td>
</tr>
</tbody>
</table>
| 2    | Keep the whole blood at room temperature until there is complete retraction of the clot from the serum.  
*If the health facility or district has a centrifuge, spin the whole blood at 1000xg for 10 minutes to separate the serum. Follow the standard operating procedures for centrifuging.* |
| 3    | Remove the serum using a sterile pipette. Avoid extracting red cells. |
| 4    | Transfer the serum aseptically to a sterile, screw-capped tube. Secure cap tightly. |
| 5    | Adhere a specimen label to the tube of serum. |
| 6    | Safely dispose of all contaminated materials and the remaining clot. |
| 7    | Keep the tube of serum at 4-8°C. |
This provides guidance on how to perform a skin snip from a deceased patient. It should be performed under sterile conditions by a medical officer or clinician experienced in the procedure.

For safety, all of the supplies used to perform the skin snip are for single use only. Do not reuse.

**Supplies needed:**
- Bucket for disinfectant
- 10 litres of water
- Liquid bleach (3 - 5% active chlorine)
- Punch biopsy tool
- Tweezers
- Blunt scissors
- Vial with formalin (20ml)
- Plastic bag
- Hand soap

**Additional supplies for personal protection**
- Boots
- Latex gloves
- Gown
- Plastic apron
- Heavy-duty gloves
- Mask
- Goggles

**Before beginning the procedure, obtain consent from the family of deceased patient.**

1. Prepare disinfectant solution immediately before starting procedure. Using liquid bleach, make 10 litres of disinfectant solution. The final concentration should be approximately 0.05 to 0.5%.

2. Put on the protective clothing in this order:
   - boots, latex gloves, gown, plastic apron, heavy-duty gloves, mask, and goggles.

3. Arrange the scissors, tweezers, and biopsy tool for use near the cadaver. Open the vial of formalin. Take the cover off the biopsy tool.

4. Gently turn the head of the cadaver to expose the nape of the neck. Place the biopsy tool perpendicular to the neck and press down into the skin up to the guard. Rotate gently. Remove the biopsy tool.

5. With the tweezers, gently lift out the core you cut in the skin and use the scissors to cut the piece away, if necessary.

6. Place the sample in the vial of formalin. Close the cap tightly to prevent leaks.

7. Dip the vial of formalin in the disinfectant for one minute. Set it aside to dry.

8. Place the rest of the equipment in the disinfectant. If you need to move the cadaver, do so while you are still wearing the protective clothing. When you are finished, rinse your exterior gloves in the disinfectant, remove them and drop them in the disinfectant bucket.

9. Still wearing the interior gloves, remove all of the disinfected material from the bucket and place in the plastic bag. Burn the bag in the incinerator. Remove your gloves and burn them.

10. Wash your hands with soap and water. The specimen is not infectious after it is placed in formalin and the outside of the vial is disinfected.

Adapted from the reference manual *Infection Control for Viral Haemorrhagic Fevers in the African Health Care Setting* (WHO/EMC/ESR/98.2).
This provides guidance on how to take a rectal swab for diagnosis of acute bacterial diarrheal disease. Rectal swabs must be transported in Cary Blair transport medium. Transport medium is used to preserve specimens for bacteriology testing.

**Supplies needed:**
- Gloves
- Sterile cotton-tipped applicators (swabs)
- One tube of Cary Blair transport medium
- Adhesive tape
- Specimen label

**Before beginning the procedure, obtain consent from the patient.**

1. Chill the tube of Cary Blair transport medium by placing it on ice packs or in the refrigerator 1 - 2 hours before collecting the specimen.

