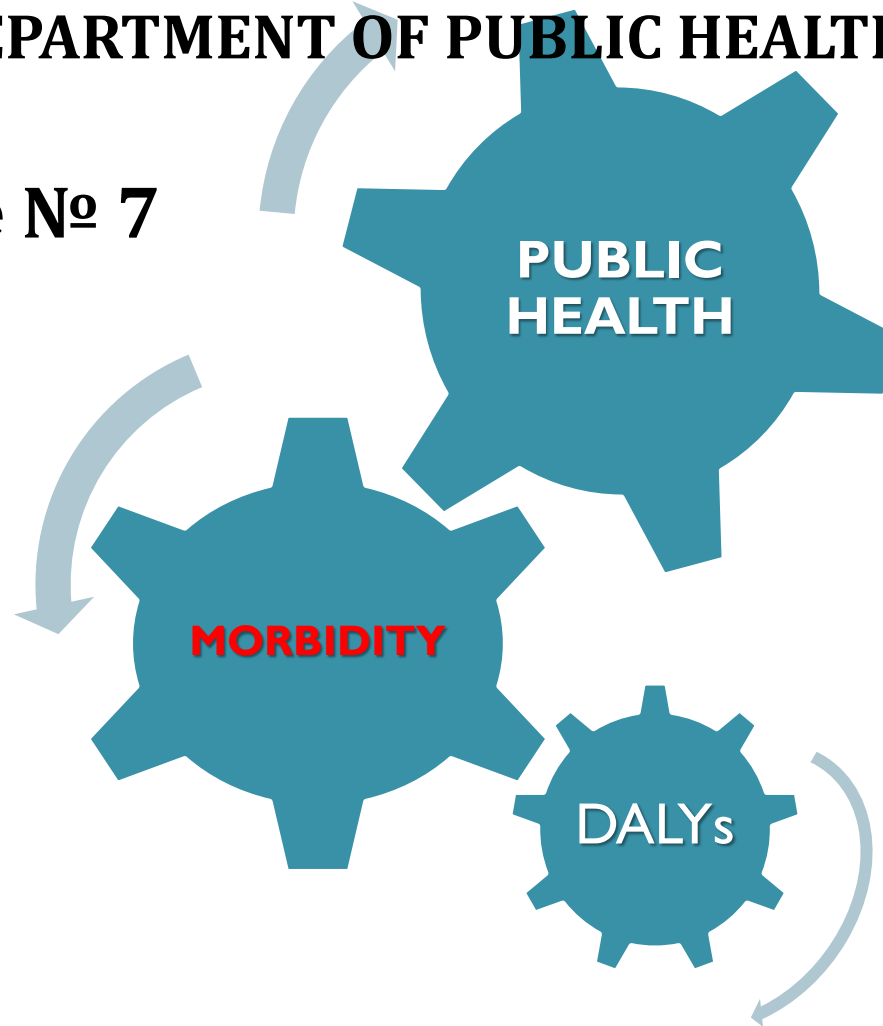




MEDICAL UNIVERSITY – PLEVEN
FACULTY OF PUBLIC HEALTH
DEPARTMENT OF PUBLIC HEALTH SCIENCES

Lecture № 7



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Public health - concept

Public health is the planning, carrying out and evaluation of health measures and health system services that both maintain and improve the health of a population and prevent and control diseases within that population.

Public health - concept

Winslow defined **public health** as „the science and art of preventing disease, prolonging life and promoting health through the organized efforts for:


- the sanitation of the environment,
- control of communicable diseases,
- education of the individual in personal hygiene,
- organization of medical and nursing services for early diagnosis and preventive treatment,
- development of social machinery to insure everyone an adequate standard of living for the maintenance of health”.

Public health measurement


- Through health indicators
- **Most common for operative purposes:**
 - Demographic indicators
 - Morbidity and disability indicators
 - Indicators for physical development



**1. WHAT IS MORBIDITY?
MORBIDITY VERSUS
MORTALITY DATA.**



Morbidity has been defined as “any departure, subjective or objective, from a state of physiological well-being”.




The WHO Expert Committee on Health Statistics noted in its 6th Report that morbidity could be measured in terms of three units:

A) persons who are ill;

B) the illnesses (periods or spells of illness) that these persons experienced;

C) the duration (days, weeks) of these illnesses.




