

ETHIOPIAN PUBLIC HEALTH ASSOCIATION



**LEADERSHIP IN STRATEGIC INFORMATION
TRAINING PROGRAM**

MODULE 3

(MONITORING, EVALUATION, SURVEILLANCE AND EPIDEMIC MANAGEMENT)

PARTICIPANT MANUAL

**June, 2014
Addis Ababa, Ethiopia**



Approval of the Training Material

The Federal Ministry of health of Ethiopia has been working towards standardization and institutionalization of in-service (IST) trainings at national level. As part of this initiative the ministry developed a national in-service training directive and implementation guide for the health sector. The directive requires all in-service training materials fulfill the standards set in the implementation Guide. Accordingly, the ministry reviews and approves existing training materials based on the IST standardization checklist annexed on the IST implementation guide.

All in-service training materials shall to be reviewed and approved by the ministry accordingly; as part of the national IST standardization process, this **Leadership in Strategic Information** IST material has been reviewed based on the standardization checklist and approved by the ministry in January 2014.

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Module 3: Monitoring, Evaluation, Surveillance and Epidemic Management

Overview

Program monitoring is the systematic documentation of aspects of program performance that are indicative of whether the program is functioning as intended or according to some appropriate standard. Program evaluation is the application of social research methods to systematically investigate the effectiveness of social intervention programs in ways that are adapted to their political and organizational environments and are designed to inform social action in ways that improve social conditions. The last four decades represent a period of rapid growth in the depth of the monitoring and evaluation body of knowledge hallmarking the professionalization of the field. For monitoring and evaluation purpose, public health managers at different levels need reliable information about the magnitude of different diseases and their risk factors. In this regard knowledge and skill on running the different types of surveillance would help public health managers to effectively prevent and control diseases. Monitoring and evaluation are important at local and international levels. At higher levels, information generated through monitoring, evaluation, and surveillance can inform the management of public health programmers and the direction of public health policy. Surveillance serves as an early warning system which provides timely information needed for action. If there is no good surveillance system in a specific locality or country, disease epidemics can affect a lot of people before actions are taken.

Since communicable diseases are prevalent in developing countries including Ethiopia, this whole module gives emphasis on monitoring and evaluation and, communicable diseases mainly HIV/AIDS.

Goal of the Module

This module aims to build capacity of health professionals in order to control communicable diseases in Ethiopia

Objectives of the Module

At the end of this module, the participant will:

- ✓ Plan and implement monitoring and evaluation of health programs
- ✓ Able to conduct health surveillance on important health problems
- ✓ Describe how outbreaks should be investigate and manage



Contents of the Module

The Module is organized in two parts. The first part deals with monitoring and evaluation and the second part deals with surveillance and epidemic management. The two parts are given for a given period of two weeks, each lasting one week.

Part 1: Monitoring and Evaluation

1. Basic Concepts and Definitions
2. Components of Monitoring and Evaluation Plan
3. Program Frameworks
4. Indicators for Monitoring and Evaluation
5. Monitoring and Evaluation in the Ethiopian Health Sector

Part 2: Surveillance and Epidemic Management

1. Introduction to Public Health Surveillance
2. Burden of HIV/AIDS
3. HIV/AIDS surveillance
4. Ethical Considerations in HIV/AIDS Surveillance
5. Outbreak investigation and management



Acronym/Abbreviation

AIS	AIDS Indicator Surveys
ART	Antiretroviral Therapy
BPR	Business Process Reengineering
BSS	Behavioral Surveillance Surveys
CDC	Center for Disease Control
DBS	data base system
DHS	Demographic and Health Surveys
FHI	Family Health International
FMoH	Federal Ministry of Health
GAR	Global Alert and Response
GOARN	Global Outbreak Alert and Response Network
HDSS	Health and Demographic Surveillance Systems
HEW	Health Extension Worker
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information System
HSDP	Health sector Development Program
IDSR	Integrated Disease Surveillance and Response
IDUs	Injection Drug Users
ISS	Integrated Supportive Supervision
M&E	monitoring and evaluation
MDG	millennium development goal
MNCH	Maternal Neonatal and Child Health
MSM	Men Who Have Sex with Men
NGOs	non-governmental organization
OR	odd ratio
OVC	Orphans and Vulnerable Children
PLHIV	people living with Human Immunodeficiency Virus
PMTCT	prevent mother to child transmission
RDS	<i>Respondent-Driven Sampling</i>
RF	<i>results framework</i>
RHBs	regional health bureau
RR	relative risk
SMART	specific, measurable, achievable, reliable and timelines
SPA	Service Provision Assessments
STI	sexual transmitted illness
SWs	Sex Workers
TB	Tuberculosis
TLS	<i>time-location sampling</i>
UAT	Unlinked Anonymous Testing
VCT	voluntary concling test



Part 1:

Monitoring and Evaluation

1. Basic Concepts and Definitions
2. Components of Monitoring and Evaluation Plan
3. Program Frameworks
4. Indicators for Monitoring and Evaluation
5. Monitoring and Evaluation in the Ethiopian Health Sector



Session 1: Basic Concepts and Definitions

Session Overview

The last four decades represent a period of rapid growth in the depth of the monitoring and evaluation body of knowledge hallmarking the professionalization of the field. Theorists in the field have forwarded definitions and described contents of different concepts commonly used by monitoring and evaluation practitioners. This section will provide definitions and brief descriptions for most commonly discussed concepts in the field of monitoring and evaluation.

Learning Objectives

At the end of this section, trainees are expected to be able to:

- Define monitoring and evaluation
- Discuss the relationships and differences between monitoring and evaluation
- Describe the different types of monitoring and evaluation activities

Brain storming

1. Differentiating monitoring and evaluation
2. Classifying monitoring and evaluation activities



Monitoring and Evaluation: Definitions

Discussion Points

- What is monitoring?
- What is evaluation?
- How are monitoring and evaluation related and different?

Group Exercise

Be in groups of five

Construct a hypothetical public health intervention implemented by a Woreda Health Office.

Identify two monitoring activities and two evaluation activities.

Discuss why each of the activities is classified as monitoring or evaluation.

Take a note on disagreements for further discussion.

Different authors and organizations have defined program monitoring and program evaluation in various ways. Some definitions from widely referred scholars and organizations are presented below.



Program monitoring is the systematic documentation of aspects of program performance that are indicative of whether the program is functioning as intended or according to some appropriate standard. It may be related to program processes, program outcomes or both.

Program evaluation is the application of social research methods to systematically investigate the effectiveness of social intervention programs in ways that are adapted to their political and organizational environments and are designed to inform social action in ways that improve social conditions.

Rossi, et al., 2004

There are also many more definitions related to the above mentioned ones. The key concepts included in these definitions include:

Monitoring continuously tracks performance against what was planned by collecting and analyzing data on the indicators established for monitoring and evaluation purposes. It provides continuous information on whether progress is being made toward achieving results (outputs, outcomes, and goals) through record keeping and regular reporting systems. Monitoring looks at both program processes and changes in conditions of target groups and institutions brought about by program activities.

Program evaluation is a time-bound exercise that attempts to assess systematically and objectively the relevance, performance and success of ongoing and completed programs and projects. Evaluation is undertaken selectively to answer specific questions to guide decision-makers and/or program managers, and to provide information on whether underlying theories and assumptions used in program development were valid, what worked and what did not work and why.

IIN/FPA

Monitoring

- ✓ Monitoring is a systematic process
- ✓ Monitoring is a continuous process
- ✓ Monitoring involves collection, analysis, interpretation and use of data
- ✓ Monitoring involves the comparison of performance with a set of expectations



- ✓ Monitoring can be applied to different components of an intervention including inputs, activities, outputs, outcomes and impacts
- ✓ The purpose of monitoring is to inform decision making

Evaluation

- ✓ Evaluation is a systematic process
- ✓ Evaluation is a need based episodic endeavor
- ✓ Evaluation involves answering evaluation questions by providing explanations to observed levels of program functionality
- ✓ Evaluation can be conducted on processes of an intervention and/or outcomes and impacts of an intervention
- ✓ The purpose of evaluation is to inform decision making

Working Definitions

Monitoring is a *systematic and continual* collection, analysis, interpretation and use of data on *key aspects of an intervention and/or its expected results* to inform decision making. Program evaluation is an *episodic systematic* process of data collection and analysis, about activities and/or effects of a program, looking to provide *explanations* for observed levels of program *implementation or changes in social conditions* under intervention with the purpose of informing decisions.

Relationships between monitoring and evaluation

Despite the very close relationship that exists between the concepts of monitoring and evaluation, the two activities represent distinct sets of procedures serving different categories of information needs for decision makers. The relationship between monitoring and evaluation lays in their interdependence, overall purpose and general methods.



Interdependence: Program monitoring is a primarily descriptive activity that provides information what a program is doing and how the social problem targeted by the program is changing over time. However it is limited in terms of providing explanations for observed degree of program implementation and why social conditions are changing or not among the target beneficiaries. What gets described in monitoring gets adequate explanations through program evaluations? In addition, data collected for monitoring purposes also served in program evaluation.

Purpose: The purpose of both monitoring and evaluation is to furnish *information for decision making* at different levels of program designing and implementation.

Methods: Collection, analysis, interpretation and use of *program related data* is a common feature of both monitoring and evaluation.

Table 1. 1. Summary differences between monitoring and evaluation

Attributes	Monitoring	Evaluation
Frequency	Continuous	Episodic
Answers the question	“What is going on?”	“Why do we have the results indicated by the monitoring data?”
Method	Follows trends, compares actual performance with targets	Compares achievements with counterfactual
Performed by	Internal	Internal and External
Uses	Alerts when to take action	Provides detailed information on what types of actions to take
Focus in general	Tracking performance	Judgment, learning, merit

Why Monitoring and Evaluation?

Monitoring and evaluation in general serves information for decision making. This general purpose could be through three more specific uses:

1. Program improvement
2. Accountability



3. Generating Knowledge



Figure 1. Feature of monitoring and Evaluation

Program Improvement

Program improvement constitutes the major purpose of monitoring and evaluation activities. In most instances findings from monitoring and evaluation are used to fine-tune program components during planning and implementation of interventions. Managers use M&E as the basis for their routine and basic decisions.

Accountability

Social programs including public health use public resources. Program implementers are therefore required to demonstrate accountability to appropriate representatives of the source of resources.

- What activities are accomplished by using allocated resources?
- What results are achieved because of the program/intervention?

Generating Knowledge

Sometimes, monitoring and evaluation activities particularly program evaluations could be conducted just with a purpose of generating knowledge for consumption by the scientific community. Findings from such evaluation studies are usually shared through publications rather than commonly used stakeholder forums.



Types of Monitoring and Evaluation Activities

In the previous sub-section, it is mentioned that both monitoring and evaluation can be applied on the different components of a program including inputs, activities, outputs, outcomes and impacts. The application of the concepts of monitoring and evaluation into these different components produces the different types of monitoring and evaluation activities to be discussed in this sub-section.

Table 1. 2. Summary of monitoring and evaluation program components

Categories of program components	Program components	Monitoring	Evaluation
Program Implementation	Inputs	Routine program monitoring (also called input/output monitoring)	Process Evaluation
	Activities		
	Outputs		
Expected Program Effects	Outcome	Outcome monitoring	Outcome evaluation
	Impact	Impact monitoring	Impact evaluation

i. Routine Program Monitoring

Routine program monitoring is the type of monitoring and evaluation involving routine tracking of information about resources utilized and program activities implemented. It primarily uses data routinely collected by program implementers, service providers and/or managers while executing program processes. Routine program monitoring is also called input/output monitoring as it primarily measures the volume and quality of resources being used and outputs produced.

ii. Process Evaluation

Routine monitoring of inputs and outputs provides descriptive information about the implementation of program processes. Sometimes, program implementers require more explanatory information about the level of program implementation and factors that hinder or facilitate the implementation of



program activities. The type of evaluation conducted with a focus on answering such questions is known as process evaluation. Implementation evaluation and implementation analysis are also used to refer to this type of monitoring and evaluation.

Process evaluations answer questions like:

- What was the degree of implementation of a program?
- What user/program/context related factors explain observed levels of program implementation?
- Are there barriers hindering access to program?

By answering these questions, process evaluation helps program implementers to document best practices and investigate causes of under achievement.

iii. Outcome Monitoring

Outcomes are intermediate level changes expected among beneficiaries targeted by a program. Follow-up of these characteristics among target beneficiaries in order to understand if changes are occurring and the direction of change is referred as outcome monitoring. In health programs, outcome monitoring involves repeated measurement of knowledge, attitude and practice of people targeted by different health programs. In outcome monitoring, there is no attempt to attribute observed changes in outcomes to a specific program.

iv. Outcome Evaluation

Like outcome monitoring, outcome evaluation also measures intermediate level changes among beneficiaries of programs. Outcome evaluation however, gives emphasis to building cause effect relationship between observed changes in outcomes with programs being evaluated. Rigorous evaluation designs are required to understand if there is any change in outcome and assess the contribution of the program for observed changes. This assessment of program net effect lays the ground to make judgments about adequacy of program effect.

v. Impact Monitoring

Impact monitoring is a type of outcome monitoring that focuses on changes agreed by major stakeholders as ultimate results of the program. Like outcome monitoring, impact monitoring simply



follows how the social problem targeted by the program is changing over time without any intention of attributing observed changes to a particular program.

vi. Impact Evaluation

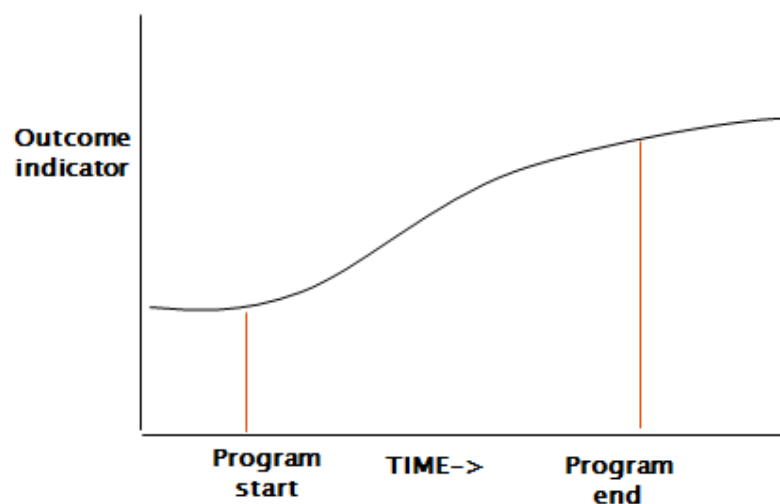
Impact evaluation is a type of evaluation focusing on the assessment of the worth of a program in terms of its contributions for changes in a social problem targeted by the program. Methodologically, impact evaluation is similar to that of outcome evaluation; however, the number of contributors to an impact level change is expected to be much more than those contributing to outcome level changes making impact evaluation more difficult and expensive.

Exercise

Refer back to your previous exercise

Classify the different M&E activities as routine program monitoring, process evaluation, outcome monitoring, outcome evaluation, and impact monitoring or impact evaluation.

Outcome Monitoring





Outcome Evaluation

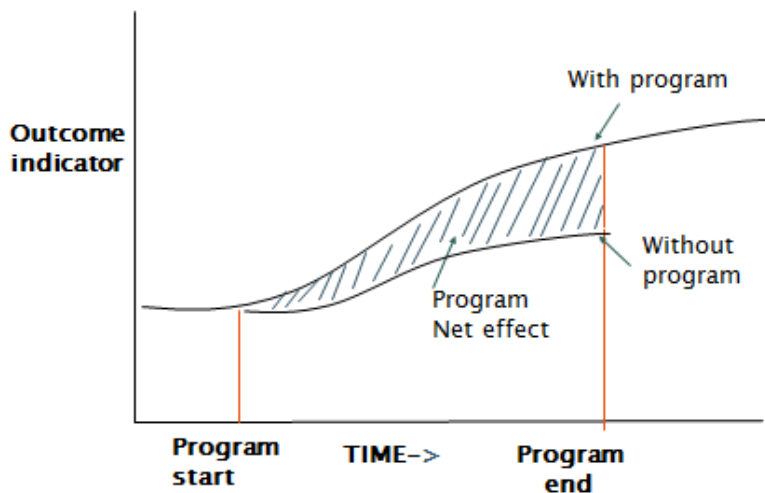


Figure 1.2. Illustration of Outcome Monitoring and Outcome Evaluation

Session 2: Monitoring and Evaluation Work Plan

Session overview

As a planning document, monitoring and evaluation plan helps you, as an implementer, to think systematically through each of the program components. A well-designed plan helps the implementer to keep track of the program's progress and make adjustments if necessary. It is also a valuable tool for demonstrating the effectiveness and impact of a program, generating credible and useful information for both the implementer and other stakeholders. When a program has proven results, the monitoring and evaluation plan is a useful method for showing the program's success. If the program is less than successful, the monitoring and evaluation plan can help to identify specific weaknesses. In general the monitoring and evaluation plan is useful for informing all stakeholders the actual progress and impact of a program against the proposed activities and objectives and contributes to learning, improved performance, and accountability. This section will help you understand what a monitoring and evaluation plan is, how it can best be used and also provide a guide for how to write one.



Learning Objectives

At the end of this section, trainees are expected to be able to:

- Define monitoring and evaluation plan
- Explain purpose of a monitoring and evaluation plan
- Explain goals of a monitoring and evaluation plan
- Identify who should be involved in monitoring and evaluation plan
- Describe when monitoring and evaluation plan be used
- Discuss key elements of a monitoring and evaluation plan

Discussion points

- What is a monitoring and evaluation plan?
- What are monitoring and evaluation plans used for? Purpose / function
- What are the goals of a monitoring and evaluation plan?

1. What is a Monitoring and Evaluation plan?

A monitoring and evaluation plan is a systematic and objective approach or process for monitoring project performance toward its objectives over time. Development of a monitoring and evaluation plan must be integral to the planning of a program design as the monitoring and evaluation plan document helps the project team to manage all monitoring and evaluation activities throughout a particular project cycle. It keeps track of what you should monitor, when you should monitor, who should monitor, and why you should monitor. A monitoring and evaluation plan should be shared and utilized by all stakeholders and sent to donors. The monitoring and evaluation plan should have flexibility. Monitoring and evaluation plan has to be well thought out and planned but also flexible to account for changes that can improve or identify better monitoring and evaluation practices. This is especially important in the ever-changing and fast-moving environment

*Note that almost all donors require that all program proposals for funding **must** include a comprehensive monitoring and evaluation plan. Because monitoring and evaluation plan is highly considered as one of the key criteria in determining the competitiveness of a program proposal.*



Purpose / function of a Monitoring and Evaluation plan: What are Monitoring and Evaluation Plans used for?

The monitoring and evaluation plan allows all staff involved with the project to have a reference sheet of all the monitoring and evaluation activities during the progress of the project and highlights data. It helps to identify “who is supposed to do what to collect which data and when it is collected” and how that data has changed over the course of a certain period.

Well developed monitoring and evaluation work plan helps to:

- Show how goals/objectives are related to results
- Describe how objectives will be achieved/measured
- Identify data needs
- Define how the data will be collected and analyzed
- Describe how results will be used
- Anticipate resources needed for monitoring and evaluation
- Show stakeholders how program will be accountable

The content and organization of monitoring and evaluation work plan are flexible. They should be appropriate for the Level (e.g., country, region, district, community, or organization) and the program areas

Goals of a monitoring and evaluation plan

A monitoring and evaluation plan focuses on the performance of a project or program and examines its implementation plan, inputs, outputs and outcomes/results. A project is defined as an individually planned undertaking designed to achieve specific objectives within a given budget and time frame.

A well developed monitoring and evaluation plan should address the following questions:

- Did the project take off as planned?
- What problems and challenges, if any, did it face?
- Is it being effectively managed?
- Is it providing planned activities and other outputs in a timely fashion?
- If not, why?
- Will the project be able to meet its targets?
- What are its intermediary effects and impacts?



- What can be done to improve its performance and impacts?

Who should be involved in monitoring and evaluation planning?

The monitoring and evaluation plan is intended for the use of the organization. Therefore, the monitoring and evaluation plan should be designed by those who are involved in the program, including strategic partners. This allows the creators of the monitoring and evaluation plan to also be the users. This participatory approach ensures project team support and learning, which can increase effectiveness of the monitoring and evaluation and organizational capacity.

When should the monitoring and evaluation plan be used?

The monitoring and evaluation Plan should be used as a reference throughout the length of the program cycle, tracking all programs and updated to include all monitoring and evaluation data and results. It should be constantly updated to include up-to-date information of monitoring and evaluation progress. This includes indicator results after each activity or intervention, data collection methods and sources, and who will be collecting data. If they occur, It should also be used and to track changes and updates to monitoring and evaluation activities.

