FACILITATOR GUIDE

NCD Surveillance in Public Health

Created: 2013
# Table of Contents

NCD Surveillance in Public Health ......................................................... 3

- **Learning Objectives** ........................................................................................................ 3
- **Estimated Completion Time** .......................................................................................... 3
- **Training Techniques** ....................................................................................................... 3
- **Prerequisites** .................................................................................................................. 3
- **Materials and Equipment** ............................................................................................. 3
- **References and Resources** .............................................................................................. 3
- **Preparation Checklist** ...................................................................................................... 5
- **Font Glossary** .................................................................................................................. 5
- **Icon Glossary** ................................................................................................................ 5
- **Module Content** .............................................................................................................. 6
- **Skill Assessment (from Participant Guide)** .................................................................... 35
NCD Surveillance in Public Health

**LEARNING OBJECTIVES**
At the end of the training, participants will be able to:

- Identify whether a non-communicable disease (NCD) surveillance system is active or passive;
- Draw a diagram of the flow of data through an NCD surveillance system; and
- Identify possible sources of selection bias and information bias for an NCD surveillance system.

**ESTIMATED COMPLETION TIME**
- 4 hours (2 hours, 30 minutes interactive presentation; 1 hour, 30 minutes Skill Assessment)

**TRAINING TECHNIQUES**
- Content and examples will be presented using lectures, group work, and class presentations. Assessment will be conducted using group exercises with sample surveillance system information.

**PREREQUISITIES**
- Prioritizing Public Health Problems

**MATERIALS AND EQUIPMENT**
For the Facilitator:
- PowerPoint file for presentation
For the Participant:
- Participant Guide

**REFERENCES AND RESOURCES**
- WHO GTSS http://www.cdc.gov/tobacco/global/gtss/index.htm (data tool link towards the bottom of the Slide)


**PREPARATION CHECKLIST**
The following are action items to be completed by the facilitator prior to training:

___ Review slides
___ Provide a local example of a surveillance system for slide 18 and be prepared to discuss system stakeholders.
___ Provide a local example of a population-based surveillance system for discussion related to slide 26.

**FONT GLOSSARY**
The following fonts are used in this guide:

<table>
<thead>
<tr>
<th>Font Type</th>
<th>Font Meaning</th>
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</thead>
<tbody>
<tr>
<td>Plain</td>
<td>Script</td>
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<tr>
<td><strong>Bold</strong></td>
<td><strong>Instructions</strong></td>
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<tr>
<td><em>Italics</em></td>
<td><em>Answers</em></td>
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**ICON GLOSSARY**
The following icons are used in this guide:

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<tr>
<th>Image Type</th>
<th>Image Meaning</th>
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<tbody>
<tr>
<td><img src="image" alt="Question Icon" /></td>
<td>Question for facilitator to ask participants.</td>
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</table>
## Module Content

<table>
<thead>
<tr>
<th>Duration/Slide Number</th>
<th>What To Do/What To Say</th>
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<tbody>
<tr>
<td>2 minutes Slide 1</td>
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<tr>
<td>1 minute Slide 2</td>
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- **Slide 1**
  - Introduce yourself to participants if you are a new facilitator.
  - Tell participants that this lesson will take approximately 4 hours to complete.
  - Lead a brief discussion on how knowing about NCD surveillance can help them in their work (e.g., to help them monitor and evaluate prevention and control measures).
  - Explain that at the end of the lesson they will complete a skill assessment with a small group.

- **Slide 2**
  - Identify whether a noncommunicable disease (NCD) surveillance system is active or passive
  - Draw a diagram of the flow of data through an NCD surveillance system
  - Identify possible sources of selection bias and information bias for an NCD surveillance system
• Direct participants to Slide 1 in their Participant Guides.
• Read the learning objectives from the slide.

1 minute
Slide 3

Lesson Overview
• Role of surveillance in NCD public health
• Structure and function of public health surveillance systems
• Operational aspects of surveillance systems
• Example of surveillance systems

• Read the slide.

2 minutes
Slide 4

ROLE OF SURVEILLANCE IN NCD PUBLIC HEALTH

• Explain that surveillance data are data for action. Data are collected so that they can be used to implement change.

• Say: This presentation begins by reviewing the basics of surveillance (definition and purpose), talking about chronic disease surveillance in particular.

