Epidemiology

Learning Objectives

At the end of the Introductory session on epidemiology, the students should be able to:

1. Define epidemiology
2. Describe uses, application and aims of epidemiology
3. Describe approaches in epidemiology

"I keep six honest serving men; they taught me all I know. Their names are what, why, when, how where and who." – Rudyard Kipling (1865 - 1936)

- Epi = Among
- Demos = People
- Logos = Study

Definition

- Defined by John M. Last in 1988
- The **study** of the **distribution** and **determinants** of **health related states or events** in **specified populations**, and the application of this study to the **control of health problems**

Explanation

- Study- Includes surveillance, observation, hypothesis testing, analytical research and experiments
- Distribution- includes time, place, person
- Determinants- includes factors that influence health, biological, physical, chemical, social, cultural, economic, genetic, behavioral, environmental, health services

- Health related states and events- diseases, causes of deaths, behavior such as tobacco, positive health states, reaction to preventive regimen and use of health services

- Specified populations- identified groups eg occupational groups, specific age groups...

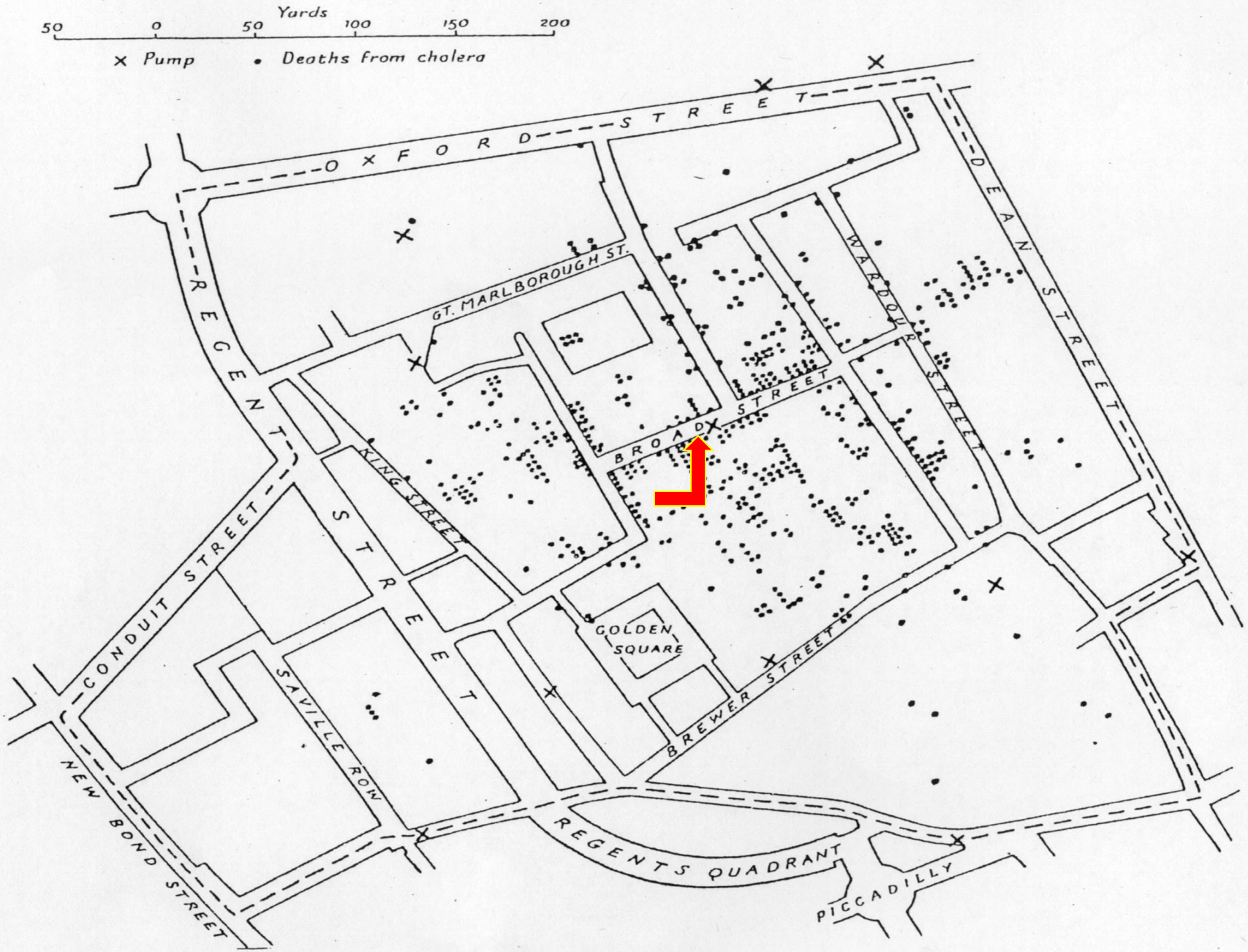
- Application of prevention and control- to promote, protect or restore health