Key Elements of a Monitoring and Evaluation Plan

1. Description of the program
2. Purpose of monitoring and evaluation activities and objectives
3. monitoring and evaluation questions
4. Description of what data will be collected
5. Methods for collecting, managing, and sharing data
6. Descriptions of who will implement various aspects of the plan
7. Resources needed to implement the plan
8. Timeline for completing monitoring and evaluation

1. Description of the program

Program narrative:

- Problem or situation that the program seeks to address
- Program goals and objectives as part of their overall description of their program



- How the program plans to improve the problem or situation (inputs and activities)
- The expected changes that would occur as a result of the program (outputs and outcomes)

Description of program components:

- Specific, detailed description of problem statement, inputs, activities, outputs, outcomes, and impacts

Program logic model

- Graphic display of the functional relationships between the components using a logic model

2. Purpose of monitoring and evaluation activities and objectives:

- How and to what extent the program will achieve its objectives
- Anticipated outcomes of the program's efforts
- How outcomes will inform decision-making

3. Monitoring and Evaluation questions

List of monitoring and evaluation questions

- Consider program's and stakeholder's needs/wants
- Prioritize based on resources and capacity to answer questions
- Make sure they are measurable

4. Description of what data will be collected

Prioritize measures and indicators:

- Describe the data needed to answer the monitoring and evaluation questions
- Describe the relevant measures and indicators
- Outline potential sources for the data

5. Methods for collecting, managing, and sharing data

Description of data collection methods:

- Data collection tools already available
- Data collection tools that will need to be developed or obtained
- The method that each tool supports

Description of data management process:

- Who, what, when, and where data will be processed
- Data storage systems
- Data quality assurance processes



- Data flow (diagram)

Description of data dissemination plans:

- What data will be shared
- Who will data be shared with
- Reasons for sharing
- Timelines and formats

6. Descriptions of who will implement various aspects of the plan

Description of the roles and responsibilities of persons involved in implementation of monitoring and evaluation Activities:

- Who will be involved in implementing each activity (may include program staff, organizational administrative staff, stakeholders, consultants)?

7. Resources needed to implement the plan

Summary of resources needed and associated cost:

- Budget for each monitoring and evaluation task taking into consideration administrative costs, program staff compensation (e.g. salary, benefits, etc.), consultants, travel, communication, printing and duplication, materials, training

8. Timeline for completing monitoring and evaluation

Summary of resources needed and associated cost:

9. Budget for each monitoring and evaluation task taking into consideration administrative costs, program staff compensation (e.g. salary, benefits, etc.), consultants, travel, communication, printing and duplication, materials, training

2. Goals, objectives and Program Frameworks

a. Developing Goals and SMART Objectives

i. Section Introduction

The unit distinguishes between program goals and objectives of monitoring and evaluation. It maps out activities contribute to higher level objectives and how meeting these objectives leads to the achievement of the overall purpose or goal of a project or programme. Developing a clear logical objective hierarchy is fundamental to good programme and project design and essential for monitoring



and evaluation. If the program goals and objectives are written in such a way that they can be easily distinguished from each other and measured, the job of monitoring and evaluation will be much easier. Unfortunately, many times, this is not the case. In this section, we will learn how to write program goals and objectives so that they are easily monitored and evaluated.

ii. Learning Objectives

At the end of this section, trainees are expected to be able to:

- Design goals and objectives for specific intervention programs.
- Describe the four basic types of frameworks.
- Design frameworks for specific intervention program
- Use frameworks for developing Monitoring and Evaluation plans.

iii. Section content

1. Definition of goals and objectives
2. Types of objectives
3. Why goals and objectives
4. Types of frameworks
5. Why frameworks
6. Exercises
 - Identify goals and objectives
 - Rewrite objectives so they are SMART
 - Develop your own frameworks for your own program

iv. Goals and Objectives: Definition

Discussion points

- *What is Goal?*
- *What is an objective?*
- *What is the difference between Goal and objectives?*



Group Exercise

- *Be in group of five,*
- *Construct a hypothetical public health intervention implemented by a Woreda Health Office which you have mentioned in the related to pervious examples.*
- *Ask participants to write about Goals and objectives.*
- *Take a note on disagreements for further discussion.*
- *Ask them to write their responses on the flip charts and to hang them on the wall.*
- *Present your work to the group during general discussion.*

Goal:

- A broad and general statement about desired program intentions that generally reflects wider community concerns and interest.
- Establishes a program's direction without specifying how the direction will be accomplished.
- Must be concrete enough to provide direction for establishing measurable objectives.

Example:

- To equip participants with an understanding of monitoring and evaluation and the knowledge and skills needed to incorporate monitoring and evaluation activities into everyday program work.
- The enhancement of food security in single parent households in certain localities.
- Eradication of protein-energy malnutrition among risky target populations.

Objective:

- Objectives are also statements of intent which specify in concise, measurable terms how goals will be achieved. Unlike goals, objectives are time-bound and achievable.
- Is more specific than a goal



Examples:

- To increase the caloric intake among infants by 30% in Gondar Zuria District by year three of the programme.
- To reduce prevalence of anemia in pregnant women by 30% in Ethiopia by 2015.
- To improve the quality of HIV counseling services at ANC clinics in Gondar Referral Hospital for pregnant mothers by 2014.

Process and Outcome Objectives

- Remember process evaluation:
 - Focuses on how a program was implemented
 - Identifies steps taken and the decisions made in developing and implementing a program
 - Answers the question: Is the program providing the activities or services intended?
- **Process objectives measure the implementation process of a program**
- **Remember outcome evaluation:**
 - Focuses on the results of a program's effort
 - Answers the question: What difference did the program make?
 - Provides information about program effects after a specified period of time
 - Measures the health, knowledge, or behavioral change for the target population
- Outcome objectives measure the specific outcomes achieved as a result of program efforts over a period of time

Examples of process and outcome objectives for the VCT Program

- **Process Objective**
 - **For the output:** Clients receive results and HIV counseling services.



- Objective: By the end of the first program year, 98% of clients receiving their test results will also receive HIV counseling.

- **Outcome Objective**

- **For the outcome:** HIV care and treatment increased
- Objective: By the end of the first program year, 50% of clients receiving positive test results will begin a treatment regimen.

Example 1: The program will provide home-based care services to elderly members of the community

- Not specific:
 - *What do home-based services include?*
 - *Who is the target population?*
 - *How is elderly being defined?*
- Does not specify how many people the program aims to reach (measurable):
 - Is it every elderly member of the community?
- Does not indicate a timeframe:
 - Does the program plan to achieve these results within the span of 6 months, 2 years?
 - The results will be different depending on the timeframe.

Example 2: 150 health workers will be trained to deliver ART services according to national and/or international standards.

- This objective is better but the time element is missing:
 - It is specific and measurable:
 - Defines who and how many people the program aims to train
 - Specifies what the target population will learn
 - It does not provide a timeframe:



- When does the program expect to achieve this objective? In 3 months? 1 year?
- The timeframe will affect how activities are implemented and the results we would expect to see

Example 3: By the end of the first program year, 1000 clients will be tested for HIV.

- This is a SMART objective:
 - The objective is specific and measurable:
 - *The objective defines who and how large the target audience is*
 - *It tells what services the program will provide to these clients*
 - The objective also provides a timeframe. “By the end of the first program year”

Activity: Write SMART Objectives for Your Program

- **Directions:**

- *Work individually or as a small group*
- *Review your program logic model you developed earlier*
- *If you already have program process and outcome objectives, write them in the flip chart, then use this flip chart to present general group and ensure that they are SMART.*
- *If your existing objectives are not SMART, revise them again and then write them in another flip chart.*

b. Frameworks

i. Section Introduction

Four types of frameworks are introduced in this module: conceptual frameworks, logical frameworks, logic models and Result frameworks. Different organizations tend to prefer a selected type of framework. It is not important to convince participants to use any particular type. The gist of this session, however, is the importance of designing a useful framework for a specific project in a specific context, not the titles or particular appearance of any designated kind of framework.



ii. Why Are Frameworks Useful?

- Frameworks are best understood as useful tools for understanding and analyzing a program.
- Designing frameworks is one way to develop a clearer understanding of the goals and objectives at the heart of a project, with emphasis on measurable objectives.
- Developing frameworks also helps to clearly define the relationships among factors key to the implementation and success of a project.
- These factors may be internal or external to the program context.
- The framework design process is crucial for developing sound implementation and monitoring and evaluation plans and serves as the foundation for selecting appropriate and useful monitoring and evaluation indicators.
- The process of designing frameworks also helps to clarify many of the concepts and assumptions underlying basic project activities.
- While frameworks are obviously useful after their completion, providing a clear structure of the indicators at the heart of monitoring and evaluation plans, one of most useful qualities is that discussing and determining their design serves to clarify many of the concepts and assumptions underlying basic project activities.
- A monitoring and evaluation plan that does not identify appropriate, useful monitoring and evaluation indicators, metrics, and data systems is a monitoring and evaluation plan that will not contribute to good program management or to an intervention's success.

iii. Learning Activities

- In groups, ask participants to identify who should be a member of the monitoring and evaluation team and what skills the members need.
- Ask them to write their responses on the cards and to hang them on the wall.
- Remind participants that at the planning stage of a program, it is necessary to include plans for monitoring and evaluation. This can be done by developing a conceptual framework of the program, a tool which is simple and readily applicable in the monitoring and evaluation of any integrated development program.



- Explain that developing a conceptual framework for a program allows staff to articulate how they anticipate program inputs and activities will achieve the desired effects, reach consensus on the details of the program, and clarify the terminology that will be used.
- Remind participants that the process in the conceptual framework starts by understanding the problem/need the program is addressing. What is the problem, how big; who does it affect, what are the cause(s) of the problem? If the program defines the problem wrongly, everything thereafter is all wrong.
- Provide handout after discussing slides then explain to participants that the framework indicates what elements need to be monitored and/or evaluated. These elements can later be translated into indicators. Inform the participants that they will learn more about indicators in the next session. Also point out that the framework makes it easier to identify specific constraints to program effectiveness as the program evolves.
- Dividing a program into various components makes it easier to create the necessary indicators to assess the program and identify the specific constraints to program effectiveness as the program is being implemented. The program conceptual framework is a dynamic instrument.
- Further point out that in this particular framework there are four principal elements: inputs, outputs, outcomes, and impacts that can be translated into indicators and are particularly useful in monitoring and evaluating programs. Point out that we make assumptions about the relationships between these elements when creating this diagram.
- Distribute the handout at the end of the exercise because they will complete the same log frame as part of group work then explain that the elements of the conceptual framework can be rearranged into a logical framework to organize the elements of the conceptual framework in tabular form.

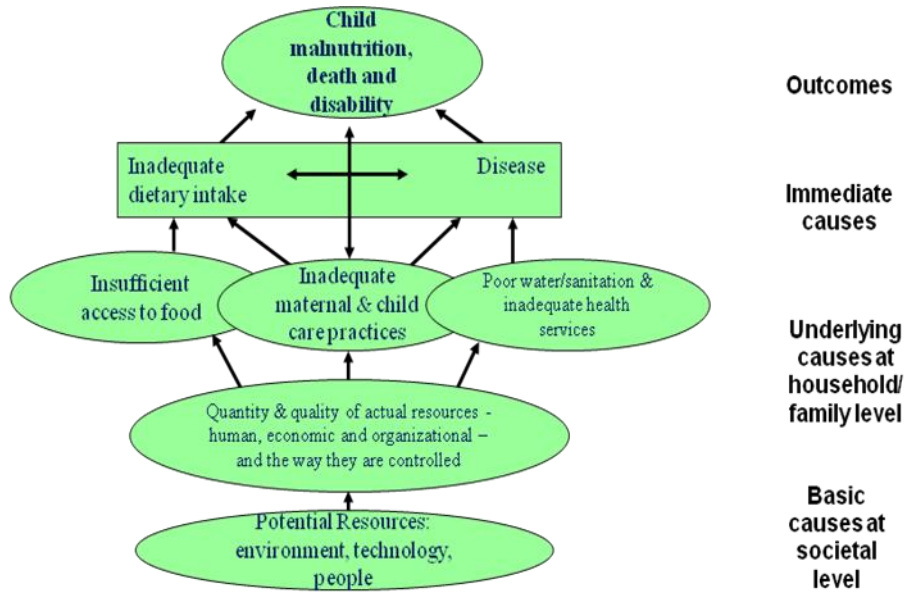
iv. Types of Frameworks

1. Conceptual Frameworks (Research or Theoretical Frameworks)

- Conceptual frameworks are sometimes called “research” or “theoretical” frameworks.
- A conceptual framework is a useful tool for identifying and illustrating a wide variety of factors and relationships that may affect program success.
- Conceptual frameworks take a broad view of the program itself in order to clarify the relationship of its activities and its main goals to the context in which it operates.



- The design of the conceptual framework should show the interrelationships between all factors that are relevant to achieving the program's goals.
- These factors can be systems, organizations, government or institutional policies, infrastructure, population characteristics, or other features of the operational landscape that may help or hinder the program's success. Constructing a conceptual framework thus clarifies the complete context affecting the outcome of a program or intervention.
- Constructing a conceptual framework also clarifies your assumptions about the causal relationships between significant features of the program context, clarifying aspects that your planned intervention may affect as well as other factors beyond your control.
- Identifying the variables that factor into program performance, and organizing the explicit ways they interact with each other sets the stage for outlining the objective results you can reasonably expect from your program activities.
- Clarifying all of these issues is a critical step toward designing valid measures for analyzing, or evaluating, the success of those interventions.
- Another type of framework, proximate determinants, highlights the factors directly affecting the health outcome.
- Sometimes the proximate determinants are labeled as such within a conceptual framework.
- *In addition Conceptual frameworks are used in the sciences to select key variables for analysis.*
- *By constructing this kind of analytical framework as the foundation within which your program will design, plan, and implement the Monitoring and Evaluation of program performance, real possibilities and limitations become clearer to everyone involved.*



Source: UNICEF, *State of the World's Children*, 1998

Figure 3. Conceptual frameworks on causes of malnutrition in the society

v. What is a Logic Model?

- Mainly a logic model is a systematic and visual way to present and share your understanding of the relationships among the resources you have to operate your program, the activities you plan to do, and the changes or results you hope to achieve.
- The term *logic model* is frequently used interchangeably with the term *program theory* in the evaluation field.
- Logic models can alternatively be referred to as *theory* because they describe how a program works and to what end.

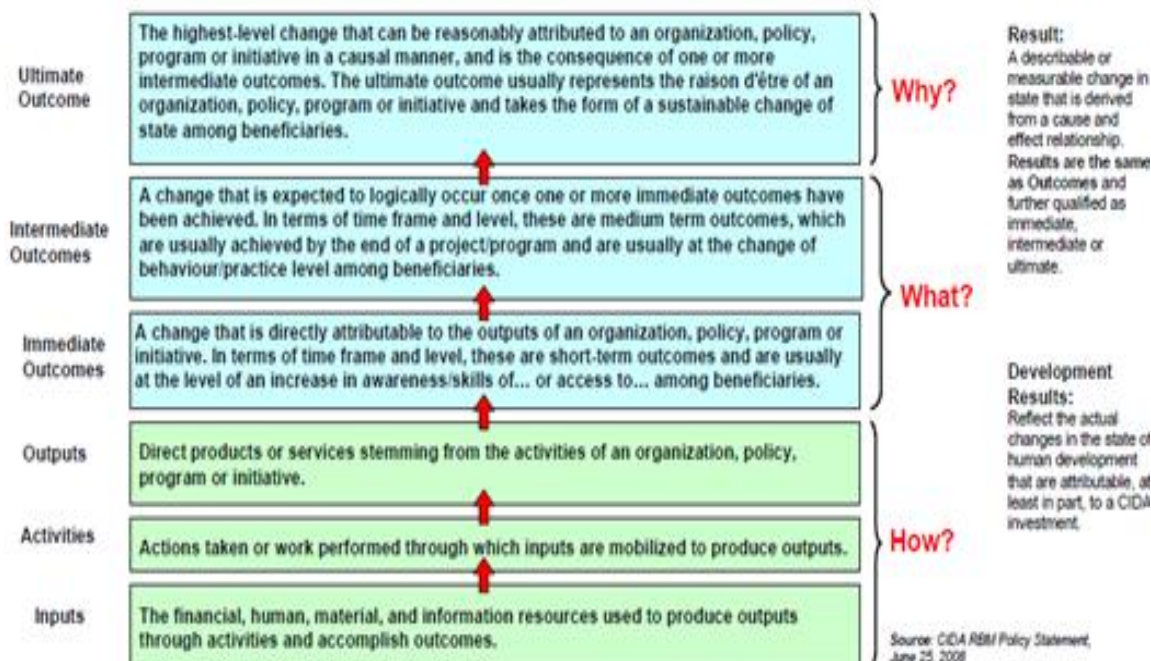


Table 4. Logical Model terms and definitions

vi. Why Develop a Logic Model?

A way to promote monitoring and evaluation by:

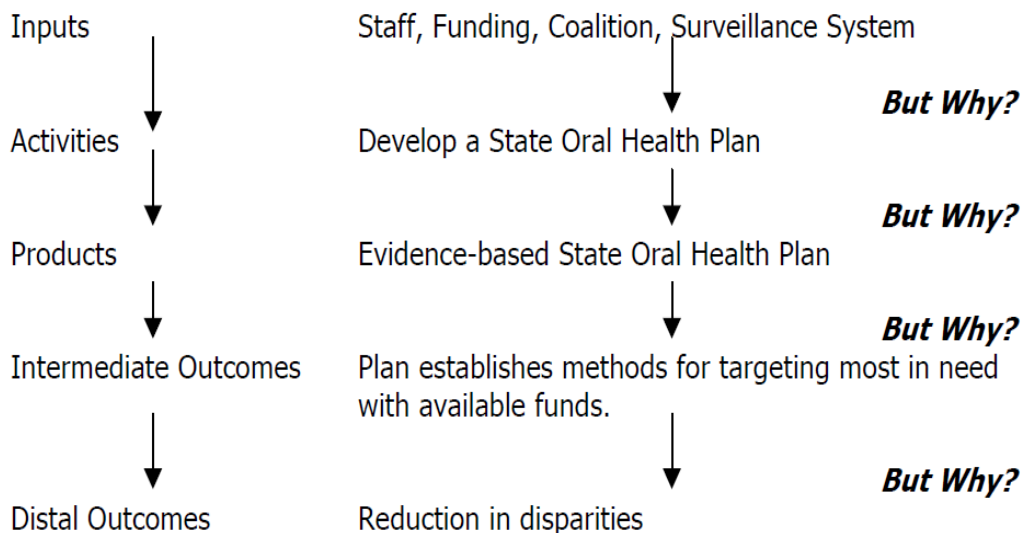
- Involving stakeholders
- Providing a reference point and promoting communication
- Illustrating the internal consistency of the program
- Helping planners identify gaps or unrealistic expectations
- Identifying potential obstacles to program operation
- Helping monitor progress
- Identifying appropriate evaluation questions and relevant data needs
- Improving program staff's expertise in planning, implementation, and evaluation



vii. How is a Logic Model used?

- Describe the main components of a program
- Show how program activities are related to intended effects
- Make assumptions about how a program will address a particular problem
- There is no “right” way to begin a logic model.
- Design construction is based on stage of the program, identified “logic,” information available concerning resources, etc. However, you should have a clear definition of the problem before starting construction of your logic model.
- The two approaches described in this module are the Forward Logic approach and the Reverse Logic approach.

Example on Left to Right or “Forward Logic”: Developing your logic model from left to right starts with articulating the program inputs and activities and requires you to work forward towards distal outcomes. This approach is often used when you need to evaluate a program in the implementation or maintenance stage but do not already have a logic model in place. You will ask the question “But Why?” as you move from left to right in your logic model.





You can also think of this left to right movement as an **IF ... THEN**Progression.

Right to Left or “Reverse Logic”

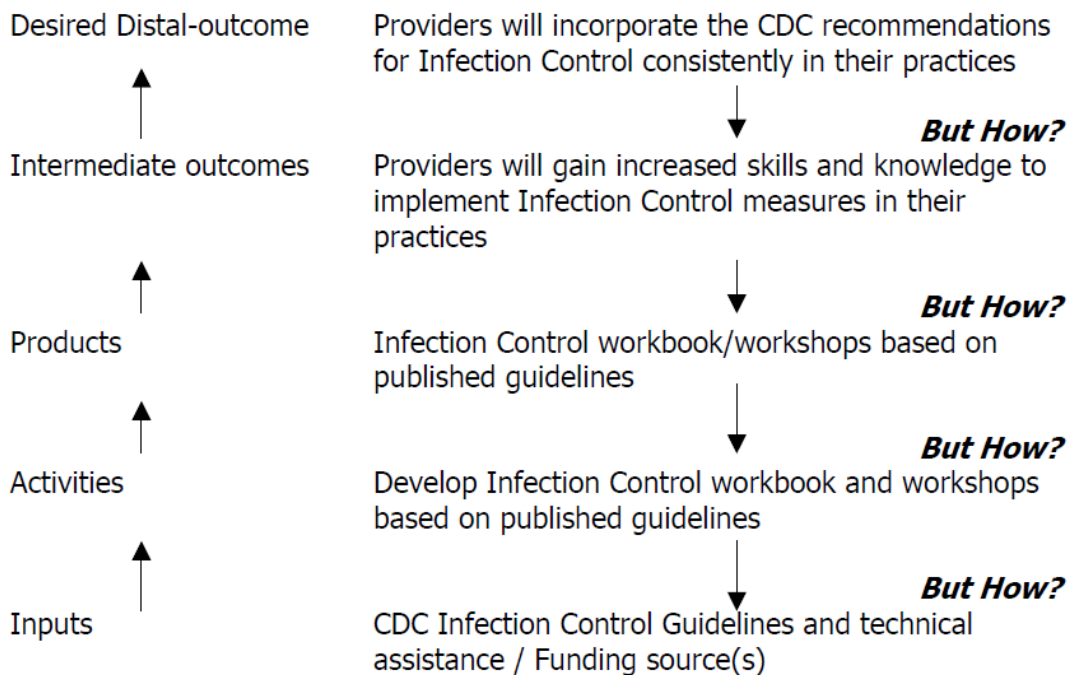
Developing your logic model from right to left starts with desired outcomes and requires you to work backwards to develop activities and inputs.