• Ask: What is surveillance?
<table>
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| **2 minutes**  
**Slide 5** | **Definition of Public Health Surveillance**  
“Systematic ongoing collection, collation, and analysis of data and the timely dissemination of information to those who need to know so that action can be taken.”  
— World Health Organization (WHO)  

**Question**  
- **Ask**: What is the purpose of surveillance?  
- **CLICK** to show WHO definition.  
- **Read** the definition.  
- **Explain** that all components (collection, collation, analysis and dissemination) are necessary. **Explain what “action” means.**  
- **Stress** that surveillance needs to be ongoing.  

**5 minutes**  
**Slide 6** | **How can surveillance provide epidemiologic and clinical information?**  
- Establish baseline rate of disease and detect increases  
- Estimate magnitude of a health problem  
- Determine geographic distribution  
- Understand the natural history  
- Generate hypotheses, stimulate research  

**Question**  
- **Explain** to participants that surveillance can provide different types of information.  
- **Ask**: How can surveillance provide epidemiologic and clinical information?
What To Do/What To Say

- CLICK to show the possible answers. Discuss each point.

- Explain/discuss what a “hypothesis” is; use simple terms, such as “is there a relationship between X & Y”?

- Ask: Who can provide an NCD example of how surveillance can give you data to generate a hypothesis and further research?

5 minutes
Slide 7

How can surveillance help inform public health efforts?
- Evaluate control measures
- Monitor changes in chronic disease presentation or infectious agents
- Detect changes in health practices
- Facilitate planning

- Ask: How can surveillance help inform public health efforts?
- CLICK to show the possible answers.

- Explain that epidemiologic and clinical information feed into the third aspect of informing public health efforts – all of these activities provide data for action.

2 minutes
Slide 8

Examples of NCD Surveillance Data
Diagnoses
- Type 2 diabetes
- Stage IV ovarian cancer

Conditions
- Screening results (e.g., elevated glucose levels)
- Overweight/Obesity

Lifestyle factors
- Smoking habits
- Dietary intake
- Physical activity
### What To Do/What To Say

#### Question

- **Ask:** What are some examples of the types of information that can be collected with public health surveillance?

- **Solicit responses and show answers on the slide.**

- **Explain that the data collected from NCDs can be based on diagnoses, as for communicable diseases, but can also entail collection of information about conditions or lifestyle factors.**

- **Explain the difference between clinical and epidemiologic (surveillance) “diagnoses”.”**

- **Read the examples on the slide.**

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<td>5 minutes Slide 9</td>
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**Similarities of Infectious Disease and NCD Surveillance**

- Document prevalence of disease
- Document risk factors
- Can be used to describe time trends
- Can include a variety of data including:
  - Laboratory data
  - Self report data
  - Medical record data

#### Question

- **Read the first bullet on the slide.**

- **Ask participants to provide you with additional similarities.**

- **Solicit responses and click on the slide to reveal the remaining bullets.**
2 minutes  
Slide 10

**Obstacles to NCD Surveillance**

- Lack of resources, infrastructure
  - Limited or no data collection mechanism
  - Limited data transmission capability
  - Lack of workforce training capacity
  - Limited availability of needed technology
- Low priority NCD or lack of political will to address
- Unenthusiastic system participants

**Question**

- **Ask:** What are some obstacles to NCD surveillance? *(To get participants moving, you can ask for volunteers to write obstacles on a flip chart.)*
- **Read the slide.**
- **Note:** Additional obstacles are lack of time and burden on the person providing the information to the person collecting the data.
- **Explain** that in addition to a lack of resources, if the political climate does not welcome interventions for a given health concern, it may hinder surveillance efforts, even if the health problem impacts many people.

