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Lecture complex

Name of discipline: «Hygiene and Epidemiology»

Code of discipline: GaE 3201

Name of EP: 6B10101 «General Medicine»

Amount of training hours /credits: 120h. (4 credits)

Course and semester of study: 3 course, V semester

Amount of lectures: 10

Shymkent 2023 y.

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Lecture complex is developed in accordance with the working program (syllabus) of the discipline «Hygiene and epidemiology» and discussed at the meeting of the department.

Protocol №10 from 23.05. 2023 year.

Head of the Department: Utepov P.D.

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Lecture №1

1. Theme: Introduction to hygiene. Scientific bases of hygienic normalization and forecasting.

2. Purpose: To introduce students to the subject, purposes, tasks, objects and methods of research of general hygiene and scientific bases of hygienic standardization.

3. Lecture theses:

Definition of hygiene as a science.

Hygiene is the science of preserving and strengthening social health by carrying out preventive measures and preventing the occurrence of diseases among the population.

The term "hygiene" in translation from Greek means "Bringing health", "healing".Hygiene is the main science that studies the influence of the environment the environment on the health of the population, which develops recreational activities aimed at preventing diseases.Hygiene is the main preventive medical discipline focused on maintaining and improving the health of the population.

Hygiene subject - studies the influence of factors and conditions the changing environment on the body of a healthy person and thus assess the role of various factors in shaping the health of the population.

Hygiene has two subjects of study - environmental factors and the body's response. The purpose - development and implementation of the foundations of primary medical prevention.

Environmental factors are varied and are classified into:

- **Biological -** microorganisms, parasites, insects, antibiotics and other biosubstrates.
- **Physical -** noise, vibration, electromagnetic and radioactive radiation, etc.
- **Chemical -** chemical elements and their compounds.
- **Factors of human activity -** the regime of the day, the severity and intensity of labor, etc.
- **Social.**

Hygiene sections:

- Communal hygiene
- Hygiene of children and adolescents
- Food hygiene
- Occupational hygiene
- Radiation hygiene

Basic methods of hygiene research

1) Physical methods make it possible to assess the microclimatic conditions of the premises, measure noise and vibration parameters, levels heat radiation, etc. Determine the temperature, humidity, atmospheric pressure.

2) Chemical research methods are used to analyze the air environment in order to determine the content of harmful substances, assess the quality of water (determine its salt composition, pollution indicators, etc.), biological value of food products, etc. Determine the chemical composition of the air and various chemical air pollution (gases, dust, smoke).

3) Bacteriological methods are used to assess the bacterial contamination of air, water, soil, food and other objects through which pathogens of infectious diseases can be transmitted.

4) With the help of **toxicological and biological methods**, especially in experiments on animals, the the nature of the action of chemical compounds on the body and the maximum permissible concentrations in

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water, air and soil are established, the permissible residual quantities or maximum allowable levels of chemicals.

5) Clinical methods make it possible to identify changes in the body that occur when exposed to environmental factors. They are carried out with a human disease. This is carried out in the process of clinical observations in hospitals and clinics or during dispensary examination at work and preventive examination.

6) Use of epidemiological methods

Allows you to identify:

1. The consequences of environmental pollution on the population,
2. Establish causal relationships between biosphere pollutants and the state human health.

7**) Statistical method** - carried out mathematical calculation, analysis, i.e. monitoring the detection of cases of morbidity, mortality, fertility and physical development.

4. Illustrative material: presentation

5. Literature:

Electronic resources:

1. Золотарева, А. В. General Hygiene: lectures for students in English medium – Общая гигиена: курс лекций для иностранных студентов, обучающихся на английском языке / А. В. Золотарева, В. Н. Бортновский, Н. В. Карташева; пер. на англ. яз.
2. General Hygiene: Workbook for medical students / Aliona Tihon; "Nicolae Testemiţanu" State Univ. of Medicine and Pharmacy, Gen. Hygiene Dep. – Chişinău: CEP Medicina, 2017. – 247p.

6. Control questions (feedback):

1. Explain the history of the development of hygiene.
2 Identify the main purposes and tasks of hygiene.
3. Methods of study used in hygiene.
4. Hygienic standard of environmental factors.
5. Priority of normalization and principles of normalization.

Lecture №2

1.Theme: Atmospheric air hygiene.

2.Purpose: to introduce students to air hygiene and hygienic problems of the air environment, prevention of diseases related to air pollution.

3. Lecture theses:

Atmosphere air consists of nitrogen, oxygen, dioxide of carbon, ozone. The state of the atmosphere influences on physical, chemical and biological processes on Earth surfaces, in hydrosphere, lithosphere. The greatest value have: **oxygen** for breath and mineralizations of dead organic substance; **dioxide of carbon** — for photosynthesis; **ozone** — for screening of earth surface from hard gamma rays of UV radiations, nitrogen, water vapour were formed due to volcanic activity and evaporations.

Properties of atmospheric air:

1. Physical:

– temperature;
– humidity;
– movement of air;
– pressure;
– solar radiation (electromagnetic radiations);
– atmospheric electricity (air ionisation, electric field, a geomagnetic field);

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– natural radioactivity.

2. Chemical:

- normal gas structure (oxygen, nitrogen, carbonic gas, inert gases
-argon, water steams, ozone);
- harmful gaseous impurity (natural and anthropogenic origin).

Atmospheric air consists of 78% nitrogen, 21% oxygen and 1 % other gases and water vapour.

3. Biological the content in air of open places and the closed premises of various microflora — bacteria, viruses, spores of mold fungi, yeast, actinomycete, cysts of the elementary, seaweed, disputes of lichens, mosses, ferns, pollen of plants.

4. **Mechanical** (presence of firm particles — dust, ash, gaseous aerosols).

Air temperature measured by thermometers

These include alcohol, mercury, electrical thermometers and maximum, minimum thermometers. To define a temperature mode of premises it is necessary to take air temperature in the following points: in the centre and at the external and internal.

Mercury thermometer 16 walls at the distance of 10 cm from them and at the level of 0.1–1.5 m from the floor. The obtained data are transferred to the minutes and analyzed on vertical and horizontal lines. The average temperature of a premise is calculated taking into account three values of measurements in various points of the horizontal line at the height of 1.5 m: – fluctuations on the vertical line within the norm of 2–3 °C; – fluctuations horizontal line within the norm of 2–3 °C; – average temperature in premises in winter is 20–22 °C, in summer 21–25 °C; – daily fluctuations in heating: in case of central heating — 2–3 °C, in case of stove heating — 4–6 °C.

Types of humidity:

1. Absolute air humidity is the mass of water vapour in 1 m 3 of air (mmHg).
2. Maximal humidity is the mass of water vapour required to saturate 1 m3 of air at a defined temperature (mmHg).
3. Relative humidity is the ratio of absolute humidity to the maximal humidity, expressed as a percentage, or percentage of air saturation with water vapour at a time of observation.

Optimum air humidity within 40–60 %, admissible — 30–70 % is considered. Humidity is measured with August and Assmann psychrometers and hygrometer.

Wind speed of movement influences on:

-organism heat exchange (increase of heat loss); – mechanical work (more than 20 m/sec) on body movement in space

-increase of energy consumption and metabolism; deterioration of movement coordination;

-processes of external breath (a normal process of breathing is broken);

-thermal state of health (a moderate wind of 1–2 m/sec in hot days invigorates); – psychological state

-mental excitement or depression; – wind over 0.5 m/sec can lead to violation of heat exchange processes, catarrhal and infectious diseases.

Air mobility is described by:

– Direction is the air move in open atmosphere.
– Wind rose is based on continuous observations over the wind direction.
– Speed is the distance, which air mass makes per unit of time (m/sec).

Wind direction is determined by anemorumbometer and weather vane.

Also for measuring air mobility using hot-wire anemometer. Small air mobility is measured by katathermometer (cylindrical and spherical).

The effects of high atmospheric pressure:

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-difficulty of breathing (exhalation);
-squeezing and pain in ears;
-slow pulse, breath, and heart rate;
- stomach squeezing, diaphragm lowering;
-hyperhidrosis;
Atmospheric pressure is measured by a barometer or aneroid barometer.
Air content and atmospheric pressure vary at different layers, and air suitable for use in photosynthesis by terrestrial plants and breathing of terrestrial animals is found only in Earth's troposphere and in artificial atmospheres.
Air pollution is contamination of the indoor or outdoor environment by any chemical, physical or biological agent that modifies the natural characteristics of the atmosphere.
WHO data show that almost all of the global population (99%) breathes air that exceeds WHO guideline limits and contains high levels of pollutants, with low- and middle-income countries suffering from the highest exposures.
Air pollution occurs when harmful substances are included in Earth's atmosphere. It may cause diseases, allergies or death of humans; it may also cause harm to other living organisms such as animals and food crops, and may damage the natural or built environment. Activity and natural processes.
Causes of air pollution: natural sources include volcanic eruptions, dust carried by the wind and gases released by living beings. Manmade activities that cause air pollution include motor vehicle use, fossil fuel burning and agriculture.
In order to understand the causes of Air pollution, several divisions can be made.
Primarily air pollutants can be caused by primary sources or secondary sources. The pollutants that are a direct result of the process can be called primary pollutants. A classic example of a primary pollutant would be the sulfur-dioxide emitted from factories.
Secondary pollutants are the ones that are caused by the inter mingling and reactions of primary pollutants. Smog created by the interactions of several primary pollutants is known to be as secondary pollutant.
Airborne nitrogen pollution affects not only the quality of the air we breathe, but also the land and the water. Nitrogen is the most abundant element in the air and is essential to plant and animal life. Sources of nitrogen from human activities, such as electric power generation, industry, transportation and agriculture, can upset the natural balance of nitrogen in the environment.
When fossil fuels are burned, they release nitrogen oxides into the atmosphere, which contribute to the formation of smog and acid rain. The most common nitrogen-related compounds emitted into the air by human activities are collectively referred to as nitrogen oxides. Ammonia is another nitrogen compound emitted to the air, primarily from agricultural activities, but also from fossil fuels. Most of the nitrogen oxides released in the U.S. due to human activity are from the burning of fossil fuels associated with transportation and industry.
Major sources of nitrogen oxide emissions include:

- Cars and trucks
- Coal-fired power plants
- Large industrial operations
- Ships and airplanes

The presence of excess nitrogen in the atmosphere in the form of nitrogen oxides or ammonia is deposited back onto land, where it washes into nearby water bodies. These excess nutrients contribute

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to pollution, harmful algal blooms and oxygen-deprived aquatic zones. Excess ammonia and low pH in these areas are toxic to aquatic organisms and affect their survival.

Agricultural activities: Ammonia is a very common by product from agriculture related activities and is one of the most hazardous gases in the atmosphere. Use of insecticides, pesticides and fertilizers in agricultural activities has grown quite a lot. They emit harmful chemicals into the air and can also cause water pollution.

Exhaust from factories and industries: Manufacturing industries release large amount of carbon monoxide, hydrocarbons, organic compounds, and chemicals into the air thereby depleting the quality of air. Petroleum refineries also release hydrocarbons and various other chemicals that pollute the air and also cause land pollution.