2. Gloves should be worn at all times when handling the specimen.

3. Remove the wrapper from the handle end of the sterile swab. Do not touch the tip of the swab.

4. Moisten the swab in chilled Cary Blair transport medium.

5. Insert the swab through the rectal sphincter 2 to 3 cm and gently rotate.

6. Withdraw and examine the swab to make sure faecal material is visible on the tip.

7. Push the swab completely to the bottom of the tube of Cary Blair transport medium.

8. Break off the top portion of the stick so the cap can be tightly screwed onto the tube.

9. After screwing cap tightly onto the Cary Blair tube, seal the tube with tape to prevent leakage.

10. Adhere specimen label to the container.

11. Keep the specimen at 4-8°C.

12. Safely dispose all contaminated materials. Do not reuse.
JOB AID: HOW TO USE CARY BLAIR TRANSPORT MEDIUM

This provides guidance on how to transfer a specimen into a tube of Cary Blair transport medium. Transport medium is used to preserve specimens for bacteriology testing. The specimen should be transferred to the transport medium immediately after the specimen has been collected.

Supplies needed:

- Gloves
- Sterile cotton-tipped applicators (swabs)
- One tube of Cary Blair transport medium*
- Adhesive tape
- Specimen label

*For stool specimens, the Cary Blair tube should be chilled 1 - 2 hours before using it.

1. Gloves should be worn at all times when handling the specimen.

2. Remove the wrapper from the handle end of the sterile swab. Do not touch the cotton tip of the swab.

3. Insert the cotton tip of the swab into the specimen. Make sure the cotton tip of the swab is completely coated with specimen.
   If the specimen is in a syringe, slowly release some of the contents to completely soak the cotton tip of the swab.

4. Push the swab completely to the bottom of the tube of Cary Blair transport medium.

5. Break off the top portion of the stick so the cap can be tightly screwed onto the tube.

6. After screwing cap tightly onto the Cary Blair tube, seal the tube with tape to prevent leakage.

7. Adhere specimen label to the Cary Blair tube.

8. Keep the specimen at 4-8°C.

9. Safely dispose all contaminated materials. Do not reuse.
This provides guidance on labeling specimens. Each specimen should be labeled. The information on the label should correspond with the patient information in the register book and on the case investigation form. Adequate labeling ensures that the laboratory results can be linked to the correct patient.

The label may be a piece of paper attached to the specimen container. Alternatively, the information may be written directly on the specimen container.

1 Using this sample label as a guide, fill in the information on a label for the specimen to be collected. Obtain the patient’s information from the patient register book. Make sure your writing is legible.

Sample label

<table>
<thead>
<tr>
<th>Patient name:</th>
<th>Specimen #:</th>
<th>Specimen type:</th>
<th>Date:</th>
<th>Time:</th>
</tr>
</thead>
<tbody>
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<td></td>
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</tbody>
</table>

Health facility: District: __________

Sample specimen #

**ARU_BAB 05 001**

Region District Year of onset Region

® Use the standard abbreviations as designated by the ministry of health to indicate the Region (3 letter code), District (3 letter code), and Year of onset (2 digit code).

® Use the unique case number (3 digit number) designated by the district.

2 Adhere the label to the specimen container. Do not attach the label to the top of the specimen container.
This provides guidance for packaging diagnostic specimens in three layers for transport to the referral laboratory. Follow specific national and international regulations for shipping diagnostic specimens.

Gloves should be worn at all times when handling the specimen.

**PRIMARY CONTAINER**

The primary container contains your specimen.

**Ensure the following:**

① Container cap should be tightly closed and sealed to prevent leakage.

② Container should be labeled with the patient name and identification number, specimen number, and date and time.

③ Label should be adhered to the container.

**Steps:**

① Wrap absorbent material such as cotton wool around the container. Use additional absorbent material to cushion multiple containers.

**SECONDARY CONTAINER**

The secondary container holds the primary container.

**Steps:**

① Use a container that is durable, watertight, and leak proof. If this is not available, use a sealable plastic bag.

② Seal the case investigation form in a plastic bag. Tape the bag to the outside of the secondary container.

