Reporting and Surveillance

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Learning Objectives

By the end of this lecture, you will be able to:

- Define surveillance
- Know aims and uses of surveillance system
- Understand the different types of surveillance systems
- Recognize the elements of surveillance system
- Be able to assist in establishing and evaluation a surveillance system

What is Surveillance?

The Centres for Disease Control and Prevention (CDC) defined Public Health Surveillance as

"Ongoing systematic collection, analysis, interpretation and dissemination of data regarding a health related event for use in public health action to reduce morbidity and mortality and to improve health"

- Surveillance means "information for action"

What is Surveillance?

- It is the eyes (and ears) of public health
- It is a network of people and activities to keep this process
- Functions at local to international levels.

Describing Surveillance?

- Surveillance systems provide descriptive information regarding **when and where health problems are occurring and who is affected** (the basic epidemiologic parameters of time, place, and person)

The Objectives of Public Health Surveillance

1. To study the trends of disease
2. Early warning of epidemics
3. To provide quantitative estimates of magnitude of health problem
4. To study the natural history of disease
5. Demonstrating the spread of a disease in time and Place
6. To develop epidemiologic research questions
7. To test epidemiologic hypothesis
8. Evaluation of control and preventive measures
9. Monitoring of change in infectious agent
10. Detecting changes in health practices

Criteria for Identifying High Priority Areas for Establishing Surveillance Activities

- The Frequency of the disease (incidence of mortality, and incidence/prevalence of morbidity due to the disease)
- The Severity (case fatality ratio, proportionate mortality ratio, hospitalization rates due to the disease, disability rates)
- The Economic impact (direct costs that add due to medical treatment for the disease and indirect costs due to reduction in productivity)
- Preventability
- The Public interest (community and political attitudes towards the disease).

Features of a Surveillance System

- Practical, clear case definitions for each disease
- Workable, uniform and continuous data collection methods
- Rapidity of collection, analysis, interpretation and dissemination of data.

Types of Surveillance

Types of Surveillance

- Passive surveillance
- Active Surveillance
- Sentinel surveillance

Passive surveillance

WHO Definition

- Regular reporting of disease data by all institutions that see patients (or test specimens) and are part of a reporting network.
- There is no active search for cases.
- Relies on the cooperation of health-care providers — laboratories, hospitals, health facilities and private practitioners
- This is the more common type of surveillance.

Passive surveillance Cont.

- In this type of surveillance **criteria are established for reporting diseases**, **risk factors** or **health-related events** then health practitioners are notified of the requirements and they **report events** as they come to their attention.
- The data recipient has to wait for the data providers to report
- In most countries with a passive surveillance system, every health facility is required to send a monthly (sometimes weekly/daily) report of all cases on a standard form.

Passive surveillance Cont.

Advantages

- Simple to conduct
- Inexpensive
- Covers wide areas (whole countries or provinces)

Disadvantages

- It can be difficult to ensure completeness and timeliness of data (because it relies on an extensive network of health workers)
- Usually underestimate the true illness burden

Active Surveillance

Definition

- In active surveillance the organization conducting the surveillance actively seeks the relevant information (healthcare providers are contacted and asked to provide details of any cases they have seen).
- Data must be obtained by searching for cases (e.g. health workers go into the community, search for cases of fever and take their blood slide for malarial parasite), and also by periodically contacting those who may know cases

Uses of Active Surveillance

- **Active surveillance is used when there is an indication that something unusual is occurring**
  - Rare disease
  - Disease on way to eradication
  - During outbreaks

- **Regular outreach to potential reporters, to stimulate the reporting of specific diseases or injuries.**

Active Surveillance Cont.

Advantages

- Produce complete data of a good quality

Disadvantages

- Expensive
- High use of resources (For this reason, when it is used, it is for a limited time period)

Sentinel Surveillance

Definition

- Collect, analyze, interpret, and use data from a select subset of potential data sources

Uses

- There is no adequate existing surveillance system
- Resources do not allow for a population-based survey

- Can be established for short term and/or rapid system set-up
- Data collected from available healthcare providers or other reporters

Example Uses for Sentinel Systems

- Injury and mental health surveillance after a disaster
- Assessment of chemical exposures to children of agricultural workers
- Assessment of workplace-related injuries or diseases

Sentinel Surveillance Cont.

