

Reporting and Surveillance

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Learning Objectives



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

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

Session Overview

- Definition
- The Uses
- Aims
- Types
- Elements
- Evaluation
- National Examples



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)

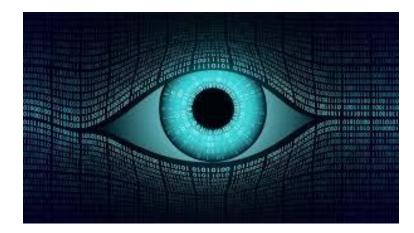
Surveillance Vs Monitoring

- Surveillance and Monitoring are often used interchangeably but they are distinct.
- Monitoring refers to "ongoing measurements of health services or a health programme with a view to 'evaluate' the particular programme / service or intervention, with constant <u>adjustment of performance</u> in relation to the results.
- Surveillance concerns general populations while monitoring applies to specific target groups (e.g. vaccinated infants).

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

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 of cases

Uses of Active Surveillance



- Active surveillance is used when there is an indication that something unusual is occurring
 - \circ 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

 Reporting of cases of specific diseases or risk factors that may indicate that the particular preventive or therapeutic activity is not working as planned.

 It is used when high-quality data are needed about a particular disease that cannot be obtained through a passive system.

Sentinel Surveillance Cont.

- It involves only a limited network of carefully selected reporting sites
- Data is obtained from selected hospitals who agree to report all cases of the disease
- Data collected in a well-designed sentinel system can be used to
 - \circ Signal trends
 - \circ Identify outbreaks
 - \odot Monitor the burden of disease in a community

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



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.

Organization and Structure of a Surveillance System

- The essential components of a surveillance system are :
- An overall organization : Consisting of personnel, finances, logistics and administrative back up.
- The originators of data : This would include the sources of data, data collectors and data collecting mechanisms.
- The transmission of data to the surveillance centre, with specification of the mode of transmission and frequency of such transmission.

Organization and Structure of a Surveillance System Cont.

- Data management and analysis : This includes manual/ computerized data files, and statistical analysis procedures.
- The sensible interpretation or results : Including their consolidation and preparation of reports.
- A system of feed back of results : To the originators of data and to those who are in a position to enforce preventive steps.
- A system to periodically evaluate the surveillance system itself.

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

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

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".

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. 28

Case Definition



A set of uniform criteria used to define a disease for public health surveillance (possible, probable, confirmed)

- Enable public health officials to classify and count cases consistently across reporting areas.
- It is not intended to be used by healthcare providers for making a clinical diagnosis or determining how to meet an individual patient's health needs
- Refer to standard definitions stated by WHO and CDC
- Every year, case definitions are updated

Case Definition Gradient



Low Specificity

High Specificity

Suspected

Probable

Confirmed

Example of Case Definition



Smallpox

Clinical Description

An illness with acute onset of fever >101 ° F followed by a rash characterized by vesicles or firm pustules in the same stage of development without other apparent cause.

Laboratory Criteria for Confirmation

- Isolation of smallpox (variola) virus from a clinical specimen, or
- Polymerase chain reaction (PCR) identification of variola DNA in a clinical specimen, or
- Negative stain electron microscopy (EM) identification of variola virus in a clinical specimen

Example of Case Definition



Probable Case of Smallpox

A case that meets the clinical case definition that is not laboratory confirmed but has an epidemiological link to another confirmed or probable case.

Confirmed Case of Smallpox

A case of smallpox that is laboratory confirmed.

Working Case Definition



Smallpox Outbreak

- Anyone who meets original case definition
- Anyone with fever (>101 ° F) or rash who was in a confirmed exposed area during the Bioterrorism (BT) event or came in contact with a confirmed or probable case should be considered a case. (*until confirmed; if not confirmed; will be under observation and could be classified as "case"; and others as "confirmed cases"*)

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

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.

<i>Box - 1</i> : 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 :			

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

<i>Table - 2</i> : Distribution of cases according to place of residence												
Disease : Reporting period :												
Number of	cases accordi	ing to Village	es									
Village - 1	Village - 2	Village - 3	Village - 4	Total								

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 <u>represent true changes</u>.
- False increase or decrease may be due to
 - \circ Improvement in diagnostic procedures
 - Duplicate reporting
 - Enhanced reporting
 - $\,\circ\,$ Increase in population size

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)

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?

