7 Steps to Use Routine Information to Improve HIV/AIDS Programs

A Guide for HIV/AIDS Program Managers and Providers

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MEASURE Evaluation

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Acronyms

ANC	antenatal care
ART	antiretroviral therapy
ARV	antiretroviral
BSS	behavior surveillance survey
CBO	community-based organization
CD4	cluster of differentiation antigen 4
DHS	Demographic and Health Survey
HCT	HIV counseling and testing
HIV/AIDS	human immunodeficiency virus/acquired immune deficiency syndrome
M&E	monitoring and evaluation
MEASURE	Monitoring and Evaluation to Assess and Use Results
MOH	ministry of health
NGO	nongovernmental organization
OVC	orphans and vulnerable children
PLWHA	people living with HIV/AIDS
PMTCT	prevention of mother-to-child transmission (of HIV)
TB	tuberculosis
VCT	voluntary counseling and testing
WHO	World Health Organization

Overview

Around the world, individuals, organizations, and governments regularly make decisions that influence the health and well-being of their communities. A wide variety of data are collected about populations, needs, services provided, and the resources needed to provide health services. For a variety of reasons, individuals, organizations, and governments often make decisions without adequate consideration of these relevant and available data and information. As a result, many health systems fail to fully link evidence to decisions and suffer from a decreased ability to respond to priority needs at all levels of the health system.

This document presents concrete steps and illustrative examples that can be used to facilitate the use of information as a part of the decision-making processes guiding program design, management, and service provision in the health sector. Specifically, seven steps to information use outlined in this document will help address barriers to using routinely collected data by providing guidance in

- linking questions of interest to program managers and providers to existing data;
- analyzing, graphing, and interpreting data; and
- continuing to monitor key indicators to inform improvements.

These approaches can help encourage more strategic and effective use of routine health data and information in decision making, whether regular or one-time, simple or complex, minor or critical. The effectiveness of HIV/AIDS programs throughout the world is dependent on the ability of program managers and providers to identify needs in the communities they serve and to understand the extent to which their programs address these needs. Routine information systems can help. While there is a great deal of routine information collected at the health facility level, much of it is collated and sent elsewhere for reporting purposes. Too often program managers and providers do not have the capacity, time, or resources to analyze the data they collect to monitor service delivery or to assess problems and identify new strategies for improving health services.

SEVEN STEPS TO USE ROUTINE INFORMATION TO IMPROVE HIV/AIDS PROGRAMS

Step 1: Identify questions of interest
Step 2: Prioritize key questions of interest
Step 3: Identify data needs and potential sources
Step 4: Transform data into information
Step 5: Interpret information and draw conclusions
Step 6: Craft solutions and take action
Step 7: Continue to monitor key indicators

1.1 What is this Guide?

This guide presents seven steps that help program managers and providers use existing health information to improve HIV/AIDS programs. The steps and examples can be used to strengthen programmatic decision making at the health facility and community levels. By using this guide, program managers and providers will be able to use data to

- identify and understand HIV/AIDS service delivery trends and needs;
- plan and set priorities for facility and community-based activities more effectively;
- support changes in program and services delivery;
- support requests for additional resources such as staff, supplies, medicines, transportation, and fuel;
- justify changes in technical, administrative, or financial policies affecting HIV/AIDS services;

- provide evidence-based clinical decision making;
- facilitate accountability to donors for expended resources; and
- engage community leaders by better communicating the importance of HIV/AIDS services and health-seeking behavior.

Many program managers and providers already have a general sense of the challenges they face when providing health services. However, the use of health data can lend precision to the process of

- assessing and resolving challenges,
- tracking changes in health programs and service performance efficiently and systematically, and
- advocating for additional resources.

The guide provides seven steps for identifying key questions of interest and the data needed to answer these questions. The guide also helps program managers analyze, interpret, and use routine information for HIV program improvement and decision making. The guide begins with an overview of the Seven Steps to use information and then provides specific examples to illustrate the process. The guide also includes two appendices. The first consists of job aids that provide a detailed explanation of how to conduct different types of basic analyses required in the guide. The second appendix consists of blank worksheets, which can be photocopied and used by teams to facilitate the Seven Steps.

1.2 | What Types of Questions can be Answered by Using this Guide?

This guide will help answer questions about the coverage, quality, and retention of clients in HIV/AIDS services. Answering these questions requires information about the number and type of people being reached, the quality of services offered, and the program's efforts to operate efficiently. Just a few of the questions programs face in designing, implementing, and improving the services that they provide appear in the box below. The Seven Steps described in this guide will help programs begin to address these questions using routinely collected data and information. It is important to note that routinely collected data cannot always fully answer the questions. Frequently, additional data will strengthen the decision-making process.

SAMPLE QUESTIONS

Coverage of Health Services

- How is our target population defined (e.g., age, pregnancy status, economic status, HIV status, geographic location)?
- How can we reach clients who need our services?
- What proportion of the target population is receiving any of our services? What proportion is receiving all of the services they need?
- How can we meet the needs of people who are not receiving care?

Quality of Health Services

- Are we providing the minimum package of services as defined by national and/or international standards?
- Are providers meeting agreed upon standards of care?
- Are the numbers of new clients remaining stable over time, decreasing or increasing?
- Are clients choosing to continue receiving services?

Program Retention

- Are we retaining clients through each step of the services being provided?

Nonroutine sources of data, such as census, survey, and other population-based data sources, can also be used in conjunction with routine data to answer questions and improve programs.

1.3 | Who Can Use this Guide?

This guide is for people who make or advocate for changes in programs related to HIV/AIDS at the subnational level. This includes nongovernmental organization (NGO) managers, ministry of health (MOH) district and provincial health officers, strategic information and monitoring and evaluation (M&E) officers, and health providers such as doctors, nurses, pharmacists, and community outreach workers.

While individuals can use this guide on their own, a participatory approach that involves data users and data producers can help ensure that program and services improvements are eventually implemented and that expertise from across the program and facility are included.

> **THE PARTICIPATORY APPROACH**
>
> Participatory M&E involves reconsidering who initiates and implements the M&E process as well as who can use the information. All stakeholders can and should be involved in identifying their own needs and priorities; collecting, analyzing, and interpreting data; and taking action to address problems and concerns.

Data users are individuals who
- make decisions,
- develop policies and plans,
- formulate advocacy messages, or
- provide services or manage programs.

Data producers are individuals who
- conduct research;
- collect primary data in the course of providing a specific service or delivering a program intervention; or
- compile, analyze, interpret, or communicate data and information.

Sometimes data users and producers are the same individuals, but often they are not. It is important that data users and data producers understand each others' needs and limitations, find common ground, share data openly, and identify new opportunities to use data and information.

Many programs face significant resource constraints—financial, material, and human—as well as limitations in the capacity of their staff and health systems to meet health needs on a consistent basis. Nonetheless, a program that is already reporting commonly collected HIV/AIDS indicators to a government or donor will likely have the resources and capacity needed to implement this approach.

1.4 | How Should this Guide Be Used? Dialogue among Data Users and Data Producers

A common thread woven throughout the approaches described in this guide is the engagement of data users and data producers.

When data users and data producers work together, they become aware of available data sources and knowledgeable of the quality of the data produced. They have the opportunity to identify

and discuss key programmatic questions and concerns and link them to the data available in their district or facility. They can also jointly analyze and interpret data to answer programmatic questions. When data-informed decisions are made, then key players have "bought into" the decision and are more likely to make changes.

1.5 When Can We Use this Guide?

The process described in this guide can be used at any point in program planning and implementation. Some programs may choose to implement this process annually to inform work planning. Others may strive for a continuous program improvement cycle throughout the life of their work.

1.6 What Data Are Used in this Guide?

Data are generated from several levels and can come from either routine or non-routine sources. The guidance and examples provided in this document are primarily focused on using routinely collected data.

Routine data sources are those that

- provide data that are collected on a continuous basis, such as patient registers;
- can be effectively used to detect and correct problems in service delivery; and
- benefit decision makers and service providers most.

There are limitations to the usefulness of routine data because routine data are generated through service provision, and they do not reflect the population that does not receive services.

Nonroutine data sources are those that

- provide data that are collected on a periodic basis, such as annually or even less frequently;
- include representative population-based surveys, such as a Demographic Health Survey (DHS), a census, an AIDS Indicator Survey, or a behavioral surveillance survey (BSS); and
- are collected less frequently because of the costly nature of collecting these data.

Many nonroutine data sources do not provide estimates at levels that are directly useful to facilities and programs. They can complement routine information systems and enrich a program manager's/service provider's understanding of his or her program.

The Seven Steps

Step 1 | Identify Questions of Interest

Organizations and facilities face common requirements and challenges and can use data to inform their responses. Vast amounts of data are available to many HIV/AIDS service delivery sites; however, compiling, analyzing, interpreting, and using these data can be a daunting task. Rather than embarking on a fishing expedition, a team of data users and data producers working in a district or at a facility can use its time more efficiently by first identifying and then prioritizing key questions of interest. Available data can then be analyzed in a targeted way to begin to answer these questions. Programmatic questions of interest can be identified by:

- participatory discussion of indicators that demonstrate program success;
- mapping how the clients flow through the service;
- generating new questions through the analysis of data;
- brainstorming about what different staff are interested in knowing about the program;
- gathering feedback from clients; and
- assessing external factors, such as audits, program evaluations, and donor's questions.

Any of these methods can generate interesting and useful questions, and we will describe two of these methods in more detail.

1.1 | Defining Program Success

One method for generating questions is to identify factors that define success for the program or service provided. Consider the factors that demonstrate a program's success or failure.

- What do you want or need to know in order to say your program is working?
- How do you know that your program or service is working?
- Is your program or service improving a client's health?
- How do you know if there are problems or that your program is not achieving its predetermined objectives?

The answers to these questions will help identify indicators of program success. While many programs and facilities already produce reports for governments and donors, there is an extensive amount of data not included in regular reports. The questions that your program identifies may require data that are not included in these reports. The steps and illustrative examples presented in this guide will help you identify, analyze, interpret, and use these data.

The purpose of measuring program success is to help determine which service areas are working smoothly and should be continued and which ones need to be improved. This requires information about the number and type of people being reached or covered with a specific service, the quality of the services offered, and the program's efforts to operate efficiently. **Coverage** is achieved when people in need of services enter the program and receive the service.

The **quality** of HIV/AIDS programs and related services is a critical focal point for facilities and programs because it can influence, among other factors, the

- client's willingness to seek and continue to receive testing and care;
- care and treatment received, which has an effect on clinical manifestations of the disease; and
- client's knowledge and behavior, which ultimately affect the spread of HIV.

As a program manager considers strategies for improving continuation rates and increasing uptake of the service, the quality of the service provided may be an important area to assess and to take action on.

Enhancing **program retention** necessitates a strong focus on providing the complete package of services that the client needs to avoid or minimize wasting resources. Many services, such as care and treatment for HIV/AIDS, require multiple contacts with the program to ensure that the client is

- receiving and adhering to the proper course of antiretroviral therapy,
- accessing and receiving prophylaxis and treatment for opportunistic infections, and
- receiving counseling and other support services to prevent additional infections to partners and/or children and ensure health and well-being of the client.

Because these contacts are often separated in time and/or space (i.e., offered at different times and by different service providers), clients who initiate the process may drop out before they receive all of the services they need. As a client continues through each contact with the program, the program uses more of its resources—both financial and human—on the particular client. It is in the best interest of the program or facility to maximize its investment in individual clients by ensuring that the client adheres to the first-line therapy and receives the full extent of required services.

1.2 | Mapping Client Flows and Program Outcomes

Another method for identifying questions of interest is to develop a map or flowchart of how HIV/AIDS services are provided at the program site—from the first interactions with an individual client to the ultimate outcome of the services. This approach allows you to identify bottlenecks in service delivery and to determine where clients may be dropping out of the service along the way, thus providing essential information for improving program retention. This visual representation of service provision will help ensure that all aspects of your program are considered as you identify key questions of interest.

GENDER COMPONENT IN HIV/AIDS PROGRAMS

During the United Nations Millennium Declaration in 2000, 191 countries adopted the resolution "to promote gender equality and the empowerment of women as effective ways to combat poverty, hunger and disease and to stimulate development that is truly sustainable."[1] Additionally, the first principle of the U.S. Global Health Initiative is a focus on women, girls, and gender equality.

Gender is defined as what a society believes about the appropriate roles, duties, rights, responsibilities, accepted behaviors, opportunities, and status of women and men in relation to one another. These beliefs vary between places and change over time in the same place. It has long been observed that gender-related factors, such as norms about men's and women's roles, women's autonomy, spousal relationship quality, and experience with and attitudes about intimate partner violence have an impact on health outcomes everywhere in the world. These outcomes include the risk of HIV, access to all types of health care, family planning use, and outcomes related to maternal and child health. According to the World Health Organization (WHO), HIV/AIDS is the leading cause of death for women aged 15–44 years worldwide, and 61% of people living with HIV in sub-Saharan Africa are women.[2]

Given the evidence documenting the relationship between higher levels of gender equality and better health outcomes, it is necessary to incorporate gender into program planning, data collection, M&E, and everyday program implementation. By including women in all levels of health improvement, the health of children, families, and communities will also benefit.

When asking questions about and monitoring HIV programs, it is important to maintain a focus on the role of gender. Gender-related information can help increase awareness of gender imbalances, support those who advocate for change, address gender dimensions of health, and demonstrate program progress and impact. Several of the illustrative examples at the end of this guide show how the Seven Steps can be used to examine the role of gender in HIV/AIDS at the program level.

Questions to consider when examining gender at the program level:

- Are there gender differences in service utilization or treatment adherence?
- Are women accessing clinics in one particular area more than in another area?
- Are there gender differentials in program service delivery outcomes?
- What might be causing these differences?

More information on integrating gender into HIV/AIDS programs is available at

- http://www.igwg.org/igwg_media/manualintegrgendr09_eng.pdf
- http://whqlibdoc.who.int/publications/2009/9789241597197_eng.pdf

[1] United Nations Millennium Declaration. 2000. Resolution adopted by the General Assembly. Available from: http://www.un.org/millennium/declaration/ares552e.htm

[2] World Health Organization. 2009. *Women and health: Today's evidence, tomorrow's agenda*. Available from: http://whqlibdoc.who.int/publications/2009/9789241563857_eng.pdf

1.3 | How to Implement Step 1

A vital part of implementing the Seven Steps is to start out with a strong team of stakeholders—or data users and data producers. These data users and data producers may play a variety of different roles, may have different interests and perspectives, and may have different resources available to themselves and to their team. For instance, a key member of the team is a strategic information or M&E officer. This data producer can help the team understand which questions can be answered with existing data. Table 1 provides a stakeholder analysis matrix and can be updated at any point during this Seven Step process. Table 2 offers a form for developing a stakeholder engagement plan. A discussion guide to use in implementing this step is provided in the box below. Some examples of this process are also provided later in this guide, in the Illustrative Examples.

IDENTIFY QUESTIONS OF INTEREST

Purpose of this Team Meeting: To document the decisions that the groups make or influence or the questions they need to answer to improve/strengthen programs and services. Prior to this meeting, you may want to identify which stakeholders or data users/data producers should be present at this meeting by using the Stakeholder Engagement Tool. http://www.cpc.unc.edu/measure/publications/ms-11-46e

Discussion Questions

Decisions to make or influence

- Are there planning decisions to be made in the near future?
- Does the program have a strategic plan? Is it up-to-date?
- When are annual work plans due?
- Are there advocacy opportunities in the near future? How can present stakeholders influence those decisions?

Programmatic success questions

- How do you know that your program or service is working?
- What do you want or need to know to be sure that your program is working and is successful?
- Is your program or service improving clients' health?
- How do you know if there are problems or that your program is not achieving its predetermined objectives?

Client flow questions

- How do clients typically enter your program? Are there multiple points of entry or just one?
- Where in the program process is client loss the greatest? Is that surprising? Are losses due to death, migration, or loss to follow-up?
- Are there bottlenecks in service delivery? Where?

Table 1—Stakeholder Analysis Matrix (Step 1: Identify Questions of Interest)

Program Issue: Strengthen existing prevention of mother-to-child transmission (PMTCT) of HIV services/clinics or scale up PMTCT services/clinics

Proposed Activity: Convene stakeholders to identify priorities on the basis of available data and to develop an action plan

Date: November 2009

Name of Stakeholder Organization, Group, or Individual National, regional, or local	**Stakeholder Description** Primary purpose, affiliation, funding	**Potential Role in the Issue or Activity** Vested interest in the activity	**Level of Knowledge of the Issue** Specific areas of expertise	**Level of Commitment** Support or oppose the activity, to what extent, and why	**Available Resources** Staff, volunteers, money, technology, information, influence	**Constraints** Need funds to participate, lack of personnel, political or other barriers
Government Sector						
Division of Maternal and Child Health (MCH), Ministry of Health (MOH)	Develops draft plans and monitors implementation of PMTCT, MCH, and family planning (FP) programs and services	Share information related to the division strategy for maternal health and identify opportunities to leverage resources and promote collaboration	High level of knowledge of in-country program—monitors pilot PMTCT programs in MCH/FP facilities; low level of knowledge of international guidelines and studies	Strongly support scale-up. The division's level of satisfaction with data sources is unknown.	Staff available and appropriated to assist with plan, strong influence among MCH facilities that will implement program	Political tensions between division and NACC exist; MOH planning cycle is different from NACC's and problems in scheduling and funding may arise
National AIDS Control Committee (NACC)	Involved in planning, implementation, and monitoring and evaluation (M&E) of all HIV/AIDS programs in the country; approves HIV/AIDS programs funded by nongovernmental organizations (NGOs) and donors	Facilitate the stakeholder meeting and prepare for the meeting by identifying data sources and preparing an agenda that allows for the sources to be discussed	High level of knowledge—receives reports on PMTCT activities from MCH Division at MOH; medium level of knowledge of international guidelines and studies	Strongly support the activity, but hesitant to use international data sources. NACC opposes use of the Demographic and Health Survey and most recent international estimates because they consider these sources to overestimate HIV prevalence	Staff available to facilitate meeting; room and computers available for meetings at NACC headquarters	Staff are supposed to facilitate process, but all have busy schedules; political tensions exist between NACC and MCH Division of MOH; MOH planning cycle is different from NACC's and problems in scheduling and funding may arise
Political Sector						
Parliamentary Committee on Population and Health	Develops laws and regulations related to providing PMTCT care; approves budget for implementation	Will approve the PMTCT plan as part of a broader Parliamentary Program to address MCH	Basic knowledge about needs for PMTCT services	Strongly support program, but concerned about funding	Strong influence; head of committee is leader in Parliament with strong ties to executive branch	Lack of personnel to routinely attend stakeholders meetings and planning sessions
Deputy Governor for Social Issues in State where PMTCT programs have been piloted and expanded	Is responsible for monitoring health programs and informing other policymakers about importance of health programs and issues	Provide insight into pilot project and lessons learned; advocate for improved and expanded PMTCT services	Basic knowledge about needs for PMTCT services; extensive knowledge about pilot program in home region	Strongly support program and hope to serve as center of excellence for other regions	Strong influence among governors; staff available to present experiences	May need travel funds to participate beyond initial visit to stakeholders meeting, seeking international sponsorship
Commercial Sector						
National Federation of Women Business Leaders	Advocate for, fund and implement programs aimed at improving the status and well-being of women	Provide any data or information the federation has produced related to PMTCT, serve as advocate for the program, and potentially financially supplement effort	Basic knowledge about needs for PMTCT services	Supportive of implementing a PMTCT program, which includes a focus on the woman during and following pregnancy (mother-to-child transmission—positive)	Strong influence among business leaders for fundraising and advocacy efforts; staff and financial support available	None

Table 1—Stakeholder Analysis Matrix (Step 1: Identify Questions of Interest) *continued*

Name of Stakeholder Organization, Group, or Individual National, regional, or local	**Stakeholder Description** Primary purpose, affiliation, funding	**Potential Role in the Issue or Activity** Vested interest in the activity	**Level of Knowledge of the Issue** Specific areas of expertise	**Level of Commitment** Support or oppose the activity, to what extent, and why	**Available Resources** Staff, volunteers, money, technology, information, influence	**Constraints** Need funds to participate, lack of personnel, political or other barriers
Nongovernmental Sector						
National Family Planning Association	Provide family planning services nationally through network of clinics, serve as clearinghouse for information and training for providers	Provide data and information on FP, including efforts to provide FP to people living with HIV/AIDS; participate in planning process as key service provider	Knowledge of FP facility data, but no knowledge of national or subnational data related to other parts of the PMTCT program; average level of knowledge of international guidelines and studies	Supportive of general PMTCT program, but concerned about funding levels for FP services	Staff interested in participating and informed about implementation and constraints of PMTCT pilots relating to FP services	Lack funds and staff time for travel to stakeholders meeting and planning sessions
Other Civil Society Target Audiences						
University researchers and professors	Conduct research on PMTCT, provide recommendations to government and international NGOs on PMTCT programming	Present relevant data or information produced by the university to stakeholders; advise planning process and conduct any necessary research per request of stakeholders	High level of knowledge about data and information analysis and needs. Most representatives have little or no clinical experience in providing PMTCT	Supportive of new PMTCT program	Staff available to participate because of donor funding; high level of technical capacity for producing quality data and reporting to decision makers; strong political influence	Funding for any future research is pending
International Donors						
Global Fund to Fight AIDS, Tuberculosis and Malaria	Provide funding, technical assistance, and advice to government and NGOs in planning and implementing PMTCT programs	Observe process, provide advice, and incorporate plan into internal donor funding and planning cycle	High level of knowledge about PMTCT programs worldwide	Strongly supportive of expanding successful model	PMTCT Coordinator allocated to participate; has access to quality data and information; provides assistance to NACC, MOH, and other program areas; has political influence	

Adapted from Brinkerhoff, D. and B. Crosby, 2001; and The POLICY Project, 1999.