Advantages

- Rapid
- Economical alternative to other surveillance methods (Because it is conducted only in selected locations

Disadvantages

- May not be as effective for detecting rare diseases or diseases that occur outside the catchment areas

Data Sources for Surveillance

Death Certificates

•Forms completed at time of death and signed (certified) by a physician.

•**Identifying information**

- Demographic information
- Place of death
- Date and time of death
- Factors contributing to death
- Cause of death

Data Sources for Surveillance

Appropriate Use of Mortality Data

Disease or conditions that are:

- Fatal
- Easily ascertained at the time of death
- Known to have a short clinical course
- Known to have well-established risk factors

Disease Registries

- Cases of defined diseases and conditions are systematically reported to a central system
- Can be based in hospitals or specialty referral centers
- Can be pathology/laboratory based
- Best for rare events, such as cancers
- Census data can be used to calculate disease rates among at-risk populations

Using Disease Registries

Advantages

- Captures morbidity data
- Can be linked to the other data sources
- Can detect clusters of disease
- Can be representative of the population

Disadvantages

- Cannot accurately represent occurrence of very common conditions
- Hospital-based registries tend to lack diagnostic data
- Pathology / laboratory based registries tend to lack demographic data

Health Surveys

Format

- Active surveillance
- Standardized questionnaire that can be administered at regular intervals (e.g. yearly)
- Sample of the population

Purpose

- Understand health problems and known and potential risk factors
- Compare the distribution of health problems between localities, districts, or countries over time (if survey is repeated)
- Plan public health programs

Health Surveys

Advantages

- In-depth information, including data on risk factors
- Identify areas of need and where to target public health programs and interventions
- Assess the effectiveness of public health programs and interventions

Disadvantages

- Costly
- Self-reported data on demographics, risk factors, lifestyle, diagnoses

Administrative Data

What are administrative data?

Collected as part of the administration of a health system.

Examples

- Hospital discharge data
- Governmental insurance claims
- Non-governmental insurance claims

Census

- Official population count
- Occurs on a regular basis
- Gathers and records information on additional demographic factors (varies by country)
  - Household income
  - Marital status
  - Family size
- Used as the denominator for population-based estimates of the occurrence of disease

Using Census Data

Advantages

- Information gathering is attempted for every member of the population
- Possibility of asking a health related question (short / long forms)

Disadvantages

- May not reach remote communities
- Technology and capacity to compile data may be limited
- Census counts are unreliable several years after the census

Steps in Establishing a Surveillance System

Steps in Establishing a Surveillance System

Step 1:

Is it Justifiable to Establish a Surveillance System?

•Confirming if the disease is of public health importance and whether prevention/ control measures are available

Steps in Establishing a Surveillance System

Step 2:

Spell out the objectives of surveillance system :

The following issues should be addressed :

- Clearly **specify the disease** (s) proposed to be brought under surveillance.
- *Specify* : **Who** needs **what** information, for **what purpose**?
- *The* **target population**
- *The* **health problem** : e.g. whether only Acute MI or entire spectrum of IHD is to be put to surveillance ?
- **Nature of control programmes** : e.g. if it is a rare disease or a disease moving towards eradication, a fine surveillance will be needed; on the other hand if it is a common disease, a crude surveillance would suffice

Steps in Establishing a Surveillance System

Step 3:

Specify the organization and structure of the surveillance ?

At the planning stage, clear specifications should be made as to “who will do what, how, and will be responsible to whom”.

Steps in Establishing a Surveillance System

Step 4:

Clearly define the disease(s) being considered for surveillance ?

- **Case definitions** should be accurately worked out after detailed consultation with experts.

- All those involved in the collection of data should be **well trained** in the use of these case definitions/ diagnostic methods.

- Case definitions/ diagnostic procedures should be **simple** enough so as to be understood and used by all those on which the system depends for reporting.