Evaluation of Surveillance System



1. Is the system detecting what it is supposed to detect?

The surveillance system data need to be compared with data produced by another detection mechanism

2. Is the system producing data in time for appropriate responses?

3. Can the system cope with changes?

The disease or our knowledge may be changing quickly. A surveillance system should adopt to such changes (flexibility)

Evaluation of Surveillance System Cont.



4. Is the system as simple and cheap as possible?

5. Are the public health responses timely and appropriate? Any system that does not lead to appropriate responses is flawed.

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 ManagementInventoryAdmin

HESN dashboard



Work Management

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Potential Client Matches Notes	Total: 0		🛛 🔍 Page	1 of 1 🕨 🕨 Ju	mp to page:			
Document Management	Reassigned Tasks					*	Hide Reassigned Tas	sks
Communication Templates						d from you and are sho). To view the work, clic		
 Reporting & Analysis Notifications Communications Log 	<u>Sub-Task Status</u>	Sub-T	ask ID Pric	ority Descri			<u>ssiqned On</u>	
Administration								

Investigation

	WORK MGMNT	INVESTIGATIONS	OUTBREAKS	IMMUNIZATION	FAMILY HEALTH	INVENTORY	ADMIN
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▶ Cohort	Investigation	Group: 🚽					
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Outbreak

	WORK MGMNT	INVESTIGATIONS	OUTBREAKS	IMMUNIZATION	FAMILY HEALTH	INVENTORY	ADMIN						
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Immunization

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Inventory

	WORK MGMNT	INVESTIGATIONS	OUTBREAKS	IMMUNIZATION	FAMILY HEALTH	INVENTORY	ADMIN	
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Administration



System Administration

System administration tasks are grouped into categories. Click on a text link to navigate to the area of interest.

INDICES

- Manage Organizations
- Manage Providers
- Manage Service Delivery Locations
- Risk Factor Categories

TERMINOLOGY

- Manage Vocabulary Domains
- Manage Value Sets
- Manage Code Sets

SECURITY MANAGEMENT

- Manage Permissions Sets
- Manage Permissions
- Manage Roles
- · Manage System Accounts
- Upload User Accounts
- Manage User Accounts
- View Audit Log

GENERAL / MISCELLANEOUS

- Manage Reference Links
- Manage Batch Schedule
- Config. Services Properties List

TEMPLATES

Manage User Defined Forms

Example of National Surveillance Systems



Influenza Surveillance In Saudi Arabia (ISSA)

•Objectives of influenza surveillance

The goal of influenza surveillance is to minimize the impact of the disease by providing useful information to public health authorities, which will help in planning appropriate control and intervention measures, allocate health resources, and make case management recommendations

Case definition													
ILI case Definition: beginning at the last 10 days, did the patient experience: Does the patient meet ILI case definition?													
History of sudden or	nset fever or	curre	ent fever (≥3	38	s.C)	🗆 Yes							
🗆 Cough						🗆 No	IF "	No", DO NOT CONTINUE					
Other suspected disease:													
ID number:			Date of	f I	First Interv	view:							
Demographic Information													
Primary Health Care:			Gender		Male								
Patient's name: (family name), (given name(s))					Female								
Nationality :				_	🗆 Hajj			Other reason					
Date of birth (Gregorian)								12) (Gregorian)					
Address: (Village/District/Governorate)			Contact	Contact Telephone Number:									
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Clinical History													
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□ Neuromuscular dysfunction □ Chronic kid						lisorder							
□ Other	mey usease		mome nem		ological o	asoraer		intine compromised					
□ Unknown													
Pregnancy: 🗆 Yes 🗆 No													
Pregnancy: □ Yes □ No Did the patient receive influenza antiviral within the last 14 days? Vaccination for influenza in the last 6 months:													
Specimen Collection				_									
Nasopharyngeal swab collected?	Throat sv	vab c	ollected?			Date of	fspec	imen collection:					
Specimen Laboratory Form	•												
* *	Hospital:												
ID number:	Date speci	imen	collected: _		//_								
	Date of sh	ipme	nt: /	1									
	Ward/Dep	artm	ent:										
Date Lab received specimen: _ / _ / /	_												
Type of specimen													
 Oropharyngeal Specimen:			1		Specimen		Yes	n No					
 Nasopharyngeal Specimen:	n No		Other (spe		uty):								
Flu A: seasonal H1N1	Pos (+)		Neg (-)		Adeno	virus		Pos (+) 🗆 Neg (-)					
Flu A: seasonal H3N2	Pos (+)		Neg (-)		hPIV 1	L		Pos (+) 🗆 Neg (-)					
Flu A: A(H1N1)pdm09	Pos (+)		Neg (-)		hPIV 2	2		Pos (+) 🗆 Neg (-)					
Flu A: H5N1	Pos (+)		Neg (-)		hPIV 3	3		Pos (+) 🗆 Neg (-)					
Flu A: Unsubtypeable/Novel	Pos (+)		Neg (-)		hMPV			Pos (+) 🗆 Neg (-)					
	<u> </u>		Neg (-)		MERS	-CoV		Pos (+) 🗆 Neg (-)					
RSV	Pos (+)		Neg (-)		Others	с —		Pos (+) 🗆 Neg (-)					
			•	Γ									
Date results reported://													
Comments:													