Aims of epidemiology

- To describe the distribution and magnitude of health and disease problems in human populations
- To identify etiological factors in pathogenesis of disease
- To provide data essential to planning, implementation and evaluation of services for prevention, control and treatment of disease and to set up priorities among those services

Ultimate Aims

- To eliminate and reduce health problems and its consequences
- To promote the health and well being of society as a whole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• Deaths from cholera
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DEAN STREET
KING STREET
CONDUIT STREET
GOLDEN SQUARE
BREWER STREET
SAVILLE ROW
NEW BOND STREET
REGENTS QUADRANT
PICCADILLY

Deaths from cholera per 10,000 houses by source of water supply

Water supply	No. of houses	Deaths from cholera	Deaths per 10,000 houses
Southwark and Vauxhall Co.	40,046	1263	315
Lambeth Co.	26,107	98	38
Other districts in London	256,423	1,422	56

Achievements in epidemiology

- Small pox eradication
- Methyl mercury poisoning
- Rheumatic fever and RHD
- Iodine Deficiency Disorders
- High Blood Pressure
- Smoking, Asbestos and lung cancer
- Hip fracture
- AIDS

Small pox eradication

- Providing information about distribution of cases and model, mechanisms and levels of transmission.
- Mapping outbreaks of disease
- Evaluating control measures

Epidemiological facts

- No extra human host
- No subclinical cases
- Recovered patients are immune and cannot transmit infection
- Naturally occurring small-pox does not spread rapidly
- Transmission is via long lasting human to human contact
- Most patients are bedridden which limits transmission

Application of Epidemiology

- Search of cause/ causes of disease/ diseases
- Helps to describe the health status of population or groups
- Helps to discover and bridge gaps in natural history of diseases
- Helps in controlling the diseases and break the weakest link in transmission of diseases

- Planning of health programs
- Evaluate health programs and interventions
- Determine the probability of diseases, deaths and disability
- Helps in better management of health services and hospital services
- Helps to set-up cut-off levels between normal and abnormal population and establishes trigger levels for actions

Epidemiology and clinical medicine

	Epidemiology	Clinical Medicine
Unit of Study	Defined Population/ Population at risk	Case/ cases
Concern	Disease pattern in entire population	Disease in individual patient
Study subjects	Sick and healthy	sick

Interest	Rates and ratios	Disease pattern in individual patient
Interpretation	Data, source of infection, mode of transmission, etiological factors, future trend and control measures	Diagnosis and Treatment
Outcome	Necessary guidance and feedback	Prognosis
Approach	Investigator goes out into the community	Patient comes to doctor

Concept	Conceptual (tables and graphs)	Biomedical concept as perceived by clinical, lab. Examinations and post-mortems
Action	Mutual supplementation	Mutual supplementation

Epidemiological Approach

- Asking questions
- Making Comparisons

Related to health events

- What is the event?
- What is its magnitude?
- Where did it happen
- When did it happen?
- Who are affected?
- Why did it happen?

Related to health action

- What can be done to reduce this problem and its consequences?
- How can it be prevented in future?
- What action should be taken? (community, health services, other sectors)
- What resources are required? How are the activities to be organized?
- What difficulties may arise and how might they be overcome?

Making Comparisons

- Two or more groups
- Comparison between individuals
- Comparability
- Randomization
- Matching
- Standardization
- Standardization of definitions, classifications, criteria and nomenclature

Question	Method	Answer
What is the problem	Define the problem and measure	Magnitude of the problem
Where is it occurring	Descriptive study	Place distribution
When did it occur	Descriptive study	Time distribution
Who are affected	Descriptive study	Person distribution
Why did it occur	Hypothesis formation/ analytical/ experimental study	Determinants of disease/ problem

What can be done	Search for modifiable determinants Modify them Find out effect by epidemiological study	Whether the problem is reduced or not

Thank you