Steps in Establishing a Surveillance System

Step 5:

Specify the Details of Collection of Information

- Select the proper sources of data
- Specify the method of data collection
- The forms that will be used
- What time/place of diagnosis will be entered
- What will be the frequency of reporting?
- Decide the method of transmission of reports
- Central Collection of Data

Steps in Establishing a Surveillance System

Step 6:

The Organization and procedures of data Analysis

- Simple display of data :
  - Data can be displayed through histograms/ bar diagrams/ line diagrams describing the data according to various characteristics of person, place and time.
- Descriptive statistics :
  - Give the “Summary statistics” (Incidence rates / prevalence / proportions /Mean / Median) along with the measures of dispersion (SD) and the 95% confidence intervals.

Steps in Establishing a Surveillance System

Box - 1 : Suggested form for weekly or monthly reporting from PHC or CHC to next higher health care level							
Period covered by the report : From (Date) : _____ To (Date) : _____							
Name and address of health facility :							
Sl No	Name	Address	Age	Sex	Diagnosis	Level of Diagnostic certainty (suspected/ probable/confirmed)	Date of onset
1.							
2.							
3.							
4.							
5.							
Name			Designation :				
Date			Signature :				

Steps in Establishing a Surveillance System

Table - 1 : Distribution of cases according to age & sex					
Disease :			Reporting period :		
Sex	Age Group (Years)				
	0 - 4	5 - 14	15 - 44	≥45	Total
Males					
Females					
Total					

Steps in Establishing a Surveillance System

Table - 2 : **Distribution of cases according to place of residence**				
Disease :		Reporting period :		
Number of cases according to Villages				
Village - 1	Village - 2	Village - 3	Village - 4	Total

Steps in Establishing a Surveillance System

Step 7:

Making Scientific interpretations out of the results

▪Consider whether the apparent, statistically significant, increases or decreases in the disease incidence at a given place and time represent true changes.

False increase or decrease may be due to

- Improvement in diagnostic procedures
- Duplicate reporting
- Enhanced reporting
- Increase in population size

Steps in Establishing a Surveillance System

Step 8:

Ensure proper feedback to all concerned

- Provide regular (usually monthly) feedback reports to all those who are in a position to take action on the surveillance data (as, secretaries and directors of health department as well as other department concerned with human development)

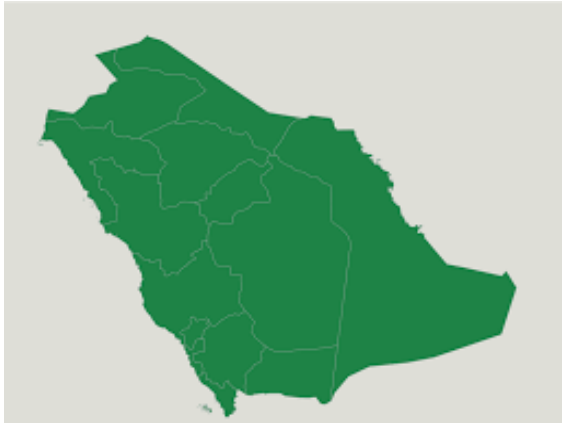
Steps in Establishing a Surveillance System

Step 9:

Periodically evaluate / review the surveillance system

- Periodic evaluation is important to identify defects and reorient the methodology
  - See whether the case definitions need a change?
  - Are there some problems in the timely and accurate reporting
  - How can it be improved?

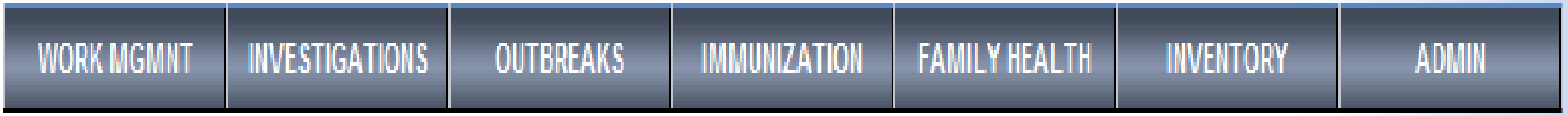
Example of National Surveillance Systems



- Health Electronic Surveillance Network” (HESN) to control and manage infectious diseases and epidemics online