Also, if stakeholders impacted by a surveillance system (such as physicians or laboratories) do not feel that the system is important, they may be resistant and noncompliant, which is a major obstacle to collecting representative data.
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<tr>
<td><strong>1 minute</strong></td>
<td><strong>Slide 11</strong></td>
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<tr>
<td></td>
<td><strong>STRUCTURE AND FUNCTION OF PUBLIC HEALTH SURVEILLANCE SYSTEMS</strong></td>
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<tr>
<td></td>
<td>• Say: We will now talk about the structure and function of surveillance systems. This includes population, data collection, and data compilation, analysis, and dissemination.</td>
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<td><strong>5 minutes</strong></td>
<td><strong>Slide 12</strong></td>
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<td></td>
<td><strong>Components of Surveillance: Population</strong></td>
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<tr>
<td></td>
<td>• National surveillance</td>
</tr>
<tr>
<td></td>
<td>• Specific to high-risk groups</td>
</tr>
<tr>
<td></td>
<td>- Occupation</td>
</tr>
<tr>
<td></td>
<td>- Health status (e.g., pregnancy clinics)</td>
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<tr>
<td></td>
<td>- Geographic area</td>
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<tr>
<td></td>
<td>• Explain that the population under surveillance is the first component. Different surveillance systems conduct surveillance among populations with different characteristics. National surveillance is intended to capture the health status among the population of an entire country.</td>
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<tr>
<td></td>
<td>• Ask: What are some populations under surveillance you can think of?</td>
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<tr>
<td></td>
<td>• CLICK to show high-risk categories.</td>
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</table>
### Possible answer:

*Populations may include occupation-based populations (e.g., coal miners, factory workers); populations with a specific health status (e.g., pregnancy clinics, specialty referral centers); or populations in specific geographic areas (such as difficult to access populations, e.g., rural highlands).*

### 3 minutes  
**Slide 13**

#### Components of Surveillance: Data Collection

- Health departments and/or organizations
  - Collect the data
  - Use forms for paper-based, fax, or emailed reports
  - Mine data from electronic records
- Laboratory
  - Testing
  - Diagnosis

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- Explain that data is collected about the health status of the defined population of interest, usually by district, regional, or national health departments or other health related organizations. These departments use established, standard methods, which may be paper-based or electronic, depending on the technology available.

- Say: For some NCDs or health conditions, there may be laboratory involvement in surveillance. For example, with diabetes, lab tests would document status of glucose levels.
• **Say:** If collecting new data is not feasible due to issues such as cost, or if it is not needed to address the question of interest, you can use data that has already been collected by other organizations who keep health-related information about populations.

• **Say:** New data should only be collected if existing data cannot meet the need.

• One way to do this is to utilize HMIS, or administrative data, from hospitals and other patient-based organizations.

In countries with adequate vital records keeping, vital registries such as death certificate data can also be used to conduct surveillance for major causes of death within the population. We will discuss this in more detail in a future lesson.
5 minutes  
Slide 15

- **Say:** If existing data are not the best option to meet surveillance data needs, and you need to collect more information than what is routinely reported to the health department or laboratory, you can initiate regular questionnaires as part of public health surveillance. Though these questionnaires may seem similar to existing research surveys, they are different in a number of ways.

- **Explain the difference between a research survey and public health surveillance as given on the slide.**

3 minutes  
Slide 16

- **Explain that it is important to remember that surveillance is more than just data collection.** It is a full cycle that involves competently processing, analyzing, interpreting, and using the information before repeating...
the cycle again.

- When discussing the bullets, include these points:
  - Data analysis, interpretation, dissemination MUST BE TIMELY.
  - It is not advisable to collect data if you do not also have the means to competently complete the analysis, interpretation, and dissemination of the results, and implement interventions.
  - Collecting and analyzing excellent data will not help your current population if there is nothing you can do about the health problem in a timely manner, either due to a lack of resources or because a feasible intervention does not exist. However, understanding gaps in knowledge or funding can lead to better health in the future, so spend money wisely and understand surveillance limitations before collecting data.
  - It is equally important that you are collecting data you actually need to address the question/requirement.

2 minutes
Slide 17

**Analysis, Interpretation, Dissemination**

- Surveillance System
  - Collate, process, analyze data
  - Monitor and interpret health indicators
  - Monitor system indicators and make improvements
  - Create regular reports

- Explain that one stage of the surveillance process is to manage and use the data. This includes the process of compiling data reported from different departments to a central surveillance system, “cleaning,” analyzing, and interpreting the data, as noted by the functions listed on the slide.
Ask participants to refer to slide #17 in their participant workbook.

Ask: Is this flow chart applicable to your work?

Explain that, among other options, a surveillance system may be structured to collect data on a variety of diseases nationally, or it may be structured to collect data on a specific disease or condition.

Ask for a volunteer to briefly explain the simplified flow chart of this generic surveillance system.

