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**HEALTH MINISTRY OF REPUBLIC OF MOLDOVA
STATE UNIVERSITY OF MEDICINE AND PHARMACY
"NICOLAE TESTEMITANU" OF THE REPUBLIC OF MOLDOVA**

**Department
"Economy, Management and Psycho pedagogy in medicine"**

Alina FERDOHLEB, Constantin ETCO

SOCIAL MEDICINE

Course for Dental faculty's students

Chisinau - 2011

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This support course is designed in compliance with the current didactic requirements of Public Health. It corresponds to the curriculum and syllabus of Social Medicine (for Dental faculty's students). It was developed based on the use of international experience and according to directions of development of the Health System in Moldova.

DESCRIEREA CIP A CAMEREI NAȚIONALE A CĂRȚII

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PREFACE

“None of human investigations can be called true science if it doesn't pass the mathematical demonstration.”

Roger Bacon

This support course was written for the students from the Dental faculty. **Social medicine** is more than just interesting - it is fascinating. This book is meant to be a guide to the understanding of your *first steps in learning Biostatistics, General epidemiology, Evidence-based medicine, Demography and the indicator of the health state, Medico-social problems of humanity, Public health systems in the world, Healthy lifestyle and Healthy promotion, Family planning, Organization in the Dental services and many others.*

The presented tables are summaries of important information in the text. The figures are referenced where their viewing would be most advantageous to help understand the text. We hope that you will enjoy this course and that this book will inspire you to learn **Social medicine**. Perhaps the best bit of advice we can give you is that memory depends on understanding.

The emphasis of the causal, multi-factorial links of demographic, social and morbidity phenomena will let us determine mathematically and logically the most appropriate sanitation actions for the promotion of human health, in the complex socio-economic actions of the world. We would appreciate hearing from you about your experiences with this textbook or suggestions for improvements in future editions.

Authors

LESSON MODULE no. 1

Subject: *The social medicine and science as subject. Biostatistics. Biostatistics research methods. Measures of central tendency. Measures of frequency of events.*

Lesson plan Purpose: (1) Study of social medicine and of the sciences of biostatistics and of their role in the medical practice preparing; (2) study and appreciation of measures of central tendency and measures of frequency of events; (3) study methods for finding their forms and parameters determining the statistical date.

Objectives – After completing this module, the students will know and possess:

1. the content, tasks and research methods of social medicine discipline;
2. the theoretical foundations of biostatistics;
3. the role of biostatistics in medicine;
4. the measures of central tendency (mean, mode, and median);
5. the measures of central tendency (ratios, proportions, rates);
6. the opportunities to learn rules and statistical analysis and learn to interpret them correctly.

Key terms: *Biostatistics, statistics, social medicine, health services, statistical totality, selective totality, units of observation, mean/average, mode, median, ratios, proportions, rates.*

Arguments:

Learning provides a training base for the future social medicine specialists, doctors. In the aspect of studying the medical-social issues in a broad spectrum it offers the possibility of analysis and study of the medical-social factors that influence human health in specific historical conditions of social development, organization and the performance of curative and preventive measures among the population.

Your practitioner should consider the results of the work to know completely the general requirements, rules, the order and consistency of carrying out any research. It is necessary for each student to acquire practical skills in collecting information about: the health of the population, the processing of it and a thorough statistical analysis.

Informative notions and materials on the subject:

Social Medicine is a branch of clinical medicine that deals with studying the health of the population in correlation with the social factors that it's influence.

Objectives of Social Medicine:

1. Health promotion
2. Health Care in maintaining health and preventing disease
3. Fighting with the diseases and their consequences
4. Recovery

Social Medicine has its own methods of investigation:

1. Historical method;
2. Mathematical method;
3. Statistical method;
4. Epidemiological method;
5. Sociological method;
6. Social-psychological method;
7. Experimental method;
8. The group of experts method;
9. Economic method and etc.

Statistics is a universal science that deals with the study of the quantity of all phenomena from society and nature.

Biostatistics is a social science that studies the quantitative part of in mass, health phenomena, in correlation with their qualitative particularities in concrete conditions, space and time.

Social Medicine's research methods:

1. **Historical method** is a study of Public Health sanitary and of Health Services' activity that were used in the historical development of society.
2. **Epidemiological method** - correlative study on the public health phenomena with risk factors (*this method synthesizes those suggested by the observation methods*).
3. **Experimental method** is the aim is the development and approval of new forms and methods of health care, checking assumptions, new methods of diagnosis treatment.
4. **Economy method** is used in assessing the effectiveness and efficiency of health services.
5. **Sociological method**
 - ✓ **Observational method** – following of the development of the phenomena

Ways of the research's realization:

a. **Statistical research** – accumulation of information in form of numerical values

It can be:

- *integral*
- *selective*

b. **Assessment through expertise** – the phenomenon is appreciated particularly by experts

Depending on the time, the research can be:

- current (on-going continuous)
- periodical (during certain periods of time)
- critical moment

6. **Social-psychological method**

The questionnaires are used in researches on population's health and in epidemiological researches. The questions in the survey can be: *open* (when the question does not give the respondent a choice and he makes the answer himself), *half-open* (an answer is given, but there is left a blank line for the exposure of respondent's personal views), *closed* (there are given two or more answers and the respondent must choose one of them.)

Methods of collecting and processing information

1. **Direct observational method** is used in clinics when the doctor does the objective study and the laboratory exams to the patient and records this data in the medical record. The same thing is done in polyclinics (*outpatients*) and during the home calls (maintenance).

2. **Extracting information from an official statistical form method (indirect method)** is used at filling the observation sheet, the patient's outpatient medical card, statistical sheet of the patient's placement and the patient's discharge sheet of stationary.

3. **Investigational method** is used the information from: *the investigational questionnaire*, previously prepared, including specific questions, which the responding must answer.

In terms of goal there are several types of studies:

1. **Cross-selection studies (transverse type)** - aims to determine the structure, at a certain time of some phenomena observed in the population group studied.

2. **Cohort studies (longitudinal type)** - enables the study of phenomena in dynamics. It can be: prospective and retrospective.

3. Case-control studies (epidemiological type) - allows the study of the necessary lots of people in parallel with control groups (*the lots of witnesses*) and thus can be determined the multi factorial causal correlations of morbidity.

They are of three types:

Type I - is used on a representative sample, the distribution is random.

Type II - is selected from the sample of two groups of subject sex posed and none is exposed to the risk factors. The distribution of patients is random, this is a prospective investigation.

Type III is allows verifying the number of non-sick patients, the distribution of subjects remains random.

Information processing

Material processing is done by checking and then grouping.

Checking can be of 2 types:

- **Quantitative** - when the registration is compiled in to forma (or a register) of the informative material (*and if the number of cases was also included in the sample record set previously*).
- **Qualitative** (logical) - usually made by the researcher it verifies logically the recorded data. Here extraordinary things may take place, for example: the diagnosis does not correspond to the global classification, being a symptomatic diagnosis. In its confrontation with age and sex it may again no correspond to the obtained legalities. Errors can be random, systematic and systematic. Any error should be detected, corrected and only then the information can be included in the block.

The information material is required to be grouped by quantitative (numerical) and qualitative (attribute) signs, to be able to analyse multilateral characteristics of the studied phenomenon.

Grouping can be:

- (1) *quantitative* (signs - age, height, weight) and
- (2) *qualitative* (signs - sex, marital status, profession, and place of residence).

In function of the number of signs grouping is divided in to:

- *Simple groups* - which include information about a sign, gathered using a thorough / detailed study;
- *Complex groups* (combined) - are based on any signs and determine the correlation links between them;
- *Repeated groups* - are merging the previously obtained groups by

and are performed to obtain a more thorough (*detailed*) analysis and synthesis.

Health Information System is a source of information and is the system of evidence, documentation forms and reports to the state.

The information system includes three subsystems:

1. Decision-making-leading / management;
2. Operating-execution;
3. Information-circulation.

Statistical totality is represents a group that includes a great number of things, objects, called elements (units of observation) relatively homogeneous taken together on the basis of a common factor in the boundaries of space and time and serves as a sample. The **statistical totality** is a mechanics sum of units of observation. The number of **units of observation** determines the volume of destined density. Its symbol is "n".

The primary element of statistical totality is called observation unit. Observation unit's characteristics are called signs. Each sign depending on the characters or expression can be divided in to:

- Attributive (qualitative, descriptive)
- Numerical (quantitative).

For example, to the attributive group can be attached sex, occupation, treatment's outcome. The quantitative group of signs includes: disease's duration, blood pressure level, age, weight.

Factorial signs (determined) are signs under whose influences change other signs.

Result signs – reproduce those results and are changed under the influence of factorial signs.

Quantitative characteristics can be:

- *Continuous (on-going) - take any value (even decimal);*
- *Discontinuous (direct) – take the appearance of fixed values, usually of integer numbers (ex. number of the children in a family).*

Qualitative characteristics may be:

- **Nominal** – with a natural ordination of categories (ex.: gender (male & female), blood group (0, A, B, AB)).
- **Ordinal** – with a simple ordination of categories (ex.: results of treatment, level of education, social class).

General integral statistical totality is the summarizing of all observation units, according to the purpose of the study, which are possible in specific boundaries of space and time.

Partial statistical totality – is including a part of the integral totality chosen on the selection and integration and is representative for the selection's integration.

The requirements for the **partial statistic totality** are:

1. *to have available the basic characteristic features of the integral one;*
2. *to have a sufficient number of observations.*

Ways to select the partial statistical totality

Partial statistical totality can be selected based on:

1. **Probability theory** is the mathematical theory studying random phenomena that can appear in the group of a studied sign.
2. **Law of big numbers** says that statistical totality has two applies:
 - a) *as the number of observations increases, the acquired results from the research on the basis of selective totality incline to the reproduction of the data of integral totality;*
 - b) *on reaching a certain number of observations in the selective totality, the research's results will be as much as possible close to the possible results of the integral totality.*
3. **Selection theory** is describes the legality (*rules*) of the selection of a sample.

Types of selection:

- a) *Random (casual, simple accidental);*
- b) *Conducted /guided (mechanical /steps, logistical /distance of Euclid);*
- c) *Mixed*

The statistical data obtained during the research express individual or group proprieties that usually are presented using absolute values, which are difficult to assess, because there are missing comparison elements and are used for analysing very rarely phenomena.

For a correlative interpretation, comparative of signs, groups of signs, and based on them of integral totality, relative values and average /mean values are used.

Types of statistical indicators:

Three kinds of frequency measures are used with two-category variables (also called dichotomous variables). These frequency measures are

1. **Ratios**
2. **Proportions**
3. **Rates**

Before you learn about specific measures, it is important to understand the relationship between the three types of measures and how they differ. All

three measures are based on the same formula:

Ratio, Proportion, Rate = $x/y \times 10^n$

- In this formula, x and y are the two quantities that are being compared.
- The formula shows that x is divided by y .
- 10^n is a constant that we use to transform the result of the division into a uniform quantity.
- The size of 10^n may equal 1, 10, 100, 1000 and so on depending on the value of n .

Example:

$$10^2 = 10 \times 10 = 100$$

$$10^3 = 10 \times 10 \times 10 = 1000$$

$$10^5 = 10 \times 10 \times 10 \times 10 \times 10 = 100,000$$

A. Ratios:

- A ratio is used to compare the occurrence of a variable in two different groups.
- These may be two completely independent groups, or one may be included in the other.
- For example, we could compare the sex of children attending an immunization clinic in either of the following ways:
 - 1) female /male, 2) doctors / nurses, 3) births / abortionsIn the first example, x (female) is completely independent of y (male). In the second example, x (female) is included in y (all). This second type of ratio, called a proportion, is examined in more detail in the next section of this module.

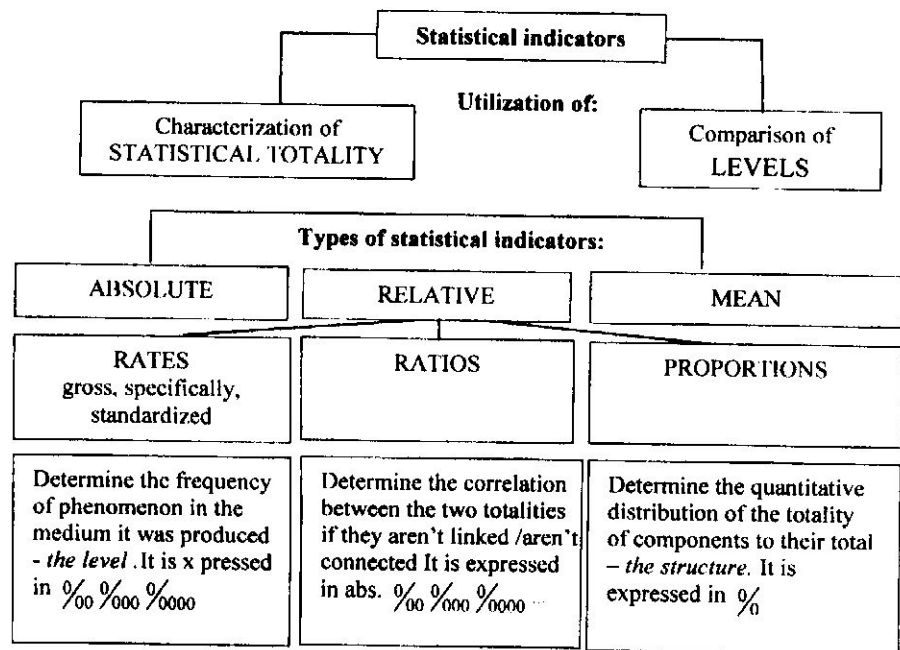


Fig.1. 1. Types of statistical indicators.

B. Proportions:

- The second type of ratio, in which x is part of y , is also called a proportion (as in the previous (female/all) example).
- Proportions are usually expressed as percentages.

Examples

➤ **Independent x and y :** During the first 9 months of national surveillance for Diabetes mellitus (DZ), WHO received 1,068 case reports that specified sex; 893 cases were in females, 175 in males. Here is the method for calculating the **female-to-male ratio** for DZ.

1. Define x and y : x = cases in females
 y = cases in males
2. Identify x and y : x = 893
 y = 175
3. Set up the ratio x/y : 893/175
4. Reduce the fraction so that one value equals 1. Female to

$$\text{male} = 893/175 = 5.1/1$$

5. Express the ratio in one of the following ways: 5.1 to 1, or 5.1:1, or 5.1/1

Thus, there were just over 5 female DZ patients for each male DZ patient reported to WHO.

➤ **x included in y:**

Based on the same data, here is the method for calculating the **proportion** of DZ cases that were male.

1. Define x and y : x = cases in males

$$y = \text{all cases}$$

2. Identify x and y : $x = 175$

$$y = 1,068$$

3. Set up the ratio x/y : $175/1,068$

4. Reduce the fraction so that one value equals 1. Divide the smaller number by the larger number: $175/1,068 = 0.16/1$

5. Proportions are usually expressed as percentages, so the value of the constant

$$(10^n) = 10^2 = 100:$$

$$0.16 \times 100 = 16 (16\%)$$

Thus, 16% of the reported DZ cases were in males.

C. Rates:

- The third type of frequency measure used with two-category (dichotomous) variables is a rate.
- Rates have the added dimension of time. Rates measure the occurrence of an event in a population over time.
- The basic formula for a rate is:

$$\text{Rate} = \frac{\text{number of cases occurring during a given time period} \times 10^n}{\text{population at risk during the same time period}}$$

- Rates are always specific to a particular population. They reflect groupings of people based on time, place and person.
 - Time: a specific year, month, week, day or hour
 - Place: country, state, county, city, township, school, institution, area
 - Person: age, sex, membership in some group or class
- Rates take into account the size of the population, so comparisons can be made across different population groups.
 - By using rates instead of raw numbers, the occurrence of

- disease in one group can be fairly compared with another.
- Example: males with females; one county with another; Republic of Moldova with the Ukraine; Republic of Moldova with Georgia; Republic of Moldova with Romania.
- To calculate a rate, we must have an estimate of the population at risk during a specific time period for the denominator.
- Ratios and proportions do not require this.
- Earlier, we calculated ratios and proportions of DZ cases without knowing the number of people at risk of DZ.
- Rates may be harder to get, because accurate denominator data may not be available for small, localized population groups.

To summarize:

- All three of these frequency measures are calculated in basically the same way. In practice, we use:
 - a **ratio** to compare two independent groups,
 - a **proportion** to compare one group with a larger one to which it belongs, and
 - a **rate** to measure an event in a population over time.
 - Ratios, proportions, and rates are used in infectious disease epidemiology to describe **morbidity** (disease) and **mortality** (death).

Descriptive statistical measurements are often used in medical literature to summarize data. Two parameters that are most frequently used in clinical medicine are *measures of central tendency* and *measures of dispersion*.

Mean values expresses the value that represents the general characteristics of the studied sign in the statistical totality. They determine the average level of a studied sign from the totality of the units of observation.

Mean values are easily compared with each other and determine the general laws. Most frequently are used:

1. **Arithmetic mean (M_a)** - the average / mean value that is obtained from the sum of individual values in a homogeneous community

Example: Suppose we are interested in the average pulse intensity of 9 persons: 65, 68, 64, 66, 73, 67, 62, 65, and 73.

$$M = \frac{\sum V}{n} = \frac{603}{9} = 67 \text{ (beats per minute);}$$

where: M_a -arithmetic mean

V -values,

\sum - sum of the values (V)

n - number of cases.

There are known:

1. simple arithmetic mean
2. weighted arithmetic mean
3. arithmetic mean through the moment method

2. **Mode** (M_0) is an average value appropriate to the maximum frequency of a distribution series.

3. **Median** (M_e) is an average value, which ranks the middle-high range of values, with similar levels, so homogeneous communities. Median divides the series of values into 2 equal halves.

To summarize: When performing a statistical research the doctor studies the selective totality, there are only a part of the general totality. So it is very important to determine the veracity (*truthfulness*) of the data.

To summarize: A measure that describes a *typical value* in a set of data that is referred to as measure of central tendency. Three measures of central tendency describe such values when they are found in a normally distributed sample: mean, median, and mode.

- **Mean:** the sum of the score divided by the number of scores - that is, the average score.
- **Median:** the 50th percentile or midpoint of a sequence - that is, the score above which, and below which, half of the scores are found.
- **Mode:** the score that occurs most frequently.

Although all measures of central tendency may be altered by the addition of very high or very low values in a distribution, the mode is usually unaffected by such values, and the mean is susceptible to the greatest degree of change.

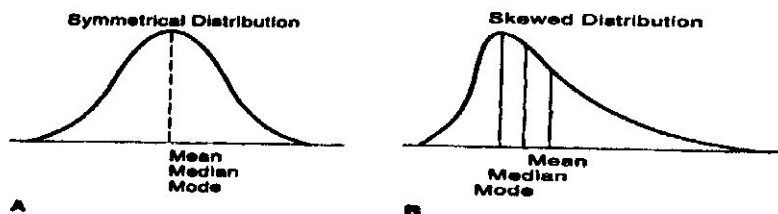


Fig. 1.2. Symmetrical and Skewed Distributions (A, B).

The direction of the tail of the curve indicates the direction of the skewed distribution. If the tail of the curve is toward the *right*, the distribution is said to be *positively skewed*; if the tail of the curve is toward the left, the distribution is *negatively skewed*.

