Reviewed By
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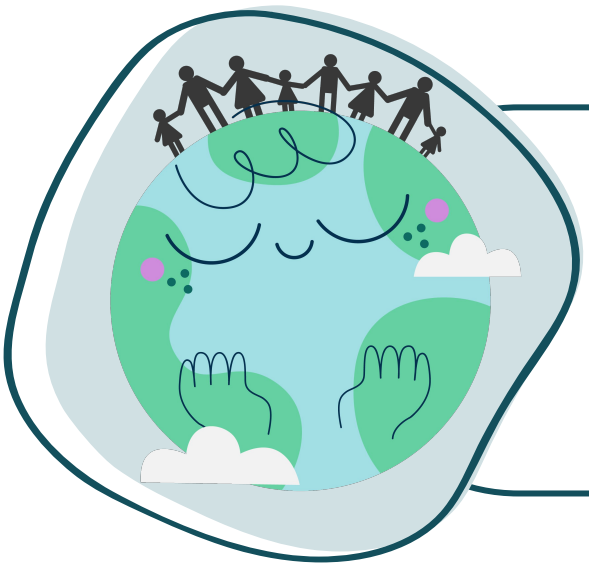

Reporting & Surveillance

Understand this lecture rather than memorizing 🥳💔

Objectives

- 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.

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Editing File

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".
- In other words, it means "**information for action**".
- It is the eyes and ears of public health.
- It a very **important tool** for public health
- It is a network of people and activities to keep this process.
- Functions at local to international levels and is available in regular reports routinely.

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 and Monitoring:

- Surveillance and Monitoring are often used interchangeably but they are **distinct**.

Monitoring [1]	Surveillance
• Refers to the ongoing measurements of health services or a health programme with a view to **'evaluate'** the particular programme / service or intervention, with constant adjustment of performance in relation to the results.	• Surveillance is a broader term
• Is concerned with a specific target Example: vaccinated infants	• Is concerned with the general population

Objectives of Public Health Surveillance [2, 3]

Main aim:
Disease control and prevention

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 Breast cancer screening
9. Monitoring of change in infectious agent like changes in malaria species
10. Detecting changes in health practices

1. More specific, to evaluate a program and is considered a specific term under the broader term of surveillance.
2. It is essential to set the objectives when you establish a surveillance system. It is not necessary to have them all you can have only one objective but you should have them at least.
3. A surveillance system can meet one objective while another one can meet multiple objectives.

Surveillance

Criteria for Identifying High Priority Areas for Establishing Surveillance Activities: [1]

1. **Frequency of the disease**
   → Incidence of mortality, and incidence/prevalence of morbidity due to the disease
2. **Severity**
   → Case fatality ratio, proportionate mortality ratio, hospitalization rates due to the disease, disability rates
3. **Economic impact**
   → Direct costs that add due to medical treatment for the disease and indirect costs due to reduction in productivity
4. **Preventability**
5. **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	Item	Description
Passive	Definition	• Regular reporting of disease [2] 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 **most common type** of surveillance. Example: Reported cases of COVID-19 by hospitals.
	Uses	• 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.
	Advantage	• Simple to conduct • Inexpensive • Covers wide areas (whole countries or provinces)
	Disadvantage	• 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.

1. Recall that surveillance is a network and aims for the general public so definitely it comes with a high cost. So not everything should be surveilled. Based on these criteria we should prioritize certain programs.
2. Not necessarily a disease. Any health related event can be surveilled.

Types of Surveillance

Types	Item	Description
Active	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, and also by periodically contacting those who may know of cases. Example: - Health workers go into the community, search for cases of fever and take their blood slide for malarial parasite - Screening for people arriving from a certain country. - Actively visiting and screening individuals in high risk areas.
	Uses [1]	Active surveillance is used when there is an indication that **something unusual is occurring**: • Rare disease • Disease on way to eradication e.g. polio • During outbreaks (very good indication) Regular outreach to potential reporters, to stimulate the reporting of specific diseases or injuries.
	Advantage	• Produce complete data of a **good quality**
	Disadvantage	• Expensive • high use of resources - For this reason, when it is used, it is for a limited time period.
Sentinel [2]	Definition	• Reporting of cases of **specific diseases** [3] or risk factors that may indicate that a particular preventive or therapeutic activity is not working as planned. Example: a measles outbreak in kids who were supposedly vaccinated.
	Uses	It is **used when high-quality data are needed** about a particular disease that cannot be obtained through a passive system. - 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: • Signal trends. • Identify outbreaks. • Monitor the burden of disease in a community.
	Advantage	• Rapid • Economical alternative to other surveillance methods. - Because it is conducted **only in selected locations**.
	Disadvantage	• May not be as effective for detecting rare diseases or diseases that occur outside the catchment areas.