Usually used in the planning stage, this approach ensures that program activities will logically lead to the specified outcomes if your arrow bridges are solid (sound logic).

You will ask the question “But How?” as you move to the left in your logic model.

This approach is also helpful for a program in the implementation stage that still has some flexibility in its choice of program activities.

Example on Right to Left or “Reverse Logic” Model



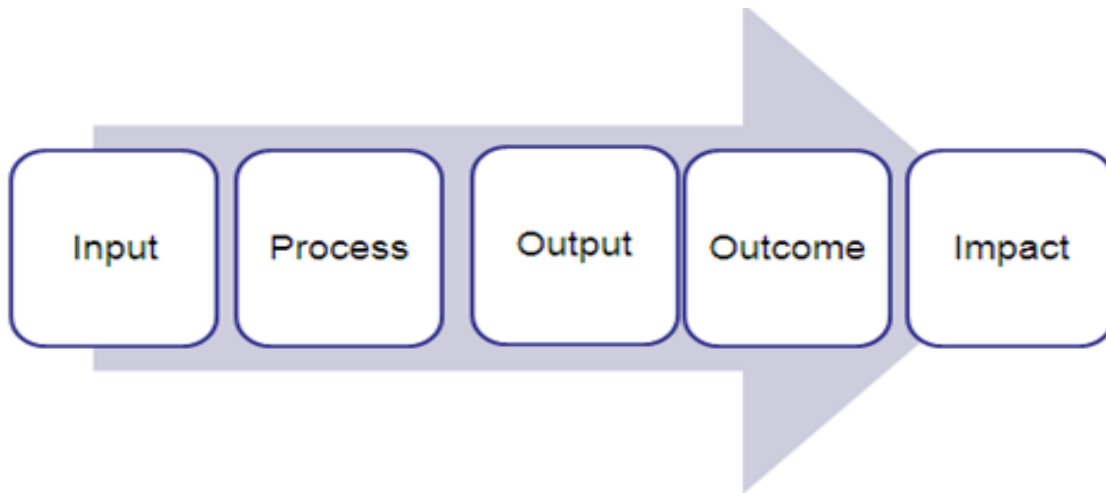
viii. Developing a Logic Model

When developing a logic model for a planned program, describe:

- How the program should function
- What results you expect
- To do this you will need:
 - Information from meetings with stakeholders
 - Knowledge of theory



- Experience or lessons learned
- For a program already underway, describe:
 - Actual inputs
 - Activities completed
 - Outcomes and impacts (impacts for completed program) that resulted from program implementation



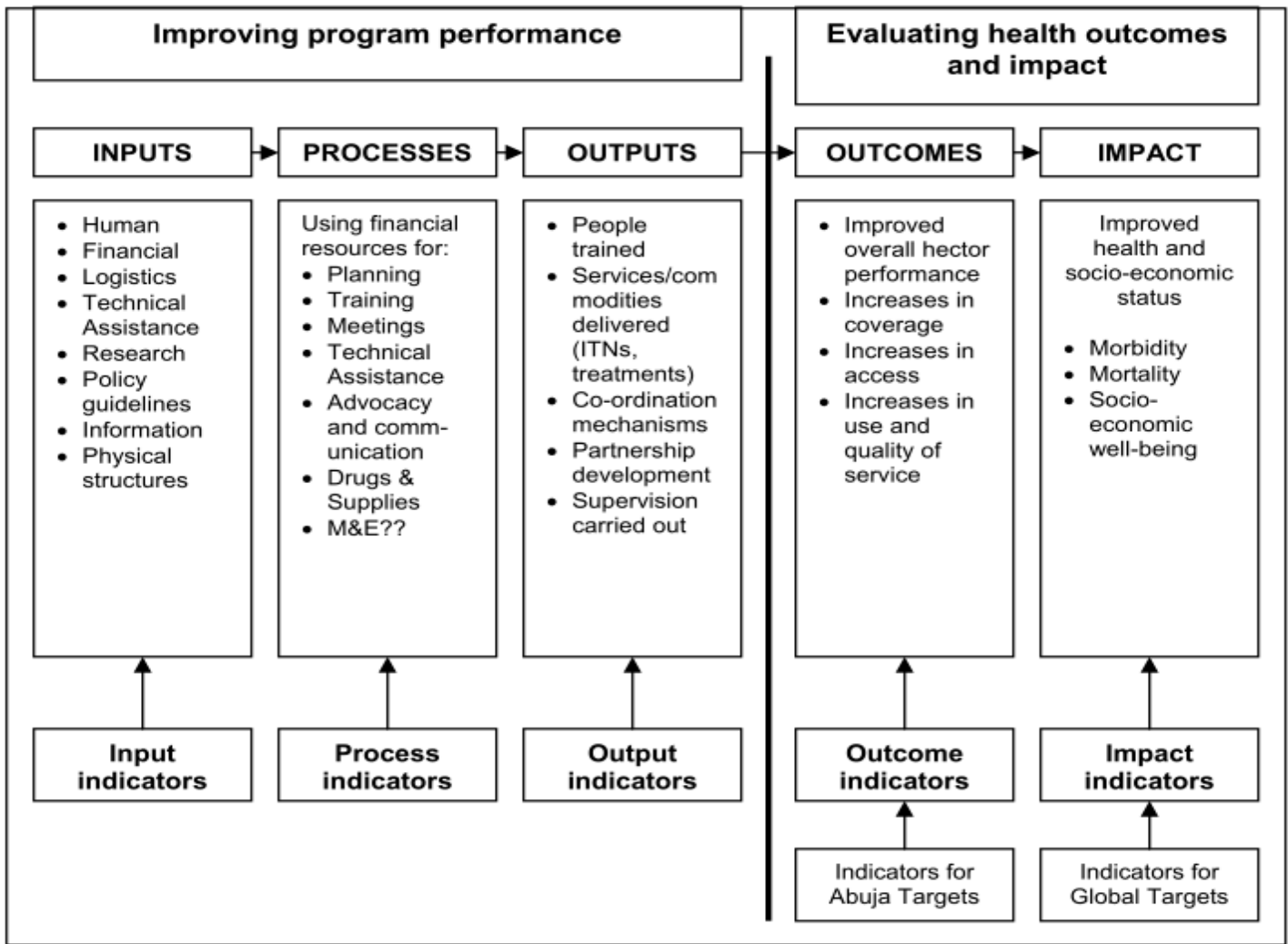


Figure 5: logic model

Example: Developing a Logic Model for a VCT Program

Problem Statement: People who do not know they are sero-negative might not be as motivated to remain disease-free, whereas those who are HIV infected might not use critical interventions to reduce HIV transmission to their children and others or other care, treatment, and support services

Logic Model Components in a VCT Program

In small groups assign one of these five elements to each group. Ask participants to explain the meaning of the element they have been assigned. Allow 10 minutes for this activity.



At the end of the small group session, synthesize the group's reports and relate to slides the following points should come out:

Inputs - all those resources that go into the program at the onset or start-up phase or during the implementation to help the program achieve its objectives.

The inputs (the number and qualifications of personnel, the financial resources, the institutional set-up, timing, etc.) must be designed as to meet the problem. The inputs should be distributed to meet all needy groups and be accessible financially, socially and technically. If this does not happen the inputs are useless and the outputs may not be met.

Outputs - all the goods and services delivered to the target population by the programme. Programme inputs have to be transformed into outputs. The quantity and quality of the outputs is very important.

For instance, if one programme input were the training of CHWs, the outputs are the number of trained CHWs. The quality of the training should also be "adequate," otherwise just training them would not help in effectively meeting the needs of the community.

Also explain that having very well-trained staff or people does not necessarily generate programme delivery nor impact. Success and impact are created by making sure that the trained personnel are enabled to do the work that they were trained for.

Outcomes - changes in behaviors/practices as a result of program activities.

The outputs, if of the right quantity and quality, should produce an outcome. The skills of the CHWs should change, and if they do their tasks well, the detrimental behavior /practices of the mothers should change for the better of their children's health. The change in skills of the CHWs and/or the change in behavior/practices of the mothers are the outcome of the programme. The outcome is expected to influence the problem, as defined initially.

Impacts - the effect of the program on the beneficiaries. The change in the problem is the impact of the program on the beneficiaries/clients.

Assumptions - the external factors, influences, situations or conditions which are necessary for project success. They are important for the success of the programme but are largely or completely beyond the control of programme management. For example, in nutrition education, we may assume that community workers who are trained will understand the training and be motivated to do what they have been trained to do. However, we cannot be sure that this actually will happen. Accordingly, it is



necessary to make assumptions explicit and list them in the framework as elements to be monitored or evaluated. Again, walk participants through the process of transferring the conceptual framework into a logical framework.

Divide participants into four groups, and provide each group with a set of cards on which the various elements of a hypothetical nutrition programme are written (each group receives a different programme. Ask participants to arrange the cards to create a conceptual framework and copy their framework onto a flipchart. Allow about 15 minutes for this activity. Share one or two examples in plenary sections. Ask participants to complete a conceptual framework and logical framework for their own programme during the evening. They should be prepared to share this in plenary the following day.

ix. Logic framework

A log frame is a tool for improving the planning, implementation, management, monitoring and evaluation of projects. The log frame is a way of structuring the main elements in a project and highlighting the logical linkages between them. It consists of a matrix with **four columns** and **several rows**, which summarise the key elements of a project plan, namely:

- The project's hierarchy of objectives (**Project description**)
- How the project's achievements will be monitored and evaluated (**Indicators and Sources of Verification**)
- The key external factors to the project's success (**Assumptions**)
- What will the activity do and what will it produce? (activity description)
- The activities hierarchy of objectives and planned results (also activity description)
- The key assumptions being made (assumptions)
- **The vertical logic** (reading up and down columns 1 and 4 of the matrix) clarifies the causal relationships between different levels of objectives (column 1) and specifies the important assumptions and uncertainties beyond the activity managers control (column 4).
- **The horizontal logic:** How the activity's achievement will be measured, monitored and evaluated (Indicators and means of verification)
- The horizontal logic (reading across the rows of the matrix) defines how the activity objectives specified in column 1 of the logical frameworks (Goal, Objectives, and Outputs) will be measured (column 2) and the means by which the measurements will be verified (column 3).



This provides a framework for activity monitoring and evaluation. This provides a framework for activity monitoring and evaluation.

Table 1. Log framework matrix applied for different program activities

Project structures	Indicator of achievement	Means of verification	Important risks & assumptions
<p>Goal: What are the wider objectives which the activity will help to achieve? Longer-term programme impact</p>	<p>What are the quantitative measures or qualitative judgments whether these broad objectives have been achieved?</p>	<p>What sources of information exist or can be provided to allow the goal to be measured?</p>	<p>What external factors are necessary to sustain the objectives in the long run?</p>
<p>Purpose: What are the intended immediate effects of the programme or project? What are the benefits, to whom? What improvements or changes will the program or project bring about? The essential motivation for undertaking the programme or project</p>	<p>What are the quantitative measures or qualitative judgments by which achievements of the purpose can be Judged?</p>	<p>What sources of information exist or can be provided to allow the achievement of the purpose to be measured?</p>	<p>What external factors are necessary if the purpose is to contribute to the achievement of the goal?</p>
<p>Outputs: what outputs (deliverables) are to be produced in order to achieve the purpose?</p>	<p>What kind and quality of outputs and by when will they be produced?</p>	<p>What are the sources of information to verify the achievement of the outputs?</p>	<p>What are the factors not in the control of the project which are liable to restrict the outputs</p>



			achieving the Purpose?
Activities What activities must be achieved to accomplish the outputs?	What kind and quality of activities and by when will they be produced?	What are the sources of information to verify the achievement of the activities?	What factors will restrict the activities from creating the outputs?

x. What is a Results Framework? (Strategic Framework)

- A *results framework* (RF) presents an operating unit’s strategy for achieving a specific objective. Typically, it is laid out in graphic form supplemented by narrative.
- A result framework includes the objective and the intermediate results necessary to achieve it.
- The framework also conveys the development hypothesis implicit in the strategy and the cause-and-effect linkages between the intermediate results and the objective.
- It includes any critical assumptions that must hold for the development hypothesis to lead to achieving the relevant objective.
- In short, a person looking at a results framework should be able both to understand the premises underlying the strategy and to see within the framework those intermediate results critical to achieving the objective.
- Key elements of an RF include the strategic objective, intermediate results, hypothesized cause-and-effect linkages, and critical assumptions. The process for identifying these elements is outlined below as a series of steps. These steps need not be followed sequentially:
- Developing a result framework is and should be an iterative process. Operating units may use a variety of approaches to develop their respective results frameworks. Whichever process is followed, it is important to involve partners.



xi. What Functions Does a Results Framework Serve?

- A results framework is both a *planning* and a *management tool*.
- The result framework is central to the strategic plan and provides a program-level framework for managers to gauge progress toward the achievement of results and to adjust relevant programs and activities accordingly.
- In addition, the design of a results framework provides an important opportunity for an operating unit to work with its development partners and customers to *build consensus and ownership* around shared objectives and approaches to meeting those objectives.
- Result frameworks also function as effective *communication tools* because they succinctly capture the key elements of a strategy for achieving an objective (i.e., program intent and content).
- Finally, as “living” management tools, result frameworks are the foundation for several critical programmatic events and processes
- Reaching agreement both within the operating units on expected results and required resources
- Identifying and designing results packages
- Selecting appropriate indicators for each program result and developing the operating unit’s performance monitoring and evaluation systems
- Using performance information to inform program management decisions (i.e. adjusting specific program activities)
- Analyzing and reporting on performance through the R4 process

A results framework should be kept current; that is, result frameworks should be revisited or revised when:

1. Results are not achieved as expected
2. Critical assumptions prove invalid
3. The underlying development theory is wrong
4. Critical policy, operational, or resource problems were not adequately recognized



xii. Steps in Designing a Results Framework

Key elements of a result framework include:

1. Strategic objective,
2. intermediate results,
3. hypothesized cause-and-effect linkages,
4. Critical assumptions.

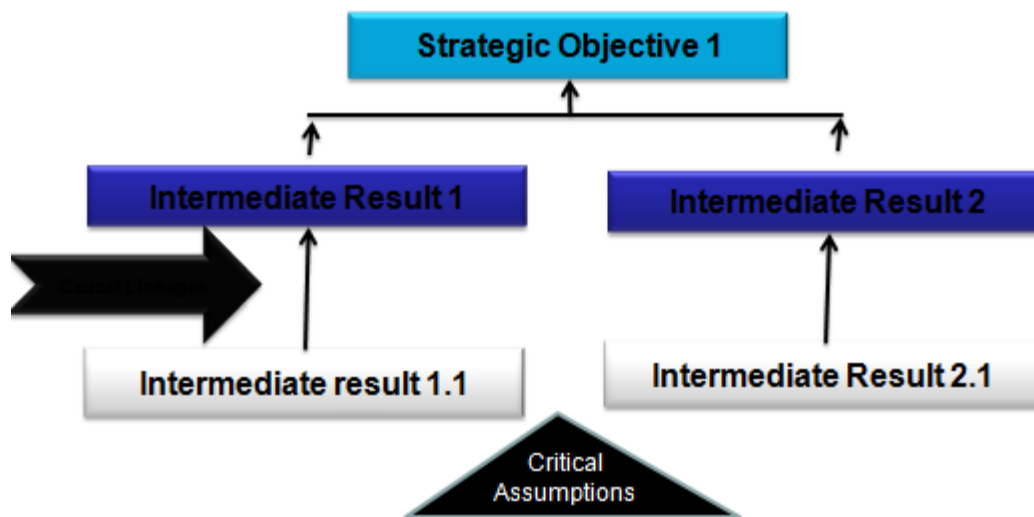
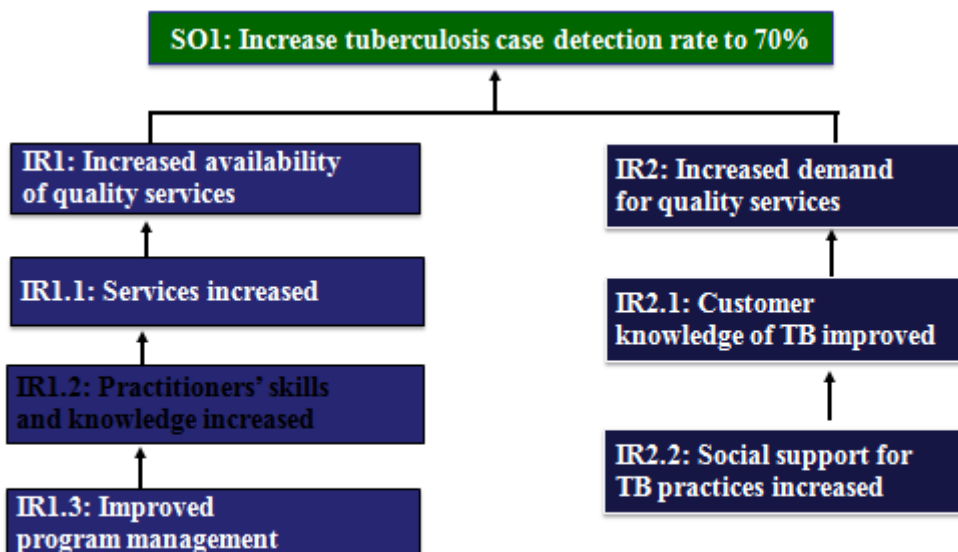


Figure 6 . Results Framework (strategic Framework)

The process for identifying these elements is outlined below as a series of steps. These steps need not be followed sequentially: developing a result framework is and should be an iterative process. Operating units may use a variety of approaches to develop their respective results frameworks. Whichever process is followed, it is important to involve partners (i.e., NGOs, other donors, and host government organizations sharing the objective). Although this takes time, the results framework will be more complete and representative with their participation. Moreover, broader ownership of the result framework among partners may promote greater harmonization of program activities aimed at a shared objective.



Figure 7: Results Frameworks: Tuberculosis (TB) Control Programs



Source: MEASURE Evaluation, 2004 (draft)

Table Summary of Frameworks

Type of Framework	Brief Description	Program Management	Basis for Monitoring and Evaluation
Conceptual	Interaction of various factors	Determine which factors the program will influence	No. Can help to explain results
Results	Logically linked program objectives	Shows the causal relationship between program objectives	Yes – at the objective level
Logical	Logically linked program objectives, outputs, and activities	Shows the causal relationship between activities and objectives	Yes – at the output and objective level
Logic model	Logically links inputs, processes, outputs, and outcomes,	Shows the causal relationship between inputs and the objectives	Yes – at all stages of the program from inputs to process to outputs to outcomes/ objectives



Session 3: Monitoring and Evaluation Indicators

Session overview

This unit helps participants to identify the components of different programs. It also explains what indicators are and how to identify and select appropriate indicators for programs monitoring and evaluation.

Learning Objectives

By the end of this unit, participants should be able to:

- Define indicators
- Describe the characteristics of good indicators
- Identify indicators that can be used to monitor a program
- Identify indicators that can be used to evaluate a program
- Able to develop appropriate indicators with their respective activities
 - Identify criteria for selection of sound indicators
 - Know how indicators are linked to the frameworks covered in the Frameworks Module

Develop an indicator matrix and complete an indicator reference sheet (group activity)

Discussion points

- What is an indicator?
- Mention types of indicators
- List characteristic of good indicators
- Develop good indicators in your respective groups

Group exercises

- Be in groups of five
- Construct a hypothetical public health intervention implemented by a Woreda Health Office.
- Start this session by discussing the objectives of the unit and then give a brief overview of the unit.



- Brainstorm on what an indicator is.
- List their responses on the flipchart.
- List characteristics of a good indicator.
- Explain why it is necessary to identify or develop appropriate indicators for monitoring and evaluation.
- Complete conceptual framework for child Health program
- Finally, identify and select appropriate input, output, outcome, and impact indicators for this program by answering the following questions:
 - what information is needed to monitor the program to evaluate the program
 - Who will collect this information?
 - Where is this information to be found?
 - Who will use the information?
 - For what purposes will it be used?

Definition of Indicators

- An indicator is a variable that measures one aspect of a program or project.
- Fundamentally, an indicator provides a sign or a signal that something exists or is true.
- It is used to show the presence or state of a situation or condition.
- In the context of monitoring and evaluation, an indicator is a quantitative metric that provides information to monitor performance, measure achievement and determine accountability.
- It is important to note that a quantitative metric can be used to provide data on the quality of an activity, project or programme.

Types of indicators

- What are the different types of indicators?



- Indicators can be categorized in a number of different ways, depending on why they are being categorized.
- However, there are two general approaches to defining types of indicators that are particularly useful in monitoring the response to HIV.
- The first is based on thematic similarities among indicators; the second is based on the relative role and/or effect that an indicator has in/on the response to the epidemic.
- The most important point about the types of indicators is how crucial it is to use a range of different types in a given set in order to get a balanced perspective.
- Only using one or two types of indicators will result in a much narrower point of view, which may provide an inaccurate picture of the situation. For example, the UNGASS set of indicators uses many different types of indicators, including behavioral outcome, disease impact, infrastructure, policy and programme/service delivery, to provide a strategic overview of the global epidemic and response.

Why are indicators useful?

- The purpose of indicators typically is to show that program activities are carried out as planned or that a program activity has caused a change or difference in something else.
- Its value will change from a given or baseline level at the time the program begins, to another value after the program and its activities have had time to make their impact felt, when the variable, or indicator, is calculated again.
- Indicator is a measurement. It measures the value of the change in meaningful units for program management: a measurement that can be compared to past and future units and values.
- A metric is the calculation or formula that the indicator is based on. Calculation of the metric establishes the indicator's objective value at a point in time. Even if the factor itself is subjective, like attitudes of a target population, the indicator metric calculates its value objectively at a given time.
- Indicator focuses on a single aspect of a program or project. It may be an input, an output, or an overarching objective, but its related metric will be narrowly defined in a way that captures that aspect as precisely as possible.



