The first step in Public Health is the recognition of a problem.
- AIDS
- West Nile Virus
- Monkeypox
- Ebola
- Avian influenza
- 2009 H1N1 Novel influenza A
- MERS co-V

Model for Role of Surveillance in Public Health Practice

The second step: definition of scope of problem

The third step: determine cause of a disease
This step consists of an epidemiologic study, not surveillance

The fourth step: design intervention to prevent transmission of infectious agent
This is NOT surveillance.
- Once developed, must be tried in experimental situation to see if it is effective

If intervention is successful, targeting of it should be guided by surveillance information that identifies high risk groups

Case Example: Smallpox
Global Eradication of Smallpox: Ring Vaccination Strategy

- Identify
- Vaccinate
- Monitor

Contacts of case
Contacts of Contacts

Case

Final Step: evaluate effectiveness of the public health intervention
- by assessing the trend in disease or injury once it becomes a routine component of public health programs
- requires surveillance

CDC Definition of Public Health Surveillance

"the ongoing, systematic collection, analysis & interpretation of health data essential to the planning, implementation, & evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know. The final link of the surveillance chain is the application of these data to prevention & control. A surveillance system includes a functional capacity for data collection, analysis & dissemination linked to public health programs"

Essential Elements of a Surveillance System:
The population & events to be studied are defined as precisely as possible

- Relevant data are collected using systematic methods

Essential Elements of a Surveillance System:
Data are consolidated or tabulated to facilitate evaluation

- Data are appropriately analyzed & interpreted

- Data are reported. This is important to bring about change.

Uses of Surveillance

- Quantitative estimates of the magnitude of a health problem
- Portrayal of the natural history of disease
- Detection of epidemics***
- Documentation of the distribution & spread of a health event
- Facilitating epidemiologic & laboratory research

***rationale for outbreak investigations
Uses of Surveillance

- Testing of hypotheses
- Evaluation of control & prevention measures
- Monitoring of changes in infectious agents
- Monitoring of isolation activities
- Detection of changes in health practice

Planning

Note: be able to describe & give examples

Types of Surveillance

- Active Surveillance
  - Routine surveillance where reports are sought dynamically from participants in the surveillance system on a regular basis (e.g., telephoning each participant monthly to ask about new cases).
  - Active case-finding – dynamic identification of the occurrence of a disease or health event under surveillance which may involve house-to-house visits to identify cases – may be used in active surveillance

- Passive Surveillance
  - Routine surveillance where reports are awaited & no attempt is made to actively seek reports from the participants in the system

Mandatory Surveillance

- A surveillance where participants must report to the system.
  - e.g., a health authority requires all public laboratories to report specified diseases – this is usually not by law but is linked to their contractual duties.

Mandatory Surveillance

- Notifiable diseases are one example of a mandatory system where reporting is by law
Serosurveillance

The surveillance of an infectious disease by measuring disease specific antibodies in a population or sub-population

Examples:

Sentinel Surveillance

Surveillance of a specified health event in only a sample of the population at risk using a sample of possible reporting sites

Sample should be representative of the total population at risk

Community Surveillance

Where starting point is a health event occurring in the community & reported by community worker or actively sought by investigators

This may be particularly useful during outbreak & where syndromic case definitions can be used

Example:

Analysis of Surveillance: By Structure, Process, or Output

Structure

– Objectives
– Resources
– Organizational procedures (e.g., inputs to the system)

Analysis by Process & Output

Process

– Observation, communication & confirmation of events
– Interpretation, presentation & communication of findings to decision-makers

Output/Outcome

– Often a report
– How the findings are put to use is ultimate test of whether a surveillance system works

Outcome vs. Process Surveillance

Example: Needlestick Injury Surveillance