MINISTRY OF HEALTH, LABOUR AND SOCIAL PROTECTION
OF THE REPUBLIC OF MOLDOVA
NICOLAE TESTEMITANU STATE UNIVERSITY OF MEDICINE
AND PHARMACY OF THE REPUBLIC OF MOLDOVA
DEPARTMENT OF EPIDEMIOLOGY

EPIDEMIOLOGY

TEXTBOOK FOR PRACTICAL WORK

Under the editorship of Prof.,
corresponding member of ASM V. Prisacaru
Translated into English by A.Paraschiv, L.Guțu, I.Berdeu, A.Nastas

Chișinău • 2019

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Editorial-Polygraphic Medicine Center
of Nicolae Testemitanu SUMPh

Approved at the Meeting of the Central Methodological Council of Nicolae Testemitanu SUMPh, Minutes No. 5 of 04.07.2018.

The textbook for practical work in Epidemiology includes the training program for students on fundamental and practical epidemiology in the following areas: general and special epidemiology of infectious and non-infectious diseases, clinical epidemiology, epidemiology in exceptional situations, epidemiological diagnosis, epidemiological surveillance and control of communicable and non-communicable diseases and health promotion. In addition to the plan of each theme, a particular attention is paid to the method of studing, both during the practical classes and self-learning. Each topic is provided with questions to prepare for the practical work, questions and tests for self-control, practical exercises such as case studies, epidemiological situations and basic and selective bibliography recommended for the theme.

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Tudor Grejdian, Proff.dr.hab.

Descrierea CIP a Camerei Naţionale a Cărţii

Epidemiology: Textbook for practical work / V. Prisacaru, A. Paraschiv, Ad. Cotelea [et al.] ; Nicolae Testemitanu State Univ. of Medicine and Pharmacy of the Rep. of Moldova, Dep. of Epidemiology. – Chişinău: Medicina, 2019 (Tipogr. "Print Caro"). – 198 p.
Referinţe bibliogr. la sfârşitul temelor. – 300 ex.
ISBN 978-9975-56-632-2.
616-036.22(076.5)
E 61

SUMMARY

MODULE I: GENERAL EPIDEMIOLOGY

THEME 1: STUDY ABOUT EPIDEMIC PROCESS. STRUCTURE, DEVELOPMENT MECHANISM AND EPIDEMIC PROCESS MANIFESTATIONS....6
THEME 2: THE SYSTEM OF ANTI-EPIDEMIC MEASURES. ORGANIZATION OF ANTI-EPIDEMIC ASSISTANCE....16
THEME 3: MEASURES DIRECTED TO THE SOURCE OF INFECTION RELEVANCE OF THE SUBJECT....19
THEME 4: ANTI-EPIDEMIC MEASURES DIRECTED TO NEUTRALIZE THE MECHANISM OF TRANSMISSION....24
STERILIZATION....35
DISINSECTION....44
THEME 5: IMMUNOPROPHYLAXIS OF INFECTIOUS DISEASES....48
THEME 6: EPIDEMIOLOGICAL INVESTIGATION OF OUTBREAKS OF INFECTIOUS DISEASES....61

MODULE II: SPECIAL EPIDEMIOLOGY

THEME 1: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN TYPHOID FEVER....65
THEME 2: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN SALMONELLOSIS....71
THEME 3: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SUPERVISION IN SHIGELLOSIS, ESCHERICHIOSIS AND OTHER DIGESTIVE INFECTIONS, INCLUDING ETIOLOGICALLY NON-DETERMINED....76
THEME 4: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN VIRAL HEPATITIS

WITH FECAL-ORAL TRANSMITTING MECHANISM, POLIOMYELITIS AND OTHER ENTEROVIRUSES.....82
THEME 5: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES AND EPIDEMIOLOGICAL SURVEILLANCE IN DIPHTHERIA AND WHOOPING COUGH.....87
THEME 6: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN TUBERCULOSIS, STREPTOCOCCAL AND MENINGOCOCCAL INFECTIONS. 97
TEHEME 7: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN MEASLES AND RUBELLA. 109
THEME 8: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN INFLUENZA AND MUMPS.....117
THEME 9: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN VECTOR-BORNE INFECTIONS: EPIDEMIC TYPHUS, BRILL DISEASE AND MALARIA 126
THEME 10: EPIDEMIOLOGY, PROPHYLAXIS AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE OF BLOOD-BORNE INFECTIONS: PARENTAL VIRAL HEPATITES AND HIV/AIDS. 134
THEME 11: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN ZOOANTHROPONOSIS 144
THEME 12: EPIDEMIOLOGY, PREVENTION AND EPIDEMIOLOGICAL SURVEILLANCE IN NON-COMMUNICABLE DISEASES 151

MODULE III: CLINICAL EPIDEMIOLOGY

THEME 1: CONTRIBUTIONS OF THE EPIDEMIOLOGICAL METHOD IN CLINICAL ACTIVITY.....163
THEME 2: THE ANTI-EPIDEMIC REGIME IN MEDICAL INSTITUTIONS. COMPONENTS OF THE CONTROL

PROGRAM OF HEALTH CARE ASSOCIATED INFECTIONS (NOSOCOMIAL) 169

MODULE IV: EPIDEMIOLOGY IN EMERGENCY

THEME 1: ANTI-EPIDEMIC MEASURES IN CALAMITIES.....185
THEME 2: FEATURES OF THE EPIDEMIC PROCESS AND ORGANIZATION OF ANTI-EPIDEMIC MEASURES FOR THE MILITARY STAFF. SANITARY AND EPIDEMIOLOGICAL INTELLIGENCE.....190
THEME 3: ANTI-BACTERIOLOGICAL PROTECTION OF POPULATION AND MILITARY STAFF. SANITARY-HYGIENIC AND ANTI-EPIDEMIC MEASURES DURING THE LIQUIDATION OF CONSEQUENCES OF WEAPONS OF MASS DESTRUCTION 195

MODULE I: GENERAL EPIDEMIOLOGY

THEME 1: STUDY ABOUT EPIDEMIC PROCESS. STRUCTURE, DEVELOPMENT MECHANISM AND EPIDEMIC PROCESS MANIFESTATIONS

Relevance of the subject

The study of the epidemic process is one of the most important component parts of general epidemiology and it constitutes the theoretical basis of practical epidemiology. The knowledge of patterns of the structure and development of the epidemic process contributes to the capacity building in argumentation and development of effective principles, methods and measures in the prevention and control of diseases. Based on this, the medical staff of different fields of activity are interested to know the epidemic process of diverse groups of diseases in order to plan appropriate and effective measures to solve the epidemiological situations.

Purpose of practical study

To develop the knowledge about the nature, structure, mechanism and features of the evolution of the epidemic process in infectious diseases and understanding their roles in planning and organizing anti-epidemic measures.

Practical work plan

1. The assessment of the initial level of knowledge.
2. Discussion on the structure, mechanism of development and manifestations of the epidemic process.
3. Solving problems in epidemiological situations and group discussion.
4. Final assessment of students' knowledge on the theme.

Material provided for the class

Tables. Slides. Movies.

The student needs to know

1. The importance of pathogenic microorganisms as an etiological factor in infectious diseases.
2. The notion „infectious process".
3. Definition of the term „epidemic process".

4. The theories of epidemiology that specify the essence of the epidemic process.
5. The socio-biological character of epidemic process.
6. The structure of the epidemic process.
7. The population approach to the essence of the epidemic process.
8. Definition of „source" of infectious microorganisms.
9. The classification of infectious diseases according to their source.
10. Characteristics of the sources in anthroponosis.
11. The sick person as a source of infection. The epidemiological importance of different forms of the disease evolution and periods.
12. The definition of the term „carrier state". Classification and the epidemiological importance of different types of carriers.
13. The characteristics of the sources in zoonosis.
14. The characteristics of the sources in zooanthroponosis. The importance of domestic, synanthropic and xenanthropic animals as sources of infection. The definition of the term „natural focality" („natural nidality").
15. The characteristics of the sources in sapronosis.
16. The features of development of the epidemic process in various groups of infectious diseases (anthroponosis, zooanthroponosis, sapronosis).
17. The definition of the term „mechanism of transmission". Phases of mechanisms of infection transmission. Types of mechanisms of transmission of causative agents.
18. The definitions of the terms „transmission factors" and „transmission routes". The specificity of transmission factors according to the mode of transmission of causative agents. The significance of social and natural factors in the development of epidemic process.
19. The essence of the definitions of populational and individual susceptibility.
20. The theory of self-regulation of epidemic process. Manifestation forms of the epidemic process.
21. Preventive measures aimed to control infectious diseases. Prophylactic and anti-epidemic measures.

The student must be able to:

1. use proper epidemiological terms in their activity;
2. present schematically the development of the epidemic process in anthroponosis, zooanthroponosis and sapronosis;

3. determine the sources of causative agents in anthroponosis, zooanthroponosis and sapronosis;
4. identify the mechanism and transmission routes of causative agents in anthroponosis, zooanthroponosis and sapronosis;
5. determine the manifestation form of the epidemic process;
6. choose the intervention measures to exclude the source of pathogens, the transmission mechanism and to strength the insusceptibility of the population;
7. use the epidemiology theories for defining the priority directions of epidemiological surveillance and infectious diseases prevention.

Exercises

Questions for self-control:

1. Formulate the definition of the term "epidemiology" as a medical science.
2. What is the difference between an epidemic process and infectious process? Argue the socio-biological essence of the epidemic process.
3. What are the epidemiology theories used to reveal the essence of the epidemic process?
4. Formulate the definitions of the terms „epidemic process, „source" of infectious microorganisms, „mechanism of transmission", „transmission factors", „transmission routes", „natural focality" („natural nidality").
5. Name the three essential factors of the epidemic process.
6. Present the structure of the epidemic process vertically.
7. List the sources of causative agents in measles, typhoid fever, anthrax, tularemia and rabies.
8. Why the mechanism of transmission is a compulsory element in maintaining the pathogens as a species in nature?
9. Name the transmission factors in measles, typhoid fever, exanthematic typhus, malaria, viral hepatitis B, tetanus, trichinellosis, difilobotriose.
10. Name five infectious diseases with natural nidality.
11. Explain the causes of regional distribution of infections with natural nidality.
12. What is the difference between anthroponosis and zooanthroponosis?
13. Why the human is not contagious in the majority of zooanthroponosis diseases?
14. What do the terms „population" and „parasitism" mean?

15. What is the difference between the terms „reservoir" and „source" of infectious microorganisms?
16. What are the basic principles of the theory of self-regulation of the epidemic process?
17. What is the role of the immune group of population in the process of self-regulation of the epidemic process?
18. What are the manifestation forms of the epidemic process?
19. Explain the relation between the epidemiological classification of infectious diseases and prophylactic and anti-epidemic measures.
20. What are the principles of classification of measures in combating infectious diseases?

Tests for self-control:

1. Which of the statements mentioned below refers to epidemiology as a science?

a) usage of the epidemiological method of investigation in the studies of diseases
b) application of epidemiological researches in clinical medicine
c) application of the epidemiological laws in the epidemiological surveillance and control of morbidity in the population
d) study of tinctorial and morphological properties of pathogenic microorganisms
e) study of the infectious process

2. The epidemic process represents the development of morbidity among:

a) plants
b) animals
c) humans
d) plants and animals
e) plants, animals and humans

3. Choose the sources of causative agents in anthroponosis:

a) humans
b) insects
c) water
d) food
e) animals

4. The epizootic process is:

a) an infectious process in human population

b) the spread of infection among humans
c) the development of infectious morbidity in animals
d) the spread of infection among bloodsucking insects
e) the dissemination of infection in the environment

5. The classification of infectious diseases in anthroponosis and zoonosis is based on:

a) the diversity of the human population receptivity to different causative agents
b) the biological characteristics of pathogens
c) the mechanism of transmission of causative agents
d) the „source" of infectious microorganisms
e) number of affected population

6. Choose the definition of the term „mechanism of transmission":

a) the excretion of microorganisms from an infected macroorganism
b) the excretion of microorganisms from an infected macroorganism and its presence in the environment
c) the excretion of microorganisms from an infected macroorganism, its presence in the environment and ingress into a healthy macroorganism
d) the presence of microorganisms in the environment, ingress into a healthy macroorganism with further development of carriage

7. Choose the mechanisms of transmission of causative agents:

a) respiratory
b) fecal-oral
c) parenteral
d) through contact
e) through inoculation

8. The normal environment for causative agents of zooanthroponosis is:

a) human body
b) animal
c) insect
d) soil, water
e) food

9. Choose the infections with natural nidality:

a) typhoid fever, brucellosis
b) rabies, tularemia;

c) measles, salmonellosis

10. Choose the natural factors that can contribute to the development of epidemic process:

a) the modification of pathogen serotype
b) intensive snow melting and overflowing of rivers
c) high population density
d) migration of population
e) the increase of solar activity

11. Choose the biological factors that determine the development of epidemic process:

a) the source of causative agents
b) the transmission mechanism of pathogens of infectious diseases
c) the susceptibility of the population
d) the age and home conditions of the source causative agents;
e) resistance of an infectious patient to the treatment

12. Who is the author of the theory of natural focality?

a) Shleahov
b) Gromashevsky
c) Beleakov
d) Pavlovsky
e) Cherkassky

13. The eradication of infectious diseases is:

a) a senseless purpose
b) possible
c) impossible

14. In an outbreak with multiple cases, the minimum number of the sick is:

a) ≥11
b) 10
c) 7
d) 5
e) ≥ 2

15. Choose the factor that determines the transmission route of infectious microorganisms:

a) the major risk factor
b) the final risk factor
c) the additional risk factor

16. The period when the infectious patient can be dangerous as a source of causative agents is:

a) throughout the incubation period
b) in the last days of incubation period
c) during the prodromal period
d) in main clinical manifestations
e) in recovery phase

Practical skills

Exercise 1: Present schematically the structure of the epidemic process on the vertical and horizontal.