- A full, complete, and appropriate set of indicators for a given project or program in a given context with given goals and objectives will include at least one indicator for each significant aspect of program activities.
- In general very simply, indicators are standardized measures that allow for comparisons over time, over different geographic areas and/or across programs. The ability to compare temporally and spatially differentiates indicators from raw data, as does the ability to aggregate data for higher-level interpretation and application.

Characteristics of a Good Indicator

- Good indicators should be useful in the establishment of “trigger points” for action.
- They should provide information useful enough to merit the cost of collecting it.
- In addition, they should have the following characteristics:

Simple: - Indicators should be simple without compromising the essence of the variable.

Selecting a simple indicator is not always an easy task. It may require finding a balance between the ideal (which may be complex and/or impossible to collect) and the practical.

Additionally, it is important to collect only what is needed rather than what is possible or interesting.

Clearly and precisely defined: Each term of an indicator should be clearly and precisely defined. It is not sufficient, for instance, to use “percent of underweight children” as an indicator. What does “underweight” mean? Which children are being measured?

Moreover, presenting indicators as proportions permits an understanding of the population which the indicator reflects (the denominator). A better indicator would be: number of underweight (WAZ < -2) children aged 6-24 months total number of children aged 6-24 months who were weighed

Measurable: - Both quantitative and qualitative indicators should be measurable. Some indicators can be directly measurable, e.g., height and weight, while other indicators need to be defined. Clearly and precisely defining indicator terms makes indicators measurable. For example, access to piped water, can be measured simply by observation once “access” is defined (e.g., available inside the household; available within 250 yards). Sometimes, a scale or index needs to be created to measure a qualitative variable in quantitative terms. Knowledge of correct breast feeding practices, for example, might be measured by a respondent’s ability to give the correct answers to a set of objective questions.



Valid: - A valid indicator accurately reflects the situation it is intended to measure. A valid indicator in one area may be less so in another, therefore it may be inappropriate to transfer indicators from region to region or program to program. For Vitamin A status, for example, dietary intake may be a valid proxy indicator in an area with adequate intake of fat but an invalid indicator in another area where fat intakes limit Vitamin A absorption.

Reliable: - A reliable indicator will produce the same results every time it is measured, regardless of who collects the data. Reliability is not the same as validity. A reliable indicator may provide an invalid result.

Variable: - To be useful, indicators must show variation between subjects and over time. If the indicator does not vary, it will not discriminate between those who have benefited from the program and those who have not. Height is a variable indicator for young children, and we can expect well-nourished preschoolers to show more rapid growth in height than malnourished ones. Among adults, height does not vary greatly over time or with nutritional status, therefore, it not of interest for tracking program impact.

Sensitive: - To be useful, indicators must be sensitive to change over time. Some indicators vary in one setting but not in another. For example, the materials used in house construction may be a good indicator of economic status in rural areas, where houses may be made of mud, sticks, or cement, but not urban areas where the poorest households live in cement structures. In another example, in order to monitor or evaluate trends (changes) over time, an indicator must be able to measure (capture) the desired changes in (during) the time intervals planned for monitoring or evaluation activities.

Essential components of an indicator

What are the essential components of an indicator?

The following series of questions is used in the Indicator Standards & Tools to confirm that the essential components are included in an indicator.

- Does the indicator have a clearly stated title and definition?
- Does the indicator have a clearly stated purpose and rationale?
- Is the method of measurement for the indicator clearly defined, including the description of the numerator, denominator and calculation, where applicable?
- Are the data collection methodology and data collection tools for the indicator data clearly stated?



- Is the data collection frequency clearly defined?
- Is any relevant data disaggregation clearly defined?
- Are there guidelines to interpret and use data from this indicator?
- What are the strengths and weaknesses of the indicator and the challenges in its use?
- Are relevant sources of additional information on the indicator cited?

Indicator components

- When new indicators are being developed, they must be fully defined.
- No indicator should be deployed without a full definition.
- In other words, the essential components of the indicator must be clear and concrete.
- To ensure meaningful responses to the questions in the Indicator Standards & Tools listed above, it is critical to understand the terms used to define the components of an indicator.
- **Title.** A brief heading that captures the focus of the indicator.
- **Definition.** A clear and concise description of the indicator.
- **Purpose.** The reason that the indicator exists; i.e. what it is for.
- **Rationale.** The underlying principle(s) that justify the development and deployment of the indicator; i.e. why the indicator is needed and useful.
- **Method of measurement.** The logical and specific sequence of operations used to measure the indicator; e.g. data collection tools, sampling frame and quality assurance.
- **Numerator.** The top number of a common fraction, which indicates the number of parts from the whole that are included in the calculation.
- **Denominator.** The bottom number of a common fraction, which indicates the number of parts in the whole.
- **Calculation.** The specific steps in the process to determine the indicator value.
- **Data collection method.** The general approaches (e.g. surveys, records, models, estimates) used to collect data.
- **Data collection tools.** The specific tools (e.g. AIDS Indicator Surveys (AIS), Demographic and Health Surveys (DHS), Service Provision Assessments (SPA), patient registers, antenatal clinic surveillance) used to collect data.



- **Data collection frequency.** The intervals at which data are collected; e.g. quarterly, annually, bi-annually. It is important that frequency is consistent with the data collection methodology. (The frequency of data collection should not be confused with the frequency of reporting, which is commonly associated with external organizations and agencies, particularly funding partners.)
- **Data disaggregation.** The relevant subgroups that collected data can be separated into in order to more precisely understand and analyze the findings. Common subgroups include sex, age and risk population.
- **Guidelines to interpret and use data.** Recommendations on how best to evaluate and apply the findings; e.g. outlining what it means if the indicator shows an increase or a decrease in a particular measure.
- **Strengths and weaknesses.** A brief summary of what the indicator does well and not so well.
- **Challenges.** Potential obstacles or problems that may have an impact on the use of an indicator or on the accuracy/validity of its findings.
- **Relevant sources of additional information.** References to information/ materials that relate to the indicator, including background information on the development of the indicator, comparisons with previous versions of the indicator and lessons learned from the use of the indicator or similar indicators in various settings.

How to select indicators

- Indicators should be selected carefully and systematically.
- It is important to consider the context or the environment in which they will be deployed.
- It is equally important to take into account any existing or applicable indicator frameworks that are relevant to the context.
- In addition, all potential indicators should be evaluated using the international indicator standards to ensure that they can and will provide useful data.
- They should be drawn from harmonized and/ or widely used indicator sets that have a successful track record.
- When selecting indicators, it is essential to understand the context in which they will be used in order to select the most appropriate ones.

Indicator frameworks : Most countries as well as most projects have developed indicator frameworks.



- In general, these frameworks correlate key objectives, project activities and/or work plans and results with specific indicators and the methods for collecting data for those indicators.
- Many of these frameworks use the structure of the ‘logic model’ or ‘logical framework’ (i.e. log frame), which has been widely used at the project level in development work.
- In effect, the aggregated list of individual indicators in a framework constitutes an indicator set, whether the framework is for a specific project (e.g. a prevention project with only prevention indicators) or a national framework that includes a range of different indicators relevant to the country’s epidemic and response

Session 4: Monitoring and Evaluation in Ethiopian Context

Session overview

At national level monitoring and evaluation is a vital management tool because it informs planners, managers, and implementers to what extent the programs or project are operating effectively and according to expectations. Monitoring and evaluation helps to make informed decisions about implementation of Health sector Development Program (HSDP) and about various program operations and enhances the most effective and efficient use of resources. For FMOH monitoring and evaluation helps to know whether HSDP and other programs are right on track or not. This section is intended to provide you brief information on the status of monitoring and evaluation in Ethiopian health system and important concepts and indicators in Ethiopian setting.

Learning objectives

- Explain status of monitoring and evaluation in Ethiopian health system
- Identify the objectives of FMOH’s monitoring and evaluation activities
- Explain types of evaluations used by FMOH
- Explain performance monitoring and quality improvement process
- Describe the terms: Routine administrative report ,integrated supportive supervision , and inspection
- Describe the monitoring and evaluation principles : Standardization, integration and simplification
- Identify the key monitoring and evaluation indicators at national level



Overview of monitoring and evaluation work plan

According to FMOH monitoring and evaluation is an action-oriented and preplanned management tool that operates on adequate, relevant, reliable and timely collected, compiled and analyzed information on programme/project objectives, targets and activities. The objectives of FMOH's key monitoring and evaluation component are to improve the management and optimum use of resources of programme and to make timely decisions to resolve constraints and/or problems of implementation. FMOH outlined that the key elements for a successful programme management and implementation are the designing of a programme built on a hierarchy of objectives, targets, activities and measurable indicators. The agreed indicators are the most important management tools for monitoring, review and evaluation purposes. Indicators are always directly linked to the objective setting of a programme.

Health Sector Development Programme is monitored and evaluated on the basis of the detailed arrangements outlined.. Quarterly, semi-annual and annual monitoring and reporting cycles are followed. To facilitate the use of information in decision-making, all reports are presented cumulative information for the six months and the full year. The monitoring and evaluation reports are expected to be summarized comparison of planned activities and achieved outputs and utilization of resources including information on actual expenditure (both capital and recurrent) during the reporting period. The preparation of the quarterly report and monitoring is the responsibility of the implementing and supervising institutions at different levels (FMOH, RHBs, Woreda Health Offices and HFs). It is important to note that Federal and Regional bureaus can't be effective without getting the necessary reports from Woreda health Offices and health facilities including from health extension workers through the respective woreda health offices. Monitoring and evaluation provides an opportunity for stakeholders to take stock of programme implementation, exchange views and experiences, to facilitate problem-solving and possible reorientation of the programme.

Types of evaluations used by FMOH

HSDP evaluations that are carried out to assess programme implementation can be formative and summative. While formative evaluation helps to improve progress during implementation, summative evaluations are usually conducted at the end of the programme and aim at the overall assessment of achieved outputs and impacts vis-à-vis the programme objectives.



Important Issues for Data Collection and Utilization

Routine Administrative report

Patient cards and registers are designed to capture all patient related data, reports are based on the 107 sector wide indicators . Allocating resources to put in place the human resources, tools and the equipment needed for the proper documentation, compilation, analysis, use and timely reporting of routine facility data as per the standard. All stakeholders operating in the health sector should support and use HMIS for programme monitoring. In Ethiopia each health facility and administrative level has to put in place the necessary institutional mechanisms as per the standard indicated of HMIS. Data is collected from health facilities from client-patient records. The data will be aggregated and analyzed to compare plan versus performance for the facility's own consumption. Facilities must supply data to the relevant administrative levels through the routine reporting mechanism as per the HMIS reporting calendar. Validation of the data is done through performance monitoring, integrated supportive supervision, surveys and regular inspections.

Performance Monitoring and Quality Improvement

Performance monitoring: is the continuous tracking of priority information on conducted activities and the indicators of success in order to identify achievement gaps and lessons learnt as an input for subsequent leading to the planning and implementation of corrective measures.

Quality improvement process is a performance monitoring activity by which health facilities (Hospitals, Health centers and Health posts) themselves use the opportunity of using locally available data generated during provision of health service to improve quality of health care through a continuous process of measurement and improvement. This aspect of monitoring and evaluation conducted based on Performance monitoring and quality improvement standard operating procedure endorsed as part of PPME core process that clearly outlines the fundamental building blocks of performance monitoring and quality improvement i.e. Quality planning, quality performance measurement, quality improvement activities, staff involvement, evaluation of quality program, and clinical information system.

Evaluation/Operational Research



Evaluation is a well thought systematic approach which may be designed to determine the value or worth of a specific program, intervention or project or any of its components to be able to link a particular output or outcome directly to a particular intervention. Program evaluation requires a systematic process of data collection, analysis and interpretation about interventions and their effects about a program or any of its components in pursuit of looking answers to evaluation questions. It fundamentally consists of making a value judgment regarding an intervention, a service or regarding any one of their components, purposing to help in evidence-based decision making. In such evolution processes, some issues may require further detailed investigation to get clear picture of the “whys” of program performances or achievements. Such evaluation questions will be addressed by program evaluation. It is technically impossible to obtain all health and health related data exclusively through HMIS. Hence, regular demand side and supply side surveys have to be conducted to capture selected set of data and triangulate various sources in order to improve the accuracy of outcomes and impacts of health interventions.

Integrated Supportive Supervision (ISS)

Integrated Supportive Supervision can be defined as a process of guiding, helping, training, and encouraging staff to improve their performance in order to provide high-quality health services through the use of integrated tools for all priority programs and empowering of health service providers at all levels. A guideline and tools for ISS have been finalized as part of the BPR and it is started to be used for HSDP IV.

Inspection

In the process of monitoring and evaluation, issues which are related with performance based financing and other most priority and emergency situations need a mechanism for verification of routine reports attached with accountability. It is being addressed by inspection which is established at all levels in the health sector. Unlike ISS which focuses on onsite support provision, inspection is primarily to prove activities and make institutions accountable for their level of compliance with agreed upon levels of performance. Manuals and tools for implementation of inspection are being used and implemented during HSDP IV.



Important Monitoring and Evaluation Principles for Establishing and Utilizing Indicators in Ethiopian Health System

It is essential to address the following three overarching principles. A combined application of these principles supports the implementation of an effective and efficient HMIS/M&E in accord with the objectives of Business Process Reengineering (BPR).

Standardization - Common definitions of indicators, data collection instruments, and data processing and analysis procedures form the foundation for effective HMIS/M&E. Without consistent principles and definitions performance cannot be systematically measured and improved across locations or over time.

Integration - A single HMIS/M&E plan, shared by all partners, is a cornerstone of HSDP Implementation of this principle requires integrating data from different programs into a shared channel from which all derive their information.

Simplification - Collecting, analyzing, and interpreting only the information that is immediately relevant to performance improvement makes best use of scarce resources, especially human resources.

5.6. Selected Key Monitoring and Evaluation Indicators for Result Framework at National Level

The following are selected, not comprehensive, list of indicators put in place to monitor programmatic areas in HSDP IV. This list of indicators that should be made available on at least annual basis (or more frequently).

Maternal Neonatal and Child Health (MNCH)

1. Contraceptive acceptance rate
2. Focused ANC 1+
3. Proportion of deliveries attended by skilled health attendants
4. Proportion of deliveries attended by HEW
5. Post natal care coverage
6. Proportion of pregnant women who receive ANC at PMTCT site who received testing for HIV
7. Proportion of deliveries of HIV+ women that receive full course of ARV prophylaxis
8. Immunization coverage; Pentavalent 3, Rotavirus, Pneumococcal, measles and fully Immunized



9. Protection at birth against neonatal tetanus

10. Health facility with services like PMTCT, BEmONC, CEmONC, IMNCI, Youth friendly services

Disease Prevention and Control

1. PIHCT testing rate

2. VCT testing rate

3. Cumulative number of PLHIV ever enrolled in HIV care

4. Cumulative number of PLHIV ever started on ART

5. Proportion of patients who are currently on ART

6. TB case detection rate

7. TB cure rate

8. TB treatment success rate

9. Proportion households in malarious areas possess at least one LLIN

10. Proportion of households in IRS targeted areas that were sprayed in the last twelve months

Nutrition

1. Children 6-59 months given vitamin A every 6 months

2. Children 2-5 years dewormed every 6 months

Hygiene and Environmental Health

1. Proportion of households using household water treatment and safe storage practice

2. Proportion of households utilizing latrine

Health Infrastructure

1. Number of new Health Facilities constructed (by type)

2. Number of Health Facilities upgraded (by type)

3. Proportion of health facilities with latrine and with functioning water supply

4. Proportion of Health facilities with water supply

5. Number of hospitals implementing EMR



6. Number of hospitals implementing tele-medicine

Human Resources

1. Health Staff to population ratio by category
2. Proportion of institutions staffed as per standards

Pharmaceutical supply and services

1. Average stock out duration Essential drug availability
2. Percentage of stock wasted due to expiry

Community Ownership

1. Proportion of model households graduated
2. Proportion of health facilities with boards where communities are represented

Quality Health services

1. Inpatient mortality rate
2. Customer satisfaction index
3. Outpatient (OPD) attendance per capita
4. Bed occupancy rate
5. Average length of stay

Public Health Emergency preparedness and Response

1. Proportion of epidemics averted (AWD, malaria and meningitis)
2. Proportion of epidemics controlled with zero mortality

Evidence based Decision Making

1. Proportion of partners implementing “one-plan”
2. Proportion of partners providing funds as DBS or MDG PF
3. Facilities implementing the new HMIS/M&E System (by type of facility)
4. Completeness and timely submission of routine health and administrative reports
5. Review meetings conducted by level

Resource Mobilization and Utilization

1. Percentage of government budget allocated for health
2. Facilities retaining and utilizing revenue (by type)
3. The ratio of health budget utilization to allocation



Part 2:

SURVEILLANCE AND EPIDEMIC INVESTIGATION

1. Introduction to Public Health Surveillance
2. Burden of HIV/AIDS
3. HIV/AIDS surveillance
4. Ethical Considerations in HIV/AIDS Surveillance
5. Outbreak investigation and management



Session 1: Introduction to Public Health Surveillance

Session overview

This session gives overview of the public health surveillance, described different types of surveillance, information generation through surveillance for evidence based practice. This session will enable you to answer the questions: how to analyze surveillance data?

Learning objectives

At the end of this session, the participant will be able to:

- Define public health surveillance and list some of the uses
- Describe different types of surveillance
- Describe the features/attributes of good surveillance and running public health surveillance
- Conceptualize the quality parameters of public health surveillance
- Have skills of analyzing surveillance data and avail information through surveillance for evidence based practice

1. Definition of Public Health Surveillance

Public Health Surveillance is an on-going systematic collection, analysis, interpretation and dissemination of health-related data essential to the planning, implementation, and evaluation of public health practice

2. Purposes of Public Health Surveillance

Surveillance has the following purposes:

- Assess public health status
- Trigger public health action
- Define public health priorities
- Evaluate programs



- Generally, it informs the management of public health programs and direction of public health policy

Information obtained by surveillance is important for Action. The major reason for collecting, analyzing and disseminating information on a disease is to control that disease. Collection and analysis should not be allowed to consume resources if action does not follow.

3. Process of Public Health Surveillance

Surveillance consists of the following interconnected activities:

- Data collection
- Data analysis
- Data interpretation
- Information dissemination
- Link to action

4. Data Sources for surveillance

Data for surveillance purpose can be obtained from:

- Records of notifiable diseases
- Routine records of health facilities
- Laboratories
- Vital records
- Registries
- Surveys
- Other data sources

5. Selection of diseases for surveillance



All diseases may not be included in surveillance because it is too expensive to include all the diseases. Therefore, there is a need of having criteria to include diseases in surveillance. The importance of a health event to be included in surveillance system should be assessed using the following criteria:

1. The current impact of the health event
 - Having high incidence/ prevalence
 - Severity (case fatality rate, hospitalization)
2. The disease should be of epidemic potential

(eg. Measles, cholera, meningitis)
3. Surveillance required internationally

(eg plague, yellow fever, cholera)
4. Availability of effective prevention and control interventions

(eg EPI, IMCI)
5. Can easily be identified using simple case definitions

Integrated Disease Surveillance and Response (IDSR)

Integrated disease surveillance and response envisages all surveillance activities in a country as a common public health service that carry out many functions using similar structures, processes and personnel. The surveillance activities that are well developed in one area may act as driving forces for strengthening other surveillance activities, offering possible synergies and common resources. Surveillance is based on collecting only the information that is required to achieve objectives for disease control. Even though there is integration, data requested may differ from disease to disease and some diseases may have specific information needs, requiring specialized systems.

Features of Integrated Disease Surveillance and Response

Integrated Disease Surveillance and Response looks at surveillance as a "common" service; Seeks to maintain surveillance and control functions close to one another; Recognizes that different diseases



may have specialized surveillance needs; Uses a functional approach to communicable disease surveillance

Integrated Disease Surveillance and Response exploits opportunities for synergy in carrying out:

- core functions: data collection, data reporting, data analysis, and response
- surveillance support functions: training and supervision, laboratory strengthening, communications, and resource management

Goal of Integrated Disease Surveillance and Response Programme

The goal of Integrated Disease Surveillance and Response is to ensure that each Member State has the capacity to define, detect and respond to communicable public health threats. To this end, an integrated disease surveillance programme aims to provide:

- timely, complete, regular and high quality information
- early detection and prediction of epidemics (early warning systems)
- objective assessment of interventions during epidemics; and
- efficient monitoring of intervention programmes

List of Priority Diseases in Ethiopian IDSR

Epidemic-prone diseases <ol style="list-style-type: none">1. Cholera2. Diarrhea with blood (Shigellosis)3. Measles4. Meningitis5. Plague6. Viral hemorrhagic fever7. Yellow fever8. Typhoid fever9. Relapsing fever10. Epidemic typhus11. Malaria	Diseases targeted for eradication <ol style="list-style-type: none">12. Acute flaccid paralysis (Polio)13. Dracunculiasis (Guinea worm)14. Leprosy15. Neonatal Tetanus Other diseases of public health importance <ol style="list-style-type: none">16. Pneumonia in children17. Diarrhea in children18. New AIDS cases19. Onchocerciasis20. Sexually transmitted diseases21. Tuberculosis22. Rabies
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6. Types of Data on Surveillance Case Report Forms

Case report forms of surveillance may consist of the following information

- Identifying information
- Demographic information
- Clinical information
- Exposure / risk factor information
- Reporter information
- (Information on contacts)

7. Elements of Surveillance System

Once diseases for surveillance are selected, the following should be done

1. Case definition of diseases included in the surveillance. (Confirmed, probable and possible)
2. Determining and updating population under surveillance
3. Time period of collected data reporting
(Immediately, weekly, and monthly)
4. Sources of data, who would report etc.
5. How data are handled (confidentiality)

7.1 Case definition of diseases

Case definition

A case definition is a set of criteria used to decide whether a person has a particular disease.