Mining operations: Mining is a process wherein minerals below the earth are extracted using large equipments. During the process dust and chemicals are released in the air causing massive air pollution. This is one of the reason which is responsible for the deteriorating health conditions of workers and nearby residents.

Indoor air pollution: Household cleaning products, painting supplies emit toxic chemicals in the air and cause air pollution.

The Prevention of Air Pollution and it's various control methods.The prevention of air pollution is a worldwide concern. There are four groups of measures: federal laws ("On Environmental Protection"), municipal laws and decrees; **technological, planning, sanitary.**

Technological measures are of primary importance in protecting the atmosphere from harmful emissions:

- replacement of harmful substances in the production of harmless or less harmful. An example would be the transfer of boilers from burning coal and fuel oil to gas;
- cleaning of raw materials from harmful impurities, for example, removal of sulfur from fuel oil;
- replacement of dry methods of processing dusty materials wet. The effectiveness of such an event can be shown by the example of the transfer of dry grinding mills in the cement industry to wet grinding, resulting in the elimination of dust emissions into the atmosphere;
- replacement of flame heating with electric (in terms of emission of harmful substances);
- sealing processes, the use of pneumatic and hydraulic transport during transportation of dusty materials;
- replacement of discontinuous processes with continuous ones. The continuity of the process eliminates salvo emissions of pollution, which is very typical for intermittent processes.

The group of planning activities includes a set of receptions, including accounting for "wind rose", zoning of the city, the organization of sanitary protection zones, landscaping of populated areas, the layout of residential areas.

Priority movement of air mass in relation to the sides of the world during a year cycle is called "wind rose".

The wind rose is used when designing houses and public buildings, industrial enterprises, medical establishments, preschool and educational establishments. Air should leave the industrial enterprises zone from the leeward side off buildings, and living houses and public buildings should locate at the windward side.

The fight against natural dust is associated with the general improvement of the city. Sanitary protection zones should be landscaped. These zones are a protective barrier against industrial

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emissions. Their presence makes it possible to reduce the levels of concentration of harmful substances in the atmospheric air by three times, since green spaces can absorb dust pollution and some gases.
Sanitary-technical measures are special measures to protect the air basin with the help of wastewater treatment plants.

4. Illustrative material: presentation

5. Literature:

Electronic resources:

1. Золотарева, А. В. General Hygiene: lectures for students in English medium – Общая гигиена: курс лекций для иностранных студентов, обучающихся на английском языке / А. В. Золотарева, В. Н. Бортновский, Н. В. Карташева; пер. на англ. яз.
2. General Hygiene: Workbook for medical students / Aliona Tihon; "Nicolae Testemiţanu" State Univ. of Medicine and Pharmacy, Gen. Hygiene Dep. – Chişinău: CEP Medicina, 2017. – 247p.

6. Control questions (feedback):

1. Hygienic significance, properties of atmospheric air.
2. Hygienic assessment of physical properties of the air environment.
3. Complex methods of assessment of physical properties of air on the organism.
4. Specify the qualitative composition of atmospheric air.

Lecture №3

1. Theme: Water Hygiene.

2. Purpose: to introduce students to the importance of water as one of the main objects of the environment and disease prevention.

3. Lecture thesis:

Water physiological functions:

- Flexibility – about 65 % of body mass of adult person consists of water.
- 70 % of water is the intracellular water, 30 % - extracellular water (in blood), (7%) - lymph and 23 % - intertissue fluid.
- Participation in metabolism and interchange of energy.
- Role in support of osmotic pressure and acid-base balance.
- Participation in heat exchange and thermoregulation.
- Transportation function – delivery of nutrients to cells with blood and lymph, removal of waste products from the organism with urine and sweat.
- As a component of dietary intake and a source of macro- and microelements supply to organism.

Epidemiological and toxicological role of water

Water can participate in spread of infections in the following ways:

- As transfer factor of pathogens with the fecal-oral transfer mechanism: enteric infections of bacterial and viral origin (typhoid, cholera, dysentery, salmonellosis).
- As a transfer factor of pathogens of the skin and mucous membrane diseases (when swimming or having another contact with water) trachoma, leprosy, anthrax.
- As the habitat of disease carriers – anopheles mosquitoes.

Classification of water supply sources

Water supply sources are divided into surface or ground and underground:

- Surface sources (ground water) can be divided into natural and artificial. Natural open sources include rivers, lakes and ponds, man-made — reservoirs, canals. In the water, open-source contains a large amount of flora and fauna.

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Surface waters are divided into flowing (running) and stagnant waters.

Open-air reservoirs can easily be polluted from outside, therefore, from epidemiological point of view they are potentially unsafe.

Compared to ground waters, surfacewater sources are characterized by big amount of suspended substances, low clarity, higher colour due to humic substances that are washed away from the soil, higher content of organic compounds, presence of autochthonic micro flora and dissolved oxygen.

Under the conditions of occurrence, groundwater is divided into several types:

1. Soil;
2. Ground;
3. Interstate (Middle waters/Artesian);

a) Pressure water;

b) Non-pressure water

Soil water lie close to the earth's surface in the first aquifer, have no protection in the form of impermeable layers, so their composition is subject to abrupt changes. Most groundwater is stored in the spring.

Groundwater is the water found underground in the cracks and spaces in soil, sand and rock. It is stored in and moves slowly through geologic formations of soil, sand and rocks called aquifers.

How much do we depend on groundwater?

Groundwater supplies drinking water for 51% of the total U.S. population and 99% of the rural population.

Groundwater helps grow our food. 64% of groundwater is used for irrigation to grow crops.

Groundwater is an important component in many industrial processes.

Groundwater is a source of recharge for lakes, rivers, and wetlands.

Middle waters with pressure (artesian) and without pressure.

Middle waters are characterized by not very high, stable temperature (5-12°C), constant physical and chemical composition, steady level and considerable flow.

Artesian water is a specific type of spring water that flows freely from underground wells. Unlike traditional wells, artesian wells don’t require a pump to extract water from underground. Instead, they rely on a natural phenomenon that involves the water flowing down into a porous material, such as rock, sand, or gravel, then being forced to the surface and out of a well due to the high pressure built up between two impermeable underground surfaces.

Self-purification (natural purification) of open-air water reservoirs

- Hydraulic (mixing and dilution of pollutants by water of water reservoir)
- Mechanical (precipitation/sedimentation of suspended solids)
- Physical (solar radiation and temperature effect)
- Biological (interaction of water plant organisms and microorganisms with sewage organisms that got into reservoir)
- Chemical (elimination of contaminants as the result of hydrolysis)
- Biochemical (conversion of some substances into other due to biological elimination.

Sanitary inspection includes three main stages:

1) Sanitary-topographic inspection of water source environment.
2) Sanitary-technical inspection of condition of water source equipment.
3) Sanitary-epidemiological inspection of area of water source location.

Main task of sanitary-topographic inspection of water source is to discover possible sources of water pollution (dumps, refuse pits, livestock farms), distances from them to water source, topography of the locality. The purpose of sanitary - technical inspection is to give a hygienic assessment of condition of technical equipment of hydraulic works at water source.

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Sanitary-epidemiological inspection is aimed to discover and consider the following:

- Presence of intestinal infectious diseases (cholera, typhoid, paratyphoid A, B, dysenteries, virus hepatitis) among population.
- Presence of epizootic diseases (tularaemia, brucellosis, anthrax, murrain) among rodents, domestic animal.
- Sanitary condition of the settlement (pollution of the territory, methods of collection and disinfection of liquid and solid domestic and industrial waste).

There are centralized and decentralized water supply systems.

- Centralized system (water pipeline) includes: source of water, water intake facility, water-lifting facility, main facilities of water supply station, where water clearing, discolour, disinfection are executed, and sometimes there also takes place special water treatment (fluorination, defluorination, deferrization) to improve water quality.
- Most often decentralized (local) water supply is realised using shaft or tube wells, and more rarely using groundwater intake structures (catchments). Underground (subterranean) water, which accumulates in water bearing aquifer over the first water-holding horizon, is used in wells. Such water laying depth amounts to some dozens of meters.

Sources of reservoirs pollution

1. Household economic-and-fecal sewage. Sewage of infectious hospitals is most dangerous in the epidemic relation. In them also contains SAM (surface-active material).
2. Industrial drains. Exist more than 140 kinds of technological processes, each of which defines specific structure of sewage. Toxic substances, radionuclide, pesticides, salts of heavy metals (water — mollusca — fish — man, water — plant — animal — man) get to water.
3. The air environment in large cities (acid rains, etc.)
4. Navigation (problem of the Baltic, the Black and Mediterranean seas). In a reservoir the crude sewage, combustive-lubricating materials get.
5. In an emergency at the enterprises.
6. Sewage of an agricultural production: • Fertilizer, pesticides; • Liquid waste products of animal husbandry industries and food production.
7. Dumps.

There are 3 basic groups of methods:

1. Methods of water cleaning - removal from mechanical impurity and improvement organoleptic parameters of water (turbidity, coloring).
2. Methods disinfecting of water – destroy micro flora in water.
3. Special methods improvement quality of water – distillation, dechlorination, fluorization, defluorization, deodorization, decontamination, deactivation water.

Coagulation is often the first step in water treatment. During coagulation, chemicals with a positive charge are added to the water. The positive charge neutralizes the negative charge of dirt and other dissolved particles in the water. When this occurs, the particles bind with the chemicals to form slightly larger particles. Common chemicals used in this step include specific types of salts, aluminum, or iron.

Flocculation follows the coagulation step. Flocculation is the gentle mixing of the water to form larger, heavier particles called flocs. Often, water treatment plants will add additional chemicals during this step to help the flocs form.

Sedimentation is one of the steps water treatment plants use to separate out solids from the water. During sedimentation, flocs settle to the bottom of the water because they are heavier than water.

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Filtration. Once the flocs have settled to the bottom of the water, the clear water on top is filtered to separate additional solids from the water. During filtration, the clear water passes through filters that have different pore sizes and are made of different materials (such as sand, gravel, and charcoal). These filters remove dissolved particles and germs, such as dust, chemicals, parasites, bacteria, and viruses. Activated carbon filters also remove any bad odors.

Physical methods of disinfecting:

Boiling - good bactericidal effect, but expensive method - the big power consumption - is applicable in domestic conditions.

- UVR - 100 % effect, but needs the big power consumption and small volumes of water - in clean water UV pass through only 50 sm, in muddy - is even less.
- Gamma irradiation - is used seldom - the complex equipment, threat of an irradiation of the personnel and the induced water radioactivity.
- A ultrasonic irradiation - complex method, influence on the personnel.

Chemical methods disinfecting of water:

- **Ozonization** - action of atomic oxygen - good bactericidal effect. The big power consumption. It is improved water organoleptics. Full destruction of toxic substances in water.
- **Action ions of silver.** «Sacred water» in churches. Ions of silver has bactericidal effect. Dearly method.
- **Kinds of chlorination water**
- On chlorine necessity or chlorination by normal dozes of chlorine - under the control contents of residual chlorine 0,3-0,5 mg/l.