Explain that for national surveillance, local reporting sites can be hospitals, clinics, and doctor’s offices. If a case of a reportable disease is seen at one of these sites, a report should be submitted to the local public health office. Each local office is part of a network within a district, and each local office reports to their own district public health office. Each district will compile information for their district and will also report the cases that are reported to the tertiary level (central level) – to the public health office at the Ministry of Health (MOH).
**Question**

- Ask: Can you give an example of a local or district level surveillance system?
- Explain that for disease or condition specific surveillance, reporting sites may report directly to a surveillance office or desk within the MOH or another health-related department, often located at the national level.
- Explain how data flow through a surveillance system.
- Point out that the public health action (to the left of the diagram) is designed to have an impact on the occurrence of the event in the population. Point out that this “action” can involve creating or revising interventions or policies by programmatic staff.

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**Slide 19**

**Surveillance System Stakeholders**

- Participants in the system
- Users of the system
- Users of the results
- Public health practitioners
- Healthcare providers
- Community representatives
- Local, state, and national governments
- Nonprofit organizations
- Public

*Engage stakeholders to ensure the system provides useful information.*

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- Explain that stakeholders play a key role in assuring that a surveillance system functions at all levels.
- Read the slide.
- Say: If you share data, it will encourage more stakeholders to become involved.
- Give a local example (e.g., cancer registry).
- Ask: Who are the stakeholders?
- Explain that stakeholders should be engaged in all levels of system implementation and evaluation, as they provide vital input to ensure that the surveillance
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<tr>
<td>1 minute Slide 20</td>
<td>Explain that in the next section we will discuss operational aspects of surveillance. This includes data sources, types of surveillance, and the potential for bias.</td>
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</table>
| 5 minutes Slide 21    | Ask participants for examples of priority data sources of NCD surveillance.  
|                       | Click on the slide until all the examples appear.  
|                       | Explain that many other sources of data are possible.  
<p>|                       | Explain that the sources on this slide are examples to provide context from where the data may come from, but we will not provide details in this lesson. Another lesson is dedicated to data sources for surveillance. |</p>
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<tr>
<td><strong>Question</strong></td>
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<tr>
<td>• <strong>Ask:</strong> For your country, what information is already available to use without doing additional data collection?</td>
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<td>2 minutes</td>
<td>Slide 22</td>
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<td><strong>Say:</strong> In general, we can categorize the methods of collecting data for surveillance into two main types: passive or active. There are many ways of structuring a given surveillance system, but the general types of surveillance systems can include population-based and sentinel surveillance. We will talk about the methods of data collection and the structure of systems over the next few slides.</td>
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<td>2 minutes</td>
<td>Slide 23</td>
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<td><strong>Say:</strong> Explain that passive surveillance is the most common form of surveillance. Examples include HMIS (Health Management Information Systems), hospital and clinic records.</td>
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<td>Explain the content on the slide. Emphasize that the</td>
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</table>
term passive is used to convey the idea that health authorities take no action while waiting for report forms to be submitted.

5 minutes  
Slide 24

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<td><strong>What To Do/What To Say</strong></td>
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<tr>
<td><strong>Passive Surveillance in Use</strong></td>
<td></td>
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<tr>
<td><strong>Advantages</strong></td>
<td><strong>Disadvantages</strong></td>
</tr>
<tr>
<td>• Inexpensive for the health office</td>
<td>• Barriers to electronic reporting</td>
</tr>
<tr>
<td>• Relative low effort approach</td>
<td>• Delay in reporting</td>
</tr>
<tr>
<td></td>
<td>• Missing data</td>
</tr>
<tr>
<td></td>
<td>• Minimal data on risk factors</td>
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2 minutes  
Slide 25

| Question | Ask participants for some advantages and disadvantages of passive surveillance and examples.  
| Question | Click on the slide until answers appear.  

| Question | Ask: What is active surveillance?  
| Question | CLICK to show bullets.  
| Question | Read the slide.  

Passive Surveillance in Use

Advantages
- Inexpensive for the health office
- Relative low effort approach

Disadvantages
- Barriers to electronic reporting
- Delay in reporting
- Missing data
- Minimal data on risk factors

Examples
- Lab reporting (e.g., cancer, lead, pollutants)
- Discharge records
- Administrative data

Active Surveillance Defined

Action required by local public health authority to collect data
- Phone calls
- In-person visits

Requires more resources than passive surveillance
5 minutes  
Slide 26

Question

• Ask participants for some advantages and disadvantages of active surveillance and examples. Examples can include for annual surveys: United States and Jordan Behavioral Risk Factor Surveillance Systems, and WHO STEPS. For disease registries, you can use Ocean Road Cancer Registry (Tanzania) and SEER United States.

