Community 432 Medicine

10 Surveillance

Objectives

- Define surveillance for infectious diseases
- Know the objectives and uses of surveillance system
- Recognize the elements of surveillance system
- Be able to assist in establishing a surveillance system
- Please make sure to go through the original lecture, thank you

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What is surveillance?

- ♣ The process that is used to collect, manage, analyze, interpret, and report this information for action is called surveillance.
- ♣ Surveillance systems are networks of people and activities to keep this process. It functions at local to international levels.
- ♣ Populations under surveillance are defined by the information needs of prevention or control programs.
- ♣ e.g. surveillance for neonatal mortality in Neonatal Intensive Care Unit and unusual ….sepsis….change in antibiotic use
- ♣ New public health problems e.g. new infectious strains / diseases; rapid implementation of surveillance is effective in early response.
- ♣ Over time, it is used to identify changes in the nature or extent of health problems and the effectiveness of public health interventions.
- ♣ Surveillance systems are generally called on to provide descriptive information regarding **when and where health problems are occurring and who is affected**—the basic epidemiologic parameters of time, place, and person.

Disease surveillance is the ongoing systematic collection, analysis, interpretation and distribution of health data for the planning, implementation, evaluation of public health interventions for the purpose of reducing morbidity and mortality.

- Examples :

- ♣ Communicable diseases: influenza, HIV/AIDS, sexually-transmitted infections
- ♣ For disease outbreaks: e.g. food poisoning, cholera
- ♣ Non-communicable diseases: lead poisoning, cancer, hypertension, diabetes
- ♣ Risk factors: tobacco use, physical exercise
- ♣ For emergencies: bioterrorism, chemical, radiation, natural disasters
- ♣ For hospitals: e.g. nosocomial infections.
- ♣ In the industry: for occupational disorders, injuries, disability pensions

♣ In the military: for diseases of the recruits

Objectives of Surveillance

- ♠ Descriptive epidemiology of health problems e.g. measles vaccine doses
- ♠ Detection of outbreaks / lab based / else
- ♠ Program planning /intervention /evaluation
- ♠ Links to services
- ♠ Links to research
- ♠ Links to Education and Policy
- ♠ Monitoring incidence and prevalence

Steps in Surveillance Analysis:

1. Data quality
2. Descriptive analysis

– Time
– Place
– Persons

3. Generate hypothesis
4. Test hypothesis

Descriptive Analysis of Time:

- ♠ Graphical analysis
- ♠ Requires aggregation on appropriate time unit
- ♠ Choice of the time variable
    - Date of onset
    - Date of notification
- ♠ To describe trend, seasonality, and residuals
- ♠ Use of rates when denominator changes over time

Burden of diseases

- ♣ Reporting only confirmed cases may not reflect true status resulting in ineffective control
- ♣ Only severe cases are reported
- ♣ Under reporting may lead to high case fatality rates; resource utilization affected

Approaches to Surveillance

- ♣ Active versus passive
- ♣ Notifiable diseases
- ♣ Laboratory based
- ♣ Registries
- ♣ Surveys
- ♣ Information systems
- ♣ Record linkage
- ♣ Combination of surveillance methods
- ♣ Volunteers

Elements of Surveillance system

- ♣ **Case definition***: (possible, probable, confirmed)
- ♣ **Population** under surveillance (hospitals, prisons, schools, factories, national, international)
- ♣ **Cycle of surveillance** (recognizing health event, notifying it, information transfer, networks, action)
- ♣ **Confidentiality** (e.g. HIV+ve children in schools)
- ♣ **Ethics** (when research is involved)
- ♣ **Laws** (as a service component governed by law in USA; e.g. disease notification)

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- ♦ **Standard set of criteria**
- ♦ **Clinical and lab**
- ♦ **Allows for comparison**
- ♦ **Sensitive vs. Specific**
- ♦ **Refer to standard definitions stated by WHO and CDC**

Validity of notification data

- ♣ Seeking of medical care is not constant
- ♣ Distance to the nearest hospital
- ♣ Cost and distance to travel
- ♣ Media reports will increase the # of people reporting to the hospital e.g. dengue fever
- ♣ Public awareness will increase the incidence

Data Quality Issues:

- ♦ Missing values
- ♦ Attraction to round figures
- ♦ Data entry errors
- ♦ Bias related to lack of representativity
  - ♣ Cases more severe
  - ♣ Urban > rural
  - ♣ Source not represented (private sector, GPs)

The first step in analysing surveillance data focuses on data quality. This is different from the evaluation process which gives you an in-depth knowledge of data collection process and potential limitation of the data. Frequency distributions of each variable is looked at, in order to identify missing values, digit attraction, logical errors such as neonatal tetanus affecting adults, and biases related to a lack of representativity
A quick look at the data may help you to identify these limitations that you will need to take into account when summarising your findings.

Timeliness of disease notification

1. Health event occurs
2. Identified by health care system
3. Reported to local health authority
4. Verification/investigation by PHS
5. Health event reported to other systems
6. Analyses of health data
7. Dissemination of surveillance finding
8. Actions based on surveillance findings

Early warning system

- Major threats to the population; 0-4 & 5 or more years of age, have been identified.
- Severe malnutrition, injuries, acute watery diarrhoea, bloody diarrhoea, acute flaccid paralysis, acute respiratory infections, neonatal tetanus, malaria, suspected measles, suspected meningitis, acute jaundice syndrome and acute FUO
- A threshold for each is defined; unusual pattern or occurrence will triggers investigations and responses.

SUMMARY

♥ Monitors long term trends

♥ To make comparisons

♥ Analyze costs and benefits of preventive measures

♥ Demands on quality of data

♥ To promote the best use of public health resources, all public health surveillance systems should be evaluated periodically

MCQ

Q1: One of the Elements of Surveillance system is:

A. Generating A hypothesis

B. Testing a hypothesis

C. Insuring confidentiality

D. Data analysis

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If you find any Mistakes please contact me:

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