Case definition may include:

- Criteria: Signs and symptoms with or without a laboratory test
- Restriction by time, place and person can be done depending on the nature of the disease



Classification of cases:

1. **Confirmed:** a case with appropriate lab. Test confirmation
2. **Probable:** a case with typical clinical features of the disease without laboratory confirmation
3. **Possible/ Suspect:** a case with few of the typical clinical features.

Example of case definition for malaria

Confirmed malaria	Probable malaria	Possible/Suspected malaria
Confirmed by laboratory test	Presence of chills, fever, headache, arthralgia, back pain etc, of sudden onset, but without laboratory confirmation	Presence of fever and headache of sudden onset without laboratory confirmation

Major advantages of case definition

- It facilitates early detection and prompt management of cases
- It is useful in areas where there is no laboratory
- It facilitates observation of trends within specified geographic areas
- It facilitates comparison accurately between different areas.

It is important to use case definition consistently because if different case definitions are used, comparison will be difficult

7.2. Determine the population under surveillance

Different population groups can be targeted for surveillance. Target population can be individuals at specific institutions, residents of a community, residents of a nation, etc. A surveillance system remains effective when it is continuously assessed. Periodically updating information about the catchment area is also necessary.



7.3 Time period of data collection

It is useful to identify problems and solve timely. For this reason it is important to decide the data collection and reporting time for different health problems.

There are three periods of reporting

1. **Immediate reporting:**

- A. For diseases considering presence of a single case to result to a suspicion for an epidemic.
- B. Suspected epidemic when a threshold is crossed

2. **On weekly basis:**

For epidemic prone diseases. eg Malaria, meningitis

3. **On monthly basis:**

For Routine surveillance eg Tuberculosis, Leprosy, AIDS cases

7.2 . Confidentiality

Personal identifying information is necessary to identify duplicate reports, obtain follow-up information when necessary, provide services to individuals, and use surveillance as the basis for detailed investigations. One should be very careful to maintain the confidentiality of the information provided by people included in the surveillance. Protecting the confidentiality of surveillance records is both an ethical responsibility and a requirement for maintaining the trust of participants.

The following mechanisms can be applied to maintain the confidentiality of data:

- limiting access of personnel to sensitive data
- adequate locks for rooms and files where data are stored
- use of passwords and other security measures in computer systems
- personal identifying information should not be kept when it is not needed

While personal identifying information may be needed at the local level, it is generally not necessary for that information to be forwarded to more central agencies. In such cases codes can be used



8. Types of surveillance

There are three major types of surveillance. These are Passive Surveillance, Active Surveillance, and Sentinel Surveillance

A. Passive surveillance

It is a mechanism for routine survey based on passive case detection and on the routine recording and reporting system. The information provider comes to the health institutions for help, be it medical or other. It involves collection of data as part of routine provision of health services.

Advantages of passive surveillance

- covers a wide range of problems
- does not require special arrangement
- it is relatively cheap
- covers a wider area

Disadvantages of passive surveillance

- Information generated is to a large extent unreliable, incomplete and inaccurate
- Most of the time, data from passive surveillance is not available on time
- Most of the time, you may not get the kind of information you desire
- It lacks representativeness as it is mainly from health institutions
- There is no feed back system

B. Active surveillance

Active surveillance is a method of data collection usually on a specific disease, for relatively limited period of time. It involves collection of data from communities such as house-to-house surveys or mobilizing communities to some central point where data can be collected. This can be arranged by assigning health personnel to collect information on presence or absence of new cases of a particular disease at regular intervals.

Example: investigation of out-breaks

The techniques employed to collect information for active surveillance are:

- Sending out a letter describing the situation and asking for reports,



- making a telephone call
- visit the facilities to collect information on cases
- Alerting the public directly, usually through local media, to visit a health facility if they have symptoms compatible with the disease in question.
- Asking patients of the particular disease if they know anyone else with the same condition.
- Conducting a survey of the entire population

Advantages of active surveillance

- the collected data is complete and accurate
- information collected is timely

Disadvantages of active surveillance

- it requires good organization
- it is expensive
- requires skilled human power
- it is for short period of time (not a continuous process)
- it is directed towards specific disease conditions

Conditions in which active surveillance is appropriate

- For periodic evaluation of an ongoing program
- For programs with limited time of operation such as eradication program.
- In unusual situations such as:
 - New disease discovery
 - New mode of transmission
 - When a high-risk season/year is recognized.



- When a disease is found to affect a new subgroup of the population.
- When a previously eradicated disease reappears.

C. Sentinel Surveillance

Sentinel Surveillance uses a pre-arranged sample of reporting sources to report all cases of one or more conditions. Usually the sample sources are selected to be those most likely to see cases of the specified condition. Sentinel Surveillance provides a practical alternative to population-based surveillance in developing countries. During the establishment of Sentinel Surveillance, health officials define homogenous population subgroups and the regions to be sampled. They then identify institutions that serve the population subgroups of interest, and that can and will obtain data regarding the condition of interest.

Main Purposes of Sentinel Surveillance

- To detect changes
- To direct and focus control efforts
- To develop intervention strategies
- To promote further investigations
- Provide the basis for evaluating preventive strategies and activities

Advantages of sentinel surveillance

- relatively inexpensive
- provides a practical alternative to population-based surveillance
- can make productive use of data collected for other purposes

Disadvantages of sentinel surveillance

- the selected population may not be representative of the whole population
- use of secondary data may lead to data of lesser quality and timeliness



8. Analysis of Surveillance Data

There is a need to analyze the data after receiving data about each individual included in the surveillance. Usually descriptive analysis by time, place and person is conducted. Additionally, it is also possible to conduct advanced statistical analysis like Time-series analyses to detect deviations, Time-space clustering etc...

What can account for an apparent increase in cases?

The increase in the number of reported cases may not necessarily indicate the increase in the extent of disease. Reports should be carefully interpreted.

The increase in the number of reported cases may due to:

- True increase in incidence
- Change in reporting procedures / change in surveillance system
- Change in case definition
- Improvements in diagnostic procedures
- Increased awareness
- Increased access to health care
- New physician, ICU, or clinic – may see more referred cases, may make diagnosis more often, or report more consistently
- Laboratory or diagnostic error
- Change in denominator

9. Dissemination of Surveillance Data

When planning to disseminate surveillance information, it is necessary to decide to whom the information shall be disseminated and how it can be disseminated.



To Whom?

- Public health officials
- Governmental officials
- Clinicians / labs (reporters)
- Public

How?

- Internal briefs
- Health agency newsletters
- Press releases
- Surveillance summaries / reports
- Medical / epidemiologic journal articles

11. Features of good surveillance System

A good surveillance system:

- Uses a combination of passive and active mechanisms
- Collects the minimum data in a simplest possible way
- Collects data in a manner useful for the workers who collect the data
- Has timely reporting system
- Provide timely and comprehensive response/action
- Incorporate strong laboratory services for accurate diagnosis

Attributes of surveillance

Surveillance systems can be judged using a list of attributes (CDC 1988). This list can be used to evaluate an existing system or to conceptualize a proposed system. Because the attributes may be conflicting, it is necessary to determine which ones are the most important for a given system.



The attributes of surveillance include sensitivity, timeliness, representativeness, predictive value, Accuracy and completeness of descriptive information, simplicity, flexibility, and acceptability.

a) Sensitivity

Sensitivity answers the question - to what extent the system identify all of the events in the target population?

b) Timeliness

It refers to timeliness of the entire cycle of information flow, ranging from information collection to dissemination

C) Representativeness

Representativeness answers the question- To what extent do events detected through the surveillance system represent persons with the condition of interest in the target population? A lack of representativeness may lead to misallocation of health resources.

d) Predictive value

Predictive value answers the questions

- To what extent are reported cases really cases?
- To what extent are measured changes in trends truly reflective of events in the community

e) Accuracy and completeness of descriptive information

Forms of reporting health events often include descriptive personal information, such as demographic characteristics, clinical pattern of disease, or potential exposures. This attribute answers the questions:

- To what extent are these sections of forms completed?
- Is the information sufficiently reliable?

f) Simplicity

This attribute answers the questions:

- Are forms easy to complete?
- Are procedures difficult?
- Is data collection kept to a necessary minimum?



g) Flexibility

It is related to issues like:

- Can the system change to address new questions?
- Can it adapt to evolving standards of diagnosis or medical care?

h) Acceptability

This attribute answers the questions:

- To what extent are the participants in a surveillance system enthusiastic about the system?
- Does the effort they invest yield useful information?

Small group work

Different Health and Demographic Surveillance Systems (HDSS) are established in Ethiopia by different universities. These HDSS sites are

1. Butajira Rural Health Program, Addis Ababa University
2. Dabat Research Center, University of Gondar
3. Gilgel Gibe Field Research Center, Jimma University
4. Kersa Demographic Surveillance and Health Research Center, Haramaya University
5. ArbaMinch Zuria Demographic and Health Development Program-ArbaMinch University
6. Kilde Awlaelo Demographic and Health Development Program- Mekele University

These HDSS sites are collecting data related to birth, death, migration, causes of death etc..There is an intention to include some diseases in the already established surveillance system.

Discussion points

- 1) Which diseases do you recommend to include in the surveillance system? Why? Discuss from the perspective of attributes of surveillance
- 2) What are the possible problems when the diseases you suggested are included in the surveillance?



References

- Rothman KJ & Greenland S. Modern Epidemiology (2nd edn). Philadelphia: Lippincott-Raven Publishers, 1998
- <http://www.who.int>. Public Health Surveillance. Accessed on 18/7/2013
- CDC. CDC's Vision for Public Health Surveillance in the 21st Century. Morbidity and Mortality Weekly Report. July 27, 2012



Session 2: Burden of HIV/AIDS

Session overview

This session gives overview of the burden of HIV/AIDS globally, nationally and regional, the common programmatic areas of HIV intervention. This session will enable you to know trend and impact of HIV/AIDS in sub-Saharan Africa and Ethiopia.

Learning Objectives

At the end of this session, participants will be able to:

- Describe the stages of HIV/AIDS epidemic
- Understand the global burden of HIV/AIDS
- Discuss on the burden, trend and impact of HIV/AIDS in Sub-Saharan Africa and Ethiopia
- Discuss key Programmatic areas of HIV/AIDS interventions

1. Stages of the HIV/AIDS Epidemic

There are 3 stages of HIV/AIDS epidemic. These are low-level, concentrated, and generalized.

A) Low-level

- confined to persons with high-risk behavior
- not above 5% in any sub-population
- E.g Madagascar, Seychelles

B) Concentrated

- above 5% in one or more risk populations
- not above 1% in ANCs or pregnant women in urban areas
- E.g Mauritania, Senegal

C) Generalized

- well established in general population



- consistently above 1% in ANCs or pregnant women in urban areas
- E.g most of sub-Saharan Africa

2. Global burden

People living with HIV

In 2011, there were 34 million people living with HIV globally. Sub-Saharan Africa is the region most affected, with nearly 1 in every 20 adults living with HIV. Sub-Saharan Africa accounts for 69% of all people living with HIV.

New HIV infections

Worldwide, about 2.5 million people became newly infected with HIV in 2011. Twenty five countries have seen a 50% or greater drop in new HIV infections since 2001. There has been 42% reduction in new HIV infections in the Caribbean (the second most affected region in the world after sub-Saharan Africa). Half of all reductions in new HIV infections in the last two years have been among newborn children. In 2011, new infections in children were 43% lower than in 2003, and 24% lower than 2009. However progress was uneven. Since 2001, the number of people newly infected in the Middle East and North Africa increased by more than 35%. In Eastern Europe and Central Asia, there has also been an increase in new HIV infections in recent years.

AIDS-related deaths

In 2011, 1.7 million people died from AIDS-related causes worldwide. Globally there were more than half a million fewer deaths in 2011 than in 2005. The numbers of AIDS-related deaths had declined by nearly one-third in sub-Saharan Africa between 2005 and 2011. The Caribbean experienced declines in AIDS-related deaths of 48% between 2005 and 2011 and Oceania 41%. However two regions experienced significant increases in AIDS-related deaths; Eastern Europe and Central Asia (21%) and the Middle East and North Africa (17%).

Antiretroviral therapy



In 2011, more than 8 million people living with HIV had access to antiretroviral therapy. The number of people accessing HIV treatment had increased by 63% from 2009 to 2011. In 10 low- and middle-income countries, more than 80% of those eligible are receiving antiretroviral therapy. However, 7 million people eligible for HIV treatment still do not have access. Seventy two percent of children living with HIV who are eligible for treatment do not have access to the service.

HIV/TB

TB-related deaths in people living with HIV have fallen by 25% since 2004. However, TB remains the leading cause of death among people living with HIV. All people living with both TB and HIV should start antiretroviral therapy. However in 2011, fewer than half (48%) of people with TB who had a documented HIV positive test result obtained antiretroviral therapy.

3. Sub-Saharan Africa

Sub-Saharan Africa remains the most heavily affected region in the global HIV epidemic. In 2011, an estimated 23.5 million people lived with HIV resided in sub-Saharan Africa, representing 69% of the global HIV burden. In the same year, 92% of pregnant women living with HIV resided in sub-Saharan Africa. More than 90% of children who acquired HIV in 2011 live in sub-Saharan Africa. Women in sub-Saharan Africa remain disproportionately impacted by the HIV epidemic, accounting for 58% of all people living with HIV in the region in 2011.

In 2011, there were an estimated 1.8 million new HIV infections in sub-Saharan Africa compared to 2.4 million new infections in 2001 which showed a 25% decline. Between 2005 and 2011, the number of people dying from AIDS-related causes in sub-Saharan Africa declined by 32%, from 1.8 million to 1.2 million. Since 2004, the number of TB related deaths among people living with HIV has fallen by 28% in sub-Saharan Africa. Between 2009 and 2011, the number of children newly infected with HIV fell in sub-Saharan Africa by 24%. In six countries of sub-Saharan Africa (Burundi, Kenya, Namibia, South Africa, Togo and Zambia), the number of children newly infected with HIV declined by 40%–59% between 2009 and 2011. Fourteen additional countries in the region reported declines of 20-39%. However, 11 countries in the region saw more modest declines of 1–19%. In four countries (Angola, Congo, Equatorial Guinea, Guinea-Bissau), the number of new HIV infections among children increased. In 2011, coverage of services to prevent mother-to-child transmission (PMTCT) of HIV in



sub-Saharan Africa reached 59%. Six countries in the region achieved PMTCT coverage of more than 75%: Botswana, Ghana, Namibia, South Africa, Swaziland and Zambia. Seven countries reported PMTCT coverage of less than 25%: Angola, Chad, Congo, Eritrea, Ethiopia, Nigeria and South Sudan.

Surveys conducted between 2004 and 2011 in 14 countries in sub-Saharan Africa found significant increases in the percentage of adults who had taken an HIV test in the previous 12 months and received their results. In Lesotho, for example, an estimated 42% of adult women reported that they had been tested for HIV in 2009 compared to about 6% in 2004. In Rwanda, nearly 39% of adult women were tested for HIV in 2010 compared to about 12% in 2005. In Ethiopia, an estimated 21% of adult men were tested for HIV in 2011 compared to approximately 2% in 2005. Approximately 23% of adult men in Kenya were tested for HIV between 2008/9 compared to about 8% of men in 2003. Among countries surveyed, HIV testing rates tended to be higher among women than men; this may be due, in part, to increased availability of HIV testing in antenatal settings. Increases in HIV testing coverage can be linked to the scale up of antiretroviral therapy programmes and investment in a broad array of HIV testing strategies, such as provider-initiated testing and counseling, rapid testing technologies and home-based testing campaigns.

In 2011, an estimated 56% of people eligible for HIV treatment in sub-Saharan Africa were receiving it compared to a global average of 54%. Five countries in the region have achieved more than 80% coverage of HIV treatment namely Botswana, Namibia, Rwanda, Swaziland and Zambia. Benin, Kenya, Malawi, South Africa and Zimbabwe achieved more than 60% coverage of HIV treatment. Coverage of antiretroviral therapy in three countries in the region—Madagascar, Somalia and South Sudan was is less than 20%. Wider access to treatment is saving lives. Since 1995, antiretroviral therapy has added approximately 9 million life-years in sub-Saharan Africa. Available evidence continues to highlight the urgent need to improve retention rates for people enrolled in HIV treatment and care.

4. Ethiopia

HIV AND AIDS ESTIMATES (2011)

- Number of people living with HIV -790,000
- Prevalence rate among adults 15 to 49 years - 1.40%



- Adults aged 15 years and up living with HIV - 6 10,000
- Women aged 15 and up living with HIV - 390,000
- Children aged 0 to 14 years living with HIV - 180,000
- Deaths due to AIDS - 54,000
- Orphans due to AIDS aged 0 to 17 years- 950,000
- Reported number of people receiving ART in 2012 - 288 137
- Estimated number of people eligible for ART in 2012 - 480 000
- Estimated ART coverage in 2012 - 60%
- Number of pregnant women living with HIV receiving antiretroviral medicines for PMTCT in 2012 - 15 828
- Estimated number of pregnant women living with HIV needing antiretroviral medicines for PMTCT in 2012 - 38 000
- Antiretroviral coverage among pregnant women living with HIV, 2012 - 41%



5. Global Action to Address the HIV/AIDS Epidemic

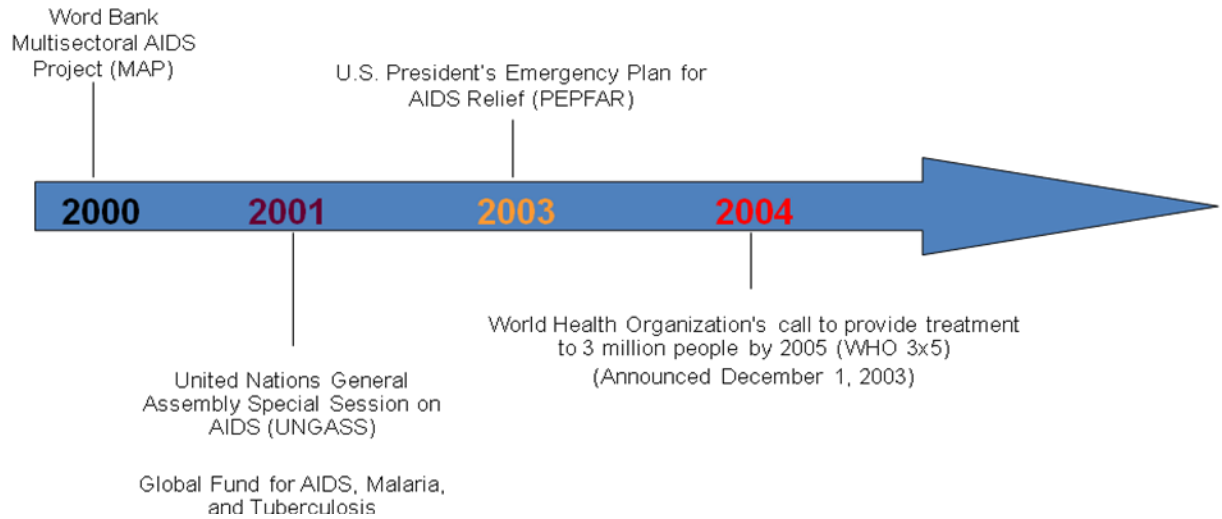
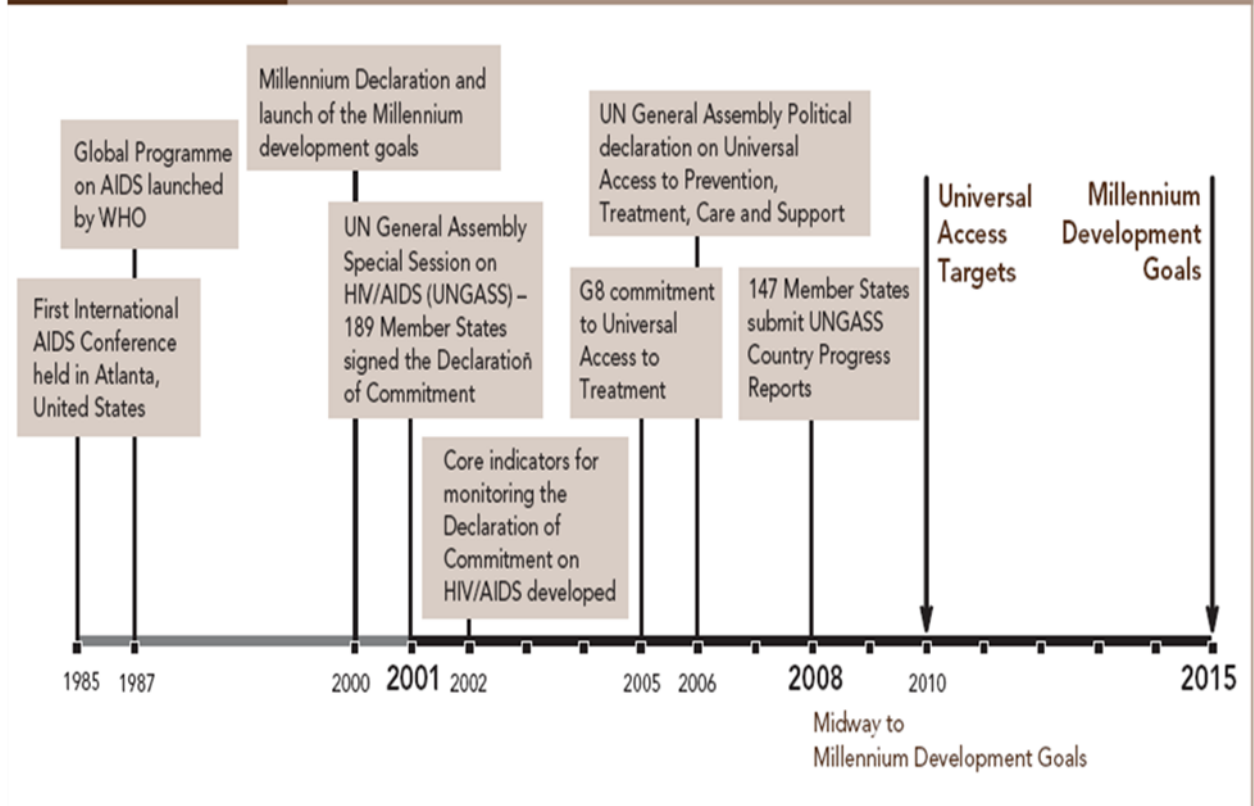


FIGURE 1.1

Selected events in the global response to the epidemic



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Goals: Global (MDG)

The following HIV/AIDS related goals were set

- a) **Millennium Development Goal 6:** Combat HIV/AIDS, malaria and other diseases
 - Target 7: Have halted by 2015 and begun to reverse the spread of HIV/AIDS
- b) **WHO 3 by 5 Goal:** Universal access to antiretroviral therapy for all living with HIV/AIDS
 - Target: Treating 3 million people by 2005

c) US Presidents Emergency Plan

- Prevention of 7 million new infections



- Treat 2 million HIV-infected people
- Care for 10 million HIV-infected individuals and AIDS orphans

6. Key HIV/AIDS Programmatic Areas

A) Prevention

1. Behavior Change Communication

- e.g. sexual behavior, condom use, injectable drug use (IDU) behaviors
- Most organizations are engaged.