**TERTIARY (OUTERMOST) CONTAINER**

The tertiary container holds the secondary container and protects it from physical damage and water. The tertiary container also serves as the outer shipping container.

**Steps:**

① Use a container made of corrugated fibreboard, cardboard, wood or other material strong enough to withstand the weight and shock of handling and shipment.

② Pack tertiary container as shown in diagram.

③ Label the tertiary container “Diagnostic specimen.” As appropriate, use additional labels (Do not freeze. Do not expose to heat. This side up.).

*Specimens in formalin require a “Dangerous Goods in Excepted Quantities” label on the tertiary (outermost) container. Contact the referral laboratory for guidance on labeling the container.
This provides guidance for packaging specimens in three layers to maintain cold chain during transport to the referral laboratory. Follow specific national and international regulations for shipping diagnostic specimens.

Gloves should be worn at all times when handling the specimen.

### PRIMARY CONTAINER

The primary container contains your specimen.

**Ensure the following:**
- Container cap should be tightly closed and sealed to prevent leakage.
- Container should be labeled with the patient name and identification number, specimen number, and date and time.
- Label should be adhered to the container.

**Steps:**
- Wrap absorbent material such as cotton wool around the container. Use additional absorbent material to cushion multiple containers.

### SECONDARY CONTAINER

The secondary container holds the primary container.

**Steps:**
- Use a sealable plastic bag that is watertight and leak proof.

### TERTIARY (OUTERMOST) CONTAINER

The tertiary container holds the secondary container and protects it from physical damage and water. The tertiary container also serves as the outer shipping container.

**Steps:**
- Use an insulated carrier or carton of double-ply corrugated cardboard or plastic. Use insulating material such as high density (30-35kgs/m3) polystyrene (small bubbles and firm when squeezed).
- Seal the case investigation form in a separate plastic bag.
- Pack tertiary container as shown in diagram. Four cold packs will maintain cold chain for 2 to 3 days.
- Label the tertiary container “Diagnostic specimen.” As appropriate, use additional labels (Do not freeze. Do not expose to heat. This side up.)

---

a) Primary container  
b) Secondary container (sealed plastic bag holding primary container)  
c) Sealed plastic bag holding case investigation form  
d) Absorbent material such as cotton wool  
e) Four ice packs.  
f) Insulating material  
g) Tertiary container (outer carton of double-ply corrugated cardboard or plastic)  
h) Address labels on tertiary container.  
i) Diagnostic specimen label on tertiary container.
## Setting IDSR Targets

**What is a target?**
- Criteria against which a district measures its performance towards goals such as reduction of disease burden (cases, deaths, disability) over time

**Why set targets?**
- Assess performance towards achieving planned/desired goals
- Provide incentives for action

**Key factors to consider when setting targets:**
- National and regional targets
- International targets
- Current performance level
- Available resources (personnel, equipment, funds, supplies)
- Other related CHMT commitments

## IDSR Data Interpretation Issues to Keep in Mind

**Why is data interpretation important?**

**Data collected by the IDSR surveillance system are used by the CHMT for:**
- Planning, implementing, and evaluating public health interventions and programs
- Determining the need for public health action
- Assessing the effectiveness of disease prevention and control activities in the district

## IDSR Data Interpretation Steps

### 1. Look at patterns (trends) over time
- Recognize normal seasonal variations of diseases in the district
- Detect unusual patterns requiring further investigation
- Determine whether disease control efforts are having a positive impact

**Review trends in numbers of cases to:**
- Recognize which of the priority diseases affects the largest portion of the population
- Prioritize disease control efforts when resources are limited
- Determine whether outbreaks are occurring
- Determine whether disease control efforts have been successful

**Review trends in numbers of deaths to:**
- Recognize which diseases have the largest impact in terms of mortality
- Prioritize distribution and use of limited resources for diseases causing the most mortality
- Evaluate and determine whether it is necessary to improve case management or access to health facilities

### 2. Look at the district as a whole (all facilities combined)
- Combine IDSR data from all facilities to show the overall picture of the disease situation in the district and track changes over time
- Measure progress against disease targets in the district

### 3. Look at individual facilities
- Outbreaks may only occur in a small part of the district (look for a large number of cases occurring in just one facility or neighbouring facilities)
- Compare facilities against each other in terms of numbers of cases and deaths for each disease. This will help to determine where efforts should be focused or where control and prevention strategies should be reviewed and/or changed.