For improvement bactericidal effect there are other kinds of chlorination:

1) Super chlorination - application big dozes of the chlorine exceeding chlorine necessity waters. It is used for very much polluted waters, unknown waters on bacteria indications (field conditions), on epidemic indications. Water then demands dechlorization - through the activated coal, hyposulfit.

2) Double chlorination - entering chlorine before and after water cleaning - is increased exposition action of chlorine, but formation toxic chlorine-organic substances raises.

3) Chlorination with ammonization - entering into water chlorine and ammonia - are formed chloramines - the greater bactericidal effect, there is no «chemist's» smell, as at usual chlorination when in water can be formed chlorphenols.

4. Illustrative material: presentation

5. Literature:

Electronic resources:

1. Золотарева, А. В. General Hygiene: lectures for students in English medium – Общая гигиена: курс лекций для иностранных студентов, обучающихся на английском языке / А. В. Золотарева, В. Н. Бортновский, Н. В. Карташева; пер. на англ. яз.

2. General Hygiene: Workbook for medical students / Aliona Tihon; "Nicolae Testemiţanu" State Univ. of Medicine and Pharmacy, Gen. Hygiene Dep. – Chişinău: CEP Medicina, 2017. – 247p.

6. Control questions (feedback):

1. Identify the physiological and hygienic importance of water.
2. What are the hygienic requirements for drinking water?
3. Identify the epidemiological significance of water.
4. Hygienic requirements for water quality of centralized water supply sources.

Lecture №4

1. Theme: Nutrition as a factor in health.

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2. Purpose: to introduce the students to nutrition as the most important factor of life support of the human body.

3. Lecture thesis:

Food borne illnesses are usually infectious or toxic in nature and caused by bacteria, viruses, parasites or chemical substances entering the body through contaminated food. Chemical contamination can lead to acute poisoning or long-term diseases, such as cancer. Many food borne diseases may lead to long-lasting disability and death. Some examples of food hazards are listed below. Food poisoning and stomach flu are both gastrointestinal infections. They both cause gastroenteritis, which is inflammation of your stomach and small intestine. Gastroenteritis is the sign that your immune system has been activated to remove the infection. Many of the same viral, bacterial and other infections can cause food poisoning or stomach flu, resulting in the same symptoms. The main difference is that food borne illness comes from food, whereas you may catch a stomach bug in a variety of other ways.

Contamination occurs when food is not:

- Fresh.
- Washed well.
- Handled in a sanitary way.
- Cooked to a safe internal temperature.
- Held at proper temperatures.
- Refrigerated or frozen promptly.

The most common symptoms of food poisoning include:

- Diarrhea.
- Nausea and vomiting.
- Stomach pain and cramping.
- Fever.
- Headache.
- Weakness.

There are three groups of food poisoning:

1 — Bacterial (microbial);
2 — Nonbacterial (no microbial);
3 — uncertain etiology.

Classification of food poisoning of microbial nature:

1. Microtoxicosis (Escherichia coli, Proteus vulgaris, Clostridium perfringens type A, Bacillus cereus, Streptococcus faecalis and other).
2. Food toxicosis (intoxication):
- Bacterial (Staphyloccus aureus, Clostridium botulinum)
- Mycotoxicosis (toxin-producing moulds Aspergillus, Fusarium, Penicillium, Claviceps purpurea) - Ficotoxicosis.
3. Poisoning of mixed etiology.

The basic signs of food poisoning of microbial nature:

Occurs singly (sporadic cases) or in outbreaks where two or more cases are related to food consumption.
Has a short incubation period.
Can`t be transmitted from man to man.
Has a sudden onset, short duration of illness.

4 Steps to Prevent Food Poisoning

Clean

Wash your hands and work surfaces before, during, and after preparing food. Germs can survive in many places around your kitchen, including your hands, utensils, cutting boards, and countertops.

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Separate

Separate raw meat, chicken and other poultry, seafood, and eggs from ready-to-eat foods. Use separate cutting boards and keep raw meat away from other foods in your shopping cart and refrigerator.

Cook

Cook food to the safe internal temperature to kill harmful bacteria. Use a food thermometer.

Chill

Keep your refrigerator 40°F/ 4-7 C° or below. Refrigerate leftovers within 2 hours of cooking .

Food poisoning of non - microbial etiology is divided into 3 groups:

1. poisoning with poisonous products: mushrooms, wild plants, fish and glands of internal secretion of slaughter animals;
2. poisoning with products that are poisonous under certain conditions: sprouted and green potatoes, raw beans, raw beech nuts, pike, mackerel, bee honey;
3. Poisoning caused by chemical impurities: residual amounts of pesticides and chemicals entering products from equipment, containers, inventory and the environment.

Poisoning by poisonous products of plant and animal origin is poisoning by mushrooms, wild plants, fish and glands of internal secretion of slaughter animals.

Mushroom poisoning most often occurs in children and adults who do not know the differences between edible mushrooms and their poisonous counterparts. The most frequent poisoning with pale toadstool is confused with champignons, fly agarics are confused with edible honey mushrooms. Poisoning by poisonous products of plant and animal origin is poisoning by mushrooms, wild plants, fish and glands of internal secretion of slaughter animals.

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Pale toadstool causes poisoning with a lethality of 50% of cases or more. Toxins have hepatotropic and neurotropic effects. The incubation period is 10-12 hours, then a violent violation of gastrointestinal functions, taking on a cholera—like character, with indomitable vomiting, diarrhea, dehydration of the body, after which jaundice develops, cessation of urination, coma and death.

Fly agarics contain muscarine, which causes poisoning after 1-4 hours, accompanied by salivation, vomiting, diarrhea, pupil constriction, hallucinations, delirium, convulsions. Lethal outcome is rare.

Poisoning with poisonous plants is also common in children and people who confuse wild plants with edible garden and edible forest crops; for example, they confuse the root of the poisonous milestone with the root of parsley, buckthorn fruits with cherry fruits, crow's eye fruits with blueberries, lily of the valley fruits with edible forest berries.

There are some poisonous fish species:

- a pufferfish that lives in the Sea of Japan,
- marinka — in the Syr Darya and Amu Darya rivers,
- sevan temple fish,
- moustache fish and some others.

The adrenal glands and pancreas of slaughter animals are also poisonous, it is not recommended to eat them.

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- moustache fish and some others.

The adrenal glands and pancreas of slaughter animals are also poisonous, it is not recommended to eat them.

Food poisoning by plant and animal products under certain conditions.

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- Solanine is contained in potatoes, especially a lot of it in sprouted and green, stored in the light. Poisoning by them is rare, but it is possible when using a large amount of such potatoes boiled in the peel. Poisoning is accompanied by nausea, vomiting, intestinal dysfunction.

Phasin enters the structure of raw beans, it is destroyed when heated. Poisoning is manifested by dyspeptic phenomena when eating raw beans, in case of insufficient heat treatment and the use of bean flour in nutrition under the same conditions.

Fagin is found in raw beech nuts. Roasted nuts are not dangerous. Poisoning is manifested by headache, nausea and intestinal dysfunction.

Poisoning by temporarily poisonous organs of fish. During the spawning period (spawning), caviar, milk and liver of many fish (burbot, pike, mackerel, etc.) become poisonous. Poisoning is characterized by the phenomena of acute gastroenteritis, sometimes taking a cholera-like course.

Poisoning with bee honey. The danger is honey collected by bees from poisonous plants (Marsh bagulnik, rhododendron, azalea, datura, henbane, etc.). Poisoning is acute, the clinical picture depends on the type of poison.

Food poisoning caused by impurities in the products of chemicals.

The causes of this group of food poisoning are food additives, residual amounts of pesticides and chemicals entering products from equipment, containers, inventory and the environment. With prolonged intake of small amounts of these substances with food, chronic food poisoning can develop.

Food poisoning by chemical impurities. Heavy metal salts — lead, copper, zinc, etc. — from dishes, food containers and equipment can get into food.

Chronic lead poisoning when eating food from dishes containing elevated concentrations of lead for a long time. The main symptoms of lead poisoning are anemia, lead edging on the edge of the gums, abdominal pain, disorders of the nervous system.

Copper poisoning is rare, but it is possible when storing acidic food in a copper dish with a disturbed half-life. Copper salts cause acute poisoning, has a cauterizing effect on the mucous membranes of the digestive tract, cause colicky abdominal pain, diarrhea, and sharp weakness.

Zinc. Only cold water is allowed to be stored in galvanized dishes. When using such dishes for cooking, especially acidic, acute zinc poisoning is possible. Clinical manifestations are acute: the incubation period is short — from a few minutes to several hours (2-3), the taste of metal in the mouth, vomiting, diarrhea, blood admixture in vomit and feces.

Prevention of non-bacterial food poisoning:

- prevention of harmful impurities from entering into products and prepared food;
- prevention of the use of poisonous products in food and those that have become poisonous under certain conditions;
- spreading knowledge about poisonous mushrooms, plants, fish and other poisonous products among the population;
- hygienic education of employees of food facilities.

Mycotoxicosis is the consequence of ingestion of grains or forage containing toxic metabolites produced by certain fungi. Fungi that produce toxins often do so only under specific conditions of warmth, moisture and humidity. Factors that adversely affect plants or their seeds (grains) often influence mycotoxin production. Mycotoxins can develop in field grains, damaged grains or improperly stored feeds.

Some toxic effects are hepatotoxic, teratogenic, immunosuppressive, neurotoxic and mutagenic.

The prevention of mycotoxicosis:

1. Breeding (it aim at disease resistance);
2. Harvesting during time;
3. Proper storage of grain;
4. Laboratory control of grain.

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Aflatoxicosis.This mycotoxicosis is caused by mycotoxins produced by Aspergillus flavus, Aspergillus parasiticus or Penicillium puberulum. Four major toxins (B1, B2, G1, G2) are produced. B1 is of greatest significance and is a potent hepatotoxin. Fungi growing on peanuts, corn, wheat and several other cereal grains commonly produce the toxins. Maximum aflatoxin formation occurs under conditions related to the specific grain, its moisture content, storage temperature and humidity.

Acute aflatoxicosis is uncommon. It is usually a subacute to chronic disease caused by daily ingestion of smaller amounts of aflatoxin over several weeks.

Ergotism. Claviceps purpurea is a fungus of many grasses and several cereal grains, especially rye, oats and wheat. The sclerotium of the fungus is a dark, elongated body and often can be seen on cereal grain heads and in processed grains. The fungus produces three major alkaloids that cause ergotism. The primary lesions caused by the alkaloids include arteriolar vasoconstriction and endothelial cell injury that often leads to thrombosis. When present in low levels, the alkaloids can result in reduced growth rates. Larger amounts lead to ischemic necrosis followed by a dry, gangrenous sloughing of parts of extremities, especially tails, ears and hooves. Symptoms of ergotism are exacerbated by cold weather. In pregnant sows, ergotism can inhibit mammary development, reduce litter size, reduce birth weights, and cause a profound post-farrowing agalactia. The agalactia is believed to be related to inhibition of prolactin secretion. Diagnosis of ergotism is based on lesions coupled with the gross or microscopic identification of significant numbers of ergot sclerotia in grains or the ground feed. Doubtful results may be verified by laboratory confirmation of significant amounts of alkaloids in the feed.