These three aspects of morbidity are commonly measured by **morbidity rates or morbidity ratios:**

- **frequency,**
- **duration** and
- **severity.**




The disease frequency is measured by **incidence and prevalence rates.**


The duration of illnesses is measured by **the average duration per case or the disability rate** (the average number of days of **disability per person**).



The severity is measured by **case-fatality rate** (the total number of deaths due to a particular disease divided by the total number of cases due to the same disease and multiplied by 100).




**What is the relation and the
difference between morbidity
and mortality?**



1. Death rates are particularly useful for investigating diseases with a high case-fatality.

However, many diseases have low case-fatality. In this situation, data on morbidity (the frequency of illness) are more useful than mortality rates.

2. Morbidity data are helpful in clarifying the reasons for particular trends in mortality.



**In considering the value of
morbidity data, it is
important to be aware of
their **limitations.****




1. Different criteria may be used among doctors in determining different disease conditions.

2. Self-reporting of illnesses is enormously variable. Patients do not have common threshold in presenting illness to a general practitioner.



3. A wide diversity of data about morbidity are collected:

- nationally or locally;**
- routinely or on ad hoc for a specific purpose;**
- as a statutory requirement, or on a voluntary basis.**




When using morbidity data, it is important to understand how complete a coverage of the disease problem these data provide.

It is important to decide how valid was the method of ascertaining whether disease was present or absent.



Many routinely available sources are deficient in both these respects.


If they are based upon the information about patients who have made contact with services, they will not include all cases that exist in the population.



In considering how completely a particular source of morbidity data describes the disease problem in the population, it is helpful to bear in mind the “iceberg” concept of health care - only a proportion of patients make contact with health services.

Sources of morbidity data

- **Notifications.** For diseases of major public health importance, notifications are collated by WHO and published in the Weekly epidemiological record.
- **Data on hospital admissions and discharges,**
- **Outpatient and primary health care consultations, and specialist services (such as accident treatment),**
- **Registers of disease events (cancer and congenital malformations).**



Because of the numerous limitations of routinely recorded morbidity data, many countries rely **on the collection of new data using specially designed questionnaires and screening methods on representative samples of the population.**



The value of morbidity data:

I. Morbidity data describe the extent and the nature of disease burden in the community, and thus assist in the **assessment of health status of the population** and in the establishment of **priorities for public health action.**



2. Morbidity data provide more comprehensive and more accurate and clinically relevant information on patient characteristics as compared to the information from mortality data and therefore **morbidity data are essential for basic research.**



3. Morbidity data serve as a starting point for etiologic studies, and thus they play a crucial role in disease prevention.

4. Morbidity data are needed for monitoring and evaluation of disease.

METHODS OF STUDYING MORBIDITY

- **Active methods**, where medical professionals actively collect data through:
 - Regular check-ups or
 - Application of sociological approaches to gather information from the patient and his family.
- **Passive methods**, where the initiative to seek medical care is left to the patients. Thus morbidity is studied through:
 - Data from medical examinations or
 - Data from causes of death.



2. BASIC MEASURES OF MORBIDITY



INCIDENCE

Incidence rate is defined as “the number of new cases of a particular disease occurring in a defined population during a specified period of time”.

**Number of new cases of specific
disease**


$$= \frac{\text{-----}}{\text{mid-year population}} \times 1000$$



There are also some specific incidence rates:

- attack rate (case rate);**
- secondary attack rate;**
- hospital admission rate**

AN ATTACK RATE

is an incidence rate (usually expressed as a per cent), used only when the population is exposed to risk for a limited period of time such as during an epidemic.