Table 2—Stakeholder Engagement Plan (Step 1: Identify Questions of Interest)

Program Issue: Strengthen existing prevention of mother-to-child transmission (PMTCT) of HIV services/clinics or scale up PMTCT services/clinics

Proposed Activity: Convene stakeholders to identify priorities on the basis of available data and develop an action plan

Date: November 2009

Stakeholder Organization, Group, or Individual	**Potential Role in the Activity**	**Engagement Strategy** How will you engage this stakeholder in the activity?	**Follow-Up Strategy** Plans for feedback or continued involvement
Government Sector			
Division of Maternal and Child Health (MCH), Ministry of Health (MOH)	Share information related to the division strategy for maternal health and identify opportunities to leverage resources and promote collaboration	Involvement in a key stakeholder meeting aimed at sensitizing stakeholders currently involved in providing maternal health services	Will be involved as a key stakeholder group during annual PMTCT program review meetings; will help monitor the new PMTCT program outcomes
National AIDS Control Committee (NACC)	Facilitate the stakeholder meeting, prepare for meeting by identifying data sources and preparing an agenda that allows for the sources to be discussed	The NACC is the lead in this activity. It will be important for the NACC to involve more specifically the PMTCT coordinator, clinical care coordinator, and National AIDS Program Coordinator	The NACC is responsible for following up with the stakeholders priorities
Political Sector			
Parliamentary Committee on Population and Health	Will approve the PMTCT plan as a part of a broader Parliamentary Program to address MCH	Involvement in key stakeholder meeting to garner interest for expanding PMTCT program	Provide updates on planning process and request review of final draft of PMTCT program
Deputy Governor for Social Issues in State where PMTCT programs have been piloted and expanded	Provide insight into pilot project and lessons learned; advocate for improved and expanded PMTCT services	Involvement in a key stakeholder meeting aimed to sensitize stakeholders currently involved in providing maternal health services	No planned involvement beyond initial stakeholders meeting
Commercial Sector			
National Federation of Women Business Leaders	Provide any data or information the federation has produced related to PMTCT, serve as advocate for the program, and potentially financially supplement effort	Involvement in a key stakeholder meeting aimed to sensitize stakeholders currently involved in providing maternal health services	No planned involvement beyond initial stakeholders meeting
Nongovernmental Sector			
National Family Planning Association	Provide data and information on family planning (FP), including efforts to provide FP to people living with HIV/AIDS; participate in planning process as key service provider	Involvement in a key stakeholder meeting aimed at sensitizing stakeholders currently involved in providing maternal health services	Select participants who are service providers who will be invited to subsequent PMTCT planning meetings
Other Civil Society Target Audiences			
University researchers/ professors	Present relevant data or information produced by the university to stakeholders; advise planning process and conduct any necessary research per request of stakeholders	Involvement in key stakeholder meeting to garner interest for expanding PMTCT program	Request assistance and/or subcontract future research efforts to inform planning and monitoring and evaluation
International Donors			
Global Fund to Fight AIDS, Tuberculosis and Malaria	Observe process, provide advice, and incorporate plan into internal donor funding and planning cycle	High level of interest in attending key stakeholder meeting	Continue to engage in planning process by inviting donors and stakeholders to planning meetings and requesting data and other assistance

Adapted from Brinkerhoff, D. and B. Crosby, 2001; and The POLICY Project, 1999.

Step 2 | Prioritize Key Questions of Interest

It is important to prioritize key questions of interest to ensure that you are addressing the most important issues and problems first and choosing questions that can be answered using existing routine data. To prioritize these questions, your team must consider specific criteria and discuss each question in depth.

- *Programmatic relevance:* Is the question of interest programmatically relevant and/or of a public health interest? Are others in the community interested in the information?
- *Answerable:* Is it possible to answer this question of interest or measure performance with existing data or data that could be collected?
- *Actionable:* Does your organization have the authority to act upon the answers to the key questions of interest? That is, if data indicate a need for a change in the current course of action, can your organization make the required changes? If not, can your organization influence those with the authority or ability to effect change?
- *Timeliness of the question:* Is there a timeline for answering this question or making a decision about the issue at hand? Can some key questions be tabled for discussion later to allow the group time to focus on questions that must be addressed more quickly?

An example of a matrix that could be used to prioritize questions is provided in Table 3. This matrix is a useful tool to facilitate discussion about each question and to reduce the influence of special interests or agendas. Each group may wish to define the criteria differently or may wish to add a criterion. This can easily be accomplished in the matrix.

2.1 | Refining the Question of Interest

Once a list of questions on program success, service flows, and outcomes has been generated and prioritized, it is important to ensure that each of the prioritized questions is as specific and well-defined as possible. The group must define what the program really wants and needs to know to ensure that available data will provide the necessary insights. These questions may have been refined through the process of applying the criteria for prioritization.

Table 3—Priority Question Scoring Worksheet (Step 2: Prioritize Key Questions of Interest)

Project/Organization: Strengthen existing prevention of mother-to-child transmission (PMTCT) of HIV services/clinics or scale up PMTCT services/clinics

Key Questions of Interest	Programmatic Relevance	Answerable	Actionable	Timeliness of the Question	Other Criterion	Total
List and rank questions according to each criterion	Highly relevant = 4 Somewhat relevant = 3 Little relevance = 2 Not relevant = 1	Easy to answer = 4 Feasible to answer with routine data = 3 May require nonroutine data = 2 Requires significant data collection = 1	Highly actionable = 4 Potential barriers to action exist = 3 Low chance of action = 2 Very little chance of action = 1	Immediate = 4 Next month = 3 Next quarter = 2 Distant future = 1	= 4 = 3 = 2 = 1	
1. What percentage of each clinic's clientele is youth aged 15–24 years?	4	4	3	4		15
2. What is the clinic's performance against a target for the number of youth aged 15–14 years served by the clinic?	2	4	2	3		11
3. Is the number of youth served at the clinic increasing each month?	2	4	1	2		9
4. Are female and male youth being served equitably? What is the ratio of female to male youth aged 15–24 years served by the clinic?	3	4	3	2		12
5. How effective is our pretest counseling program for youth?	4	2	4	4		14
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						

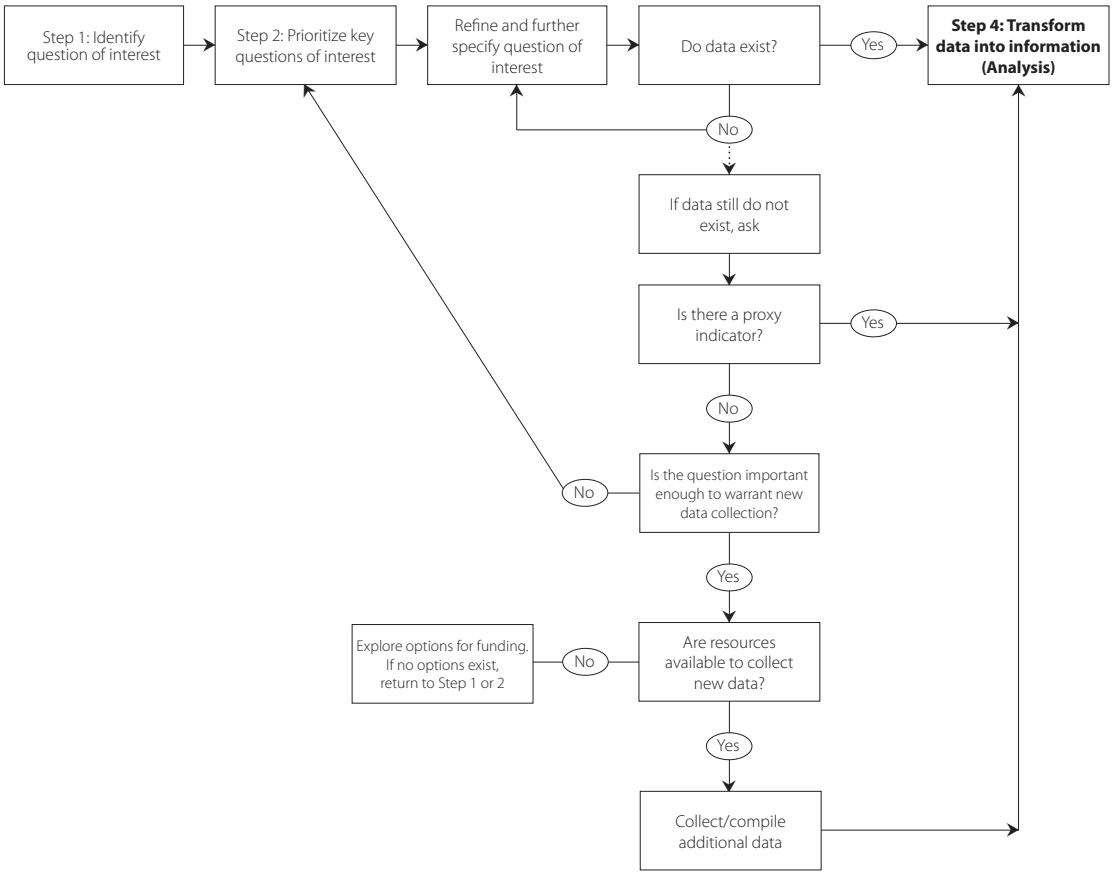
Step 3 | Identify Data Needs and Potential Sources

Now that you have prioritized and refined a list of questions of interest, it is time to bring the data into the picture. Finding the answer to a question may require one indicator or it may require the triangulation of several different performance indicators from multiple data sources. Figure 1 provides a visual guide of the first three steps in the Seven Step process.

The following must be considered in the process of identifying and focusing on specific data needs and sources:

- How frequently or at what intervals do we need this information?
- Do the data already exist and are they readily available?
- Are the data of sufficient quality?

Figure 1—An Expanded Process for Step 3: Identify Data Needs and Potential Sources



3.1 | At What Intervals Do We Need This Information? Routine and Nonroutine Data

Data are generated from several levels and can come from either routine or nonroutine sources. As described above, **routine** data sources provide data that are collected on a continuous basis, such as information that clinics collect on the patients who use their services. **Nonroutine** data sources provide data that are collected annually or even less frequently, such as a population-based survey or a census. The guidance and examples provided in this document focus on using routinely collected data.

3.2 | Do the Data Already Exist and Are They Available?

It is important to determine whether or not existing data can help answer the question of interest as defined above. A key member of the team is a strategic information or M&E officer. This individual can advise the team on which data exist and are available. As outlined in Figure 1, if the data do not provide an answer to the question at hand, ask:

- Can the question of interest be refined such that existing data will provide needed insight?
- Is there a proxy indicator that can be used to begin to respond to the data needs? That is, are there other data being collected that could begin to shed light on the question at hand?
- Is the question of interest of a level of significance that warrants new data collection?
- How can we get these data or where can the necessary information be found?
- What is the most efficient method of collecting this information?

The guidance and examples provided in this document do not address new data collection but focus on using existing data and information to strengthen programs and services.

3.3 | Are the Data of Sufficient Quality?

When determining the usefulness of various data sources, data quality should also be considered. The better the quality of the data, the more trustworthy these data will be, and the more likely it is that stakeholders will use the data. The need for high-quality data, though, is tempered by the feasibility and expense involved in obtaining them. Data quality may be negatively affected by extensive reporting requirements, which are often perceived by managers and service providers as a burden that gets in the way of serving clients. This in turn may reduce the effort program managers and service providers expend in recording and compiling the required data, thus compromising the quality of the information produced. To improve data quality, provide feedback to service delivery points on their performance, and make M&E reporting data relevant for and supportive of program decision making at all levels. Data quality is affected by

- *Accuracy:* Do the data measure what they are intended to measure?
- *Reliability:* Do the data consistently measure what they are intended to measure?
- *Completeness:* Is there a complete set of data for each element of interest or is something missing?
- *Precision:* Do the data have sufficient detail?
- *Timeliness:* Are the data collected, available, and used in a timely manner? Are they up-to-date?
- *Integrity:* Are the data free and safe from deliberate bias or manipulation?

MEASURE Evaluation has developed a series of guidance and tools designed to strengthen the quality of data being collected. These tools can be accessed at http://www.cpc.unc.edu/measure/tools/monitoring-evaluation-systems/data-quality-assurance-tools.

Table 4 is an example of the Framework for Linking Data with Action tool that could be used as an organizing framework for Steps 1–3. The tool provides a way to connect stakeholders and decision makers to the prioritized questions and data sources identified in Steps 1–3. This example shows how the framework could be completed for the priority question identified in Step 3, but this framework is also a useful tool to facilitate the entire Seven Steps process. It links questions of interest to decisions, stakeholders, and a timeline, thereby holding key players accountable for the process. Once an organization completes the Seven Steps process for each area of interest, or work, the tool can be used to manage the process for all questions of interest.

For more information about the Framework for Linking Data with Action, see the MEASURE Evaluation Data Demand and Use Tool Kit at http://www.cpc.unc.edu/measure/publications/ms-11-46.

Table 4—Framework for Linking Data with Action

Title: Prevention of Mother-to-Child Transmission (PMTCT) of HIV Programs

Objectives of the Plan:

Time Period of Decision Making: 6 months

Action/Decision	Policy or Programmatic Question	Decision Maker (DM) and Other Stakeholders (OS)	Indicator/Data Required	Data Source	Timeline	Communication Channel
Strengthen existing PMTCT services/clinics or scale up PMTCT services/clinics	What percentage of HIV-positive clients receive antiretroviral (ARV) prophylaxis?	Division of Maternal and Child Health, Ministry of Health; National AIDS Control Committee; Deputy Governor for Social Issues in State where PMTCT programs have been piloted and expanded	Percent of HIV-positive clients who receive ARVs aggregated by clinic	Clinic records; client survey	6 months	Create data brochure to hand out at face-to-face meetings with relevant stakeholders

Step 4 | Transform Data into Information

Once specific data sources have been identified and obtained to answer your question of interest, the data can be transformed into information to facilitate decision making and action. Analysis involves reviewing and examining data and transforming them into useful information. Analysis can be conducted manually or by using computer programs. See the box below for more information on analysis software.

4.1 | Isolate Required Indicators and Data Elements

Programs and facilities are already calculating and monitoring a variety of indicators to report to government and external donors; however, these indicators may be insufficient to inform program improvements. Programs may need to construct their own set of performance indicators that use routine data to monitor internally. At times, the data required are not included in monthly reports to government and donors but are collected and stored by programs and facilities. For instance, some donors do not require data on the number of clients counseled. Rather, they may require data only on the total number of clients tested and number of clients who are HIV positive.

4.2 | Analyze the Data/Calculate the Indicator

A variety of analysis techniques are available to program managers and service providers. In many cases, these basic analyses simply require paper, pencil, and basic mathematical skills. These different analysis techniques are demonstrated in the Illustrative Examples later in this guide. Step-by-step guidance in conducting many of these basic analyses is provided in Appendix I: Job Aids.

DATA ANALYSIS SOFTWARE

There are several computer programs available for data analysis. Some are available at no charge. It is important to note that specialized skills are required to use data analysis software. For more information, use the following links:

- Microsoft Excel: http://office.microsoft.com/en-us/excel
- Epi Info: http://www.cdc.gov/epiinfo/
- CS Pro: http://www.census.gov/ipc/www/cspro/
- SAS: http://www.sas.com/technologies/analytics/statistics/stat/index.html
- STATA: http://www.stata.com/
- SPSS: http://www.spss.com/software/statistics/

4.3 | Depict Data in Charts or Tables

Many potential data users are more attentive to and have a better understanding of numbers when they are presented in a graph or table. For example, some data users find it easier to understand the proportion of a whole through a pie chart rather than through raw data. It is usually easier to compare performance over time or across sites and see true differences through visual representations of data, such as graphs, charts, or tables. For instance, a program manager can tell whether things are improving by looking at data over time rather than at one data point or at a series of numbers. Appendix I includes aids for choosing the type of graph needed and the essential elements in graphs and tables.

It is important to include all the information needed to interpret the meaning of the graphic. These essential elements include axis labels, a legend, a descriptive title that conveys primary findings, and targets, when applicable. For instance, Figure 2 is difficult to understand and interpret. The axis labels are inaccurate and the title of the graph does not provide enough detail. If the graph depicts a facility's progress toward a target, the actual target should be clearly marked, as seen in Figure 3. This will provide the user with a visual representation of how much farther the facility must go to meet its goals.

Figure 2—New Enrollees Tested for HIV at Each Site by Quarter

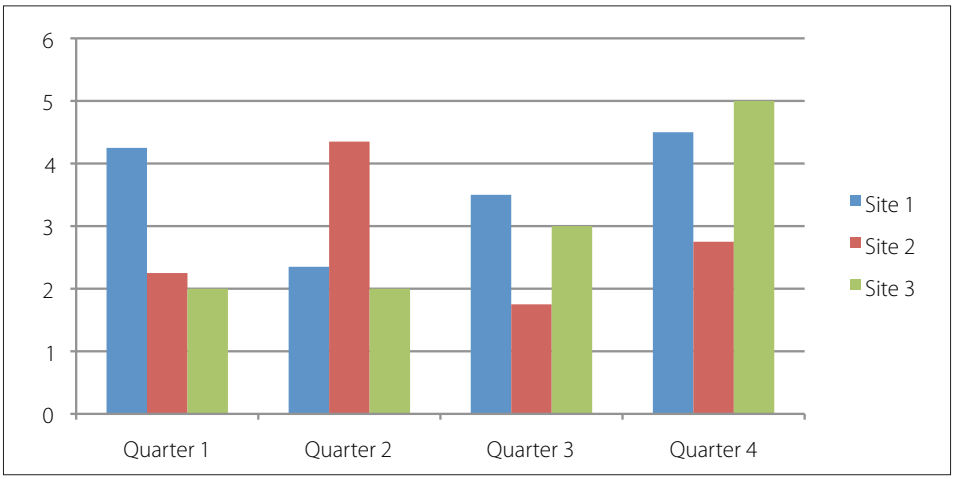
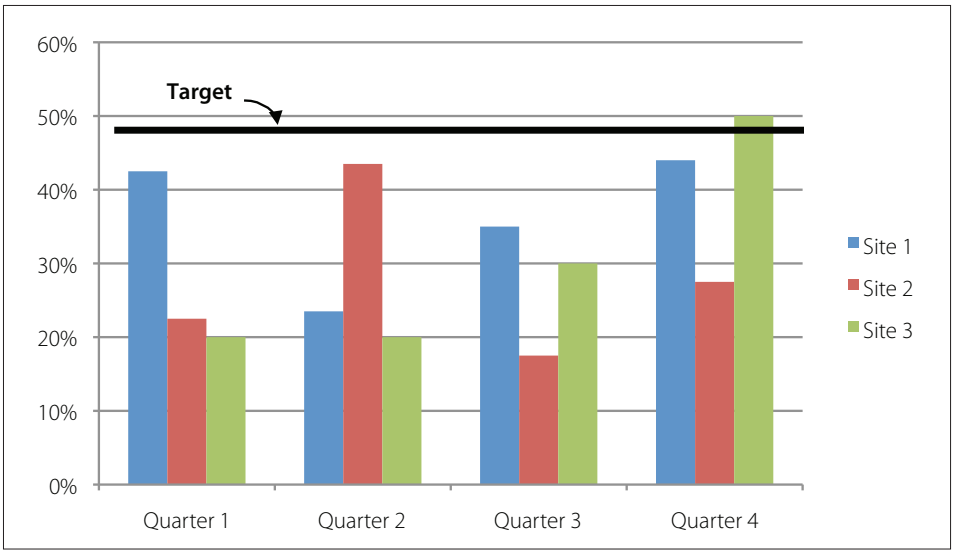


Figure 3—Percent of New Enrollees Tested for HIV at Each Site by Quarter



Now that you have analyzed available data and have presented it in visual and narrative formats, it is time to convene key data users and data producers to interpret this information, find solutions, and take action.

Step 5 | Interpret Information and Draw Conclusions

5.1 | Analysis Versus Interpretation

The terms and concepts of analysis and interpretation are sometimes considered synonymous and are often combined into one process. In this guide, these processes are separated into distinct steps (Steps 4 and 5) because analysis can be conducted effectively by one person or by a team of people with different backgrounds, but interpretation is most productive when a group is involved. Let us assume that we want to know if our program is on track.

- **Analysis** involves comparing a program's goals or expected achievements with actual program performance.
- **Interpretation** is a process by which key stakeholders discuss why you have or have not achieved the goal and what this means for your program.

DISTINGUISHING ANALYSIS AND INTERPRETATION

Analysis: Involves transforming data from counts and individual data elements to information that describes the program or answers key questions about the program. Analysis involves describing the data with tables, graphs, or narrative.

Interpretation: A participatory process through which we derive meaning from analysis, bringing other knowledge and expertise to the table.

Now let us assume that we want to understand whether our project continues to improve and reach more clients over time.

- **Analysis** involves comparing the numbers of clients reached with a particular service over time (months, quarters, years).
- **Interpretation** is a process by which key stakeholders, including providers and beneficiaries, discuss why your project has or has not continued to reach more clients over time.

Several different paths may appear during the process of interpretation. In answering the question of interest, you may find that there is no problem and that this particular part of your program or service is working well or according to plan. Alternatively, you may find that there is a problem and that corrective action is required. Finally, additional information may be needed to fully understand the root cause of this problem and to design a solution.