Fusariotoxicosis is one of the types of fungal intoxication that occurs under the influence of toxic components of Fusarium fungi. These pathogens belong to the class of trichothecenes and are one of the main pathogens that occur in food, animal feed. Mycotoxins cause diseases such as alimentary-toxic aleikia (causative agent of Fusarium sporotrichioides) and poisoning with “drunk bread” (Fusarium graminearum). For the formation of mycotoxicosis, it is necessary to get the toxins of the pathogen in an alimentary way — when eating infected bread, cereals and other products from infected cereals. Toxic substances penetrate into the gastrointestinal tract, from where they can spread throughout the body and cause systemic intoxication syndrome. The target organs for fusariotoxicosis are the bone marrow and the structures of the central nervous system, which explains the severity of this type of mycotoxicosis. The disease affects all hematopoietic organs and proceeds with a change of 3 stages:1. Intoxication syndrome (weakness, sweating, headaches) in combination with a superficial burn of the gastrointestinal tract (pain when swallowing and along the esophagus, abdominal discomfort).2. Leukopenia and thrombopenia — decrease in the level of leukocytes and platelets.3. Anginous-hemorrhagic stage — the development of necrotic angina, debilitating fever, bleeding (nasal, gingival, pulmonary, rectal). Kashin-Beck disease (KBD) is a chronic osteoarthritic disease, endemic in parts of China. Its etiology is unknown. Selenium deficiency, high concentration of organic matter (mainly fulvic acid) in drinking water, and severe contamination of grain by fungi have been proposed environmental causes. The clinical manifestations are related to decrease in growth and multiple joint damage. The worst form of the disease starts at childhood (age 2–3 years) and may result in dwarfism. Signs of symmetrical severe articular deformities caused by primary epiphyseal destruction are followed by severe cartilage destruction resulting in restriction of movements and metaphyseal enlargement. The distal joints of the upper and lower limbs are most often and most severely affected. Frequently involved joints are the ankle-, wrist-, knee- and elbow joint. Patients experience arthritic pain, morning stiffness, shortened fingers, deformed and/or enlarged joints, with limited motion in the extremities .

4. Illustrative material: presentation

5. Literature:

Electronic resources:

1. Золотарева, А. В. General Hygiene: lectures for students in English medium – Общая гигиена: курс лекций для иностранных студентов, обучающихся на английском языке / А. В. Золотарева, В. Н. Бортновский, Н. В. Карташева; пер. на англ. яз.

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2. General Hygiene: Workbook for medical students / Aliona Tihon; "Nicolae Testemiţanu" State Univ. of Medicine and Pharmacy, Gen. Hygiene Dep. – Chişinău: CEP Medicina, 2017. – 247p.
3.Korolev, 2016 y, Nutrition.

6. Control questions (feedback):

1. What is the energy balance of the body?
2 What is nutritional biological value?
3. How is the daily energy expenditure calculated?
4. Biological action of food and types of nutrition.
5. The concept of rational nutrition.

Lecture №5

1. Theme: Hygiene of children and adolescents.

2. Purpose: to give the trainee an understanding of the subject, objectives and research methods of child and adolescent hygiene.

3. Lecture thesis:

HCT is a section of hygiene studying the action of environmental factors on a growing organism and developing preventive measures to maintain and strengthen the health of children and teenagers. The primary tasks of HCT are:

- studying the physical development
- elaboration of hygienic requirements to children's preschool and school institutions, to training, physical training of children, to children's toys
- hygiene of teenagers work
- hygiene of children's nutrition
- medical-professional consulting at school

Methods of research in HCT

- Epidemiological method (studying the health state of children's contingents depending on environmental factors);
- Method of sanitary description (sanitary inspection of children's preschool institutions, schools, etc.);
- Method of sanitary examination (examination of children's toys, etc.);
- Methods of laboratory experiments (for example, studying the effect of harmful factors on a growing organism in experiments on laboratory animals).

Schemes of age periodization

The biological periodization accepted in HCT includes:

- the period of new-born (1-10 days);
- infancy - till 1 year;
- early childhood - 1-3 years;
- the first childhood - 4-7 years;
- the second childhood - boys of 8-12; girls - 8-11 years;
- teenager age - boys of 13-16; girls - 12-15 years;
- youthful age - young men of 17-21; girls - 16-20 years.

Neonatal period

The main functions of the body in a state of unstable equilibrium:

– in the first 2–4 days are observed weight loss (6–10 %);
– icteric staining associated with a temporary failure of the liver and enhanced disintegration of erythrocytes;
– Insufficient thermoregulation (body temperature can easily change with changes in ambient temperature).

Normally, all these functional changes disappear by the second week of life.

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Infants (from 10 days to 1 year)

- At this period marked the highest intensity of growth and development. The body length is increased approximately 1.5-fold, and weight — 3-fold. From 6 months start teething.
- Fast paced neuropsychological development: the first months of developing the activities of all the senses, form positive emotions. By the year of the child may have to walk independently, formed the preparatory stages of the development of speech, begins the development of higher mental functions: attention, memory, thinking.
- Some of the relative weakness of the organs and systems against a background of intense growth and development in this period of life can lead to more frequent cases of acute illness, the formation of variations in health (often exudative diathesis, rickets, anemia, and various digestive disorders).

Early childhood (from 1 to 3 years)

- At this period marked ends the process of eruption of primary teeth.
- After 2 years of absolute and relative values of the annual increase in body size decrease rapidly.
- Begin to form complex functions of the brain develops speech (vocabulary of 200–300 words), rapid pace of morphological and functional development of all organs and systems.
- With incomplete immunity associated diseases, even for minor violations of the nutrition and hygiene care. Each transferred the disease can lead to chronic diseases or lead to lag in the physical and neuropsychological development.

First childhood (preschool age from 3 to 7 years)

- At this period marked the slower growth rate. The increase in body length per year on average 8 cm, body weight increase — about 2 kg. During this period, boys and girls do not differ from each other in size and shape of the body.
- Starting from 6 years appear first permanent teeth.
- Continuing growth and functional improvement of all organs and systems, as well as intensive development of intellectual abilities.
- There is insufficient hardness of bones due to the predominance of organic matter over mineral (calcium, phosphorus, magnesium). This requires continuous monitoring of the correctness of posture while reading and writing, to avoid the appearance of spinal deformities.

Second childhood (from 7–8 years to 12 years old boys and 11 girls)

- At this period marked revealed sex differences in size and shape of the body erated growth in body length. Growth rate in girls higher than boys, since puberty in girls starts on average 2 years earlier. About 10 years old girls outperform boys on the length and weight at shoulder width.
- By 12–13 years in boys and girls completed a change of baby teeth to permanent teeth.
- Increased secretion of sex hormones (especially girls), which begin to develop secondary sexual characteristics. In boys, the process of maturation is expressed to a lesser extent.
- Ossification of the spine is not yet complete, it remains a danger of distortion during long voltage and improper posture at a desk.
- In this age are not allowed excessive exercise. Indicated an incomplete fusion of parts of the skeleton, particularly the pelvis, which may cause displacement of the pelvic bones when jumping to incorrect splicing in the future and adversely affect the girls later in childbirth.

Adolescence 13 to 16 years old boys from 12 to 15 years old girl

- Boys just beginning puberty in girls are already completed.
- Observed a further increase in the rate of growth (puberty jump), which applies to all body sizes.

The greatest increase in body length in girls observed at the age of 11–12 years, boys — aged 13–14 years.

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- At this period marked rearrangement of the major physiological systems (musculoskeletal, circulatory, respiratory, digestive, etc), by the end of the functional characteristics of adolescents approaching the characteristics of an adult.
- The boys especially intensively developed muscular system, formed secondary sexual characteristics.
- The girls are continuing the development of mammary glands, growth of pubic hair and armpits. The clearest indicator of the degree of maturation of the female body is the first menstruation, whose appearance indicates the relative maturity of the uterus.

Adolescence from 17 to 21 years old boys from 16 to 20 years old girl
During this period largely completed the process of growth and the formation of the body, and all major dimensions of the body reach the final value of the adult.

The social age periodization

- day nursery age - till 3 years;
- preschool age - 3-7 years;
- junior school age - 7-10 years;
- middle school age - 11-14 years;
- senior school age - 15-18 years.

Physical development is a complex of morphological and functional signs determining growth, formation of child's organism, resources of its vital energy, tolerance and activity, and level of biological development also. Physical development is one of the important parameters characterizing the health state of children and influence of various factors on it.

The purposes of physical development research are the following:
1.revealing the laws of growth and development;
2.estimation of individual and population level of health;
3.studying the effect of environmental, social, genetic factors;
4. estimation of efficiency of medical-prophylactic measures.

- Somatoscopic – the description of the skeleton form, spinal column, chest, legs, posture, development of muscles, puberty, elasticity of the skin
- Somatometric (anthropometric) – measuring height, body mass and circumference of the chest
- Physiometric – measuring vital capacity of the lungs, chest excursion, muscle strength, blood pressure

Determination of biological development level (biological age)

Biological age – is complex of morphological and functional characteristics of organism, depending from individual rate of growth and development. Biological age is determined by criteria:

- number of second teeth
- degree of hand ossification
- growth and augmentation of growth for last year
- time of cutting and change of first teeth
- development of secondary sexual characters

The criteria for estimation of health state are:

1) Presence or absence of chronic diseases – determined at medical examination by specialists.
2) Degree of resistibility of child's organism estimated by liability to diseases –number of acute diseases (including acute attacks of chronic) during last year.
3) Functional level of the main organism systems.
4) Level and harmony of physical development.
5) Level of mental development – determined by psychoneurologist.

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Acceleration is a speeded up physical development of children and teenagers as compared with anthropometric parameters of children many years ago. For the recent 10-15 years rates of acceleration have noticeably decreased and even deceleration is observed, i.e. decreasing of physical development of children and teenagers in comparison with anthropometric parameters of children 10-15 years ago. Up to now the universal reason of acceleration is not established in view of great amount of factors influencing physical development.

The basic theories of acceleration are:

- Alimentary theory – improvement of qualitative and quantitative parameters of nutrition of the population;
- Medical theory – decrease of disease incidence, gynaecological pathology due to development of medicine;
- Heliogenic theory - influence of cyclic changes of solar activity and levels of UVR;
- Ecological theory - growth of CO_2 content in atmosphere, increase of intensity of electromagnetic fields, elevation of level of natural radioactive background;
- Theory of hysteresis – increase of mixed marriages of different races and nationalities.

Types of CPI are: kindergarten (for children of 3-7 years), day nursery (till 3 years), children's center (day nursery + kindergarten), children's home, preschool children's home, specialized CPI for children with disorders of development, preschool health-improving institutions for summer vacation.

Requirements to Choice of Site for CPI

- Accessibility for population - radius of service in micro district is 300 m;
- Optimal hygienic conditions on the site (optimal microclimate, absence of air pollution by chemical and physical factors, presence of green plantations).
- The site area is 30-40 m^2 per child;
- The form of the site should be rectangular;
- There should be special functional zones on the site based on principle of group and age isolation.