Exercise 2: Name the transmission routes according to the mechanism of transmission.

Exercise 3: Fill in the table with the transmission routes and factors according to the primary localization of pathogenic agents in the macroorganism.

Localization of pathogenic agents transmission routes and factors	Mucosa of respiratory system	Intestine	Blood	Cutaneous membranes, mucosa
transmission routes				
transmission factors				

Exercise 4: Fill in the table with the respective terminology.

Sources of pathogenic agents			Factors favoring transmission of pathogenic agents in accomplishing of transmission mechanism in anthroponosis			
anthroponosal	zooanthroponosal	sapronosal	Through breathing	fecal-oral	Parenteral (by vectors)	contact

Exercise 5: Draw the schemes of epidemic processes in anthroponosis and zooanthroponosis.

Exercise 6: List the manifestations of epidemic process in different infectious diseases according to the following data:

a) the cholera incidence has been recorded in the population of 45-50 countries over the past 15-20 years;
b) single cases of diphtheria were recorded in the Republic of Moldova within the last 10 years, the incidence being 0.05 – 0.02 per 100 000 pop.
c) in 2009, in the Republic of Moldova the morbidity of the flu exceeded 9 times the sporadic occurrence in the last two years;
d) a focus with five infected persons with anthrax has been registered in august.

Exercise 7: List and argue the importance of the factors that influence the susceptibility of the population to infectious diseases.

Exercise 8: List the social and natural conditions as factors that favor the worsening of the epidemiological situation of:

a) intestinal diseases
b) respiratory diseases
c) zooanthroponosis

Problems:

Problem 1. In the city of B., a few cases of typhoid fever have been detected. According to the epidemiological anamnesis, it was found out that all patients previously consumed milk from the same manufacturer.

Name the possible source of causative agents and the possible transmission factor.

Problem 2. Cases of icteric leptospirosis among employers of a pig farm have been identified.

Identify the probable sources of infection and possible transmission factors.

Problem 3. An outbreak of Shigellosis Zone was recorded in a kindergarten. Its occurrence was associated with the consumption of cream.

Name the possible sources of infection.

*Problem 4.*A 3-year-old child was diagnosed with measles. The epidemiological anamnesis showed that on the first day of the disease the child attended the kindergarten, and in the evening the family was visited by relatives with children.

Determine the borders of the outbreak.

Problem 5. During 2 months of 2010 five cases of viral hepatitis were re-

corded among male patients in a psycho-neurological institution. The first case was identified on 15.03.2010. Other cases of hepatitis were recorded on the 2nd, 10th, 11th and 13th of May 2010. All patients were men aged 32-64, hospitalized in different rooms of the same department. All of them were using the same bathroom. HbsAg carriers were not identified among the employees. Parenteral interventions were not carried out in the institution.

Problem 6. On 07.12.2009 the first patient underwent surgery (cholecystectomy) followed by a blood transfusion according to the epidemiological investigations. Once a week a barber came to trim and shave the patients. The razor blades were not changed after each patient.

1. What type of viral hepatitis can you suppose?
2. Who can be the source of causative agents?
3. What are the mechanism, route and transmission factors?

Problem 7. Choose the probable sources (1) and transmission factors (2) in the examples given below:

a) several cases of typhoid fever have been identified. According to the epidemiological investigations all patients consumed milk from the same manufacturer;
b) in the locality of B, the shigellosis morbidity among the population who used water from the river for the irrigation of vegetables has increased;
c) the appearance of Shigellosis Zonnei cases among the residents of the buildings in one of the zones of the city of C. is associated with the consumption of cow cheese from a nearby grocery store. It has also been found that all local stores are provided with dairy products by the same manufacturer. In other zones of the city, shigellosis cases were not recorded;
d) a leather-processing enterprise employee has been diagnosed with anthrax.

Problem 8. In the locality of B, a case of measles was recorded in a kindergarten group. The child was hospitalized in the infectious disease hospital.

When will the epidemic outbreak end?

a) immediately after the hospitalization of the patient;
b) after the maximum incubation period since the contact with the patient;
c) immediately after the final disinfection in the hotbed;
d) after the administration of immunoglobulin or vaccination of contact persons.

Problem 9. During two days, three cases of diphtheria were recorded in a children's institution.

No cases were previously recorded. Determine the type of epidemic process manifestations.

The answers at the tests:

1. a, b, c	9. b
2. c	10. c, d
3. a,	11. a, c
4.c	12. d
5.d	13. b
6. c	14. e
7. a,b,c,d	15. a
8. b	16. b,c,d,e

RECOMMENDED LITERATURE

Basic literature

1. Prisăcaru Viorel. General epidemiology with medicine based on evidence. Chişinău, 2015.
2. Prisăcaru Viorel. Epidemiologie generală. Bazele medicinei prin dovezi. Chişinău, 2012, 380 p.
3. Prisăcaru V., Guţu L., Paraschiv A. Epidemiology in tests. Chişinău, 2013.
4. Lecture material.

Additional literature

1. Bocşan Ioan Stelian. Epidemiologie generală. Cluj-Napoca, 2006, 115 p.
2. Tratat de epidemiologie a bolilor transmisibile. Sub redacţia prof. univ. Aurel Ivan. Polirom, 2002, 837 p.
3. Брико Н.И., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В. Эпидемиология. Том I, М., 2013, 832 с.
4. Зуева Л.П., Яфаев Р.Х. Эпидемиология. Санкт-Петербург, 2005, 547 с.
5. Шляхов Э.Н. Практическая эпидемиология. Издание пятое. Кишинэу, 1991, 566с

THEME 2: THE SYSTEM OF ANTI-EPIDEMIC MEASURES. ORGANIZATION OF ANTI-EPIDEMIC ASSISTANCE.

Relevance of the theme

Prevention and control of infectious and noninfectious diseases should be based on well-designed anti-epidemic system for population health care. The effective management of the anti-epidemic system of the population is the main purpose of the epidemiologist as organizer of the activity in the public health surveillance system. The knowledge about principles of the anti-epidemic system, as well as the principles of its activity is mandatory.

Purpose of the study

The purpose of the module is to form students' knowledge and skills regarding the system of organization and realization of anti-epidemic measures, how to evaluate their effectiveness in different conditions of the epidemic process.

Plan of practical lesson

1. Assesment of the initial level of knowledge.
2. Analysis of methodologies to groupanti-epidemic measures.
3. Analysis of the structure of the anti-epidemic system at different levels.
4. Discussion on the structure and functions of the epidemiology departments of Public Health Center.

The student needs to know

1. The system of anti-epidemic measures.
2. The notion of „prophylactic" and „anti-epidemic" measures.
3. The principles of grouping of anti-epidemic measures.
4. The notion about „epidemic outbreak".
5. Institutions, departments and specialists participating in the organization of anti-epidemic measures in population.
6. Principles to control the anti-epidemic system in population.
7. Principles of planning the activity in institutions, subdivisions andspecialists of the state surveillance system of public health.
8. Organization of the epidemiologist's activity according to the principle of the epidemiological surveillance.
9. Parameters of thequality of anti-epidemicactivity of subdivisions and specialistsof the anti-epidemic service.
10. Principles to determine the main direction of anti-epidemic measures.

The student must be able to:

- draw up the organizational chart of anti-epidemic service in the institutions (subdivisions) with different level;
- determine the specific activity of the epidemiologist's activity according to the epidemiological surveillance principle (postcard);
- determine the type and boundaries of the epidemic outbreak;
- elaborate the plan of anti-epizootic measures for the elimination of the outbreak;
- determine anti-epidemic measures in different epidemiological situationsaimed to neutralize the source of pathogens, the mechanism of transmission and receptivity of the population.
- determine prophylactic and anti-epidemic measures organized by differentmedical and non-medical services.

Exercises

Questions for self-control

1. What are prophylactic and anti-epidemic measures?
2. What are the three main directions of prophylactic and anti-epidemic measures?
3. What are the main directions of prophylactic and anti-epidemic measures in infections of digestive system?
4. What are the main directions of prophylactic and anti-epidemic measures in respiratory system infections?
5. What are the main directions of prophylactic and anti-epidemic measures in zooanthroponosis?
6. What are the main directions of prophylactic and preventive anti-epidemic measures in blood infections?
7. List the criteria and methods to assess the quality of anti-epidemic measures perfomed in the focus.
8. List the epidemiologist's activities in fighting against infectious diseases.
9. List the functions of family doctors and clinicians in prophylaxis and control of infectious diseases.

Practical tasks

1. To draw up the list of anti-epidemic measures directed to all three components of the epidemic process.
2. To determine the main anti-epidemic measures tocombat:
   - digestive anthroponoses;

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Relevance of the theme

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6. What are the main directions of prophylactic and preventive anti-epidemic measures in blood infections?
7. List the criteria and methods to assess the quality of anti-epidemic measures perfomed in the focus.
8. List the epidemiologist's activities in fighting against infectious diseases.
9. List the functions of family doctors and clinicians in prophylaxis and control of infectious diseases.

Practical tasks

1. To draw up the list of anti-epidemic measures directed to all three components of the epidemic process.
2. To determine the main anti-epidemic measures tocombat:
   - digestive anthroponoses;

- respiratory anthroponoses;
- blood anthroponoses;
- zooanthroponoses.

3. Draw the structure of anti-epidemicservice of population:
   - vertically;
   - horizontally at all hierarchical levels and list the directions of the activity of medical specialists.
4. Describe the types of plans developed by specialists of epidemiology department of the Center for Public Health.
5. Describe the activities of both the epidemiologist and family doctorin the prevention and control of diseases.
6. List the criteria for evaluating the anti-epidemicactivity.

LITERATURE

Basic

1. Viorel Prisacaru. General epidemiology with medicine based on evidence. Chişinau, 2015, p. 95-119.
2. Prisăcaru Viorel. Epidemiologie generală. Bazele medicinei prin dovezi. Chişinău, 2012, 380 p.
3. Prisacari V., Guţu L., Paraschiv A., etc. Epidemiology in tests. Chisinau, 2013.
4. Lecture material.

Additional literature

1. V. Chicu, G.Obreja, V. Prisăcaru. Epidemiologie de intervenţie. Chişinău, 2008, p.p. 6-26.
2. Tratat de epidemiologie a bolilor transmisibile. Sub redacţia prof.univ.dr. Aurel Ivan. Polirom, 2012.
3. Брико Н.И., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В. Эпидемиология. Том I, M., 2013, 832 с.
4. Шляхов Э.Н. Практическая эпидемиология. Кишинэу, 1991.

THEME 3: MEASURES DIRECTED TO THE SOURCE OF INFECTION

Relevance of the subject

The measures aimed to neutralize sources of pathogens in anthroponoses and zooanthroponoses constitute a separate important compartment in the system of prevention and control of infectious diseases.

Purpose of the practical lesson

The purpose of these theme is to develop knowledge about anti-epidemic measures necessary to undertake, in order, to neutralize sources of pathogens to prevent and control infectious diseases.

Plan of practical lesson

1. Assesment of the initial level of knowledge.
2. Discussion about methods and means for neutralization of the source of infection in anthroponoses.
3. Discussion about methods and means for the neutralization of sources of infection in zooanthroponoses.
4. Problem-based learning of clinical cases and different epidemiological situation.
5. Evaluation of final knowledge.

Materials provided for the class

Clinical cases, tests, samples of rodenticides.

The student needs to know

1. Sources of pathogens in various anthroponoses and zooanthroponoses.
2. Epidemiological significance of early detection of patients with infectious diseases as an anti-epidemic measure.
3. Epidemiological significance of early detection of infectious carriers.
4. The role of laboratory investigations in detection of sources of pathogens.
5. Criteria and conditions for isolation of infectious patients.
6. The epidemiological role of surveillance measures for people who have contacted with the source of pathogens. Methodology and surveillance period.
7. The epidemiological role of emergency prophylaxis in epidemic outbreaks. Means used for emergency prophylaxis.
8. Criteria to discharge the patients with infectious disease from the hospital.

9. The role of deratization in prevention of infectious diseases.
10. Methods and means used for the deratization.
11. Methods to assess the effectiveness and efficiency of measures directed towards neutralization of sources of pathogens.

The student must be able to:

- determine sources of pathogens in infectious diseases according to the infection;
- determine the form and conditions to isolate the source of pathogens depending on infectious disease;
- supervise people who had contact with the source of pathogens in epidemic outbreaks according to nosological forms;
- perform specific prophylaxis among contact people depending on the nosologic form;
- determine the criteria to discharge and perform the follow-up of the convalescence patient.

Exercises

Questions for self-control

1. List clinical and epidemiological criteria for hospitalization of the patient with contagious disease in the infectious hospital.
2. List clinical and epidemiological criteria for isolation and treatment of the patient with infectious disease in home conditions.
3. Give examples of infectious diseases when the patient's hospitalization is mandatory.
4. Give examples of infectious diseases when the patient's hospitalization is not mandatory.
5. Explain the epidemiological role of early infectious patient detection.
6. What is the purpose of laboratory investigations of people that had contact with the source of pathogens?
7. What kind of clinical and epidemiological elements include the surveillance of people that had contact with the source of infection in the epidemic outbreak?
8. What is the main criterion to determine the period of surveillance of contact people in the outbreak?
9. What is the purpose of emergency prophylaxis in the outbreak?
10. List the means that can be used for emergency prophylaxis.
11. Explain the epidemiological role of carriers of pathogens in the development of the epidemic process in infectious diseases.