2. Medical Interventions

- e.g. PMTCT, VCT, blood safety, universal precautions, STI treatment etc.

B) Care and Treatment

3. Care and support to PLWHA and their families.
4. Prophylaxis and treatment of opportunistic infections (including tuberculosis).
5. Treatment with antiretroviral therapy (ART).

C) Impact Mitigation

6. Support to Orphans and Vulnerable Children (OVC)
7. Reduction of stigma and discrimination
8. Addressing gender disparities

Small group work

In some Sub-Saharan African countries the prevalence of HIV/AIDS remained high. What are the possible reasons?



References

- UNAIDS. Global Fact Sheet. World AIDS Day 2012
- UNAIDS. Regional Fact Sheet 2012
- WHO Report (June 2013). Global Update on HIV Treatment 2013: Results, Impact and Opportunities



Session 3: HIV/AIDS surveillance

Session overview:

This session gives overview of the purposes HIV/AIDS surveillance to know the types of different the types of surveillance. This session will enable you to know the surveillance sampling method and methods of surveillance data collection. Why is HIV/AIDS surveillance needed? How do they work and what are their types?

Learning Objectives

At the end of this session, participants will be able to:

- Describe the purposes of HIV/AIDS surveillance
- Describe core elements of HIV/AIDS surveillance
- describe the different surveillance systems
- Understand the components of Second-Generation HIV Surveillance
- Describe basic data collection methods
- Discuss the surveillance sampling methods
- Describe the indicators used in surveillance

1. Purposes of HIV and AIDS Surveillance

HIV and AIDS Surveillance have the following purposes:

- Provide an accurate assessment of the distribution of disease by person, place and time
- Provide information on trends in disease distribution by geographic, socio-demographic or exposure parameters
- Identify groups or geographical areas for interventions
- Provide information to evaluate effectiveness of interventions
- Provide data for prevention programme management
- Provide data for development and implementation of research efforts



2. Core Elements of HIV/AIDS Surveillance

a) AIDS case reporting

It is routine reporting of AIDS cases in all or selected health facilities in a country. The purpose of such reporting is to monitor AIDS morbidity in the general population

b) HIV sero-surveillance

The purpose of this form of surveillance is to estimate the prevalence of HIV infection in selected populations. Sero-prevalence surveys are conducted on selected populations on an ongoing basis

3. Common Surveillance Systems

Surveillance system	Description	Advantages
Universal case reporting	Minimum data collected from all health facilities in the country where cases are seen.	It provides data that can be generalised to the entire population of a nation.
Sentinel surveillance	More complete data are obtained from all patients seen at a small number of facilities, which are known to consistently report cases.	It provides detailed, high-quality data about more specific population by using a smaller, more reliable system.

Considerations in Selecting Sentinel Populations

The local epidemiology of HIV and major risk factors and the state of the epidemic shall be considered in selecting the sentinel populations

In **low-level** epidemics, sentinel surveillance should focus on high-risk groups. For example, commercial sex workers

In **concentrated** epidemics, sentinel surveillance should include both persons from high-risk groups and women in ANCs.



In **generalised** epidemics, sentinel surveillance should focus primarily on women in ANCs. Since most sub-Saharan African countries have generalised epidemics, surveillance should focus on women attending ANCs.

Advantages of ANC Attendees as Sentinel Populations

- ANCs include sexually active women aged 15 to 49.
- ANCs are attended by a large proportion of the adult female population in many countries.
- HIV testing can be done on an anonymous basis since blood specimens are taken for other purposes.
- HIV prevalence among pregnant women can be used to estimate the potential for mother-to-child transmission of HIV.
- ANCs are most common sentinel surveillance sites in sub-Saharan Africa and developing world.
- Provide a basis to compare districts, countries and regions.

Disadvantages of ANC Attendees as Sentinel Populations

- ANCs do not include infertile women, women who have abortions and women on contraceptives.
- HIV may decrease fertility and women's desire for children, so HIV+ women will be under-represented.
- ANCs may underestimate HIV prevalence in older age groups as HIV-positive women are less likely to:
 - get pregnant
 - to attend ANCs if they are pregnant
- ANC attendance may vary by gravidity and quality of care provided.
- ANC-based sentinel surveillance does not directly measure HIV prevalence in men.
- ANCs may not include or be able to identify women at highest risk for infection (for example, sex workers).



Selecting ANC Attendees for HIV Surveillance

- Selection criteria must be standardised.
- Clear inclusion and exclusion criteria to ensure integrity of results, e.g.
 - Minimise multiple sampling of the same women attending an ANC
 - Include only women who are attending the ANC for the current pregnancy for the first time
 - Only sample ANC clients screened for syphilis (syphilis screening only once)

STI Clinics for HIV Sentinel Surveillance

STI clinic patients are an easily identifiable and readily accessible group at high risk for acquiring HIV infection through sexual intercourse.

Advantages of STI Clinic Patients for HIV Sentinel Surveillance

- HIV testing can be done anonymously with unlinked results if blood is drawn for serologic testing for syphilis.
- STI clinics include large numbers of both men and women.

Disadvantages of STI Clinic Patients for HIV Sentinel Surveillance

- May not be representative of the population of all persons with STIs. Many persons self-treat STIs or seek treatment outside of government-run STI clinics.
- Only patients with STI symptoms will seek care.
- Some STIs do not cause symptoms, especially in women.

Additional Sentinel Populations

Patients in other health care facilities can potentially be used as sentinel populations.

For example:

- Tuberculosis (TB) clinics
- Hospital wards and clinics providing health care to refugees or other high-risk groups



- Workplace-based clinics: factory workers, miners or plantation workers

Members of other high risk populations may not be seen at a particular clinic. In such cases, special community-based sero-surveys may be needed. Such populations include truck drivers, sex workers in brothels or streets, migrant workers etc..

Recommendations for Sentinel Populations in Sub-Saharan Africa

- **First Priority:** Pregnant women attending ANC's
- **Second Priority:** STI clinic attendees
- **Third priority:** Other populations, for example sex workers, long-distance truck drivers or male occupational groups

Criteria for Site Selection

Selection of sites for HIV sentinel surveillance is a balance between:

- including as much of the selected population as possible; and
- logistical necessities

One may consider the following criteria during selection of sites

- 1) **Population served:** Sites provide services for selected sentinel populations.
- 2) **Blood samples available:** Blood is drawn from patients as part of routine care.
- 3) **Laboratory access:**
 - A reliable laboratory is available on-site or nearby to perform routine laboratory tests
 - Alternatively, reliable transport options exist to send specimens to reference laboratory
- 4) **Accessibility:** Sites are readily accessible to surveillance staff for data collection or supervision.
- 5) **Size of client base:** Sites provide services to a large enough number of persons to reach target sample size within sampling period.



- 6) **Geographic diversity:** Sites are located in different geographic areas, both in cities and rural areas.
- 7) **Resources:** Needed resources (human, laboratory, transport) can be mobilised.
- 8) **Staff acceptance:** On-site staff
 - understand need for HIV sentinel surveillance
 - willing to implement activities
 - open to training and supervision

Number and Distribution of Sentinel Sites

Number and distribution of sites is usually decided on a national level. Ideally, sentinel sites Shall:

- Represent each district
- Reflect the country-wide epidemic
- Include both urban and rural areas

Setting Priorities

- **First priority:** Include at least one site per district so that all regions or provinces are included in the national system
- **Second priority:** Include additional sites in particular districts because sexual behaviour and determinants for HIV transmission may not be uniformly distributed

Surveillance with Limited Resources

- Aim for broad geographic coverage
- Don't over-stretch resources
- Quality over quantity

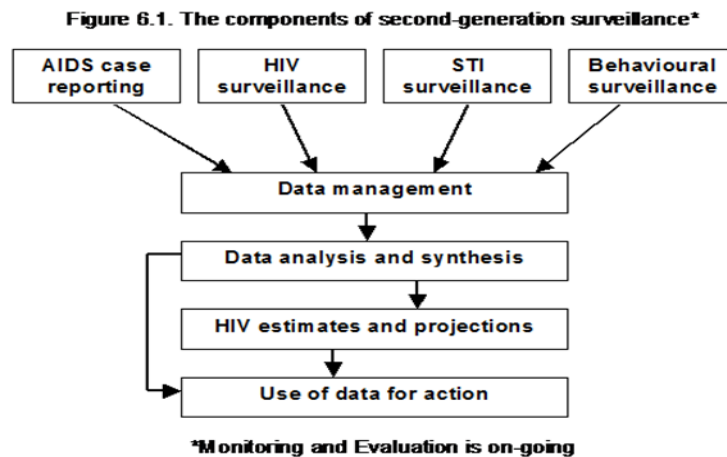
4. Second-Generation HIV Surveillance

Second-Generation HIV Surveillance is developed by the WHO and UNAIDS as a response to the increasing complexity of the HIV epidemic. Second-Generation HIV Surveillance:



- Outlines more sophisticated surveillance activities
- Provides a more comprehensive understanding of epidemic trends
- Improves effectiveness of control and prevention efforts

The Components of Second-Generation Surveillance



#1-6-5

Goals of Second-Generation HIV Surveillance

- Better understanding of trends over time
- Better understanding of behaviors driving the epidemic in a country
- Increased focus on sub-populations at highest risk for infection
- Flexible to change with the stage of epidemic

Indicators of Second-Generation HIV/AIDS Surveillance

- Biological indicators
- Behavioral indicators
- Socio- demographic indicators



Biological Indicators

- HIV prevalence
- STI incidence and prevalence
- TB prevalence
- number of adult AIDS cases
- number of pediatric AIDS cases

Behavioral Indicators

- sex with a non-regular partner in last 12 months
- condom use at last sex with non-regular partner
- age at first sex for youth
- use of unclean injection equipment by drug injectors
- reported number of clients in the last week by sex workers

Socio-demographic Indicators

- Age, sex
- socio-economic and educational status
- residency or migration status
- parity (for antenatal sites)
- marital status

5. Basic Data Collection Methods

- Sentinel surveillance in defined sub-populations (such as antenatal clinic attendees, STI clinic patients, sex workers)
- Serial cross-sectional behavioral surveys in high-risk sub-populations
- Regular HIV screening of donated blood



- AIDS case surveillance

Additional Data Collection Methods

- Regular screening of occupational cohorts or other sub-populations (such as factory workers, military recruits)
- HIV screening of specimens taken in general population surveys
- Serial cross-sectional behavioral surveys in the general population
- HIV case surveillance
- Death registration and mortality surveillance
- STI and TB surveillance
- Data from VCT and treatment programmes

6. Surveillance of Populations at High Risk for HIV Transmission

Populations at increased risk are the most likely to get HIV infection first in a new epidemic. They are infected at higher *prevalence* than the *general population*. In other words, a population at increased risk will become infected at a faster rate than people who are not members of a population at increased risk.

Populations at High Risk for HIV Transmission Includes:

- Sex Workers (SWs)
- Men Who Have Sex with Men (MSM)
- Mobile Populations and Migrants
- Injection Drug Users (IDUs)
- Out-of-School Youth
- Prisoners
- Uniformed Personnel



Populations at increased risk play a central role in the spread of HIV infection. At the beginning of an HIV epidemic, the first infections appear in these groups, because they have higher-risk behaviours. These behaviours, for instance, include:

- having sex without using a condom (*unprotected sex*) with multiple partners and/or having a high number of new partners
- injecting drugs with shared needles

Populations at increased risk also serve as *bridges* to other groups and the general population, since they can introduce HIV into these groups. For example, a client of an HIV-infected sex worker may get HIV infection. He may then have unprotected sex with his wife, infecting her. In this scenario, he has acted as a bridge, from which HIV infection has passed from the sex worker to his wife.



Uses of HIV surveillance data in populations at increased risk at different states of the epidemic

Epidemic State	Situation	Uses
Low-level	<p>HIV has not reached significant levels in high-risk groups</p> <p>HIV is largely confined to people within high-risk groups who exhibit higher-risk behaviours</p>	<p>Early warning of a possible epidemic</p> <p>Triggers interventions to prevent HIV in populations at increased risk</p>
Concentrated	<p>HIV has spread rapidly in one or more high-risk groups</p> <p>Epidemic is not well-established in the general population</p>	<p>Monitor infection in populations at increased risk</p> <p>Monitor effects of intervention programmes on HIV prevalence and behaviours</p>
Generalised	<p>Epidemic has matured to a level where transmission occurs in the general population (not dependent on populations at increased risk)</p> <p>With effective prevention, in general, prevalence will drop in populations at increased risk before they drop in the general population.</p> <p>For example, following a prevention campaign targeted at sex workers, surveillance should first find a decrease in STIs in the sex workers, then in male sentinel populations, and then in antenatal clinics</p>	<p>Monitor for initial decreases in HIV prevalence in populations at increased risk</p> <p>Monitor effects of intervention programmes on HIV prevalence and behaviours</p>



7. Behavioral Surveillance Surveys (BSS)

Behavioral surveillance involves regular, repeated cross-sectional surveys collecting data on HIV risk behaviors and other relevant issues that can be compared over time.

Use of BSS

1) It serves as an early warning system

Not everyone in the population is at the same risk for HIV. Behavioural data can indicate which populations are at risk locally, and can suggest the pathways the virus might follow if nothing is done to brake its spread. It can indicate levels of risk in the general population too, and can identify sexual links or “bridges” between groups in the population with especially high risk of infection, and groups with lower risk.

2) BSS informs program design

Without information on HIV related risk behaviour, public health officials and others are unlikely to be able to prioritize their interventions. Behavioural data can pinpoint specific behaviours which need to be changed, and can also highlight those that are not changing over time in response to program efforts. This information should lead to a rethinking of prevention approaches, and the design of new, more effective interventions.

3) BSS helps evaluate programs

A good behavioural data collection system will give a picture of changes in sexual and drug-taking behaviour over time, both in the general population and in groups of people whose behaviour puts them at high risk of infection. These changes should give an indication of the success of a package of activities aimed at promoting safe behaviour and reducing the spread of HIV, both in the general population and in groups with high risk behaviour.

4) Changes in behaviour help explain changes in HIV prevalence

Changing behaviour and a consequent reduction in new infections are possible reason for changes in HIV prevalence



Designing a Behavioural Surveillance System

When designing a behavioural surveillance system, you should consider:

- whom to include in surveillance
- where to access the surveillance populations
- how to link biological and behavioural surveillance data
- how to ensure that surveillance is appropriate for the context.

Whom to include in surveillance by epidemic state

State of the epidemic	Biological surveillance (annually if feasible)	Behavioural surveillance
Low-level	High-risk groups	High-risk groups annually, general population every 3-5 years
Concentrated	High-risk groups, general population	High-risk groups annually, general population every 3-5 years
Generalised	High-risk groups, general population	High-risk groups annually, general population annually

Essential Indicators for Behavioural Surveillance

General population	IDUs	CSWs
<ul style="list-style-type: none"> ▪ proportion who had commercial sex in past year ▪ frequency of commercial sex in past year ▪ proportion who had non-regular/casual partners in 	<ul style="list-style-type: none"> ▪ proportion who shared needles last time ▪ proportion who did not use clean needles consistently in 	<ul style="list-style-type: none"> ▪ last time and consistent condom use with clients ▪ proportion who injected drugs in past



<p>past year</p> <ul style="list-style-type: none"> ▪ frequency of non-regular/casual partners in past year ▪ last time and consistent condom use by partner type ▪ proportion who injected drugs in past year 	<p>past week (or other time reference period)</p>	<p>year</p>
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Content of surveys useful for behavioural surveillance

Survey	Content
<p>Demographic and health surveys (DHS), AIDS Indicator Survey (AIS), MACRO International</p>	<ul style="list-style-type: none"> ▪ Knowledge and source of knowledge of AIDS and other STIs ▪ Knowledge of how to avoid HIV/AIDS ▪ Condom use at last and penultimate sex ▪ Relationship to last and penultimate sexual partner ▪ Length of time known last and penultimate sexual partner ▪ Age at first sex <p>Internet link: http://www.measuredhs.com/</p>
<p>Multiple Indicator Cluster Survey (MICS), UNICEF</p>	<ul style="list-style-type: none"> ▪ Knowledge and source of knowledge of AIDS ▪ Knowledge of how to avoid HIV/AIDS ▪ Knowledge of testing sites and if ever tested <p>Internet link: http://www.childinfo.org/index2.htm</p>
<p>Behavioural surveillance surveys (BSS), FHI</p>	<ul style="list-style-type: none"> ▪ Surveys for CSW, MSM, IDUs, Youth, Adults on HIV-related risk behaviours <p>Internet link: http://www.fhi.org/en/topics/bss.htm</p>



Working with hard-to-reach populations

High-risk groups that are included in surveillance are often hard to reach because:

- They engage in illegal/clandestine behaviours.
- They often do not want to be identified because of high levels of stigmatisation and discrimination.
- Their existence is denied by the general population and government.
- There are restrictions on who may approach the group and how the group can be approached (gatekeepers such as brothel owners may not want sex workers interviewed, the government may not want non-military personnel interviewing military, etc.).
- Group members have little time to talk.
- Groups do not want to be found for surveillance because they fear authorities or do not want outsiders entering the group.

8. Sampling Methods

Two broad methods

- 1) Non-probability sampling methods
- 2) Probability sampling methods

Non-probability sampling methods

These methods do not claim to be representative of the entire population

E.g.s Convenience sampling, quota sampling

1) Convenience sampling

For convenience sake the study units that happen to be available at the time of data collection are selected



2) Quota sampling

It ensures that a certain number of sample units from different categories with specific characteristics are represented. The investigator interviews as many people in each category of study unit as he can find until he has filled his quota

Probability sampling methods

Probability sampling methods Involves random selection procedure. All units of the population should have an equal or at least a known chance of being included in the sample. Generalization is possible in probability sampling methods.

Probability sampling methods include:

- 1) Simple random sampling
- 2) systematic sampling
- 3) stratified sampling
- 4) Cluster sampling
- 5) Multistage sampling

Sampling issues in behavioral surveillance

1. Consistent sampling is required across survey rounds:

If sampling changes between rounds, we don't know if any observed changes are real or a result of changes in methodology.

2. General populations can rarely be used to access high-risk groups:

- Group members may not be found in households in sufficient numbers and may not want to talk in household settings.
- Instead, the locations where group members congregate can be defined as clusters.



Examples of possible clusters for high-risk groups

High-risk group	Possible cluster
Brothel-based sex workers	Brothels
Non-brothel-based sex workers	Streets, bars, hotels, guesthouses
Men who have sex with men	Cruising sites
Intravenous drug users	Shooting galleries, injecting sites
Truckers	Loading/unloading/halting points
Migrants	Households, workplaces

3. Cluster sampling is difficult when clusters are not stable.

- A measure of cluster size is needed for cluster sampling.
- It is difficult to estimate cluster size when we use locations like sex worker sites as clusters, because the people in each cluster are rarely fixed.
- The risk behavior in a cluster may also vary by time of day.
- This makes it difficult to select a sample that is representative of the entire target population using conventional cluster sampling.

4. Members of high-risk groups may be difficult to identify and access.

5. Cluster sampling is impossible if group members do not congregate.

- Some groups do not congregate at all.
- In others, only some members of the population congregate and important sections of the group may be missed.