1. This type of surveillance is not effective in all types of diseases.
2. Similar to passive but more detailed and is not considered a main type of surveillance.
3. E.g. Myocardial Infarction

Organization and Structure of a Surveillance System

Components of a Surveillance System:

1	**An overall organization:** - Consisting of personnel, finances, logistics and administrative back up.
2	**The originators of data:** - This would include the sources of data, data collectors and data collecting mechanisms.
3	**The transmission of data to the surveillance centre** - With specification of the mode of transmission and frequency of such transmission.
4	**Data management and analysis:** - This includes manual/ computerized data files, and statistical analysis procedures.
5	**The sensible interpretation or results:** - Including their consolidation and preparation of reports.
6	**A system of feedback of results:** - To the originators of data and to those who are in a position to enforce preventive steps.
7	A system to **periodically evaluate** the surveillance system itself.

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.

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”.

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.

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.

Example	Item	Description
Beginning of COVID-19 (2019-nCoV)	Suspected case	A person with acute respiratory illness (fever with cough and/or shortness of breath) AND and of the following: 1. A history of travel to China in the 14 days prior to the symptom onset. 2. A close physical contact in the past 14 days with a confirmed case of COVID
	Confirmed case	Suspected case with laboratory confirmation of 2019-nCoV infection
Smallpox	Probable case	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	case of smallpox that is laboratory confirmed.

Steps in Establishing a Surveillance System

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
- Polymerase chain reaction (PCR) identification of variola DNA in a clinical specimen
- Negative stain electron microscopy (EM) identification of variola virus in a clinical specimen (Level D laboratory or approved Level C laboratory)

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

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

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					

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.		We need it for contact					
3.							
4.							
5.							

Name | Designation :

Date | Signature :

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

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

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

Skipped by the doctor

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).
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.

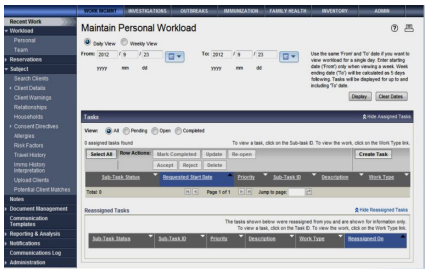
Examples of National Surveillance Systems

1 HESN

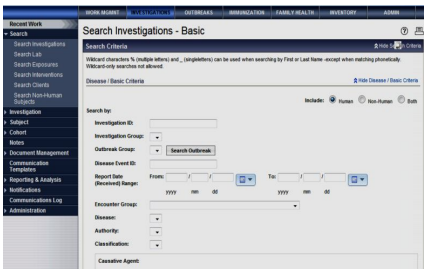
- **Health Electronic Surveillance Network** (HESN) is used to control and manage infectious diseases and epidemics online.