12. What is the main method to detect carriage states?
13. Describe the main measure to prevent and control zooanthroponoses where rodents are the source of the causative agent.

Tests for self-control

1. *Which of the following infectious diseases necessitates the hospitalization of the patient:*
   a) typhoid fever;
   b) Shigellosis;
   c) whooping cough.
2. *Which of the following infectious diseases necessitates the hospitalization of the patient:*
   a) salmonellosis;
   b) diphtheria;
   c) measles.
3. *Which of following infectious diseases allows the isolation and treatment of the patient in home conditions?*
   a) anthrax;
   b) polio;
   c) rotavirus infection.
4. *Which of the following infectious diseases allow the isolation and treatment of the patient in home conditions?*
   a) cholera;
   b) mumps;
   c) plague.
5. *Choose the surveillance period necessary to be performed in case of contact people in the epidemic outbreak:*
   a) minimum incubation period;
   b) average incubation period;
   c) the maximum incubation period.
6. *What is the purpose of emergency prophylaxis in the outbreak?*
   a) treatment of the patient;
   b) prevention of illness;
   c) making the diagnosis.
7. *Investigation of surgeon is indicated before the employment to:*
   a) Neisseria meningitidis;
   b) Staphylococcus aureus;
   c) Salmonella enteritidis.

8. *A worker employed at water treatment plant has a higher epidemiological risk if he is a carrier of:*
   a) Corynebacterium diphtheriae;
   b) Salmonella typhi;
   c) HIV.
9. *Choose the criteria to discharge infectious patients from the hospital:*
   a) the patient's recovery;
   b) results of laboratory investigations;
   c) depending on the clinical form of the disease.
10. *Choose the means to prevent typhoid fever:*
    a) vaccine;
    b) immunoglobulin;
    c) bacteriophage.
11. *Choose the means for tetanus emergency prophylaxis:*
    a) antibiotic;
    b) immunoglobulin;
    c) bacteriophage.
12. *Choose the means for emergency anthrax prophylaxis:*
    a) antibiotic;
    b) vaccine;
    c) bacteriophage.
13. *Wich of the infections listed below necessitates measures directed to neutralize the source of pathogens mandatory:*
    a) typhoid fever;
    b) diphtheria;
    c) leptospirosis.
14. *Which of the infections listed below necessitates measures directed to neutralize the source of pathogens mandatory:*
    a) measles;
    b) rabies;
    c) cholera.

Case studies

Case study no.1. The family doctor, being called at home, as a result of the patient's examination, suspected typhoid fever.

– To determine the patient's isolation conditions.

Case study no.2. The family doctor was called at home by the patient. After the examination he suspected the flu.

– Determine the patient's isolation conditions.

Case study no. 3. The family doctor as a result of the patient's examination at home suspected diphtheria.

– To determine the patient's isolation conditions.

Case study no. 4. The family doctor as a result of the patient's examination at home suspected whooping cough.

– To determine the patient's isolation conditions.

Case study no. 5. The family doctor as a result of the patient's examination suspected anthrax.

– To determine the patient's isolation conditions.

Case study no. 6. The family doctor as a result of examining the patient suspected scarlet fever.

– To determine the patient's isolation conditions.

Case study no. 7. As a result of the epidemiological investigation of the typhoid fever outbreak, it was estabilished that 7 persons had contact with the patient at home.

– What means can be used for emergency prophylaxis.

Case study no. 8. A person with a wound produced by a dog's bite was admitted to the medical center.

– What means can be used for tetanus and rabies emergency prophylaxis.

Case study no. 9. Three persons who contacted with the patient in the epidemic outbreaks of shigellosis were detected.

– List the components of active diagnostic during the surveillance of contact persons.

Case study no. 10. During the epidemiological investigation of the influenza outbreak five people that had the contact with sick were detected.

– Determine the structure of active diagnostic during the medical supervission of contat persons.

Test answers

1. a	8. b
2. b	9. a,b
3. c	10. c
4. b	11. b
5. c	12. a
6. b	13. c
7. b	14. b

RECOMMENDED LITERATURE

Basic literature

1. Prisăcaru Viorel. General epidemiology with medicine based on evidence. Chișinău, 2015.
2. Prisăcaru Viorel. Epidemiologie generală. Bazele medicinei prin dovezi. Chișinău, 2012, 380 p.
3. Prisăcaru V., Guțu L., Paraschiv A. Epidemiology in tests. Chișinău, 2013.
4. Lecture material.

Additional literature

1. Bocșan Ioan Stelian. Epidemiologie generală. Cluj-Napoca, 2006, 115 p.
2. Tratat de epidemiologie a bolilor transmisibile. Sub redacția prof. univ. Aurel Ivan. Polirom, 2002, 837 p.
3. Брико Н.И., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В. Эпидемиология. Том I, М., 2013, 832 с.
4. Зуева Л.П., Яфаев Р.Х. Эпидемиология. Санкт-Петербург, 2005, 547 с.
5. Шляхов Э.Н. Практическая эпидемиология. Издание пятое. Кишинэу, 1991, 566 с.

THEME 4: ANTI-EPIDEMIC MEASURES DIRECTED TO NEUTRALIZE THE MECHANISM OF TRANSMISSION

Disinfection

Relevance of the subject

In maintaining the public health one of the priority is to ensure the quality and safety of anti-epidemic measures. In the surveillance and control of infectious diseases, disinfection is of particular importance. It is a measure aimed to interrupt the mechanism of transmission of causative agents from the external environment. It is one of the main intervention measures in digestive infections, helminthiasis, respiratory and cutaneous infections.

At the same time, it was found that the use of disinfectants in uNoeasonable way in the medical practice leads to both diminishing the effectiveness of disinfection and increasing of the microorganisms resistance to disinfectants. In order to prevent these negative phenomena, the knowledge and skills are needed to choose and use disinfectants correctly.

Purpose of the practical lesson

To obtain theoretical knowledge and practical skills in organization and carring out the disinfection: available disinfectants, methods and forms of use of disinfectants, technical means used for disinfection, evaluation of the

effectiveness of disinfection, awareness of the role of disinfection in the prevention of communicable diseases.

Plan of practical lesson

1. Evaluation of the initial level of knowledge by tests and oral discussion.
2. Practical exercises on the subject.
3. Discussion about documents that regulate the practical activity of disinfection depending on infectious disease.
4. Solving clinical cases of epidemiological situations.
5. Discussion of the results on clinical cases.
6. Evaluation of final knowledge by tests;
7. Summarizing on the results of the practical lesson.

Materials provided for the class

1. Samples of disinfectants;
2. Disinfection equipment and apparatus;
3. Records about disinfection quality;
4. Physico-chemical tests to control the concentration of the working solution in disinfectants;
5. Practical situations.
6. Normative acts that regulate disinfection measures.

The student needs to know

1. The notion of disinfection.
2. The role of disinfection in the prevention of infectious diseases.
3. Types of disinfection.
4. Methods of disinfection.
5. The main chemical groups used as disinfectants.
6. Disinfectants approved in the Republic of Moldova.
7. Methods of disinfection and types of disinfectants used in different groups of infections.
8. Factors that influence the effectiveness of disinfection.
9. Requirements for disinfectants and disinfection.
10. Types of ovens used in terminal disinfection. The working regime of ovens.
11. Methods and means used to evaluate the quality of disinfection.
12. The content of the disinfection regime in the medical institution.
13. Biosecurity measures for the staff responsable for disinfection.

The student must be able to:

- determine the necessity and type of disinfection;
- organize current and terminal disinfection in the outbreak;
- assess the quality of the disinfection;

- prepare basic and working solutions for disinfection;
- work with technical means used in disinfection;
- calculate the quantity of disinfectants and antiseptics necessary for medical institution.
- organize the prophylactic disinfection in the medical institution according to hospital profile (therapeutical, surgical, infectious);
- use the protective equipment correctly.

Additional information

Table 1. Norms of antiseptic consumption

N	Consumer indicators	Norms admitted (ml)
1	1 bed/day, therapeutical department	160
2	1 bed/day, surgical departmet	180
3	1 bed/day, tuberculosis department	230
4	1 medical person / day	30
5	Hygienic hand disinfection	4
6	Hand disinfection before surgery	8
7	Hand disinfection in phthisiology department	8

Table 2. Disinfection regime in air and steam ovens

Foci of:	Items for disinfection	Amount of cargo per m^3, kg	t°C	Duration of disinfection, min
Typhoid fever Dysentery	Cotton, wool, bed sheets, silk and synthetic fibers	60 60	80-90 80-90	10 20
Diphtheria, Viral hepatitis, tuberculosis, leprosy	Clothes, bed sheets, articles of silk and synthetic fibers	60	80-90	30
Fever Q, Microsporia,	Clothes, bed sheets, articles of silk and synthetic fibers sintetice Books (of 9-30 mm)	48 60	80-90 80-90	45 40
Favus, Tricofitie.		800-1000 specimens	70-75	180
Antrax, gangrene gaseous, tetanus	Clothes, bed sheets, articles of silk and synthetic fibers	60	97-98	30

Table 3. Disinfection regime in steam ovens

Foci of:	Items for disinfection	Amount of cargo per m^3, kg	t°C	Pressure in oven	Duration of disinfection, min, min
Typhoid fever	clothes	60-72	100	0	10
Dysentery	Bed sheets	50	100	0	60
viral hepatitis	Bed sheets	50	104-111	0.2-0.5	40
microspore	clothes	60-72	100	0	30
Epidermophyitia	Bed sheets	50	100	0	60
Favus	Bed sheets	50	104-111	0.2-0.5	40
Anthrax	clothes	60-72	100	0	30
Gangrene gaseous, tetanos, etc.	Bed sheets	50	104-111	0.2-0.5	60
Pediculosis	clothes	60-72	100	0	5
Scabies	Bed sheets	50	100	0	30

Table 4. Disinfection regime in steam and formalin ovens

Foci of:	Items for disinfection	Amount of cargo per m^3, kg	t°C	The amount of formalin per m^3	Duration of disinfection, min, min
Typhoid fever	Clothes, items of silk and synthetic fibers	30	57-59	75	45
Dysentery	Clothes, items of silk and synthetic fibers	24	49-51	150	90
viral hepatitis	items of silk and synthetic fibers	15	40-42	200	180
Tuberculosis	Clothes, footwear	30	57-59	150	60
Lepra	Clothes, footwear	18	49-51	250	240
Fever Q	Clothes, footwear	30	50-59	300	210
Microsporia	Clothes, footwear	30	57-59	250	165
Tricophytia, Epidermophytia Favus.	Other items including sonic toys	35	55-57	120	90
Anthrax, Gangrene gaseous, tetanus, etc.	Clothes, items of silk and synthetic fibers	18	57-59	250	165

Table 5. Disinfection in dysentery, typhoid fever, parathyroid A and B foci

Itemes / indices	Desinfectanți																			
	Chlora-mine		Lime chlo-ride		sulfochlo-ride		Clordezin		Clorbeta-naftol		H_2O_2		Dezoxon- I		Lysol		Natrium metasili-cate		Dichlor 1	
	%	ex	%	ex	%	ex	%	ex	%	ex	%	ex	%	ex	%	ex	%	ex	%	ex
Sanitary itemes	0.5	60		60	0.2	60	1	120	2	30	3	120	0.2	120	5	60	2	60	2	60
Contaminated bed sheets	1	240			0.2	60	1	120	2	60	3	60	0.2	60	5	60	2	15	2	120
Clean bed sheets	0.2	60			0.1	30	0.5	120	1	60	3	30	0.1	30	3	30	2	30	1	30
Dishes with food scraps	1	60	1	60	0.2	60	1	15	1	60	3	60	0,2	60	-	-	2	15	2	60
Dishes without food scraps	0,5	30		30		30	0,5	120	0.5	60	3	30	0, 1	15					1	30
Toys, school sup-plies	0.5	30	0.2	30	0.1	60	0,5	15	0.5	60	3	15	0,1	30	5	30	2	60	1	30
Rooms, furniture	0,5	60	0,5	45	0,2	30	0.5	15	0,5	60	3	60	0.1	30	5	20	2	30	2	60
Sanitary-technical equipment	1	30	0.5	30	0.2	60	0,5	60	2	60	3	60	0.2	30	5	30	3	30	2	60
Transport	1	45	0.5	30	0.1	60	0,5	60	0.5	60	3	60	0.1	30	5	20	2	15	2	60
Container for feces	1	60	1	30	0.2	60	1	120	2	60	3	60	0.2	60	5	30	2	60	2	120

Table 6. Disinfection in cholera outbreaks

Itemes %	Desinfectants												
	Lime chlo-ride		Chloramine		Sulfoclo-rantil		Chlordezin		Natrium Hypochlo-rite		Lysol		Metasilicate of Natrium
	ex	%	ex	%	ex	%	ex	%	ex	%	ex	%	ex
Bedpan	1	30	1	30	0,2	60			1	60	5	30	2	60
Dishes	0,5	30			0,2	60	1	120	1	60			2	15
Means for washing dishes	0,5	60		60	0,2	60	0,5	60	-	-			2	60
Bed sheets and underwear			1	240	0,2	60	1	120	-	-	3	60	2	15
Toys	0,5	30	0.5	30	0,1	30	0,5	15	-	-	3	30	2	15
Surfaces of rooms, furniture, toilet, transport, morgue	0,5	30	1	60	0,1	30	0,5	30	1	30	3	30	2	30
Outdoor WC	10										5		10	
The manure of the sick Scraps of food	Clorură de var Lizol A 5% – B10% Metasilicat de Na – 10%				1:5 exp –1oră 2:1 exp – l oră 2:1 ex – l oră									
Sanitary means	1	60	1	240	0,2	60	1	120	1	60	5	60	2	60

It is important to know how to perform prophylactic disinfection of fountains, cisterns and other water supply sources, in order, to ensure the population with drinking water. The prophylactic disinfection of these objects is usually done at the completion of the construction, repair, and periodically once a year, after their cleaning, in case of floods and rashes by infectious digestive diseases.

