Principles of Disease Surveillance

Public health surveillance
A method to monitor occurrences of public health problems.

Source: World Health Organization

Surveillance
Surveillance is the ongoing systematic collection, collation, analysis and interpretation of data; and the dissemination of information to those who need to know in order that action may be taken.

Indicator-Based Surveillance
IBS is the systematic (regular) collection, monitoring and interpretation of structured data, which contribute to early warning.

Data collection:
- usually passive

Sources of information:
- mainly healthcare-based immediately reporting unusual disease pattern and grouped under “case-based surveillance”.
- non-(human) health sources

Event-based Surveillance
EBS is the organized and rapid capture of information about events that are a potential risk to public health.

Data:
- Rumors
- Other ad-hoc reports transmitted through formal and informal, including:
  - Events related to the occurrence of disease in humans
  - Events related to potential exposure for humans (i.e. diseases/deaths in animals, contaminated food products/water, and environmental hazards)

Indicator-Based Surveillance (Cont.)

Data:
- structured, organized, and regular
- represent individual or aggregated cases, disease-specific or syndromic,
- come from exhaustive or sentinel systems

Interpretation:
- comparison with baseline values or thresholds defined in advance
- determine unusual disease patterns
**IBS and EBS**

- Sensitive and timely surveillance system can trigger early warning and rapid response to minimize the effect of a potential outbreak.
- Both IBS and EBS are essential components of a disease surveillance system.
- Trade-off between sensitivity and false warning

**Rationale for Disease Surveillance**

- The disease is of public health importance
- Caution!
  - Is it worth the effort (money, human resources)?
  - Are relevant data easily available?
  - Can action be taken?

**Objectives of surveillance**

- Monitoring trends and estimate magnitude of health problem
- Epidemic (outbreak) detection and prediction
- Monitor progress towards a control objective
- Monitor programme performance
- Estimate future disease impact
- Evaluating an intervention
- Understand characteristics of health events
  - Distribution and spread
  - Natural history
- Facilitate planning

**Objective:** To detect outbreaks of dysentery by monitoring number of blood diarrhoea cases

**Objective:** To monitor the trend of laboratory confirmed malaria and proportion due to *P. falciparum*

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Objective: To monitor the ability of a TB programme to ensure treatment completion and cure

Treatment completion and cure in TB cases, 1994-1997

Objective: To predict future trends of AIDS for health service planning

Cases of AIDS in a city district, 1990-2004

Dissemination mechanism

- Directly to all who need to know
- Press release to the public
- Reports, bulletins
- Others

Assure use of analysis and interpretation

- Control measures
  - rapid response
  - case management
  - prevention programme (immunisation)
- Planning/policy making
  - epidemic preparedness
  - policy modification
  - prediction and future planning
- Feedback to the system

Surveillance: Tasks

- Detect
- Treat
- Report
- Analyse
- Investigate
- Respond
- Feedback

Surveillance: General Principle

- Support
- Policy and targets
- Funding

Decision

Information

Feedback

Analysis & Interpretation

Evaluation

Action

Reporting

Data

Health Care System

Public Health Authority

Ministry of Health

WHO

Peripheral level

Intermediate level

Central level

Regional/International level

Surveillance: Tasks

Surveillance: General Principle
What is the difference between recording/reporting and surveillance