Zone of building up

- Zone of group playgrounds. The area of group playgrounds should be 7,2 m^2 per child, game and sports equipment should correspond to age.;
- Zone of sports grounds. There should be 2 sport grounds with area of 150-250 m^2 – separately for junior and senior age groups;
- Household zone. It should be located in a distant part of the site, it should be separated by green plantations;
- Zone of green plantations. It should occupy not less than 50% of the site area;

Hygienic requirements to a group section

- A group section is the basic functional unit of CPI; it is a set of premises intended for staying one group of children.
- A group room is a common room which can be divided into a room for playing and a bedroom. The total area is 4 $м^2$ per child.
- Frequency of natural ventilation - 1,5.

Hygienic requirements to illumination.

- Coefficient of natural illumination (CNI) - 1,5%.
- Light coefficient (LC) 1:4 – 1:5.
- Artificial light 150 lx (at luminescent lamps 300 lx).

Microclimate in CPI:

- The air temperature is 21-22˚C (in a day nursery) or 18-20˚C (in a kindergarten), relative humidity - 40-60%, speed of air movement - 0,1-0,3 m/sec.

Requirements to School Location

- Accessibility (radius of service is 1.5 km in a city and 3 km in the country);
- Optimal hygienic conditions in the place of future school site.

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Requirements to a School Site

- The area is 20-50 m^2 per pupil, the site should be of a rectangular form.
- Functional zones of school site include: zone of building up (of school building); zone of rest; training-experiential zone; sports zone; household zone; zone of green plantations.
- Functional zones of school site

Zone of building up. The systems of school construction may be:
centralized (all premises are in one building; it is an old project which causes high level of infections, noise, air pollution), a pavilion type (there are many small buildings, it is accepted now for schools of a sanatorium type),
a block type (blocks for junior, middle, senior classes, for gymnasium, kitchen).

- Zone of rest - two grounds for outdoor games for junior and senior classes, a ground for a quiet rest, benches.
- Training-experiential zone – a garden, vegetable garden, greenhouses, educational workshops, etc.
- Sports zone – a stadium with racetracks and pits for jumps, grounds for volleyball, sports apparatuses, etc.
- Household zone should be located at the end of a school site, closer to economic entrance and separated by green plantations.
- Zone of green plantations should occupy not less than 40-50 % of the site area

The area should be 2.25 m2 per pupil, on the whole not less than 50 m^2.

- Microclimate should be the same as for usual premises, frequency of air ventilation per hour - 4, ventilation volume - 20-30 m3/h/pupil, CO_2 concentration in the air is not more than 0.1 %.

Requirements to illumination are very important. It should be:

- natural: LC 1/4-1/5, CNI – 1.5 %, light angle - 27º, angle of aperture – 5º;
- artificial: common illumination - 150 lux (luminescent lamps - 300 lux).

Requirements to school desks (school tables): In a classroom the desks should be of not less than 3 sizes, placed in 3 rows, with distance of 0.7 m between rows, 2.5m to the blackboard, and 0.5m to the walls.
Hygienic Requirements to Educational Laboratories

Chemistry, physics, biology laboratories. Their area should be 70-100 m^2, they should have an additional room of 6 m^2; it is better to locate them on the top floors of a school building where airing is better; they should be equipped with artificial ventilation, water-pipe for washing utensils and equipment.
The areas of classrooms and classrooms of technical and vocational education, post-secondary education, higher and postgraduate education are determined by:
1)at least 2.5 m2 per 1 student - for 12 - 15 places;
2) 2.2 m2 per 1 student - for 16-25 places;
3) 1.8 m2 per 1 student - for 26 - 49 places;
4) 1.5 m2 per 1 student - for 50 - 75 places;
5) 1.3 m2 per 1 student - for 76 - 100 places;
6) 1.2 m2 per 1 student - for 100 - 150 places;
7) 1.1 m2 per 1 student - for 150 - 350 places;
8) 1.0 m2 per 1 student - for 350 or more places.
Hygienic Requirements to School Furniture include the following:

- correspondence to the anthropometrical sizes of children (prevention of disorders of the osteomuscular system and organs of vision);
- prevention of traumatism;
- non-toxicity of materials and dyes, their stability to disinfection;
- light or green colouring of tables.

Hygienic Standards of School Furniture

These include:

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- Differential – a vertical distance from a table to chair – it should be equal to 1/7-1/8 of height or to the distance from the lowered elbow to sitting.
- Distance of sitting – a horizontal distance between the edge of the table and edge of sitting – it should be -4–5 cm.
- Distance of chair back – a horizontal distance from the edge of table up to back of sitting = the anterior-posterior section of body + 3-5 cm.
- Height of sitting - length of leg + 2 cm.

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Hygienic Requirements to School Schedule

Restriction of number of lessons per week: in the 1st form - up to 20 lessons, 2nd form - up to 22, 3-4 form - 24, 5-8 form - 30, 9-11 form - 31 lessons per week; Arrangement of lessons by complexity within a day and week using a scale of difficulty of school subjects: Requirements: it is impossible to put 2 difficult lessons together, at the beginning and at the end of the day and week. The maximally difficult lessons must be on Tuesday and Wednesday, i.e. in the middle of the week. It corresponds to dynamics of capacity for work.

Medical-professional consultation and orientation at school are carried out by doctors, teachers and experts of youth employment centers with the purpose of choosing the future professions and recommendation to schoolchildren in respect to professions suitable for their health state.

Professional orientation includes: information service about availability of vacant occupations, psychological consultations in view of type of the nervous system activity.

Medical-professional consultation is carried out twice:

- in the 5th form for children with abnormalities of physical development, for the rest - in the 7th form;
- in the 10-11th form.
- For the first time it is carried out for early revealing and treatment of diseases limiting capacity for work, for the second time – for the final determination of range of professions.
- While medical professional consultations the medical documentation for a schoolboy is used, evaluation of physical development and physical examination are carried out, if necessary – a thorough medical examination in hospital is done.

4. Illustrative material: presentation

5. Literature:

Electronic resources:

ТҮПНҰСҚА ОРИГИНАЛ

1. Золотарева, А. В. General Hygiene: lectures for students in English medium – Общая гигиена: курс лекций для иностранных студентов, обучающихся на английском языке / А. В. Золотарева, В. Н. Бортновский, Н. В. Карташева; пер. на англ. яз.
2. General Hygiene: Workbook for medical students / Aliona Tihon; "Nicolae Testemiţanu" State Univ. of Medicine and Pharmacy, Gen. Hygiene Dep. – Chişinău: CEP Medicina, 2017. – 247p.

6. Control questions (feedback):

1. When was the discipline of child and adolescent hygiene formed?
2. What are the goals and objectives of child and adolescent hygiene?
3. Identify the investigation methods of child and adolescent hygiene.
4. What are the main problems facing the discipline of child and adolescent hygiene?

Lecture №6

1. Theme: Fundamentals of occupational hygiene and physiology.

2. Purpose: to introduce students to the hygienic characteristics of the main factors, the industrial environment and the labor process and the prevention of professional diseases.

3. Lecture thesis:

Occupational Hygiene = Industrial Hygiene. "Industrial hygiene is the science of protecting and enhancing the health and safety of people at work and in their communities". "Occupational hygiene is the science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace, and which could impair the health and well-being of workers, also taking into account the possible impact on the surrounding communities and the general environment".

The main task: Qualitative and quantitative assessment of the impact of working conditions on the body and the development and implementation of measures that can ensure maximum productivity in the absence of harmful effects on the health of workers.

Harmful production factor is a factor of the environment and the labor process, the impact of which on the worker under certain conditions can cause occupational disease, temporary or persistent decrease in working capacity, increase the frequency of somatic and infectious diseases, lead to a violation of the health of offspring.

Harmful production factors

- Physical factors
- Chemical factors
- Biological factors
- Factors of the labor process (severity and intensity of labor)

Chemical hazards

- – Particles, including nanoparticles
- – Gases and vapors, especially solvents
- – Heavy metals
- – Skin irritants

• Physical hazards – Noise

- – Radiation
- – Temperature extremes

• Biological hazards

- – Infectious disease agents
- – Mold

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• Injury hazards
* – Unintentional traumatic injuries, including vehicle crashes
* – Violence
* – Musculoskeletal disorders
• Social/behavioral hazards
* – Stress
* – Sleep deprivation
* – Substance abuse

General occupational hygiene studies factors of the production environment, morbidity, standards

Private occupational hygiene working conditions in various industries: machine-building, sewing, textile, in the construction materials industry and in construction, etc., the state of health of workers, occupational morbidity, recreational activities.

Occupational hygiene is a preventive and legislative science

1. Develops hygienic standards for production factors (dust, gas, noise, vibration, illumination, temperature, humidity.)
2. Develops a rational work and rest regime
3. Develops recommendations for the prevention of fatigue and improving performance
4. Participates in the development of engineering and technological means of pest control (ventilation, vibration damping devices) and personal protective equipment.
5. Studies the state of general and occupational morbidity of workers. Medical care of employees, organization of preliminary and periodic examinations.

Methods used in occupational hygiene:

- Chemical
- Physical
- Physiological and pathophysiological, psychological
- Biochemical
- Clinical
- Statistical
- Method of sanitary supervision

Occupational disease is an acute or chronic disease caused by the impact of harmful production factors on an employee in connection with the performance of their work (official) duties.

There are seven groups of occupational diseases:

* chemical factors – acute and chronic intoxication, as well as their consequences, occurring with isolated or combined damage to various organs and systems;
* dust – pneumoconiosis – silicosis, silicatoses, metalloconioses, pneumoconiosis of electric welders and gas cutters, grinders, sanders, etc.;
* physical factors – vibration disease; diseases associated with exposure to contact ultrasound, – vegetative polyneuritis; hearing loss by the type of sensorineural hearing loss; diseases associated with exposure to electromagnetic radiation and laser radiation; radiation sickness; diseases associated with changes in atmospheric pressure, – decompression sickness; diseases that occur under adverse meteorological conditions, – overheating, obliterating endarteritis, vegetative-sensitive polyneuritis;
* overstrain – diseases of peripheral nerves and muscles – neuritis, radiculopolyneuritis, cervical-brachial plexitis, vegetomyofascitis, diseases of the musculoskeletal system - chronic tendovaginitis, stenosing ligamentitis, bursitis, epicondylitis of the shoulder, deforming arthrosis; coordination neuroses – writing

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spasm, other forms of functional dyskinesia; diseases of the vocal apparatus – phonasthenia and organ of vision – asthenopia and myopia;

* biological factors – infectious and parasitic – tuberculosis, brucellosis, glanders, anthrax, dysbiosis, candidomycosis of the skin and mucous membranes, visceral candidiasis;
* allergic factors – conjunctivitis, upper respiratory tract diseases, bronchial asthma, dermatitis, eczema;
* oncological diseases – tumors of the skin, bladder, liver, cancer of the upper respiratory tract.

There are also acute and chronic occupational diseases.