5.2 | Interpreting Information, Drawing Conclusions, and Crafting Solutions as a Team

As described above, this guide suggests that the most effective method for interpreting program and services information, drawing conclusions, and crafting solutions and next steps is in a dialogue among service providers, program managers, data specialists, and representatives of the target populations and communities. Some facilities and programs host monthly management team meetings in which they review and discuss specific questions or indicators, highlight problems, and craft potential solutions. The department managers attending these meetings may also convene departmental meetings or may confer one-on-one with other staff in the department to craft a solution and propose it to the management team at a later date. Some examples of this process are described in the Illustrative Examples and in the box below.

DATA INTERPRETATION AT THE FACILITY LEVEL: DISCUSSION QUESTIONS

- Does the indicator meet the target?
- Is the finding surprising? Why or why not?
- Why are we seeing this trend?
- How do these data compare with data from other facilities?
- What accounts for differences between units and districts? Consider differences in funding, staff, and programmatic approaches and processes.
- Are there external factors contributing to the findings? Examples include seasonal, political, environmental, cultural, or socioeconomic factors.
- Could the trend be the result of improved data collection?
- What other data should be reviewed to understand the finding?

Step 6 | Craft Solutions and Take Action

For program managers and providers, questions about their program's performance arise from
- an intuitive concern about a specific element of program performance,
- intentions to plan for the future,
- externally mandated or politically motivated events,
- a desire to understand whether an intervention is working, and
- feedback from reviews of submitted reports.

In some cases, program performance meets expectations, and the only action required is to inform stakeholders of successful efforts. In many cases, some kind of action is required. A fundamental element of the Seven Steps approach is participation of service providers, M&E or data specialists, health administrators, and the community. Involving stakeholders in the process of crafting solutions will help ensure that these solutions are actionable and ultimately implemented. This step entails convening a meeting with relevant data users and data producers to
- use the conclusions identified in the previous step to brainstorm potential solutions;
- further specify, craft, and prioritize these solutions to respond to the problem; and
- develop an action plan for implementing each of these solutions.

SETTING TARGETS

If the program has not previously set a target—or a goal—for the specific indicator in question, then you may consider setting an internal target. Your program could consider the following factors when setting a target or a goal:
- What can realistically be achieved within a clearly defined time period, given the available resources and the program context?
- What are the baseline levels? What was the situation at the beginning of our intervention?
- What do past trends tell us? Are the same amounts of resources available? Has the context changed?
- What are neighboring sites or districts achieving? What is being achieved at the national level?
- What is the capacity of our program to meet these goals/targets?

It is important to note that a target is not necessary or relevant for all indicators, and data can be analyzed and monitored without consideration of a target. For instance, your program can monitor progress over time through a trend, and you can make changes or improvements to your program on the basis of an analysis of a trend. As noted above, it is useful to observe trends prior to setting targets.

See the box with discussion questions below for helpful points to consider when crafting solutions and developing an action plan.

CRAFTING SOLUTIONS AND PLANNING FOR ACTION: DISCUSSION QUESTIONS

- What are the most interesting findings?
- Why are we seeing this happen?
- Why are we seeing this trend?
- What can we do to solve the problem?

Brainstorm potential interventions or actions required. Following the brainstorm, prioritize the actions using criteria similar to those in Step 2, such as feasibility, marginal cost, efficacy of the action, and relative impact of the intervention.

Depending on the scope of the problem and the list of potential solutions, the team can use a matrix—similar to that used for prioritizing questions of interest—to prioritize different interventions to put into the program action plan. Examples of each are shown on the following pages in Tables 5 and 6. Once the program or facility begins implementing the program action plan or specific solutions identified collectively by the team, the team must continue to monitor progress toward resolving the problems.

Table 5—Priority-Setting Worksheet For Potential Solutions (Step 6: Craft Solutions and Take Action)

Project/Organization: Strengthen existing prevention of mother-to-child transmission (PMTCT) of HIV services/clinics or scale up PMTCT services/clinics

Potential Solutions	Magnitude	Feasibility/Support	Change in Cost	Other Resources Needed	Capacity	Total
Please list your proposed solutions and rank them according to each criterion.	Large scale = 4 Medium scale = 3 Low Scale = 2 Very Low Scale = 1	Highly feasible = 4 Good feasibility = 3 Low feasibility = 2 Not at all feasible = 1	Low Cost = 4 Medium Cost = 3 High Cost = 2 Very High = 1	Minimal = 4 Few = 3 Several = 2 Significant = 1	Excellent Capacity Exists = 4 Good Capacity Exists = 3 Fair Capacity Exists = 2 Little Capacity Exists = 1	
1. Conduct confidential survey with clients to understand why clients do not receive antiretroviral (ARV) prophylaxis	3	4	4	4	4	19
2. Conduct internal project planning session and stakeholder meetings to assess and resolve barriers to clients' receiving ARV prophylaxis	3	4	4	3	4	18
3. Strengthen linkages between clinics and village-based midwives and traditional birth attendants by initiating training and discussion forums	4	3	2	3	3	15
4. Retrain staff in counseling techniques to improve ARV uptake	3	3	2	2	3	13
5. Develop dynamic supply and logistics system to monitor ARV uptake throughout the country	4	2	1	2	3	12

Table 6—Program Action Plan (Step 6: Craft Solutions and Take Action)

Program: Strengthen existing prevention of mother-to-child transmission (PMTCT) of HIV services/clinics or scale up PMTCT services/clinics

Date: June 20, 2010

Activity or Intervention	Baseline	Goal	Activity Detail/Steps Involved	Person Responsible	Other Stakeholders	General Timeline	Person Responsible for Monitoring
Indicator to Monitor Success: Percentage of HIV-positive clients at the antenatal clinic who receive antiretroviral (ARV) prophylaxis	40%	100%					
1. Conduct confidential survey with clients to understand why clients do not receive ARV prophylaxis			Design and plan survey	Research Advisor	Medical staff at clinics, local groups for people living with HIV/AIDS (PLWHA)	Sept 10	Deputy Director of Project
			Implement survey and disseminate findings	Research Advisor	Medical staff at clinics, local PLWHA groups, Chief Medical Advisor	Dec 10	Deputy Director of Project
2. Conduct internal project planning session and stakeholder meetings to assess and resolve barriers to clients receiving ARV prophylaxis			Convene stakeholders to discuss potential barriers and solutions	Deputy Director of Project	Policy Advisor, Research Advisor, Medical Advisor, medical staff at clinics, community leaders	Dec 10	Project Director
			Develop and begin implementing plan for resolving barriers	Deputy Director of Project	Policy Advisor, Research Advisor, Medical Advisor, medical staff at clinics, community leaders	Feb 11	Project Director
3. Strengthen linkages between clinics and village-based midwives and traditional birth attendants by initiating training and discussion forums			Conduct training in infant life-saving skills and PMTCT	Chief Medical Officer	Midwifery Advisor, Neonatal Health Advisor, medical staff at clinics, village birth attendants	Sept 10	Deputy Director of Project
			Initiate monthly discussion forum at the first training to allow stronger linkages and relationships between clinic staff and village birth attendants	Midwifery Advisor	Chief Medical Officer, other advisors, medical staff at clinics, village birth attendants, community leaders	Oct 10	Deputy Director of Project

Step 7 | Continue to Monitor Key Indicators

Your program may choose to analyze and interpret data once and take action, or your program or site may need to monitor several indicators over time to develop, test, and validate solutions. The course you choose will depend on a variety of factors, including the size of the program or facility, the nature of the priority questions of interest, and whether or not any problem was highlighted during data interpretation (Step 5). Many programs have developed their own framework for improving the quality of their program or service and have designed tools, such as spreadsheets and dashboards, to monitor their efforts at program implementation and program improvement.

One such collection of tools is the Health Care Improvement Project's Documentation, Analysis, and Sharing (DAS) System. The DAS tools are designed to help teams monitor and evaluate their efforts at improving the quality of their services by analyzing their results and determining which changes actually led to improvement. The tools also facilitate the work of synthesizing what is being learned across teams to enable these good practices to be spread. These tools can be accessed on the Health Care Improvement portal at http://www.hciproject.org/node/1051.

7.1 | How Often Do We Need to Monitor?

The frequency of monitoring (continued collection, analysis, and interpretation of key indicators) will depend on the nature of the program and services provided as well as the nature of the question of interest. In many cases, the indicator cannot be expected to change in the course of a month and would be best monitored quarterly, semiannually, or even annually.

7.2 | How Long Should We Monitor a Given Indicator?

As you monitor priority indicators to improve services, you may choose to monitor these indicators less frequently once your program is performing well in that specific area. Your team can refer back to the prioritized list of questions of interest. Or if a significant amount of time has passed, the team can reconvene to brainstorm a list of questions of interest and prioritize questions again (Step 1 and Step 2). This process then becomes a continuous cycle of program and services improvement.

Strengthening the practice of providing feedback to service delivery points on their performance and making M&E reporting data relevant for and supportive of program decision making at all levels—especially at the service delivery point—will ultimately benefit both service delivery and program reporting. This may require programs and facilities to develop their own set of performance indicators for internal monitoring in addition to those being collected for reporting purposes, but these indicators can and should directly respond to the questions that are a priority for the facility and program staff.

Illustrative Examples

1 | HIV Counseling and Testing

1.1 | Step 1: Identify Questions of Interest

Program managers supporting two clinics were interested in applying for additional funding from a donor organization to strengthen their clinics' capacity to meet the needs of youth in their catchment areas.

To justify the proposals and their requests, the program managers wanted to understand the extent to which the clinic services were already meeting the needs of youth in their districts. These full-service clinics are currently supported by an NGO to provide HIV counseling and testing (HCT) services. While these clinics are located in neighboring districts, the distance is such that they serve different populations and their catchment areas do not overlap.

Program managers convened a participatory meeting of different staff at the NGO currently providing support or advice to the clinics. The program managers, clinical advisors, and M&E specialists at the NGO met to identify key questions of interest in seeking to improve services for youth through a brainstorming session. The following questions were posed:

- What percentage of each clinic's clientele is aged 15–24 years?
- What is the clinic's performance against a target for the number of clients aged 15–24 years served by the clinic?
- Is the number of youth served at the clinic increasing each month?
- Are female and male clients aged 15–24 being served equitably? What is the ratio of female to male clients aged 15–24 years served by the clinic?
- How effective is our pretest counseling program for youth?

1.2 | Step 2: Prioritize Key Questions of Interest

Following the brainstorming session, the group prioritized the questions of interest. The team recognized the limited time and resources for answering and monitoring all of the questions of interest and decided to focus on two specific questions:

- What percentage of each clinic's clientele is aged 15–24 years?
- How effective is our pretest counseling program for youth?

The team narrowed the list to these two questions because the questions responded directly to their stated goal to justify their argument in the proposal that the clinics need to strengthen their capacity to meet youth's HIV testing needs. They acknowledged that after analyzing these data, there may be a need to answer additional questions or conduct further analyses.

1.2.1 | Refining the Question of Interest

Following the participatory meeting described above, the program managers further refined the questions of interest before moving to the next step. The question "How effective is our pretest counseling program for youth?" required further specification and refinement. The program managers reasoned that although measuring the effectiveness of the pretest counseling program may require different data elements, or even special data collection efforts, high levels of HIV testing uptake could be an indicator of effective pretest counseling. They identified a more specific and targeted question:

- What percentage of clients aged 15–24 years is accepting the HIV testing following pretest counseling?

1.3 | Step 3: Identify Data Needs and Potential Sources

As will be demonstrated in this example, incorporating the number of clients counseled into an analysis can shed light on client retention and quality of services provided at the clinic. If the counseling provided is not successful in convincing clients to be tested or to receive their results, then it is not maximizing its investment in the client and in the clinic regarding the services provided thus far. Obtaining counseling and testing services, but not receiving the test results, is ultimately a waste of resources.

Table 7—HIV Counseling and Testing (HCT) Monthly Form

HCT Clients	< 15 Years		15–24 Years		> 24 Years		Total
	M	F	M	F	M	F	
Counseled							
Tested							
HIV positive							

The next step for the team was to determine if the data were already being collected. Many programs have implemented youth-friendly HCT services or track HCT client volume and test results by age, as in the form. These summary forms are compiled periodically from confidential client forms. This form asks service sites to disaggregate or break down monthly HCT service volume by client age:

- under age 15,
- ages 15–24, and
- age 25 and older.

1.3.1 | Isolate the Indicator and/or Data Element

To respond to the first question of interest—What percentage of each HCT clinic's clientele is aged 15–24 years?—the team decided to use the data collected for the number of clients counseled at the HCT clinic.

The second question—What percentage of clients aged 15–24 years is accepting the HIV testing?—requires two different data elements disaggregated by age group:

- number of clients counseled at the HCT clinic, and
- number of clients tested.

The team concluded that the appropriate data are already being collected and began the process of transforming these data into information that could be added to their proposal to demonstrate achievements and gaps at the clinics.

1.4 | Step 4: Transform Data into Information

It is important to note that some data elements required to answer these questions are not included in monthly reports to government and donors, but are collected and stored by programs and facilities. For instance, some donors do not require data on the number of clients counseled. Rather, they may require data only on the total number tested and number testing HIV positive.

1.4.1 | Analyze the Data and Depict the Data in an Image (Graph/Chart or Table)

These clinics are located in neighboring districts, but the distance is such that they serve different populations, and their catchment areas do not overlap. Both clinics report testing the same number of clients aged 15–24 years in the last reporting period.

1.4.2 | Question 1: What Percentage of Total HCT Clients are Aged 15–24?

The total number of clients served can be represented by the number counseled at the clinic.

CALCULATION | To calculate the percentage of total HCT clients aged 15–24 years in each clinic, use the following formula:

$$\frac{\text{Number of clients aged 15-24 years who were counseled}}{\text{Total number of HCT clients counseled}} \times 100$$

CALCULATION | Calculating the numerator:

$$\frac{\text{Number of males aged 15–24 years counseled} + \text{Number of females aged 15–24 counseled}}{\text{Total number of HCT clients aged 15–24 years counseled}}$$

Total number of clients aged 15–24 years who were counseled in clinic A:

$53 + 51 = 104$

Total number of clients aged 15–24 years who were counseled in clinic B:

$69 + 62 = 131$

Table 8—HIV Counseling and Testing (HCT)

	< 15 Years		15–24 Years		> 24 Years		Total
	M	F	M	F	M	F	
HCT clients at clinic A							
Counseled	2	8	53	51	96	96	306
Tested	2	8	50	50	95	95	300
HIV positive	0	0	1	8	11	13	33
HCT clients at clinic B							
Counseled	2	8	69	62	310	314	765
Tested	2	8	50	50	295	295	700
HIV positive	0	0	1	1	36	38	76

Denominator: The total number of HCT clients counseled is highlighted in Table 8. Clinic A counseled a total of 306 clients and clinic B counseled a total of 765 clients. The percentage of total HCT clients aged 15–24 years in each clinic can be calculated as follows:

CALCULATION | Clinic A:

$$\frac{104}{306} = 0.34 \times 100 = 34\%$$

Clinic B:

$$\frac{131}{765} = 0.17 \times 100 = 17\%$$

At clinic A, clients age 15–24 years old represented 34% of the total HCT client volume, while at clinic B, clients aged 15–24 accounted for 17% of the HCT clientele.

Proportions or percentages of a whole are often best depicted visually in the form of a pie chart. As you can see in Figures 4 and 5, key information is conveyed in the title of the graph, and the labels for the pie slices can be depicted in different ways. More information on selecting the type of graph and tips on creating a useful and meaningful graph, chart, or table can be found in Appendix I..

Figure 4—Clinic A: More than 30% of HCT Clientele are Young Adults Aged 15–24

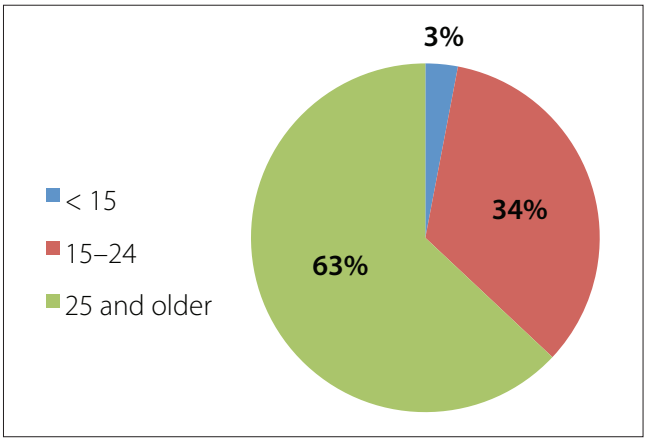
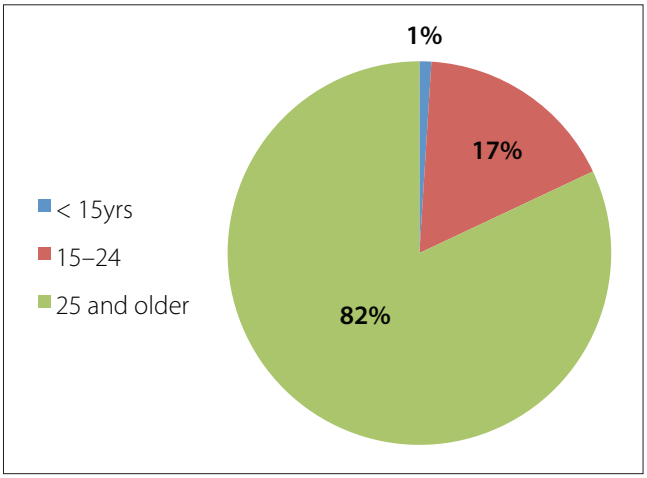


Figure 5—Clinic B: Less Than 20% of HCT Clientele are Young Adults Aged 15–24



1.4.2 | Question 2: What Percentage of Counseled Clients Aged 15–24 Years Accept the HIV Test?

While both clinics report 100 clients aged 15–24 years being tested for HIV, clinic B appears to have lost clients who originally came to the clinic and received pretest counseling.

CALCULATION | Answering this question requires calculating a percentage:

$$\frac{\text{Number of clients aged 15–24 years who were tested}}{\text{Number of clients aged 15–24 years who were counseled}} \times 100$$

Clinic A:

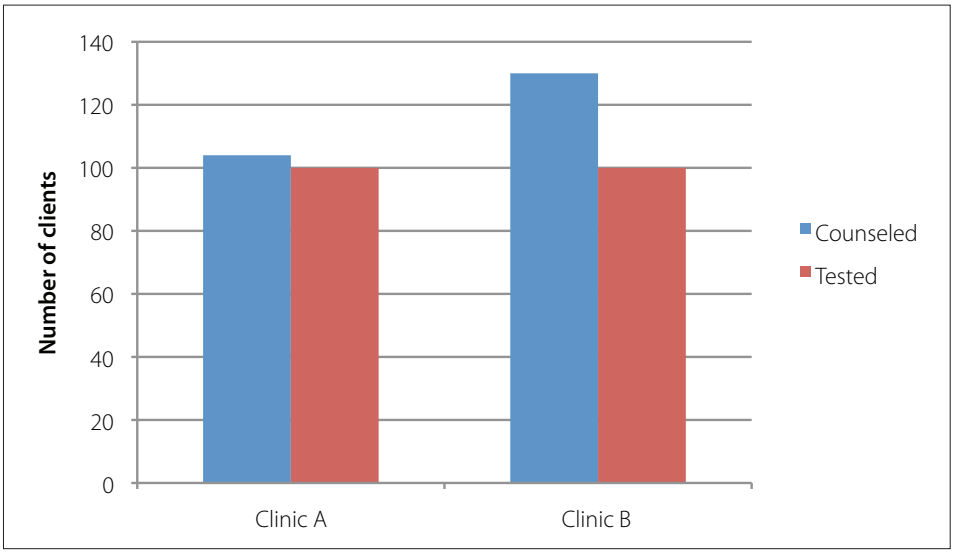
$$\frac{100}{104} = 0.96 \times 100 = 96\%$$

Clinic B:

$$\frac{100}{131} = 0.76 \times 100 = 76\%$$

A graph with columns can be used to display a cascade of services, particularly if you wish to assess retention of clients throughout a program or service. The columns can also allow the reader to compare clinics side by side.

Figure 6—Clinic B Retains Only 76% of Counseled Clients for HIV Testing



1.5 | Step 5: Interpret Information and Draw Conclusions

Interpreting routine data and defining next steps for improving a program are best conducted by a group. In addition to the stakeholders based at the NGO who defined the questions of interest, each of the following key stakeholders can contribute to the process of interpretation, finding solutions, and taking action:

- the managers of clinics A and B,
- staff of the HCT programs in these clinics,
- representatives of youth in the area, and
- district level health officials.

Look back at the data analyzed above. Gathering input from a variety of different individuals to help interpret these data will help avoid misinterpretation. Is this information surprising or was it expected and already understood? Reviewing Figures 4 and 5, it appears that clinic B is reaching fewer youth in the community. Thirty-four percent of clinic A's clientele are aged 15–24 years, while 17% of clinic B's clientele are in this age group. A series of questions may arise among stakeholders reviewing these data:

- What can account for these differences?
- Do the populations in these clinic catchment areas differ?
- Are youth in clinic B's catchment area being served elsewhere?