Conventional cluster sampling

It is appropriate for the general population, youth and a few high-risk groups, such as prisoners.



Newer Sampling Methods

Two new sampling methods combine the methods of *probability* and *non-probability sampling* to identify with relative ease samples that are representative and from which results can be generalised.

These are:

- ▲ *respondent-driven sampling* (RDS)
- ▲ *time-location sampling* (TLS).

RDS and TLS are ideally suited for surveys of high-risk groups, especially those that are harder to find.

Respondent-Driven Sampling

RDS combines the methods of snowball sampling with a mathematical model in a way that weighs the sample to compensate for the non-random way it was collected. This method does not require a sampling frame. It is especially useful for finding hard-to-reach groups, which do not congregate

Steps in RDS:

1. Start with initial contacts or 'seeds,' who are surveyed and then become recruiters.
2. Each recruiter invites up to three people they know in the high-risk group to be interviewed.
3. The new recruits become the recruiters.
4. Five to six recruitment waves occur.

Time-location sampling

Time location sampling is used when high-risk groups congregate, but their clusters are not stable. It allows locations to be included as clusters more than once (e.g., at different times of the day or on different days of the week). Clusters are defined by both location and time.

For example:

- Cluster 1= Site 1 weekday afternoon
- Cluster 2= Site 2 weekday evening
- Cluster 3= Site 1 weekend
- Cluster 4= Site 2 weekday afternoon



Cluster 5= Site 1 weekday evening

Cluster 6= Site 2 weekend

Time location sampling is like conventional cluster sampling, but addresses the problem of everyone not being in the same place at the same time. It requires extensive ethnographic mapping to prepare a sampling frame that captures the variability in the time and location of behaviours and the number of group members

8. Indicators

Behavioural surveillance indicators should measure behaviours that are key to the spread of HIV and that are targeted by HIV prevention programmes.

These are:

- ⤴ behaviours that increase the chance that an uninfected person will come into contact with an infected person
- ⤴ behaviours that increase the chance that HIV will be transmitted if contact with an HIV-infected person occurs
- ⤴ determined by the country's data needs

Family Health International (FHI) publishes guidelines for repeated behavioural surveys in populations at risk of HIV, including indicators that are key to the spread of HIV among FSWs. These guidelines are available online at: <http://www.fhi.org>. The HIV/AIDS Survey Indicators Database of MEASURES DHS includes applicable health indicators that are used to evaluate attitudes and behaviours relative to the health risks measured by HIV and STI prevalence surveys. These indicators are available online at: http://www.measuredhs.com/hivdata/ind_tbl.cfm

Small group work

- Discuss the HIV/AIDS surveillance systems being applied in Ethiopia.
- Suppose polygamy is acceptable in one of the districts of Ethiopia. It is also acceptable for a man to have extramarital sex. There are many commercial sex workers in the capital city of the district



- Which group of people should be targeted for surveillance? Commercial sex workers or pregnant women attending ANC clinics? Why?

References

- FHI, Impact, USAID, DFID. Behavioral Surveillance Surveys. Guidelines for repeated behavioral surveys in populations at risk of HIV. 2000
- UNAIDS. GLOBAL AIDS RESPONSE PROGRESS REPORTING 2013. Construction of Core Indicators for monitoring the 2011 UN Political Declaration on HIV/AIDS. 2013

Session 4: Ethical Considerations in HIV/AIDS Surveillance

Session overview:

This session gives highlight the major ethical issues of HIV/ADIS surveillance. How to conduct surveillance in vulnerable group of people. This session will described the major ethical priceples when conducting HIV/ADIS surveillance.

Learning Objectives

By the end of this unit, the participant will be able to:

- Describe the basic ethical principles
- Describe the major ethical issues in HIV/AIDS surveillance
- Discuss the mechanisms of respecting the ethical principles when conducting HIV/AIDS surveillance
- Describe how to deal with vulnerable group of people when conducting HIV/AIDS surveillance

1. Major ethical issues in HIV-AIDS related surveillance

- elevated risk of harm for people in high-risk populations, especially if their behaviour is illegal
- stigma



- confidentiality
- informed consent
- access to prevention and care services

2. Basic Ethical Principles

- **Respect for persons** – study subjects are persons whose rights and welfare must be protected, not just passive sources of data
- **Beneficence** – researchers should balance benefits and risks (physical and psychological harm) to individuals
- **Justice** – risks and benefits from studies should be distributed fairly and evenly in populations

These principles are considered universal regardless of geographic, economic, legal and political boundaries. Researchers are obliged to assure that these principles are followed while conducting research involving human participants.

2.1. Respect for persons

Respect for persons addresses two main ethical considerations

- a) Respect for autonomy, and
- b) Protection of persons with diminished or impaired autonomy.

An autonomous person is one who is capable of deliberation about personal goals and of acting under the direction of such deliberation. To respect autonomy is to give weight to the considered opinions and choices of the individual, while refraining from obstructing his/her actions

Not every individual is capable of decision-making.

Lack of maturity, mental disability, or circumstances that severely restrict liberty (as in the case of prisoners), may all decrease the capacity for decision-making. Respect for those with diminished or impaired autonomy may require protecting them.

Respect for persons demands the **voluntary participation** of the research participant with adequate information. According to this principle, the study participants have the right to be well informed and give consent. This process is known as **informed consent**



Voluntary participation

An agreement to participate in research constitutes a valid consent only if voluntarily given. This requires freedom from coercion and undue influence. **Coercion** occurs when an overt threat of harm is intentionally presented by one person to another to obtain compliance. On the contrary, **undue influence** occurs through an offer of an excessive, unwarranted, inappropriate or improper reward to obtain compliance. It is impossible to state precisely where justifiable persuasion ends and undue influence begins. Undue influence includes actions like manipulating a person's choice through the controlling influence of a close relative and threatening to withdraw health services to which an individual would otherwise be entitled.

Unique issues of consent with minors and the role of parents in the consent process

Protection of vulnerable individuals who may not have the psychological or legal capacity to choose is necessary. Parents are required to consent to their children's participation. Depending on the nature of the research and the age of the child, the child's consent is also required. This set of basic premises raises significant problems in second generation surveillance, where interviewing adolescents about their sexual behaviour may clearly be critically important. Parents may not want their children to participate, and parents who are informed that their children have chosen to participate may view such a decision as indicative of disapproved behaviour involving either sex or drugs. Without parental involvement, adolescents may be included in studies involving sex and drugs under the following circumstances:

- 1) Studies involving investigation of adolescents' beliefs and behaviour regarding sexuality or use of recreational drugs;
- 2) Researches that address domestic violence or child abuse.

For studies on these topics, ethical review committees may waive parental permission if, for example, parental knowledge of the subject matter may place the adolescents at some risk of questioning or even intimidation by their parents.

Impact of the social context on the capacity to consent

People receiving **clinical care** who are recruited to studies may believe that they have no alternative but to agree to participate. They may feel that their treatment will be compromised or interrupted if they choose not to participate or if they choose to withdraw from studies that they have agreed to join.



Even when they do not feel that their treatment is threatened, they may believe that they have a duty to their caregivers to agree to participate. Review committees should include people who can ensure that the approach to patients avoids coercive elements. For example, they may determine that the consent process be undertaken by people who are not directly involved in patient care.

Prisons may provide a unique environment for second generation surveillance. Prisoners are at increased risk for believing that their failure to cooperate with research studies will result in punitive responses. In addition, relatively small benefits that may accrue as a result of participation may cause undue inducements.

In **poor populations**, small offers or payments to potential subjects of surveillance may be hard to refuse. In relatively wealthy countries, this is an issue that affects impoverished and marginalized minorities. In countries in which poverty is widespread, offers by external sponsoring researchers with access to resources may produce pressure to participate in surveillance. Payments should not be so large or the medical services so extensive as to induce prospective subjects to consent to participate in research against their better judgement.

Issues of consent unique to women

In many societies the father, husband or family head is expected to make all decisions regarding sensitive family issues. Women and other family members who fail to submit to male authority are subject to domestic violence, divorce or social ostracism. Refusing to involve women in studies because of such cultural constraints could affect investigations crucial to women's interests. A woman's informed consent may be supplemented by consent from a man under the following conditions:

- a) it would be impossible to conduct the research without obtaining such supplemental permission; and
- b) failure to conduct this research could deny its potential benefits to women in the host country; and
- c) measures to respect the woman's autonomy to consent to research are undertaken to the greatest extent possible



A husband, father or head of household may not provide the sole consent for a woman to participate in surveillance. Although there may be circumstances in which a woman may need to consult with and get the approval of her husband or father, her individual informed consent remains imperative before she is enrolled in behavioural surveillance studies

Informed Consent

Researchers must present information to help the subject decide whether to participate, including:

- the nature of the surveillance system
- the procedures the project will entail
- potential risks and benefits
- assurance that participation is voluntary and confidential

Whenever informed consent is obtained, participation bias is an important issue and should be considered in the analysis. When HIV test results are to be given to individual subjects, confirmatory testing is required for positive specimens

Written Consent Forms

Written consent forms are required to document that the process of informed consent has occurred. In some situations, verbal consent documented by the investigator may be adequate. When individuals cannot give informed consent, surrogate consent should be obtained

2.2 Beneficence

Two general rules have been formulated as complementary expressions of beneficence:

- a) Do not harm, and
- b) Maximize possible benefits and minimize possible harms.

One should not injure study participants regardless of the benefits that might come to others.

Potential Benefits of HIV Surveillance

- guiding HIV prevention and care programmes



- guiding STI and other services
- raising public awareness of and sympathy for burden of disease in the population
- reducing stigma and effecting social change, especially around HIV infection
- special benefits for certain high-risk populations, such as STI clinics specifically for sex workers
- HIV treatment services for prisoners

Potential Harms Caused by HIV/AIDS Surveillance

Harm	Result
Physical	public attack, spouse/partner abuse, domestic violence
Legal	arrest, prosecution, especially with high-risk populations
Social	workplace discrimination, loss of employment, isolation, loss of healthcare services

Common terminologies related to the principle of Beneficence

Stigma – a mark of disgrace or shame

Confidentiality – keeping the identity of a participant and their test results secret

Unlinked anonymous testing – when a sample of blood is tested for HIV after all information that could identify the source of the blood is eliminated from the sample

Linked anonymous testing – when the HIV result is linked to a patient’s other clinical data after all information that could identify the source of the blood is eliminated from the sample

Confidentiality

Confidentiality protects subjects from adverse consequences that may arise if their personal information is known. If confidentiality about HIV infection is violated, subjects may suffer discrimination. Public health officers must maintain the confidentiality of individuals’ records to guard against accidental disclosure. In general, behavioural surveillance studies do not require that data be recorded in a manner that links them to identifiable individuals. Research should be conducted in a way that makes sensitive records anonymous when this can be done without compromising the



investigation. However, identifiable records may be required in some circumstances, such as in longitudinal studies, which seek to track changes in behaviour over time, or if linkage to other data sources is essential for the investigation. Under these circumstances, every effort must be made to protect the confidentiality of research records. For example, coded identifiers could be appended to each research record and the link between that code and a given individual kept in a highly secure file. Although researchers are obligated to report their findings in a way that protects the anonymity of their research subjects, a very different problem arises when studies conducted in small communities would clearly identify individuals despite the effort to make research records anonymous. Thus, anonymous records cannot be regarded as strictly confidential in all circumstances. Researchers and ethical review committees are obligated to protect the confidentiality of people recruited to behavioural studies. Such an obligation may be met by recording the data anonymously. If this is not possible, every effort must be made to secure records to prevent unwarranted disclosure. Legal or ethical limits on confidentiality should be disclosed to research participants as part of the informed consent process. While maintaining confidentiality, the minimum identifiable information necessary to conduct a study should be collected.

Unlinked Anonymous Testing (UAT)

UAT without informed consent is conducted only in clinical settings. A specimen of blood originally collected for other purposes is used as follows:

- All personally identifying information is removed from the specimen.
- The blood is tested for HIV.

UAT has been deemed ethical if:

- No interaction takes place with the survey participant solely for the purpose of the surveys
- Information that may inadvertently identify a person is not kept

Communities should be broadly notified that blood collected for one purpose may be anonymously tested for HIV. Although fully informed consent is not required for unlinked anonymous surveillance, the wishes of individuals wishing to opt out of such surveillance should be respected where possible. If the numbers of individuals opting out or spontaneously refusing to participate threaten the validity of



surveillance efforts, ethics review committees will have to determine whether the public health significance of the studies warrants overriding the right to refuse to participate.

Advantages and disadvantages of UAT

Advantages

- Privacy of the individual is maintained.
- Participation bias is minimised.

Disadvantages

Tested individuals are not aware that they are being tested and cannot receive their test results or counselling. This can be overcome by offering voluntary counselling and testing (VCT) at the sentinel site

Small group work

These days many adolescents in high schools are engaged in risky sexual behavior. You want to establish a surveillance system in high schools so that you can follow the HIV infection rate and behavior of adolescents in the high schools

- 1) Describe how you will be maintaining the ethical principles when you are establishing the surveillance
- 2) What are the challenges of such surveillance?

References

Ann Aschengrau, George R. Seage III. Essentials of Epidemiology in public health. Jones and Bartlett Publishers. 2008

<http://www.who.int>. Ethical issues to be considered in second generation surveillance. Accessed on 18/7/2013.

Robert B. Wallace, Nearl Kohatsu, Brownson, Schetcer, Scutchfield, Zaza. Public health and preventive Medicine.

Thomas M. Garrett, Harold W. Baillie, Rosellen M. Garrett. Health Care Ethics. Principles and Problems (4th edition). Upper Saddle River, New Jersey, 2001.



Tom L. Beauchamp, James F. Childress. Principles of biomedical Ethics, 5th Edition, Oxford University Press, 2001.

Session 5: Outbreak investigation and management

Session overview

Outbreak investigations, an important and challenging component of epidemiology and public health, can help identify the source of ongoing outbreaks and prevent additional cases. Even when an outbreak is over, a thorough epidemiologic and environmental investigation often can increase our knowledge of a given disease and prevent future outbreaks. Finally, outbreak investigations provide epidemiologic training and foster cooperation between the clinical and public health communities. This session gives highlight the major steps of outbreak investigation.

Learning objectives

At the end of this session, participants will be able to:

- Understand the definition of outbreak/epidemic
- Describe the levels of disease occurrence
- Describe the types of outbreak/epidemics
- Describe the steps to be following during outbreak investigation
- Describe the different approaches /strategies of outbreak management

1. Definitions

A disease outbreak is the occurrence of cases of disease in excess of what would normally be expected in a defined community, geographical area or season. An outbreak may occur in a restricted geographical area, or may extend over several countries. It may last for a few days or weeks, or for several years. A single case of a communicable disease long absent from a population, or caused by an agent (e.g. bacterium or virus) not previously recognized in that community or area, or the emergence of a previously unknown disease, may also constitute an outbreak and should be reported and investigated.



2. Levels of Disease Occurrence

Diseases can occur in a community at different levels. The occurrence can be at predictable levels or in excess of what is expected.

The expected predictable levels can be:

- **Endemic:** the usual presence of disease from low to moderate level
- **Hyper or Hypo endemic:** a persistently high or lower level of disease

On the other hand there can be **sporadic** occurrence of disease where the disease normally does not occur, but occasional cases can be seen at irregular intervals

Epidemic/ Outbreak:

Epidemic refers to an excess occurrence of disease above expected level (or threshold) at certain time. A threshold of a specific disease is determined by taking average incidence of consecutive 3 to 5 years duration for that month of the disease

Pandemic: is an epidemic that affects several countries or continents (a sudden increase of affected population).

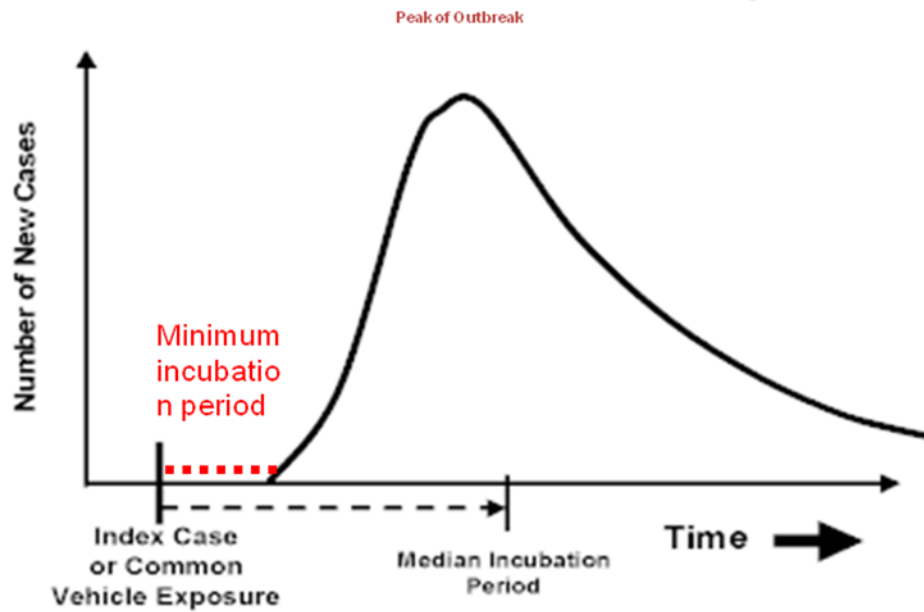
2. Types of Epidemics

A. Common Source Epidemic.

In Common Source Epidemic, disease occurs as a result of exposure of a group of susceptible persons to a common source of a pathogen, often at the same time or within a brief time period. When the exposure is simultaneous, the resulting cases develop within one incubation period and this is called a **point source epidemic**. The epidemic curve in a point source epidemic will commonly show a sharp rise and fall. E.g Food borne epidemic following an event where the food was served to many people.



Epidemic Curve of Point Source Epidemic

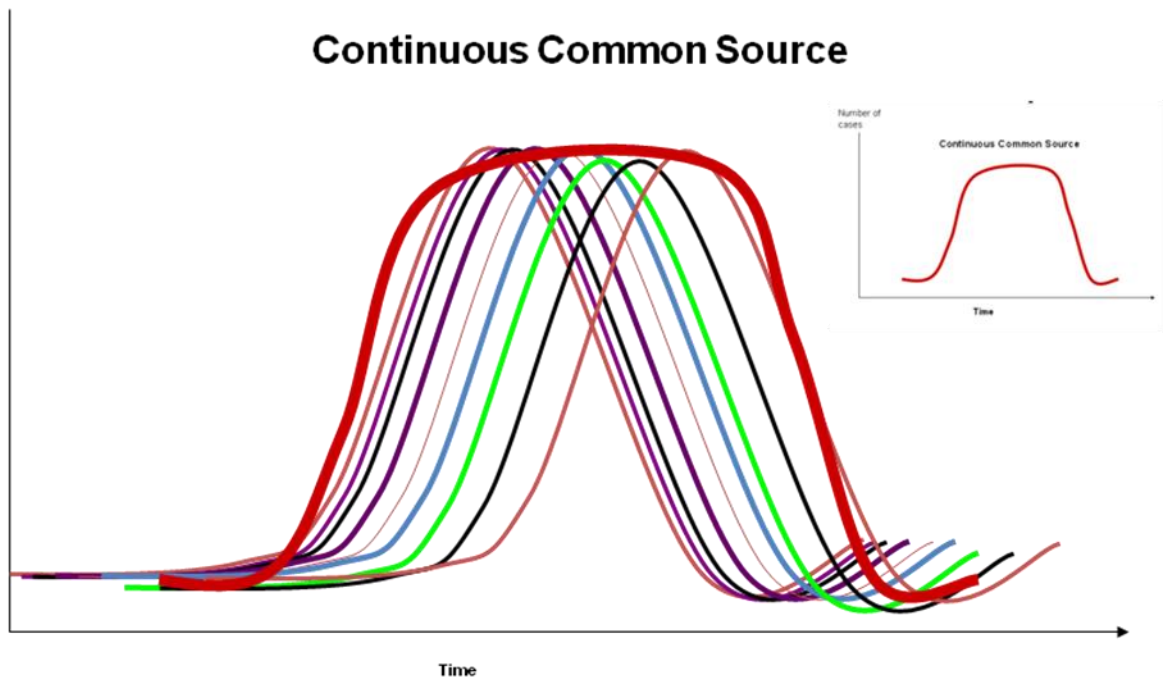


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If the exposure to a common source continues over time it will result in a **continuous common source epidemic**. E.g A water borne outbreak that is spread through a contaminated community water supply, The epidemic curve may have a wide peak because of the range of exposures and the range of incubation periods.