HESN

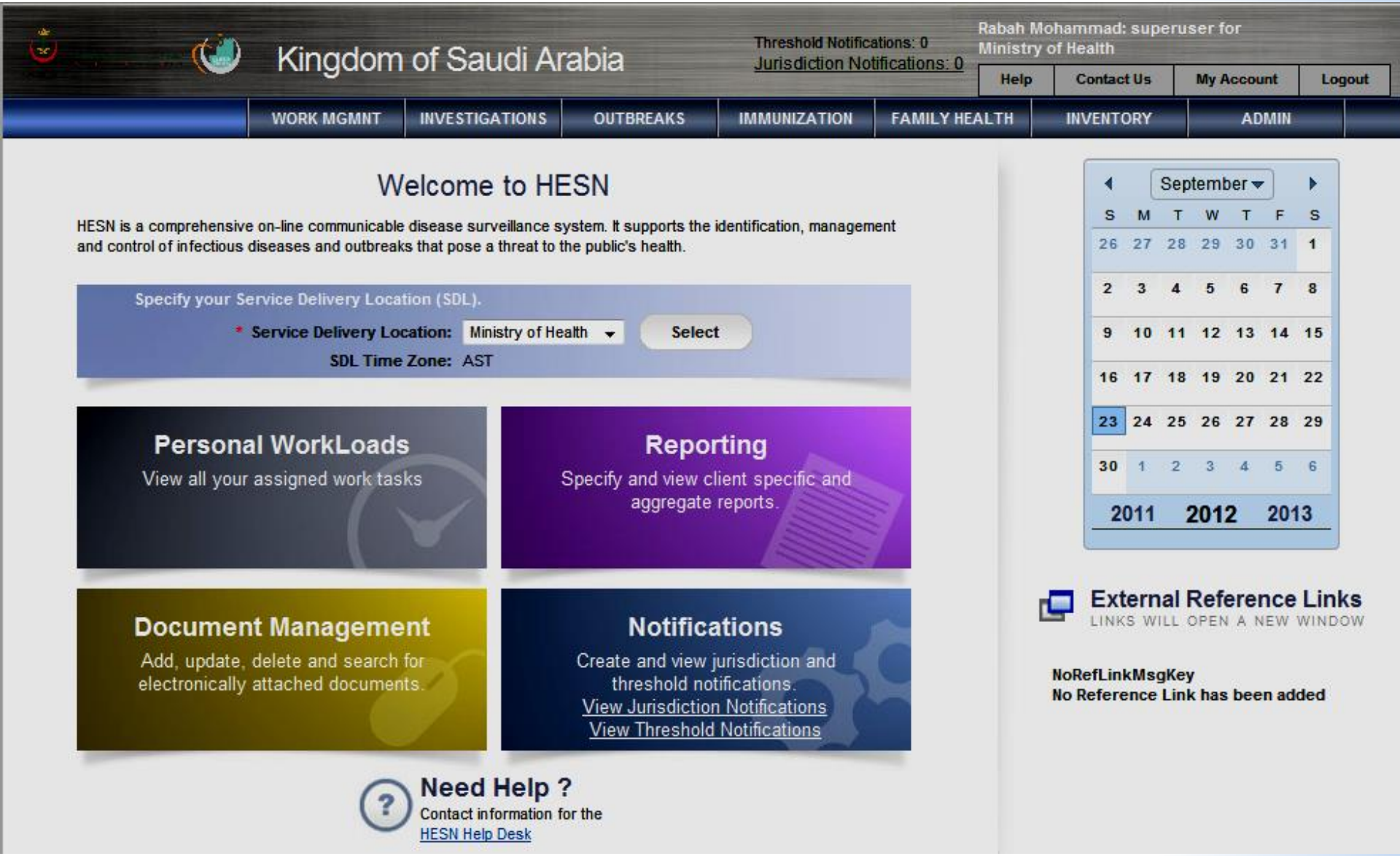
It includes 7 modules they are:



- Investigations
- Outbreaks
- Immunization
- Family Health

- Work Management
- Inventory
- Admin

HESN Dashboard



- Surveillance is an important tool for public health
- It is defined as an “Ongoing systematic collection, analysis, interpretation and dissemination of data regarding a health related event for use in public health action to reduce morbidity and mortality and to improve health”
- Routine surveillance data are available in regular reports by national and international sources all over the world

- Three main types of Surveillance:
  1. Passive (Common)
  2. Active
  3. Sentinel

- **Main aim** → disease control and prevention


Thank
You