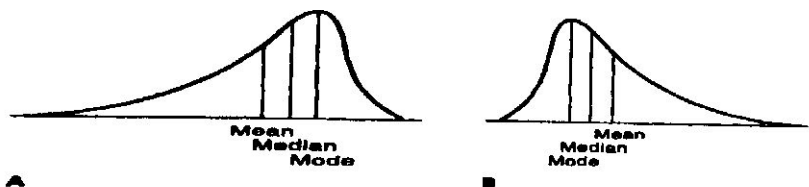


Fig. 1.3. Positive and Negative Skewed Distributions (A, B)

In a **skewed distribution**, the *mean* always follows the "tail" of the curve. From the tail of the curve to the apex (*mode*), the *mean*, *median*, and *mode* are always in **alphabetical order**. Remembering this little "pearl" will negate the possibility of answering questions about skewed distributions incorrectly.

Negatively SKEWED	Positively SKEWED
skewed toward the LEFT	skewed toward the RIGHT
mean less than median	mean greater than median

The appreciation of the authenticity (correctness/accuracy) of the relative indicators

When talking about the authenticity (accuracy) level of the relative statistical indicators is understood to their imagined reality of the phenomenon in the integral totality.

To appreciate the authenticity of the research means to determine with

what probability the results gained can be transferred from a selective totality (a sample) to the universe of statistics (integral statistical totality).

This assessment is used by calculating the following parameters:

- a) the representative average error of the index;
- b) the confidence limits of relative values;
- c) the authenticity of the divergence between the two values after "t- student test";
- d) the authenticity of divergence of groups compared by the χ^2 -test;

The average error relative of the values (representation error) "m" allows us to determine how much the results obtained from those that could be obtained from study of all the *elements of selective totality* differ from those that could be obtained from study all the *elements of the general totality*.

To determine the average error of the relative values is used the following formula:

$$m = \pm \sqrt{\frac{p \times q}{n}}$$

where:

p – relative indicator;

q – the difference between the average rate in correspondence with the index was calculated (100, 1000, 10000 etc.) and even the indicator values,

n – number of causes under observation.

The Authenticity of the arithmetic mean is determined using the arithmetic mean error, which is calculated as:

$$m \pm \frac{\sigma}{\sqrt{n}}$$

where:

σ – deviation; *n* – frequency of causes

Think about it: When the frequency is less than 30 cases, the denominator should be *n-1*.

The size of the error shows with value the obtained result by the selective survey differs from the potential one that we have

achieved through the thorough investigation of the general totality. Thus, we can determine the boundaries of trust; and the maximum and minimum limits; that will necessarily include of the index general totality:

$$M_{gen} = M_{sel} \pm t \cdot m;$$

where:

M_{gen} - general totality mean

M_{sel} - selective totality mean

m - arithmetic mean error

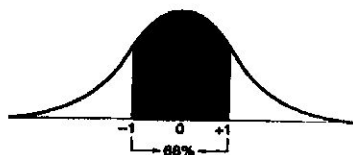
t - accuracy criterion

With the help of "*student's t test*" we can present the selective results of the outside-limits for the arithmetic mean in the totality, with different kinds of probabilities (p).

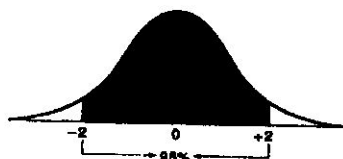
$t=1$ $p=68.26\%$

$t=2$ $p=95.45\%$

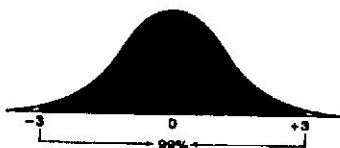
$t=3$ $p=99.73\%$



A.



B.



C.

Fig. 1.4 (A, B, C). The number of Standard Deviations (SD) from the *mean*.

It is bell - shaped.

It has symmetry around the mean.

The mean, median, and mode are equal.

The dispersion or spread from the mean is represented by the standard

deviation.

- 68.26% (*two third*) of the values fall within one standard deviation of the mean
- 95.45% of the values are found within two standard deviations of the mean
- 99.73% of the values are found within three standard deviations of the mean

The smaller are the limits the bigger is the probability of getting closer or the coincidence of arithmetic mean calculated on the basis of selective and general totality.

This proves that the studied selective totality is representative and allows us to consider the results as indicators of general totality.

Quiz:

1. What is the definition of *Social medicine*?
2. What is *Social Medicine* what does it study?
3. What is the purpose of *Social medicine* and management of Health Services?
4. Name the *factors / determinants* that influence population's health.
5. What are the methods used and applied by researches in *Social medicine* and in the management of health services?
6. What is *Statistics*? What is *Biostatistics*?
7. What is *Statistical totality*?
8. What is a *Unit of observation*? Name the out it's characteristics and their classification.
9. Characterise *General totality* and *Selective totality*.
10. What are the methods used for selecting *Units of observation*?
11. Characterize the traits of the basic group and the criteria of *Statistical totality*. What are the *Sanitary Information System* and its *subsystems*?
12. Name the types of *quantitative variables*.
13. Name the types of *qualitative variables*.
14. What is the utility of statistical indicators?
15. What *types of statistical indicators* do you know?
16. When does one use the *absolute values* in biostatistics?
17. When does one use the *relative values* in biostatistics?
18. What are the *Ratios - indicators*?

19. What are the *Proportions*?
20. What are the *Rates - indicators*?
21. Which is the medium values utility?
22. What is *Mean*?
23. What is *Mode*?
24. What is *Median*?

Bibliography: 3, 5, 21, 22, 26, 34.

LESSON MODULE no. 2

Subject: Statistical study's steps. Time series. Direct standardization method. Concepts of correlation and regression. The graphical representation.

Lesson plan: *Purpose:* (1) to learn about the statistical study's steps and development of a statistical research study, (2) to study of variable and chronological series, indicators' calculation and (3) to interpretation, identification of the direct method of standardization in the comparative interpretation of statistical data and of the degree of correlation between phenomena and signs.

Objectives – After completing this module, the students will know, will possess and will be able to identify:

1. the spread of various diseases of the maxillofacial region, mouth, teeth;
2. the analysis of the volume and quality of the medical institutions' and doctors' work;
3. the dental service's activity, generally and by specialty (dental therapy, dental surgery; prosthesis, orthodontics) at village, district, and republic levels;
4. the variables and chronological series;
5. the interpretation of variables and chronological index series;
6. the necessary conditions to perform the direct standardization method;
7. the stages of standardization by the direct method;
8. the correlation between phenomena and signs.

Key terms: *Stage of a statistical research, unit of observation, program of a statistical research, types of tables, variable series, chronological series, standardization.*

Arguments:

Medical activity requires constant analysis to improve and raise the efficiency. Medical work's analysis is done basing on the statistical study. Statistical analysis requires physician's knowledge of the legalities of variable series' and time series' forming and the legalities of standardization of the obtained values. The effectiveness of medical activities closely linked to the scientifically reasoned statistical studies, which requires knowledge of the statistical study's stages and methods of analysis of information gained throughout this study.

Informative notions and materials on the subject:

Any biostatistical study takes place in 4 steps:

1. *Planning and organization of the statistical study;*

2. **Material accumulation;**

3. **Processing of the obtained information;**

4. **Analysis and summary's synthesis, conclusions and practical proposals.**

Stage I Developing the plan and the program of study

1. Formulate the purpose /aim of the study.

Determine the unit of observation, the whole the observation and the sample. An unit of observation - every single case to be studied during the study. The choice of the unit of observation depends not only on the topic, but also on proposes of the study. If the unit of observation is correctly chosen, doctors study the homogeneous totality which allows the comparison of results of various studies and accurate conclusions /valid.

2. Determine the type of study:

a. *Full or selective,*

b. *Current or concomitantly (simultaneously).*

Concomitant study – if such a study is made, the accumulation of material is done at a certain time for example – the annual assessment of the number of beds, medical hospitalization.

Current study- data is accumulated with out interruption during their occurrence. For example: patient records in dental clinics, in hospital wards (departments). In case of *full (integral) study* all units of observation are recorded. For example: census of population, morbidity and mortality through a rare disease. The *selective (part of) study* is studying only a part of the whole full. Selective study saves time, personnel involving, technique. But if we want that with the data from a selective study to do conclusions on the whole then the study must be representative.

3. Elaboration of the statistical studies program.

Determine which questions will be given to patients at the time of data collection, during patient's examination; be sure to keep the connection between the curriculum and the study's theme. *Program of study* -- is an important element in determining the level of statistical study and research utility.

4. **Elaborate questionnaire for patients' recording** for further processing (manual or automated). Such a survey should include the name, official data (name of patient observation form number, name of medical institution), program questions, encryption, and signature of doctor.

Stage II - Accumulation of material. It implies filling of the questionnaire for each unit of observation. Control the quality of filling of each questionnaire.

Stage III- processing the obtained information

1. **Group the signs of units of observation.** Signs' grouping is an important stage in the statistical study. The accuracy of subsequent findings on it depends.

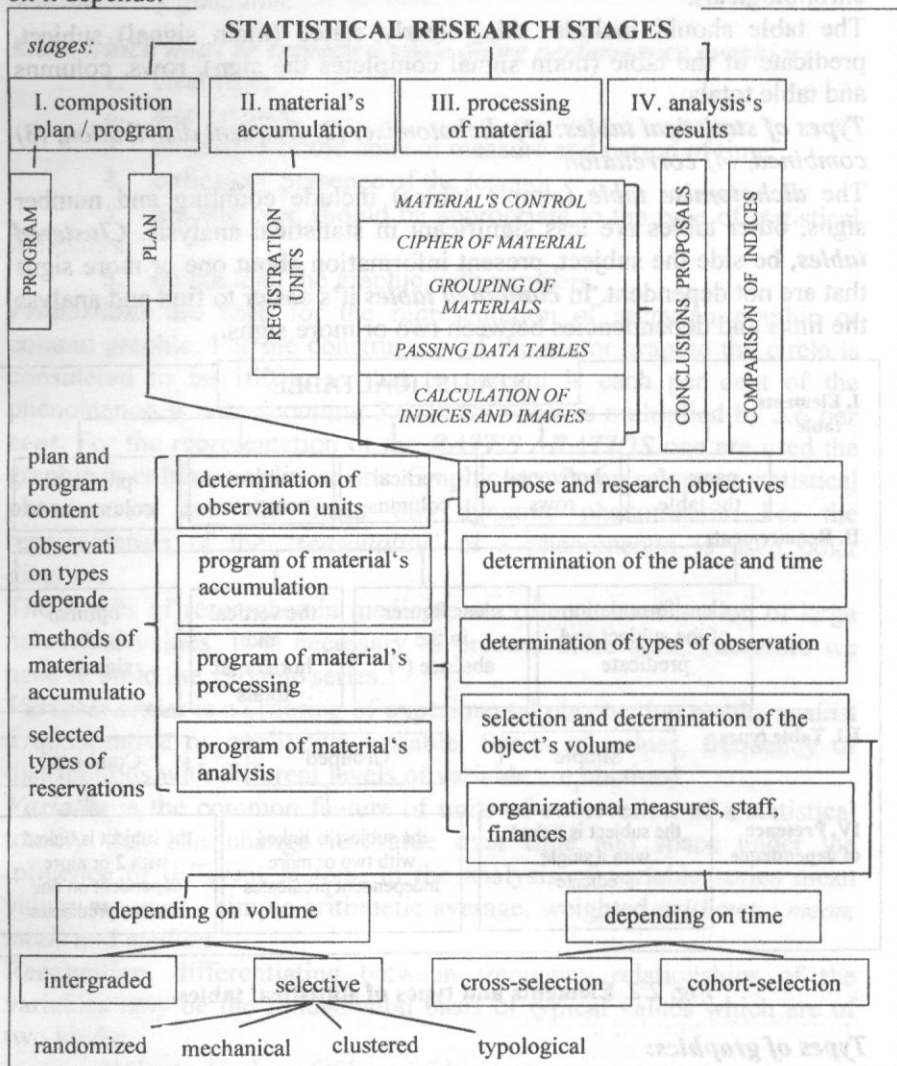


Fig. 2.1. Content of statistical research's stages.

Graphical representation is frequently used by doctors to illustrate statistical data and determine particular / certain/regularities. *Type's graphical representations* are *tables, diagrams, and series* (variable / chronological).

The table should include: title, clearly stated (main signal) subject, predicate of the table (main signal completes the sign), rows, columns and table totals.

Types of statistical tables: (1) *dichotomise*, (2) *frequent distribution*, (3) *combined*, (4) *correlation*

The *dichotomise table* (simple tables) include counting and number signs, other tables are less significant in statistical analysis. **Clustered tables**, beside the subject, present information about one or more signs that are not dependent. In *combined tables* it's easier to find and analyse the links and dependencies between two or more signs.

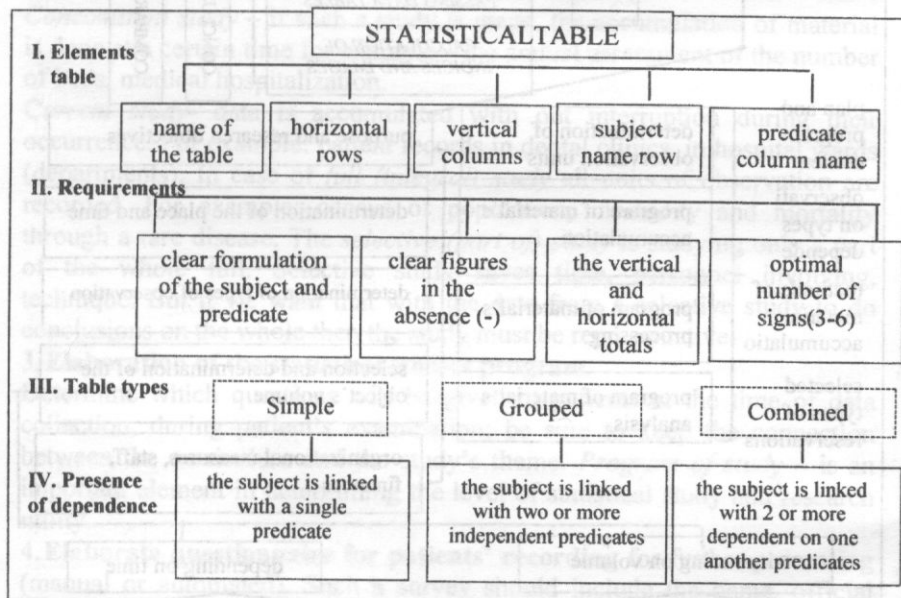


Fig. 2.2. Elements and types of statistical tables.

Types of graphics:

1. *diagram* is the statistics are represented by geometric figures (rectangles, lines, circles);

2. **map** is age o graphical map on which using colour intensities is shown the spread of the phenomenon;

3. **map-chart** is a combination of maps with different types of schematically diagrams.

Rules which must be respected while doing performance graphics:

1. clear title;
2. step respect;
3. indication of the units of measure and period of time;
4. obligatory presence of the legend;
5. graphic type should be appropriate to the type of statistical indicators;
6. do not load the graphic with numbers.

Proportions are used for the representation of sectorial graphic or column graphic. For the construction of the sector graphic the circle is considered to be 100%, so that to percent is each per cent of the phenomenon is corresponding 3.6. Index value is multiplied by 3.6 per cent. For the representation of the **RATES / RATIOS** one are used the graphic in columns or linear one. Graphic in column sex press statistical phenomenon and the linear one dynamic phenomenon. For the representation of the "seasonality" of a phenomenon is used polar diagram.

The results of researches in medicine are often a combination of large numerical values. It is necessary to process these data. Therefore we need to build the variable series.

Variable series is a ordering of experimental observation results against a quantitative or qualitative variable. Series of values, frequency of distributions with different levels of variable are obtained.

Variable is the common feature of units of observation of a statistical totality that can change its value over time and space under the influence of different factors. In the analysis of variable series mean values are used - simple arithmetic average, weighted *arithmetic mean*, *mode* and *median*.

Recognition, differentiating between frequency relationships of the variables may be the fundamental basis of typical values which are of two kinds:

- 1) *Central value of the variable*
- 2) *Value of grade*

To summarize:

Mean values - median module and are non-parametric values, they often do not coincide with the arithmetic mean. They can coincide only if the ideal symmetrical distribution, the value of the arithmetic medium, module and median occupies a middle position in the series variable.

Deviation measured grade's dispersion from the mean of a set of values.

The chronological series is a comparable homogeneous string consisting of values, which characterizes the change of a phenomenon in a certain period of time.

The chronological series can be represented by absolute (number of Parodontozia sick), mean (average number of patients seen daily) and relative values (decay dynamics of morbidity during the years under the influence of water fluorine).

The numerical values of the time series are called levels of the series. Series' levels can be represented by absolute, relative or medium numerical values. The series may be simple (absolute values) and compound (relative to medium values). The simple chronological series is of two types: of time and of interval.

To detect the dynamic trend of chronological series' levels is necessary to adjust the series.

Adjusting the chronological series can be performed by increasing the range method or smoothing the series method using sliding average and group average.

The analysis of chronological series is performed by calculating the following indices: absolute growth, growth's rhythm, the absolute value of a share of prosperity. The impossibility of comparative interpretation of statistical index in a statistical totality of studied phenomena requires looking for the true value of the studied phenomenon. To be able to compare a statistical index of the population's health indifferent areas and different time periods, the direct method of standardization is used. The doctors basically have to know the key elements and ways of standardization through the direct method, so that therefore to apply them impractical work.

Standardization is a conventional method that allows the calculation of standardized indicators, which replace the general or medium indicators, when it is impossible to compare them because of statistical totality's non-homogeneity.

The standardized or conventional indices, having eliminating factors' action on real indices, show what value they would have had if they had not been influenced by one or more factors.

There are known several standardization methods. The direct method is most commonly used.

It consists of five stages.

- Stage I - calculation of intensive (average), special (for each group by sex, age, etc.) index for the totality that is compared
- Stage II – selection and calculation of the standard
- Stage III - calculation of “expected values” for each standard group
- Stage IV–determination of standardized indices
- Stage V-comparison of totalities by general intensive (or average) and standardized indexes

Correlation is a statistical method used to determine the relationship between two or more variables.

Coefficient of correlation is a quantitative value that describes the relationship between two or more variables. It varies between -1 and +1, where extreme values assume a perfect relationship between variables, while means a total lack of linear relationship. A more appropriate interpretation of the obtained values is made by comparing the obtained result with certain pre - established values in correlation tables depending on the number of subjects, type of connection and threshold of graded significance.

Regression is used to express a random variable called the “dependent variable” and noted by Y as a function of other p variables, called “independent variables” and noted as X_i , where: $i=1,2, \dots, p$:

$$Y = f(X_i)$$

Regression is a statistical method that explains the variability of a random variable and/or predicts the value of that variable. In the latter case, it is about prediction.

Quiz:

1. What are the directions of the usage of statistics in the dentist's work?
2. Name the stages of a statistical research.
3. What is the program of a statistical research?

4. What is the first stage of a statistical research?
5. What is the second stage of a statistical research?
6. What is the third stage of a statistical research?
7. What is the signs' grouping and its significance?
8. What is the fourth stage of a statistical research?
9. Name the types of tables and reason their analytical significance.
10. What is the variable series? What are the basic elements of the variable series and what is their meaning?
11. What is the difference between grouped and ungrouped variable series?
12. List the stages of establishing a grouped variable series.
13. How to distribute the units of observation in groups?
14. How to determine:
 - a. the number of groups in the variable series?
 - b. the size of range?
 - c. the basic structural elements (beginning, middle and end of the group)?
15. List the requirements for determining the limits of groups of variable series.
16. Name the dispersion values.
17. What is deviation and how is it determined?
18. What is the coefficient of deviation and how is it determined?
19. What does a coefficient of variation below 10% indicate?
20. What does a coefficient of variation exceeding 10% indicate?
21. What coefficient of variation characterizes non-homogenous totality?
22. What is chronological series?
23. What kind of chronological series do you know?
24. How to adjust chronological series?
25. How to increase the range?
26. What are the steps of analysis of chronological series?
27. How are group average and sliding average calculated?
28. What is the need for a dentist to know the method of standardization?
29. When is the standardization of indicators used?
30. What is statistical standardization?
31. What kinds of indicators are undergoing the standardization method?