The disinfection of the well can be done by the determination of the volume of water (m3) according to the formula:

$S = 3,14xR2$,

where, S – the area of the well section in m^2;

R – section radius (m).

The prophylactic disinfection is performed by irrigating the walls outside and inside after pumping and cleaning the well. The solution of 5% lime chloride or calcium hypochlorite based on 0.5 l per 1 m^2 are used for this purpose.

After filling the well with water till the usual level, the disinfection of water is performed with lime chloride or calcium hypochlorite in the amount of 100-150 mg of active chlorine per 1 liter of water or 100-150 g per 1 m^3 of water. The calculation of the required amount of lime chloride or calcium hypochlorite is carried out according to the formula:

$P = (V-C-100)/H$,

where:

P – is the amount of lime chloride or calcium basic hypochlorite (g);

V – water volume in the well, (m^3);

C – stable concentration of active chlorine in well water, (mg/l, g / $m^{3)}$;

H – content of active chlorine in chlorogenic substance,%;

100 – the constant numerical coefficient.

The required amount of lime chloride or basic calcium hypochlorite is dissolved and poured into the well, then it is shaken during 15 minutes. The duration of exhibition is 6 hours. It is not allowed to use water from the well during this time.

Exercises

Questions for self-control

1. The definition of disinfection.
2. What is the purpose and tasks of disinfection?
3. What do prophylactic and focus disinfections mean?
4. List the methods of disinfection.

5. What are the main active groups of substances used for disinfection?
6. Give the general characteristic of each group of disinfectants?
7. What are the optimal conditions for disinfectants storage?
8. What disinfectants are approved in the Republic of Moldova?
9. How are disinfectants classified according to their action?
10. What kind of factors influence the effectiveness of disinfection?
11. What tests evaluate the quality of disinfection?
12. Give examples of prophylactic disinfection. Who is responsible for performing prophylactic disinfection?
13. What do current and terminal disinfections include.
14. Who is responsible for organization and performing the current disinfection?
15. What methods and substances are used for current disinfection in outbreaks of digestive infections?
16. Who is responsable for the organization and carrying out terminal disinfection in the outbreak?
17. What infections necessitates mandatory the terminal disinfection?
18. How is the evaluation of terminal disinfection performed?
19. What features are specific in disinfection of anthrax outbreaks?
20. What features are specific in disinfection of HVA outbreaks?
21. What objects can be decontaminated in steam, steam and formalin ovens and in one with dry air?
22. What methods are used to assess the quality of disinfection in the oven?
23. Which substances can be used for hand disinfection?
24. What are the features of the disinfection in hospital according to the department profile?
25. What is the content of *biosecurity of medical staff*? What does the protective equipment include?

Practical tasks

1. Demonstrate stages of hand washing and disinfection.
2. Choose the disinfectants for disinfection in foci of different etiologies.
3. Make the scheme of the alternation of disinfectants in hospitals according to the substances proposed by the lecturer.
4. Prepare the basic solution of 10% lime chloride from the f lime chloride powder that contains 20% of active chlorine.
5. Evaluate the quality of the disinfectant and concentration of active chlorine by express method.

6. Enter disinfection results in the internal register of health care institution.
7. Demonstrate the steps to put on disposable gloves.

Problems of epidemiological situations

Problem No. 1. It is necessary to organize current disinfection in the infectious disease department. The department has 20 beds. Over the past 2 days, 16 patients with dysentery were hospitalized as a result of an outbreak.

- Indicate the steps of the disinfection and the itemes that need to be disinfected.
- Choose the substances that can be used for disinfection. What is the concentration and exposure of these substances.

Problem No. 2. E. coli was identified on toys and dishes as a result of the evaluation of the disinfection quality by the bacteriological method in a toddler group. The kindergarten is quarantined because a sick child with dysentery was found two days ago. During the epidemiological investigation carried out in the kindergarten, it was found that the current disinfection was performed with chloramine (toys – 0.2% and dishes – 0.1%).

- Evaluate the quality of the performed disinfection. Make the necessary recommendations.

Problem No. 3. The quality of the disinfectant solution was evaluated in one of the institutions. It was found that the lime chloride solution that should have 1% of active chlorine containes in fact 0.05%.

- Evaluate the quality of the disinfectant.
- Determine possible consequences of disinfection with this solution.

Problem No. 4. During the evaluation of the disinfection quality in the hospital, it was determined that the basic solution used for the preparation of working solutions contained 2.5% of active chlorine.

- Evaluate the quality and effectiveness of performed disinfection.

Problem No. 5. The psychiatric hospital was moved to a new building. It was decided to place the department of intestinal infectious diseases in the previous building. The building has four rooms of 17 m^2 each and two rooms of 30 m^2. The total area of the former psychiatric hospital is 140 m^2.

- Determine the type of disinfection, disinfectants and its quantity required to be used.

Problem No. 6. Choose the objects that need to be disinfected in the typhoid fever outbreak. What disinfectants and what concentration is necessary for the disinfection of: a) dishes, b) bed sheets, c) excrements of patients, d) the patient's urine, e) the floor of the room, f) walls, g) the air h) toys.

Problem No. 7. According to the indication of the epidemiologist, the final disinfection in the typhoid fever focus was carried out.

- Choose the evaluation methods of the quality of performed disinfection.

Problem No. 8. After the hospitalization of a child with the diagnosis of whooping cough in the infectious disease department of the district hospital, the terminal disinfection was recommended to be performed at home.

- Evaluate if the recommendation is correct.

Problem No. 9. During the evaluation of the kindergarten, it was found that the concentration of chloramine in the working solution used for disinfection is 20%.

- Assess the correctness of the disinfection.

Problem No. 10. A patient with typhoid fever was hospitalized on the 05.09. The patient lives in the village and has a private home. The house has 2 rooms with a surface of 28m^2 each and a kitchen with the surface of 10m^2. The toilet has a surface of 1.5m^2. The Public Health Center has only lime chloride.

- Determine: who will perform the disinfection, what will be disinfected, how to prepare the lime chloride solution, what is the concentration of the basic and working solution, the volume of disinfectants required to perform the disinfection.

Problem No. 11. It is necessary to perform the disinfection in a campus with HVA focus. The patient is hospitalized. From the epidemiological anamnesis it is known that the family of the patent live in a room of 24m^2. The WC, kitchen and the corridor are common. On the same floor there are 3 families.

- To determine: the type of disinfection, who will carry out the disinfection, the substances and their concentration used for disinfection.

Problem No. 12. Hospital No.5 has 400 beds, including 300 beds in the therapeutical department, 50 beds in the surgical department and 50 beds in the obstetric one.

- Calculate the amount of antiseptic in need to be purchased for the future year.

Problem No. 13. On the 27.05.2016, it is planned to have 5 births, 3 surgeries and four dressings of post-surgery patients at hospital No.7.

- Calculate the amount of antiseptic that is in need to be consumed during all indicated procedures.

Problem No. 14. In the town of C., 5 outbreaks of tuberculosis, 30 outbreaks of Acute Diarrheal Diseases and 7 outbreaks of viral respiratory infections were recorded in 2017.

- Choose a disinfectant that will be effective for all three types of infections.
- Indicate the concentrations of the working solutions and calculate the quantity required to be used.

Problem No. 15. Choose four disinfectants used for disinfection of instruments, hands, surfaces and floors. Indicate the work concentrations and exposure time of solutions.

Problem No. 16. Daily disinfection is planned in the therapeutic department of Clinical Hospital No.9.

- Indicate three mandatory components of the disinfection regime before the applcation of the disinfectant.

Problem No. 17. It is planned to re-profile the dysentery department into the hepatitis A department in 5 days. Currently, there are 7 patients in 3 rooms of 60 m^2. The total area of the other rooms, including WC, is 100 m^2.

- Determine the type of disinfection, concentration and quantity of disinfectants necessary to be used. Determine the time when it will be performed.

Problem No. 18. The mayor of village C. acquired 200 kg of lime chloride for the disinfection of wells. There are 620 wells in the locality with an average depth of 5m.

- Calculate if the quantity of lime chloride is sufficient to perform the qualitative disinfection of wells.

Problem No. 19. 48 cases of HVA were recorded in one of the localitiies. The Public Health Center decided to perform the disinfection of wells in the locality according to epidemiological indications. The village has 260 wells with an average depth of 4.8m.

- Determine the steps of organization and carrying out the disinfection of wells, indicate the disinfectants, the concentration of the working solution and methods of evaluation of the disinfection quality.

Problem No. 20. An outbreak of HVA is recorded in village X. The village administrative Council together with the Center of Public Health decided to disinfect the village aqueduct. The aqueduct is constructed of a pipe network: one with a length of 1.5km and a diameter of 300mm, another with a length of 1km and a diameter of 20mm, and the water tower with the volume of 25m3.

- Determine the steps of disinfection of the aqueduct and the water tower. Determine disinfectants used for disinfection, their application, the necessary technical equipment, and the methods of evaluation of the disinfection quality.

RECOMMENDED LITERATURE

Basic literature

1. Prisăcaru V. General epidemiology with medicine based on evidence. Chişinău, 2015.
2. Prisăcaru V. Epidemiologie generală. Bazele medicinei prin dovezi. Chişinău, 2012, 380 p.
3. Ghid de supraveghere şi control în infecţii nosocomiale. Sub redacţia prof. univ. V.Prisăcaru, Ediţia II, Chişinău, 2009
4. Prisacari V., Guţu L., Paraschiv A., etc. Epidemiology in tests. Chisinau, 2013.
5. Material of the course.

Additional literature

1. Tratat de epidemiologie a bolilor transmisibile. Sub redacţia prof. univ. Aurel Ivan. Polirom, 2012, 837 p.
2. Брико Н.И., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В. Эпидемиология. Том I, М., 2013, 832 с.
3. Зуева Л.П., Яфаев Р.Х. Эпидемиология. Санкт-Петербург, 2006.
4. Медицинская дезинфекция, дератизация, дезинсекция. Под редакцией В.В. Шкарина, В.А. Рыльникова. Нижний Новгород, 2016.

STERILIZATION

Relevance of the theme

Sterilization is an important measure to prevent infectious diseases, and basically it is a decisive factor in the prevention of blood-borne infections, including those associated with healthcare. In this context, it is important to know the sterilization service management, sterilization methods and means, methods of evaluation of the quality of sterilization in the medical institutions.

Knowledge about steps of sterilization process is the basis for providing qualitative medical services to the population. The sterilization of medical instruments and medical supplies contribute to the prevention of blood-borne infections. Currently, a significant rate of viral hepatitis B, C and D is due to the non-qualitative sterilization of medical instruments.

Sterilization is a procedure of major significance, especially in the prevention of blood-borne and septic-purulent infections.

Supervision of the quality of sterilization, as well as the proper storage

of the sterilized materials is the obligation of the medical institution first of all because they have to guarantee the safety of the patients and medical staff regarding blood-borne and septic-purulent infections.

Purpose of the practical lesson

The purpose of the lesson is to learn the essence and importance of sterilization measures in the prevention of infectious diseases, the features of the sterilization process, sterilization means and methods, steps of preparation of the sterilization material, the evaluation methods of the sterilization quality.

Plan of practical lesson

1. Assessment of the initial level of knowledge.
2. Discussion about methods of sterilization, sterilization flow and organization of sterilization in medical institutions.
3. Solving and discussion on problems based on epidemiological situations.
4. Assesment of the student's results obtained in solving problems of the epidemiological situation;
5. Final assesment of student's knowledge through tests;
6. Summarizing the practical lesson.

Material provided for the class

The study is organized at the epidemiology department and medical institution where the student has the opportunity to learn about organization and structure of the sterilization department and the sterilization regime. The student receives the plan of sterilization department with material flow, medical instruments, register to record the sterilization procedure, control tests for the evaluation of the sterilization quality, normative acts that regulates sterilization activities in medical institutions.

The student needs to know

1. The notion of sterilization. Types of sterilization.
2. Sterilization steps.
3. Conditions for compliance with the sterilization regime of medical instruments.
4. Methods of packaging and sterilization depending on chemical composition of medical instruments and sterilization material.
5. Types of sterilizers and sterilization cycles.
6. Exhibition terms after carring out the sterilization.
7. The evaluation of sterilization quality.

Practical skills:

1. Determination of infections where sterilization has a predominant position in their prophylaxis;
2. Distribution of sterilized materials depending on the chemical composition;
3. Evaluation of the sterilization flow;
4. Determination of the sterilization regime according to the type of medical instruments.
5. The evaluation of the sterilization quality;
6. The registration of the sterilization results in the register with the attachment of evaluation tests used for the evaluation of sterilization quality.