* Acute occupational disease (intoxication) occurs suddenly, after a single (for no more than one work shift) exposure to relatively high concentrations of chemicals contained in the air of the work area, as well as levels and doses of other adverse factors.
* Chronic occupational disease occurs as a result of prolonged systematic exposure to adverse factors on the body

Hierarchy of Control

1) Elimination

– Complete removal of the hazard or the process that produces it from the workplace

– Responsibility for change not placed on exposed person

2) Engineering Controls

– Physical, chemical, or biological changes made to a process or a product that reduce exposure to hazards

– Responsibility for change not placed on exposed person

– Concepts: substitution, automation, isolation, ventilation, control equipment

3) Work Practice and Administrative Controls

– Changes in how, when, or by whom tasks are performed in order to reduce exposure to hazards

– Management and exposed person responsible for change

4) Personal Protective Equipment (PPE)

– Equipment or clothing used by individual to reduce exposure

– Exposed individual responsible for chang

Work Practice &Administrative Controls

• Work practice (how) control examples

– Scooping powders rather pouring from containers

– Regular maintenance of equipment

– Regular cleaning of work surfaces

– Wet cleaning instead of dry methods to reduce dust levels

– Proper hand washing

– Continuing education and training

– Emergency drills

• Administrative (when, by whom) control examples

– Restricting access to areas with potentially hazards

– Use of hot, warm, and cold zones in response to spills

– Security procedures

– Limit work time to reduce mistakes

– Schedule potentially hazardous operations during shifts when fewer workers are present

Personal Protective Equipment

"When exposure to hazards cannot be engineered completely out of normal

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operations or maintenance work, and when safe work practices and other forms of administrative controls cannot provide sufficient additional protection, a supplementary method of control is the use of protective clothing or equipment.

4. Illustrative material: presentation

5. Literature:

Electronic resources:

1. Золотарева, А. В. General Hygiene: lectures for students in English medium – Общая гигиена: курс лекций для иностранных студентов, обучающихся на английском языке / А. В. Золотарева, В. Н. Бортновский, Н. В. Карташева; пер. на англ. яз.
2. General Hygiene: Workbook for medical students / Aliona Tihon; "Nicolae Testemiţanu" State Univ. of Medicine and Pharmacy, Gen. Hygiene Dep. – Chişinău: CEP Medicina, 2017. – 247p.

6. Control questions (feedback):

1. The basic tasks of labor hygiene.
2. How does the labor process affect the functional state of the organism?
3. What is fatigue, prevention of fatigue?
4. Modern classification of industrial hazards.

Lecture №7

1.Theme: Hygiene of treatment and prevention organizations.

2. Purpose: to study the subject of hygiene of medical and preventive institutions, purpose, tasks, history of development of hygiene of medical and preventive institutions.

3. Lecture thesis:

List of diseases for mandatory preventive vaccinations within the guaranteed volume of medical care

1. At the expense of the republican budget, mandatory preventive vaccinations (injection of vaccines and other immunobiological drugs) are carried out against the following infectious and parasitic diseases after receiving the informed consent of the person to be vaccinated:

1) routine preventive vaccinations:

- viral hepatitis "B";
- haemophilus influenza b;
- diphtheria;
- whooping cough;
- measles;
- rubella;
- pneumococcal disease;
- poliomyelitis;
- tetanus;
- tuberculosis;
- epidemic parotitis;

2) preventive vaccinations according to epidemiological indications:

- rabies;
- typhoid fever;
- spring-and-summer tick-borne encephalitis;
- plague;

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- coronavirus infection.

2. At the expense of local budgets, mandatory preventive vaccinations (injection of vaccines and other immunobiological drugs) are carried out according to the epidemiological indications against the following infectious diseases after receiving the informed consent of the person to be vaccinated:

- viral hepatitis "A";
- flu;
- anthrax;
- tularemia.

Rules for mandatory preventive vaccinations within the guaranteed volume of medical care

1. These Rules for mandatory preventive vaccinations within the guaranteed volume of medical care (hereinafter the Rules) have been developed in accordance with paragraph 5 of Article 85 of the Code of the Republic of Kazakhstan dated July 7, 2020 On Public Health and Healthcare System and define the procedure for carrying out preventive vaccinations.

2. Mandatory preventive vaccinations (hereinafter - vaccinations) shall be carried out by legal entities with a license for providing primary health care, consultative and diagnostic and (or) inpatient medical care for adults and (or) children.

3. The terms of mandatory vaccinations within the guaranteed volume of medical care shall be established in accordance with the appendix to these Rules.

4. Persons with a higher and secondary medical education, trained in the rules of vaccination techniques, emergency care in the event of adverse post-immunization effects, who have a permit for carrying out vaccinations, shall be allowed to administer injections.

The permit shall be issued annually by an ad hoc commission formed at the medical organization for the issuance of permits to administer injections.

5. The heads of medical organizations shall organize vaccinations, training of specialists administering injections.

6. Vaccines shall be administered in specially equipped vaccination rooms of healthcare organizations and (or) educational organizations. The premises where vaccinations are carried out must be provided with emergency and anti-shock therapy kits with instructions for their use.

7. In the absence of conditions for vaccinations in a settlement (absence of a healthcare organization, a healthcare professional or conditions for storing vaccines and other immunobiological preparations), vaccinations shall performed by the respective mobile vaccination team.

The mobile vaccination teams' operation mode shall be determined by the local public health authorities of regions, cities of republican scale and the capital.

8. Vaccines and other immunobiological preparations shall be administered that are duly registered as prescribed by the legislation of the Republic of Kazakhstan in healthcare.

9. Injections shall be administered parenterally with the use of autodestruct syringes and orally - by ingestion.

10. On the vaccination day to the vaccinated person, the doctor, in the absence of a doctor - a paramedic, shall conduct a survey of the vaccinated person or his legal representative with a medical examination and thermometry to exclude contraindications to immunization and, in the absence of such, shall give permission for the vaccination.

11. The healthcare professional shall provide the vaccinated person or his legal representative with complete and objective information about the vaccination, possible reactions and adverse manifestations after immunization, the consequences of refusing to be vaccinated. Vaccinations shall be carried out after obtaining an informed consent for vaccination by citizens, parents or other legal

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representatives of minors and persons recognized as incapacitated as prescribed by the civil legislation of the Republic of Kazakhstan.

12. A medical examination of an adult vaccinated person before vaccinations shall be carried out in the event of a complaint about deteriorating health and / or in the presence of objective symptoms of diseases.

13. Before vaccinations, a healthcare worker shall check the integrity of the ampoule (vial), the expiration date and labeling of the vaccine and other immunobiological preparations, the compliance of the vaccine with the solvent and the attached instructions.

14. Vaccinated persons shall be under observation for 30 minutes in the healthcare organization where they received injections to take action in the event of post-immunization adverse effects. In the event of vaccinations by a mobile vaccination team, the vaccinated shall be under the supervision of the healthcare worker who made the injection.

15. All the carried out vaccinations shall be subject to registration by a health professional and must contain the following information: date of drug administration, drug name, batch number, dose, control number, expiration date, nature of reaction to drug administration, country of origin. The listed data shall be entered into the registration forms of the following medical documents:

1) for children - a card of preventive vaccinations (form 063 / y), history of the child's development (form 112 / y), medical record of a child (form 026 / y), an insert sheet for a teenager to the outpatient's medical card (form 025-1 / y), a log of preventive vaccinations for newborns (form 064-1 / y), a log of vaccines movement (form 064-2 / y);

2) for adults - an outpatient's medical card (form 025 / y), a registration log of preventive vaccinations (form 064 / y).

16. Information about vaccinations shall be entered in the vaccination passport, the form of which is approved by the authorized body in healthcare in accordance with subparagraph 31) of article 7 of the Code of the Republic of Kazakhstan dated July 7, 2020 On Public Health and Healthcare System.

The healthcare worker who performed the injections shall ensure the correctness and reliability of the entries on vaccinations in the records and vaccination passport.

17. All cases of reactions and adverse effects after immunization to the injected vaccines and other immunobiological preparations shall be recorded in the registration forms of medical documents indicated in paragraphs 15 and 16 of these Rules.

The following population groups shall be subject to mandatory preventive vaccinations:

1) persons by age in accordance with the established terms of mandatory preventive vaccinations;

2) the population living and working in natural foci of infectious diseases (spring-summer tick-borne encephalitis, anthrax, tularemia, plague);

3) persons belonging to risk groups by the nature of their occupation:

healthcare workers (viral hepatitis "B", influenza);

workers of sewage and treatment facilities (typhoid fever);

4) persons belonging to risk groups for their health condition:

persons who received blood transfusion (viral hepatitis "B");

children who are on dispensary registration in a medical organization (influenza);

5) children from orphanages, infant orphanages, inmates of old age nursing homes (influenza);

6) persons who have been bitten, salivated by any animal (rabies);

7) persons who have sustained injuries, wounds with violation of the skin and mucous membranes integrity (tetanus);

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8) persons with a high risk of infection on epidemiological indications (viral hepatitis “A”, influenza, measles, rubella, epidemic mumps, corona virus infection).

List of some invalidated resolutions of the Government of the Republic of Kazakhstan

1. Resolution No. 2295 of the Government of the Republic of Kazakhstan dated December 30, 2009 "On approval of the list of diseases against which preventive vaccinations are carried out, the Rules for carrying them out and population groups subject to routine vaccinations" (Collected Acts of the President and the Government of the Republic of Kazakhstan, 2010, No. 4, art. 45).

2. Resolution No. 663 of the Government of the Republic of Kazakhstan dated June 29, 2010 On amendments to Resolution No. 2295 of the Government of the Republic of Kazakhstan dated December 30, 2009 (Collected Acts of the President and the Government of the Republic of Kazakhstan, 2010, No. 40, art. 357).

3. Resolution No. 119 of the Government of the Republic of Kazakhstan dated February 12, 2013 On amendments to Resolution No. 2295 of the Government of the Republic of Kazakhstan dated December 30, 2009 On approval of the list of diseases for preventive vaccinations, the Rules for carrying them out and population groups, subject to routine vaccinations (Collected Acts of the President and the Government of the Republic of Kazakhstan, 2013, No. 15, art. 266).

4. Illustrative material:presentation

5. Literature:

Electronic resources:

1. Золотарева, А. В. General Hygiene: lectures for students in English medium – Общая гигиена: курс лекций для иностранных студентов, обучающихся на английском языке / А. В. Золотарева, В. Н. Бортновский, Н. В. Карташева; пер. на англ. яз.
2. General Hygiene: Workbook for medical students / Aliona Tihon; "Nicolae Testemiţanu" State Univ. of Medicine and Pharmacy, Gen. Hygiene Dep. – Chişinău: CEP Medicina, 2017. – 247p.

6. Control questions (feedback):

1. Tell the history of the development of hygiene treatment and prevention facilities.
2. What institutions are included in the treatment and preventive care facilities?
3. Tell the functions and tasks of medical and preventive institutions.
4. What activity conducts therapeutic and preventive institutions?

Lecture №8

1. Theme: The subject and method of epidemiology.

2.Purpose: To teach students to realize knowledge in the field of epidemiology and epidemiological surveillance, formation of students' knowledge of theoretical foundations of epidemiology, characteristics of epidemic process, tasks of epidemiology of infectious and non-infectious diseases.