32. Name the stages of the direct method of standardization.
33. How to do and what is the result of the first phase of the standardization?
34. How to do and what is the result of the second stage of direct standardization?
35. How to do and what is the result of the third stage of direct standardization?
36. How to do and what is the result of fourth stage of direct standardization?
37. How to evaluate the results of standardization?

Bibliography: 1, 2, 3, 4, 5, 16, 18, 21, 22, 24, 26, 27, 33.

LESSON MODULE no. 3

Subject: Epidemiology. Epidemiological methods in Public Health. Evidence-based medicine.

Lesson plan: *Purpose:* (1) to acquire the epidemiological methods of study of appreciation of the factors' influence on health in practical medicine; (2) to develop students' skills of critical reading of medical literature.

Objectives – After completing this module, the students will be able to and know:

1. the areas of application of epidemiology and the methods used in epidemiology;
2. the types of epidemiological studies;
3. the method of analysis in epidemiology's surveys;
4. the principles of Evidence-based medicine (EBM) in clinical activity as a dentist.

Key terms: *Epidemiology, primary prevention, secondary prevention, tertiary prevention, analytical studies, cross-sectional studies, cohort studies, case-control studies, Evidence-based medicine, bias, Absolute risk, Relative risk, Attributable risk.*

Arguments:

The population is sometimes influenced by unknown pathogenic effects: food additives, pollutants of air and aquatic environment, radiation, drugs, stress, etc. This range of infectious harmful factors, often acts to limit the occult or clinical visibility.

Epidemiology provides to medicine, in its overall, methods for the systematic study of distribution and change in bio-psycho-social phenomena in human population's mass, for assessing the economic aspects of health and disease, providing useful information to clinicians and public health managers.

The character of human pathology and public health's needs are continuously changing and this should be reflected in the training of future doctors. Taking account of the current needs of the population, every doctor, regardless of specialty, needs to know the basis of epidemiology, to form an epidemiological thinking and broad preventive concept.

Informative notions and materials on the subject:

Epidemiology as defined by *Last* is "the study of the distribution and

determinants of health-related states or events in specified populations, and the application of this study to the prevention and control of health problems". Epidemiologists are concerned not only with death, illness and disability, but also with more positive health states and, most importantly, with the means to improve health. The term "disease" encompasses all unfavourable health changes, including injuries and mental health.

Epidemiology is the science that studies the link between environmental factors in the aspect of mass.

Epidemiology is the science that studies the distribution and determinants of disease in human populations.

Epidemiology is the study of health or disease as a mass phenomenon and their relationship with human ecosystem, to promote health and control of morbidity, mortality indifferent populations.

Scope epidemiology are: A focus of an epidemiological study is the population defined in geographical or other terms; for example, a specific group of hospital patients or factory workers could be the unit of study.

A common population used in epidemiology is one selected from a specific area or country at a specific time. This forms the base for defining subgroups.

Epidemiology refers to the investigation of factors that determine the frequency and distribution of disease or other health-related conditions within a defined human population during a specified period.

Epidemics is an increase in the incidence of diseases, conditions, or other health-related events in a defined human population that is clearly in excess of that which was expected during a specified period. Although the presence of the disease or event is typically occasional in a particular community, its epidemic is always relative to its usual frequency in terms of time, place, and population. Outbreaks that affect large numbers of animals are referred to as *epizootic*.

Endemics are diseases, conditions, or health-related behaviours that are *constantly present* in a human population. An endemic may be referred to as the usual prevalence of an event or occurrence in a defined community. Endemics that occasionally or seasonally become epidemics are referred to as endemo-epidemics, and those that are present at a high rate of incidence and affect all ages equally are called hyper-endemics.

Pandemics are widespread epidemics that achieve large geographic proportions.

Epidemiology's subject is population groups and not individuals.

Objectives of epidemiology

1. Description of the disease's distribution or of the risk factors in population depending on:
 - 1) personal characteristics
 - 2) temporal evolution
 - 3) geographical distribution
2. The explanation of the aetiology of disease. Proving the existence of risk factor-disease relationship.
3. The prediction about the probable number of diseases in a given population, or about the improving of health services.
4. Substantiation of prevention and disease control programs in a given population.

Application of epidemiology in Public Health:

1. Disease Classification
2. Description of the real picture of the disease in the population
3. Determining the frequency of risk factors
4. Description and explanation of patterns of morbidity and mortality
5. Mass screening and surveillance of diseases
6. Community prevention and control of disease
7. Healthy planning and promotion of health actions
8. Evaluation of actions, procedures and health services

Application of epidemiology in clinical medicine:

1. Description of the natural history of disease
2. Determination of normal value
3. Identification of new syndromes
4. Study of disease's aetiology
5. Amelioration of the effectiveness of diagnostic and therapeutic procedures
6. Assessment of medical technologies
7. Study of the disease's prognosis
8. Critical reading of the literature

There are different degrees in the health's conception that theoretically range from the point zero of health (death) and the point in which optimum of health is reached.

To summarize:

Primary prevention is a reduction in the incidence of disease through immunization, sanitation, education, or other means of eliminating pathogenic contamination in the human environment.

Secondary prevention is the early detection and treatment of diseases.

Tertiary Prevention is the reduction of the complications of diseases and the improvement in the patient's level of function through palliative treatment and rehabilitation therapy.

Primary prevention, the ideal desideratum of medicine, provides prevention of diseases and human suffering, but it becomes inoperative if we do not have accurate and sufficient information on the ethio-pathogenesis of disease or if opportunities to detect the presence of risk factors are missing. In such situations, doctor's actions are guided to the **secondary prevention**, so early and active detection of disease, in order to cure them per first or to prevent further complications, deformities and infirmities.

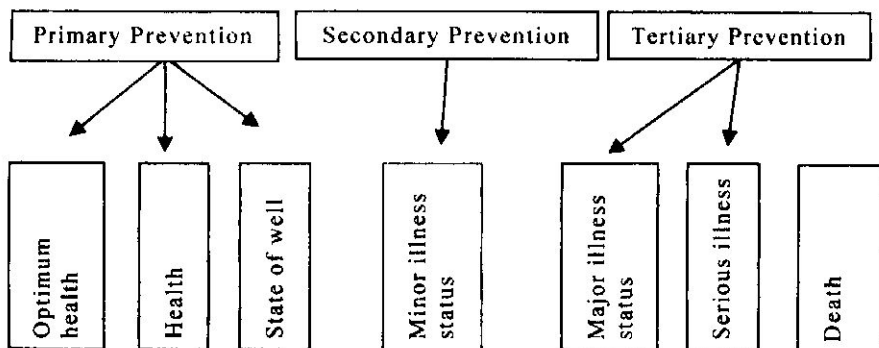


Fig. 3.1. Schema duties and activity of prevention

The possibility of intervention is some times reduced to **tertiary preventive** measures, so to maintain the morpho-functional residual capacity, so in the recovery of chronically ill or disabled patients, in social and professional rehabilitation.

Types of epidemiological studies:

1. Observational:
 - 1) Descriptive

- 2) Analytical
 - a. Cohort
 - b. Case-control
2. Experimental:
 - 1) Randomized clinical trials;
 - 2) Community trials.

Descriptive epidemiological surveys highlight changes in distribution of disease in population and of risk factor characteristics, depending on the variation of some time, space and person characteristics. **The descriptive studies** help to elaborate hypothesis and answer the questions: when does the phenomenon occur, where does the phenomenon occur and to whom.

The analytical epidemiological surveys verify the role of risk factor or of protective factor and answer how and why does the phenomenon occur.

The experimental epidemiological studies control practically with verification supplement the elaborated by descriptive study and verified analytically hypothesis.

Descriptive studies assume:

- The natural evolution of disease;
- Determination of allocated resources;
- Suggest assumptions about the disease.

Descriptive epidemiological studies describe models of occurrence of disease or of exposure to risk factors depending on **person, place** and **time**. Person refers to **who** is affected, the place – **where** is the health problem more or less wide spread, and time – **when** occurs the health problem. This information is very valuable for public health personnel: administrators, clinicians, epidemiologists and researchers. Knowledge about the subgroups from population that are often affected, allow direction resources to prevention and training programs for those segments of the population. Identification of descriptive characteristics may be the first step towards determination of risk factors that can later be modified or eliminated in order to reduce or prevent the disease or other health problems. Descriptive studies can provide important information for generation of specific hypotheses that are then tested in the analytical studies (Hennekens and Buring, 1987).

A descriptive study of good quality must answer the following questions:

- Who? •What? •When? •Where?

Goals of descriptive studies:

- Incidence models;
- Person, space, time;
- Program planning;
- Generation of hypotheses.

Although the **descriptive studies** don't include a formal comparison group, it is possible to make valid comparisons. For example, a descriptive study of a whole population or a whole geographical area will include as people with risk factor or health out come and as well the persons without them. It is therefore possible to compare the characteristics of people with and without a certain exposure or outcome.

The **cohort study** is an analytical epidemiological study in which the studied population consists of classified as exposed and unexposed to a particular risk factor (comparison group) people. These groups are followed by a specific period of time to estimate the incidence of an outcome or to develop health problems.

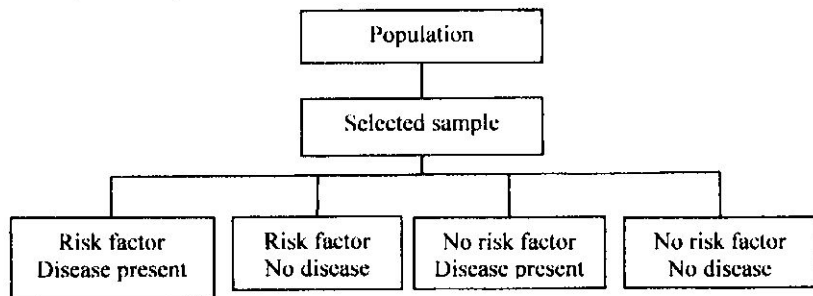


Fig. 3.2. Study design for cross sectional studies.

The exposed group is composed of individuals who have been exposed to a risk factor or a protective factor for a particular health problem. The unexposed group is composed of individuals who are similar to those from the exposed group but known that they are not exposed to risk or protective factor.

Cohort studies:

- **Prospective**
Exposure is determined when the study is started and exposed and unexposed groups are followed before the study in time to see if the result we're interested in shows up.

- **Retrospective**
The studied persons already have the health problem or the out come,

and were exposed before the study started.

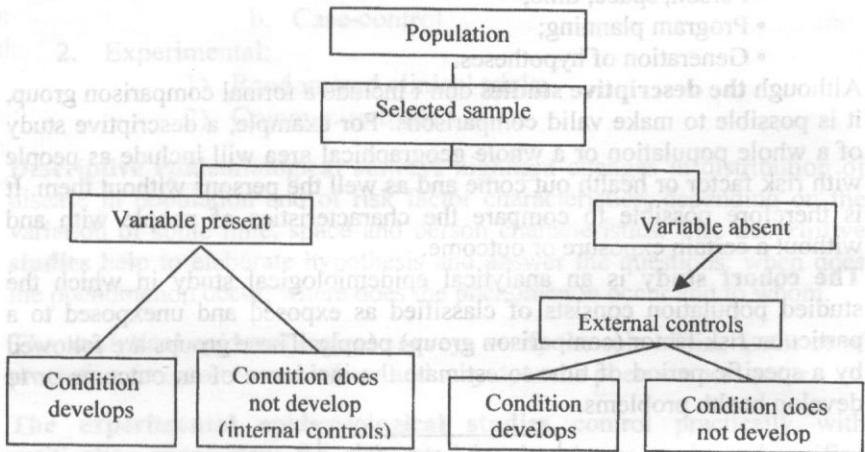


Fig. 3.3. Study design for cohort studies.

The case-control study is an analytic epidemiological study in which the studied population consists of groups that have or do not have a particular health problem. The study subjects that have the health problem are called cases, and the study subjects that do not have this health problem are called control persons. In the case-control study data from the past are analysed in order to assess the exposure of the study subjects. Then the exposure among cases is compared to the exposure among control individuals to determine whether this exposure could be responsible of the state health of the cases.

Randomized clinical trials (studies) represent a controlled experiment used to evaluate the safety and effectiveness of applied treatments for diseases and health problems at humans. Randomized clinical trial is used to determine whether a treatment, usually new, is superior to existing treatments.

Randomized clinical trial principles:

- Random treatment
- Control Group
- The “blind” or “double blind” principle

The level of evidence

Traditional hierarchies of different types of studies make the following order:

1. **Systematic reviews and Meta-analysis**

2. **Randomized clinical trials with definitive results** (results with a confidence interval that does not include the threshold below which there is no clinically significant effect)

3. **Randomized clinical trials with not definitive results** (a point estimate that suggests a clinically significant effect, but with a confidence interval that includes the threshold below which these effects are not clinically significant)

4. **Cohort studies**

5. **Case-control studies**

6. **Cross-sectional (transverse) studies**

7. **Case studies**

Prospective or Cohort study (*This study attempts to answer the question, "What should happen in the future?"*)

This study is also known as a **longitudinal** or **incidence** study design. In a prospective or cohort study, a group of people are followed over a specified period to determine how many develop a specific disease or condition (incidence) after exposure to the risk factor or attribute under study. A **cohort** is a group of people who are either of the same age or share some other common characteristic(s).

Disease		Present		Absent	
		A	B	C	D
Risk Factor	+	A	B	A + B	
	-	C	D	C + D	
		A + C		B + D	

Prospective studies are usually *community-based, time-consuming, expensive, and difficult to perform, and require a larger number of subjects* than case-control studies (discussed later). In a prospective study, the **incidence** and **relative risk** determinations can be made with accuracy and subjects are *less prone to selection bias* than in case-control studies. Prospective or cohort studies are usually done for *relatively common diseases*.

The Relative Risk in a Prospective Study

In a prospective study of the relationship between smoking and the

subsequent risk of developing lung cancer, cohorts of 1000 people were followed and the distribution was as follows:

Lung Cancer		Present		Absent		
		A	225	B	75	
Smoking	+					
	-	C	75	D	625	C + D = 700
		A+C=300		B + D=700		n (A+B+C+D)=1000

Incidence rate among smokers (*absolute risk*) = $\frac{A}{A + B} = \frac{225}{300}$

Incidence rate among non-smokers (*absolute risk*) = $\frac{C}{C + D} = \frac{75}{700}$

As can be seen from the 2-by-2 table, 225 out of 300 smokers were eventually found to have lung cancer, as opposed to 75 of the 700 non-smokers in this cohort study. The relative risk for smokers was then determined by the following ratio:

The relative risk (*in a cohort study*) = $\frac{\text{Incidence rate among risk group}}{\text{Incidence rate among - risk group}}$

$$\text{The relative risk (in a cohort study)} = \frac{\frac{A}{(A + B)}}{\frac{C}{(C + D)}} = \frac{\frac{225}{(225 + 75)}}{\frac{75}{(75 + 625)}} = \frac{0,750}{0,107} = 7$$

Therefore, relative to non-smokers, smokers are *seven times as likely* to develop lung cancer based upon this *prospective (cohort) study*.

Warning: If, instead of being given a 2-by-2 table, you are given only

the number of cases exposed to a risk factor (A of the 2-by-2 table) and the number of cases not exposed (C of the 2-by-2 table), the relative risk becomes a simple ratio of A/C, *where*

$$\frac{A}{C} = \frac{\text{Number of cases exposed to the risk factor}}{\text{Number of cases not exposed to the risk factor}}$$

Warning: If you are given only the number of cases exposed to a risk factor (A of the 2-by-2 table) and the total number of cases (A + C of the 2-by-2 table), simply subtract the number of cases exposed to the risk factor (A) from the total number of cases (A + C) to obtain the number of cases not exposed (C of the 2-by-2 table), and use the same formula of A/C.

Relative Risk of greater than 1 is considered to be clinically significant.

Retrospective or Case-Control Study (*This study attempts to answer the question, "What happened in the past?"*) In a retrospective or case-control study, researchers use documented medical records to select subjects *with a disease (cases)* and compare them to subjects *without the disease (controls)* to study differences between the two groups. These studies are usually hospital-based and are *easier, less time-consuming, and less expensive* than prospective studies, and require a *smaller number of subjects*. In a case-control study, it is **not possible to determine** either an incidence rate or a **relative risk** because of the retrospective essence of this type of investigation as opposed to the prospective nature of incidence rate and risk determinations). This study is also *more prone to selection bias* than prospective (cohort) studies (particularly with respect to the selection of control groups), and is more appropriate for the study of *rare diseases*.

Example - A case-control study was done to investigate the relationship between oral contraceptive use and the subsequent risk of developing deep vein thrombosis among 110 women between 35 and 65 years of age. Cases were selected from hospital-based medical records with a confirmed diagnosis of deep vein thrombosis, and were then compared to controls which had no history of contraceptive use during their lifetime. The results of the study were as follows:

**Deep Vein
Thrombosis**

	Present	Absent	
+	A 40	B 20	A + B
-	C 20	D 30	C + D
	A + C	B + D	

OC+ history of oral contraceptive use

OC - no history of oral contraceptive use

Odds ratio - Since we cannot determine an **incidence rate** or an accurate **relative risk** in a **retrospective case-control study**, how are we to estimate the risk of developing deep vein thrombosis either for the group who used oral contraceptives or the group who did not?

Because **case-control studies** are used for **rare diseases** (having a low incidence), if there is an absence of selection bias and **information (misclassification) bias** with respect to the selected *control group* populations, an alternative is often used to retrospectively estimate the relative risk that existed for each group. This *estimate of relative risk* is referred to as the **Odds ratio**.

$$\text{Odds ratio} = \frac{A \times D}{B \times C}$$

The **odds ratio** in this study is:

$$\frac{A \times D}{B \times C} = \frac{40 \times 30}{20 \times 20} = \frac{1200}{400} = 3$$

Therefore, the **odds ratio** states that, according to this *retrospective case-control study*, women with a history of oral contraceptive use were three times as likely to develop deep vein thrombosis as women without this history of birth control.

Warning: Odds ratio represents the best estimate of **relative risk**. An **odds ratio** of greater than 1 is considered to have been significant in the absence of experimental error.

Table 3.1.

Comparison between cohort and case-control study designs

CHARACTERISTICS	COHORT	CASE-CONTROL
synonyms	prospective, longitudinal, incidence	retrospective
question	what should happen	what has happened
view in 2-by-2 table	horizontal (rows)	vertical (columns)
onset of disease to study	no	yes
risk measurements	incidence, relative risk	Odds ratio
usual site of study	community-based	hospital-based
types of diseases	relatively common	relatively rare
sample size	larger	smaller
cost	expensive	less expensive
time efficiency	very time-consuming	less time-consuming
difficulty level	tedious	relatively easy
selection bias	less time-consuming	more likely

Cross-Sectional or Prevalence Study (*This study attempts to answer the question, "What is happening right now?"*)

As the name suggests, these studies determine the **prevalence**, and **not the incidence**, of a disease. Because all subjects represent existing cases, both the disease and the *risk factor (attribute)* may be ascertained at the *same time*. This type of study will describe both components at one *point in time (point prevalence)* or during a specified *period of time (period prevalence)*.

These studies are *easy, quickly performed*, and relatively *inexpensive*. **Cross-sectional studies** do not necessarily establish *causal relationships*. Surveys and polls are *cross-sectional* in nature.