Examples of National Surveillance Systems

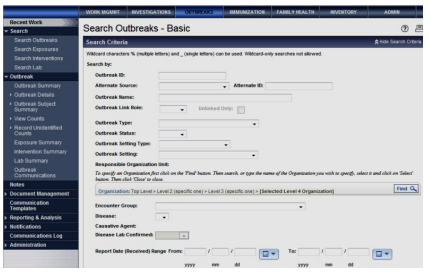
1 HESN



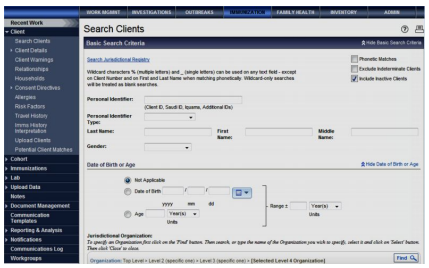
Work management



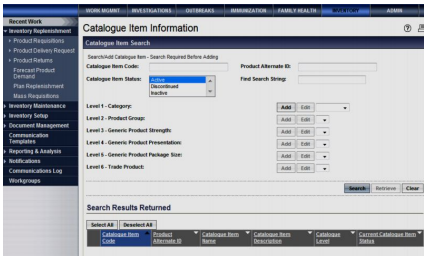
Investigations



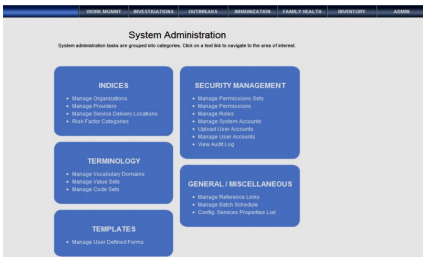
Outbreaks



Immunization



Inventory



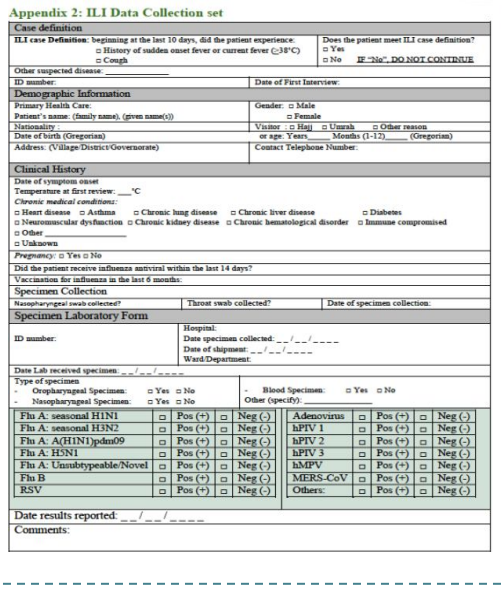
Administration

2 ISSA

- **Influenza Surveillance In Saudi Arabia** (ISSA)

Objectives:

- 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.


Appendix 2: ILI Data Collection set

Case definition

ILI case Definition: beginning at the last 10 days, did the patient experience:
□ History of sudden onset fever or current fever (≥38°C)
□ Cough

Does the patient meet ILI case definition? □ Yes □ No
IF "No", DO NOT CONTINUE

Other suspected disease:
ID number:
Date of First Interview:

Demographic Information

Primary Health Care:
Patient's name: (family name), (given name(s))
Nationality
Date of birth (Gregorian)
Address: (Village/District/Governorate)
Gender: □ Male □ Female
Visitor □ Hajj □ Umrah □ Other reason
or age: Years Months (1-12) (Gregorian)
Contact Telephone Number:

Clinical History

Date of symptom onset
Temperature at first review: °C
Chronic medical conditions:
□ Heart disease □ Asthma □ Chronic lung disease □ Chronic liver disease □ Diabetes
□ Neuromuscular dysfunction □ Chronic kidney disease □ Chronic hematological disorder □ Immune compromised
□ Other
□ Unknown
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 swab collected? | Date of specimen collection:

Specimen Laboratory Form

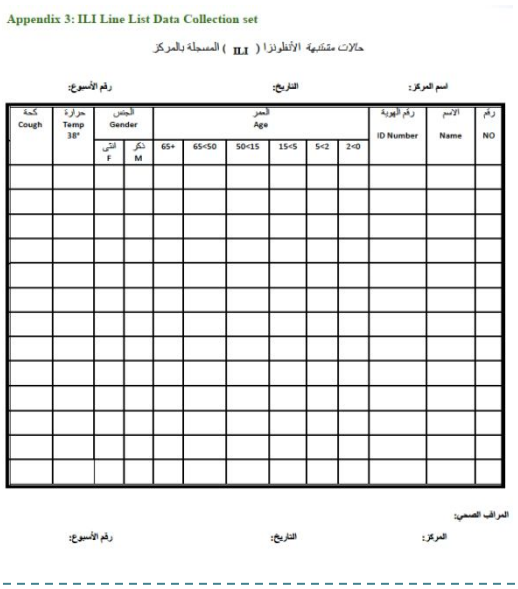
ID number:
Hospital:
Date specimen collected: _ _/_ _/_ _ _ _
Date of shipment: _ _/_ _/_ _ _ _
Ward/Department:

Date Lab received specimen: _ _/_ _/_ _ _ _

Type of specimen
- Oropharyngeal Specimen: □ Yes □ No
- Nasopharyngeal Specimen: □ Yes □ No
- Blood Specimen: □ Yes □ No
Other (specify)