• Click on the slide until answers appear.

3 minutes  
Slide 27

• Explain that now we will transition from data collection methods to talking about the different general structure a surveillance system may have.
• Read the information on the slide.
• Provide a relevant, local example of national surveillance.
### What To Do/What To Say

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<td><strong>5 minutes</strong></td>
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<tr>
<td><strong>Slide 28</strong></td>
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<tr>
<td><strong>Sentinel Surveillance</strong></td>
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<tr>
<td>• Surveillance on a selected subset of potential sources</td>
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<tr>
<td>• Collection of data from a limited number of sites</td>
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<tr>
<td>– Can be passive, active, or a combination</td>
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<tr>
<td>• Sites can be chosen to be representative of a population of interest</td>
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<tr>
<td>– Clinics</td>
<td></td>
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<td>– Hospitals</td>
<td></td>
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<tr>
<td>– Laboratories</td>
<td></td>
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<tr>
<td>– Individual providers</td>
<td></td>
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<tr>
<td>• Representative sample of cases is highly recommended</td>
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<tr>
<td>• Explain that sentinel surveillance is usually conducted as part of a population-based surveillance system.</td>
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<tr>
<td>• Read the slide.</td>
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<p>| <strong>5 minutes</strong>          |                        |
| <strong>Slide 29</strong>           |                        |
| <strong>Sentinel Surveillance in Use</strong> |                     |
| • Useful if there is no existing surveillance system or if one has been disrupted | |
| • Can be expensive | |
| • Difficult to ensure that selected sites are representative of a larger population | |
| • More information on risk factors can be collected | |
| • Example: | |
|  • Demographic Surveillance System | |
| • Explain that sentinel systems are smaller and more flexible and therefore are useful for establishing surveillance if there is no existing surveillance system for a disease or condition, or if a system has been disrupted. | |
| • <strong>Say:</strong> Although sentinel systems can be expensive, they are less expensive than data gained through active surveillance of the total population, and the data can be of higher quality than those collected through passive systems. | |
| • <strong>Say:</strong> It is logistically easier to obtain higher quality | |</p>
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<td>information from a smaller population in sentinel systems, and more information can be collected on demographic and other factors of importance.</td>
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- **Ask**: What might the disadvantages be?
- **Possible answer**: One disadvantage of sentinel systems is that it is difficult to ensure the sites are representative of the population, and it is expensive to establish and maintain the sentinel network, especially compared to passive surveillance.
- **Ask**: Can you give an example? (Other example answers:
  - Demographic surveillance systems (DSS) are sentinel systems, however, they are mainly managed and run by academic institutions for primarily research instead of surveillance. (references provided above)
  - Generalizability: data obtained from the sentinel sites is not usually representative of the country.
  - Data from sentinel sites may not be available publicly limiting their use for public health impact.)
- **Click on the slide and briefly discuss the example.**

**3 minutes**

**Slide 30**

**Dissemination of Information**

- To which groups of people should surveillance results be distributed?
- Decision-makers (policy makers as well as heads of surveillance, epidemiology, or public health offices)
- Participating providers/reporters, colleagues
- The population under surveillance (the community)

- **Ask**: Who should receive feedback from surveillance?
- **CLICK** to show three groups that should be kept aware of surveillance results. The class may have additional
• Read the first bullet. Note that the level of technical information should be different, depending on the audience. For example, the head of the epidemiology office can read a highly technical report, but someone who is responsible for allocating funding and resources needs to know the bottom line about what interventions to support.

• Read the second bullet. Explain that feedback to participants in the system encourages them to continue reporting.

• Read the third bullet. Note that for a general or public audience, the message should be tailored to what is most useful information for them. For example, explain basic facts about a health problem and any steps they can take to prevent this health problem among them.

• Explain that the target population has the right to know the results of surveillance and that the citizens will trust government more if it shares the data.
• **Say:** Surveillance attempts to gain an accurate cross-section – or picture – of the health status of a population, but sometimes the accuracy of surveillance data is compromised by bias.