Number of cases

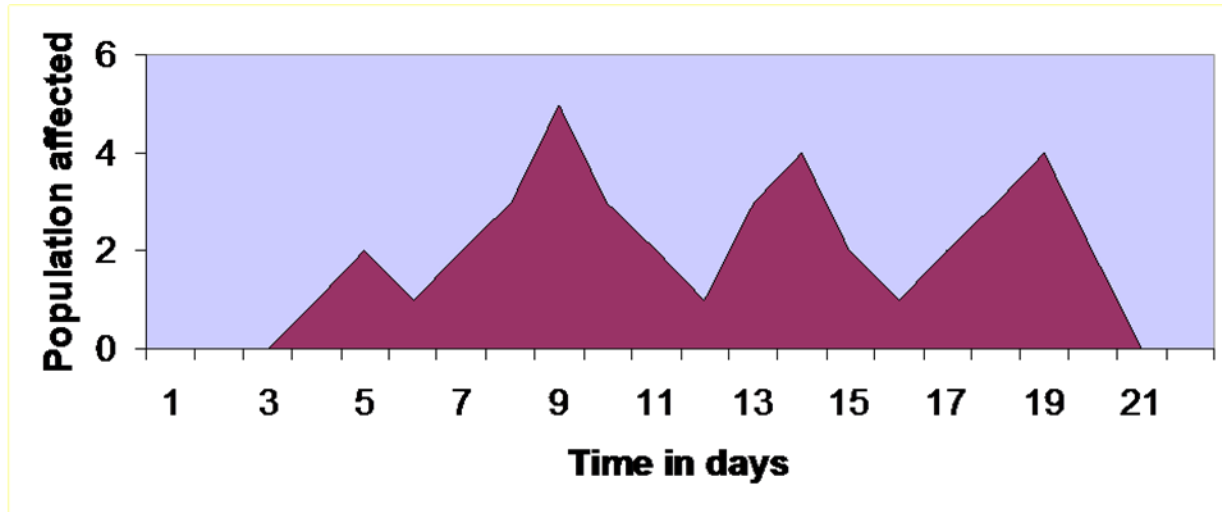


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B. Propagated or progressive epidemic:

Infectious agent is transferred from one host to another. It can occur through direct and indirect transmissions. Propagative spread usually results in an epidemic curve with a relatively gentle upslope and somewhat steeper tail. E.g outbreak of malaria.

When it is difficult to differentiate the two types of epidemics by the curve, **spot map** can help. In the propagated epidemics there will be successive generations of cases.



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C.

Mixed Epidemics.

The epidemic begins with a single, common source of an infectious agent with subsequent propagative spread. Many food borne pathogens result in mixed epidemics.

4. Investigation

Investigation refers to the process of identifying the cause of the epidemic, the source of the cause, the mode of transmission, and taking preventive/control measures of an epidemic

4.1 Source of information for an outbreak

One of the uses of public health surveillance is detecting an outbreak. Outbreak is detected when a routine surveillance data reveals an increase in reported cases of a disease. It can also be detected when the outbreak come to attention of health providers. Members of affected group are other important sources for both infectious and non-infectious diseases

4.2 Reason for investigation

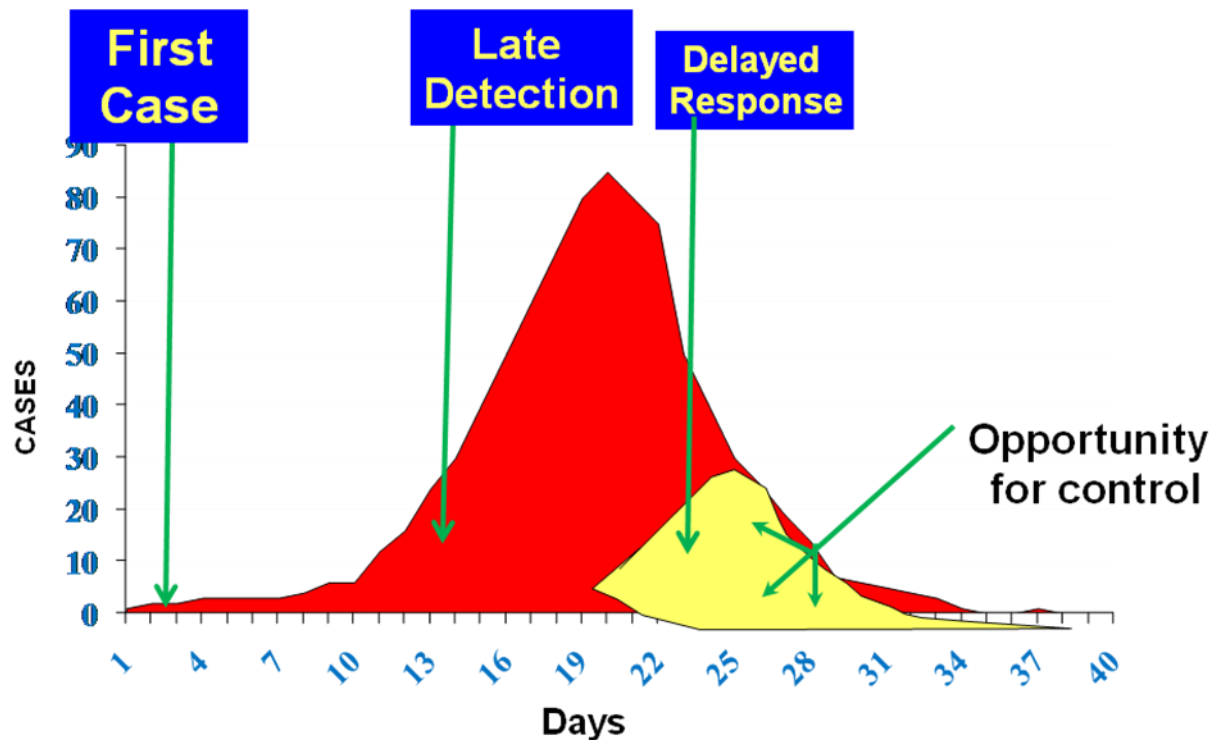
1. To institute control and prevention measures
2. A good opportunity for research and training.



3. Useful for program consideration
4. Political concern and legal obligation

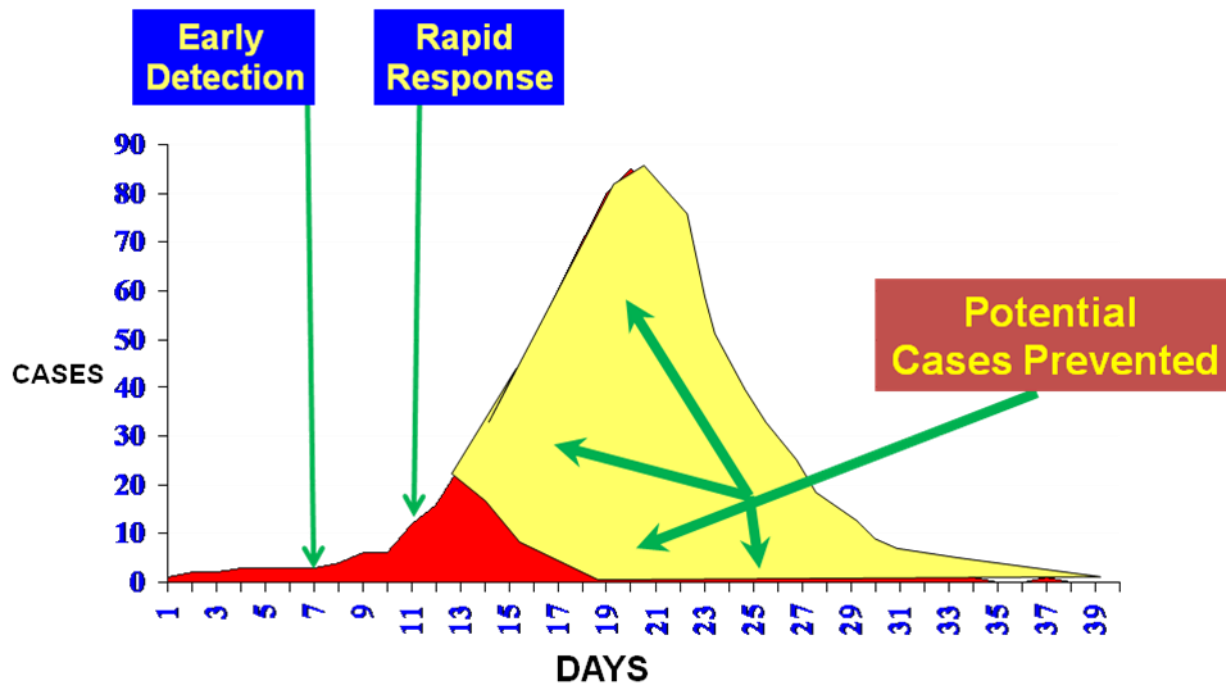
1. To Institute control/ prevention measures

It is the primary public health reason to investigate an outbreak. Before we do a control strategy, we should identify where the outbreak is in its natural course.



Outbreak detection and response without preparedness

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Outbreak detection and response with preparedness

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Choosing between control measures versus further investigation depends on how much is known about the cause, the source of the outbreak, and the mode of transmission of the agent. If we know only little about the outbreak, further investigation is needed. In contrast, if we know well about the outbreak, control measures should be instituted immediately.

Decision regarding how extensively to investigate an outbreak is influenced by severity of the illness, knowledge of the source or mode of transmission, and availability of preventive and control measures. It is particularly urgent to investigate an outbreak when the disease is a severe (serious illness with high risk of hospitalization, complication or death)

2. Research and Training opportunity

Each outbreak should be viewed as an experiment waiting to be analyzed. It presents a unique opportunity to study the natural history of the disease in question. It could be a good opportunity to gain additional knowledge by assessing the impact of control measures and the usefulness of new epidemiology and laboratory techniques. It is considered as on-job-training for public health professionals.



3. Public, political, or legal concerns

Politicians and leaders are usually concerned with control of the epidemic. They may sometimes override scientific concerns. The public are more concerned in cluster of disease and potentials of getting medication.

4. Program considerations

Occurrence of an outbreak notifies presence of a program weakness. This could help program directors to change or strengthen the program's effort. That means it can improve future directions

4.3 Steps in an outbreak investigation

There is no hard and fast rule but verification of the diagnosis and establishment of the existence of an epidemic always deserves early attention. The following steps can be considered:

- Step 1. Prepare for field work
- Step 2. Verify the existence of an outbreak
- Step 3. Verifying the diagnosis
- Step 4. Establishing case definition
- Step 5. Case finding
- Step 6. Performing descriptive analysis
- Step 7. Developing hypothesis
- Step 8. Evaluating the hypothesis
- Step 9: Conduct additional environmental studies
- Step 10. Implementing control and prevention measures
- Step 11. Communicating the findings

Step 1. Prepare for field work

Before leaving for the field an investigator must be well prepared to undertake the investigation. Identify outbreak investigation team. Outbreak investigation is usually a team work. It is not only health professionals but also it may need involvement of others. Composition of a team could include a team of health workers, representative of community, politicians, concerned sectors etc.



Preparations can be categorized into three:

A. Investigation related:

Investigator must have the appropriate scientific knowledge, supplies, and equipment to carry out the investigation. Discuss the situation with knowledgeable people, review applicable literature, and collect sample questionnaire.

B. Administration related:

This includes arrangement of transportation and organizing personnel matters.

C. Consultation related:

You need to clarify your and your team role in the field. Identify local contacts at the site where the outbreak is reported and arrange where and when to meet them.

Step 2. Verify the existence of an outbreak

An outbreak/epidemic is the occurrence of more cases of disease than expected. Be cautious and rule out the following misleading phenomena:

- Change in population size
- Change in diagnosis
- Change in case definition
- Increase in interest due to new in-service training

Step 3. Verifying the diagnosis

Goals of verifying the diagnosis include:

- To ensure that the problem has been properly diagnosed.
- To rule out laboratory error as a basis for the increase in diagnosed cases.
- To ensure the diagnosed disease is possibly endemic

We should visit several patients with the disease. Involving a qualified clinician and using possible diagnostic equipment is essential.



Step 4. Establishing case definition

A case definition is a standard set of criteria for deciding whether an individual should be classified as having disease of interest or not. It includes clinical criteria but (restricted by time, place and person). The clinical criteria should be simple having objective measures. Case definition can be narrow or broad (confirmed, probable, suspected case). Use "loose" case definition early to capture all potential cases.

Step 5. Case finding

Conduct systematic search based on case definition. Direct the case finding to take place both in health institutions and outreach sites. If it is a localized form of epidemic, case finding should go to the epidemic area. Finally, you can ask case patients if they know anyone else with the same condition. Once the cases are found, the following information should be collected:

- Identification information
- Demographic information
- Time of onset
- Clinical information
- Possible risk factor information
- Place and distance from possible risk factor
- Reporter's information



Example of line listing for an outbreak of Malaria

Case #	Name	Date of Report	Date of onset	Diagnosis					Lab		Age	Sex	
				MD Dx	Signs & symptoms				Hgb	BF			
					F	C	RP	HA					BP
1.	SD	10/12	05/12	Mal	+	+	+	+	-	12	+	12	M
2.	DR	10/12	04/12	Mal	+	-	+	-	+	13	-	13	F
3.	CF	11/12	02/12	Mal	+	+	-	+	+	14	-	21	M
4.	GT	11/12	07/12	NA	-	-	-	+	-	15	-	19	M
5.	AS	13/12	04/12	Mal	+	+	+	+	-	10	+	20	M
6.	FR	13/12	05/12	Mal	+	+	+	+	-	11	-	15	F
7.	SD	10/12	05/12	Mal	+	+	+	+	-	12	+	16	F
8.	CF	11/12	02/12	Mal	+	+	-	+	+	14	-	17	M
9.	GT	11/12	07/12	NA	-	-	-	+	-	17	-	18	F
10.	CD	11/12	02/12	Mal	+	+	-	+	+	14	-	19	M
11.	GM	11/12	07/12	NA	-	-	-	+	-	16	-	20	F
12.	AS	13/12	04/12	Mal	+	+	+	+	-	10	+	22	M
13.	FP	13/12	05/12	Mal	+	+	+	+	-	11	-	18	M

F = Fever	C = Chilling	RP = Rheumatic Pain
HA = Headache	BP = Back pain	
Hgb = Hemoglobin mg /100ml	BF = Blood film	

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Step 6. Performing Descriptive Analysis

Once data is collected, it should be analyzed by time, place and person (Descriptive epidemiology). Analysis by Person includes age, marital status, sex, occupation, behavior (e.g alcohol drinking) etc.

Analysis by **time** (time of onset) can be supplemented by using epidemic curve. One can distinguish several types of epidemics according to the mode of transmission and duration. The epidemic curve can help to identify the type of epidemic.

Analysis by place can be done using spot map. **Spot map** may ascertain localized epidemic by place (**Clustered epidemic**). Use **area map** if large area is affected. Areas affected are identified by intensity of shading corresponding to incidence of disease.

Step 7. Developing Hypothesis

Hypotheses can be generated by:

1. Using subject-matter knowledge



2. Using the information from descriptive epidemiology
3. Talking with patients
4. Talking with local officials

1. Subject-Matter Knowledge

Ask yourself:

- What kind of agents causes this clinical presentation?
- What are the agent's usual reservoirs?
- How the agent is usually transmitted?
- What vehicles are commonly identified?
- What are the known risk factors?

Brainstorming about the above questions with knowledgeable professionals may be important

Read also books, journal articles, reports of previous outbreak investigations. Browse websites like www.who.int, www.cdc.gov etc...

2. Descriptive Epidemiology

Time (Epidemic curve)

- Does shape hint at mode of transmission?
- Does narrow peak point to a particular time of exposure?

Place

- Is attack rate high in one place?

Person

- Which group/s (by age, sex, occupation, etc.) have highest rates?

3. Talking with Patients

- Open-ended conversation



- What do they think about the source?
- For food-borne outbreak, ask about foods. sometimes, look at kitchen
- Bring some patients together to chat and see whether they have any common exposures

4. Talking with Local Authorities

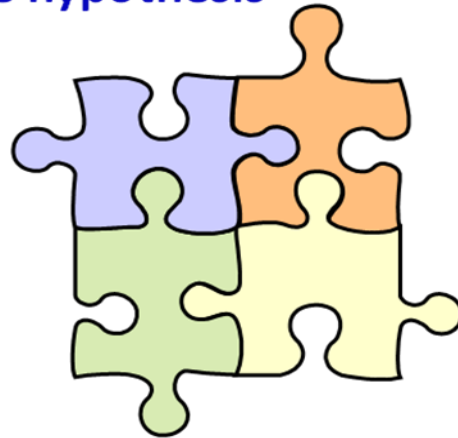
- What do they think about the cause?
- Ask about any unusual events like, holidays, festivals, sporting events, gatherings?
- Ask also about any new products, local produce, etc.?

Putting it all together

Many ways of generating hypotheses can mean many different hypotheses!

Try to combine the hypothesis

1. Subject-matter knowledge
2. Descriptive epidemiology
3. Talking with patients
4. Talking with local officials



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Compare hypotheses with reality at local level

- Does all the evidence point in the same direction?
- What evidence is the strongest?



Collect laboratory data

- Environmental samples
- Clinical samples

Step 8. Evaluating the Hypothesis

Here doing analytic studies is useful. Association between the postulated exposure factor and the disease is tested using analytic design like **Case control** and **Cohort**. Test for statistical significance by using appropriate tests (E.g Chi-square test). Also compute appropriate measure of association (OR for case control, RR for cohort design).

Step 9: Conduct additional environmental studies

Collect food, water, and other environmental samples. Determine what happened with the implicated source or food

Step 10. Implementing control and prevention measures

In outbreak investigation, the primary goal is to control and prevent the outbreak. Implementing control measure should be done as soon as possible. It should go in parallel to investigating the outbreak.

Control measure should be aimed at the **weak link** in the chain of infection.

It may be aimed at:

- the specific agent,
- source or reservoir
- Interrupting the transmission or exposure
- Instructing (educating) people to reduce their risk of contacting possible exposure
- Reduce susceptibility by immunizing individuals



Step 11. Communicating the findings

Findings can be communicated in two forms

1. An oral briefing for local authorities and implementers of control and prevention.
 - a) What is done,
 - b) what is found,
 - c) what should be done in the future
2. A written report

It is a blueprint having formal scientific format with [introduction, objectives, methods, results, discussion and recommendations]

5. Global Alert and Response (GAR)

Core functions

- Support Member States for the implementation of national capacities for epidemic preparedness and response in the context of the IHR(2005), including laboratory capacities and early warning alert and response systems;
- Support national and international training programmes for epidemic preparedness and response;
- Coordinate and support Member States for pandemic and seasonal influenza preparedness and response;
- Develop standardized approaches for readiness and response to major epidemic-prone diseases (e.g. meningitis, yellow fever, plague);
- Strengthen biosafety, biosecurity and readiness for outbreaks of dangerous and emerging pathogens outbreaks (e.g. SARS, viral haemorrhagic fevers); Maintain and further develop a global operational platform to support outbreak response and support regional offices in implementation at regional level.



Global Outbreak Alert & Response Network

The Global Outbreak Alert and Response Network (GOARN) is a technical collaboration of existing institutions and networks that pool human and technical resources for the rapid identification, confirmation and response to outbreaks of international importance. The Network provides an operational framework to link this expertise and skill to keep the international community constantly alert to the threat of outbreaks and ready to respond.

Group work exercise

- Suppose you are head of the district health office in one of the districts
- One of the health extension workers reported that there is outbreak of malaria in the kebele where she is assigned to work. This kebele is under your jurisdiction
- What will you do in such circumstance?

References

- Fletcher M. Principles and practice of Epidemiology. 1992
- Goodman RA, Buehler JW, Koplan JP. The epidemiologic field investigation: science and judgment in public health practice. Am J Epidemiol 1990;132:9-16.
- MacKenzie WR, Goodman RA. The public health response to an outbreak. Current Issues in Public Health 1996;2:1-4.



Sample Schedule on Leadership in Strategic information (LSI) training program on the third module, Surveillance, Monitoring and Evaluation of HIV/AIDS

Week 1	Monday	Tuesday	Wednesday	Thursday	Friday
08:30 – 10:00 am	<i>Definition of basic monitoring and evaluation terms</i>	<i>Information sources Evaluation design</i>	<i>Indicators</i>	<i>M&E of HIV/AIDS programs</i>	<i>Preparing an M&E Plan</i>
10:00 – 10:30 am	Tea/Coffee B r e a k				
10:30 – 12:30 pm	<i>Monitoring & Evaluation frameworks</i>	<i>Information sources Evaluation design</i>	<i>Indicators</i>	<i>M&E of HIV/AIDS programs</i>	<i>Preparing an M&E Plan</i>
12:30 – 02:00 pm	L u n c h				
02:00 – 03:30 pm	<i>Monitoring & Evaluation frameworks</i>	<i>Information sources Evaluation design</i>	<i>Indicators</i>	<i>M&E of HIV/AIDS programs</i>	<i>Preparing an M&E Plan</i>
03:30 – 04:00 am	Tea/Coffee B r e a k				
04:00 – 05:00 pm	Project analysis (Mentors)	Project analysis (Mentor)	Project analysis (Mentor)	Project analysis (Mentor)	Presentation of research work



Week 2	Monday	Tuesday	Wednesday	Thursday	Friday
08:30 – 09:00 am	Introduction to Public Health Surveillance	HIV/AIDS Sero-surveillance	Introduction to Surveillance of populations at High Risk for HIV Transmission: BSS	Introduction to STI Surveillance in and the Relationship between STIs and HIV:	Project analysis Presentation
09:00 – 10:00 am					
10:00 – 10:30 am	Tea/Coffee B r e a k				
10:30 – 12:30 pm	ANC Senitnnel surveillance	Core Elements of HIV Surveillance	Introduction to Surveillance of Populations at High Risk for HIV Transmission: BSS	Universal Case Reporting and Sentinel Surveillance for STIs	Project analysis Presentation
12:30 – 02:00 pm	Lunch				
02:00 – 03:30 pm	Second Generation HIV Surveillance	Demographic and Health Surveys Plus and its relevance (Behavioral combined with HIV test)	Most at Risk Populations (MARPS): Ethical issues in HIV surveillance	Universal Case Reporting and Sentinel Surveillance for STIs	Project analysis Presentation
03:30 – 04:00 am					
04:00 – 05:00 pm	Project analysis Exercise	Project analysis Exercise	Project analysis Exercise	Project analysis Exercise	Project analysis Presentation