Surveillance

State Institute of Health & Family Welfare, Jaipur
Public Health Approach

Implementation: How do you do it?

Intervention Evaluation: What works?

Risk Factor Identification: What is the cause?

Surveillance: What is the problem?

Problem

Response

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Surveillance
Information for Action
Surveillance is the bridge between what we think is happening and What actually is happening
Surveillance?

“a system of close, continuous observation of all aspects of the occurrence & distribution of a disease through systematic Collection, Tabulation, Analysis and Dissemination (Timely) of all relevant data pertaining to that Disease/event”. Descriptive (purposeful)

Action (Public health policy)

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Purpose:

General-
Reducing mortality/ morbidity through **timely** prevention & control

Specific-
- Understanding problem
  - NHD, Magnitude, Trend
- Define priorities
- Decide objectives
- Determine strategies
- Evaluate control/ prevention
- Suggest further research

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Surveillance Helps in:

- Understanding Natural History
- Deciding levels of existence of disease
- Explaining changes in pattern with time
- Identifying Changes in agent characteristics
- Measuring efficacy of control measure
- Forecasting trends
Uses of Public Health Surveillance

- Estimate magnitude of the problem
- Determine geographic distribution of illness
- Portray the natural history of a disease
- Detect epidemics/define a problem
- Generate hypotheses, stimulate research
- Evaluate control measures
- Monitor changes in infectious agents
- Detect changes in health practices
- Facilitate planning
Types:

➢ **Routine**
  - **Active** (agency solicited)
  - **Passive** (provider initiated)

➢ **Sentinel**
  - Reporting by specified units from defined area
  - Denominator absent

➢ **Focused** *(Situation / Process / Area)*
  - Case/outbreak investigations
  - Special surveys-Nutritional surveillance

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Routine Surveillance

- Through Out Patient Dept. of Health facilities (Passive) Wait & See who reports what
- Field surveys (Active) Go & Get Data/Information

Issues-
Representative?
Home treatment?
Number of Health Facilities reporting
Completeness of reporting
Passive

- Simple
- Less burdensome
- Inexpensive
- May not be representative
- May fail to identify outbreaks
Active

- Assures complete reporting
- Can be used with specific investigations
- Can be done for brief periods
- Requires skilled personnel
- May be perceived as invasive
- Expensive
Sentinel Surveillance

Monitoring of key health events through sentinel:
– Sites
– Events
– Providers
– Vectors/animals
Sentinel Surveillance

• Reporting of health events by selected Units/Professionals representing a geographic area
• Could be active or Passive
• Only a small number of units selected
• Selected units report all cases for a specific time period
• Reports include additional information
• Easier to maintain Quality & Regularity
• Denominator absent
• Data collected are *Not representative* & *NO generalization*
Good Surveillance System:

- Simplicity-
  - ease of operation - minimum paper work
  - simple definitions
  - using existing system

- Flexibility
- Acceptability
- Sensitivity
- Predictive value
- Representative
- Timeliness
- Regularity
- Data quality-complete/reliable/accurate
- Cost-effectiveness

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Initiating a Surveillance System Activities:

- Choose a disease that has proved control measures available
- Define how data collected shall be used
- Set a standard case definition
- Use existing system
- Visit those who supply Data
- Develop a data base
- Develop a regular reporting system for distribution (Feed back)
Disease Selection for Surveillance

Eligibility Criteria:

- Public Health problem (Quantitative BOD)
- Impact
  - Clinical spectrum (Severity)
  - Mortality
- Communicability (Epidemic potential)
- Preventability (in terms of feasibility & cost)
- Risk perception
  - Global health organizations
  - National authority
  - NGO
  - People
- Political pressure
Prerequisites of an Effective Surveillance System

- Standard case definition
- Enumeration of Reporting units
- System For Disease Surveillance
  - Notifiable disease reporting System
  - Laboratory based surveillance
  - Hospital based surveillance
  - Population based surveillance
Standard Case Definition

- May not necessarily be the same as what clinician perceives
- Depends on-
  - Severity
  - Certainty of Diagnosis
    - Confirmed
    - Probable
    - Possible
    - Suspect
    - Non-case
  - Purpose
    - Sensitivity
    - Specificity
Systems of Disease Surveillance

- Notifiable disease reporting System
  - Morbidity
  - Mortality
  - Case investigation
  - Epidemic reporting
  - Field investigation
  - Drug and Biological use

- Laboratory based surveillance
- Hospital based surveillance
- Population based surveillance
  - Surveys
  - Services
Sources of Surveillance Data

- Mortality
- Morbidity
- Case reports
- Epidemic reporting
- Epidemic field investigations
- Laboratory reporting
- Surveys
- Vector distribution studies
- Biologics & drug distribution
- Demographic & environmental data
- News media
Choice of Source Depends On

- Disease
- Method used for identifying disease
- Program goals
- Resources—personnel/material
- Population involved
- Characteristics of disease occurrence
Surveillance Processes:

- Routine surveillance
  - Reporting
  - Motivation
  - Procedural simplicity
  - Case definition
- Active reporting
- Sentinel physician reporting

- Lab. Surveillance
- Hospital surveillance
- Absenteeism surveillance
- Special surveillance
- Data analysis (time, place, person)
- Reports and evaluation
Diseases Under NPSCD

- Acute Flaccid Paralysis (AFP)
- HIV/AIDS
- Chickenpox
- Cholera like Diarrhea
- Diphtheria
- Dysentery
- Encephalitis
- Fever Syndrome (fever of more than 6 days duration)
- Fever with Bleeding
- Hepatitis

- Malaria
- Measles
- Meningitis
- Rabies
- Tetanus Neonatorum@
- Tetanus@
- Pulmonary Tuberculosis
- Whooping cough
- Any other disease of public health importance that might come up.

