Medical and social aspects of demography

Demography
is the statistical study of populations,
especially human beings

Demography (prefix *demo-* from Ancient Greek meaning "the people", and *-graphy* implies "writing, description or measurement)

The statistical study of population conducted in two main directions:

- Statics of the population (the population at a given time, composition of the population by sex, age, occupation, marital status, language, education, etc.).
- Population Dynamics (changes in the number of people): the mechanical movement of the population and the natural movement of the population or reproduction

Indicators of population statistic are needed to:

- **natural movement indicators calculation**
- **planning the work of the whole health system**
- **determining the need for different types of medical care**
- **determine the required amount of budgeted funds for health care**
- **the organization of anti-epidemic work, etc.**

The most reliable source of information about the statics of the population is **population census**

Census - a global (full) population registration when takes place the collection of demographic, economic and social data characterizing each inhabitant of the country or administrative territory in a certain time

<u>The main features of modern censuses:</u>

periodicity, universality, simultaneity, unity of methods, a centralized data processing

Mechanical population movement - population change under the influence of migration processes

*«**Migration**» (stem from Latin migrātus - migrāre ... to move from place to place, change position or abode)*

Human migration is the movement by people from one place to another with the intentions of settling, permanently or temporary in the new location.

- **The main reasons for migration:** socio-economic, political, military, natural and climatic. The past ones include natural disasters (earthquakes, floods, etc.).

Types of migration:

- **Irrevocable migration (with a constant change of residence)**
- **Revocable (temporary)**
- **Seasonal migration**
- **Pendulum migration (commuting rides to and from work or study outside their locality)**
- **External (emigration, immigration) and internal (inter-regional migration and resettlement of residents from rural to urban)**
- **Over the last 2 centuries, the world population is characterized by the process of urbanization (from the Latin «urbs» - city) - increasing the role of cities in the development of society**

Migration has a great medical and social importance:

- **Urbanization alters the environment affects the structure of morbidity and mortality**
- **Pendulum migration - leads to an increase in injuries and contributes to the spread of infectious diseases**
- **Seasonal migration leads to uneven loading of medical organizations**
- **Health indicators of migrants differ from health indicators of the indigenous population**

The natural movement of the population - a set of processes of birth, mortality and natural growth that provide generational renewal and change

- **<u>The main components of the population natural movement:</u>**
- **birth rate (natural process of the population renewal)**
- **mortality (the process of natural population decline)**
- **population growth**

  If birth rate exceeds death rate of a population => natural increase of a population

  If death rate exceeds birth rate of a population => natural decrease of a population
- **average life expectancy**

Birth rate is characterized by statistically registered number of live births in a given population over a certain period of time

For the analysis of major trends of natality using the following statistics indicators:

- **The total fertility rate**
- **Special fertility rate**
- **Age-specific birth rates**
- **Aggregated fertility rate**

Method of calculating the total fertility rate

$$\frac{\text{the total number of live births per year} \times 1000}{\text{average annual population}}$$

Evaluative levels of total fertility rate (WHO):

- **High** — **higher than 25 %**
- **Medium** — **15-25 %**
- **Low** — **up to 15 %**

Factors affecting natality

- **Age, sex and marital structure of the population**
- **The social position of women**
- **The level of material well-being**
- **The cultural level**
- **Living conditions**
- **Urbanization, migration**
- **National traditions, religious factors**
- **Demographic aging of population**
- **State demographic policy**

To ensure birth registration in the Russian Federation approved the account form "Medical birth certificate» №103/y

Mortality is characterized by statistically recorded number of deaths in a given population over a certain period of time

<u>For the analysis of mortality statistics are used:</u>

- **Crude death rate (total mortality rate)**
- **Age-specific death rates**
- **Indicators of mortality patterns per reasons**
- **The maternal mortality rate**
- **The infant and child mortality coefficients**
- **Perinatal mortality rate**
- **Coefficient of stillbirth**

Method of calculating the crude death rate

$$\frac{\text{the total number of deaths per year} \times 1000}{\text{average annual population}}$$

Evaluation levels of total mortality (WHO):

- **Low** **7-10 %**
- **Medium** **11-15 %**
- **High** **16-20 %**

Factors affecting the mortality rate:

- **Demographic aging of the population (in the age structure when more than 12% of persons aged 60 years and older)**
- **Lifestyle of the population**
- **The current state of medical science**
- **The availability and quality of care, and others.**

To ensure the registration of mortality in the Russian Federation approved the account form "Medical death certificate» №106 / y

Infant mortality - deaths of children in the first year of life

A simple way to calculate the infant mortality rate (crude rate):

$$\frac{\text{the number of children who died during the year at the 1st year of life}}{\text{the number of live births in given calendar year}} \times 1000$$

The calculation methodology of the infant mortality rate recommended by the WHO (Raatz formula)

$$\frac{\text{the number of children who died during the year at the 1st year of life}}{\text{2/3 live births in a given calendar year} + \text{1/3 live births in the previous year}} \times 1000$$

Evaluation levels of the indicator according to the WHO:

Very low	**6-10‰**
Low	**11-15‰**
Medium	**16-23‰**
High	**above 24‰**

Causes of infant mortality (by primary causes of death)

- **Certain conditions originating in the perinatal period**
- **Congenital anomalies (malformations) and chromosomal abnormalities**
- **Respiratory diseases**
- **External causes**

- **<u>Factors affecting infant mortality:</u> mother's health and way of life, the pregnant woman should in time be registered in the antenatal clinic, peculiarities of pregnancy, labor (parturition) management tactics, newborn care , etc.**

Perinatal mortality (mortality in the perinatal period: 22 weeks of gestation before birth, during childbirth, in the first 168 hours of life)

Perinatal mortality index :

$$\frac{\text{number of born dead + the number of deaths during the first 168 hours of life} \times 1000}{\text{the number of live and dead births}}$$

The main causes of perinatal mortality:

states of the perinatal period, congenital anomalies, hemolytic diseases of the newborn, fetal infection

To ensure the registration of perinatal mortality in the Russian Federation approved the accounting form "Medical certificate of perinatal death» №106-2 / y

The overall rate of natural increase

- **This is the difference between total fertility rates and mortality rates for a certain period of time**
- **The negative natural increase in all cases evidence of negative processes in the public health**
- **Low natural increase with high mortality also indicates a unfavorable demographic situation**
- **High natural increase can be seen as a favorable demographic phenomenon only in low mortality rates.**

Life expectancy

- **This is a hypothetical number of years which shall be lived by this generation (born or living among a certain age), provided that throughout the life of deaths in each age group will be the same as it was in the year for which the calculation is made**
- **The indicator characterizes the viability of the population as a whole and does not depend on thepopulation age structure**