In addition, data presented in Figure 6 show that clinic B retained only 76% of clients aged 15–24 years for HIV testing. Why is clinic B losing so many clients? Why is clinic B losing clients at a more precipitous rate than clinic A? It is more urgent to address the issue of losing clients after pretest counseling than to bring in more clients for counseling and testing. The team may wish to assess what percentage of all clients at clinic B was retained for testing. Is clinic B primarily losing clients aged 15–24 years or is the clinic losing clients from other age groups as well? To answer this question, the team must perform the same calculations described above for other age groups or for the entire clinic population.

It is important to note that the best way to respond to these questions may involve triangulating routine data with other data sources. The realities of many programs are such that there is limited time, resources, and experience to collect additional data. Routine data provide important insights that can then be explored with a broad group of stakeholders to find and test solutions. Stakeholders developed the following **conclusions** in addition to the questions and requests for additional information outlined above:

- Priority action must be taken to reduce the losses of clients for HIV testing in clinic B.
- Further investigation should be taken to understand why only 17% of clinic B's clientele are aged 15–24 years.

1.6 | Step 6: Craft Solutions and Take Action

The stakeholders mentioned above—clinic managers, HCT program staff, and representatives from the community—may be able to provide additional observations, anecdotes, or even evidence from interviews and focus groups to increase understanding of the root causes of any identified problems. The program or districts may consider convening a participatory management meeting in which all issues and observations are discussed to develop a solution and to take action. The following are issues that could be discussed by stakeholders in the course of developing solutions and a plan for action:

- Are the clinics providing services in different ways or following different protocols? Are counselors in the clinics trained differently or provided with different resources? What could clinic B learn about the successful experience retaining clients at clinic A?
- Are the hours of operation at clinic B convenient for youth? Should the manager of clinic B add special clinic hours for youth to increase coverage in the catchment area? Before making that investment, the manager could consider whether there are other youth-friendly HCT services nearby.

Clinic managers are not typically provided with feedback about the performance of surrounding facilities but, in this case, it might be worthwhile to share the profile of surrounding facilities and their clientele. Understanding the services being provided at other nearby facilities and the profile of their clients may provide insight into whether or not there are clinics nearby that focus on youth or have greater success with youth.

1.7 | Incorporating Gender into the Seven Steps

After answering the initial question about the effectiveness of the pretest counseling for youth at the two clinics, the program managers wanted to know if there were differences between male and female youth receiving counseling and accepting HIV testing. This would be beneficial not only for each clinic, but also for the funding proposal, because the donor organization is interested in funding programs that recognize gender equity as a crucial step in improving the health of individuals and communities.

1.7.1 | Step 1: Identify Questions of Interest

The program managers identified these gender questions of interest:

- Are young women and men being served equitably?
- What is the ratio of women to men aged 15–24 years being served by the clinics?
- How effective are pretest counseling services for male versus female clients?

1.7.2 | Step 2: Prioritize Key Questions of Interest

After some discussion, the group selected the following question:

- What percentage of male versus female clients aged 15–24 accept the HIV testing following pretest counseling?

1.7.3 | Step 3: Identify Data Needs and Potential Sources

This step required very little additional effort. The data were already separated by gender, so the team decided to recalculate the information needed by using the existing data.

1.7.4 | Step 4: Transform Data into Information

The team used the same process and calculations they had just completed. They decided to calculate the information in two steps. The first step was to answer Question 1:

Question 1: What percentage of male versus female clients aged 15–24 years were counseled?

CALCULATION | To calculate the percentage of HCT clients aged 15–24 years that was female:

$$\frac{\text{Number of female HCT clients aged 15–24 years counseled}}{\text{Total number of HCT clients aged 15–24 years counseled}} \times 100$$

And do the same for male clients:

$$\frac{\text{Number of male HCT clients aged 15–24 years counseled}}{\text{Total number of HCT clients aged 15–24 years counseled}} \times 100$$

Table 9—HIV Counseling and Testing (HCT)

	< 15 Years		15–24 Years		> 24 Years		Total
	M	F	M	F	M	F	
HCT clients at clinic A							
Counseled	2	8	53	51	96	96	306
Tested	2	8	50	50	95	95	300
HIV positive	0	0	1	8	11	13	33
HCT clients at clinic B							
Counseled	2	8	69	62	310	314	765
Tested	2	8	50	50	295	295	700
HIV positive	0	0	1	1	36	38	76

The total number of HCT clients aged 15–24 years was calculated earlier in the example; clinic A counseled 104 clients aged 15–24 years, and clinic B counseled 131 aged 15–24. Using these numbers, they calculated the percentage of male and female clients aged 15–24 in each clinic:

CALCULATION | **Clinic A (Females):**

$$\frac{51}{104} = 0.49 \times 100 = 49\%$$

Clinic A (Males):

$$\frac{53}{104} = 0.51 \times 100 = 51\%$$

Clinic B (Females):

$$\frac{62}{131} = 0.47 \times 100 = 47\%$$

Clinic B (Males):

$$\frac{69}{131} = 0.53 \times 100 = 53\%$$

In clinic A, females represented 49% of clients aged 15–24 counseled, and in clinic B, females represented 47% of clients counseled. The ratio of females to males seemed equivalent, but the program managers decided to finish the investigation by answering the question about what percentage of counseled males and females accept the HIV test.

Question 2: What percentage of male vs. female clients aged 15–24 accept the HIV tests?
Answering this question again requires calculating a percentage. The team used the same formula as earlier, but this time it was split by gender:

CALCULATION | **Females:**

$$\frac{\text{Number of female clients aged 15–24 years who were tested}}{\text{Number of female clients aged 15–24 years who were counseled}} \times 100$$

CALCULATION | Males:

$$\frac{\text{Number of male clients aged 15–24 years who were tested}}{\text{Number of male clients aged 15–24 years who were counseled}} \times 100$$

Clinic A (Females):

$$\frac{50}{51} = 0.98 \times 100 = 98\%$$

Clinic A (Males):

$$\frac{50}{53} = 0.94 \times 100 = 94\%$$

Clinic B (Females):

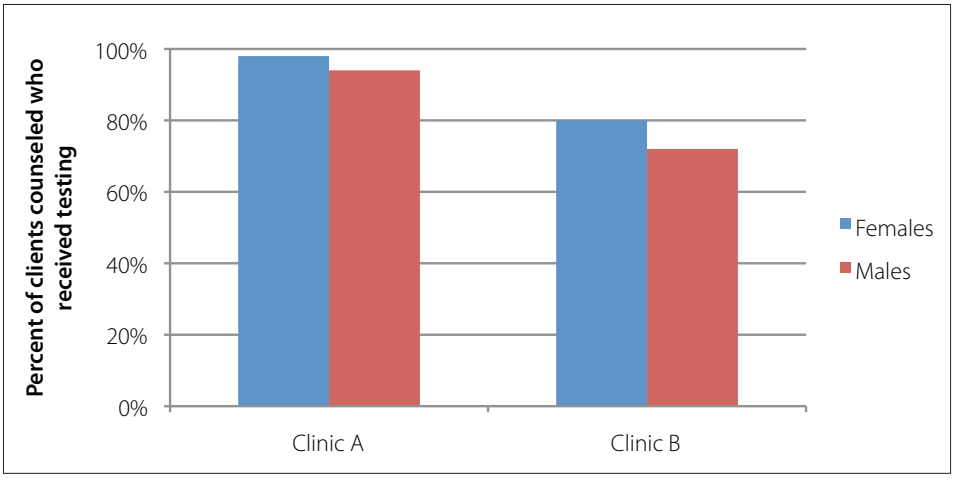
$$\frac{50}{62} = 0.81 \times 100 = 81\%$$

Clinic B (Males):

$$\frac{50}{69} = 0.72 \times 100 = 72\%$$

Once again, a graph with columns can be used to display the results comparing the differences between genders and clinics.

Figure 7—Youth Accepting HIV Testing



Despite the fact that there were more males than females being counseled at each clinic, the calculations revealed that a greater proportion of females were tested. Females accepted testing more often than males at both clinics. The difference in test acceptance between males and females is greater at clinic B.

1.7.5 | Step 5: Interpret Information and Draw Conclusions

Stakeholders focused on interpreting the new findings, crafting solutions, and taking action. The team also decided to ask additional program staff to be involved in interpreting the data. Including additional staff gave the stakeholder group a more balanced gender representation. The stakeholders could discuss any of the following questions:

- What could account for these gender differences?
- Why are more male clients being counseled, but more females are accepting testing?
- Are males and females being counseled differently? Are females allowed to make the decision for themselves?
- Are gender norms or stigma affecting who accepts HIV testing?
- What is different about clinic B that might be causing more pronounced gender differences?

Once again, it may be important to consider performing the same calculations for other age groups or for the entire population to see if the gender differences are only among clients aged 15–24 or are throughout the entire population the clinics serve.

1.7.6 | Step 6: Craft Solutions and Take Action

This would be a good time to again encourage feedback from stakeholders who may have additional insight into these results. It may be important to discuss the following questions while developing a solution and taking action:

- Are male and female clients being treated differently?
- Could counselors benefit from training to ensure equal treatment of men and women?
- Are there external factors or biases that pressure men to decline testing while pressuring women to accept?
- What can be done to further investigate differences in service utilization or treatment adherence?

It is important to remember to always consider whether gender could be influencing care or outcomes of any program or clinic. Gender is being incorporated into health programs and policies on local, national, and international levels. Ensuring equal access to treatment for men and women throughout the process of health care programming, provision, and evaluation is crucial to the advancement of health of individuals throughout the world.

2 | Prevention of Mother-to-Child Transmission of HIV—*Counseling*

2.1 | Step 1: Identify Questions of Interest

A training program for HIV counseling and testing among pregnant women included staff from a clinic that serves three million people across two districts. The training program was implemented for the facility staff without considering the facility's current performance or specific opportunities for performance improvement. Counselors were provided training, as well as materials to post and distribute to clients. Six months after the training and a pilot of these new counseling approaches, a variety of stakeholders requested that the facility evaluate the new counseling approaches. The national target for pregnant women who are tested in health facilities and who receive HIV test results is 80%. The M&E team was tasked with analyzing available data and presenting them graphically for facility staff to interpret and present to external and internal stakeholders. This was the key question of interest:

- Have the new counseling procedures increased the proportion of antenatal care (ANC) clients who get tested and receive their HIV test results?

2.2 | Step 2: Prioritize Key Questions of Interest

Since there was only one question, there was no need to prioritize questions. However, the question did require further refinement to ensure that appropriate data were used to provide an answer. The M&E team reasoned that while measuring the effectiveness of the pretest counseling program may require several different data elements, they would begin by answering the following:

- In the 5 months following implementation of the new counseling procedures, did the percentage of ANC clients who received their HIV test results increase compared with the 5 months prior to the training program that the counselors received?

2.3 | Step 3: Identify Data Needs and Potential Sources

The next step for the team was to determine whether the data were already being collected. The team concluded that the appropriate data were already being collected and began the process of transforming the data into information.

2.3.1 | Isolate the Indicator and/or Data Element

To respond to the question of interest, the team decided to use these data elements:

- number of first visits for ANC
- number of ANC women who received HIV test results

2.4 | Step 4: Transform Data into Information

2.4.1 | Analyze the Data and Depict the Data in an Image (Graph/Chart or Table)

The M&E team took the following steps to analyze the data:

- Separate monthly data into two groups—5 months prior to intervention and 5 months following intervention. They chose not to include the month that counselors were trained in the new procedures (February 2009).

- For each month, compute the proportion of ANC clients who received HIV test results by dividing the number of women who received their HIV test results by the number of first visits for ANC.
- Compute percentage by multiplying ratio by 100.
- Plot time trends (percentage in each month).

To demonstrate different scenarios and opportunities for analysis and interpretation, we are providing two different scenarios—Examples A and B.

2.5 | Example A

The following formula was used for each of the 5 months prior to implementing the new counseling procedures (September 2008 to January 2009) and for each of the 5 months following the implementation of the new counseling procedures (March to July 2009).

Table 10—Example A: Percentage of Antenatal Care (ANC) Clients Who Receive HIV Test Results

Date	No. of Women on First Visit to ANC	No. of Women Who Receive Test Results	%
September 2008	735	478	65
October 2008	764	443	58
November 2008	721	541	75
December 2008	680	422	62
January 2009	744	494	66
March 2009	735	492	67
April 2009	750	480	64
May 2009	801	657	82
June 2009	663	517	78
July 2009	680	646	95

CALCULATION | To calculate the percentage of women who attended ANC and received HIV test results in September 2008:

$$\frac{\text{number of women who received test results}}{\text{total number of women who attended ANC}} \times 100 \rightarrow \frac{478}{735} = 0.65 \times 100 = 65\%$$

Figures 7 and 8 display the percentage of women receiving HIV test results at the ANC clinic during the 5 months prior to counseling intervention and the 5 months following the initiation of the counseling intervention.

Figure 8—Percentage of Women Receiving HIV Test Results at ANC During 5 Months Prior to Counseling Intervention

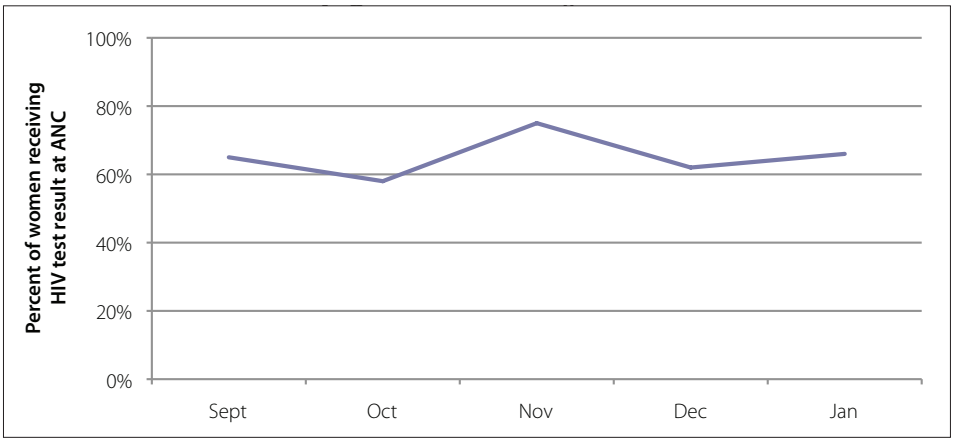
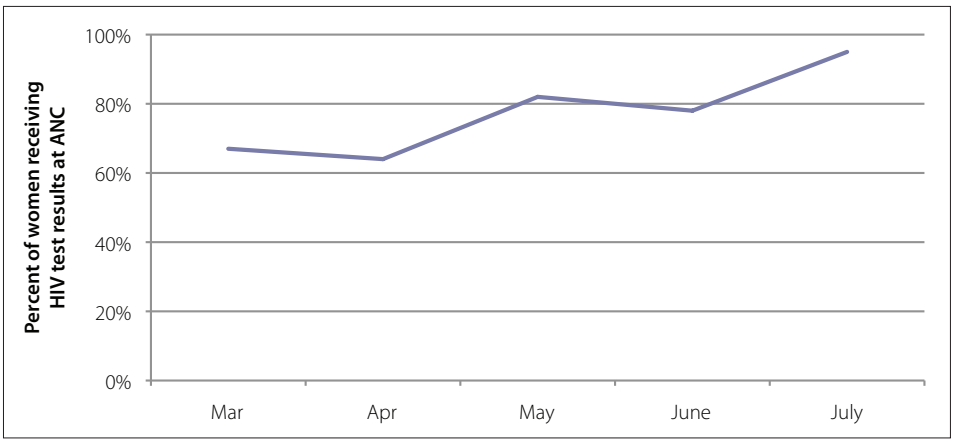


Figure 9—Percentage of Women Receiving HIV Test Results at ANC Clinic During 5 Months Following Counseling Intervention



2.5.1 | Step 5: Interpret Information and Draw Conclusions

Interpreting routine data and defining next steps for improving a program are best conducted by a group. In addition to the stakeholders based at the facility, other key stakeholders can also contribute to the interpretation of these data, including

- other facilities that participated in the training program,
- ANC clients that may be repeat clients to the clinic,
- representatives from the donor/organization that conducted the training, and
- district representatives.

Let's look at the data analyzed above. Prior to the implementation of the new counseling procedures, the facility had not reached the national goal of 80% of pregnant women seen in health facilities receiving HIV test results. Progress toward achieving this goal was fairly stable and consistent. Within 3 months of implementing the new procedures, the facility reached the goal. The manager of the facility noted that they should also consider that this change could be attributed to other factors or interventions unrelated to the new counseling procedures. Are there

any nearby facilities that did not implement new counseling procedures? If so, what has been their trend over the past year? Were there any other changes or differences at the facility? Were the same staff in place during this time? The review of available data can often lead to additional questions. In this case, stakeholders identified the following additional questions:

- Are more women receiving test results following implementation of the intervention than before implementation?
- Is it possible that the upward trend in May, June, and July is due to a seasonal difference rather than the intervention itself? What percentage of women received HIV test results at the antenatal clinic each month during a full year prior to the intervention?
- Did other facilities in the area implement the same new counseling procedures? If so, did they see similar results?
- Could a maternity ward institute mandatory HIV testing for women who were monitored at ANC clinics that performed particularly poorly?

2.5.2 | Step 6: Craft Solutions and Take Action

It appears that the new counseling intervention may have had a positive effect on the number of women receiving their HIV test results. The implementation of the new counseling procedures was being piloted in this facility. While additional analysis and data collection would give a definitive answer to the question, this initial analysis is helpful in identifying possible program effect. Additional investigation into the questions listed above as well as other factors would be prudent prior to scale-up.

As mentioned previously, assume that the facility performed differently in the 5 months prior to the new counseling program. This can have an impact on the interpretation of the findings and the actions taken as detailed below.

2.6 | Example B

The following formula was used for each of the 5 months prior to implementing the new counseling procedures (September 2008 to January 2009) and for each of the 5 months following the implementation of the new counseling procedures (March to July 2009).

Table 11—Example B: Percentage of Antenatal Care (ANC) Clients Who Receive Test Results

Date	No. of Women on First Visit to ANC Clinic	No. of Women Who Receive Test Results	%
September 2008	735	257	35
October 2008	764	336	44
November 2008	721	440	61
December 2008	680	394	58
January 2009	744	494	66
March 2009	735	492	67
April 2009	750	480	64
May 2009	801	657	82
June 2009	663	517	78
July 2009	680	646	95

CALCULATION | To calculate the percentage of women who attended ANC and received HIV test results in September 2008:

$$\frac{\text{number of women who received test results}}{\text{total number women who attended ANC}} \times 100 \rightarrow \frac{257}{735} = 0.349 \times 100 = 35\%$$

2.6.1 | Step 5: Interpret Information and Draw Conclusions

As mentioned in example A, interpreting of routine data and defining next steps for improving a program are best conducted by a group. In addition to the stakeholders based at the facility, other key stakeholders can also contribute to the interpretation of these data, including

- other facilities that participated in the training program,
- ANC clients who may be repeat clients to the clinic,
- representatives from the donor/organization that conducted the training, and
- district representatives.

Figure 10—Percentage of Women Receiving HIV Test Results at ANC Clinic During 5 Months Prior to Counseling Intervention

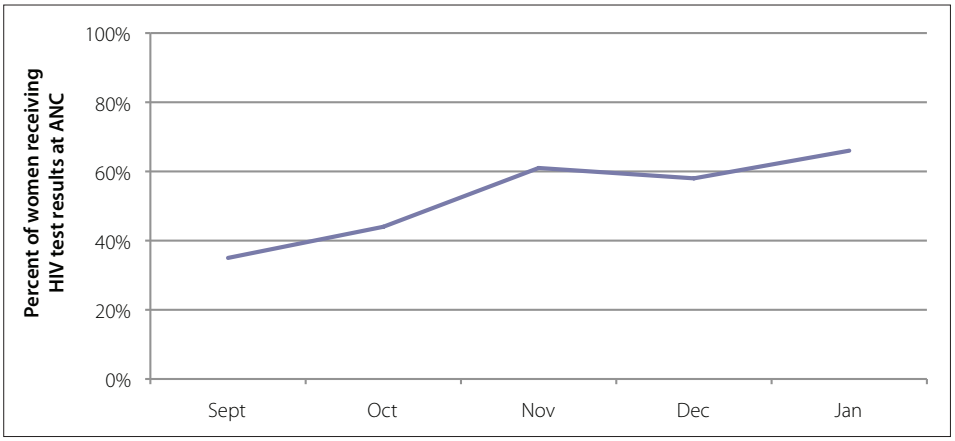
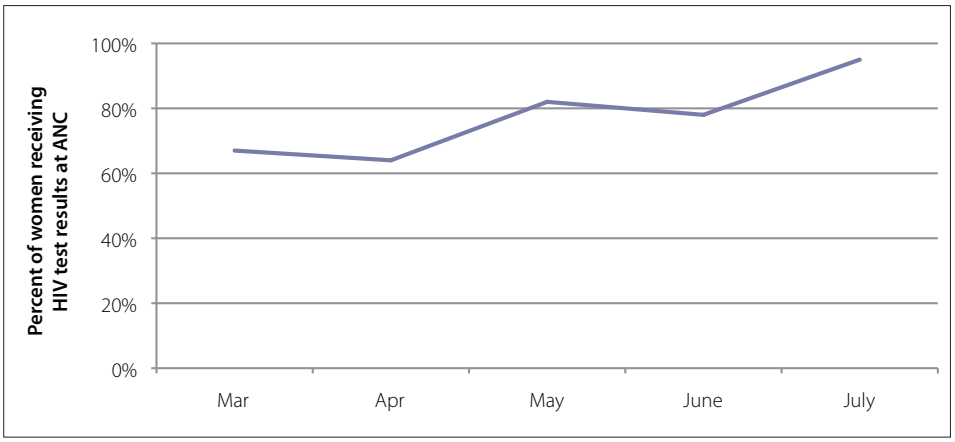


Figure 11—Percentage of Women Receiving HIV Test Results at ANC Clinic During 5 Months Following Counseling Intervention



Let's look back at the data analyzed above. Prior to the implementation of the new counseling procedures, the facility had not reached the goal of 80% of pregnant women seen in health facilities receiving HIV test results. Within 3 months of implementing the new procedures, the facility reached the goal. In the 6 months prior to implementation of the new counseling procedures, the number and percentage of women receiving HIV test results was on the rise, and this trend continued following the intervention.