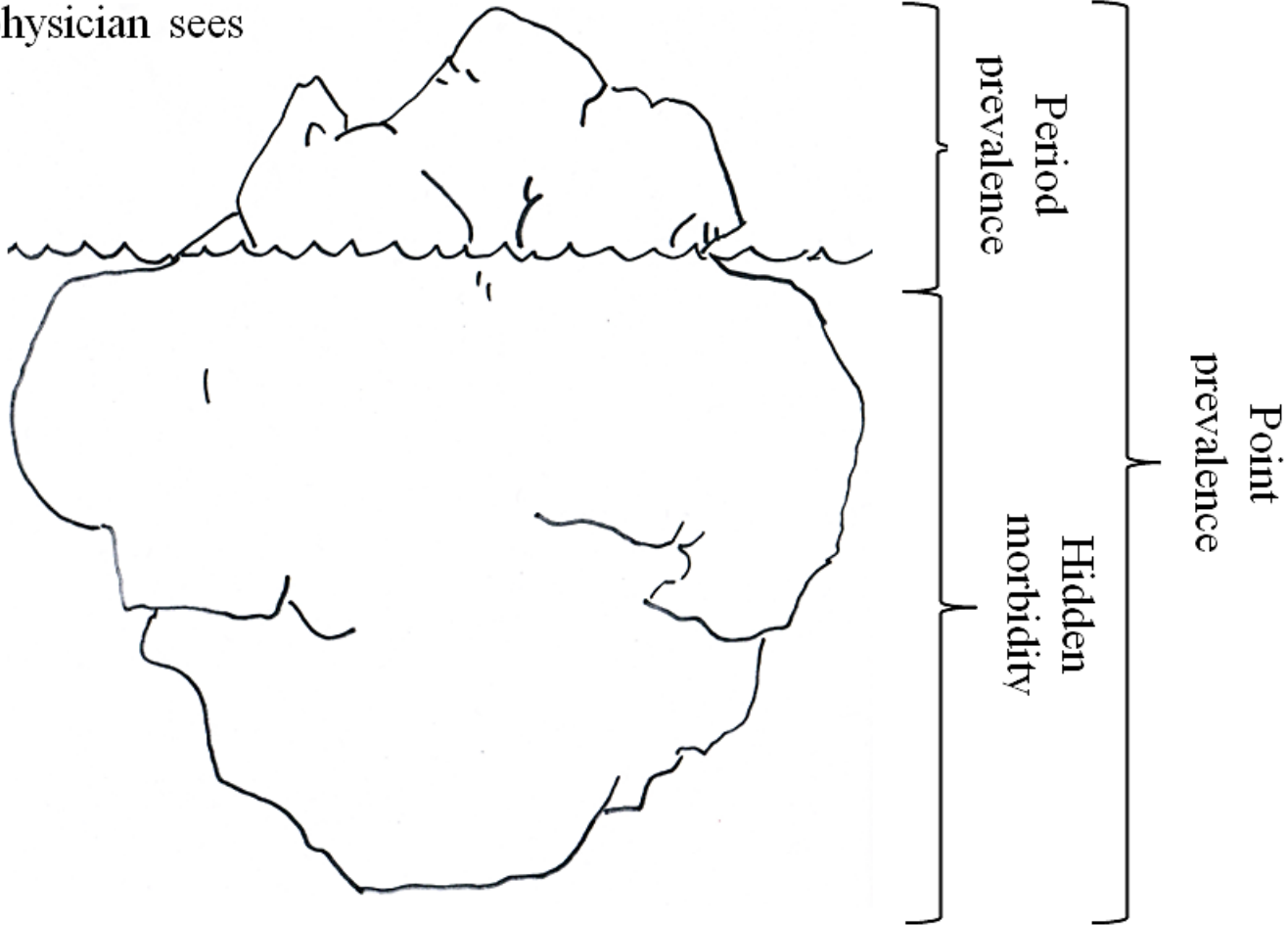


SECONDARY ATTACK RATE

is defined as the number of exposed persons developing the disease within the range of the incubation period following exposure to a primary case.

Iceberg of morbidity

What the
physician sees



PREVALENCE


In contrast to incidence, **prevalence** measures all cases of the disease existing:

- at a point in time (**point prevalence**) - the “point” may be a day, several days or even a few weeks;
or **over a period of time (period prevalence)**.


Period prevalence is a less commonly used measure of prevalence.

The value of prevalence and incidence rate

- 1. The incidence** is an estimate of the risk of developing the disease and hence is of value mainly **to search for the causes or determinants of the disease.**
- 2. Prevalence helps to estimate the magnitude of health or disease problems in the community, and identify potential high risk populations.**
- 3. Prevalence** is of a particular value **in planning health services or workload,** since it indicates the amount of illness requiring care.




To an increasing extent, measurements concern not only the occurrence of diseases, but also the persistence of the consequences of disease: **impairments, disabilities and handicaps and disease burden.**



DALYs expresses years of life lost due to premature death and years lived with a disability, adjusted for the severity of disability.

One DALY is one lost year of healthy life.