Additional information

Proper processing of medical instruments and equipment before and after use is of particular importance in the prevention of nosocomial infections. The choice of the sterilization method depends on instrument category and the way it is used in patient care. Instruments and objects used in health care are classified into three categories depending on the risk of transmission of infections:

- critical istruments;
- semi-critical instruments;
- non-critical tools.

Critical instruments include:

- instruments that come into the contact with sterile tissues or vascular system;
- instruments that penetrate the skin or mucosa (examples: scalp, needles, vascular catheters, implants and other invasive surgical instruments). These tools require mandatory the sterilization between uses.

Semi-critical instruments:

- instruments that come into the contact with mucous membranes, except periodontal mucous membranes (flexible endoscopes, laryngoscopes, endotracheal tubes, equipments for the assisted anesthesia and breathing, oral or rectal thermometers, etc). These instruments require a high-level sterilization or disinfection between uses.

Non-critical instruments:

- instruments that come into the contact only with intact skin (stethoscopes, table surfaces, pavements, rooftops, furniture, etc.) and require disinfection of intermediate level between uses.

The physico-chemical indicators for the assesment of the sterilization effectiveness are:

a) color change of adhesive tapes with physico-chemical marker on the boxes, kits, packages packed into the special paper or printed it on a bag or plastic;
b) color change of the indicators placed inside each packet or in a test pack in each basket and checking the temperature, time and saturation of the vapor.

The assesment can be done through the transparency of the plastic in case of plastic or transparent packaging materials. The materials packed in metal boxes are assesed through the test pack attached to each kit. The material is considered non-sterile and cannot be used when the color of the indicator was not changed.

In order to control the effectiveness of sterilization, the following biological indicators are admitted:

1. Biological indicator with *Bacillus stearothermophyllus* impregnating a cotton package in the form of patches or yarns. The test-box is inserted into the autoclave with the sterilizing material. At the end of the cycle, the biological indicator is sent to the microbiological laboratory. The result is received after 7 days.
2. Biological indicators with *Bacillus stearothermophyllus* impregnated on the box together with the culture medium in the vial. At the end of the sterilization cycle, the vial is broken by pressure and incubated. The result can be read after 24 or 48 hours.
3. Bacteriological control of autoclave sterilization with spore suspension of *Bacillus stearothermophyllus* in nutritional solution.

The mode to be used:

a) Test vials are placed in the autoclave at different levels among medical devices and sterilization materials. Sterilization is carried out according to the parameters indicated by the manufacturer (eg 120°C during 30 minutes);
b) after the sterilization, the vials are placed in an incubator at 56°C;
c) reading the results:
   - maintaining of the color (color, transparency) unmodified demonstrates that the sterilization is correct;
   - yellow color and a slight opalescence of the content of the indicator means that sterilization is below the optimum efficiency parameters (viable spores remained).

This test is not suitable to asses the quality of the sterilization in the autoclave at temperatures above 120°C. Changing of the purple color of the product into the reddish violet till yellow shades, even when taking out the ampoules from the autoclave, indicates that the temperature exceeds 120°C. The color is changed due to chemical degradation of the substrate under the high temperature. The vials do not need to be incubated because spores have been destroyed.

The duration of sterility of packaged materials in perforated metal boxes or in necklaces is 24 hours after sterilization, provided that the boxes and enclosures are kept closed. The duration of sterility of materials packaged in bags, plastic or paper are of two months after sterilization, with the condition that the integrity of the packaging material is maintained. Materials packaged in special paper (two-layer paper, without continuity solutions) are valid for one month after sterilization.

The evaluation of sterilization effectiveness is carried out:

a) for each cycle:
   - throughout the complete sterilization cycle, the control panel is followed and the temperature and pressure achieved for each phase of the cycle are recorded;
   - the color of indicators is read for the temperature from the adhesive strip, steam sterilizer under the pressure which tell about the time, temperature and saturation of the vapor during the sterilization;

b) daily:
   - the quality of steam penetration is controlled by the Bowie &Dick test,
   - control with a biological indicator (*Bacillus stearothermophyllus*) is carried out for autoclaves in central sterilization department or for autoclaves that are not equipped with an automatic recording device.

The service of the autoclave to check their operation is carried out by an authorized technician.

The complete sterilization cycle comprises the following phases:

a) initial vacuum;
b) preheating;
c) removal of air and moistening the objects;
d) sterilization (exposure to gas);
e) final vacuum;
f) air purging and ventilation;
g) aeration (desorption).

Factors that influence the sterilization:

- the quality of presterilization;
- the sanitary-hygienic state of the rooms where sterilization and storage of sterilized objects are carried out;
- exposure time;
- the quality of sterilization devices;
- the properties of the chemical sterilizing agent.

Table 1. Methods, means and regimes for the sterilization of medical items according to the chemical composition

The material from which the article is made	Mode, means and sterilization regimes
1. Glass, rubber, polymers (high density polyethylene, PVC)	• high humidity steam and high pressure • 6% hydrogen peroxide solution • Steam mixing and formaldehyde
2. Corrosion-resistant metal	• high humidity steam and high pressure • 6% hydrogen peroxide solution • 1% dezoxon sol.
3. Textiles	• high-humidity under the high-pressure steam • dry hot air
4. Optics, cardiostimulators, plastics	• OB mixture (ethylene oxide with bromomethyl) 1: 2.5
5. Endoscopes, analogue medical instruments	• 2.5% glutaraldehyde • Steam, formaldehyde in ethanol

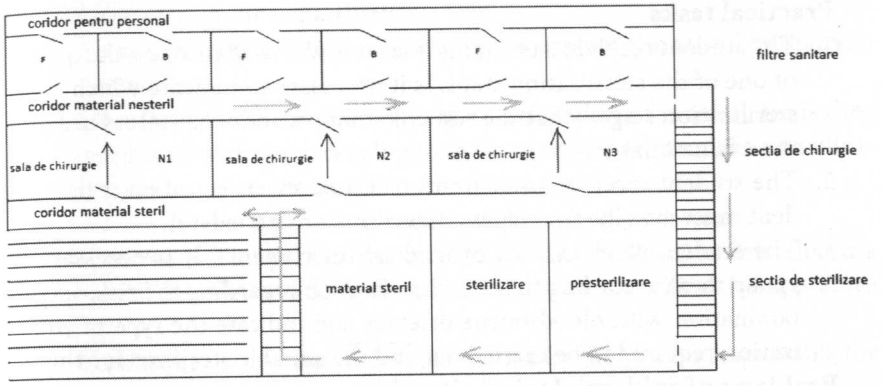
Table 2. The sterilization regime of medical items in the autoclave

Sterilizing material	Temperature in °C	Pressure in atm	Durataion in min
Instruments, syringes (plastic, glass), rubber	120±2	1.1±0.2	45±3
Pansamente (comprese), țesături (cîmpuri operatorii, halate)	132±2	2.0±0,2	20±2
	or 120±2	1.1±0,2	45±3

Table 3. Regime of dry heat sterilization

Working temperature in the sterilization chamber, °C		The time of the exhibition, in min.	
The normal value	*Maximum deviation*	*The normal value*	*Maximum deviation*
180	+2 -10	60	+5
160	+2 -10	150	+5

Fig.1 The flow of non-sterilized and sterilized material from the operator rooms to the sterilization department and vice-versa



Exercises

Questions for self-control

1. What does the term "Sterilization" mean?
2. What is the role of sterilization in the prevention of infectious diseases.
3. List the methods of sterilization.
4. Classify the medical instruments according to the risk of transmission of blood-born diseases.
5. What are the features of decontamination of critical, semi-critical and non-critical instruments?
6. Describe the sterilization steps and draw up the flow of medical material for sterilization.
7. Specify the steps and contents of the presterilization stage.
8. What methods are used to check the quality of the sterilization?
9. Which medical items can be sterilized in dry hot air sterilizers?
10. Which medical items can be sterilized in steam sterilizers under the pressure?
11. Which instruments are allowed to be sterilized with ethylene oxide?
12. List the the control tests used to assess the sterilization effectiveness for different types of sterilizers.
13. What is the shelf life of medical articles according to the type of packaging?
14. List the mandatory requirements and conditions for sterilization.

15. List the factors that influence the sterilization.
16. What are the tasks of the centralized sterilization department?

Practical tasks

1. The student receives a test sample after it was used to assess the quality of one of the sterilization steps. Is it necessary to indicate which is the sterilization stage, what the test color shows and what test is used for the evaluation?
2. The student receives a sterilization record sheet. Based on it the student must discribe the stages of sterilization carried out.
3. The student receives a set of medical instruments. It is necessary to group them according to their classification regarding the risk of contamination with blood-borne diseases and indicate the type of sterilization required to be carried out and the suitable sterilizer for this.

Problems of epidemiological situations

Problem No. 1. Medical Surgical Instruments and flexible endoscope have been used in the surgical surgery.

- Determine sterilization methods and appropriate working regimens.

Problem No. 2. After the surgical operation medical instruments of metal and glass were collected.

- List the stages of the sterilization process.
- Choose the method and all cycle of sterilization.

Problem No. 3. After the sterilization, the sterilized package was transported and handed to the surgery department. The sterilized package was opened at 10 o'clock.

- Specify the expire time of sterilized package and what first action should be taken by the doctor until the surgery.

Problem No. 4. The function of autoclave was checked through bacteriological method with *Bacillus stearothermophyllus* cultivated on a culture medium at 132°C during 20 minutes. After the complete sterilization cycle, the test was incubated at 56°C. The result was below optimum parameters (the product appearance changed).

- What mistake was made during the autoclave test?

Problem No. 5. After the sterilization, the nurse of the sterilization department extracted the sterilized packages from the autoclave at 10 o'clock and placed them on the table next to the sterilizer. Next day the nurse of the dental office came after the sterilized equipment.

- Assess actions of the nurse taking into account the time that lasts after finishing the sterilization process?

Problem No. 6. After the sterilization of the medical items in the autoclave, they were kept in the metal boxes without filters during 5 days and then they were distributed to the departments.

- Assess the quality of medical items and explain the mistakes that you found.

Problem No. 7. On 20.08.2016 after the sterilization of medical items they were distributed without packaging to the surgery department. The sterilization was performed on 18.08.2016.

- Assess the quality of sterilized items. Explain the answer.

Problem No. 8. The person responsible for the sterilization introduced a soft material (textile) and compresses in the dry heat sterilizer (temperature of 180°C).

- Assess the corectness of the action done by the person responsible for the sterilization.
- Choose the appropriate sterilizer for this type of items.

Problem No. 9. On March 24th, 2016 an operation is scheduled in the surgery department. A day before the operation, the person responsible for the sterilization prepared the sterile water in autoclave.

- Assess the quality of sterile water prepared for the operation.

Problem No. 10. The person responsible for the sterilization used biological tests with Bacillus stearothermophilus (spores) to check the quality of the sterilization in dry heat sterilizer.

- Explain the result of quality control through this test.

Problem No. 11. The quality control of the presterilization stage of the medical items by the azopyramic test showed the appearance of the violet color and in a few seconds it turned into a pinkish-blue color.

- Assess the quality of the presterilization step. What does the azopyramic test determine?

Problem No. 12. The person responsible for the sterilization checked the presterilization stage by the amidopirin test. At the end of the assesment, the test was colored in blue-green.

- Assess the quality of the presterilization stage and indications of the amidopirin test to be used.

Problem No. 13. After the control of the presterilization stage by the phenolphthalein test, it showed a pink color.

- Assess the test result.
- Give the indications for using of phenolphthalein test.

Problem No. 14. During the planning control of medical institution the epidemiologist of the CPH decided to check the quality of sterilization of medical instruments. The epidemiologist used the Sudan-III test to assess the quality of sterilization. The result of the test was positive.

- Determine for which sterilization stage this test is used.
- What does this test determine?
- When is considered the result of the test to be positive?

RECOMMENDED LITERATURE

Basic literature

1. Prisacaru V. General epidemiology with medicine based on evidence. Chișinău, 2015.
2. Prisăcaru V. Epidemiologie generală. Bazele medicinei prin dovezi. Chișinău, 2012.
3. Ghid de supraveghere şi control în infecţii nosocomiale. Sub redacţia V.Prisacari. Ediţia II. Chişinău, 2009.
4. Prisacari V., Guțu L., Paraschiv A., etc. Epidemiology in tests. Chisinau, 2013.
5. Material of the course.

Additional literature

1. Брико Н.И., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В. Эпидемиология. Том I. М. 2013, 832 с.
2. Зуева Л.П., Яфаев Р.Х. Эпидемиология. Санкт-Петербург, 2006.Медицинская дезинфекция, дератизация, дезинсекция. Под редакцией В.В. Шкарина, В.А. Рыльникова. Нижний Новгород, 2016

DISINSECTION

Relevance of the theme

Disinsection is an important section in in practical epidemiology, which includes the development and use of fighting methods against vectors that spread the infections diseases. Knowledge about biological and ecological features of vectors responsable for the transmission of infectious diaseses and methods and means used in disinsection are the basic measures against their transmission.

Purpose of the practical lesson

The purpose of the lesson is to learn about biological and ecological features of arthropods that are vectors in infectious diseases, methods and means of fighting, as well as the skills on organization of disinsection measures.