Example - 1

To minimize morbidity and mortality resulting from stroke (*cerebrovascular accident*) secondary to hypertension, the prevalence of stroke and the blood pressures of a sample of county residents over the age of 35 were recorded in 1991 to justify the inception of a stroke

prevention program in Orange County, California.

Example - 2

Upon determining the prevalence of coronary heart disease and its association with high levels of cholesterol, blood samples were taken from high school teenagers in Dade County, Florida, in April 1992 to record serum cholesterol levels in order to implement a new nutritional program of a low-fat, high-fiber diet in the public school lunch system.

Experimental Studies or Randomized Clinical Trials

The purpose of these studies in clinical medicine is to determine which treatment is superior among competing treatments. This involves **randomization** of patients into various groups, and minimizes the potential for **selection (sampling) bias**. The study is *prospective* in nature - that is, subjects are followed over a period of time. This study is most commonly referred to as a **randomized clinical trial**.

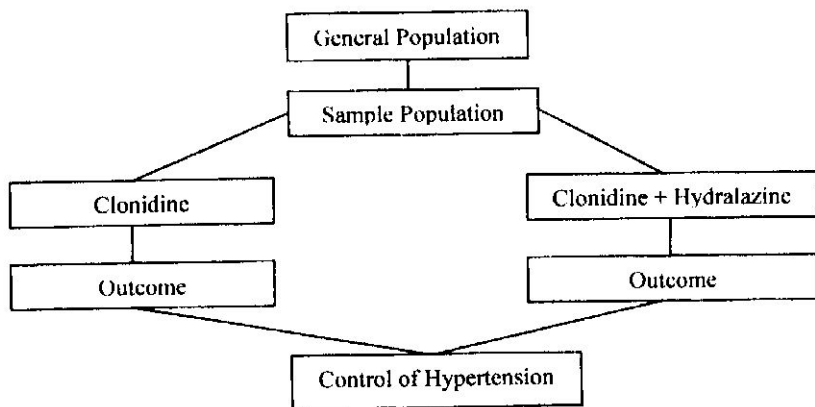


Fig. 3.4. Experimental study.

In double-blind clinical trials, both the subjects and the investigator(s) are blinded - that is, neither knows into which groups the subjects are enlisted. This study design reduces the potential for *selection (sampling) bias*.

In **cross-over studies**, one group is given a specific treatment, and the other group a placebo. After a specified period of time, the assignment is reversed. This study also minimizes the potential for *selection bias*.

Independent Variables

An **independent variable** is one that the researcher can either introduce or isolate in order to demonstrate its *effect upon a dependent variable*. In the following study, the independent variable is *smoking*.

Lung Cancer	Present	Absent	
Smoking	A	B	A + B
	C	D	C + D
	A + C	B + D	

Dependent Variables

A **dependent variable** is one that may be *present, absent, or altered* when an independent variable is *present, absent, or altered*. In the preceding study, the dependent variable was *lung cancer*.

Confounding Variables

A **confounding variable** is one that *affects both the dependent and independent variables* - that is, has an association with both the disease and the risk factor under study that may distort relationships between the two and confound the study results.

Example

In a case-control study assessing the relationship between smoking and the subsequent risk of developing laryngeal cancer, **alcohol consumption** may be a *confounding variable*.

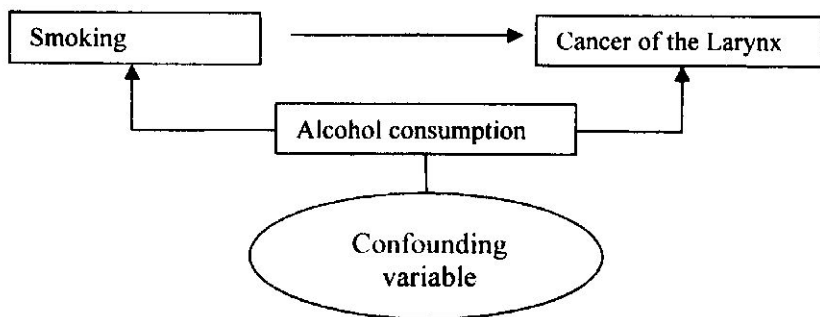


Fig. 3.5. Confounding variable.

Cigarette smokers are often drinkers of alcohol. Because alcohol consumption has been shown to increase both the frequency of cigarette smoking and the risk of developing laryngeal cancer, it is extremely important to establish *controls* for alcohol as a potential *confounding variable* in the study analysis. Establishing **controls** for the confounding variable (alcohol) allows us to demonstrate a true statistical association between the dependent and independent variables of laryngeal cancer and smoking, respectively.

Confounding variables may not always be as easy to identify as in the preceding example. The possibility of the existence of unrecognized confounding variables must always be considered in experimental studies.

Bias (Systemic Error)

The *validity* of a test is dependent upon the *accuracy* of test classifications and measurements. When there is a distortion of a test measurement that results in a unidirectional deviation from the mean that cannot be corrected by statistical manipulation, it is referred to as a **non-random systemic error, or bias**.

Three of the most problematic forms of bias in medicine are: **selection (sampling) bias, information (misclassification) bias, and confounding**.

Selection (Sampling) Bias: Selection bias occurs when study results become distorted by the selection process. This distortion may occur in many different ways. Some of the important ones are the following.

Admission rate (Berkson's) bias: Distortions in risk ratios occur as a result of *different hospital admission rates* among cases with the risk factor, cases without the risk factor, and controls with the risk factor—causing greatly different risk-factor probabilities to interfere with the outcome of interest. This type of bias can be reduced by choosing controls from a wide variety of disease categories that is, *randomization*.

Non-response bias: A common problem encountered in household health surveys is the noncompliance of people who have scheduled interviews at their homes. The most valid way to manage the problem of “non-response” is to try repeatedly to visit or call the non-responders at their homes. If this is unsuccessful, the most appropriate way to manage the nonresponsive subjects is to include them in the survey but treat them as *unknown* in the data analysis.

Lead time bias: Very often a *time differential* exists between diagnosis

and treatment among sample subjects, which may result in higher survival rates being erroneously attributed to superior treatment rather than to early detection. An appreciable time differential may also exist between diagnosis and the onset of disease within a given sample, producing artificially low incidences for a given period.

Think about it:

Selection (sampling) bias is only the **non-random (systemic)** component of sampling error. Errors in sampling are also caused by **random error** that is, random variation within a sample that is strictly attributable to *chance* rather than to a sample that is unrepresentative of the general population (bias). **Bias** in a study may be reduced by *increasing sample size* and by *equalizing the chances of each member of a population to be chosen* for the sample. This is what is known as **randomization**.

Information (Misclassification) Bias: Information bias occurs when study results become distorted by poor data collection or inaccurate measurements of variables. Some of the more common forms of this type of bias are the following.

Recall bias: Differentials in the memory capabilities of sample subjects may cause risk-factor exposures to be under- or over-reported.

Interviewer bias: Because the "blinding" of interviewers to diseased and control subjects is often difficult, subject responses may be influenced by variations in the interviewer's tone of voice, body language, probe level, and perceived preference level all of which may be influenced by the interviewer's perception of the subjects' condition

Unacceptability bias: Patients often reply to an interviewer's questions with "desirable" answers regarding dietary, drug, exercise, behavioural, and recreational habits, resulting in understated measurements of many risk factors and other pertinent variables.

Confounding variable may lead to bias in a study because it has a relationship with both the dependent and independent variables that either masks or potentiates the effect of the variable under study.

MEASURES OF RISK

Factors that are likely to increase the *incidence, prevalence, morbidity, or mortality* of a disease are called **risk factors**. Three valuable estimates are used to measure risk: **absolute risk, relative risk, and attributable risk**.

		<i>Lung Cancer</i>		
		Present	Absent	
<i>Smoking</i>	+	A 225	B 75	A + B = 300
	-	C 100	D 565	C + D = 665
		A+C=325	B + D=640	n=965

Absolute risk allows us to separately calculate the incidences of a particular disease in both populations of a risk factor study for the purpose of making individual risk comparisons for each population. Absolute risk may be determined for the population of people exposed to a risk factor as well as for those not exposed to the risk factor.

$$\text{The Absolute Risk for smokers} = \frac{A}{A+B} = \frac{225}{300} = 0,75 = 75\%$$

$$\text{The Absolute Risk for non-smoker} = \frac{C}{C+D} = \frac{100}{665} = 0,15 = 15\%$$

Therefore, 75% of this population of smokers eventually developed lung cancer as opposed to only 15% of the study's non-smoking population.

$$\text{Relative Risk} = \frac{\text{The Absolute Risk for smokers}}{\text{The Absolute Risk for nonsmokers}}$$

Relative risk gives us risk as a ratio of the incidence among subjects exposed to a particular risk factor divided by the incidence among subjects who were not exposed to the risk factor. Calculations of high-risk-group incidences relative to disease incidences in the general (average risk) population are one of the most important ratios used in clinical and preventative medicine.

$$\text{Relative Risk} = \frac{\text{Incidence rate among those exposed to the risk factor}}{\text{Incidence rate among those not exposed to the risk factor}}$$

$$\text{RR} = \frac{\frac{A}{A+B}}{\frac{C}{C+D}} = \frac{\frac{225}{225+75}}{\frac{100}{100+565}} = \frac{0,750}{0,150} = 5$$

Therefore, relative to non-smokers, smokers are five times as likely to develop lung cancer, based upon this study.

4. Think about it

A relative risk of greater than one is always important in the clinical evaluation of a patient.

Attributable Risk

Attributable risk allows us to attribute differences in the incidences of a disease to a particular risk factor. This is done by simply subtracting the incidence among those not exposed to a risk factor from the incidence among those who were exposed.

Attributable Risk = = *incidences rate among those exposed to the RF* - *incidences rate among those non exposed to the RF*

$$\text{AR} = \frac{A}{A+B} - \frac{C}{C+D} = \frac{225}{225+75} - \frac{100}{100+565} = 0,750 - 0,150 = 0,60$$

Often, attributable risk is expressed as **attributable risk percent**, where **attributable risk** is a *percentage of the absolute risk* (incidence rate among those exposed to the risk factor for example, smoking).

$$\text{Attributable risk per cent} = \frac{\text{Attributable risk}}{\text{Absolute risk}} \times 100$$

$$\text{Attributable risk per cent} = \frac{\text{Attributable risk}}{\text{Absolute risk}} = \frac{0,60}{0,75} \times 100 = 80\%$$

Therefore, 80% of the time, the differences (variations) in the incidence of lung cancer between those exposed to the risk factor (smoking) and

those not exposed to the risk factor may be directly attributable to the presence of the risk factor in this particular study. This percentage is most frequently used to justify the inception of risk prevention programs when Attributable risk factor percentages are deemed to be high.

Warning: The preceding estimates (Relative risk, Attributable risk, and Attributable risk percent), as with all others that we have discussed, do not necessarily establish a cause and, effect relationship between risk factors and disease. They do, however, support the hypotheses made in many reputable studies throughout the medical community that risk factors may be considered to be contributory factors to specific diseases, and may have either a direct or indirect influence on their incidence, prevalence, morbidity, and/or mortality.

Think about it:

<i>Lung Cancer</i>		Present	Absent	Attributable Risk
+	<i>Smoking</i>	A 225	B 75	A + B = 300
-		C 100	D 565	C + D = 665
		A+C=325	B + D=640	n=965

$$\text{Absolute risk} = \frac{A}{(A + B)} = \frac{225}{(225 + 75)} = 0,75 = 75\%$$

$$\text{Relative risk} = \frac{\frac{A}{A + B}}{\frac{C}{C + D}} = \frac{\frac{225}{225 + 75}}{\frac{100}{100 + 565}} = \frac{0,750}{0,150} = 5\%$$

$$\text{Attributable risk} = \frac{A}{(A + B)} - \frac{C}{(C + D)} = 0,75 - 0,60 = 0,15 = 15\%$$

$$\text{Attributable risk per cent} = \frac{\text{Attributable risk}}{\text{Absolute risk}} = \frac{0,60}{0,75} \times 100 = 80\%$$

Epidemiological surveillance

The main purpose of the epidemiology, to know the cause of disease in order to neutralize them, can be achieved only through the accumulation of huge amounts of information on health status of various human communities. On the basis of hypothesis and conclusions resulting from this information, deductions regarding factors and mechanisms that contribute to the emergence, spread and prevention of disease in a population may develop.

These evaluations are done through epidemiological surveillance of the population, through techniques and special means, with a multidisciplinary character, it allows the accumulation, processing, interpretation and multidirectional transmission of information about the epidemiological potential of a given geographical area or of a specific community, in order to organize prevention and control actions.

Epidemiological surveillance allows assessing the size of health issues of a population, allows estimating the incidence and prevalence of diseases.

Evidence-based medicine (EBM) or evidence-based practice (EBP) aims to apply the best available evidence gained from scientific method to clinical decision making. It seeks assess the strength of evidence of the determinants of treatments and clinical/diagnostic tests. EBM/EBP can range from meta-analyses and systematic reviews of double-blind, placebo-controlled clinical trials at the top end. EBM/EBP recognizes that many aspects of health care depend on individual factors such as quality- and value-of-life judgments, which are only partially subject to scientific methods.

Classification – two types of EBP have been proposed. (1) Evidence-based guidelines (EBG) are EBM the practice at the organizational or institutional level (*guidelines, policy, and regulations*). (2) Evidence-based individual decision making (EBID) making is EBM as practiced by the *individual health care provider*.

EBM/EBP recommends the use of conscientious, accurate and judicious best current evidence for making decisions about individual

care of each patients, provides integration of individual clinical experience with the best available clinical evidence.

The six steps of EBM/EBP are:

1. Transforming the clinical problem in a question consisting of four parts.
2. Searching an answer for the question consisting of four parts, basing only on internal evidence.
3. Searching and finding external evidence to answer the question consisting of four parts.
4. Critical evaluation of found external evidence.
5. Integration of external evidence in internal evidence.
6. Outcome evaluation.

1. Transforming the clinical problem in a question consisting of four parts (PICO).

- **Patient(or Problem)** -description of the patient or target disease
- **Intervention**-exposure, diagnostic test, prognostic factor, therapy, patient perception
- **Control**-control group
- **Outcome**-clinical out come of interest for the doctor and the patient.

2. Searching an answer for the question consisting of four parts, basing only on internal evidence

Internal evidence:

- Knowledge from the university
- Experience during practice
- The obtained information from the individual patient

3. Searching and finding external evidence to answer the question consisting of four parts

External evidence:

- Experienced Colleagues
- Case Reports
- Randomized trials
- Reviurile Cohrein

4. Critical evaluation of found external evidence

Validity, critical relevance, applicability

5. Integration of external evidence in internal evidence

6. *Outcome evaluation*

Quiz:

1. Give the definition of epidemiology.
2. What is primary prevention?
3. What is secondary prevention?
4. What is tertiary prevention?
5. What types of epidemiological studies do you know?
6. Name the types of observational studies.
7. Name the types of analytical studies.
8. What are the differences between prospective and retrospective cohort studies?
9. When using descriptive studies, which are their goals?
10. When is case-control studies used?
11. What is a randomized clinical trial and what are his principles?
12. What is the epidemiological surveillance and what is its purpose?
13. What is Evidence-based medicine?
14. Name the seven steps of Evidence-based medicine.
15. What are the internal and external evidence?
16. What are the sources of external evidence in evidence-based medicine?

Bibliography: 1, 3, 5, 6, 10, 13, 14, 15, 16, 19, 20, 22, 24, 26, 27, 29, 30.

LESSON MODULE no. 4

Subject: Demography

Lesson plan: *Purpose:* to study the demographic dynamics, students must know the methods of study, of assessment and analysis of demographic indices.

Objectives – After completing this module, the students will know:

1. the goals, tasks and the methodologies of study of demography;
2. the methods of study, of analysis and assessment of the indices of natural movement and migration movement;
3. the research, the analysis and assessment of mortality and fertility methods.

Key terms: *Demography, demographic statistics, sources of demographic statistics, population.*

Arguments:

Demographic indices determine tendencies of population from society. They are necessary in planning of economic, and of labour development, as well as of Public Health system development in the country. Knowledge of demographic indices allows: correct planning of development of national economy's branches and infrastructure; preparation of professional cadres and development of tertiary institutions, locating labour force in the labour field, locating and developing branches of the public health system. Demographic indicators appreciate indirectly the tendencies of population's state health. Knowledge, practical skills of study and appreciation of demographic indices, allow the doctor examining the birth rate, mortality and population movement, to formulate conclusions of prophylaxis in medical practice.

Informative notions and materials on the subject:

Demography is the science about the dynamic of phenomena and of events that take place in the bosom of a defined population. Medical demography studies the influence of demographic processes on the health of the population.

The demographic event is a simple statistical unit or an individual case that modifies effectively the composition of population the structure level.

Demographic phenomenon - all recorded demographic events in a certain period of time.

Demographic process is the change of demographic phenomena under the influence of a group of economic, social, cultural and biological factors.

The health of population is assessed through four groups of indices:

- 1) Demographic indicators;
- 2) Morbidity indicators;
- 3) Disability indicators;
- 4) Physical development indicators.

Demography is composed of two branches:

- 1) Static (statistical study);
- 2) Population's Dynamic (dynamic study).

Population's Static (statistical) includes the population at certain time, in a specific area, density of population, its territorial distribution and structure of population due to biological, social, economic, cultural and ethnic criteria.

Source of data in statistical a study is census of population and recorded civil status events in a period of time in the given territory.

Demographic events of civil status are:

- a) Birth rate;
- b) Mortality.

Population's Dynamics is composed of:

- a) Mechanical dynamics;
- b) Natural dynamics.

Mechanical dynamics (migratory movement) of the population is people's move from one area to another within a unit time (days, months, years).

Data's sources about migration movement are the passport departments and sections on migration.

The natural dynamics (natural movement) of the population is characterized by demographic phenomena of birth and death. Besides birth and mortality on the process of natural dynamics influence also fertility, marriage, divorce. Data sources of the natural movement of population are the birth certificate, death certificate, and marriage certificate, issued by the official departments from the territory.

Indices characterizing the dynamics of migration are:

- a) brut migration - the amount of immigrants and emigrants;
- b) net migration - the difference between immigrants and emigrants;
- c) net migration growth rate - is the index of net migration per 1000 population;
- d) brut migration growth rate - is the index of brut migration per 1000 population.

Structuring criteria of population are age, sex, occupation, place of residence

We know:

- *Internal migration* – people’s move within a territory;
- *External migration* - people’s move outside a territory;
- *Immigration* - people’s move (arrival) from another territory in the given territory;
- *Migration* - people’s move (departurc) from the given territory to another territory;
- *Permanent migration* - leaving to live from the given territory in another territory on a permanent term;
- *Seasonal migration* - people’s move to another area for short time, seasonal work;
- *Migration of “pendulum”* (shuttle) people’s move from the place of residence to the work place during 24 hours (with return).

Mechanical dynamics (migratory movement) influence on:

- a) Population’s health, because of the influence of various risk factors, changing population structure and others
- b) Reproduction of population –ratio’s change between age and sex;
- c) Marriage and divorce -young people leaving the territory;
- d) Mortality;
- e) Birth rate;
- f) Structure and density of population;
- g) Needs in medical services for population.

indicators are calculated with these formulas:

$$a) \quad I + E = M_{br}$$

$$b) \quad I - E = M_n$$

$$c) \quad S_{mbr} = I + E/L \times 1000$$

$$d) \quad S_{mn} = I - E/L \times 1000$$

I – immigrants (arriving)

E – emigrants (departed)

M_{br} – brut migration

M_n – net migration

S_{mbr} – rate of growth of brut migration

S_{mn} – rate of growth of net migration

L – number of population in the given territory

Natural dynamics is the difference between the number of new-borns and the number of those that dyed in the given territory during the given period of time.

