Principles of Epidemiologic Surveillance
WHY DO WE NEED SURVEILLANCE

HEALTHY PERSONS

REVERSIBLE CHANGES

ILL PERSONS
WHY DO WE NEED SURVEILLANCE

HEALTHY PERSONS

REVERSIBLE CHANGES

ILL PERSONS
What is surveillance?

**Surveillance** does represent *Collecting,*

*Systematically,*

*Valid data, Analysis, and Interpretation of data; dissemination of the information* in order to decide the **Action needed**

- **Steps**
  - collecting
  - validation
  - analysis
  - dissemination

- **Essential Concepts**
  - continuous process
  - rapid
  - *Information for action*
Surveillance of a disease – why and when?

- Is the disease important for the population health?

- Is there a possibility to influence that evolution at population level?

- Are there relevant data easy to obtain?

- Are there sufficient financial and human resources?
Surveillance Objectives

- Describes the magnitude of the disease
- Detects foci/epidemics: Alert!
- Monitors the trend of an endemic disease
- Evaluation of a health intervention
- Monitors the impact of the control measures
- Monitors the performance of a health program
- Predicts epidemics
- Estimates the impact of the disease in population
Surveillance Objectives

Specific
Measurable
Action oriented
Realistic
Timely
Objective: Monitoring the incidence and fatality rate of the acute respiratory infections at children under 5 years.
Objective: Monitoring the progress of the program for eradication of poliomyelitis - monitoring the incidence of polio cases with wild virus, at children under 14 y.

Cases of poliomyelitis, the wild virus isolated in children under 14 y., in a rural area, 1980-1996
Surveillance:
“you see what you look at”

- Exposed
- Infected
- Ill people
- Ill – Medical Services
- Ill – Tests
- Positive Tests
- Report

Surveillance of groups exposed to risk factors
Serological Surveillance
Community Surveillance
Surveillance based on medical services
Surveillance based on laboratory
Surveillance: Principles

Health System

Event

The real world!.. Waits for something.....

Intervention

Public Health

Data

Analysis and interpretation

Information

Decision (Feedback)

Report

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Surveillance: Principles

Event in Health Status:
- Disease
- Syndrome (ex: jaundice)
- Hospital Problem (ex: antibiotic-resistance)
- Environment (ex: vector, animal, water)
Surveillance: Principles

Data Source (1)

- Clinic
- Laboratory
- Statistics (ex: death certificates)
- Other

Data

Information

Intervention

Health System

Public Health
Surveillance: Principles

Data Source (2)
- General Population
- Age Groups, gender
- Exposure to a risk factor
- Other criteria
Surveillance: Principles

Data Source (3)
- Public Sector
- Private Sector, NGO
- Selected Locations (sentinels)
- Time period selected

Health System

Public Health

Data

Information

Intervention
Case Definition (1)

- Criteria of time, are and person
- Clinical / laboratory Diagnosis
- Epidemiological data of the disease
- Several levels (suspect, probable, confirmed)
- Sensibility and specificity high
**Surveillance: Principles**

**Health System**

**Case Definition (2)**
- Clear and simple
- Stable
- Tested in the field

**Public Health**

- Data
- Information

**Intervention**
Surveillance: Principles

Health System

Intervention

Public Health

Event

Frequency of Reporting

- Immediately
- Weekly
- Monthly ...
- “Zero” moment?

Data

Information
Surveillance: Principles

Event Mode
- On paper
- Telephone, Fax
- E-mail
- Web
Surveillance: Information Circuit

- Local Level
- Intermediary Level
- Central Level
- International Level
- Clinic (suspect)
- Laboratory diagnosis (confirmation)
- Regional Reference Laboratory

Ministry

+ laboratory data, epidemiologic link (presumption)

Laboratory diagnosis (confirmation)

WHO
Surveillance: Principles

Health System

Public Health

Event

Intervention

Data Analysis

- Data Characteristics
- Data Validation
- Descriptive Analysis
- Hypothesis
Surveillance: Principles

Event

Data Characteristics
- Various sources
- Different quality

Intervention

Health System

Public Health
Surveillance: Principles

Data Validation

- Data incomplete/missing
- Errors
- Duplicated
Surveillance: Principles

Health System

Event

Intervention

Public Health

Descriptive Analysis

• Time
• Area
• Population
Surveillance: Principles

Health System

Event

Intervention

Public Health

Data

Information

Generating the Hypothesis
Surveillance: Principles

Using Information

• Feedback
• Control
• Strategies
Surveillance: Principles

- Epidemiologic Bulletin
- Reports
- Website, others
Surveillance: Principles

Control
- Rapid answer
- Case Management
- Prevention
  (ex: immunization)
Surveillance: Principles

Health System

Public Health

Data

Information

Strategies

• Contingency Strategy
• Prediction, planning
• Prepared in the eventuality of an epidemic
Surveillance Functions

**Essential**
- Detecting
- Report
- Investigation & confirmation
- Analysis & interpretation
- Action / response

**Support**
- Training
- Supervision
- Resources
- Standards / guidelines
Surveillance : Main Ingredients

- A functional network with motivated specialists
- Case definitions and reporting system clear
- Efficient communication system
- Basic epidemiological knowledge
- Laboratory support
- Feedback and rapid answer