3.Lecture thesis:

Epidemiology comes from the Greek words epi meaning on or about, demos the common people, and ology meaning to study a certain subject. Literally then, epidemiology is the study of people.

In particular, epidemiology is the study of what causes diseases, where, when and in whom diseases take place, and how we prevent or control them. When epidemiology was being developed, it was because of major outbreaks of infectious diseases usually among poor people.

Epidemiology is the foundation of public health and is defined as the study of the “distribution and determinants(link is external and opens in a new window)” of diseases or disorders within groups of people, and the development of knowledge on how to prevent and control them. Epidemiological

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research helps us understand not only who has a disorder or disease but why and how it was brought to this individual or region.

Aims of epidemiology

- To describe the magnitude and distribution of the disease problem in human populations.
- To provide data essential for planning, implementation, and evaluation of health services and setting priorities among the services.
- To identify risk factor or etiological agents.
- To eliminate or reduce the health problem or its consequences and
- To promote the health and well being of society as a whole.

Objectives of epidemiological research

- assessment of the health status of the population in terms of morbidity (incidence), morbidity (prevalence), mortality, temporary disability;
- assessment of the prevalence of morbidity by territory, among various groups population and time;
- formulation, assessment and substantiation of hypotheses about cause-and-effect relationships between the incidence and its determining factors (risk factors);
- proof of hypotheses about risk factors and assessment of the effectiveness of measures to disease prevention and treatment of patients.

Epidemiology centers around the idea that disease and illness do not exist randomly or in a bubble. Epidemiologists conduct research to establish the factors that lead to public health issues, the appropriate responses, interventions, and solutions.

By using research—from the field and in the lab—and statistical analysis, epidemiologists can track disease and predict its future outcomes.

Types of epidemiology

- Epidemiology can cover a wide range of issues, from unintentional injuries to psychosocial stress.
- Infectious Disease Epidemiology for Public Health
- Chronic Disease Epidemiology
- Environmental Epidemiology
- Violence and Injury Epidemiology

This type of epidemiology is at the forefront of today's world—as epidemiologists work on the front lines to track and trace the spread of COVID-19. In this concentration, infectious disease epidemiologists work to detect pathogens or viruses, understand their development and spread, and devise effective interventions for their prevention and control.

Chronic disease epidemiologists battle day-to-day chronic conditions such as cancers, diabetes, obesity, and more. Epidemiologists in this fieldwork to research the origins, treatment, and health outcomes of these diseases in the fight towards prevention. Environmental epidemiology focuses on how an individual's external factors affect health outcomes. This includes physical factors like pollution or housing, as well as social factors like stress and nutrition. Environmental epidemiologists work to understand how different environments may result in physical or neurological outcomes, ranging from psychiatric to cardiovascular disorders. This epidemiological focus aims to address unintentional and intentional injuries across a lifespan. For example, epidemiologists in this field might focus their research on car accidents and work to identify the associated risk factors. Armed with extensive research, the goal of violence and injury epidemiology is to improve a population's health by reducing the morbidity and mortality rate from unintentional and intentional injuries.

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Epidemiology and the information generated by epidemiologic methods have been used in many ways. Some common uses are described below.

Public health officials responsible for policy development, implementation, and evaluation use epidemiologic information as a factual framework for decision making. To assess the health of a population or community, relevant sources of data must be identified and analyzed by person, place, and time (descriptive epidemiology).

More detailed data may need to be collected and analyzed to determine whether health services are available, accessible, effective, and efficient. For example, public health officials used epidemiologic data and methods to identify baselines, to set health goals for the nation in 2000 and 2010, and to monitor progress toward these goals.

These are the terms we use to describe the status of a disease within a population. The continuous presence of an infectious disease in a geographical location is called endemic. For example, there are many parts of the world where Malaria is endemic — it is always present and kills over 400,000 people each year.

An epidemic is the occurrence of a disease that is greater than that expected in the location region. For example, there is currently an epidemic of Ebola virus in Congo and Uganda which started in 2018.

An outbreak is like an epidemic but is often used for a more limited geographic area. For example, there has recently been an outbreak of measles in Samoa.

Finally, when the epidemic involves different countries and a large population it is called a pandemic.

The three major epidemiologic techniques are descriptive, analytic, and experimental. Although all three can be used in investigating the occurrence of disease, the method used most is descriptive epidemiology. Once the basic epidemiology of a disease has been described, specific analytic methods can be used to study the disease further, and a specific experimental approach can be developed to test a hypothesis.

Disinfection is a set of measures aimed at destroying pathogens of infectious diseases and destroying toxins on objects in the external environment to prevent them from getting on the skin, mucous membranes and wound surfaces. It is one of the types of disinfection.

Disinfection may not completely destroy them, but reduces the number of microorganisms to an acceptable level.

Distinguish between preventive, current and final disinfection:

- Preventive - carried out constantly, regardless of the epidemic situation: washing hands, surrounding objects using detergents and cleaning agents containing bactericidal additives.
- Current - is carried out at the patient's bedside, in isolation wards of medical centers, medical institutions in order to prevent the spread of infectious diseases beyond the outbreak.
- Final - is carried out after isolation, hospitalization, recovery or death of the patient in order to release the epidemic focus from pathogens scattered by the patient.
- Mechanical - provides for the removal of the contaminated soil layer or the installation of flooring.
- Physical - treatment with lamps emitting ultraviolet light, or gamma radiation sources, boiling linen, dishes, cleaning materials, patient care items, etc. It is mainly used for intestinal infections.
- Boiling is used to treat linen (boiled in a soap and soda solution for 2 hours), dishes (in a 2% soda solution for 15 minutes), drinking water, toys, food. The steam-air mixture is the active principle in the steam-formalin disinfection chamber; in the disinfection chambers, the patient's

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belongings and bedding are disinfected. Ultraviolet irradiation is used for disinfection of indoor air in medical and other institutions (BUV-15 or BUV-30 lamp).

- Chemical (the main method) is the destruction of pathogens and the destruction of toxins with antiseptics and disinfectants.
- Combined - based on a combination of several of the listed methods (for example, wet cleaning followed by ultraviolet irradiation)
- Biological - based on the antagonistic action between various microorganisms, the action of biological agents. It is used at biological stations, for wastewater treatment.

Incidence: The number of new cases of a disease or disorder in a population over a period of time.
Prevalence: The number of existing cases of a disease in a population at a given time.
Cost of illness: Many reports use expenditures on medical care (i.e., actual money spent) as the cost of illness. Ideally, the cost of illness would also take into account factors that are more difficult to measure, such as work-related costs, educational costs, the cost of support services required by the medical condition, and the amount individuals would pay to avoid health risks. (Adapted from the Environmental Protection Agency's Cost of Illness Handbook)
Burden of disease: The total significance of disease for society, beyond the immediate cost of treatment. It is measured in years of life lost to ill health, or the difference between total life expectancy and disability-adjusted life expectancy (DALY). (Adapted from the World Health Organization.)
DALY (Disability-Adjusted Life Year): A summary measure of the health of a population. One DALY represents one lost year of healthy life and is used to estimate the gap between the current health of a population and an ideal situation in which everyone in that population would live into old age in full health. (Adapted from the World Health Organization.)

4. Illustrative material: presentation

5. Literature:

Electronic resources:

1. Золотарева, А. В. General Hygiene: lectures for students in English medium – Общая гигиена: курс лекций для иностранных студентов, обучающихся на английском языке / А. В. Золотарева, В. Н. Бортновский, Н. В. Карташева; пер. на англ. яз.
2. General Hygiene: Workbook for medical students / Aliona Tihon; "Nicolae Testemiţanu" State Univ. of Medicine and Pharmacy, Gen. Hygiene Dep. – Chişinău: CEP Medicina, 2017. – 247p.

6. Control questions (feedback):

1. The concept of epidemiology.
2. State the purpose of epidemiology.
3. State the main tasks of epidemiology.

Lecture №9

1. Theme: Epidemiologic methods of investigation.Epidemiologic surveillance and its peculiarities in infectious diseases.

2.Purpose: Formation of students' knowledge about epidemiological surveillance of infectious diseases and epidemiological methods of investigation.

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3. Lecture thesis:

Epidemiology is concerned with investigations of patterns of disease distribution and of the factors influencing these patterns. These investigations usually are conducted within a conceptual model or philosophical framework. Thus, epidemiology can be viewed as an integrative eclectic discipline deriving strength from diverse disciplines such as biology, biostatistics, economics, genetics, medicine, psychology and sociology. The field of social epidemiology, for example, is an inductive science concerned with the influence of social, economic and psychosocial factors on disease patterns. On the other hand, pharmaco-epidemiology is concerned with the influence of a particular set of drugs or formulations on disease occurrence.

Epidemiology is also essentially a "comparative" discipline. That is, most epidemiological investigations study diseases and the potential factors related to these diseases among different groups, different periods and different places and then make comparisons. The first step in this process is to determine the strength of statistical association between a factor and disease and then derive biological inferences from the statistical associations.

The information obtained from these investigations is used in several ways:

1. To fully understand the etiology of a specific disease or a group of diseases. For example, a study goal may be to fully understand the roles of genetics and social environment on a set of established cardiovascular disease risk factors such diabetes, hypertension, obesity and hypercholestremia.
2. To evaluate the consistency of epidemiologic data with etiological hypotheses developed using clinical or laboratory observations. For example, several clinical and laboratory observations on the relationship between oral contraceptive use and cardiovascular disease lead to several large epidemiological investigations.
3. To provide a basis for developing consistent preventive procedures, public health policies and public health practices. For example, the epidemiological investigations described in (2) led to lowering of estrogen dose in the oral contraceptives, which have demonstrably lowered the risk of cardiovascular diseases.

Given such a wide scope and uses of epidemiology, several types of epidemiological studies have been proposed. The bulk of the epidemiology is concerned with observational studies. This chapter provides an overview of the design and analytical issues in such studies. The rest of the chapter is organized into 3 sections. Section 2 briefly describes different kinds of epidemiological investigations; Section 3 describes statistical quantities used to measure the strength of association between disease and exposure (characteristic of interest). Section 4 addresses certain design and analytical issues in retrospective and prospective studies, two prominent designs used in epidemiology. Finally, Section 5 concludes the paper with a discussion of areas needing further research.

2. Types of Investigations Epidemiological investigations can be broadly grouped as follows:

1. Observational Epidemiology refers to the inference about the etiological factors that influence the disease occurrence based on the collection and analysis of data from human population groups. Much of epidemiology falls into this category. The designs used in these investigations can be classified into two categories, retrospective (cross-sectional or case-control) and prospective (longitudinal or cohort) designs. These designs are described later. There are some hybrid versions these designs, which are also briefly described later. A bulk of this paper is confined to observational studies.
2. Experimental Epidemiology broadly refers to a planned experiment where the investigator has control over the population groups by deciding which groups are exposed to a factor under scrutiny. For example, much of the acceptable evaluation studies of preventive measures fall into this category. The design and analysis methods employed in these investigations are similar to those used in

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randomized clinical trials. A reader interested in finding more details about the design and analytical issues can find them in numerous books and a popular one is listed in the references. There are some caveats that are unique to experimental epidemiology. For instance, an evaluation of preventive measure may involve randomization of groups of people, rather than individuals.