Plan of the practical lesson

1. Evaluation of the initial student's level of knowledge.
2. Solving and discussion on epidemiological situation problems.
3. Discussion of the results of problem drawing up the plan on anti-epidemic measures to combat vectors.
4. Final assessment of student's knowledge by testing;
5. Summarizing the practical lesson.

Material provided for the class

1. Sample of disinsectant substances.
2. Devices and equipment for disinsection.
3. Problems on epidemiological situations.

The student needs to know

1. The role of disinsection in combating communicable diseases.
2. Arthropods as vectors of pathogen transmission in infectious diseases.
3. Methods of disinsection.
4. Disinfection means.
5. Organizational Structure and Management of Disinfestation Measures.
6. Mechanical, physical and chemical methods used to assess the quality of disinsection.

Practical skills:

- determination of the proper method to combat arthropods (vectors) according to the development stage, breeding teritory and subjects that necessitate to be disinsected.

Exercises

Questions for self-control

1. What do prophylactic and focus disinsection include?
2. Specify the methods and means used for disinsection.
3. Which methods and means of disinsection are used in case of infectious diseases transmitted by mosquitoes.
4. Which methods and means of disinsection are used in case of infectious diseases transmitted by ticks.
5. Which methods and means of disinsection are used in case of infectious diseases transmitted by flies.
6. Specify the requirements for substances that are used in disinsection.

7. What factors cause the development of the pathogen resistance to disinsectants?
8. Which methods are used to assess the quality of disinsection.

Practical tasks

1. Determine infectious diseases with the transmission of causative agents by vectors (mosquitoes, ticks, sandfly, fleas, lice, flies), transmission mode and methods to control them.

Vector species	**Infectious disease**	**Transmission mode**	Methods of combating		
			physical	chemical	mechanical

2. Describe the insecticides proposed by the lecturer according to the scheme.

Insecti-cidele	**Duration of action**	**Mechanism of action**	**The lethal dose**	**Toxicity for domestic animals and humans**

Problems of epidemiological situations

Problem No. 1. As a result of prophylactic control in one of the schools, pediculosis was detected in three students.

- Determine the measures that necessitate to undertake to combat pediculosis in the outbreak.
- List the preparations and their concentrations to be used.

Problem No. 2. In July, as a result of examination of a group of people returning from Africa, 2 carriers of Tertiary Malaria were found. That zone was populated by large number of mosquitos.

- Determine measures necessary to undertake to prevent a possible spread of malaria in the territory.

Problem No. 3. A patient with Brill disease was found in the locality F.

- Draw up a plan of anti-epidemic measures to be taken in this situation.

Problem No. 4. Pediculosis was found during the examination of a patient who was hospitalized with suspicion of dysentery in the Infectious Diseases Hospital.

- Propose measures for the elimination of pediculosis in this patient to prevent its spreading.

Problem No. 5. Clothes of a patient with pediculosis were disinfected in the oven.

- Specify the type of oven to be used, the method of clothes disinsection.
- Discribe methods of the assessment of the disinsection quality.

Problem No. 6. Patient's clothes were brought from the typhoid fever and exanthematical typhus focus to the Disinfection Department. The disinfection and disinsection were carried out in ovens. The section has ovens with hot steam, hot dry air, steam and formalin.

- Specify the ovens where clothes will be disinfeced and disinsected and what working regime will be choosen.

Problem No. 7. During the medical examination of children, pediculosis was detected in a few children at a kindergarten.

- What measures necessitate to be carried out in the kindergarten?
- Indicate the preparations that must be used to combat pediculosis in the kindergarten.
- Describe the processing methods.

Problem No. 8. Pediculosis was detected in the boarding school. Several sets of bedding and body linen made of wool, cotton and synthetic fibers were brought to the Disinfection Department. The department has two types of ovens: oven with steam and oven with steam and formalin.

- Distribute the mentioned items according to the type to be processed in the ovens.
- Specify the working regime in the ovens.

Problem No. 9. A patient with malaria was hospitalized in the infectious diseases hospital.

- Specify the anti-epidemic measures that need to be taken in the hospital.

Problem No. 10. A group of students organized a party in the forest. In three of them ticks on the skin were detected.

- List the necessary actions that need to be taken in this situation.

RECOMMENDED LITERATURE

Basic literature

1. Prisacaru V. General epidemiology with medicine based on evidence. Chișinău, 2015. p.117-118.
2. Prisăcaru V. Epidemiologie generală. Bazele medicinei prin dovezi. Chișinău, 2012.
3. Prisacari V., Guțu L., Paraschiv A., etc. Epidemiology in tests. Chisinau, 2013.
4. Material of the course.

Additional literature

1. Брико Н.И., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В. Эпидемиология. Том I. М. 2013, 832 с.
2. Зуева Л.П., Яфаев Р.Х. Эпидемиология. Санкт-Петербург, 2006.Медицинская дезинфекция, дератизация, дезинсекция. Под редакцией В.В. Шкарина, В.А. Рыльникова. Нижний Новгород, 2016

THEME 5: IMMUNOPROPHYLAXIS OF INFECTIOUS DISEASES

Relevance of the subject

The prevention of communicable diseases through the vaccination is the most effective investment in public health. High coverage of population vaccination can decrease substantially the morbidity, mortality and disability resulting from infectious diseases, as well as the economic and social losses caused by these diseases. Only through the vaccination was possible eradication of smallpox globally (1978), elimination of polio from several geographic areas throughout the world, and stop the diphtheria outbreak within the Commonwealth of Independent States over the last decade.

Purpose of the practical lesson

The purpose of the practical lesson is to develop knowledge about means used in the prevention of infectious diseases and skills on organization of the immunoprophylaxis in medical practice.

Plan of practical lesson

1. Assesment of the initial level of knowledge.
2. Examination of immunobiological preparations used in medical practice.
3. Discussion about principles of organization of the immunoprophylaxis in
medical practice.
4. Discussion about indications and contraindications for vaccination.
5. Discussion about conditions for the storage of immunological preparations. Components of the „Cold Chain".
6. Discussion of the National Immunization Program. Vaccination schedule. Principles for the development of the vaccination schedule.
7. Discussion about basic principles in organization and administration of vaccines.

8. Discussion about methods of administration of vaccines into the body and a post-vaccination adverse reactions.
9. Determination of the required amount of vaccine and necessary equipment to perform the vaccination to the population.
10. Evaluation of efficiency and efectivness of immunoprophylaxis.
11. Analysis of the management of medical wastes resulting from immunization of the population.
12. Practical exercises on vaccination simulation in the study room.
13. Problem-based learning.
14. Final assessment of student's knowledge by testing.

Materials provided for the class

The study is organized at the Epidemiology Department of Nicolae Testemitanu State University of Medicine and Pharmacy. The student will receive immunological preparations used in medical practice, equipment used to maintain the „Cold Chain", Statistical Reports on Vaccine Coverage, Vaccine Record Form No.1 from the Center of Public Health, Form No. 2 on vaccine records in medical institutions, 063/e Vaccine Evidence Registry, 063-3/e Vaccine Certificate, Statistical Form about Monthly Vaccine necessary in Medical Institutions.

The student needs to know

1. The role of immunoprophylaxis in the control of infectious diseases;
2. Immunobiological preparations used in medical practice. Types, classification, methods of production, storage conditions, methods of vaccines administration. Requirements to immunological preparations.
3. The National Immunization Program and the Vaccination Schedule.
4. Principles of organization of vaccinations;
5. Methods of vaccines and other immunobiological preparations administration;
6. Indications and contraindications of population vaccination;
7. Post-vaccination adverse reactions (side effects) and their management;
8. Methods of immunoprophylaxis evaluation.
9. Epidemiological surveillance of immunoprophylaxis.

Practical skills

1. The determination of vaccine type, validity, mode and the scheme of administration, schedule, dose, indications and contraindications for vaccination.

2. The elaboration of the vaccination plan and calculation of the required amount of vaccines and other components necessary in carrying out the immunoprophylaxis of the population.
3. Knowledge about contraindications and precautions. The impact of contraindications and precautions in increasing the level of population vaccine coverage.
4. The use of epidemiological methods in immunoprophylaxis evaluation.
5. To be able to fill in the Statistical Reports about Vaccine Coverage, Fact Sheet No.1 of vaccine evidence in the Centers of Public Health, Fact Sheet No. 2 of Vaccine Record in Medical Institutions, Vaccine Record Register 063/e, Statistical Sheet about Monthly Vaccine Order in Medical Institutions.
6. Choice of vaccine administration methods;
7. Management of post-vaccination reactions and side effects;
8. Management methods of waste resulting from immunization of the population.

Additional information

One of the basic conditions to achieve high vaccine coverage is the ensurance with the sufficient quantity of vaccines in time. The availability of excessive amount of vaccines in medical institutions has the risk of expiration date, exposure to unfavorable conditions during storage, decrease or loss of immunogenicity. On the other hand, such situations can cause vaccine deficits in other institutions or excessive spending.

The calculation of the necessary amount of vaccines includes:

1. The calculation of necessity of vaccines in medical institutions monthly, at the end of each month and designed for use the next month. It is performed acording to actual number of people that are to be immunized.
2. The calculation of the required amount of vaccines will be performed on the basis of individuals that need to be vaccinated for each dose and the type of vaccine designed for use next month. As a result, there is calculated the total number of doses of vaccine that will be administrated and the number of people that are going to be vaccinated.
3. Determination of the Wastage Factor (WF) for each vaccine that was used in the previous month: WF is an index that characterizes the amount of inevitable loss of vaccines that occurs during immunizations. It is the ratio between the total number of doses used and the real number of immunized individuals. The WF is calculated according to the formula:

$$WF = \frac{\text{Number of used doses}}{\text{Number of immunized people}}$$

The table below shows the recommended WF (pediatric dose) for medical institutions depending on the type and packaging of the vaccines.

Vaccine	Purpose	Packaging of the vaccine (no. dosis in the vial)		
		1-2	5-10	20
BCG	Vaccination	-	-	3.0
BCG	Revaccination	-	-	3.0
HepB	Vaccination of children	1.05	1.2	-
HepB	Vaccination of adults *	2.10	2.2	-
VPO	Vaccination/revaccination	1.05	1.2	1.3
DTP	Vaccination/revaccination	1.05	1.2	1.3
DT, Td	Vaccination/revaccination	1.05	1.2	1.3
Measles, Mumps, Rubella	Vaccination	1.05	1.4	-

* Dual pediatric dose is used to vaccinate adults

4. Calculation of the vaccine volume according to the type of vaccine (CVV):

CVV= Number of persons that will be immunized x WF

5. Calculation of the Maximum Volume of the Vaccine (CMVV):

A supplement of 25% will be added to CVV in case of unforeseen needs.

CMVV = CVV x 1,25

6. Determination of the residual vaccine (RV) existing in the medical institution is performed in parallel by two methods:
   a) the number of doses of a given vaccine that remained in the institution at the end of the month is summed up to the number of doses of the same vaccine received during the reporting month and minus the amount of doses used for immunization;
   b) the doses of each type of vaccine existing in the institution are counted.

The results obtained by both methods must coincide with each other.

7. Determination of the volume of ordered vaccine (VOV) according to the formula:

$VOV = CMMV - RV$

Exercises

Questions for self-control

1. The notion of immunoprophylaxis. What are the main goals of the immunoprophylaxis?
2. Definition and types of immunity.
3. What are active and passive immunities and what immunobiological preparations are used to develop active and passive immunity?
4. The importance of immunoprophylaxis in different infectious disease.
5. What are advantages and disadvantages of live vaccines?
6. What are advantages and disadvantages of inactivated vaccines?
7. List requirements for vaccines as biological products.
9. Describe all methods of vaccines administration.
10. Indications and contraindications for vaccination according to the type of vaccine.
11. What is the „Cold Chain" and its components?
12. Conditions for storage and handling of vaccines at different levels of medical institutions organization (National Center for Public Health, Municipal/District Center of Public Health, Center for Family Doctors and Maternity).
13. Rules for the placement of vaccines in the refrigerator. Temperature monitoring devices.
14. Immunization records used in medical practice by the National Center of Public Health , Municipal/District Center of Public Health and Center of Family Doctors.
15. Vaccination schedule in the Republic of Moldova and the vaccination schedules in other countries.
16. Features of vaccination according to National Program of Immunization and vaccination according to epidemiological indications.
17. Current legislation that regulates the population vaccination in Republic of Moldova.
18. Basic principles in the organization and administration of vaccines.
19. List the steps of the immunoprophylaxis organization in medical institutions. How is the room for vaccination prepared?
20. What do the planning and monitoring of vaccinations include. Safe injection practices.

21. Monitoring of vaccination side effects. List the reactions and possible side effects after the vaccination depending on the type of the used vaccine.
22. What legal obligations regarding immunoprophylaxis has the person? What is the law in force regarding the person's obligations for immunoprophylaxis?
23. What is the „vaccine coverage rate"?
24. What methods can be used to assess the efficacy of immunoprophylaxis?

Practical tasks

1. Describe features of the given vaccine (vaccine type, method of obtaining, general features, immunization schedule, method of administration, indications and contraindications for vaccination and requirements of storage).
2. Choose the possible ways to obtain active artificial and natural immunity from the proposed list:

I. Active artificial immunity:

II. Active natural immunity:

a) symptomatic form of infection;
b) asymptomatic form of infection;
c) administration of the live vaccine;
d) serum administration;
e) the entry of small doses of pathogen into the body after the contact with the source of the infection;
f) immunization with toxoid.