### 4. Look at inpatients and outpatients separately
- Inpatients tend to have more severe disease and their diagnosis is often more accurate
- Different types of prevention and control measures may be required in inpatient and outpatient populations
- Often disease control programs have objectives to reduce the number of severe cases and deaths. Inpatient information may be more useful when determining whether specific disease control programs are working.
Interpreting Morbidity (Cases) and Mortality (Deaths) Data

Possible reasons for increasing cases or deaths:

- Has a new health facility or hospital opened in the district?
- Is there improved access to some health facilities in the district? (i.e., a new ambulance, improved roads)
- Are clinicians in the district using different diagnostic criteria or standard case definitions so that more patients are classified as having certain diseases?
- Have there been data recording errors?
- Has there been an increase in the number of health facilities reporting information to the surveillance system?
- Does the increase reflect normal seasonal variation, for example, does the increase occur at the same time as the rainy season?
- Has surveillance improved, so that more facilities are sending their IDSR reports to the district?
- Has anything unusual occurred (such as environmental changes, population movements, etc.) that would lead to an increase in cases or deaths in the district?
- After considering the factors above, does it appear that more people really are getting sick or dying in the district? If so, why? This may require further investigation.

POSSIBLE ACTIONS

**Focus on areas where the CHMT can make an impact:**

- Review IDSR work at all supervision visits
- Work with facility IDSR focal persons to improve data quality
- Train new facility & CHMT staff in IDSR procedures
- Ensure facilities have IDSR materials and know how to use them
- Improve and implement health education activities
- Review and revise disease targets based on current data
- Provide feedback to facilities quarterly
- Incorporate IDSR activities into CCHP
- Work with laboratories to strengthen case confirmation and outbreak procedures

Possible reasons for decreasing cases or deaths:

- Have any health facilities or hospitals closed (fewer reporting sites)?
- Are fewer facilities in the district reporting IDSR data to the district? Are you missing data from facilities or hospitals likely to be seeing cases of the disease?
- Have staffing changes (improvements) been made at any of the health facilities, leading to better patient care?
- Have there been data recording errors?
- Have clinicians started using different standard case definitions, so fewer patients are classified as having certain diseases?
- Does the decrease reflect normal seasonal variation, for example, does the decrease occur during the typical “low season” for the disease?
- Have there been any large population movements out of the district?
- Does the decrease correspond to the introduction of any disease control or prevention programs? Does the decrease reflect success of these programs?
- Have health education campaigns been implemented effectively?
- After taking into consideration the factors above, does it appear that fewer people really are getting sick or dying in the district? If so, why? This may require further investigation. **Real declines should be noted if the CHMT is implementing effective disease prevention measures.**

**Possible Causes of Poor Reporting Performance:**

- Transport problems (difficulty sending reports to district)
- Communications problems
- Facility staff do not know deadlines and thus do not send reports in on time
- Facility staff have difficulty with reports and take a long time to prepare them or do not do them at all
- New staff do not know that they should be reporting
- Insufficient supply of IDSR reporting forms at the facilities
- Facility staff send reports but do not know they are late (due to lack of feedback from the district)
- Facility staff do not understand importance of IDSR reporting and how the data benefit them

---Assess district IDSR performance regularly---
---Document data interpretation and use---


Ghana Health Service/Ministry of Health/National Surveillance Unit (2005c). Integrated Disease Surveillance and Response facility level training materials.