Flu A: seasonal H1N1	□	Pos (+)	□	Neg (-)	Adenovirus	□	Pos (+)	□	Neg (-)
Flu A: seasonal H3N2	□	Pos (+)	□	Neg (-)	hPIV 1	□	Pos (+)	□	Neg (-)
Flu A: A(H1N1)pdm09	□	Pos (+)	□	Neg (-)	hPIV 2	□	Pos (+)	□	Neg (-)
Flu A: H5N1	□	Pos (+)	□	Neg (-)	hPIV 3	□	Pos (+)	□	Neg (-)
Flu A: Unsubtypeable/Novel	□	Pos (+)	□	Neg (-)	hMPV	□	Pos (+)	□	Neg (-)
Flu B	□	Pos (+)	□	Neg (-)	MERS-CoV	□	Pos (+)	□	Neg (-)
RSV	□	Pos (+)	□	Neg (-)	Others:	□	Pos (+)	□	Neg (-)

Date results reported: _ _/_ _/_ _ _ _
Comments:


Appendix 3: ILI Line List Data Collection set

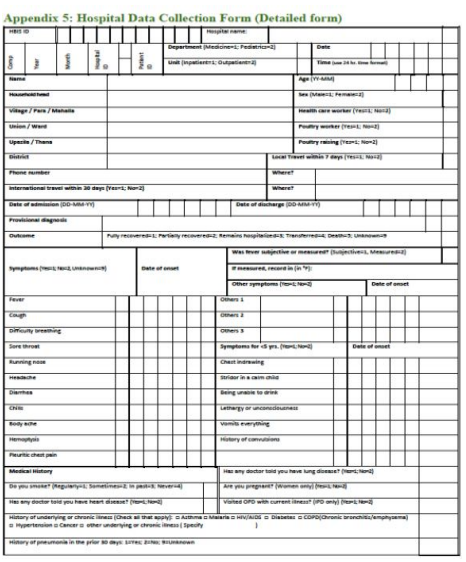
حالات مشتبهة الأنفلونزا (ILI) المسجلة بالمركز

رقم الأسبوع: التاريخ: اسم المركز:

كحة Cough	حرارة Temp 38°	الجنس Gender		العمر Age					رقم الهوية ID Number	الاسم Name	رقم NO
		انثى F	ذكر M	65+	65<50	50<15	15<5	5<2	2<0			

المراقب الصحي:

رقم الأسبوع: التاريخ: المركز:


Appendix 5: Hospital Data Collection Form (Detailed form)

Quiz

MCQ

1- You want to conduct a surveillance program system on “Nocardiosis”. You know that Nocardia infections are very rare in your country. Which type of surveillance system would you use?
A- Passive surveillance
B- Active surveillance
C- Semi active surveillance
D- Sentinel surveillance

2- “Measurements used to evaluate a certain program with constant adjustments done based on the results”. Which of the following terms best describe the statement?
A- Reporting
B- Surveillance
C- Monitoring
D- Adjusting

3- You decided to create a surveillance program that tests people for certain highly deadly genetic illness. Your supervisor told you that testing people born with a genetic illness is not a priority. Which of the following criterias **DOESN’T** apply to your proposed program?
A- Severity
B- Preventability
C- Disability
D- Fatality

4- Which of the following statements is true regarding case definition?
A- Probable and suspected cases are distinct and can never overlap
B- It is intended to be used by healthcare providers for making a clinical diagnosis or determining how to meet an individual patient's health needs
C- A case of a patient who meets the clinical criteria is said to be a susceptible case. If the patient had contacted a confirmed case it is said to be probable.
D- a case of a patient who meets the clinical criteria is said to be susceptible case. If the patients shows radiographic images suggestive of the case it is said to be confirmed

5- Which of the following describes a difference between survey and surveillance?
A-Survey monitors long term trends whereas surveillance informs about patterns of disease occurrence
B- Survey provides data for new cases of diseases whereas surveillance provides history of old and new cases of disease
C- Survey is time consuming while surveillance is relatively quick
D- Survey is a one time activity and surveillance is an ongoing collection of data

6-Which one of the following is an obstacle for obtaining high quality surveillance data?
A- On time responsiveness
B- Under reporting
C- Use of active surveillance system
D- Well-trained staff

Answers

Q1	Q2	Q3	Q4	Q5	Q6
B	C	B	C	D	B

Thank You and Good Luck

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- Rema AlMutawa
- Sara AlAbdulkareem
- Sedra Elsirawani
- Wejdan Alnufaie
- Abdulrahman Alhawas
- Abdulrahman Shadid
- Abdullah Aldawood
- Abdullah Shadid
- Alwaleed Alsaleh
- Bader Alshehri
- Bassam Alkhuwaiter
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- Omar Alghadir
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