3. Which of the preparations from the given list below refer to homologous and heterologous preparations:

I. Homologous preparations:

II. Heterologous preparations:

a) measles immunoglobulin;
b) tetanus immunoglobulin;
c) tetanus serum;
d) botulinum serum;
e) rabies immunoglobulin;
f) influenza immunoglobulin;
g) anthrax immunoglobulin.

4. What recommendations can you recommend in situations described below?

a) As a result of the refrigerator mafuctioning, 15 boxes with BCG vaccine, 4 ampoules with rabies immunoglobulin, 3 ampoules with chemical vaccine against typhoid fever, and 20 ampoules with tetanus toxoid were frozen.
b) As a result of refrigerator failure during 3 weeks, the following preparations were kept at room temperature (+ 25°C): 10 ampoules with measles vaccine, 30 ampoules with DTP vaccine, 3 vials with polio vaccine, 10 ampoules with tetanus serum.
c) The instruction of the vaccine using was not present when the measles vaccine box was opened;
d) It was found that some ampoules of BCG vaccine in boxes are not clearly marked.
e) Three ampoules of measles immunoglobulin were detected with the content which does not correspond to the description in the instruction.
f) 200 boxes with DTP vaccine which validity date expired 3 weeks ago were detected at the polyclinic.

5. During March, the medical institution used 40 doses of DTP vaccine, 50 doses of OPV vaccine and 20 doses of MMR vaccine, all are packed in 10-dose vials. 32 children were immunized with DTP vaccine, 38 children – VPO vaccine, 15 children – MMR vaccine. Calculate the wastage factor for each type of vaccine.

$$WF_{DTP} = \frac{\quad}{\quad} =$$

$$WF_{OPV} = \frac{\quad}{\quad} =$$

$$WP_{MMR} = \frac{\quad}{\quad} =$$

6. Calculate the required amount of DTP, OPV and MMR vaccines that is necessary for April if it is known that at the end of March in institutions the remaining vaccines were: 8 doses of DTP, 5 doses of OPV, 10 doses of MMR. The number of children to be vaccinated in April is shown in the table below:

Table 11

Vaccines	DTP1	DTP2	DTP3	DTP4	OPV1	OVP2	OVP3	OVP4	MMR1
No. of children planned for the immunization	6	8	6	10	6	8	8	10	14

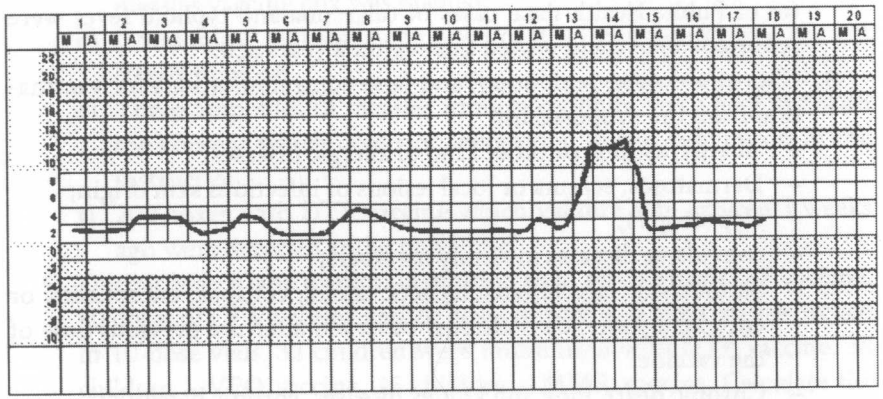
Fill in Form No.3 of Vaccines Monthly Order for Healthcare Institutions to receive the vaccines from the Center of Public Health.

7. Draw up the plan of immunization of 150 second-year and third-year students who decided to go to the region where according to the Center of Public Health data, cases of tularemia and typhoid fever were reported. 30 of them visited this region 2 years ago.
8. Choose absolute, temporary, and false contraindications for vaccination from the proposed list.
   - Allergy, asthma or other kind of allergic diseases;
   - Dermatoses, eczema or local lesions of infectious skin origin;
   - Hypotrophy;
   - convulsive diseases in family members;
   - Serious side effects (anaphylactic shock, collapse, encephalitis or encephalopathy, convulsions) observed after the previous dose of the vaccine.
   - Chronic heart, lung and kidney diseases, chronic hepatitis;
   - Immune deficiency or immune deficiency due to tumors, as well as due to the administration of immunodepressant or radiotherapy.
   - newborn jaundice
   - neurological diseases, for example, Dawn syndrome.
   - Mild illness (eg respiratory or diarrhea infection) with temperature up to 38.5°C;
   - Serious side effects after the first dose of DTP vaccine;
   - Children who react to chicken eggs or neomycin with the appearance of hypersensitivity symptoms (generalized urticaria, difficulty breathing, laryngeal edema, collapse, shock) will not receive vaccines that contain chick embryos or neomycin (eg measles vaccine or trivalent vaccine against measles, rubella, mumps).
   - preterm and low-birth-weight newborn;
   - Treatment with antibiotics or low doses of corticosteroids, as well as local use of steroids;
   - Decompensated neurological pathology (children with epilepsy or

children with progressive encephalopathy).

9. The medical nurse noticed a granulated sediment in the vaccine vial. How should the nurse proceed?
   a) to take the contents in the syringe;
   b) shake the vial before use;
   c) not to use the vaccine.
10. Make comments about the temperature data recorded in the refrigerator from the figure below.

The temperature data are recorded at 08:00 and 16:00 o'clock



11. On March, 30/2002, 8 doses of DTP vaccine remained in a vial of 10 doses (lot No. E3015b) with expiration date on June/ 30/ 2002. On April 2/2002, 50 doses of DTP vaccine were received from the Center of Public Health in vials of 10 doses, (lot No. E30152b) with expiration date on June/ 30/ 2002. On April 20, 10 doses of DTP vaccine were delivered to the Medical Center. Within the institution, 35 doses of vaccine were used for the vaccination during the month. Fill in the „Record Sheet No. 2 of the vaccine stock in the medical institution".
12. Choose the recommended temperature for storage of vaccines and what vaccines can be used if the temperature dropped to -4°C.
    a) The recommended temperature for storage of vaccines is + 2 + 8°C;
    b) The recommended temperature for storage of vaccines is 0°C – + 8°C;
    c) BCG, MMR, OPV vaccines may be used;
    d) DTP vaccine, hepatitis B and Hib vaccine may be used;

    e) none of the vaccines can be used if the temperature dropped to -4° C.

Problems of epidemiological situations

Problem No.1. The bottles of BCG and tularemia vaccine were broken. What is necessary to do in this situation:

a) to throw bottles in trash;
b) the disinfection of the broken bottles with concentrated disinfectant solution;
c) to burn bottles with vaccines;
d) to perform high-level disinfection in autoclave.

Problem No.2. All employees are going to be vaccinated against diphtheria and tetanus at the factory. Which of the individuals listed below can be vaccinated:

a) A healthy mechanic aged 24, who suffered from dysentery 3 months ago;
b) A healthy guardian aged 26, who hade viral hepatitis B 4 months ago;
c) A healthy nurse aged 25, who is 20 weeks pregnant;
d) An electric aged 34, who suffering of leukemia during 2 years;
e) A healthy carpenter aged 24, who got the flu a week ago;
f) An administrator aged 44, who suffers from skin eczema for years. Now he is in remission for 8 months.
g) A healthy nurse aged 24 who works in the Care Center and she was vaccinated against tetanus 3 weeks ago after an injury.
h) A healthy worker aged 44 who had Quincke's edema.
i) An accountant aged 24 who has congenital disease of the heart.

Problem No. 3. On the 2nd day after the vaccination with pentavalent vaccine of 200 people, 2 persons with fever over 38.5°C, 8 persons with fever of 38°C and 15 with fever of 37.2 – 37 5°C were recorded. How to proceed in this situation:

a) to stop the vaccination with this vaccine series;
b) to enhance the control of sterilization equipment;
c) to consider the number of reactions as normal and to continue the vaccination;
d) to destroy all vaccine series;
d) to withdraw all series of vaccine for additional tests.

Problem No. 4. Two people presented to the traumatological unit after being bitten by animales. The first person was bitten by the neighbor's dog and

it caused a mild injury. The dog is under the surveillance and it is healthy. The second person was bitten by a fox, and it caused multiple injuries on the shoulder and hand fingers.

- Determine the need for rabies vaccination and explain the vaccination steps in both cases.

Problem No. 5. Why is the use of antibiotics, sulfanilamide, or immune serum after the vaccination carried out with live vaccines forbidden?

a) vaccination will not be effective as these drugs will kill the pathogen;
b) the patient will develop complications due to the increase of pathogen virulence;
c) side effects may occur;
d) anaphylactic shock may develop.
e) immunity will be of short time.

Problem No. 6. Determine who in a group of 50 tourists will travel to an endemic region of tularemia and typhoid fever needs vaccination and revaccination if 20 tourists will for the first time and 30 tourists go for the second time. These 30 tourists were vaccinated against typhoid fever and tularemia 3 years ago.

a) all tourists will be vaccinated against both diseases;
b) 20 tourists going for the first time will be vaccinated against tularemia and typhoid fever;
b) 30 tourists going for the second time will be be revaccinated only against tularemia;
c) 30 tourists going for the second time will be revaccinated only against typhoid fever;
d) 30 tourists going for the second time will be revaccinated only against tularemia and typhoid fever.

Problem No. 7. The evaluation of a medical institution estabilished the vaccination coverage in DTP – 65%, MMR – 89%, Hib – 76%, and revaccination with DTP carried out in children aged 24 months – 104%.

- Evaluate the situation:

a) Vaccination coverage against DTP, MMR and Hib is sufficient to prevent the occurence of diseases;
b) Vaccination coverage against DTP, MMR and Hib is lower than recommended by the WHO;
c) Vaccination coverage must be not less than 95% for all diseases;
d) The number of selected children for DTP revaccination was calculated incorrectly.

e) The rate of 104% vaccination coverage is the result of the high number of children resulting from migration.
f) The assistant did not calculate correctly the coverage of the revaccination of children aged of 24 months.

Problem No. 8. The family doctor must plan the vaccination of children for the next month. What information is required to achieve this task:

a) data on population natality;
b) the total number of children aged 14 and the distribution of childdren according to the age;
c) data on contraindications and precautions to population vaccination;
d) the number of children attending the kindergarten;
e) data on the children included in the risk group for some infectious diseases;
f) data on the number of pregnant women that are waiting for delivery.

Problem No. 9. The refrigerator has been damaged in the vaccination office of a medical institution. As a result, 15 boxes of BCG vaccine, 4 ampoules of rabies immunoglobulin, 3 boxes of MMR and 20 boxes of DTP vaccine were frozen.

- Choose the correct actions to be performed in this situation:

a) BCG and MMR vaccines may be used;
b) BCG and DTP may be used;
c) rabies immunoglobulin and DTP vaccines may be used;
d) rabies immunoglobulin and DTP vaccines will be destroyed by chemical disinfection;
e) only BCG vaccine may be used;
f) the situation should be discussed and solved with the epidemiologist from the Center of Public Health.

Problem No. 10. Vaccination against typhoid fever has been recommended after the registration of a large number of cases. When opening the vaccine box, the nurse noticed a sediment on the vial walls. She has doubts about the possibility of using the vaccine.

- Choose the necessary actions to be taken in this case:

a) to inform the Center of Public Health about the vaccine quality;
b) to do a shake test;
c) to compare the vial with another one;
d) to use the vaccine only after the decision of the epidemiologist;
e) to discuss the problem with the family doctor without informing the Center of Public health.

Problem No. 11. A mother with a 2-month-old child was consultied at the Center of Family Doctors. According to the mother, the baby had fallen from the baby carriage while walking. The baby has facial injuries contaminated with soil. The baby received the last vaccine in the maternity.

- Determine the necessary measures to be taken by the family doctor:

a) to wash facial lesions with water and soap;
b) to cover lesions with patch;
c) to vaccinate baby against tetanus;
d) to vaccinate the baby against anthrax;
e) to vaccinate the baby against tetanus and rabies;
f) to organize medical supervision of the baby during the maximum incubation period of tetanus development.

Problem No. 12. A child aged 3 months has not been vaccinated against tuberculosis because of contraindications in the maternity. What actions should be carried out by a family doctor in this case:

a) vaccination of the child is carried out immediately;
b) vaccination is carried out after the positive result of the Mantoux test;
c) vaccination is carried out only after the negative Mantoux test;
d) the doctor will vaccinate the child after clinical examination and positive Mantoux test;
e) the doctor will vaccinate the child after the clinical examination and negative Mantoux test;
f) the doctor will not take into the account the result of Mantoux test because it is not an important issue in taking decision on the vaccination.

RECOMMENDED LITERATURE

Basic literature

1. Prisăcaru Viorel. General epidemiology with medicine based on evidence. Chișinău, 2015.
2. Paraschiv A. Immunoprophylaxis of infectious diseases. Chisinau, 2012.
3. Prisăcaru V. Epidemiologie generală. Bazele medicinei prin dovezi. Chișinău, 2012.
4. Prisăcaru V., Guțu L., Paraschiv A. Epidemiology in tests. Chișinău, 2013.
5. Lecture material.