Reproduction of population is its permanent renewal as a result of natural demographic phenomena-births and deaths during a given period of time and in a given territory.

Fertility of population is determined by the level of fertile contingent of population-males between 18-54 years and women aged 15-49 years at a given time.

Birth rate is the ratio of all births (living new-borns) to the average number of population during a given period of time in a given territory, multiplied by 1000.

Mortality is the ration of all deaths to the average number of people in a given period of time in a given territory, multiplied by 1000.

Marriage is the ratio of all marriages to the average number of population during a given period of time in a given territory, multiplied by 1000.

Divorce is the ratio of all divorces to the average number of population during a given period of time in a given territory, multiplied by 1000.

The natural dynamics of the population are characterized by these indices:

General fertility – specific index;

$$F_{ge} = N_v / L_f (15-49 \text{ years}) \times 10.000$$

F_{ge} – specific index of general fertility;

N_v – number of living new-borns

L_f – number of women aged 15 to 49 years.

Birth rate - (calculated in pre mile (%₀);

$$N = N_v / L \times 1000$$

N – natality (*birth rate*)

N_v – number of living new-borns

L – average number of population.

Birth rate indicator can be calculated according to (1) territorial criteria (urban - rural); (2) seasonal and (3) age of the mother.

Breeding (reproduction) of population indicator:

Brut reproduction indicator is the number of born alive girls by a woman during the fertile period.

Net reproductive indicator is indicating the number of girls born alive by a woman during the reproductive period and that survived the age their mother had when they were born.

Mortality is the number of all deaths, which occurred during a given period of time, in a given territory from the average number of the population;

$$M = D/L \times 1000$$

M – Mortality index

D - Number of deaths

L – average number of population.

Mortality indicator can be calculated by criteria such as sex, age, cause of death.

Maternal mortality is the number of all deaths that occurred from complications of pregnancy, delivery or postnatal period during a period of 42 days after being born alive in the given territory from the number of alive new-borns;

$$M_{s.n.l.} = D_{s.n.l.} / N_v \times 1000$$

$M_{s.n.l.}$ – mortality index of pregnancy complications, birth postpartum

$D_{s.n.l.}$ – maternal deaths during 42 days after birth

N_v - number of infants born alive

Infant mortality is the number of children's deaths during the first year of life;

$$M_{inf} = D_x / L_x \times 1000$$

M_{inf} – Infant mortality index;

D_x – the number of deaths of children up to age one

L_x – number of children born alive.

Mortality under 5 years (children) is the number of under 5 years children deaths in the given territory from the number of alive new-borns;

$$M_{0-5} = D_x / L_x \times 1000$$

M_{0-5} - mortality under 5 years;

D_x - the number of deaths of children up to the age of five

L_x - number of children born alive.

Natural growth rate of population is the difference between natality index and mortality index.

$$S_n = N_v - D / L \times 1000$$

S_n - natural growth rate of population

N_v - number of new-borns alive

D - number of deaths

L - average number of population

Real growth of population is the sum between the natural growth rate of population and the migratory growth rate of population;

$$S_r = S_n + S_m = (N - M) + (I - E)$$

S_r - real growth

S_n - natural growth

S_m - migratory growth rate

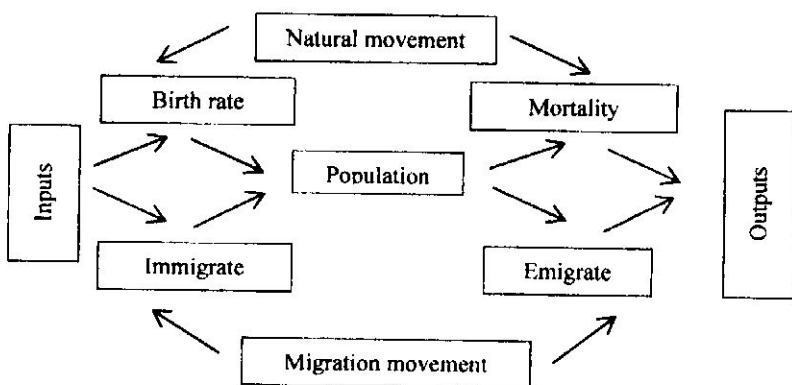


Fig. 4.1. The movement of population and its components.

Years of Potential Life Lost (YPLL) is the numerical difference between a predetermined end point age (*usually 75 age*) and the age at

death for a death or deaths that occurred prior to that end point age. The potential years of life lost (YPLL) for each death (usually to residents of a geographic area for a specific time period) is summed to represent the total years of potential life lost for that area.

YPLL = Predetermined end point age – Age of decedent who died prior to end point age.

Table 4.1.

The logical structure of demography.

<p>Application in the health system</p>	<ul style="list-style-type: none"> • Evaluation of the health of the population • Predicting demographic dynamics of population • Predicting events and phenomena that could occur in the population's health status • Planning the development of Health system's structures and infrastructure. • Planning the education and training of medical workers
<p>Branches of demography</p>	<ol style="list-style-type: none"> 1. Population's Statistics <ul style="list-style-type: none"> • the absolute number of population • the composition and structure of population due to sex, age, place of residence, social status, professions. 2. Demographic dynamics of population <ul style="list-style-type: none"> • natural dynamics of population • mechanical dynamics(migration) of population
<p>Demographic indicators of population's dynamics</p>	<p>The natural dynamics of population:</p> <ul style="list-style-type: none"> • Birth rate • General fertility • Nuptial fertility • Fertility by age • Mortality: <ol style="list-style-type: none"> 1. General 2. Infant 3. sex, age, cause of death; • Natural growth rate of the population <p>The mechanical (migration) dynamics of population</p> <ul style="list-style-type: none"> • immigration • emigration • the migration gain (growth) <p>Real growth rate of population</p>

Quiz:

1. What is demography and what's its role in medico- social research?
2. What is the disciplinary structure of demography?
3. What are demographic statistics and its significance for medical practitioner?
4. What are the sources of demographic statistics?
5. What does the statistical study of the population consist of?
6. Census of population and its requirements.
7. What are the study indices of demographic statistics?
8. Structural study of population.
9. Territorial distribution and population density.
10. Graphic interpretation of population structure due to age.
11. Necessity to study the population due to civil status, place of residence, occupation and to assess indices' medical importance.
12. What is demographic dynamics?
13. What are the demographic dynamics' compartments?
14. What are the types of migration and methods to calculate them?
15. Natural movement of population and criteria to assess it.
16. What is the reproduction of population?
17. What are the doctor's role and place in the natural movement of population?
18. What is *Birth rate*? What are its appreciation indices and how do you calculate them?
19. What is *Fertility* and what are its appreciation indices?
20. What is *Mortality* as a demographic phenomenon?
21. Give the classification and characteristics of mortality appreciation indices.
22. What is the significance of studying mortality's criteria of study for medicine?
23. What are the causes of general, maternal and infant mortality?
24. What is life expectancy at birth and what are its methods of assessment?
25. The natural and real growth rate of population. What are they and how are they calculated?
26. What is the aging phenomenon and what's its appreciation?
28. What are the demographic indicators in dental work?

Bibliography: 7, 8, 12, 14, 28, 33.

LESSON MODULE no. 5

Subject: Population's morbidity.

Lesson plan: *Purpose:* to learn methods of studying and of assessment of population's morbidity.

Objectives – After completing this module, the students will know and possess:

1. the methods of study of population's morbidity;
2. the morbidity's structure of the population, ways, form and sources of collection and processing the information about morbidity's level of the population;
3. the methods of assessment of morbidity's indices of population.

Key terms: *Morbidity, incidence, prevalence.*

Arguments:

Morbidity is the main criterion for assessing the health of the population. Morbidity's indices of population determine its level and structure due to nosology, age, sex, place of residence, loss of working capacity, and effectiveness of treatment criteria.

Knowledge and proper assessment of morbidity's indices allow elaborating measures of primary, secondary or tertiary prevention; of health system's structures' mobilization in expanding the volume and quality of health care population.

Knowledge and practical skills used for studying and assessing the level and tendencies of population's morbidity allow your doctor to study, analyse and take action in order to improve population's health.

Informative notions and materials on the subject:

Population's morbidity is represented by all illnesses of population from the given area and during the given time.

Morbidity of population is studied basing on:

1. Addressability of the population to medical institutions;
2. Medical examination of the population;
3. Study of the causes of death.

Addressing to patient's medical institution may be primary in life, with the establishment of detected disease's diagnosis for the first time in life. It may be primary during the calendar year, but not primary in life, with the establishment of diagnosis of the disease the patient had before,

the disease can repeat during the year.

The information source of patient's addressing to the ambulatory medical institution for the first time is a statistical ticket and medical ambulatory record.

Medical examination may be obligatory (employment to work) or periodical (work is connected with risk factors); selective or general.

Source of information is the medical examination record, the prophylactic examination record and the medical ambulatory record.

In case of detection of the disease for the first time in their life the statistical ticket (files) is completed. It serves as a source of information.

Causes of death are studied basing on the medical files, stationary sheet and certificate of death.

Morbidity's appreciation indices are:

1. incidence;
2. prevalence;
3. pathological affection (disease);
4. accumulated pathological affection;
5. real morbidity (real pathological affection of the population).

Types of morbidity due to the addressability principle:

1. general morbidity;
2. infectious (epidemic) morbidity;
3. non epidemic morbidity;
4. hospital morbidity;
5. morbidity with temporary work incapacity

Sources to collect data about:

- general morbidity is the statistical ticket (files)
- infectious morbidity is the announcement about an infectious disease,
- non epidemic morbidity is the announcement that is used in case of detection of oncological diseases, or tuberculosis and another source is again the statistical ticket;
- hospital morbidity is the extras from patient's stationary sheet and statistical ticket of outcome.
- temporary work incapacity morbidity is the disease bulletin

When studying population's morbidity indices (*Ratios, Proportions, and Rates*) are calculated and assessed.

The logical structure of the morbidity's study

Risk factors of health	<ol style="list-style-type: none"> 1. Climate-geographical 2. Socio- economical 3. Biological 4. Lifestyle 5. Hereditary
Methods of study	<ol style="list-style-type: none"> 1. Addressability 2. Medical exams 3. Death cases
Sources of information	<ol style="list-style-type: none"> 1. "Medical examination record" of the examined person 2. Statistical ticket of final registered diagnosis of disease 3. Ambulatory medical record (form on) 4. Disease bulletin 5. Discharged stationary sheet (form) 6. Statistical tickets of patient's discharge Announcement about detected infectious diseases (record declaring emergency) 7. Certificate of death 8. The Dispensary Care of the Patient Record 9. Record declaring the patients with non-epidemic diseases
Types of morbidity	<ol style="list-style-type: none"> a. general morbidity b. infectious, morbidity (epidemic) c. non epidemic morbidity d. hospital morbidity e. morbidity with work incapacity

Population's morbidity can be represented graphically through column, rectangle, linear, polar and structural diagrams, through chart-maps, through diagram-maps and symbolic figures.

Morbidity of the population can be calculated to 1000, 10,000, 100,000 residents. Temporary work incapacity morbidity is calculated to 100 workers.

Below are given to formula to calculate:

1. Indices of morbidity's incidence (%₀)

$$\text{Incidence} = \frac{\text{the number of cases of disease registered for the first time in life during the calendar year}}{\text{the number of population}} \times 1000$$

2. Indices of morbidity's prevalence (%₀)

$$\text{Prevalence} = \frac{\text{the total number of cases of disease recorded in first calendar year}}{\text{the number of population}} \times 1000$$

3. Indices of pathological disease (%)

$$\text{Pathological disease} = \frac{\text{the number of detected diseases' cases during medical examination}}{\text{the number of population}} \times 1000$$

4. Indices of real pathological disease (%₀₀)

$$\text{Real pathological disease} = \frac{\begin{array}{l} \text{the number of all registered cases of ill nev. for the first time during the calendar year +} \\ \text{the number of the cases of detected diseases during the medical examination} \end{array}}{\text{the number of population}} \times 1000$$

5. Morbidity's structure (%)

$$\text{Morbidity's structure} = \frac{\text{data due to nosology, sex, age, domicile criteria (expressed in absolute numbers)}}{\text{the number of population}} \times 100$$

6. Prevalence (%₀)

$$\text{Prevalence} = \frac{\text{the number of all registered cases of disease during the calendar years}}{\text{the number of population}} \times 1000$$

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7. Indices of morbidity with temporary work incapacity

a. Number of cases with temporary work incapacity at 100 workers (%)

$$\text{Number} = \frac{\text{the number of cases of disease with temporary work incapacity during a reported period of time}}{\text{the average number of workers}} \times 100$$

b. Number of days with temporary work incapacity at 100 workers (%)

$$\text{Number} = \frac{\text{the number of days with temporary work incapacity}}{\text{the average number of workers}} \times 100$$

c. Average duration of a disease with temporary work incapacity (days)

$$\text{Duration} = \frac{\text{the number of days with temporary work incapacity}}{\text{the number of cases of disease with temporary work incapacity}}$$

8. Indices of hospital morbidity (‰)

$$\text{Hospital morbidity} = \frac{\text{the number of discharged patients}}{\text{the number of population}} \times 1000$$

9. Indices of infantile morbidity (‰)

$$\text{Infant morbidity} = \frac{\text{the number of registered cases of disease of under 12 months children}}{\text{the number of under 12 months old children}} \times 1000$$

Infantile morbidity is also analysed structurally due to nosology, sex, domicile, age criteria.

Quiz:

1. What is population's morbidity and what's medico-social study's role in the development of health system?
2. What are the criteria of morbidity?
3. What is the International classification of diseases? What are the principles of classification?
4. What are the methods of studying population's morbidity?
5. What are the sources for the study of population's morbidity?
6. What is the morbidity's structure due to addressing?
7. What are the units of observation and sources of information of morbidity's types?
8. What are the indices of assessment of morbidity's types and what are the methods of calculation?

Bibliography: 3, 5, 13, 15, 16, 22.

LESSON MODULE no. 6

Subject: *Follow up (dispensary care) of the population. Medico-social and professional rehabilitation.*

Lesson plan: *Purpose:* to study the elements, the way of organization of follow of the population and its steps.

Objectives – After completing this module, the students will know:

1. the methods for determining the health status of the population;
2. the way of organization of active surveillance (supervision) of healthy individuals, subjects to risk factors and the sick;
3. the risk factors for health and the undertaking curative and the preventive measures / enterprise.

Key terms: *Dispensary care, Follow up, Rehabilitation.*

Arguments:

The prevention of disease in populations, methods of strengthening public health and development are some of the key attributes of medical practitioner's activity, which determine the effectiveness of his work.

The family doctor, the dentist or the specialist from a narrow profile is bound to take measures for disease prevention in groups; to detect the early stages of different diseases in different population groups; to monitor the health status of the population.

Each physician bears a moral, legal and occupational responsibility of the health of served population, which requires him to know the placement of the population.

Informative notion sand materials on the subject:

The *follow up* is an active method of observation, monitoring the health status of certain population groups depending on the degree health status.

The major goal (purpose) of dispensary care is to preserve, strengthen and restore the health of healthy patients, to increase the longevity of people and their labour productivity by improving working conditions and implementing a healthy lifestyle.

The *follow up* population made in some stages:

1. The preparation stage that mandates an examination of medical brigades population group, conduct public information system about

the need and how to spend health assessment, examining medical personnel involved in training of the population, training, premises, equipment and tools necessary medical examination to establish population groups that will examine the conduct of the medical examination.

II. Stage which is a process in (3) three phases of work assigned:

I Phase - examination of population groups, screening criteria and causes diseases in early stages (risk factors) that determine the health of these populations.

II Phase - development of measures for sanitation, preventive and curative found healthy and diseased individuals detected.

III Phase - dynamic monitoring the health status of each individual under taking / firm preventive measures and recovery, and assessing their effectiveness

Organization of *follow up* management is performed by medical institutions, and conduct of dispensary is done by family doctors and specialist's doctors.

Family physicians are obliged to provide evidence strengthened to serve the population to participate in organizing and conducting medical examinations, to plan and carry out therapeutic measures, reclamation and recovery for every persona medical examination to monitor the dynamic state of health of all persons *follow up* subject.

A medical examination takes place at three levels.

I. level - laboratory investigation tools, functional and technological

II. level - examination by specialist's doctors;

III. level - examination and further investigations, depending on the targeted profit implies pathology detected.

After the results of medical examinations, persons subject to their assigned into 3 groups:

I. group - healthy people, with the parameters investigatory function normally;

II. group - practically healthy persons with functional parameters at the lower limit, the possible occurrence of various pathological conditions, deviations from the norm function of the body;

III. group - the sick, with different stages of disease flare or remission, compensation or been decomposition.

It is divided into two subgroups:

- III a - patients compensation stage of disease;
- III b - sick stage of decomposition of the disease process, disabled (invalids).

The measures undertaken for these groups of people are:

- I. group - recommendations for maintaining and improving the health, medical review every year;
- II. group - the preventive measures for prevention of disease, removal of risk factors, strengthening of health. It is practicing a strictly healthy life style. Recommendations SPA - sanatoria and rehabilitation. Medical review 2-3 times per year.
- III. group - curative measures, recovery and rehabilitation. Reviews the state's medical and health surveys for sub groups III is 4-6 times per year, and in sub group IIIb is monthly or more often in case of overheating of the pathological process.

The unit observed is healthy persons in the groups I and II, and are sick person group III.

Primary information source is "Medical form on *follow up* evidence of" and "Medical records of ambulatories' patients".

Indicators for assessing the population *follow up* results are:

1. full on the dispensary evidence (keeping)
2. opportunity to dispensing evidence
3. effectiveness of dispensary evidence

The "*follow up*" basic criteria of effectiveness are:

1. the dynamics of health status persons on *follow up* evidence;
2. the present state of overheating, complications of and decomposition of diseases of persons on dispensary evidence;
3. the dynamics of morbidity with temporary incapacity of work among persons on dispensary evidence;
4. the dynamics of the level of invalidity and mortality among persons on dispensary evidence.

To summarized

The effectiveness of *dispensary care* of population is assessed in dynamic about 3-5 years.

Quiz:

1. What is the *follow up*?
2. What are goals and objectives of *follow up*?

3. What are the organizational measures *follow up*?
4. What is the role of family doctor in the dispensary cares of the population?
5. What is the preparation stage by medical examinations of the population?
6. What is the stage of working population *follow up*?
7. What are the medical examinations of population levels?
8. How many groups of dispensary know and how best to target these population groups?
9. The frequency of review, monitoring and remedial measures – preventive planned for each group of *follow up*?
10. How documentation *follow up* you know?
11. What is effectiveness criteria *follow up*?
12. How indices of *follow upon* process analysis you know?

Bibliography: 34, 35, 36.

LESSON MODULE no. 7

Subject: Council of Medical Expertise of Vitality (CMEV).

Lesson plan: *Purpose:* study types of medical expertise and its methods of organization.

Objectives – After completing this module, the students will know and possess:

1. the principles, methods and tasks of medical expertise of vitality;
2. the characteristics and causes of temporary and permanent work incapacity;
3. the methods of release of the disease bulletin and of the referral bulletin to the Council of Medical Expertise of Vitality (CMEV).

Key terms: *Medical Expertise of Vitality, Medical Advisory Board, sick leave certificate, medical certificate, disability groups, basic indices of disability.*

Arguments:

In everyday medical practice, the doctor must: determine the work incapacity arisen from the disease, assess the level of work incapacity towards patient's professional obligations and the necessity of releasing the disease bulletin (sick leave), as well patient's return to work.