3. Natural Experiments refers to a fortuitous situation where a natural course of public events closely approximate a planned control experiment. However, these are basically observational studies. For instance, the welfare reform in the United States has induced important differences in the social conditions. Thus, the effect of changes in the social conditions on the disease occurrence can studied through the patterns of disease occurrence in the two periods, before and after the welfare reforms were implemented. Such natural experiments occur through important public policy changes at both the state and national levels. A natural experiment may also occur in a setting of a cohort study. For example, the Monitoring the Future study is an on-going large school based longitudinal survey to elicit information about the drug and alcohol use and to study its impact on the wellbeing. During the course of this study, many new laws governing drug use were enacted, thus providing a natural experiment setting to perform “before-after” comparisons. The common methods discussed in Section 3 can be used to analyze the data from such experiments.

4. Theoretical Epidemiology refers to development mathematical and statistical models to explain the patterns of occurrence of diseases. Several models to explain the outbreak and spread of infectious diseases have been developed. Modern computing power enables numerical simulation to check and refine these models. It is also possible to use the results from the observational and planned or natural experiments to develop mathematical models. These mathematical models can then used to simulate “what-if" scenarios of disease patterns when the associated factors are altered in some meaningful ways.

5. Literature:

Electronic resources:

1. Золотарева, А. В. General Hygiene: lectures for students in English medium – Общая гигиена: курс лекций для иностранных студентов, обучающихся на английском языке / А. В. Золотарева, В. Н. Бортновский, Н. В. Карташева; пер. на англ. яз.

2. General Hygiene: Workbook for medical students / Aliona Tihon; "Nicolae Testemiţanu" State Univ. of Medicine and Pharmacy, Gen. Hygiene Dep. – Chişinău: CEP Medicina, 2017. – 247p.

6. Control questions (feedback):

1.Importance of epidemiologic surveillance.
2. Theoretical basis of epidemiologic surveillance.
3.Tasks of epidemiologic diagnosis.
4.The concept of epidemiologic method of examination.
5.Types of epidemiologic investigations.
6.The concept of the term screening.
7.The main tasks of epidemiologic investigations.

Lecture №10

1. Theme: Activities directed at increasing the immunity of the population.

2.Purpose: Formation of students' knowledge of the theoretical basis of immunoprophylaxis of infectious diseases and the WHO Expanded Programme of Immunization.

3. Lecture thesis:

Hygienic requirements for the planning and organization of the internal environment of the hospital

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Hospital hygiene Hospital hygiene is a branch of hygiene that studies the influence of factors related to conditions of patients ' stay in hospitals, and developing regulations and requirements, eliminating the adverse effects of these factors. Hospital hygiene is developing standards and requirements for placing, planning and sanitary- technical support of medical institutions. The main objective of the hygiene of hospitals the creation of optimal conditions of stay of patients, effective therapeutic process and favorable working conditions for medical staff.

Hospital building systems A. Decentralized, B. Mixed, C. Centralized

Sanitary and epidemiological requirements for the design, construction, reconstruction, re-profiling of health facilities buildings Projected no more than 9 floors. Ward departments of children's hospitals are located not higher than the 5 floor, chambers for children under the age of seven and children's psychiatric departments (chambers) not higher than the 2 floor. It is not allowed to place in a residential and public building: a hospital with a round-the-clock stay of patients, a microbiological (virologic, parasitological) laboratory, a department of magnetic resonance imaging. Infectious, psychiatric, skin-venereal, tuberculosis departments, which are part of multi-profile hospitals, are located in separate buildings. When planning isolation and the availability of autonomous ventilation systems, it is allowed to place these compartments in the same building with other offices, except for antituberculous.

Path anatomical department Is located in a separate building or in an annexed building to a building located in the economic zone, with the exception of the food unit. The distance from the department to the chambers and the kitchen should not be less than 30 m. In the path anatomical department should be at least three entrances (two for separate reception and delivery of corpses, the third for the staff). The premises for opening infected corpses are isolated and have a separate entrance from the outside. The building of the path anatomical department should not be viewed from the windows of medical and maternity facilities, residential and public buildings located near the territory of the organization.

Sanitary and epidemiological requirements for water supply, sewage of health facilities In the wards, offices, toilets, treatment rooms, dressings and ancillary rooms, wash basins with hot and cold water supply are installed through the mixers. The temperature of hot water in the distribution network in children's and psychiatric wards should not exceed 37 ° C. Pre-operative, dressing rooms, birth halls, treatment rooms, nurses' posts in newborn wards, surgical, gynecological offices, lock boxes, semi-boxes, laboratories are equipped with shells with the installation of elbow valves, ulnae dispensers with liquid antiseptic soap and solutions of antiseptics. In the wards of newborns, sinks with a wide bowl and hot and cold water are installed through the faucets to wash the children. In infectious and anti-tuberculosis hospitals (departments) there must be local treatment facilities.

Sanitary-epidemiological requirements for natural and artificial illumination of health facilities

Sanitary and epidemiological requirements for ventilation of health facilities

Sanitary and epidemiological requirements for the collection, neutralization, transportation, storage and disposal of medical waste The medical waste of the organization (hereinafter referred to as waste) is divided into five classes according to the degree of danger: Class A - non-hazardous, like solid household waste; Class B - moderately dangerous; Class C - extremely dangerous; Class D - wastes of composition similar to industrial wastes; Class E - radioactive. 1) waste collection and disposal; 2) temporary storage of waste in containers in the territory (class A) and in specially designated premises (classes B, C, D, D) 3) transportation of containers to the place of neutralization or destruction of waste.

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The main structural units of the hospital Admission department; Ward offices; Medical-diagnostic department; Laboratory; Central sterilization department; pharmacy; Service of cooking; Path anatomical department; Administrative and economic service.

Admissions department The planning of the admissions department should exclude the possibility of cross-contamination of patients. In order to prevent nosocomial infections, the admission departments of the children's, obstetric, tuberculosis, infectious, skin-venereal departments should be independent and located at each of these departments. With centralized and mixed hospital construction systems, the reception compartment is located in the main building, with the decentralized system in the housing with the largest number of beds. In all cases, the admissions office should be located near the entrance to the hospital. The ambulance from the street to the waiting room should be short, not to intersect with the internal roads of the hospital.

Ward section The main structural unit of the hospital is the ward section. The section is an isolated complex of chambers, medical-auxiliary and household premises, a corridor and sanitary units. The hospital section is provided for patients with the same type of diseases. A ward section of beds is considered the most suitable for providing favorable conditions for patients to stay. Two ward sections make up a department that has a general staff of medical personnel. Ward department - the main functional element of a hospital.

Surgery department

Surgical block Ward section

Basic variants of the organization of operational blocks the presence of an operation block in each surgical department. To achieve maximum isolation of the operating unit, it is placed in the dead-end zone of the compartment or in a separate wing of the building. Operational blocks of several surgical departments are combined into one operating complex.

The premises of the operating unit are conventionally divided into 4 groups depending on the degree of correlation of aseptic rules The most stringent requirements are imposed on operational, Preoperative and anesthetic, Premises for storage of blood, equipment, Premises for staff (nursing, laboratory and "clean" zone of the sanitary inspection for personnel).

The operating unit

The operating unit must have two isolated non-conductor compartments - septic and aseptic. When placing operating one on top of the other, septic surgery should be placed above aseptic

Operating room

S > 36 m2 with the participation of a large operating team S = m2 H = 3, 5 m The walls of the operating room should be smooth, with rounded corners. They are lined at full height with glazed tiles or other moisture-resistant materials that are easy to wash and withstand disinfectant treatment. The ceiling is painted with oil paint, and the floor is made of tiles with a slight inclination to the ladder. Floors must be non-sparkling, antistatic. The operating room doors must be tightly closed.

Operating room lighting The light factor in the operating room should be 1: 4-1: 5, KNL - at least 1.5% The illumination with a total coverage of fluorescent lamps should not be less than 400 lux. For local illumination of the operating field, special shameless, suspended or mobile lamps are used. The illumination created by the shameless lamps reaches 10, lux.

Microclimate of the operating room. The air temperature in the summer is ° C (in the winter of ° C) at a humidity of 50-55% and the speed of air movement up to 0.1 m / s. The air must be cleaned with bactericidal filters, natural ventilation is not allowed. Multiplicity of air exchange should be not less than 10, moreover, an inflow of at least 20% should prevail over the hood. For good air exchange in

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the operating room, the supply air holes are located under the ceiling at one operating room wall, and the exhaust openings at the opposite side near the floor.

Obstetric department

In the reception and inspection rooms, a filter is arranged, through which the woman in childbirth passes from the lobby. There are two examination rooms – one for those entering the family physiological department and the department of pregnancy pathology and the second for those entering the observatory department. After the examination in the filter room, where thermometry is carried out, an anamnesis is collected, an outbreak of pustular diseases is detected, the woman in labor enters the examination room. From it - to the room for sanitation and then to the department. Both the physiological and the observational departments have a common planning scheme - prenatal chambers, ancestral block, intensive care chambers, postpartum chambers, and wards for newborns. Each department has its own set of medical diagnostic and auxiliary facilities.

Infection department. The infectious department should have its own reception compartment, which consists of reception and observation boxes, as well as diagnostic boxes for patients with an unclear diagnosis. The infection compartment should consist of boxes, half-boxes and chambers. The children's infectious departments are provided with boxed wards. To prevent nosocomial infections, the most reliable boxing complex of rooms (entrance vestibule, bathroom with bathtub, ward, gateway between the room and the corridor). The patient enters the box from the street through the entrance tambour. Staff enters the patient through the gateway. Poluboks consists of the same premises as boxing, but does not have an entrance from the street. Patients enter the half-boxes from the corridor of the department. In the section consisting of half-boxes, there can be patients only with the same diseases. In the boxed chambers of children's infectious divisions, between the beds there are partitions m high, the upper part of which is glazed. This ensures a partial isolation of children in the same ward. In each infectious disease ward, a neutral zone should be provided, where doctors and nurses' offices are located. The best option for planning is fully boxed offices.

4. Illustrative material: presentation

5. Literature:

Electronic resources:

1. Золотарева, А. В. General Hygiene: lectures for students in English medium – Общая гигиена: курс лекций для иностранных студентов, обучающихся на английском языке / А. В. Золотарева, В. Н. Бортновский, Н. В. Карташева; пер. на англ. яз.

2. General Hygiene: Workbook for medical students / Aliona Tihon; "Nicolae Testemiţanu" State Univ. of Medicine and Pharmacy, Gen. Hygiene Dep. – Chişinău: CEP Medicina, 2017. – 247p.

6. Control questions (feedback):

1. Place of immunoprophylaxis in the system of anti-epidemic measures.
2.Significance of immunoprophylaxis in various infectious diseases.
3.Factors determining the effectiveness of immunoprophylaxis.
4.Methods of assessing the quality and effectiveness of immunoprophylaxis.

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