• **Say:** Bias is a systematic error in the collection or use of data. It may lead to an over- or under-estimate of a problem. It may also lead to false conclusions. Incorrect conclusions may lead to misdirected public health interventions.

• **Say:** Today we will focus on two main types of bias: selection and information bias.
Explain that selection bias refers to how the population is “selected” into being observed in the system and is one way that the picture of the population’s health can be rendered inaccurate.

Ask: What can cause selection bias?

CLICK to show examples

Explain that much of the population either does not have the resources to access medical care or there is not medical care available. If you gather information on the occurrence of disease at a point of medical care, then much of the population is not being represented.

Explain that if a system recruits providers that are easily accessed (convenient), without taking into consideration the population that visits those providers and whether it represents the target population overall, the cases captured may not represent the characteristics of the cases actually occurring in the population.

3 minutes
Slide 34

Information Bias

Degree to which the data obtained do not accurately reflect the true values or measures
- Missing fields, especially those important to the topic
  - Example: “Smoking” field is blank, especially among smokers who may not want to admit to smoking
- Question or field is open to interpretation
  - Example: “Diagnosis” could be from the initial doctor, the hospital discharge records, the underlying cause of disease, or listed as cause of death

Explain that information bias occurs when the collected information contains inaccuracies such as missing data or poor responses, which can lead to false conclusions. Like any bias, this distorts the picture of your population’s health.

Ask: Can you give an example of information bias?
### What To Do/What To Say

- Explain that there are many kinds of information bias, but the ones we tend to be concerned about are the ones that make comparison groups (e.g., exposed and non-exposed, or sick and non-sick) look more different from each other than they actually are.

- Other examples include:
  - Data recording errors
  - Data entry errors
  - Interviewer bias

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<tr>
<td>1 minute Slide 35</td>
<td>Explain that in this last section, we will look at some examples of NCD data collection and surveillance systems.</td>
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<tr>
<td></td>
<td>Examples of NCD Surveillance Systems</td>
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<tr>
<td>3 minutes Slide 36</td>
<td>Explain that the GTSS was developed by WHO, CDC, and the Canadian Public Health Association (CPHA).</td>
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**Global Tobacco Surveillance System (GTSS)**

- Purpose is to enhance the capacity of countries to design, implement, and evaluate their national comprehensive tobacco action plan and to monitor the key articles of the WHO Framework Convention on Tobacco Control
- Countries choose to administer survey components
- Data collected through four surveys
  - Aimed at youth, schoolteachers/administrators, students in the medical field, and adults
  - Each collects data about tobacco knowledge, attitude, use, and/or intention to quit in the target population.
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<td>- Read the purpose given on the slide.</td>
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<td>- Explain that standard sampling methodology and survey instruments have been developed, and countries can choose to administer “core” questionnaires as well as additional surveys, according to their time, interest, and resources.</td>
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1 minute
Slide 37

- Say: Data from all four surveys are available for public use from the WHO website. This screen shot shows the interactive data tool that can be used. The website for this tool is provided in the Participant Guide.

- Here are some examples of uses of GTSS:
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<th>Duration/Slide Number</th>
<th>What To Do/What To Say</th>
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3 minutes
Slide 38

### WHO STEPwise Methods

- STEPwise approach to Surveillance (STEPS)
- Simple, standardized method for collecting, analyzing, and disseminating data in WHO member countries
- Risk factor assessment in three steps:
  - Questionnaire
    - Demographic factors
    - Lifestyle factors
  - Physical measurements
  - Biochemical measurements

- **Explain that the WHO STEPwise approach to surveillance provides an entry point for low and middle income countries to get started on chronic disease surveillance activities. It is also designed to help countries build and strengthen their capacity to conduct surveillance. The goal is that WHO STEPwise is that the surveys will be repeated every 3-5 years. However, that may be difficult for low and middle income countries who lack resources. But WHO STEPwise is important because surveys used for research often occur one time. Surveys used for surveillance are used to monitor specific behaviors, diseases, and conditions over time (increases, decreases) and can be used to examine the impact of interventions.**

- **Explain that STEPS methodology covers three different levels of steps of risk factor assessment.**

- **These steps are:**
  1. Questionnaire
  2. Physical measurements
3. Biochemical measurements

- Explain that the questionnaire is aimed at demographics and lifestyle factors.