The manager of the facility noted that they should also consider that this continued rise in the percentage of women receiving HIV test results could be attributed to other factors or interventions unrelated to the new counseling procedures. At first glance, it appears that the new counseling intervention may have had a positive effect on the number of women receiving their HIV test results. However, reviewing the months prior to the intervention, an upward trend in the percentage of women attending the ANC clinic who receive HIV test results continues on through the subsequent 5 months. It is unclear whether the intervention had a role in the increase in the percentage of women receiving HIV test results.

2.6.2 | Step 6: Craft Solutions and Take Action

In both scenarios, the outcomes are positive. More pregnant women are being retained throughout the course of ANC and HIV counseling and testing services. Unless significant costs are associated with continuing to implement the new counseling procedures, the most likely action is to continue to implement the program. If the implementation of the new counseling procedures was being piloted at this facility, additional investigation into the questions listed below as well as other factors would be prudent prior to scale-up. Are there any facilities that did not implement new counseling procedures? If so, what has been their trend over the past year? Were there any other changes or differences at the facility? Were the same staff in place during this time?

Stakeholders mentioned above identified the following additional questions:

- Are more women receiving test results following implementation of the intervention than before implementation?
- Were other interventions adopted in the year prior to training providers in the new counseling procedures in February?
- Did other facilities in the area implement the same new counseling procedures? If so, did they see similar results?

3 | Prevention of Mother-to-Child Transmission of HIV—*Retention and Performance*

3.1 | Step 1: Identify Questions of Interest

A prominent donor-funded HIV/AIDS project has been supporting facilities for more than 1 year. As the project begins to finalize a plan and budget for its next year operation, senior leadership in the project decided to assess performance, programmatic needs, and gaps at the facility level. They convened a stakeholder meeting to assess these needs and determined that stakeholders are concerned about retaining clients.

The project facilitated a brainstorming session to identify the following key questions of interest:

- What percentage of clients coming into the supported facilities are actually provided with HIV testing?
- Which sites need special attention to improve the uptake of ARV prophylaxis?
- Are HIV-positive clients receiving infant feeding counseling and guidance?
- What percentage of HIV-positive clients bring their child in for continuous monitoring and diagnostics?
- Does our facility have sufficient inventory of HIV test kits and other necessary supplies?

ASSESSING PROGRAM RETENTION AND QUALITY OF SERVICES

As will be demonstrated in this example, incorporating (1) number of clients counseled, (2) number subsequently tested, (3) number receiving results, and (4) number receiving ARV prophylaxis into an analysis can shed light on patient retention and quality of services provided at the clinic. If the counseling provided is not successful in convincing clients to be tested or to receive their results, then it is not maximizing the investment of the client and the clinic in the services provided thus far.

Providing an HIV-positive client with counseling about her HIV status without ARV prophylaxis is a missed opportunity to prevent HIV infection among infants and is a waste of the resources already invested in the client. Obtaining counseling and testing services but not receiving the test results is ultimately a waste of resources. It is more urgent to prevent losses of clients who know their status, who have been tested, or who have received pretest counseling than to bring in more clients for counseling and testing services.

3.2 | Step 2: Prioritize Key Questions of Interest

Following the brainstorming session, the group recognized the need to assess each facility's performance at each point in the delivery of prevention of mother-to-child transmission (PMTCT) of HIV services. The team chose to look at the entire spectrum of PMTCT services (Table 12) because it responds directly to their stated goal of understanding any vital needs or gaps and providing services efficiently and effectively.

Table 12—Prevention of Mother-to-Child Transmission of HIV

Measure			Antenatal Care	Maternity	Postnatal Clinic	Totals
A	No. of visits	First visits				
		Revisits				
B	No. of women	Counseled				
		Tested				
		Received test results				
		HIV positive				
C	No. of women counseled and tested at first visit					
D	No. of women given preventive antiretrovirals					
E	No. of infant nevirapine doses	Issued				
		Administered				
F	No. of clients that initiated cotrimoxazole	Women				
		Infants				
G	No. of partners	Counseled				
		Tested				
		HIV positive				
H	HIV-positive clients referred for follow-up	Mothers				
		Infants				
		Partners				
I	No. of mothers counseled on infant feeding options					
J	No. of infants tested for HIV	At 6 weeks				
		After 3 months				

3.2.1 | Refining the Questions of Interest

Following the participatory meeting described above, the team further refined the questions of interest before moving to the next step. The group decided to assess the counseling and testing program by analyzing the data on the number of first-time visits to the ANC center, the number of women counseled, the number tested, and the number receiving test results. Following that analysis, the team decided to use the following indicators:

- number of women testing HIV positive,
- number of women who received test results,
- number of women tested,
- number of women counseled,
- number of first visits, and
- number of women counseled and tested at first visit.

3.3 | Step 3: Identify Data Needs and Potential Data Sources

The team identified additional indicators collected on the form in Table 13 that would contribute to their understanding of the facility's performance in providing PMTCT services. These data are available in the facility's monthly report to key donors and stakeholders. The following are specific data elements included in this example:

- number of women receiving preventive ARVs,
- number of women testing HIV positive,
- number of women who received test results,
- number of women tested,
- number of women counseled, and
- number of first visits to ANC.

3.4 | Step 4: Transform Data into Information

3.4.1 | Analyze the Data and Depict the Data in an Image (Graph/Chart or Table)

The group began by presenting the cascade of PMTCT services provided over the past 6 months graphically. These data appear in Table 13. The M&E officer for each facility compiled 6 months of data and plotted the indicators noted above in a column graph for each facility. The group engaged staff from facility 5 in the discussion but did not include their data because the program had recently begun operations at that facility and there were still very few clients.

Facility 4 presented its data as seen in Figure 12. Facility and program managers for the project noted that looking at monthly figures, Facility 4 had seen continuous improvement over the 6-month period, and concluded that no action was currently needed. Other facilities presented similar graphs for their data. Facility 2, on the other hand (Figure 13), had lost a larger percentage of clients than the other facilities and had continued to see more clients leave the site before receiving their test results.

Table 13—Prevention of Mother-to-Child Transmission of HIV

Month	No. of Women Who Are HIV Positive	No. of Women Issued Preventive Antiretrovirals	%
Facility 1			
May	35	29	83
June	29	25	86
July	32	29	91
August	26	22	85
September	38	33	87
October	36	32	89
Facility 2			
May	92	63	68
June	101	65	64
July	91	61	67
August	95	62	65
September	98	66	67
October	101	65	64
Facility 3			
May	9	6	67
June	9	6	67
July	5	4	80
August	6	5	83
September	10	7	70
October	11	9	82
Facility 4			
May	28	18	64
June	30	20	67
July	29	23	79
August	31	25	81
September	27	24	89
October	35	31	89
Facility #5			
May	0	0	0
June	2	2	100
July	0	0	0
August	1	1	100
September	1	0	0
October	0	0	0

Figure 12—Percentage of Clients Retained Through Each Step of PMTCT Services at Facility 4

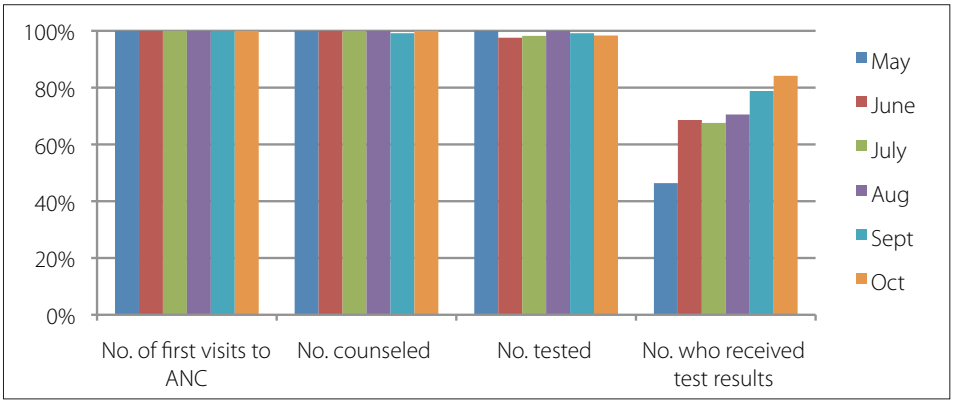
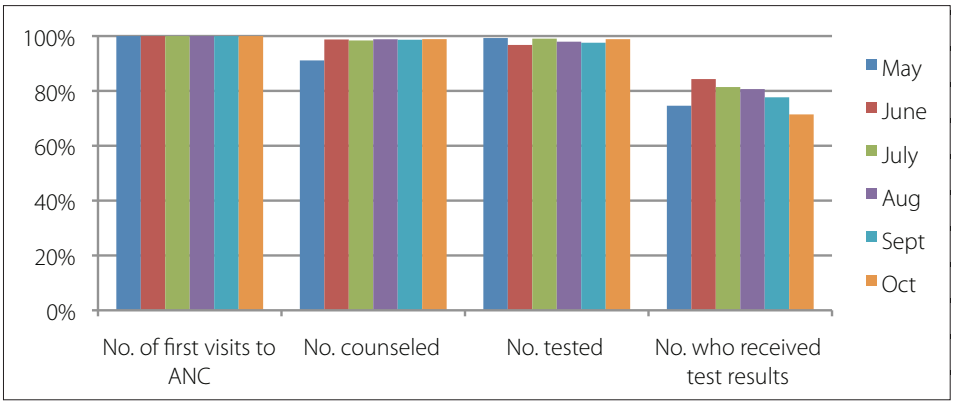


Figure 13—Percentage of Clients Retained Through Each Step of PMTCT Services at Facility 2



CALCULATION | **Compute the step-wise proportions shown in Figures 11 and 12:**

$$\frac{\text{number of women who received pretest counseling}}{\text{number of first visits for ANC for each month (May–October) and for each facility of interest}} \times 100 = \%$$

$$\frac{\text{number of women tested}}{\text{number of women who received pretest counseling for each month (May–October) and for each facility of interest}} \times 100 = \%$$

$$\frac{\text{number of women who received their test results}}{\text{number of women tested}} \times 100 = \%$$

CALCULATION | **Then plot percentages for each facility by month. Data for facility 1 is shown as an example. To calculate the percentage of ANC clients at each facility who received HIV test results:**

$$\frac{\text{number of women who received test results}}{\text{total number women who attended ANC}} \times 100 \rightarrow \frac{494}{744} = 0.66 \times 100 = 66\%$$

3.5 | Step 5: Interpret Information and Draw Conclusions

The location of each facility can influence the size of the population receiving services as well as the number of women receiving test results. Location of the facility and that of other facilities serving the same population catchment area should be taken into account in planning and designing new interventions. A variety of different stakeholders can monitor these indicators and can use these data in different ways. ANC clinics can compare their own performance with predetermined standards or targets, trends at the clinic and, if provided by the district, with the district average or with other facilities (Table 14).

Table 14—Prevention of Mother-to-Child Transmission of HIV Results at Four Clinics

		Measure	May	June	July	Aug	Sept	Oct
Facility 1	A.1	No. of first visits to antenatal care (ANC)	543	509	541	535	534	513
	B.1	No. counseled	542	509	541	535	534	513
	B.2	No. tested	531	503	528	522	527	505
	B.3	No. who received test results	511	483	492	503	520	497
	B.4	No. HIV positive	35	29	32	26	38	36
	D	No. issued preventive antiretrovirals (ARVs)	29	25	29	22	33	32
Facility 2	A.1	No. of first visits to ANC	1,362	1,281	1,181	1,282	1,042	1,067
	B.1	No. counseled	1,241	1,265	1,162	1,267	1,028	1,055
	B.2	No. tested	1,232	1,224	1,151	1,241	1,003	1,043
	B.3	No. who received test results	919	1,032	937	1,001	779	745
	B.4	No. HIV positive	92	101	91	95	98	101
	D	No. issued preventive ARVs	63	65	61	62	66	65
Facility 3	A.1	No. of first visits to ANC	46	54	62	60	61	66
	B.1	No. counseled	44	54	57	58	60	65
	B.2	No. tested	41	53	49	56	58	63
	B.3	No. who received test results	36	41	37	51	56	61
	B.4	No. HIV positive	9	9	5	6	10	11
	D	No. issued preventive ARVs	6	6	4	5	7	9
Facility 4	A.1	No. of first visits to ANC	110	124	113	112	120	122
	B.1	No. counseled	110	124	113	112	119	122
	B.2	No. tested	110	121	111	112	118	120
	B.3	No. who received test results	51	83	75	79	93	101
	B.4	No. HIV positive	28	30	29	31	27	35
	D	No. issued preventive ARVs	18	20	23	25	24	31

Clinics can provide feedback to their staff to demonstrate progress and define areas that require additional effort. Hospital maternity wards may wish to compare the performance of different ANC clinics that feed into their hospital. This would allow them to better identify women who could be at a higher risk of arriving at the maternity ward without having been tested for HIV. For instance, if a clinic performs poorly at providing counseling and testing to their ANC clients, the hospital may choose to conduct HIV tests of all women referred from that clinic. Districts and organizations can compare the percentage of ANC clients who receive their HIV test results across ANC sites. Look back at the data analyzed above. Upon convening the team again, the district facilitated the process of interpretation by asking the following questions:

- Are these data surprising?
- Which facility is performing better/worse than expected? Why?

During this meeting, the team generated additional questions as well as some conclusions for the project to consider:

- What is the trend over time for these facilities? What is the quarterly/annual percentage of ANC clients receiving HIV test results for these facilities?
- Why are facilities losing contact with a significant number of women after they have been tested, but who never return for their results or for additional ANC?

The group reached the following conclusions that need further consideration by the project leadership:

- An intervention is needed to improve performance in facility 2. This could involve examining the past performance of successful facilities by conducting similar analyses for different months or examining the trend over the past year.
- The district may wish to advise hospitals to test all women in their maternity ward who received ANC at facility 2.
- Because a number of facilities lose clients between testing and receiving results, a new protocol should be considered for this stage of the program process.
- Consider the experiences of better performing facilities and communities when designing interventions. Are there approaches used in facilities 1 and 4 that could be applied to improve services in facilities where the percentage of women retained throughout the process of PMTCT service delivery is low? Is their capacity greater? Is their record-keeping system different from those at the other sites?

3.6 | Step 6: Craft Solutions and Take Action

Project leadership convened a smaller group of stakeholders to craft solutions based on the analyses and conclusions described above. The group developed an action plan for addressing each of the conclusions, including actions to

- develop a policy document to allow hospitals to monitor ANC clinic data, and
- develop a new protocol and advocacy plan for implementing a rapid HIV testing program.

The rapid HIV testing would allow clients to receive their results immediately and may result in fewer clients lost during the counseling and testing process.

4 | Demonstrating Monitoring Outcomes in an ART Program Through a Cohort Analysis

HIV is a chronic disease and many of the indicators of an antiretrovial therapy (ART) program's success require looking at how well patients do with treatment over time, as well as monitoring loss of clients from the ART program. One such example is how long patients remain in treatment. To monitor these outcomes, it is necessary to use what is referred to as a cohort analysis to examine the data in a meaningful way. In the context of the ART program, a cohort consists of patients who start treatment during a specific period of time and are then followed over time. The time period of initiating ART should be the same for each patient in a cohort.

Trends in the quarterly cohort data can be examined to see whether there are improvements in outcomes from one quarter to the next. The patients in each cohort are followed over time, and different outcomes are then assessed at 3, 6, and 12 months after starting treatment. These outcomes include cluster of differentiation antigen 4 (CD4) counts, a test commonly used to ascertain when to begin AIDS treatment. Other outcomes include patients who have started and are still continuing one kind of ART, those who have switched to another drug or switched over to second-line drugs, and other factors such as loss to follow-up, death, or stopping.

Compared with a monthly report, why might information about a cohort provide you with additional insight? Cohort information is longitudinal observation data on a group of patients who have started ART during the same period and are being followed up. The determinants affecting the outcomes are considered to be the same for all members of the cohort. The monthly data present a cross-sectional view of the ART program for a given ART center and consist of all patients at a given point in time; thus, the determinants affecting the outcome are not same in this case.

4.1 | Step 1: Identify Questions of Interest

Program managers within a government-funded ART program have asked facility leaders and other stakeholders to convene to discuss how they can ensure that patients are not lost as the program scales up services and how they can improve tracking of defaulting or lost ART clients over time. Program managers, service providers, health administrators, support group leaders, and M&E specialists met to identify key questions of interest in seeking to strengthen their ART programs:

- What percentage of clients is alive and on treatment at 3, 6, and 12 months after initiating ART?
- Are we seeing an increase in CD4 counts as clients remain on treatment for longer periods of time?
- Are clients receiving adequate counseling and support to maintain adherence to ART?
- Are clients being referred to community-based organizations (CBOs) for support groups, counseling, and services?

4.2 | Step 2: Prioritize Key Questions of Interest

Following the brainstorming session, the group prioritized the questions of interest. They decided to answer each of these questions in turn, but the most pressing issue at hand was whether or not clients are surviving and remaining on treatment.

4.2.1 | Refining the Question of Interest

Program managers decided to refine the question and choose one facility in which they would test the analysis. The question "What percentage of clients is alive and on treatment at 3, 6, and 12 months after initiating ART?" was refined further:

- What percentage of patients receiving services at facility B is alive and remains on treatment after 3, 6, and 12 months among the cohort that began treatment from April to June 2008?

The group agreed that once they had tested this analysis in one clinic, they would gather data from the other clinics and compare the performance across clinics. This particular analysis would exclude any clinics that were not providing ART services during the entirety of the period from April to June 2008. That is, if the clinic began providing ART services in May 2008, its data would not be included in this particular analysis.

4.3 | Step 3: Identify Data Needs and Potential Sources

The next step for the team was to determine whether the data were already being collected. All ART facilities participating in the program were collecting detailed data about their patients and the services they received. The facilities were all using the WHO ART Card, which documents all the data needed for a cohort analysis.

EXCERPT FROM A WHO ART CARD

Date:

- ❒ Confirmed HIV-positive test
  Where: _____ HIV 1 2 Ab / PCR
- ❒ Enrolled in HIV care / ARV therapy
- ❒ Medically eligible Clinical stage _____
  Why eligible:
  - ❒ Clinical only
  - ❒ CD4/% _____
  - ❒ TLC _____
- ❒ Medically eligible and ready for ART
- ❒ Transferred in from _____
  ART started _____
- ❒ Start ART first-line initial regimen _____
- ❒ At start ART: Weight _____ Clinical stage _____ Substitute within first line:
- ❒ New regimen _____ Why _____
- ❒ New regimen _____ Why _____
  Switch to second line
  (or substitute within second line)
- ❒ New regimen _____ Why _____
- ❒ Died
- ❒ Transferred out To where _____

4.3.1 | Isolate the Indicator and/or Data Element

To respond to the first question of interest, the government program's M&E team developed a table that would guide facility B on the exact data elements needed to perform the required calculations (Table 15). The team concluded that the appropriate data were already being collected and began the process of transforming these data into information.

Baseline Result; Then Results at 3, 6, and 12 Months on ART	Cohort Apr 08	3 Months	6 Months	12 Months	Cohort May 08	3 Months	6 Months	12 Months	Cohort June 08	3 Months	6 Months	12 Months
D. Total number in cohort started on ART	150	150	150	150	87	87	87	87	73	73	73	73
E. Number alive and on treatment [D – (I + J + K)]		130	127	125		61	61	59		61	60	58
F. Number on first-line regimen		125	115	111		57	50	50		59	54	51
G. Number who have changed first-line regimen		5	12	13		4	11	11		3	6	7
H. Number on second-line regimen (switched)				1								
I. Died		8	9	11		14	14	15		3	3	3
J. Stopped		12	12	13		12	12	12		9	9	10
K. Lost to follow-up		0	2	1		0	0	1		0	2	3
L. Percent of cohort alive and on ART (E/D × 100)		87%	84%	83%		70%	70%	68%		83%	82%	79%
R. Number of people in cohort who picked up their antiretrovirals consistently every month		130/130 (100%)	124/127 (97%)	124/125 (99%)		60/61 (98%)	59/61 (96%)	59/59 (100%)		59/61 (97%)	57/60 (95%)	56/58 (96%)

4.4 | Step 4: Transform Data into Information

4.4.1 | Analyze the Data and Depict the Data in an Image (Graph/Chart or Table)

Table 15 shows data compiled for the April, May, and June 2008 cohorts and the primary outcome of patients who are alive and continuing on ART at 3, 6, and 12 months of follow-up. On the basis of these data, the M&E team at facility B calculated the percentage of patients who are alive and remain on treatment after 3, 6, and 12 months for the April–June 2008 quarter.