Appendix 2: ILI Data Collection set

Appendix 3: ILI Line List Data Collection set

حا*لات مشتبهة* الأنفلونزا (ILI) المسجلة بالمركز

رقم الأسبوع:

التاريخ:

اسم المركز:

کحة Cough	حرارة Temp		الجز ider			لحمر Age				رقم الهوية	الاسم	رقم
	38°	انئی F	ذکر M	65+	65<50	50<15	15<5	5<2	2<0	ID Number	Name	NO

المراقب الصحي:

رقم الأسبوع:

HBIS I	D						Γ	Т	T				Γ	'	Hospita	i name:													
				Ϊ,		•	•	ľ.			De	part	men	it (N	Medicir	e=1; Pediatri	ics=	2)		Date									+
Comp	Year	Month		and a	CII	ŀ		Patien	9		U	nit (Ir	npati	ient	=1; Ou	tpotient=2)				Time	(use 2	4 hr. ti	me fo	rmat)			\vdash	\vdash	\top
Name		•		-	Т	-		-											Age (WY-MM)				Т,		-	ŕ –	
House	hold head				1														Sex (Male=1;	Fem	ale=2	:)		-			-	1
Villag	e / Para / N	lahali	la		╡											Health care worker (Yes=1; No=2)										╀			
Union	/ Ward				1														Poult	try worl	ker (Y	es=1;	No=	2)					
Upazi	ia / Thana																		Poult	try raisi	ng (Ye	es=1;	No=2)					
Distric	t																Т	Local Tra	ivel wi	ithin 7 d	lays (Yes=1	l; No:	=2)					
Phone	number																1	Where?											•
Intern	International travel within 30 days (Yes=1; No=2)												T	Where?															
Date of	of admissio	n (DD	-MM	-111)				Т		Γ	Т	T		Γ		Date of d	list	harge (DD	-MM-	vi)			Γ	Τ	Τ	Τ			
Provis	ional diagr	osis													•	•								•					
Outco	me				F	Fully	rec	over	ed=	1; Pa	artis	illy re	cove	ered	1=2; Re	mains hospit	aliz	ed=3; Tra	nsferre	ed=4; De	eath=	5; Un	knov	vn=9					
								Т								Was fever	sub	jective o	meas	ured? (Subje	ctive	=1, M	leasu	red=	2)			
Sympt	toms (Yes=1	; No=2,	Unik	nown	:=9)			1	Dat	e of	ons	et				If measured, record in (in *F):													
																Other sym	pto	ms (Yes=1	;No=2)				•	ate o	of on	set			
Fever														Γ	•	thers 1							ľ			Τ	Т		
Cough														Τ	•	Others 2							\top						
Difficu	ilty breathi	ηg												Τ	•	thers 3										Τ	\top		
Sore t	hroat														Sy	mptoms for	<51	yrs. (Yes=1	;No=2))		Dat	te of	onse	ŧ				
Runni	ng nose														a	est indrawin	Б												
Heada																ridor in a calr													
Diarrh	ca															ing unable to													
Chills															Le	thargy or un	con	sciousnes	s										
Body																mits everyth													
Hemo															H	story of conv	rulsi	ons											
Pleurit	ic chest pair	•																											
	al History															las any docto				-			No=2)						
	u smoke? (i											=4)				tre you pregn													
	ny doctor to							-		-						isited OPD w				-			-						
	y of underly pertension o														Malari	a 🗆 HIV/AIDS)	5 0	Diabetes	= CO	PD(Chro	onic b	rond	nitis/e	mph	ysen	na)			
Histor	y of pneum	onia i	in the	: prio	r 30	days	: 1=	Yes;	2=1	No; S	9=UI	nkno	wn														\uparrow		

Appendix 5: Hospital Data Collection Form (Detailed form)



- Surveillance is an **important tool** for public health
- It is <u>defined</u> 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