3 minutes

Slide 39

Example Studies Using STEPwise Methods
- Combined prevalence of impaired glucose levels or diabetes in Lusaka urban district, Zambia: a population based survey
  - Recommended targeting young and middle-aged adults for prevention-based interventions
- Alcohol consumption in Mozambique: Regular consumption, weekly pattern, and binge drinking
  - Determined the pattern of current and binge drinking according to education, gender, income

- Explain that this slide gives two examples of how different countries have used STEPwise methods.

- First example explanation: In Zambia, based on increasing impaired glucose levels in older age groups, the investigators recommended targeting young and middle-aged adults for prevention-based interventions.

- Second example explanation: In Mozambique, forty percent of the current drinkers reported to have had at least one binge drinking occasion in the previous week. The prevalence of current drinking increased with age and education among women, and with income among men. No consistent pattern was observed in binge drinking by education level among either gender, or by annual income among men, but it was significantly less frequent among more affluent women.

- Ask: What examples do you have of STEPwise?

- Provide participants to the WHO link: Global Health Observatory Data Repository for NCDs/ risk factors: http://apps.who.int/gho/data/?vid=2469
Tell participants that they will now participate in the Review Game.

Note: Adjust number of questions depending on number of tables and teams. If participants are already at small tables, you may keep them together as a team. Otherwise, divide the class into teams of four or five participants.

After participants are in their teams, ask each team to (quickly) give you a team name. Record team names on a flip chart.

Tell participants to discuss answers in their teams before providing them out loud. Correct answers will receive 2 points. You may give 1 point for partially correct answers.

Begin by clicking on the following slides, one question at a time.

To reveal the answers, click on the slide after the question appears (and participants answer the question).
Review: Answers 1-4

1. What is the definition of surveillance? Surveillance is the systematic ongoing collection, collation, and analysis of data, and the timely dissemination of information to those who need to know so that action can be taken.

2. What are the three components of surveillance systems? The population, data collection, and analysis/interpretation/dissemination.

3. Give two examples of surveillance systems. There are many acceptable answers, but the Global Tobacco Surveillance System and WHO STEPS were featured in the lecture.

4. What are the two main data collection methods? Active and passive data collection methods.

• CLICK to display each answer.

Review: Answers 5-6

5. Describe the cycle of surveillance. Surveillance begins at the population level with the detection of a health event by medical care providers and laboratories. These entities report to health departments, where data collection, cleaning, analysis, and interpretation takes place. Reports are then disseminated back to the stakeholders in the system, including health departments, reporters, and the population.

6. What is the difference between population-based surveillance and sentinel surveillance? In population-based surveillance, all providers and/or laboratories in the country report data and data is collected at the local level. In sentinel surveillance, surveillance is on a selected subset of potential sources; sites can be chosen to be representative of a population of interest.

• CLICK to display each answer.

Review: Answers 7-8

7. What is bias? When looking at surveillance data, bias is an inaccurate representation of cases occurring in the population under surveillance in those data.

8. What is the difference between public health surveillance and research surveys? Public health surveillance is hypothesis-generating, focuses on multiple health issues, and looks at broad trends and patterns across health issues and geographical areas. Research surveys are hypothesis-testing, focus on specific health issues, and go into depth within those specific health issues.
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<td>CLICK to display each answer.</td>
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<td>Tell participants that they will now practice what they learned.</td>
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<td>Explain that they will work in their small groups to complete the skill assessment.</td>
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90 minutes (60 minutes assessment; 30 minutes review)

**Activity**

**Skills Assessment**

1. You will work in small groups to assess a given NCD surveillance system in terms of structure and design.
2. All group members should keep notes, but assign one group member to record official responses.
3. Spend no more than one hour completing the assignment.
4. Be prepared to share your work with the class.

- Read the skill assessment instructions to the participants.
- Keep participants in the same small groups they worked with during the previous lessons.
- Tell them to turn to the appropriate Slide in their Participant Guide. Explain that they should spend approximately 1 hour on the assessment.
- Hand out flip chart paper on which to draw the flow of surveillance data (question 2).
- Tell participants to begin.
- Walk around the room and assist the groups as needed.
- Reconvene the groups and ask each group to provide the answers to the questions. Encourage the other groups to provide feedback to their colleagues.
- Refer to the next Slides to see the Skill Assessment from the Participant Guide with possible answers.
Activity

Instructions:
1. Read the information below about an NCD surveillance system.
2. Work with your group to the answer the questions that follow.
3. Be prepared to share your responses with the rest of the class.