CALCULATION | To calculate the percentage after 3 months:

$$\frac{\text{number alive and on treatment at 3 months for each monthly cohort}}{\text{total number started on ART within the 3 months of the cohort}} \times 100 \rightarrow \frac{(130+61+61)}{(150+87+73)} \times 100 = 81\%$$

CALCULATION | To calculate the percentage after 6 months:

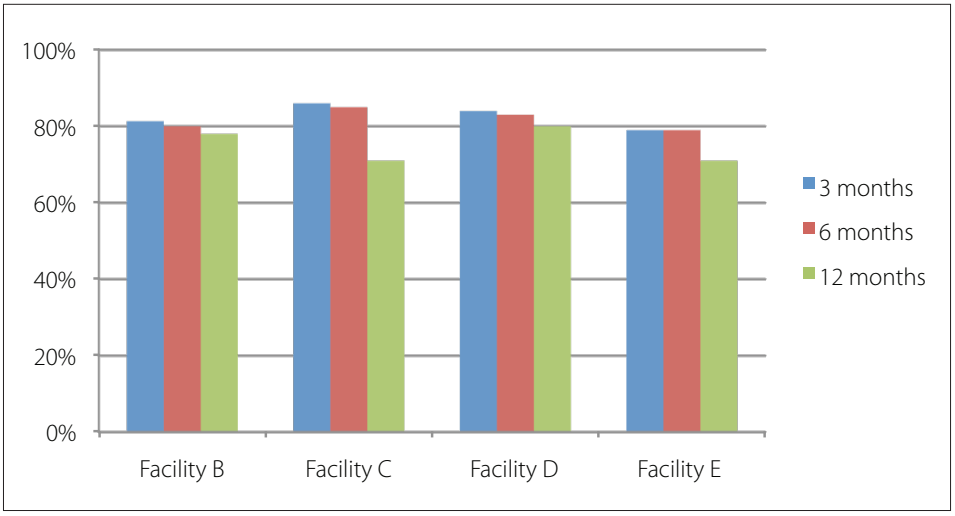
$$\frac{\text{number alive and on treatment at 6 months for each monthly cohort}}{\text{total number started on ART in the 3 months of the cohort}} \times 100 \rightarrow \frac{(127+61+60)}{(150+87+73)} \times 100 = 80\%$$

CALCULATION | To calculate the percentage after 12 months:

$$\frac{\text{number alive and on treatment at 12 months for each monthly cohort}}{\text{total number in the monthly cohort started on ART}} \times 100 \rightarrow \frac{(125+59+58)}{(150+87+73)} \times 100 = 78\%$$

If we consider these data in terms of facility B's ability to keep patients on treatment over time, it appears that at this center there is not much difference between the percent who remain alive and on treatment between 6 months and 12 months of follow-up. We can see in Figure 14 that not all facilities performed as well. Facility C lost a significant percentage of its clientele.

Figure 14—Percentage of Clients Alive and Still on ART at 3, 6, and 12 Months After Starting ART



4.5 | Step 5: Interpret Information and Draw Conclusions

Interpreting routine data and defining next steps for improving a program are best conducted by a group. In addition to the stakeholders who defined the questions of interest, each of these key stakeholders can contribute to the process of interpretation, finding solutions, and taking action:

- the managers of facilities,
- clinical and counseling staff,
- support groups for people living with HIV/AIDS (PLWHA), and
- local health officials.

Let's look back at the data analyzed above. These data suggest that, after patients have finished their first 3 months of treatment, facility B provides good care and follow-up. It is possible that the 20% who dropped out within the first 3 months of treatment were very sick when they started treatment and would not be expected to do well regardless of facility B's skill at managing patients. Even so, it would be useful to understand the reasons for losses in the first 3 months. The facility may want to conduct an in-depth assessment of the causes of mortality and gather more information about the individuals who stopped treatment during the first 3 months on ART.

It may be useful to conduct this analysis again in the future to see if there is a drop-off between 12 and 24 months. During this period, patients may get used to feeling healthier and become lax about coming in for follow-up visits or adhering to their medication. It may also be a time when patients begin to develop resistance to the first-line regimen and may require more complex, toxic, and expensive second-line or salvage regimens.

Considering the performance of facility C and facility E with a significant drop in clients alive and on ART at the end of 12 months, the stakeholders began to ask the following questions:

- Are facilities C and E providing services in a different way or following a different protocol? Why are their performances weaker?
- What was the health status of these clients when they began ART? Can we analyze the CD4 counts of cohorts from before they began ART and throughout 6-month intervals?
- What are the reasons for these losses of patients?

The group decided to conduct a cohort analysis of CD4 counts across the facilities as an immediate next step to better understand how the CD4 count changes in clients receiving ART and also to better understand the health status of clients in the cohort when they began treatment. This may also necessitate a mortality case review among those clients who died in the first 3 months on ART. The group also chose to focus on monthly reports on follow-up and losses among ART clients—not only those within this cohort—to better understand monthly trends and facilities' efforts to reduce losses within the program. This process is described next in Steps 3–5.

5 | Monitoring Losses in ART Clients

This example illustrates the analysis conducted to answer a question that arose from the Seven Steps process completed in the previous example. For background information please see Illustrative Example Four: Demonstrating Monitoring Outcomes in an ART Program Through a Cohort Analysis.

5.1 | Step 3: Identify Data Needs and Potential Sources

The team determined that appropriate data about the status of clients on ART were being collected and maintained. Their analysis of the data is shown in Table 16.

Table 16—Antiretroviral Therapy (ART) Follow-up (Cumulative) for Facility C in 2009

	January	February	March	April	May	June
Stopped	10	10	11	12	12	12
Transferred out	5	5	5	7	9	9
Died	3	3	3	17	18	18
Lost to follow-up	1	1	2	7	8	8
Unknown	31	33	32	8	3	14
Total	50	52	53	51	50	61

5.2 | Step 4: Transform Data into Information

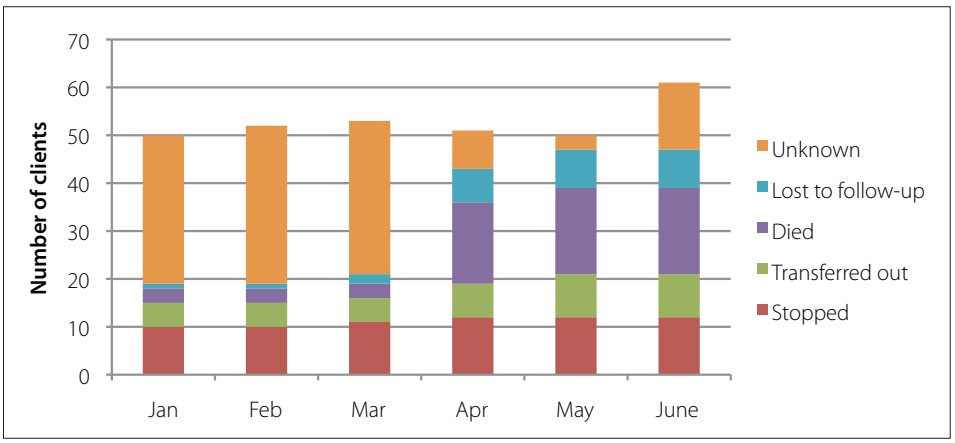
5.2.1 | Analyze the Data and Depict the Data in an Image (Graph/Chart or Table)

Client records and facility registers were assessed to identify those clients who were no longer in the care of facility C's ART program and the reasons they had not returned. Table 16 presents data compiled for one facility in a 6-month period regarding the status of clients currently in the ART program. The status of each client, known or unknown, is recorded in the client records as well as in the facility register. The program had already defined specific categories for losses:

- *Stopped:* The client has elected to end his/her ART, care, and support from the facility.
- *Transferred out:* The client has transferred his/her records and care to another ART program.
- *Died:* The facility has documented the death of the client from HIV/AIDS or other causes.
- *Unknown:* The location and status of the client is unknown (he/she has not been seen at the facility within the last 3 months).
- *Loss to follow up:* The location and status of the client is unknown (he/she has not received care at the facility for longer than 3 months).

These data can also be depicted by using a bar graph that shows the total number of clients lost to the ART program in 1 month and the reasons for the losses for each month (Figure 15).

Figure 15—Losses from Antiretroviral Therapy (ART) Program at Facility C in 2009



5.3 | Step 5: Interpret Information and Draw Conclusions

Let's look back at the data presented above. A group of stakeholders representing facility C, as well as additional technical advisors from the organization managing these ART efforts across facilities, convened to discuss the findings. It appears that, until March 2009, there were no substantial mechanisms in place for following up when clients did not come to the facility.

In April and May 2009, the number of clients with an unknown status dropped dramatically, but there was a significant rise in the number of clients who either died or were lost to follow-up. Numerous factors could have caused this sudden shift, including a new community-based effort to track and follow up with clients in their communities or improved data collection and tracking.

In this case, the facility was anticipating a visit from a donor organization in May 2009. The donor organization requested detailed information, including data about lost clients, and the facility feared that too many clients categorized as "unknown" could be seen as poor performance. In June 2009, once again the number of clients categorized as "unknown" began to rise. In this case, the facility stopped tracking and following up with clients after the donor visited. Considering the performance of facility C as described in the cohort analysis and in this analysis of client losses in the ART program, the stakeholders developed the following conclusions:

- Facility C has the capacity and training to track and follow up with clients but chooses to direct resources elsewhere.
- Facility C needs to develop a strategy for following up with clients to ensure adherence and proper documentation of reasons behind losses in the ART program.

5.4 | Step 6: Craft Solutions and Take Action

Project leadership convened a smaller group of stakeholders to craft solutions based on the analyses and conclusions described above. The group developed an action plan that included these actions:

- Develop and test a new program strategy for community-based tracking and follow-up among clients to prevent losses to follow-up and reduce cases in which the status of a client is unknown.
- Assess the adherence counseling services provided at the facility to identify potential reasons for so many losses.
- Strengthen the quality of data collection and production to ensure that facilities have up-to-date, relevant information as soon as a client has missed an appointment. When a client has already missed 3 months of appointments or services, it can be much more difficult to bring the client back to the facility to continue with ARV treatment.

6 | Support and Care

6.1 | Step 1: Identify Questions of Interest

A major HIV/AIDS treatment and care facility works closely with four different CBOs to meet psychological, social, and spiritual support needs of PLWHA in their care. Each PLWHA client has different needs depending on his or her personal economic and social situation, health status, and sources of external support.

All PLWHA are referred by the facility to one or more of the CBOs for assessment and support. Additionally, as the clinical team determines that a client is eligible for ART, this information is shared with the CBOs to ensure that the client is directed to a support group for people on ART and other relevant services. Many PLWHA suffer from malnutrition or require nutritional supplements. Some estimates state that 10.3% of HIV-positive women are malnourished. Children and men also suffer from malnutrition. Even if an HIV-positive individual is not considered to be malnourished, the WHO has concluded that PLWHA require additional energy for their bodies to suppress infection.

While not every PLWHA requires nutritional supplements in the form of vitamins or food supplies, all PLWHA can benefit from some supplementation of their diet whether or not their family can support this need. Many support groups and CBOs that provide care may also provide food for their members.

During a routine facility staff meeting, adherence counselors and physicians at the facility noted staff interest in knowing about the care and support received by their clients outside the facility. Specifically, they identified the following key question of interest for understanding the reach of the CBOs and groups associated with the facility:

- What percentage of PLWHA currently enrolled in our care and treatment program (patients currently on ART or ART-eligible) receive some form of nutritional support?

6.2 | Step 2: Prioritize Key Questions of Interest

In this case, the team identified one key question of interest in the course of a management meeting. The question is specific and does not require further refinement.

6.3 | Step 3: Identify Data Needs and Potential Sources

The next step for the team was to determine whether the data were already being collected. Many organizations working in the communities ask their volunteers and staff to keep records of each contact with a client and the services provided during that contact. Tables 17 and 18 show part of a form used to capture these data. The facility already has information about the total number of clients currently on ART and the number of clients who are enrolled and eligible for ART but have not been started on ART (i.e., clients who are on the "waiting list"). These data are aggregated monthly for reporting purposes (Table 18).

Table 17—Form 756: Home-Based Care (HBC)

HBC		Actual Totals		
		M	F	Total
74	3a. How many NEW people in antiretroviral therapy (ART) program were provided with nutritional support (supplements or foodstuffs) by your organization?			
74	3b. IN TOTAL how many people in the ART program were provided with nutritional supplements by your organization?			

Table 18—Form 756: Monthly Results of Nongovernmental Organization Assistance to People Living with HIV/AIDS

Home-Based Care (HBC)		M	F	Total
75	3b. IN TOTAL how many people on antiretroviral therapy were provided with nutritional support (supplements or foodstuffs) by your organization?			1,416
	Organization #1			812
	Organization #2			105
	Organization #3			97
	Organization #4			402

6.3.1 | Isolate the Indicator and/or Data Element

To respond to the question of interest, the team decided to use the data collected for the following data elements:

- number of PLWHA provided with nutritional support,
- number of patients currently on ART, and
- number of ART-eligible patients who have not yet started on ART.

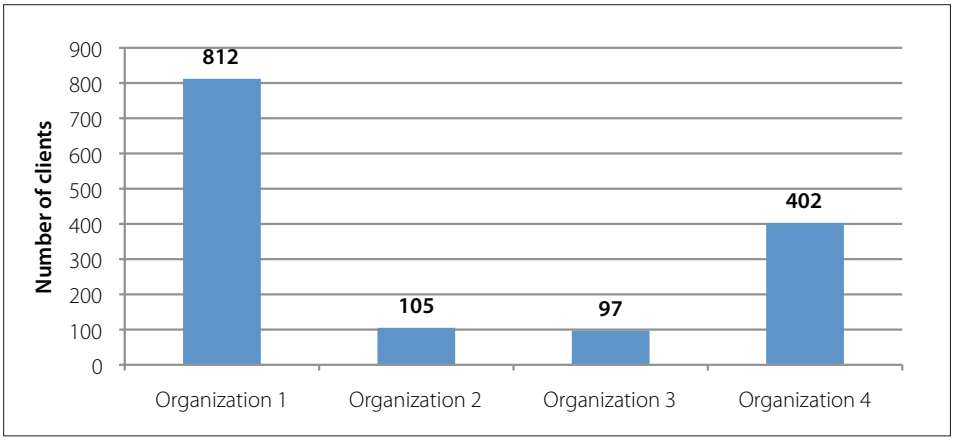
It is important to note that, at times, the data required are not included in monthly reports to government and donors but are collected and stored by programs and facilities. For instance, some donors do not require data only on the number of clients receiving nutritional supplements. Rather, they may require data on the total number of clients receiving care and support. Some donors may not require information on the number of clients who are eligible for ART but have not yet started. The team concluded that the appropriate data are already being collected and began the process of transforming these data into information that could answer the question posed by facility staff.

6.4 | Step 4: Transform Data into Information

6.4.1 | Analyze the Data and Depict the Data in an Image (Graph/Chart or Table)

First, the team required an aggregated report of PLWHA provided with nutritional supplements across all reporting organizations associated with the facility. They added these numbers, as depicted in Form 756 (Table 18). The team then presented these data in a bar graph (Figure 16).

Figure 16—Number of PLWHA in ART Program Provided with Nutritional Support this Month



Next, the team analyzed data in their monthly ART report to determine the number of patients at the facility who are currently on ARV treatment plus the number of people who are enrolled and eligible for ART but have not been started on ART (uptake plan). This requires summing the data reported in lines E.3 and F in Table 19.

Table 19—Monthly Antiretroviral Therapy (ART) Report

Measure			Children 0–14 Years		Adults > 14 Years		Total		Grand Total
			M	F	M	F	M	F	
E	Total no. of patients currently on ART	1. Pregnant women							
		2. All others							
		3. Subtotal							1,682
F	No. of people who are enrolled and eligible for ART but have not been started on ART								2,367

CALCULATION | To calculate the percentage of PLWHA eligible for ART who are receiving nutritional support:

$$\frac{\text{total number provided with support}}{\text{total number requiring ART}} \times 100 \rightarrow \frac{1{,}416}{(1{,}682 + 2{,}367)} = 0.349 \times 100 = 35\%$$

6.5 | Step 5: Interpret Information and Draw Conclusions

Interpreting routine data and defining next steps for improving a program are best conducted by a group. In addition to the adherence counselors and physicians who defined the question of interest, there are other key stakeholders who contribute to the process of interpretation:

- CBO leaders and staff,
- PLWHA support group leaders, and
- PLWHA clients of the facility and the CBOs.

It is important to take into account the nature of the program in interpreting data and using them for program planning and improvement. In some cases, treatment facilities may offer or provide nutritional supplements to people on ART. In this particular situation, nutritional supplements and food are provided in the community instead of at the health facility. Let's look back at the data analyzed. Only 35% of PLWHA on ART or who are eligible for ART are receiving nutritional support. The team may then ask:

- What percentage of PLWHA currently on ART is receiving nutritional support?

CALCULATION | To calculate the percentage of PLWHA currently on ART who are receiving nutritional support:

$$\frac{\text{total number provided with support}}{\text{total number currently on ART}} \times 100 \rightarrow \frac{1{,}416}{1{,}682} = 0.84 \times 100 = 84\%$$

6.6 | Step 6: Craft Solutions and Take Action

The next steps for this team depend on the interpretation of the data. In the case of a program that appears to be meeting the nutritional support needs of PLWHA, these findings can be used to estimate future resource needs and targets. Programs that fall short of serving a standard or acceptable percentage of PLWHA will need to investigate further why there are gaps in coverage. Nutritional supplements are generally recommended for clients who are mildly or moderately malnourished. Additional data may be required to better understand what percentage of these clients receiving nutritional support was assessed for malnutrition, and what percentage is receiving supplements versus foodstuffs. The team may also wish to investigate further to understand how frequently and consistently the nutritional support is provided.

While the team may have initially been concerned to note that only 35% of PLWHA who are eligible for ART or receiving ART are actually receiving nutritional support, the fact that 84% of PLWHA currently on ART receive nutritional support demonstrates that the CBOs are reaching a majority of clients receiving ART with their community-based services.

6.7 | Other Important Considerations

The review of available data can often lead to more questions. The process of analyzing and interpreting these data revealed to the team that only 41% of those eligible for ART were actually receiving it. There was an extensive waiting list. It is unclear, on the basis of these data, why there was such an extensive waiting list. The facility staff may wish to analyze additional data to learn more about why so many people had not yet begun ART. Were drugs available? Were those eligible for ART receiving adequate counseling and support to take the next step in accepting therapy? The team may also wish to consider how they can better meet the nutritional needs of clients eligible for ART. They may ask:

- How can we increase coverage of nutritional support services to clients who are eligible for ART but are not receiving it?

6.8 | Incorporating Gender into the Seven Steps

The facility staff members and physicians wanted to ensure that their program was promoting gender equality and providing equal access to services, so they decided to look into nutritional support differences between men and women.

6.8.1 | Step 1: Identify Questions of Interest

The team identified several ways in which they could investigate equality in their programs:

- What percentage of PLWHA receiving nutritional support are male vs. female?
- What percentage of ART-eligible individuals on the waiting list to start ART are men vs. women?
- Does the proportion of men and women eligible for ART match the prevalence of HIV in men and women in the area?

6.8.2 | Step 2: Prioritize Key Questions of Interest

The team decided to focus on one question initially and return to the other questions if time and funding allowed:

- What percentage of PLWHA receiving nutritional support are male vs. female?

6.8.3 | Step 3: Identify Data Needs and Potential Sources

The team determined that the data were already being collected and were available.

Table 20—Form 756: Monthly Results of Nongovernmental Organization Assistance to People Living with HIV/AIDS

Home-Based Care		M	F	Total
75	3b. IN TOTAL how many people on antiretroviral therapy were provided with nutritional support (supplements or foodstuffs) by your organization?	624	792	1,416
	Organization #1			812
	Organization #2			105
	Organization #3			97
	Organization #4			402

6.8.4 | Step 4: Transform Data into Information

Analyze the Data and Depict the Data in an Image (Graph/Chart or Table)

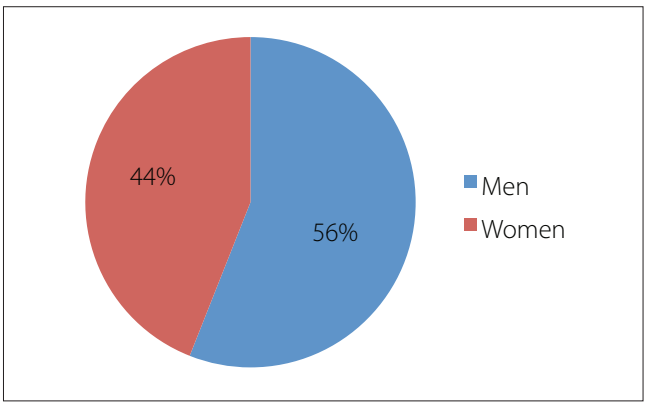
First the team obtained the disaggregated number of men and women who were receiving ART, found in Table 20, and used these data to calculate the percentage of men and women receiving nutritional support.

CALCULATION | To calculate the percentage of men and women who are receiving nutritional support:

$$\frac{\text{Number of women receiving nutritional support}}{\text{Total number of people receiving nutritional support}} \times 100 \rightarrow \frac{624}{1{,}416} = 0.44 \times 100 = 44\%$$

$$\frac{\text{Number of men receiving nutritional support}}{\text{Total number of people receiving nutritional support}} \times 100 \rightarrow \frac{792}{1{,}416} = 0.56 \times 100 = 56\%$$

Figure 17—Percent Receiving Nutritional Support



6.8.5 | Step 5: Interpret Information and Draw Conclusions

As discussed earlier, interpreting data and defining next steps are best completed by a group. All stakeholders were once again invited to participate, and efforts were made to ensure that women were equally represented. Questions raised during the discussion included the following:

- Do the percentages of men and women receiving nutritional support match the percentages of men and women on ART and the prevalence of HIV among men and women in the community?
- If not, then what could be causing the difference between genders in obtaining nutritional support?
- Are women more likely to be malnourished and, if so, is this trend represented in the percentage of clients eligible for nutritional support?