This medical right implies also responsibility from the doctor in the correct assessment of the level of temporary or permanent work incapacity, all these together makes the doctor to know the criteria of: release of disease bulletin, types of sick leaves (medical holidays) and the modality to present them. In order to assess correctly the necessities of guiding the patients to CMEV, it is necessary to know criteria of determination of the disability level and disability's causes.

The disease bulletin and disability certificate are documents of legal-financial responsibility, which requires from the physician knowledge and practical skills in medical expertise of vitality party.

Informative notions and materials on the subject:

Medical expertise of vitality is a form of medical expertise, which consists of the assessment of patient's work incapacity level, incapacity arisen from an illness, trauma, and at the same time of determination of incapacity's duration, incapacity's causes and disability criteria.

Principles of organization of the medical expertise of vitality:

- a) government character, which results from the fact that medical expertise of vitality is done by medical institutions and government institutions of expertise;
- b) prophylaxis character, consisting of medico-social and professional rehabilitation of patients with temporary work incapacity or of the disabled;
- c) collegiality in assessing the level of work incapacity.

The legal aspect of medical expertise of vitality is determined by the current legislation, normative acts and the settlement of modalities of expertise's organization.

Work capacity is a socio-legal category that reflects the human capacity of work depending on the physical and intellectual development, state of health, professional knowledge, capabilities and skills, work experience.

Work capacity is general and professional, total and partial.

Work incapacity is patient's impossibility to exercise his professional and functional duties because of medical or social reasons.

Vitality's expertise assesses work incapacity's medical and social criteria.

1. Medical criteria depend on the clinical diagnosis of disease, body's functional and morphological changes' level after the disease, complications and the degree of disease's advancement, complexity and effectiveness of the necessary treatment.

2. Social criteria depend on the profession, specialty, job, work rhythm, work's organization, physical and mental functional strain of the organism, the specific of work process's organization, the presence of harmful factors.

Temporary work incapacity is a state of the body, appeared because of disease or trauma, leading to the emergence of disturbances of body function that leads to the impossibility of practicing work duties under the existing work conditions for a short period of time and that disappears after the disease's treatment.

Temporary incapacity for work can be total or partial (total - the patient is unable to work for a period of time, needs medical treatment and therapy, partial - the patient, because of a trauma cannot practice his work obligations, but can temporarily practice other work functions).

There are known two stages of medical expertise of temporary work disability.

I stage - GP (general practitioner /family doctor) - may issue a disease bulletin for up to 6 days (2 times each being of 3 days).

II stage - medical advisory board of the medical institution **Medical Advisory Board** (MAB), in the composition of the treating physician, the head of department (institute) - has the right to release a disease bulletin from the 7th day to 4 months without or to 5 months with interruption.

Types of sick leaves, provided by the medical expertise of temporary reduction of vitality are:

- 1) sick leave;
- 2) at work or usual trauma;
- 3) pregnancy;
- 4) orthopaedic prosthesis (artificial limb, eye, ear);
- 5) care of a seriously ill patient or child by a family member;
- 6) medical rehabilitation and balneal treatment.

Permanent work incapacity presents a stable and deep reduction of capacity to practice job obligations, to fulfil any work due to complications and consequences of chronic disease or trauma, which caused large physiological, morphological and functional changes in body.

The degree of permanent work incapacity, the occurrence and causes of disability are established by governmental institutions – **Council of Medical Expertise of Vitality** (CMEV).

Permanent work incapacity is determined by social and biological factors.

Social determinants are:

1. Work process's character and requirements to the body;
2. The level of professional training and requirements, qualification of the work process;
3. Studies and their improvement;
4. Hygienic working and production process conditions;
5. Financial and living conditions;
6. Possibility of granting a complex of social assistance measures;
7. Forecast of social and production development of work team and work process's character.

Biological determinants are:

1. Age, sex;
2. Nature of the disease, duration and its consequences;
3. The degree of functional and morphological disorders in the body due to the disease or trauma;
4. Adaptation and compensation possibility of the body;
5. Clinical prognosis of the disease or trauma;
6. Effectiveness of treatment and rehabilitation measures;
7. Etiologic and pathogenesis of disease;
8. Psychological particularities of the person and his predisposition to work.

Permanent work incapacity (disability) is a legal category, which gives the disabled, certain rights: the interruption of professional work activity, being provided with pension and social benefits, to do requalification studies.

The patient directed to the council of medical expertise of vitality must have: passport, disease bulletin and the extract from the disease sheet with guidance to expertise. To *CMEV* are guided patients who had continuous medical leave for a period of four months or five months with break, which have marked signs of disability.

To *CMEV* may be guided the following categories of persons:

1. Workers, civil servants, peasants, clerks and other citizens who have social insurance;
2. Students of high and medium specialized education institutions and candidates for a doctor's degree;
3. Citizens, whose permanent work incapacity appeared due to exercise of governmental obligations related to internal or external security, of saving human lives etc.;
4. Reserve Military men, retired policemen and their family members in case of loss of the family breadwinner, corresponding to the current legislation;
5. The disabled since childhood;
6. Workers who were injured at work.

Criteria for determining disability are:

1. The degree of vitality's reduction;
2. Decrease (loss) of requalification, travel, communication, orientation, self-servicing, self-control behaviour possibilities;

3. Health contraindications to exercise work obligations;

4. Reduction of the monthly income due to the necessity to change the profession that is less paid and qualified.

Corresponding to the reduction of vitality disability degree it is known the following classification:

1. Light (up to 25% disability);
2. Moderate (disability from 25% to 50%);
3. Marked (disability from 50% to 75%);
4. Accentuated (more than 75% disability).

Depending on the severity of the disease; the degree of functional reduction of body, clinical prognosis of the disease and of the working capacity's recovery are set three disability groups:

I group of disability (disability accentuated more than 75%) is established to the patients (traumatic) who cannot serve themselves and require constant care by others;

II group of disability (disability from 50% - 75%) is established to the sick who cannot perform any physical or intellectual work, as a result of accentuated functional and organic disorders of the body, but can serve themselves;

III group disability (disability from 25% to 50%) is established to the patients with pronounced functional and organic disorders of the body, leading to the need to change the job or profession for a less qualified and paid in case of impossibility of employment corresponding to the degree of health.

Causes of admission to disability are:

- a. sickness disability;
- b. work accident disability (trauma);
- c. professional disease disability;
- d. childhood disability;
- e. disability from the army;
- f. disability with "Chernobyl" syndrome

Periodical re-expertise of the disabled aims to supervise the efficiency of the treatment and of the rehabilitation measures, medico-social re-adaptation of the disabled.

The re-expertise of the disabled from the I group is made once in three years or is given for life in exceptional cases and of the disabled from the II group and the III group is carried out once a year (or 2 years).

Quiz:

1. What is the work capacity?
2. What is the medical expertise of vitality?
3. Why does the doctor need to know what is the medical expertise vitality?
4. What are the basic principles of medical expertise of vitality?
5. What problems does the medical expertise of work incapacity cope with?
6. What types of work incapacity do you know?
7. What problems curative act and section chief doctor at the medical expertise of vitality.
8. Where and when is MAB organized? What is its basic composition and what are its functions?
9. In what cases of temporary work incapacity are issued certificates of sick leave?
10. What is the order of guiding patients to *Medical Advisory Board (MAB)*?
11. What is the longest period of issuing a sick leave certificate, depending on the cause of work incapacity and doctor's enforcement powers (legal possibilities)?
12. How and for what time is the medical quarantine certificate issued?
13. How and for what time is the medical certificate in case of removal from work by health authorities issued?
14. How is the certificate of sick leave in case of care for a sick child or other family member issued?
15. How is the sick leave certificate in case of pregnancy, normal and pathological birth issued?
16. What is the sick leave certificate's legal, social and economic importance?
17. What documents are needed in order to have a sick leave certificate issued?
18. Who has the right to issue a medical sick leave certificate?
19. In what cases the sick leave certificate is issued with the added past days?
20. What are the order and the period of time of issuing sick leave certificate in trauma cases?
21. What are the fulfilment order and the deadline for issuing the sick leave certificate in case of abortion?

22. List the rules of expression of the work incapacity in case of guidance to balneal treatment.
23. What is the order of issuing and full-filaments of sick leave certificate in case of drunkenness?
24. What do permanent reduction of vitality and disability represent?
25. What is the main criterion of differentiating temporary and permanent work incapacity in case of chronic illness?
26. When disability is characterized by stable loss of work capacity?
27. On what are the determination of work incapacity and settlement of disability groups based?
28. Name the disability groups and the indication of determining them?
29. What are the main causes of disability?
30. Name the terms of re-examination of the disabled. In what cases the disability group is settled for life?
31. What are the indications and order of guiding the patients to CMEV?
32. In what cases CMEV allows the extension of sick leave certificate?
33. Name the basic indices of disability.

Bibliography: 35, 36.

LESSON MODULE no. 8

Subject: Organization of the Dental service in Republic of Moldova

Lesson plan: *Purpose:* (1) to study and know the organizational structure of the dental service, of the municipal dentistry centre and of the dentistry department of the regional hospital, their tasks, (2) to the study documentation and analysis indices of their activity.

Objectives – After completing this module, the students will know:

1. the organizational structure and goals of dental service;
2. the structure and tasks of the municipal dentistry centre and of the regional dentistry department;
3. the types of evidence and about the types of reporting used in the municipal dentistry centres and in the regional dentistry departments, and also the calculation of their activity's indices;
4. the methods of prevention the dental pathologies among the population.

Key terms: *Dental service's goals, Structure of the municipality dental service, Structure of the regional dental service, indices of medical dental institutions.*

Arguments:

Dental pathologies influence negatively the level of health. Dental defects reflect negatively on the process of eating. Prophylaxis of dental pathologies deserves a special attention from the dentists. Knowledge of the dental service's structure, goals and tasks will enable the dentist to implement more quickly and effectively new forms of organization the in work process, and to fit plenary in the practical activity at work. Learning the types of documentation used in the activity of the organizational structures of the dental service, calculating indices of dentist's activity, of dentistry institutions' activity, will allow the dentist to control the correctness of work obligation's execution performance.

Informative notions and materials on the subject:

The control of the dental service in Moldova is made by the Ministry of Health of Republic of Moldova in the person of the main republic's dentist. Organizational-methodical and instructive-consultative assistance of dental service's structures is carried out by *Republican social protection centre of dentistry.*

Medical dental assistance of population is provided:

- in municipalities by dentistry centres for adults and children dentistry centres; in regional centres by the dentistry departments of the central district hospitals; in rural area by the dental cabinets of the health centres.

- in rural where are medical points or physician's offices, the population receives emergency dental assistance from physicians or medical assistants and consists of prescription of analgesics and guidance to treatment in the dental cabinets from health centres or from the district dentistry department.

- the organization of public medical dental assistance is based on the principle of synthesis of alternation of preventive, curative, continuous and successive measures in providing dental services and doing the follow up of the persons with dental problems.

Dental service's goals:

1. Development and fulfilment of, primary, secondary and tertiary preventive measures of dental diseases;
2. Undertaking measures of detection dental pathologies in the early stages among the population with effective treatment of them
3. High level and effective Public Medical Dental Assistance;
4. Providing Health education to population in order to fulfil the primary prevention about dental pathologies.

Dental service's objects:

1. Development and improvement of the dental service;
2. Performance of medical examinations of children, students and decreed work communities;
3. Treatment of the oral cavity of all patients that come to the medical dental institutions.
4. Treatment of the oral cavity of recruits;
5. Providing medical dental emergency assistance to population;
6. Performance of expertise of vitality;
7. Guidance to the stationary of patients with dental pathologies (*if necessary*);
8. Providing orthodontic treatment and dental prosthetics;
9. Implementation of new methods and technologies of diagnosis and of dental pathologies' treatment;
10. Planning and carrying out measures of improvement and raising the professionalism of medical staff;

11. Health education for population about the prevention of dental pathologies and promotion of a healthy lifestyle;

12. Providing organizational – methodical, advisory, instructive assistance to dental service's structures.

The treatment of the children's oral cavity is done twice a year mandatory. The organization forms of treatment of oral cavity at children, teenagers and adults can be decentralized, centralized, mixed and in teams.

The tasks of the organizational structures of dental service result from the dental service's task.

The evidence documentation and the report of the dental service's organizational structures include:

1. The statistical ticket for the registration of the final diagnosis;

2. The ambulatory sheet of the dental patient;

3. Dispensary record sheet;

4. Registry books of:

a) evidence of new recorded ambulatory sheets;

b) evidence of sick leave certificates;

c) evidence of the patients that did the medical examination.

5. Dentist's agenda:

a) therapist;

b) surgeon;

c) orthodontist.

6. Daily evidence lists of the patients that were given medical dental assistance:

a) therapeutic;

b) surgical;

c) orthodontic.

The follow up of the patients with dental pathologies is done according to requirements of the population's process of follow up.

The analysis of dental institutions' activity is done according to the following indicators:

a. level of completion of units by dentists;

b. providing people with dentists;

c. average number of residents at a unit of dentist;

d. average number of visits of a resident at the dentist during a year;

e. ratio of number of patients with complications of caries to the number of patients without complications;

- f. ratio of number of treated teeth to the number of removed;
- g. proportion of people that did the medical examination;
- h. proportion of people that that need the treatment of the oral cavity from the number of people that didn't pass the medical examination;
- i. proportion of people that that need the treatment of the oral cavity from the number of people that did the medical examination;
- j. proportion of treated population from the number that needed the treatment;
- k. level of complications after filling;
- l. proportion of remade artificial teeth;
- m. proportion of complications after pulling out teeth.

Quiz:

1. What are the dental service's goals?
2. Describe the structure of the dental service of the Republic of Moldova.
3. Describe the structure of the dental service of Chisinau.
4. Describe the structure of the district dental service.
5. Describe the structure of the municipal dentistry centre.
6. Describe the structure of the district dentistry department.
7. What are the main objects of the dental service?
8. What are the planned forms of oral cavity's treatment?
9. Enumerate the types of evidence documents used by the organizational structures of the dental service.
10. Describe and explain the activity indices of medical dental institutions.
11. Calculate and analyse the activity indices of medical dental institutions.

Bibliography: 34, 35, 36.

LESSON MODULE no. 9

Subject: Family's health and pathology. Family planning.

Lesson plan: *Purpose:* (1) to familiarize students with the principles of health and of family pathology, as well with the principles of family planning.

Objectives – After completing this **module**, the students will know and will be familiarize with:

1. the family's structure and functions as a system;
2. the family's "health lifestyle" and maintaining its health;
3. the therapeutics of family health;
4. the principles and features of family planning.

Key terms: *Family's structural groups, family life cycles, internal functions of the family, external functions of the family, risk's factors for family health, family health dates.*

Arguments:

Society's development and population's reproduction are based on family. Family is the nucleus of forming the healthy lifestyle, of development, of health's fortification and of reproduction. Knowledge of family's forming and development principles, of determinant factors of family's health, of the system of family's health indices, of main action directions in providing family health, allows the doctor to orientate his curative and prophylactic activity in family.

The efficacy of medical activity in family is higher. Young generations' health of and reproduction are basing on the family planning.

Informative notions and materials on the subject:

Family as a system has the following features:

1. Family is an organization composed of independent members;
2. Family is a body that seeks for balance, continuously adapting in order to exercise its functions;
3. Family is a whole with unitary and differentiated tasks, depending on the society's demands and on its members' demands;
4. Family is a social micro group characterized by natural and biological determinations, being the only one in which love bonds and blood relationships are fundamental;

5. Family is the only social group formed basing on affection, the legal conditions interfering only to strengthen the mutual bonds of understanding that result from the common aspirations and goals;
6. Family is the smallest form of social organization (the elementary and primary unit of society), the most natural, necessary and the oldest that existed before the State and any other social group in logical and chronological order;
7. Family is based essentially on relations of intimacy, harmony and good will;
8. Family asserts itself as being the most able to provide its members multilateral and harmonious development;
9. Family combines the respect for tradition with openness to the future, giving the young people a wealth of experience and making plans, hopes and aspirations. Being the natural background in which the personality of children is formed, family is at the same time the environment of parents' improving.

Family can be divided into six structural groups:

1. *Nuclear family* composed of the *married couple* (husband and wife) and their natural children;

2. *Nuclear families with adopted children* - include the married couple, plus the adopted children or natural children from previous marriages;

3. *Extended nuclear family* - is represented by a large family group, consisting of the elements of the nuclear family (husband, wife, and children) and family's relatives and friends;

4. *Nuclear family in the process of disorganization* - is the family group in which the emotional relationships have a contradictory character, creating an unfavourable intra familial atmosphere (tensions, conflicts, misunderstandings, violence), relationships that lead to the imminent dissolution of the marital couple (abandonment, divorce) and as a result the disorganization of the nuclear family;

5. *Disorganized family* - is the incomplete family group, characterized by the absence of a parent (through abandonment, divorce, death), being composed of the remaining parent and children, sometimes it can be extended by relatives and friends;

6. *Cohabitation* - even though, legally, it is not a family structure, this couple (pseudo-conjugal) with or without children, that leads a common illegal existence, through mutual understanding, but often

without consistency and always susceptible to disorganization.

The scheme of "family life cycle" is a movement in time of the family life and consists of:

- initial stage of the couples without children;
- stage of the couples with preschool children;
- stage of the family with children of school age;
- stage of the family abandoned by children that are already adults ("empty nest" stage) - stage of the "family" composed of a single man (widowhood).

Family's functions can be external and internal.

Internal functions

1. Biological function of reproduction, which ensures the biological continuity of society;
2. Maintenance and growth of children function is pedagogical - educational and moral.
3. Educational function has the humanization and socialization of children as content, thus contributing to cultural continuity of society.
4. Family solidarity function (mutual aid based on feelings of equality, respect and love between partners, between parents and children, between brothers and sisters, towards the old or sick from the family).
5. Economic function.
6. Psychological function aims the emotional security and development of the identification feeling between the family members.

External functions

1. Framing family life in community activities;
2. Framing adults capable of work in the social process of production;

Family provides its members with:

- The material environment of existence (food, home);
- Regulation of sexual life and providing human reproduction;
- Preparing children for the role of adults;
- Performance of the function emotional and psycho-social stabilization;
- Performance of the role of bearer and transmitter of moral values and traditions;

- Internal economic cooperation, goods' sharing, development and maintaining unity of family micro group;

- Protection of dependent or in dilemma members, the maximal desideratum being their socio-professional reintegration.

Determinant factors of the health of family are:

a. biological, genetic factors ("capital", "wealth" of health);

b. common habitat (home);

c. social environment (conditions of hygiene and comfort, nutrition and diet, job, spiritual and psycho - social atmosphere, relations between generations, etc.).

d. "style" life model of family life;

e. access to health services and the way of their utilization

Risk factors for family members' health are:

- Social conditions (the primacy of material interests in the settlement of a family, economic ruin, insufficient income, presence of strangers in the privacy of family life, ethnic- socio - cultural differences between spouses);

- Psychological conditions (tense or indifferent states, affairs, family abandonment, divorce, death of a family member, professional failures, conflicts between generations, tyrannical behaviour of one spouse etc.);

- Psychosomatic causes (physical or mental illness, sensory or motor deficiencies of a family member, birth of a deformed child etc.);

- Harmful habits (irrational alimentation, toxic consumption - alcohol, drugs, smoking).

The systems of indices of the health of family are:

A. Family status:

- Economic status (income, house, facilities etc.).

- Hereditary charge;

- Stress charge (violence, disturbed marital relations, chronically ill or disabled in the family, breaches, overworked mother, etc.)

- Capacity of resistance in dealing with life issues (existential);

- Lack of knowledge and / or experience in housework and in childcare issues, in combating isolation and harmful environment

B. Status of woman in the reproductive period

- Age at the first pregnancy;

- Balance sheet of health and of the reproductive system;

- Harmful habits during pregnancy (smoking, alcohol consumption, exposure to toxic substances, high physical effort);
- Woman's reproductive history (miscarriages, stillbirths, premature births, multiparous etc.).