GBD 2010 was the largest study of global burden of disease including:

291 diseases,

235 causes of death,

67 risk factors,

and 187 countries in the world.

Five leading risk factors contributing to DALYs

Source: Murray CJL, Vos T, Lozano R, et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990—2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012; **380**: 2197-2223

GBD 1990	GBD 2010
Underweight in childhood	High blood pressure
Home air pollution due to solid fuels	Smoking (incl. passive)
Smoking (incl. passive)	Alcohol consumption
High blood pressure	Home air pollution due to solid fuels
Short-term breastfeeding	Insufficient use of fruits and vegetables

Ranking of the ten leading causes for DALYs

Source: Murray C JL, Vos T, Lozano R, et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012; **380**: 2197-2223


GBD 1990	GBD 2010
Lower respiratory infections	Ischemic heart disease
Diarrheal diseases	Lower respiratory infections
Perinatal conditions	Cerebrovascular disease
Ischemic heart disease	Diarrheal diseases
Cerebrovascular disease	HIV/AIDS
Chronic obstructive pulmonary disease	Low back pain
Malaria	Malaria
Tuberculosis	Perinatal conditions
Undernutrition	Chronic obstructive pulmonary disease
Neonatal encephalopathy	Road traffic injuries

Socially significant diseases

1. High incidence and prevalence with continuous negative trends, especially among the active population.
2. High mortality and case-fatality rate, high proportion among the leading causes of death in the population, especially among the active population.
3. High proportion in morbidity with temporary and permanent disability.
4. High proportion in hospital admissions and hospital expenditures for treatment and rehabilitation and considerable burden to the social insurance system.
5. Considerable social, medical, economical and psychological damages to the patients and their families.




3. DISEASE RECORDING SYSTEMS. ICD - 10



The World Health Organization, by international agreement, produces

“The International Statistical Classification of Disease and Health Related Problems” or “ICD” and it is used in many countries as the principal means of classifying and coding both mortality and morbidity experience.




The latest revision of the ICD, known as **ICD-10, was published by WHO in 1992, and replaced its predecessor, ICD-9, as the standard coding system.**

The existence and widespread use of such an internationally agreed disease classification is of vital importance. Without it, comparisons of statistics over time and between different places would not be possible.




The 10-th revision groups diagnoses, signs and symptoms, causes and other factors into **21 chapters**.

The **codes are alphanumeric**, and run from **A00.0 to Z99.9**, excluding the letter **U**, which is reserved for additional codes and changes arising between revisions of the classification.



The first three characters of a code define a category, with the fourth character supplying extra detail.

Hence K26 is the category “Duodenal ulcer” and K26.1 is “Duodenal ulcer - acute with perforation”.



**The 11th Revision of the
International Classification
of Diseases (ICD-11) is due
by 2018!**

ICD-11 - Mortality and Morbidity Statistics



- ▶ 01 Certain infectious or parasitic diseases
- ▶ 02 Neoplasms
- ▶ 03 Diseases of the blood or blood-forming organs
- ▶ 04 Diseases of the immune system
- ▶ 05 Endocrine, nutritional or metabolic diseases
- ▶ 06 Mental, behavioural or neurodevelopmental disorders
- ▶ 07 Sleep-wake disorders
- ▶ 08 Diseases of the nervous system
- ▶ 09 Diseases of the visual system
- ▶ 10 Diseases of the ear or mastoid process

- ▶ **11** Diseases of the circulatory system
- ▶ **12** Diseases of the respiratory system
- ▶ **13** Diseases of the digestive system
- ▶ **14** Diseases of the skin
- ▶ **15** Diseases of the musculoskeletal system or connective tissue
- ▶ **16** Diseases of the genitourinary system
- ▶ **17** Conditions related to sexual health
- ▶ **18** Pregnancy, childbirth or the puerperium
- ▶ **19** Certain conditions originating in the perinatal period

- ▶ 20 Developmental anomalies
- ▶ 21 Symptoms, signs or clinical findings, not elsewhere classified
- ▶ 22 Injury, poisoning or certain other consequences of external causes
- ▶ 23 External causes of morbidity or mortality
- ▶ 24 Factors influencing health status or contact with health services
- ▶ 25 Codes for special purposes
- ▶ 26 Traditional Medicine conditions - Module I
- ▶ V Supplementary section for functioning assessment
- ▶ X Extension Codes