6.8.6 | Step 6: Craft Solutions and Take Action

The solutions and action plan the team comes up with will depend on the answer to some of the questions brought up in the discussion above. If the percentages of men and women accessing nutritional support is equal to HIV rates in the community, then it would appear that their program is serving men and women equally. If the percentages do not match, then action steps would include further investigation into why there are gender differences and ways to counteract those differences. Are women having trouble getting to the clinics or meeting with counselors? Is there greater stigma associated with ART and nutritional support in the community for one gender or the other? Does the number of women accessing services or support vary between locations or organizations?

7 | Orphans and Vulnerable Children

7.1 | Step 1: Identify Questions of Interest

Several volunteers for a CBO providing a variety of psychological, social, and economic services to orphans and vulnerable children (OVC) noted to the program manager that they seemed to be providing services to more girls than boys. They were not sure if this was actually the case, but expressed the concern that boys may not be adequately reached through their services. The program manager mentioned this in a meeting with his counterpart at a donor organization, and the donor requested that all CBOs providing OVC services begin to monitor the gender balance of services provided through volunteers. At the next CBO coordinating meeting, CBOs would be asked to present their findings. In this case, the key question of interest is

- What is the gender balance of OVC receiving services?

7.2 | Step 2: Prioritize Key Questions of Interest

CBOs were asked to add this one question of interest to their usual presentation, and thus a prioritization exercise is not required.

7.2.1 | Refining the Question of Interest

To ensure that each CBO would report comparable data, the program manager refined the question of interest to be more specific and measurable:

- What is the ratio of male OVC to female OVC who are being provided with each type of service?

7.3 | Step 3: Identify Data Needs and Potential Sources

The next step for the CBOs was to determine whether the data were already being collected. Many OVC programs ask volunteers to collect data about the services they provide and then share those data regularly with the organization.

7.3.1 | Isolate the Indicator and/or Data Element

To respond to the question of interest, the team used these data elements: male and female OVC served for each type of service.

Table 21—Orphans and Vulnerable Children (OVC) Reporting Form

How many *total* OVC were served by your organization?	M	F	Total
Shelter and caregiving			
Health care referral			
Education and/or vocational training			
Protection and legal aid service			
Psychosocial or spiritual support (including nutrition)			
Economic strengthening services			
Other			

Table 22—Monthly Orphans and Vulnerable Children (OVC) Report

How many OVC were served with shelter and caregiving services by your organization?				
	M	F	Total	Ratio M:F
Organization 1	98	82	180	1.2
Organization 2	18	20	38	0.9
Organization 3	65	94	159	0.7
Organization 4	8	13	21	0.6
Organization 5	55	98	153	0.6

The team concluded that the appropriate data were already being collected and began the process of transforming these data into information that could be added to their proposal to demonstrate achievements and gaps at the clinics. Table 21 shows an OVC reporting form used by 5 organizations, and Table 22 shows a monthly report of the five organization's findings.

7.4 | Step 4: Transform Data into Information

7.4.1 | Analyze the Data and Depict the Data in an Image (Graph/Chart or Table)

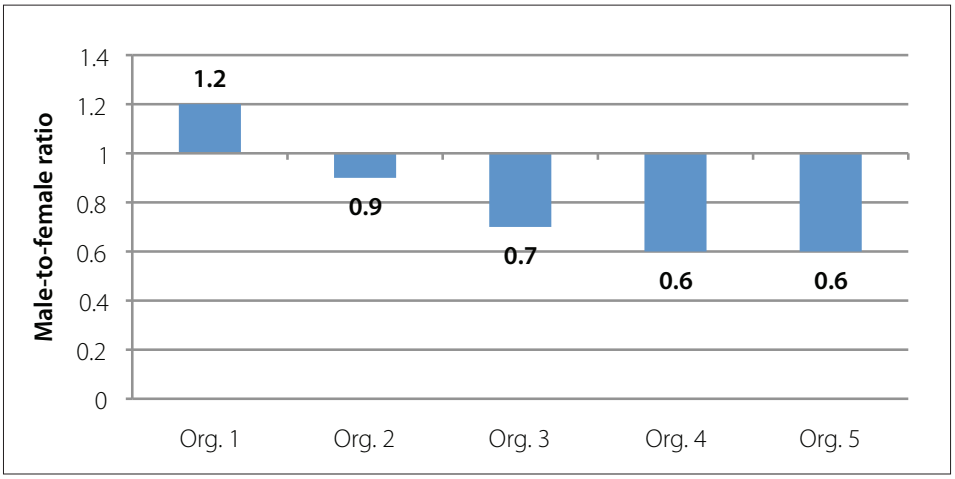
If we expect equal numbers of boys and girls to be orphaned or made vulnerable by HIV infections among their parents, then a value of 1 would mean that boys and girls are being equally served, assuming the ratio is calculated as males divided by females. A value of more than one means that more males are being served. A value of less than one means that more females are being served.

CALCULATION | To compute the ratio of males to females for each type of service:

$$\frac{\text{number of males served for each service}}{\text{number of females served for each service}} = \text{ratio}$$

Plot the ratios across types of services and organizations. Figure 18 shows these ratios for the five organizations.

Figure 18—Ratio of Male to Female Children Provided with Shelter and Caregiving Services



7.5 | Step 5: Interpret Information and Draw Conclusions

Interpreting routine data and defining next steps for improving a program are best conducted by a group. In addition to the stakeholders based at the CBOs, each of these key stakeholders can contribute to the process of interpreting data, finding solutions, and taking action:

- gender specialists in the country,
- program volunteers, and
- district level officials.

At the next OVC coordinating meeting, CBOs presented the data above along with similar data for other services provided to OVC, and the question "What could explain the observed gender differences?" was discussed along with these additional questions:

- What is the gender balance of identified OVC in this district?
- Are volunteers primarily contacting OVC at home? Are males engaged somewhere outside the home and unable to access assistance provided by these programs?
- Do female OVC have a greater need?
- Are the needs of OVC boys and girls different enough among the target group to warrant a ratio that does not approximate 1.0 (e.g., sex ratios among street children may not be equal)?

Organizations and districts can conduct further investigations to determine whether there is an unmet need among male OVC and (if there is a need) identify ways to reach more males. In the meantime, the group of stakeholders concluded that there was an immediate need to take action to reach more males.

7.6 | Step 6: Craft Solutions and Take Action

The working group called an emergency meeting of stakeholders to craft solutions to the inequities seen in the OVC program. The group discussed the meaning of the data and reasons for the trend. They also discussed possible solutions. Changes that they included in the plan to reach more males include changing the recruitment protocol for identifying and enrolling OVC or offering different services that might be of greater importance or of a higher priority to male OVC. CBOs can ask volunteers and program managers to use this information in program recruitment and planning.

Glossary

ACCURACY
A quantitative description of how close a result is to a known quantity.

AGGREGATE
A collection of data assembled for a specific type of analysis.

AIDS INDICATOR SURVEY
Provides specific information about a defined cohort such as epidemic descriptions and demographic prevalence rates.

ANALYSIS
The comparison of program target values to actual values that allows for a conceptual understanding of program performance.

ANTENATAL CARE
Prenatal care.

ANTIRETROVIRAL THERAPY (ART)
Strategies for medicinal treatment of infections by retrovirus, such as HIV.

CATCHMENT AREA
Refers to the geographic area and population served by a facility.

CLUSTER OF DIFFERENTIATION ANTIGEN 4 (CD4)
A primary receptor used by HIV-1 to gain entry into host T cells.

COHORT
A group of subjects with a common, defining characteristic that allows for statistical analysis.

COMPLETENESS
Describes the comprehensiveness of the data set.

COVERAGE
Describes what percentage of a catchment area is served by a program.

DASHBOARD
A tool used by researchers and program officers to manage and monitor program results.

DATA
Refers to raw, unprocessed numbers, measurements, or text.

DATA DEMAND AND USE
A systematic approach that applies best practices and appropriate tools with the goal of increasing demand for quality health-related data and ensuring that the resulting information is used in an evidence-based decision-making process.

DATA-INFORMED ANSWER
Responses that utilize collected information to address specific program elements. Such answers can extend the reach of the program or service, improve the quality of service, and enhance program retention.

DATA PRODUCER
Individuals or organizations who conduct research; collect primary data in the course of providing a specific service or delivering a program intervention; or compile, analyze, interpret, or communicate data and information. A data user and a data producer may be the same individual.

DATA USER
Individuals or organizations that make decisions, develop policies and plans, formulate advocacy messages, provide services, or manage programs. A data user and a data producer may be the same individual.

DENOMINATOR
The part of a fraction that is below the line (the divisor of the numerator).

DIAGNOSIS
The conclusion from an investigation or analysis of the cause or nature of a particular situation.

DIALOGUE AMONG DATA USERS AND PRODUCERS
An important element of ensuring that information is useful and that the appropriate information is being collected to address a specific need or decision.

DISAGGREGATE
To separate or divide data into their component parts.

FLOW CHART
A visual aid that describes the path of a process.

HEALTH-SEEKING BEHAVIOR
The adoption of conscious, healthy lifestyle habits.

HEALTH SYSTEM
An organized arrangement dedicated to facets of health-related services.

HIV INDICATORS
A group of statistical values that collectively describe aspects of HIV within a defined environment.

INDICATOR
A group of statistical values that collectively describe a defined system.

INFORMATION
Refers to processed data, or combined data presented in a specific context.

INFORMATION SYSTEM
An organizational scheme that is developed to house and analyze inputted data.

INTEGRITY
The extent to which data are free from deliberate bias or manipulation.

INTERPRETATION
The process by which results of an analysis are understood within the context of a program.

MEAN
The sum of observations divided by the number of observations.

MEDIAN
The middle value of a set of data when data points are arranged from least value to greatest value or vice versa.

MONITORING
Continued analysis and interpretation of key indicators.

MONITORING AND EVALUATION (M&E)
The process by which data are collected, analyzed, and communicated to provide information to policymakers and other stakeholders for use in making decisions, diagnosing problems or concerns, and answering programmatic questions.

NEVIRAPINE
Antiretroviral drug used to treat HIV-1 infection and AIDS and given to mother and child to reduce the rate of mother-to-child transmission of HIV.

NONROUTINE INFORMATION SOURCE
Provides data that are collected on a periodic basis. Examples include representative population-based surveys such as Demographic Health Surveys, censuses, AIDS indicator surveys, and behavior surveillance surveys.

NUMERATOR
The part of a fraction that is above the line and signifies the number to be divided by the denominator.

OPPORTUNISTIC INFECTION
Infection by disease-causing microorganisms which, in a healthy immune system, would not cause disease but which take advantage of the decreased immunity of an HIV-infected individual.

PERCENTAGE
Expresses a fraction of a total. A ratio multiplied by 100 results in a percentage.

PRECISION
Describes how closely data points within a data set are related.

PREVENTION OF MOTHER-TO-CHILD TRANSMISSION (PMTCT) OF HIV
Programs intended to prevent infection of HIV from an HIV-positive mother to her child during pregnancy, labor, delivery, or breastfeeding.

PROPHYLAXIS
A public health procedure that is intended to prevent a disease.

PROPORTION
A ratio in which the individuals included in the numerator must also be included in the denominator.

PROXY INDICATOR
Indirect measures of a program target.

QUALITATIVE DATA
Data described in terms of quality.

QUALITY OF CARE
The extent to which health services provided meet optimal standards.

QUANTITATIVE DATA
Data that are numerically described.

RATE
A ratio in which two measurements are related to each other.

RATIO
An expression that compares quantities relative to each other.

RELIABILITY
The consistency of data collection and measurement.

ROUTINE INFORMATION SOURCE
Provides data that are collected on a continuous basis, such as patient registers.

SERVICE PROVIDER
Program stakeholder who offers the service about which data are being collected and analyzed.

STAKEHOLDER
Any person, group of people, or organization with a particular interest in a policy or program.

STRATEGIC INFORMATION
Information that supports the decision-making processes that guide program design, management, and service provision.

TARGET
A program goal or indicator goal.

TIMELINESS
The appropriateness of the time of data collection, availability, and usage.

TREND
A representation of observations or analyses that occur over a defined period of time.

TRIANGULATION
The utilization of more than two methods to cross-examine results.

VITAL STATISTICS
A record of births and deaths among a population.

WHO ART CARD
World Health Organization list that provides all the data needed for a cohort analysis of antiretroviral therapy (ART).

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Appendix I

Job Aids

1 | Calculating a Rate

A rate is the number of cases that occur over a given time period in a population at risk in the same time period. A rate is often expressed per 1,000, 10,000, or 100,000 population. In the first example below, we want to know the infant mortality rate of New Zealand, Nigeria, and Russia in 2007. Table 23 shows infant mortality rates for the three countries.

Table 23—Infant Mortality Rate per 1,000 Live Births in 2007

Country	Infant Mortality Rate
New Zealand	5.7
Nigeria	95.5
Russia	11.1

The infant mortality rate of three countries with very different populations becomes easy to compare after a rate is calculated for each. Table 24 shows the incidence rate of tuberculosis (TB) cases from 1997 to 1998 in the Federal Capital Territory (FCT) of Nigeria, by local government area. The incidence rate is the number of new cases arising in a given period of time in a specified group of people (population).

Table 24—Tuberculosis (TB) Cases in Federal Capital Territory, 1997–1998

Local Government Area	Population (1997–1998)	TB Cases
Bwari	141,000	446
Abaji	25,000	79
Kuje	65,000	206
Gwagwalada	91,000	288
Kwali	85,000	269
Municipal	350,000	1,108
Garam	224,000	709
Total	981,000	3,106

CALCULATION | **The total incidence rate of TB was 317 cases per 100,000 people or:**

$$\frac{3{,}106}{981{,}000} = 0.003166 \times 100{,}000 = 317$$

2 | Calculating a Proportion and Percentage

A proportion is a ratio in which all individuals included in the numerator must also be included in the denominator. In the example below, we would like to know how many clients aged 15–24 years are counseled out of the total number of all ages counseled at each clinic. We will answer this question by calculating proportion and percentage for each clinic.

CALCULATION | In Table 3, the proportion of total HCT clients aged 15–24 years at clinic A is:

$$\frac{\text{number of clients 15–24 years old counseled}}{\text{total number of HCT clients counseled}} \rightarrow \frac{104}{306} = 0.34 \text{ which is the proportion of clients aged 15–24}$$

A percentage is a way to express a proportion. The proportion is simply multiplied by 100. By calculating a percentage, we can compare data across facilities, regions, and countries. It also helps us better conceptualize what needs to be done. Percentages help us to

- track progress toward our targets,
- estimate coverage,
- measure outcomes, and
- understand our performance as measured against quality of care indicators.

Table 25—HIV Counseling and Testing (HCT) Monthly Report

No. of Clients	< 15 Years		15–24 Years		25 or Older		Total
	M	F	M	F	M	F	
HCT: Clinic A							
Counseled	2	8	53	51	96	96	306
Tested	2	8	50	50	95	95	300
HIV positive	0	0	1	8	11	13	33
HCT: Clinic B							
Counseled	2	8	69	62	310	314	765
Tested	2	8	50	50	295	295	700
HIV positive	0	0	1	1	36	38	76

To better illustrate how to calculate a percentage, consider an example where we want to know what percentage of total HCT clients are aged 15–24. We need to identify the number of clients aged 15–24 counseled at the clinic (numerator) and the total number of HCT clients of all ages (denominator) coming to the clinic; then, we divide the numerator by the denominator and multiply by 100.

Using Table 25, we know that in clinic A, 104 clients counseled are 15–24 years old and there are 306 total HCT clients counseled. In clinic B, there are 131 clients 15–24 years old counseled and 765 total HCT clients. The percentages of total HCT clients who are aged 15–24 are:

CALCULATION | Clinic A:

$$\frac{104}{306} = 0.34 \times 100 = 34\%$$

Clinic B:

$$\rightarrow \frac{131}{765} = 0.17 \times 100 = 17\%$$

3 | Calculating a Mean (or Average)

When looking at a data set, it is useful to be able to make generalizations about the data as a whole. This is often done by calculating the center, or point around which all data points cluster. The two most common calculations used are the mean and median. The mean (or average) is described in greater detail below and the median is discussed on the next page. The average is calculated by adding all of the observations/measurements in a data set and dividing by the total number of observations/measurements. Using the Table 26, we want to know the average number of patients seen each month in clinic A.

Table 26—Clinic A: Patients Seen Each Month

Month	Number of Patients
January	90
February	110
March	100
April	95
May	92
June	106
July	104
August	100
September	101
October	92

To calculate the average number of patients seen, we would have to add the 10 patient counts from each month and then divide the sum by the number of months (10).

CALCULATION | **The average number of clients seen would be:**

$$\frac{(90 + 110 + 100 + 95 + 92 + 106 + 104 + 100 + 101 + 92)}{10} = 99$$

The average takes into consideration the magnitude of every observation in a data set, which makes it sensitive to extreme values. For example, if the data from Table 26 were accidentally modified and the patient counts of two clinics were 9.0 and 11.0 rather than 90 and 110 (Table 27):

Table 27—Clinic A: Patients Seen Each Month

Month	Number of Patients
January	9.0
February	11.0
March	100
April	95
May	92
June	106
July	104
August	100
September	101
October	92

CALCULATION | **The average number of clients seen would be:**

$$\frac{(9.0 + 11.0 + 100 + 95 + 92 + 106 + 104 + 100 + 101 + 92)}{10} = 81$$

As you can see, two values that don't fit with the rest of the data set make a difference in the generalization we would make about these clinics when calculating the mean (average).

4 | Calculating a Median

The median is not as sensitive to extreme values as the mean because it takes into consideration the ordering and relative amount/weight of the values. We therefore use the median when data sets contain extreme values. (Note that in Table 28, most figures cluster between 92 and 106. The numbers 9, 11, and 14 are extreme values and are not part of the cluster.)

If a list of values is ranked from smallest to largest, then half the values are greater than or equal to the median (or middle value) and the other half are less than or equal to it. When there is an even number of values in the data set, the median is the average of the two midpoint values.

Table 28—Cluster of Differentiation Antigen 4 (CD4) Count by Client

Client	CD4 Count
Client 001	9
Client 002	11
Client 003	100
Client 004	***95***
Client 005	92
Client 006	106
Client 007	104
Client 008	100
Client 009	101
Client 010	92
Client 011	14

Going back to the example from the previous page, if we rank the values in Table 27 from smallest to largest, we have 9.0, 11.0, 92, 92, 95, 100, 100, 101, 104, 106.

CALCULATION | Since there is an even number of observations, the median is calculated as:

$$\frac{(95 + 100)}{2} = 97.5$$

When there is an odd number of values, the median is the middle value. Table 28 shows the median CD4 count by client. With 11 clients, when the values are ordered from smallest to largest, 95 is the middle value. In this case there is no need for a calculation.

5 | Calculating Coverage

Coverage is the extent to which a program reaches its intended target population, institution, or geographic area. Coverage assesses the availability and/or utilization of services. Examples of coverage indicators for HIV/AIDS care and treatment programs include

- number of clients receiving voluntary counseling and testing (VCT) services,
- number of clients provided with ART,
- percent of children in need receiving antibiotic prophylaxis, and
- percent of HIV patients receiving therapy for TB.

The following examples demonstrate how to calculate coverage.

5.1 | Example 1

To assess the availability of VCT services in two different catchment areas, we want to know the number of VCT clinics per target population in each area. In catchment area A, there are nine VCT clinics per 10,000 people. In catchment area B, there are two clinics per 10,000 people. This information tells us that coverage may be higher in catchment area A. We may want to know more about density and location.

Table 29—Antiretroviral Therapy (ART) Monthly Report

	Number on ART
Males	7,980
Females	15,881
Cumulative number	23,861
Year 5 target	32,000
% Coverage	***75%***

5.2 | Example 2

In some cases, coverage is defined as the percentage of the target population receiving or utilizing a service.

CALCULATION | If there are 32,000 HIV-positive people in one catchment area, the coverage is the percentage of HIV-positive people who are receiving ARV services:

$$\frac{\text{23,861 HIV-positive people receiving ART}}{\text{32,000 HIV-positive people (target population) coverage}} = 0.75 \times 100 = 75\%$$

6 | Assessing Program Retention

Program retention is the extent to which a program is operating to achieve the most optimal outcome—retention of clients through the program or service. It is important to assess program retention especially in clinical projects where drug adherence is an issue (e.g., TB or HIV/AIDS). To assess program retention, we typically look at trends (how has the coverage changed over time?) and targets (how does the coverage of services compare to what we expected to achieve?). Using Table 30, we want to assess retention by calculating the change in the percentage of clients who stayed in the ART program over a 6-month period of time (trend) and the percent achieved toward the expected target.

Table 30—Antiretroviral (ART) Reports by Region

	Region 1	Region 2
Clients on ART at baseline	488	859
Clients on ART at 6 months (current)	343	784
Percent of ART retention	70%	91%
5-year target	679	918
Percent of 5-year target achieved	51%	85%

CALCULATION | To calculate the percentage of clients who stayed in the ART program over time (trend) for the selected cohorts:

$$\frac{\text{the change}}{\text{the original number}} \times 100$$

Region 1:

$$\frac{(488 - 343)}{488} = 0.30 \times 100 = 30\% \text{ decrease in clients}$$

ART retention for this cohort is 70%

Region 2:

$$\frac{(859 - 784)}{859} = 0.09 \times 100 = 9\% \text{ decrease in clients}$$

ART retention for this cohort is 91%

To calculate the percent achieved toward the expected target, divide the number of current clients on ART by the 5-year target and multiply by 100.