C. Status of children and young people:

- Growth and nutrition;
- Behaviour and development;
- Results from the kindergarten and school;
- Pathology (morbidity, mortality).

D. Status of the old:

- Activities and concerns;
- Deficiencies and regression;
- Isolation and dependence;
- Pathology (morbidity, mortality).

The main directions of action in order to ensure family health are:

1. Optimal formation and function of the family body;
2. Promoting family health through the cultivation of a hygienic lifestyle and ensuring conditions for the full expression of family functions;
3. Detection of risk factors of disease and surveillance of families exposed to their action;
4. Development of interdisciplinary scientific research (anthropological, medical, psychological, sociological, etc.) regarding the complex family issues.

The indices of a healthy family in bio-psycho-social terms are the mutual respect and acceptance, cooperation in seeking compromises, psychological balance.

Psycho-hygiene, prevention and control of family pathology measures are:

Family advice (premarital advice) – acts in form of consultations or as a supervision method of biological and mental status of the partners of the future couple or in case of a recently formed a couple. It is a form of counselling, of control and of medical and psycho-social guidance regarding psycho-prophylactic measures to maintain physical and mental health of family members.

Genetic advice – regards the psycho-biological aspects of a family, passed from parents to successors, meaning the procreation function. It aims to establish some rules that would promote human fertility, the

birth of psychosomatic healthy, resistant, without birth defects children.

Psycho-educational measures – aim the application of the most effective methods and forms of education of children in the family; establish forms of relationships between spouses, between parents and children and between the family and the social group it is part of. The woman - mother during pregnancy and lactation, represents the first moment of implementation sane-genetically and suppression of harmful habits factors. The child is receptive and malleable element to cultivation of sane-genetically factors and the action on him should be initiated immediately after birth and continued, specifically during the preschool and school.

Psycho-prophylactic measures – aim to plant good mental health in the family environment, to prevent of mental disturbances that may occur in the family. They seek the avoidance of emotional trauma, family disorganization, planting a positive psychological climate, the psycho-prophylactic measures regarding the mental development of children, development of personality and of behaviour, are also important.

Recovery measures - are required when disturbances occur in the family environment. In such cases, it is necessary to consider the relationships between patients and their family members.

The practice of “primary health care” at the level of primary medicine means of providing sane-genetically preventive and curative services to families. It includes the following issue:

- Family formation, reproduction and contraception;
- Supervision of the child, from birth to adolescence and adulthood;
- Persons of the adult and of the persons influenced by risk factors;
- Prevention of early aging and surveillance of the old;
- Health education;
- Vaccination and epidemiological surveillance;

Physician's acts are directed by four major directions:

1. Maintain health and prevention of disease in the family;
2. Avoiding risks and early detection of disease;
3. Constantan bio-psycho-social supervision and care of patients (follow up)
4. Providing advice on current issues of the family life and issuing medical documents

Family planning is a complex of preventive and informative -

educational measures directed to the formation of a responsible and safe attitude in the sexual behaviour; to prevention of an unwanted or high risk pregnancy, to protection against transmissible diseases, to reduction of infant and maternal mortality and morbidity.

Its objectives aim to reduce maternal mortality and morbidity, to provide conditions for the birth of wanted and healthy children, to prevent abortion, to protect reproductive health and to save the genetic fund of the nation.

The main strategies of the National Program of improving the assistance in family planning and in reproductive health are:

1. Creation of a governmental legal base regarding the human rights related to sexual and reproductive health;
2. Reorganization and optimization of the governmental service of family planning and of reproductive health;
3. Establishing an educational system in order to prepare the youth for family life;
4. Establishing an information system for the population on family planning and reproductive health protection.

In order to rationalize and increase the efficiency of assistance in family planning and reproductive health were established the following levels:

Level 1. Provides assistance to people at the level of specialists from the primary medical district and village institutions

Level 2. Provides specialized assistance to population at the level of reproductive health and family planning regional centres.

Level 3. Provides assistance at the level of reproductive health and family planning Republican Centre where is also provided advisory assistance for diagnosis and treatment of population in family planning issues.

Quiz:

1. What is family?
2. What are family's characteristics as a system?
3. What are family's structural groups?
4. What are "family life cycles"?
5. What are family's functions?
6. Describe the internal functions of the family.
7. Describe the external features of the family.
8. What does family provide to its members?
9. What are the determinant factors of the health of family?

10. What are the risk's factors for family health?
11. Describe family health dates.
12. Enumerate the fundamental directions of providing family health.
13. Describe measures of prevention and control of family pathology.
14. What is the issue of practicing primary care of family health?
15. Describe the direction of activity of physicians.
16. What is family planning?
17. What are the objectives of family planning?
18. Enumerated the main strategies of the National Program of improving the assistance in family planning.
19. Describe the levels of care in family planning.

Bibliography: 34, 35, 36, 37.

LESSON MODULE no. 10

Subject: Healthy lifestyle /Way of life. Health promotion.

Lesson plan: Purpose (1) to learn and know the role of life style for health, the risk factors of health, formation of healthy lifestyle, and (2) to study the role of health promotion in the formation of a healthy lifestyle.

Objectives – After completing this module, the students will know:

1. the structure of the lifestyle and its importance for individual health;
2. the life style influences health and the determinant risk factors;
3. the medical activity as a form of human activity as a way of life;
4. the models of formation of healthy lifestyle;
5. the aims & objectives of *Health Lifestyle* as subject of study and science of health Promotion, as a form of doctor's action;
6. the principles and forms of health promotion.

Key terms: *Health Lifestyle, Health education, Way of life, Health promotion, "Health enlightenment", "Living conditions", "Living standard's level", "Ordering life".*

Arguments:

The lifestyle is one of the components of the human life, of its activity's manifestation. Characteristics of forms' structure, of lifestyle allow developing logical thinking in assessing the role of lifestyle on health. Studying and assessing the determinant health risk factors allow future doctors to promote active and effective methods of prevention of many diseases.

Learning how to promote healthy lifestyle will allow the doctor to implement health values in the population's way of thinking. Knowledge of health promotion mode's principles and forms will enable the physician to shape and develop the people striving for healthy lifestyle.

Informative notions and materials on the subject:

The lifestyle is a specific form of human activity, historically determined or a determinant form (*behaviour*) in terms of people's material and spiritual situation, a totality of human activities.

Them lifestyle isn't the human life it self, only a form, a kind of human

activity, human behaviour, determined by objective factors of society's development.

The structural elements of lifestyle are:

- 1) reform activity (nature, society, people);
- 2) activity of satisfaction of material and spiritual needs;
- 3) forms of participation in socio-political life and management of people;
- 4) activity of knowledge, of learning the subject at theoretical, empirical and capitalization level;
- 5) communicative and of communication activity;
- 6) medical and pedagogical, education and physical, spiritual and intellectual activity.

Factors (elements, aspects, parts) of lifestyle can be distributed according to the following criteria:

- 1) character of activity-physical, intellectual;
- 2) field of activity-inside and outside working hours;
- 3) form of activity -social, of production, cultural (training) habitual, medical.

Production activity's criteria:

- 1) level of satisfaction regarding the specialty and the performed work;
- 2) work intensity;
- 3) job (function);
- 4) work relations in the team;
- 5) level of qualification and of professional training;
- 6) sanitary-hygienic conditions of work and of life;
- 7) participation in various public activities.

Socio-political activity's criteria are:

- 1) realization of a permanent public work;
- 2) participation in electoral activities;
- 3) interest in political literature;
- 4) speaker activities at different meetings;
- 5) interest in the international situation.

Living conditions present a totality of material and spiritual factors, that act on lifestyle and the lifestyle is behaviour determined by the living conditions.

Living conditions determine the lifestyle, stimulating or reducing some forms of activity, of person's behaviour.

Living standard's level is determined by the volume and structure of the material and spiritual needs, which can be assessed quantitatively (numerically through spiritual budgetary units or natural).

Ordering (like) life is an arrangement, an order of social, production, habitual and of rest behaviour, in which people work.

Quality of life is the degree of satisfaction of material and spiritual needs that cannot be directly measured, only through a complicated quantification.

The health risk factors can be grouped into 4 large groups.

- I. *Lifestyle factors, which in proportion of 49-53% determine the health level:*
 - a) *smoking;*
 - b) *consumption of alcohol or drugs;*
 - c) *low-quality and irrational feeding;*
 - d) *stress;*
 - e) *hypo-dynamic;*
 - f) *harmful working conditions;*
 - g) *unsatisfactory living conditions;*
 - h) *low level of culture and payroll;*
 - i) *intensive urbanization;*
 - j) *weak family relationships and loneliness.*
- II. *Biological and genetic factors, which, in proportion of 18-22% determine the level of health:*
 - a) *hereditary predisposition to disease and degenerative diseases;*
- III. *Environmental factors, in proportion of 17-20% of cases determine the level of health:*
 - a) *air pollution with harmful and carcinogenic gases;*
 - b) *water and soil contamination with toxic and carcinogenic substances;*
 - c) *sudden climate change;*
 - d) *radiation fund's raising sun-cosmic and of magnetic fields.*
- IV. *Organizational factors of health services, which in the rate of 8-10% of cases determine the level of health:*
 - a) *reduced effectiveness of preventive measures;*
 - b) *poor quality of care;*

- c) delayed nurse.

Multiple medical and social studies have demonstrated the role of listed above factors on the level of health of each individual, on each population group of study and on population as a whole.

Medical activity is one of the most characteristic types of human activity in improving health and strengthening each individual and society as a whole. The basic elements of this activity are:

- a) hygienic behaviour, respecting individual, family, place of residence and work hygiene;
- b) respect for individual values of health and of other persons' health;
- c) following there commendations and treatment indicated by the physician;
- d) seeing medical institutions, especially for prophylaxis.

Medical activity can be positive-regarding keeping and strengthening health and can be negative, that reflects adverse health effects. Medical activity consists of several elements:

- a) medical knowledge available to individuals or society;
- b) hygienic or unhygienic habits;
- c) addressability for advice to doctors;
- d) following the requirements of follow up;
- e) participation in the measures of maintaining and strengthening public health and of activity of medical institutions.

Medical activity can be characterized by respecting the alimentation regime, engagement in sport and physical work, exaggerate alcohol drinking, smoking, behaviour in case of illness, respecting personal, living and working hygiene, cultural level of health. Medical activity is a form, a model of life that has nothing to do with the activity of medical institutions.

Healthy lifestyle is a form of human activity that aims to preserve and strengthen individual and society's health. Healthy lifestyle includes a type of social, intellectual, of production, physical and medical training activity, which influences positively individual and public health in concrete natural and social conditions.

Healthy lifestyle is a form, a type of conduct, behaviour, activity in concrete socio-economic, political and ecological conditions that does

not depend on the activity of health care system. Health care system / Medical Services System is a state structure that takes prophylactic measures of treatment and rehabilitation measures for improving and maintaining health. In order to form a healthy lifestyle two directions should be followed:

- 1) formation, development, strengthening and activation of conditions, of factors and of positive circumstances for individual and society's health, in order to promote health.
- 2) overcoming, reducing negative health determinant factors.

Among the factors that stimulate the formation, development, strengthening and reproduction of health are:

- 1) increased work activity that gives you spiritual satisfaction;
- 2) physical and spiritual comfort, harmonious development of physical and intellectual capacities;
- 3) social optimism, active life position, high level of culture;
- 4) positive environmental behaviour, keeping and ecological treatment of the environment;
- 5) practicing sports and physical culture;
- 6) rational, qualitative and balanced alimentation;
- 7) good living conditions and family relationships;
- 8) intensive medical activity;
- 9) healthy heredity.

There are known 10 main rules of healthy lifestyle:

- 1) respecting of individual and work hygiene, safety technique;
- 2) knowledge of psycho-hygiene and psychotherapy procedures and their application;
- 3) giving up *smoking*;
- 4) practicing sport and physical-culture;
- 5) rational alimentation;
- 6) alcohol abstinence;
- 7) active participation in the action of the follow up;
- 8) addressing on time for advice or medical help;
- 9) ability to provide first aid in case of different acute states;
- 10) preserving the ecological environment.

Overcoming the risk consists from the removal of activities that negatively influence on health from daily life, respecting the main rules of healthy lifestyle. The science, which deals with the determination and assessment of public health, with the methods of preservation and

strengthening public health, of health's reproduction, is called "**health lifestyle**".

"Health lifestyle" is the science about health, about the health of healthy people, about forms of preservation, fortification, promotion and reproduction of public health. It summarizes the knowledge about primary prevention of individual and public health, about the role and influence of lifestyle on health, about the formula of healthy lifestyle.

To summarized:

"Health lifestyle" is the science about the protection of public, group, population health of healthy people and about it's strengthening through the formation of a certain lifestyle.

It organizes the struggle for health and longevity through the formation of healthy life styles on state and community levels, involving all ministries and departments.

"Health lifestyle" is the science about the security of public, group, population health of healthy people and it's strengthening through forming a specific lifestyle.

It organizes a struggle for health and life's continuity through forming a healthy lifestyle on state and public levels, with the participation of ministries and state structures.

"Health education" is the science concerned with the study of individual health, spiritual health, and spiritual behaviour.

The pillar of *sinology* is the science about preservation, strengthening and reproduction of public health, and the foundation of *sinology's* the healthy lifestyle.

Formation of a healthy lifestyle is the main state direction of social policy in public health.

The strategy of this state policy should reflect real and complex state programs, aiming to form, promote and educate a healthy lifestyle at population.

This strategy requires reorganizing and reforming the public health system.

The objective of a healthy lifestyle can be achieved through effective health education.

Health education's goals are:

1) forming and raising health knowledge among the population about the healthy lifestyle, about basic disease prevention measures;

2) creating an active position towards individual and public health, with active participation at measures of strengthening, preservation and reproduction of health;

3) forming and developing of correct habits in order to preserve and strengthen health.

The main objective of health education is the formation of hygienic behaviour of the population, of a concept of health's true value for each person and for the entire population, of a model of healthy behaviour.

Health education must promote an orientation of disease prevention and of risk factors' influence on health.

In the process of health education it is necessary to know the cognitive, motivational and formative side of the health problem of the healthy lifestyle.

The product of health education is health culture-part of general culture that contains its field of knowledge, opinions, interests and attitudes towards health, healthy lifestyle.

The basic principles of health education are:

1) the principle of priority-health education is more effective when started from young ages;

2) the principle of specificity and authority- higher the authority of the educator, higher the efficiency;

3) the principle of state-health education should be a policy of the state power.

The forms of health education are variable:

1) auditory forms (oral);

2) imagination forms (visual);

3) audio-visual forms;

4) complex forms;

5) printing.

The doctor has the main role in health education. The ultimate goal of health education is to raise the population's health.

Quiz:

1. What is lifestyle?
2. What are the structural elements of lifestyle?
3. According to what criteria are distributed the aspects, elements of lifestyle?
4. What are the elements of the activity of producing lifestyle?

5. What are the elements of social-political activity of the lifestyle?
6. Named Living relationships - lifestyle.
7. What is the level of life, lifestyle, ordering of life, quality of life?
8. What categories are divided the health risk factors in?
9. What is medical activity?
10. What are the basic elements of medical activity?
11. What is healthy lifestyle?
12. What are the directions of the formation of a healthy lifestyle?
13. What factors stimulate, strengthen and maintain health?
14. What are the main rules of a healthy lifestyle?
15. What is "Health lifestyle"?
16. What are the goals of health education?
17. What are the differences between *health education* and *health enlightenment*?
18. What are the basic principles of health education?
19. What are the forms of health education?

Bibliography: 34, 35, 36, 37.

LESSON MODULE no. 11

Subject: Public health systems in the world. Methods of reorganizing public health systems.

Lesson plan: *Purpose:* to study the characteristics of existing public health systems in the world, the implemented methods of reorganization and reformation of public health systems

Objectives – After completing this module, the students will know and will be able to assess:

1. the principles of organization of public health systems in the world;
2. the public health systems in the world;
3. the reorganization, reformation of public health systems policy;
4. the shapes, methods of reorganization of public health systems in the world;
5. the appreciation's criteria for the evaluation of public health systems.

Key terms: *Public health system, determinant factors, Beveridge's model, Bismarck's model, Semasko's model, mixed model, Canadian model, Public health programs "Medicalaid", decentralization.*

Arguments:

Every doctor must know the characteristics of a public health system, the models of existing public health systems indifferent countries of the world, the principles of finance and administration of these systems, the methods and models for the reorganization of the national public health systems. Possession of this knowledge allows the physician to orientate in the structure of public health systems, to develop strategies of reorganization of the public health system and to assess the effectiveness of national public health systems.

Informative notions and materials on the subject:

Public health systems represent a set of subsystems that interact with each other in order to achieve a common goal of providing people with healthcare services. A public health system has the following characteristics:

1. The system as a whole has more positive qualities than the sum of qualities of its subsystems;
2. The circulation of information within a well-organized system is

faster and easier.

3. The degree of independence towards the environment is higher;
4. The management of a system is more effective than the separate management of each subsystem.

The formation of a public health system depends on:

1. historical development of the country
2. level of economic development of the country
3. cultural, social and environmental factors
4. ideology of health policy in the country
5. the health education level

The basic components of a public health system are:

1. Technical - material base and development of resources;
2. Organization of programs;
3. Economical insurance;
4. Health management;
5. Health services' degree of development and quality.

The comparison of **health systems** from different countries is **effectuated** through:

1. Comparing the components of each public health system, expressed by the production of medical services and their impact on the health of the population;
2. Comparing the population's lifestyles, environment, and structure of human and technology resources.

In the efficiency of the country's public health system are interested:

1. The executive bodies (government, municipality, municipalities)
2. Employers
3. Insurers
4. Patients
5. Economical agents
6. Suppliers that provide medical services.

Every national public health system has its own aims / objectives. There are known five models of public health systems' organization.

Table 11.1.

Typology of national public health model

Type	Source of financing	Administration
Bismarck's insurance model through the social security system (Germany, Japan, France, Austria, Belgium, Switzerland, Israel)	Mandatory fiscal contributions to health insurance funds with the help of social security	In Germany, public authorities regulate the activity of medical insurance funds, which pay the costs of provided private services, there are medical insurance foundations strong and medical unions; in Israel medical insurance foundations compete with HMO, the services from the mandatory basket being paid according to the capitation tax principle.
Beveridge's insurance model (United Kingdom, Norway, Sweden, Denmark, Italy, Spain, Portugal, Greece)	The government from the general taxes and other incomes;(in UK) - national finance; In the Nordic countries - common finance, sources accumulated by the national, regional and local authorities	Centralized planning, decentralized management of hospitals, of GP services and of public health institutions, district and regional integrated systems that are remunerated according to the capitation tax principle (UK and Nordic countries)
Douglas's insurance model through the State(Canada, Australia)	Fiscal sources - common finance by federal and provincial governments	Administration by the provincial authorities, federal regulation, health services are paid according to the principle of payment for services, hospitals are financed through block budgets, reforms that promote regionalization and integration of services are ongoing

Semasko's insurance model National Health System - (former USSR)	State - tax and other revenues, national health insurance post-soviet	Planning and strictly centralized by the State, finance according to fix norms at a number of people, a constant increase in the number of hospital personnel and beds, the reforms of the 1990s promoted the decentralization of the management of the remunerated services according to the capitation tax principle and mandatory medical insurance (taxes for salaries)
Mixed Public / Private insurance System (USA, Latin America (Colombia), Asia (Philippines) and Africa (Nigeria))	Private medical insurance through medical insurance at the work or public medical insurance in the sector of social security for specific population groups	The State exercise the function of strict regulating (USA), there are private and public medical, private and public hospitals, state preventive and regional services, hospital assistance is paid basing on DRG, quick development of controlled assistance, expansion of Medicaid Program

National public health systems are in continuously developing. The main objective of health systems is to improve the level of population's health through ensuring access, equity, efficiency and quality of medical services. Achieving this goal is possible through the elaboration of effective strategies and tactics of the health policy.