System description
The National Cancer Surveillance System (NCSS) is a population-based cancer registry that serves to capture specific cancer diagnoses. Participating hospitals and providers were selected to represent the nation’s population in terms of geographic distribution and urban/rural setting, and have agreed to voluntarily participate in the registry. Providers are provided no compensation for their participation.

Data collection
Local health departments collect data from participating physicians and hospitals. Reporting can take place through any one of three methods:
- mail-in of a standard form
- fax-in of a standard form
- telephone surveillance office and verbally provide the required information

Each participating provider or hospital is asked to report cases monthly, including when there are zero cases diagnosed. Data collected include age, address, occupation, marital status, weight, height, smoking status and history, previous cancer history, diagnosis, site and stage of cancer diagnosed.

Local health departments note that many providers do not report on a monthly basis. Sometimes a provider appears to “save up” cases and will mail in forms every few months on an irregular basis. Although local surveillance officers spend most of their time handling infectious disease outbreaks, one local officer has noted that she doesn’t have the capacity to make copies of reporting forms when they run out, and doesn’t know if the hospital in her jurisdiction does either. Additionally, the postage for regular reporting can add up, and the postal system is hard to rely on, especially during seasons when water and mud make roads between localities difficult to travel.

When their schedule allows, local surveillance officers follow up on incomplete forms or with providers who have consistently not reported.
Data collation, analysis, and interpretation
Local health offices accept forms from participating providers, and are required to enter the data into a database at their local office, and then submit forms to the district-level health offices, as well as the database (when possible). While all local health offices have computers, only 23% of local health offices nationally have computers systems that are 5 years old or less. District surveillance officers have noted that they often receive hard copies of NCSS surveillance forms hand-delivered when local health officers travel to district offices for meetings.
District surveillance offices are required to enter all data into an electronic database and perform basic analyses showing percent of cases that are male and female, percent of cases in standard age groups, and number of cases diagnosed thus far this year compared to the number diagnosed by the same time the previous year and 3 years ago (which marked the beginning of the NCSS). While all surveillance officers have computers, not all of them have training on manipulating databases or creating tables and graphs. District officers are required to send a semi-annual report, accompanied by the database, to the national level. The report is sent by fax and email, and the database is sent by email only.
At the national level, data are collated from all districts. National level analysts have access to the original data forms upon request: they may ask the district office to send copies, or call the district surveillance officer to ask for clarifications. Data are analyzed by available “person” and “place” characteristics, and an annual surveillance summary is created highlighting any changes in trends during the current year compared to the previous three years for which data are available.

Information dissemination
The yearly surveillance summary is published in the national epidemiology bulletin. Additionally, a “lay-person friendly” version of trends and basic risk factors gleaned from the data are posted on the Ministry of Health website. For the most recent annual surveillance summary, a press release highlighting the main findings was issued. Up until now no public health action has been taken on the basis of the surveillance data, but national level surveillance officers plan to use the evidence gathered thus far to highlight the importance of specific types of cancers in the country as a whole in order to advocate for funding to strengthen the surveillance network. They hope that a strong NCSS network would be a good conduit for disseminating prevention information to the population at risk.
1. **Is this surveillance system active, passive, or a combination?**

   *The system is passive, with active components when surveillance officers follow up on missing information or reports.*

2. **Draw a diagram representing the flow of data from the source, to the point where data are analyzed, to the point of dissemination of information and results.**

   **Possible Answer:**

   ![Flowchart](chart.png)

3. **List at least one possible source of selection bias and one possible source of information bias in this system.**

   **Possible Answer:**

   *Selection bias* – The information given states that the selected hospitals and providers were chosen to be representative of the population in the country, so we can assume selection bias is low. However, we do not know whether they were randomly selected, which would help ensure objective representativeness. There could be some characteristic about the participating providers that makes the patients seen there differ from the general population.

   *Information bias* – The most likely source of information bias is from hospitals and providers that do not end up reporting, especially those who are in remote areas or areas where transporting data forms is difficult. The information that does end up in the surveillance system may under-represent populations in these areas.