CALCULATION | Region 1:

$$\frac{343}{679} = 0.51 \times 100 = 51\%$$

Region 2:

$$\frac{784}{918} = 0.85 \times 100 = 85\%$$

7 | Summarizing Data

Two ways of summarizing data are by using tables or by using charts and graphs. A table is the simplest way of summarizing a set of observations. A table has rows and columns containing data (Table 31), which can be in the form of numbers or percentages or both. Graphs are pictorial representations of numerical data and should be designed so that they easily show the general patterns of the data by portraying trends, relationships, and comparisons.

Table 31—Number of Births by Year

Year	Number of Births
1900	5
1901	7
1902	9

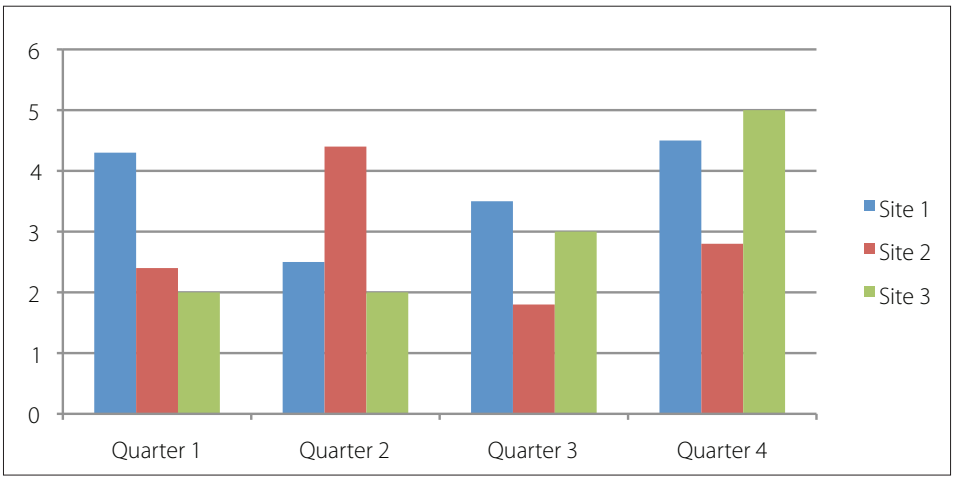
To make the graphic as self-explanatory as possible, there are several things to include:

- Every table or graph should have a title or heading.
- The x-axis (line across the bottom) and y-axis (line along the left side) of a graph should be labeled—include value labels, such as a percent sign, and a legend.
- Cite the source of your data and include the date when the data were collected or published.
- Provide the sample size or the number of people to which the graph is referring.
- Include footnotes if the graphic isn't self-explanatory.

7.1 | Chart and Graphs

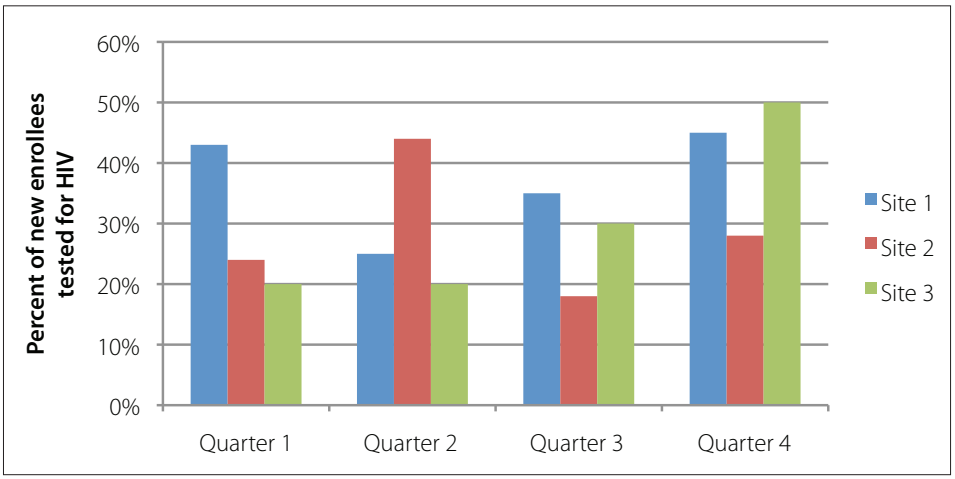
We're going to review the most commonly used charts and graphs in Microsoft Excel and Power Point. **Bar charts** are used to compare data across categories. In this bar chart, we're comparing the categories of data from different sites. What should be added to the chart in Figure 19 to provide the reader with more information?

Figure 19



In Figure 20, we see how the graph has been improved and is now self-explanatory. To improve the graph, we added a title and defined the values by adding a y-axis label and data labels. By adding a title you know the population to which the graph is referring and by labeling the y-axis you know that the values are percentages rather than absolute numbers.

Figure 20—Percentage of New Enrollees Tested for HIV at Each Site by Quarter



To interpret Figure 20, we should look at several things such as the target, the utilization coverage across sites, the trend over time, and the mean number of enrollees. The target (represented by a line) is to test 50% of new enrollees at each site in each quarter. Only sites 1 and 3 reached the target, which occurred in quarter 4.

What is the utilization coverage (percentage of the target population utilizing services)? In quarter 1 it is 30% at site 1 and 20% at the other two sites. What is the trend over time? The utilization coverage for site 1 increased from 30% in quarter 1 to 50% in quarter 4.

A **stacked bar chart** is often used to compare multiple values when the values on the chart represent durations, such as the number of months clients have been enrolled in HIV care (Figure 21). What should be added to this chart (Figure 21) to provide the reader with more information?

Figure 21

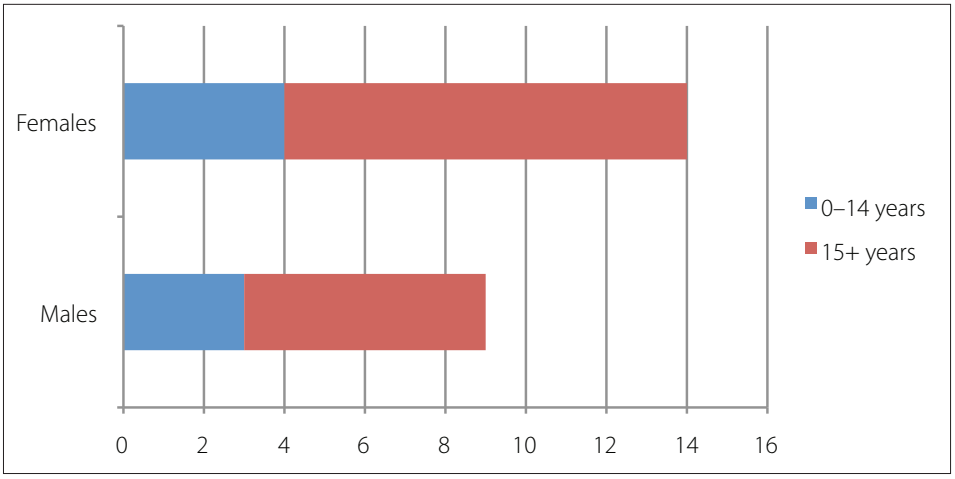
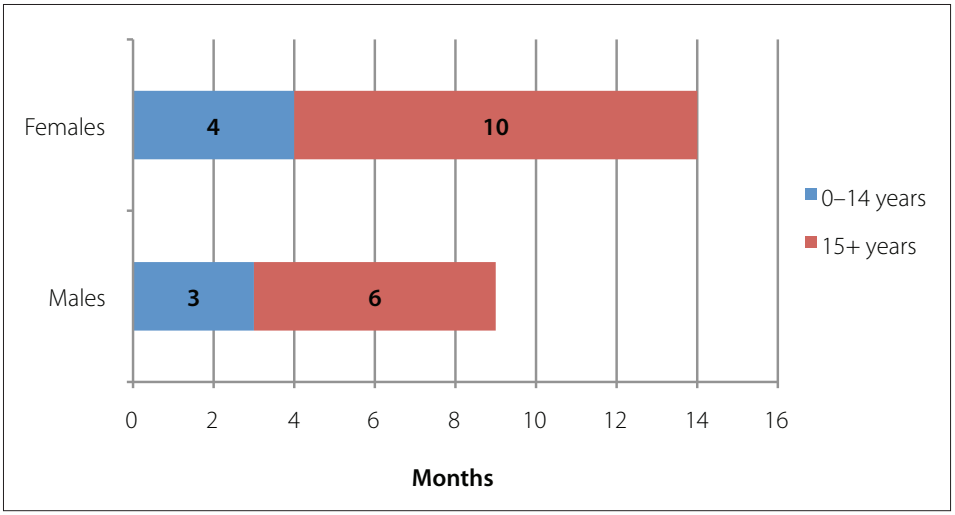


Figure 22 shows that adding a title and data labels makes it easier to understand. You could also add the source of the data, but it isn't necessary if all of your tables and graphs are derived from the same source/data set.

Figure 22—Number of Months Clients Have Been Enrolled in HIV Care by Age Group



Line graphs should be used to display trends over time and are particularly useful when there are many data points. In this case, we have four data points for each clinic (Figure 23). What should be added to this chart to provide the reader with more information?

Figure 23

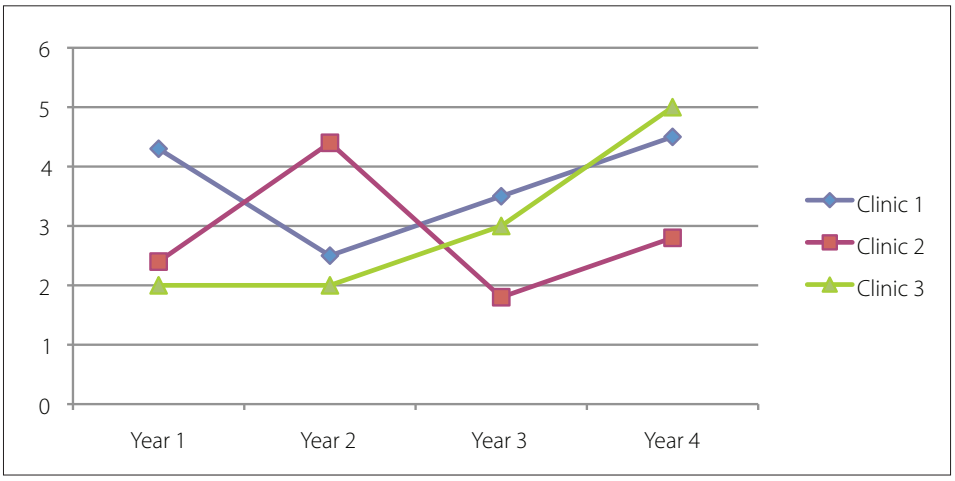
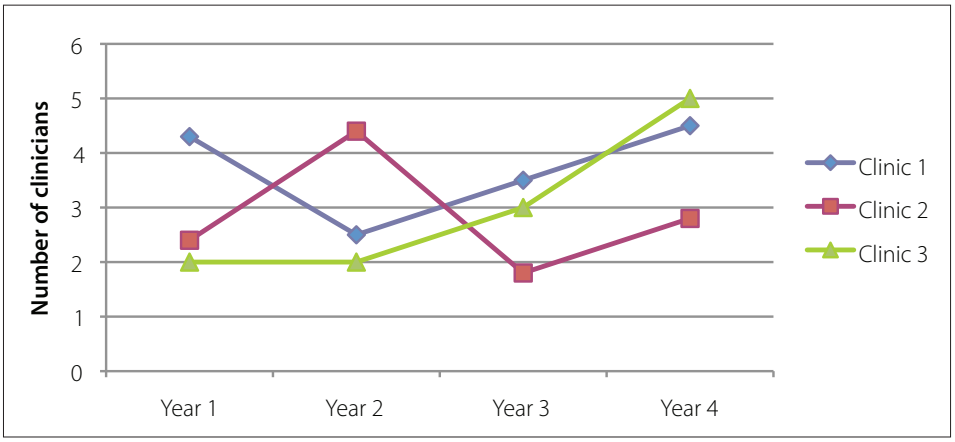


Figure 24 shows the same chart with additional information. A label for the y-axis and a title have been added. In some settings, clinicians may mean only doctors but,; in this case, we are referring to both doctors and nurses, so we added a footnote to make this point clearer.

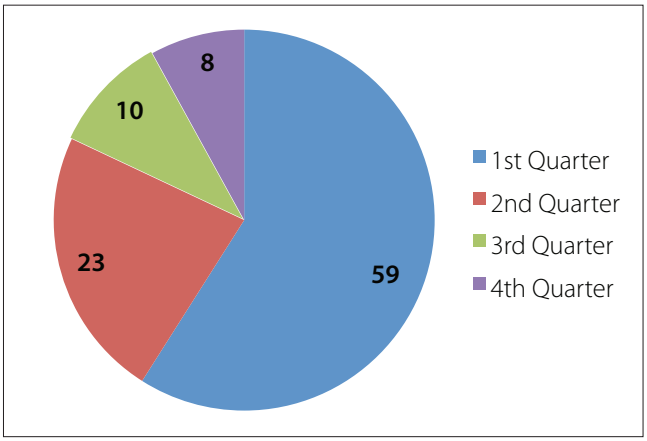
Figure 24—Number of Clinicians* Working in Each Clinic During Years 1–4



***includes doctors and nurses**

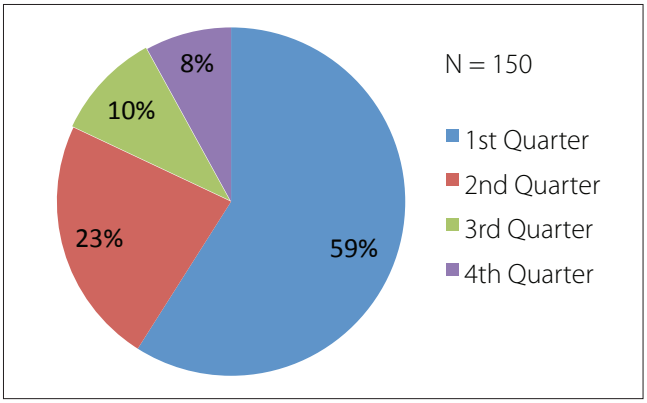
Pie charts show percentages or the contribution of each value to the total. In Figure 25, the values add up to 100%. In this case, the chart shows the contribution of each quarter to the entire year. For example, the first quarter contributed the largest the percentage of enrolled patients (59%). What should be added to this chart to provide the reader with more information?

Figure 25—Patients



To make this pie chart easier to understand, we added a more descriptive title and percentage labels. On the previous chart, it was not obvious whether the values were numbers or percentages. Adding the sample size provides the total number of observations.

Figure 26—Percentage of All Patients Enrolled by Quarter



Appendix II

Blank Worksheets

Discussion Guide (Step 1: Identify Questions of Interest)

Purpose: To document the decisions that the groups makes or influences or the questions they need to answer to improve and strengthen programs and services. Prior to this meeting, you can identify which stakeholders should be present at this meeting by using the Stakeholder Engagement Tool:
http://www.cpc.unc.edu/measure/publications/ms-11-46e

Meeting Date:

Facility/Organization Name:

Facilitator:

Stakeholders Present:

Discussion Questions

Decisions to Make or Influence
Are there planning decisions to be made in the near future?

Does the program have a strategic plan? Is it up-to-date?

When are annual work plans due?

Are there advocacy opportunities in the near future? How can present stakeholders influence those decisions?

Programmatic Success Questions
How do you know that your program or service is working?

What do you want or need to know in order to know that your program is working and is successful?

Is your program or service improving clients' health?

How do you know if there are problems or that your program is not achieving its predetermined objectives?

Client Flow Questions
How do clients typically enter your program? Are there multiple points of entry or just one?

Where in the program process is client loss the greatest? Is that surprising? Are losses due to death, migration, or loss to follow-up?

Are there bottlenecks in service delivery? Where?

Stakeholder Analysis Matrix (Step 1: Identify Questions of Interest)

Program Issue: _____

Proposed Activity: _____

Date: _____

Name of Stakeholder Organization, Group, or Individual National, regional, or local	**Stakeholder Description** Primary purpose, affiliation, funding	**Potential Role in the Issue or Activity** Vested interest in the activity	**Level of Knowledge of the Issue** Specific areas of expertise	**Level of Commitment** Support or oppose the activity, to what extent, and why	**Available Resources** Staff, volunteers, money, technology, information, influence	**Constraints** Need funds to participate, lack of personnel, political or other barriers
Government Sector						
Political Sector						

Stakeholder Analysis Matrix *continued*

Name of Stakeholder Organization, Group, or Individual National, regional, or local	**Stakeholder Description** Primary purpose, affiliation, funding	**Potential Role in the Issue or Activity** Vested interest in the activity	**Level of Knowledge of the Issue** Specific areas of expertise	**Level of Commitment** Support or oppose the activity, to what extent, and why	**Available Resources** Staff, volunteers, money, technology, information, influence	**Constraints** Need funds to participate, lack of personnel, political or other barriers
Commercial Sector						
Nongovernmental Sector						

Stakeholder Analysis Matrix *continued*

Name of Stakeholder Organization, Group, or Individual National, regional, or local	**Stakeholder Description** Primary purpose, affiliation, funding	**Potential Role in the Issue or Activity** Vested interest in the activity	**Level of Knowledge of the Issue** Specific areas of expertise	**Level of Commitment** Support or oppose the activity, to what extent, and why	**Available Resources** Staff, volunteers, money, technology, information, influence	**Constraints** Need funds to participate, lack of personnel, political or other barriers
Other Civil Society Target Audiences						
International Donors						

Adapted from Brinkerhoff D and Crosby B, 2001; The POLICY Project, 1999.

Stakeholder Engagement Plan (Step 1: Identify Question of Interest)

Program Issue: _____

Proposed Activity: _____

Date: _____

Stakeholder Organization, Group, or Individual	**Potential Role in the Activity**	**Engagement Strategy** How will you engage this stakeholder in the activity?	**Follow-Up Strategy** Plans for feedback or continued involvement
Government Sector			
Political Sector			

Stakeholder Organization, Group, or Individual	Potential Role in the Activity	Engagement Strategy How will you engage this stakeholder in the activity?	Follow-Up Strategy Plans for feedback or continued involvement
Commercial Sector			
Nongovernmental Sector			

Stakeholder Engagement Plan *continued*

Stakeholder Organization, Group, or Individual	Potential Role in the Activity	Engagement Strategy How will you engage this stakeholder in the activity?	Follow-Up Strategy Plans for feedback or continued involvement
Other Civil Society Target Audiences			
International Donors			

Adapted from Brinkerhoff D and Crosby B, 2001; The POLICY Project, 1999.

Priority Scoring Worksheet (Step 2: Prioritize Key Questions of Interest)

Project/Organization: _____

Key Questions of Interest	Programmatic Relevance	Answerable	Actionable	Timeliness of the Question	Other Criterion	Total
List and rank questions according to each criterion	Highly relevant = 4 Somewhat relevant = 3 Little relevance = 2 Not relevant = 1	Easy to answer = 4 Feasible to answer with routine data = 3 May require nonroutine data = 2 Requires significant data collection = 1	Highly actionable = 4 Potential barriers to action exist = 3 Low chance of action = 2 Very little chance of action = 1	Immediate = 4 Next month = 3 Next quarter = 2 Distant future = 1	= 4 = 3 = 2 = 1	
1.						
2.						
3.						
4.						
5.						

Discussion Guide (Step 5: Interpret Information and Draw Conclusions)

Date:

Facility:

Stakeholders Present:

Facilitator:

Discussion Questions

Does the indicator meet the target?

Is the finding surprising? Why or why not?

Why are we seeing this trend?

How do these data compare with performance data from other organizations?

What accounts for differences between units and districts? Consider differences in funding, staff, and programmatic approaches and processes.

Are there external factors contributing to the findings? Examples include seasonal, political, environmental, cultural, or socioeconomic factors.

Could the trend be the result of improved data collection?

What other data should be reviewed to understand the finding?

Priority Solutions Scoring Worksheet (Step 6: Craft Solutions and Take Action)

Project/Organization: _____

Potential Solutions	Magnitude	Feasibility/Support	Change in Cost	Other Resources Needed	Capacity	Total
Please list your proposed solutions, and rank them according to each criterion.	Large scale = 4 Medium scale = 3 Low scale = 2 Very low scale = 1	Highly feasible = 4 Good feasibility = 3 Low feasibility = 2 Not at all feasible = 1	Low = 4 Medium = 3 High = 2 Very high = 1	Minimal = 4 Few = 3 Several = 2 Significant = 1	Excellent = 4 Good = 3 Fair = 2 Little or none = 1	

Program Action Plan (Step 6: Craft Solutions and Take Action)

Program: _____

Date: _____

Activity or Intervention Indicator to Monitor Success	Baseline	Goal	Activity Detail/Steps Involved	Person Responsible	Other Stakeholders	General Timeline	Person Responsible for Monitoring

Framework for Linking Data with Action (Overall Guide to Process)

Title: _____

Objectives of the Plan: _____

Time Period of Decision-Making: _____

Action/Decision	Policy or Programmatic Question	Decision Maker and Other Stakeholders	Indicator/Data Required	Data Source	Timeline	Communication Channel

MEASURE Evaluation
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www.cpc.unc.edu/measure