Table 11.2.

Aims, objectives, strategies and tactics of national health policies

Aims	Objectives	Strategies / Tactics
National authorities' responsibility for prosperous health for everyone	<ul style="list-style-type: none"> • Health is the state's responsibility. • Universal access. • Adoption of international standards. • Regional and social equity of access to medical services. • The free choice of the health care provider by the consumer. • Healthy lifestyle as national policy. 	Promoting health as national policy Laws / Regulations Regulating health rights of consumers Informing about health the public Groups of defence of public, professional interests
Adequate national financing to ensure social benefits	<ul style="list-style-type: none"> • Adequate total financing (>6% from the GDP) • Transition from planning by cost to planning by results • Special purpose grants to achieve the national objectives 	Increase the national, state and local financing Mandatory health insurance as an additional income source Reducing the number of beds for acute assistance < 3.51 / 1000 District health authorities with funding based on the capitation tax principle.

<p>Management to ensure cost efficiency</p>	<p>Mastering costs, cost effective health initiatives, decentralized management, monitoring policies and national standards. Information / monitoring systems, district health structure</p>	<p>Development of primary assistance, Development of assistance at home, increasing the number of beds for long-term assistance Development of ambulatory surgery, of long-term assistance institutions Health Information Systems development of controlled assistance and Groups with Common Diagnosis (GCD)</p>
<p>Definition of national health goals</p>	<p>Definition the main causes of morbidity, mortality and PYLL, of hospitalization with regional analysis data Promotion of health versus curative philosophy Priority utilization of available resources Utilization of international relevant standards</p>	<p>Analysis of social factors in health Improving health KAP Community's attitude towards health promotion Promoting public health, adequate nutrition, health of environment, mass immunization</p>

Public health systems require under going a continuous process of evaluation. For a complex analysis of health system's activity are needed in addition to mortality, morbidity, birth indicators, etc., also the indicators of primary prevention of prevent able by vaccination diseases, level of population's immunization, level of quality and average life expectancy, and level of population's health.

National public health systems are parts of the complex process of social and economic development of society, they contribute significantly to the increasing of quality of life.

Contradictions between the morality of medical assistance given to population through the acts of solidarity, accessibility and equitability, on one hand, and the economic - financial part of restraint of health

services' costs and expenses, on the other hand, are the base of the public health system's reforms.

Public health system's reform lies in the change of health policy and public health institutions that form this policy. Public health systems' problems can be resolved through institutional reforms, reorganization of managerial organizational structures and of health institutions.

The key elements of public health system's reform are:

I. In terms of procedure:

1. Structural reforms but not evolutionary or stage changes under the management of local executives and the government;
2. Directional but not random changes;
3. Changing national public health policy's goals with institutional reorganization but not development of new tasks;
4. Continuous and long but not one time reforms;
5. Vertical reorganization of public health system.

II. In terms of content:

1. Diversification of reform measures;
2. Determination of specific national characteristics of public health system.

There are known several methods of public health systems' reorganization:

Decentralization is one of the most frequently used methods in the reorganization of public health systems.

Decentralization is transfer of power and empowerment in terms of management, planning and taking decisions at national or local level.

Table 11.3.

There are known four types of decentralization.

Type of decentralization	Characteristics
De-concentration (administrative decentralization)	Redistribution of administrative obligations at national / local level with preservation of the existing structure of public health (it is a less radical reform)
Transmission of functions (political decentralization)	The government gives some of its functions related to deciding the funding and structure of public health subsystems, to NGOs and local executives

Delegation of powers	Some possibilities of planning and execution of some sides of public health system's activity without any control from higher authorities are forwarded to executive organs.
Privatization	State functions and obligations from the health services field are forwarded by the state to the owner

Reorganization of the public health system through the decentralization method must determine:

- a. up to what level will the decentralization be implemented;
- b. whom should functions and powers as a result of decentralization be delegated;
- c. what functions and tasks can be decentralized.

The results of decentralization are assessed by the degree of population's health, equity and accessibility to medical services, effectiveness and quality of medical services, ensuring the patient's right to free choice of medical services provider.

Table 11.4.

Each of these types of decentralization has its advantages and disadvantages.

Type of decentralization	Advantages	Disadvantages
De-concentration	Reducing the number of central organs of administration. Implementing new ideas and activities.	Emergence of unacceptable variants in public health system's activity. The "right" side does not know what the "left" side is doing.
Transmission of functions	Providing better opportunities for taking decisions and planning on the spot, depending on the specific created situation under the influence of some decision factors	Lack of political control in the style and forms of providing health services

Delegation of powers	Reducing the influence of central authorities. Execution of decisions more effectively and quickly	Decrease of professionalism Emergence of difficulties in ensuring the quality and effectiveness of medical institutions' activity
Privatization	Ensuring free and independent activity of power organs and politicians, depending on the demand of medical services market	Monopolies formation, which can abuse of power and lead to the loss of medical services market.

The “**pendulum**” method of reorganization of public health system is based on two interdependent strategies: obtaining of consensus and intensification of the reform process.

Obtaining of consensus is:

- Reduction of fear of cultural and social changes as a result of the reform;
- Beneficiaries' awareness of the reform needs;
- Formation of a positive support of reforms, clarifying the benefits of reforms to those that are interested in them and that would benefit from reforms;
- Organizing political unions, political groups to support reforms with isolation of the groups those are in opposition.

Intensification and acceleration of reforms consists of:

- Reorganization of reforms in admissible terms;
- Planning reforms' implementation in the same time with their elaboration;
- Attracting in the reorganization of public health system both supporting and opposing groups, obtaining success.

Measures of reorganization of the public health system can be divided into four categories:

I. The potential or human technical managerial and financial resources necessary to the reform.

Social-cultural factors that can prevent or stimulate reforms:

II. Political unions of relations' formation that can prevent or stimulate reforms.

III. Procedural measures that being implemented can stimulate reforms.

IV. The analysis of measures and factors that can stimulate reforms, gives the possibility to overcome distrust and to accelerate the reform of public health system.

Quiz:

1. What is the public health system?
2. What are the characteristics of a public health system?
3. What are the public health system's determinant factors?
4. What are the basic components of a public health system?
5. What models of public health systems do you know?
6. What are the aims of a national public health system?
7. What are the interested parties in the efficient work of the national public health system?
8. What are the sources of funding and guidance principles in the Beveridge's model?
9. What are the sources of funding and guidance principles in the Bismarck's model?
10. What are the sources of funding and guidance principles in the Semasko's model?
11. What are the sources of funding and guidance principles in the mixed model?
12. What are the sources of funding and guidance principles in the Canadian model?
13. What are the objectives of the National Public Health Program in Canada?
14. What are the principles of activity of the "Medicaid" public health program in the U.S.A.?
15. What are the principles of activity of public health programs "Medicaid"?
16. What are the strategy and the national health policy's tactics in the field of public health?
17. What is the public health system's reform?
18. What is decentralization?
19. What are the types of decentralization?
20. What are the advantages of each type of decentralization?
21. What are the disadvantages of each type of decentralization?

22. What does the pendulum model of public health system's reorganization consist of?
23. What are the steps for obtaining a consensus?
24. What are the measures to promote the reform according to the model of the "pendulum"?
25. What are groups of the complex of measures of public health system's reorganization according to the pendulum model?

Bibliography: 35, 37.

LESSON MODULE no. 12

Subject: Medical and social problems of humanity

Lesson plan: *Purpose:* to study and defined medico-social problems of humanity, the ways to study and analyse them.

Objectives – After completing this module, the students will know, apply and identify:

1. the medico - social problems of humanity.
2. the characteristics of medico - social problems.
3. the statistical data in the medical problems of humanity.

Key terms: *Medico - social problems, cardiovascular diseases, tuberculosis, trauma, oncological diseases, drug addiction, alcoholism, nutritional problems, iodine deficiency, Anaemia, control of vitamin D.*

Arguments:

Modern Life's diseases or non-infectious diseases are at the moment the main cause of morbidity and mortality. Non-infectious diseases' etiology is complex and in order to prevent the diseases many risk factors should be taken into account. Knowledge of humanity's medico-social problems' characteristics and of the ways of studying them is necessary in the analysis of the doctor's activity.

Informative notions and materials on the subject:

The characteristics of humanity's medico – social problems are:

1. Negative medical impact, as a result of the high level of diseases' spreading, the affected population and the low efficiency of the treatment.
2. The various gammas of risk factors in the apparition and spread of these diseases, this leading to reduction of primary, secondary and tertiary prevention's efficiency.
3. High costs of medical services of prevention, treatment and rehabilitation.
4. Negative economic impact as a result of high costs of medical services, of long treatment, of long absence from work, high level of disability with supplementary social expenses.
5. Negative demographic impact as a result of high level of mortality, of reduction of average duration of life, of increased morbidity and disability.

6. Negative social impact as a result of high level of morbidity, of diminution of work forces, raise of unproductive stratum of society, of social inactivity of affected population.

Cardiovascular diseases (CVD)

Cardiovascular diseases include a large number of diseases present all over the world, and high morbidity among the population tends to increase (slow epidemic character).

Community, family and individuals are interested in the implications of cardiovascular diseases because of its many social, economic, demographical and familial aspects. From the large number of deaths, especially of those premature, CVD influence the most the reduction of average life expectancy.

Since environmental factors play an important role in the release and evolution of these diseases, their occurrence can be prevented and the incidence - reduced through the change of the environment and correct personal attitude towards health.

Cardiovascular pathology affects people of all ages and of both sexes.

There were identified more than 70 risk factors involved in the appearance and maintenance of cardiovascular diseases in the population. The most important are the following: irrational alimentation (over-nutrition), obesity, sedentary lifestyle, high cholesterol, hypertension, psycho-emotional stresses, harmful habits (smoking, coffee abuse, alcohol) and the imbalance between the trace elements.

Oncological pathology

Medico-social nature of oncological diseases is confirmed by the complicated ethology and pathogenesis, widespread, high mortality, ranking second in the overall mortality structure.

Other factors that place oncological pathology among medico - social problems are:

- High level of primary disability;
- The long duration of a case of hospitalization;
- Considerable influence on the average level of life expectancy.

There has been established a real dependence and correlation of the level and dynamics of the oncological pathology with the risk factors and their predisposing.

Depending on the risk factors cancer has been classified in four groups:

- Cancers whose aggressive factors come from the environment and

are known or applied with great probability;

- Cancers whose aggressive sources can be deducted from the environment through clinical and epidemiological studies;

- Cancers whose sources, ways and oncogenic mechanisms are unknown;

- Cancers in which the genetic factors can play a certain role.

The emergence and development of cancer is determined by a number of harmful factors:

- Physical factors;
- Chemical factors;
- Biological factors;
- Alimentation factors;
- Toxic factors;
- Metabolic factors;
- Hormonal factors;
- Genetic factors;
- Professional factors;

Trauma represents the totality of all registered trauma at a group of people (at home, at the office, in the street, in sports or during military service) in a given space and during a certain period of time, divided by its number.

Trauma is considered "plague" of the twentieth century. "Epidemic" of trauma continues and daily are hundreds of thousands of new and new cases of trauma recorded in the world.

The premises of trauma's placement among medico - social problems are:

1. High frequency;
2. The high level of posttraumatic death;
3. Predominantly affecting the population of working age;
4. Considerable influence of social factors on trauma;
5. Long-term treatment, economic damages in connection with

the release of sick benefits

and teaching the patients new specialties of work in another

fields;

6. Causing of health, social and economic damage;
7. Insufficient level of trauma assistance in the field.

Trauma is conditioned by a variety of factors:

1. Urbanization, hyper population, the transition to market economy, increased psychological tension in society, incapacity to adapt to new socio - economic conditions;

2. Disastrous condition of roads, lack of traffic lights at crossings, imprudence and irresponsibility of both drivers and pedestrians;

3. Implementation in production and daily life of new technologies;

4. Alcohol abuse, use of drugs and other vicious habits.

Alcoholism has always been an acute medico- social problem. The social aspect reveals the moral, demographical, economic and biological damages related to excessive consumption of alcoholic drinks of consumers themselves, and society as well.

The forms of alcohol consumption can be divided into three groups:

a) Consumption of alcoholics' beverages accepted in society in situations of rituals, customs, traditions, etc.;

b) Forms of abusive consumption – pre-nosological – of alcoholic drinks;

c) Pathological forms of consumption of alcoholic drinks.

The number of patients with alcoholism in different countries has increased from 15 to 50 times.

Morbidity among abusive alcohol consumers is twice higher than in the population.

Drug addiction

Drug abuse and illicit trafficking of narcotic substances have become at the end of the twentieth century one of the most dangerous social problems that concerns the entire international community.

Drug addiction has become a serious factor that influences negatively the development of society, representing danger to public health.

The spread of drug addiction in Moldova has an epidemical character.

Drug addiction is a complex of medico- social and legal problems that arise in because of consumption of drugs and other stupefying substances by a stratum of the population.

Narcotic substance is characterized by three criteria: medical, social and legal.

There were established four groups of factors that contribute to drug addiction:

1. Availability of drugs;

2. Social reasons that determine the first step to drug addiction;
3. Human psychology, the psychological state in a certain moment that involves consumption of drugs;
4. Hereditary physical and psychological predisposition – heredity itself.

Tuberculosis (TBs)

Recognizing that tuberculosis is one of the most neglected health threats and that the TBs epidemic is out of control in many parts of the world, in April 1993 WHO proclaimed the disease as a global danger.

The causes of this phenomenon are:

- The unexpected increase of migration and as a result some groups of population left the doctor's observation;
- Worsening of TBs control measures, especially in prevention and early detection of TB in groups where there exists the increased risk of disease;
- Enlarging of the number of TBs cases with destructive forms and especially resistant forms' development, this leads to the development of irreversible tuberculosis characterized by high lethality;
- Socio-economic situation.

AIDS

It is the acquired immunodeficiency syndrome that appears after infection with HIV (Human immunodeficiency virus).

AIDS – affects only humans, the parasite is in the human blood cells, attacks the immune system.

It is a disease that grows continuously and affects usually the youth; it reached more than 30 millions of people on Earth. The infection is transmitted through blood, semen, vagina fluid and breast milk.

Transmission

1. Haematogenous – exchange of needles, lack of caution during surgical interventions
2. Sexual – acts of unprotected sex
3. From mother to child – trans-placental at birth and during breastfeeding

Risk groups: prostitutes, drug addicts, persons with amoral lifestyle, homosexuals, infected persons.

Causes – lack of information, of preventive knowledge, precarious

social and economic state, drugs, and lack of protection; *AIDS's symptoms* – asthenia, sweats at night, cough, fever, lymphadenopathy, cutaneous eruptions, fast weight loss, difficult breathing; *Prophylaxis* – disinfection, protection, abstinence.

Alimentation

High frequency of morbidity states and various disorders (dependent on the food factor) of organs and systems at children, adolescents and pregnant women, in hospital, of the states generated by the deficiency of some essential food components (micronutrients, vitamins, etc..) is characteristic for Moldova.

One of the major problems that characterize the nutritional state is anaemia. It affects 28% of the children under 5 years, 20% of the women in the fertile age and almost 50% of children of 6 - 12 months. These high shares of anaemia are mainly of nutritional origin, due to the deficiency of iron.

Iron deficiency is one of the most common nutritional disorders in the world. Affecting a large number of children and women in the developing countries, this is the only deficiency of micronutrients also widespread in industrialized countries. Iron deficiency comes after a continuous loss of iron without proper completion of the existing results in the body. Acute stages of iron deficiency are associated with anaemia.

Currently it is recognized that even a moderate iron deficiency without anaemia signs, has adverse functional consequences.

Iron deficiency affects:

- cognitive performance, behaviour and physical development of infants, under-scholars and students;
- the immune state and morbidity through infectious disease at groups of all ages;
- the utilization of energy sources by the musculoskeletal system and in this way the physical capacities of adolescents and adults.

Particularly, at pregnant women iron deficiency conditions:

- growth of prenatal risks at mothers and new-borns;
- growth of the level of infant mortality.

Being one of the most common nutritional deficiencies, anaemia affects all age groups. Iron deficiency and anaemia inhibit cognitive development of children of all ages; the IQ is 5-10 points lower. Iron

deficiency affects immune mechanisms of the body and is associated with high rates of morbidity.

Anaemia during pregnancy and childbirth is associated with multiple negative results related to maternal and child health, including risks of bleeding, infections, maternal and prenatal & postnatal mortality and low birth weight. It is estimated that almost all women have iron deficiency, and half of pregnant women from developing countries suffer from anaemia. About 40% of maternal deaths worldwide are conditioned by anaemia. At the same time, iron deficiency and anaemia can reduce up to 30% of body's capacity physical effort and therefore bring serious damage to work productivity and individual performance.

Iodine deficiency is another problem in the nutritional status of the Republic of Moldova's population, affecting the health of children and mothers. It is conditioned by low iodine content in the natural geographical environment of the country - lack of iodine in soil, water and air.

The effects of iodine deficiency

Iodine deficiency through its effects on the development of brain has condemned millions of people to a life with fewer opportunities and continuous underdevelopment. Worldwide, iodine deficiency is the single most important cause of preventable brain damage.

People living in areas affected by iodine deficiency can have reduced intellectual development indicators (IQ), up to 13.5 points lower than in communities from the unaffected areas by the IDD (iodine-deficiency disease). This mental deficiency has an immediate effect on the children's cognitive ability, women's health, quality of life and therefore on economic productivity.

Iodine-deficiency diseases develop where iodine's consumption is below the recommended levels and the thyroid gland synthesizes no longer a sufficient amount of thyroid hormones. The low level of thyroid hormones in the bloodstream (hypothyroidism), leads to brain's damage in the process of development and other harmful effects, known as iodine-deficiency diseases.

The effects of insufficient iodine:

On the fetus

- abortions;
- births of dead children;

- congenital abnormalities;
- increased prenatal & postnatal mortality;
- increased infant mortality;
- neurological cretinism;
- Myxedematous Cretinism;
- mental deficiencies;
- hypothyroidism;
- psychomotor defects;

On the new-borns,

- Neonatal hypothyroidism;

On the children, adolescents

- mental retardation and physical retardation;

On the adults

- Goiter;
- Hypothyroidism;
- Undermined mental function;
- Increased susceptibility to nuclear radiation.

In the gravest forms, iodine deficiency conducts to **cretinism**. At the same time, viewed from public health's point of view, less pronounced forms of brain damage and reduced cognitive ability represent a greater danger, because they affect the whole population. Consequently, the mental capacity of children and adults with apparently normal development, but that live in areas with iodine deficiency is reduced compared to the capacity of those that live under more favourable circumstances.

Rickets affects in Republic of Moldova over 20% of children under 2 years. This phenomenon is conditioned by several factors including: the inability to use milk enriched with vitamin D for feeding infants by many families, almost complete absence of utilization of supplements of vitamin D by the population, dressing infants and not going out at least for a few time with them during the first months of life, insufficient sunstroke during the summer months, insufficient sunstroke during the winter months because of temperatures, frequent prescription of Phenobarbital that influences the metabolism of vitamin's D precursors.

Vitamin D is one of the most important biological moderators in the human body. Together with parathyroid hormone, vitamin D contributes to normal

15. What are the measures of control of vitamin D deficiency and rickets?

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