# But for two all are communicable disease
Notifiable/Under Surveillance Diseases

- Under WHO surveillance-
  - Louse borne Typhus
  - Relapsing fever
  - Paralytic Polio
  - Malaria
  - Viral Influenza

- Notifiable
  - Cholera/
  - Plague/
  - Yellow fever

- Notifiable as part of routine HIS
  - Cholera
  - Malaria
  - Plague
  - Polio
  - Relapsing fever
  - Influenza
  - Rabies
  - Salmonellosis

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How to Notify

Notification-

1. Report of Cases-
   - Individually
   - Collectively

2. Report of Epidemics-
   - Case report universally required under International Health Regulations or as disease under WHO surveillance
   - Case reports regularly required whenever a disease occurs Report to local health authority by fastest means
   - Selectively reportable in endemic areas

3. Obligatory reporting of Epidemics
What Steps Do I Take for Notification

- Collect basic data-(Health facility)
- Compile at
  - District,
  - State and
  - National level
- Report: District – State - National Health authority to WHO
How Do I Disseminate Surveillance Data

- Morbidity and mortality weekly report
- Surveillance summaries
- Surveillance reports
- Annual summary
- Medical literature
General Framework of Surveillance System

- Engagement of stakeholders
- Evaluation objective
- System description
- System performance
- Conclusions and recommendations
- Communication
A. Engagement of Stakeholders

Stakeholders?

- Owners and the customers
- Users of surveillance system information
  - Public health workers
  - Government
  - Data providers
  - Clinicians
- Steering group?
- A condition for change
B. Evaluation Objective

- Objective and methods
- Specific purpose
- Scope of evaluation
- Methods
  - Document studies
  - Interviews
  - Direct observations
  - Special studies
C. System Description

- Public health rationale (why?)
- Objectives (what?)
- Operations (how?)
- Resources (how much?)
1. Rationale for Surveillance

The disease
- Severity
- Frequency
- Communicability
- International obligations
- Costs
- Preventability

Society
- Public and mass media interest
- Will to prevent
- Availability of data
2. Objectives of System

- Documented?
- SMART?
  - Specific
  - Measurable
  - Action oriented (information for action)
  - Realistic
  - Time frame specified

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3. Operations of System

- Health events under surveillance
  - Type of event: exposure -> infection -> disease / outbreaks -> outcome
  - Case definitions
- Legal framework
- Organisational framework
- Components
  - Flow chart
  - Description
Components of System

- Population under surveillance
- Period of data collection
- Type of information collected
- Data source
- Data transfer
- Data management and storage
- Data analysis: how often, by whom, how
- Dissemination: how often, to whom, how

Confidentiality, security
4. Resources for System Operation

- Funding sources
- Personnel time
- Other costs
  - Training
  - Mail
  - Forms
  - Computers

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Importance of Evaluation

- **Quality**
  - Often neglected
  - Basis for improvements

- **Obligation**
  - Does the system deliver?
  - Credibility of public health service

- **Learning process**
  - "Do not create one until you have evaluated one"
Goals of Surveillance Evaluation:

- Prioritizes health events under surveillance
- Surveillance systems meet objectives
- Surveillance systems operate efficiently
System Performance

Does it work? \[\rightarrow\] Is it useful?

System attributes
- Simplicity
- Flexibility
- Data quality
- Acceptability
- Sensitivity
- Positive predictive value
- Representativeness
- Timeliness
- Stability

Use of information
- Users
- Actions taken

Link to objectives

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Data Quality

Completeness
- Proportion of blank / unknown responses
- Simple counting

Validity
- True data?
- Comparison
  - Records inspection
  - Patient interviews

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Evaluation of Surveillance System

3 Basic

• Does the system address an important public health problem?

• Does it accomplish the Objectives (purpose) of the system?

• Does the system have the right combination of attributes to achieve its purpose?
Does the System Address an Important Public Health Problem?

Can it measure-

➢ Disease burden
  • Incidence/prevalence
  • Severity
  • Lost productivity
  • Premature mortality
  • Medical care costs

➢ Potential burden
  • Emerging problems
  • Problems under control

➢ Preventability
Does it Meet the Goal

Reduction in-
  • Morbidity
  • Mortality
Does it Accomplish the Objectives

- Projects NHD and trends?
- Quantifies morbidity / mortality?
- Detects changes in epidemiologic pattern of disease?
- Evaluates hypotheses?
- Identifies and evaluates control/prevention measures?
- Detects epidemics?
- Leads to public health action?
- Stimulates research?
Meeting Objectives?

- **Has information produced?**
  - Trends
  - Outbreaks
  - Future impact
  - Cases for further studies

- **Was information used, and by whom?**
  - Actions: list
  - Consequences: list
Does it Have Right Combination of Attributes

- Sensitivity (ability to detect all cases)
- Specificity (non-cases not reported)
- Predictive value (Reported are real)
- Representative
- Timeliness
Limitations

• Severe events need treatment (Treatment sought alters the course of disease)
• Laboratory facilities- availability
• Reporting-Timeliness and accuracy
• Sources for identifying mild or sub clinical cases
• Support of Public Health system
A good Surveillance System does not necessarily ensure making of right decisions; but it reduces the chances of wrong ones.
Thank You

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