Additional literature

1. Ghid practic. Imunizările în activitatea medicului de familie. Chișinău, 2012.

2. Bocșan I.S. Epidemiologia generală, Cluj-Napoca, 2006.
3. Bucov V., Melnic A., Țurcan L., Rusu G. Contraindicații la vaccinare și reacții postvaccinale. Chișinău, 2014, 128 p.
4. Doina Azoicăi. Vaccinologie. Iași, 2009.
5. Hotărârea de Guvern „Cu privire la aprobarea Programului Național de Imunizare pentru anii 2016-2020".
6. Брико Н.И., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В. Эпидемиология. Том I. М. 2013, 832 с.
7. Зуева Л.П., Яфаев Р.Х.. Эпидемиология. Санкт-Петербург, 2005.

THEME 6: EPIDEMIOLOGICAL INVESTIGATION OF OUTBREAKS OF INFECTIOUS DISEASES

Relevance of the subject

The epidemiological analysis of the outbreak of infectious diseases is one of the major epidemiological processes in epidemiological surveillance. The process has a specific character and is used to determine the causes and conditions of the outbreak, to detect the source of pathogens, the pathways and transmission factors, the people at risk of contamination, and to determine the comprehensive anti-epidemic measures required to locate and eliminate the outbreak.

To conduct an epidemiological investigation of outbreaks of single or multiple cases of diseases, epidemiologists or family doctors must have profound knowledge in general and special epidemiology, depending on the particularities of the outbreak and the nosologic form of the disease.

In addition to these, the epidemiological inquiry also has a scientific purpose. The results of the survey serve as primary information in conducting epidemiological studies, including the implementation of the operative and retrospective epidemiological analysis. These are mandatory elements in the epidemiological surveillance system, where it is important the quantitative information accumulated on the basis of the epidemiological inquiry be complete and objective.

Purpose of practical study

To investigate outbreaks of infectious diseases with single or multiple cases (epidemic eruptions) and develop intervention measures to locate and eliminate the outbreak based on the epidemiological diagnosis.

Practical work plan

1. To evaluate the students' theoretical knowledge of the topic.
2. To discuss the features of the epidemiological inquiry according to the nosologic form and outbreak type, with single or multiple cases.
3. Conducting the epidemiological surveillance of the outbreak.
4. Discuss the results of the epidemiological investigation of outbreaks in different nosological forms, and planned intervention measures in order to locate and eliminate the epidemic outbreak.

Material provided for the class

- Records of evidence of infectious diseases;
- Epidemiological surveillance of the outbreak of infectious disease.

The student needs to know:

1. The notion of „epidemic outbreak".
2. The notion of „epidemiological inquiry of the epidemic outbreak".
3. Scope and objectives of epidemiological investigation of outbreak.
4. Methodology and achievement stages of the epidemiological inquiry.
5. Sources of information in the investigation of the outbreak.
6. Characteristics of epidemiological investigation of outbreaks with single cases and with multiple cases.
7. Possible intervention measures according to the specificity of the disease.

Students must know the following aspects of each nosological form:

- define and determine the spatial dimensions of an epidemic outbreak;
- specify the stages of investigation of an epidemic outbreak;
- conduct the epidemic outbreak investigation;
- identify the factors that led to the epidemic outbreak;
- complete the epidemic outbreak survey sheet;
- draw up a plan of measures to locate and eliminate the epidemic outbreak.

Exercises

Questions for self-control

1. Define the notion of „epidemic outbreak".
2. What considerations determine the territorial limits of an epidemic outbreak?
3. What is the scope of the epidemiological survey of the outbreak?
4. List the objectives of the epidemiological inquiry.

5. Determine the method of epidemiological studies used in the investigation of the epidemic outbreak.
6. List some specific characteristics of the investigation of outbreaks in anthroponosis and zooanthroponosis.
7. Who performs the investigation of the epidemic outbreak in medical practice, determination and implementation of intervention measures, and the surveillance of the outbreak?

Determine the role and activities of different specialists in detecting, investigating, locating and eradicating the outbreak.

8. What are the characteristics of the epidemiological investigation of outbreaks with single cases and multiple cases?
9. List the sources of information in the investigation of epidemiological outbreak questionnaire.

Practical skills

1. Students in group study the contents of the epidemiological inquiry sheet and under the guidance of the lecturer assimilate the procedure of completing each point in the document.
2. Students receive a number of filled in papers, study them, determine the completeness, identify the shortcomings and make the appropriate proposals.
3. Students receive information about epidemic outbreaks in the territory and shall carry out the epidemiological inquiry by themselves. The results of the epidemiological investigation with the established epidemiological diagnosis along with the proposed intervention measures to locate and eradicate the epidemic outbreak are discussed in the classroom.

RECOMMENDED LITERATURE

Basic literature

1. Prisacaru Viorel. General Epidemiology with medicine based on evidence. Chisinău, 2015, 177 p.
2. Prisăcaru Viorel. Epidemiologie generală. Bazele medicinei prin dovezi. Chișinău, 2012, 380 p.
3. Prisăcaru Viorel. Epidemiologie specială. Chișinău, 2015, 412 p.
4. Prisacaru Viorel. Special epidemiology. Chișinău, 2017.
5. Prisacaru V., Guțu L., Paraschiv A. Epidemiology in tests. Chișinău, 2013.

6. Lecture material.

Additional literature

1. Brumbaru Maria Irina. Metode epidemiologice de bază pentru practica medicală. Cluj-Napoca, 2005, 122 p.
2. Брико Н.И., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В. Эпидемиология. Том 1. М., 2013, 654 с.
3. Черкасский Б.Л. Руководство по общей эпидемиологии. М., 2001, 558 с.
4. Шляхов Э.Н. Практическая эпидемиология. Кишинэу, 1991

MODULE II: SPECIAL EPIDEMIOLOGY

THEME 1: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN TYPHOID FEVER

Relevance of the subject

The incidence of typhoid in Moldova has been significantly reduced thanks to the achievements in national medicine in recent decades and particularly the efforts of the State Public Health Service. At the present stage, typhoid fever morbidity is sporadic. However, typhoid remains a public health problem, caused by the clinical features and epidemiology of this infection, and primarily by carriers in the general population, possible recurrence of outbreaks cannot be ruled out. It is necessary to maintain an effective epidemiological surveillance system for typhoid fever, for these reasons.

Purpose of practical study

Study of epidemiological features, principles of organization and implementation of measures for prevention and control of typhoid fever, drawing up the anti-epidemic action plan.

Plan of practical study

1. Introduction and answers to student's questions.
2. Evaluating the students' abilities of the practical work:
2.1. Identifying students' expectations from practical work;
2.2. Assessment of students' initial knowledge.
3. Practical work:
3.1. Discussing the specificity of epidemiological investigation in outbreaks of typhoid fever;
3.2. Solving the epidemiological cases;
3.3. Development of comprehensive plans for combating and preventing typhoid fever.
3.4. To analyze the solution of the problems and implementation of the comprehensive plans to combat and prevent typhoid fever;
3.5. Familiarization with the main instructive methodical documents, regulating the practical activity of combating and preventing typhoid fever;
3.6. Assessment of knowledge by tests.

Required materials

1. Practical guide on epidemiology.
2. Epidemiological survey of the outbreak.
3. Instructive methodical documents, regulating the measures in combating and preventing typhoid fever in the Republic of Moldova.
4. Epidemiological cases.
5. Tests for assessing students' knowledge obtained in the practical class.

The student is required to know

1. Epidemiological features of typhoid fever;
2. Characteristics of the epidemiological investigation in the outbreaks of typhoid fever;
3. Principles of organization of epidemiological surveillance in typhoid fever;
4. The main measures to combat and prevent typhoid fever;
5. The role of specialists in Centers for Public Health and medical institutions in the organization of epidemiological surveillance of typhoid fever;
6. Principles of implementation of comprehensive plans for prevention and combating typhoid fever;

Practical skills

1. Study of the method of conducting epidemiological investigation in epidemic outbreaks of typhoid fever.
2. Exploring of the early detection method of new cases of typhoid fever in people who have been in similar epidemic situations or are highly susceptible to infections.
3. Conducting medical surveillance in epidemic outbreaks of typhoid fever;
4. Organizing anti-epidemic measures and eradicating the outbreak;
5. Doing the epidemiological analysis of manifestations of the epidemic process of typhoid fever.
6. Development of comprehensive plans to combat and prevent typhoid fever.
7. Conducting the epidemiological surveillance of typhoid fever.

Exercises

Questions for self-assessment

1. Explain the epidemiological characteristics of the pathogenic agent of typhoid fever and paratyphoid;

2. What are the potential sources of *S. typhi* infection and their degree of contagiousness?
3. List the main features of the transmission mode in typhoid fever and paratyphoid fever;
4. Determine the manifestations of the epidemic process at the current stage, including different geographic areas and social groups;
5. Determine the epidemiological and clinical importance of different laboratory investigations in patients suspected of typhoid fever;
6. Comment on the immune response in typhoid fever;
7. List the main measures to combat and prevent typhoid fever.
8. List the main directions of epidemiological surveillance in typhoid fever;
9. What are the structure and content of the comprehensive plan to combat and prevent typhoid fever?
10. Determine the main directions for promoting health and educating the public in preventing typhoid fever.

Problems of epidemiological situations

Problem No. 1. An epidemic outbreak with multiple cases of typhoid fever has been identified as the result of the epidemiological inquiry. In total, three persons became ill with typhoid fever. The interval of the appearance of first clinical signs of the disease among patients was from two to three days.

The epidemiological investigation also found out that, two weeks before the first case of illness, the sick students had participated in a two-day tourist trip. They ate food prepared at home, they prepared barbecue on the first day of their trip. The students used water from available sources, some of them also used this water for drinking. In the students' families nobody suffered from typhoid fever, all family members had normal body temperature.

– Identify the route of transmission of the infection. What anti-epidemic measures are to be taken throughout the outbreak?

Problem No. 2. The Center for Public Health (CPH) received information from three different Centers of Family Physicians (CMF) about the suspicion of typhoid fever in three persons. The epidemiological investigation by CPH specialists found out that the people suspected of typhoid fever live in different areas of the city, but all three of them had participated in a festive dinner organized in a bistro ten days before the disease.

All members of the service staff underwent bacteriological investigations and it was found out a 60-year-old chef was a carrier of*S. typhi.*

- Identify the route of transmission of the infection and what anti-epidemic measures need to be taken throughout the outbreak.

Problem No. 3. As a result of the epidemiological investigation of an outbreak of typhoid fever, the CPH specialists have determined that the patient lives in an apartment building with common facilities and works at a local factory. The epidemiological analysis identified that within the last two weeks in this residential building two outpatients had been diagnosed with acute enterocolitis, in mild form. At this time three patients with fever are under the supervision of a family doctor for three and four days respectively. During the last two days two patients with preventive diagnosis of bronchopneumonia were hospitalized.

All patients are workers of the same factory, but from different production sites, and live on the same floor of the residential building. On that floor there is a shared kitchen and toilet.

- Identify the route of transmission of the infection and what anti-epidemic measures must be taken for the outbreak.

Problem No. 4. During an epidemic spread of typhoid fever, an epidemiological investigation was conducted and the epidemic outbreak of typhoid fever was established. The patient returned from his vacation, that he had spent outside the country, four weeks ago. Two weeks ago a family member had a long-lasting and unidentified fever. The mother of the patient, aged 70, suffered from typhoid fever many years ago. The wife working at the local canteen was vaccinated against typhoid fever three weeks ago.

- Choose the epidemiological information and propose measures to improve the situation.

Problem No. 5. A 47-year-old patient with a preventive diagnosis of pneumonia, with fever in the range of 37.4 – 38.8 ℃ was admitted to the municipal hospital. The patient is considered ill for about a week. By the time of admission, the patient was self-medicating, especially with antipyretics. After admission, the condition of the patient did not improve. On the fourth day of admission a blood sample was collected to exclude typhoid fever. On the third day after blood collection the positive result for the passive agglutination reaction was received. Bacteriological investigations have not been performed.

The epidemiological anamnesis has determined that the patient worked on a three-month exchange program in an African country. He has returned to the country recently.

- Indicate the diagnostic errors committed in the concrete situation.
- Analyze whether the investigations are sufficient to make the diagnosis of typhoid fever.
- Determine the necessary anti-epidemic measures of the outbreak.

Problem No. 6. A patient who had recently returned from a trip to India visited a family doctor. After the examination the doctor made a preventive diagnosis of typhoid fever. The patient is a cook, his wife works at the kindergarten and the son studies at the construction college. The family lives in an apartment block, in a two-room apartment.

- Find the additional information to take appropriate anti-epidemic actions.

Problem No. 7. In different areas of the city, there were 12 cases of typhoid fever within 12 weeks. The epidemiological analysis has established that sick people work for the same enterprise and usually eat at the company's canteen.

- List the components of the epidemiological investigation.

Problem No. 8. A patient was hospitalized with the diagnosis of „pneumonia" and later it was determined him to have typhoid fever. The patient lives in a separate house, uses water from a common well with other neighbors. The well is not in a satisfactory sanitary condition. Residents of neighboring houses are using additional toilets, that are not regularly cleaned. There are four people in the patient's family: the wife – a teacher, the son – a college student, the daughter – a pupil, and the retired grandmother.

- Identify the source of pathogens and possible contamination pathways.
- Organize anti-epidemic measures for the outbreak.

Problem No. 9. On the 20th and 26th of September, 2017 two 12th grade students were admitted to the Infectious Diseases Department of a district hospital, with the diagnosis typhoid fever. Both patients live on the same street and study at the same school. In the town, the supply of drinking water is provided by well.

The epidemiological anamnesis found that the grandmother of one patient frequently receives treatment for chronic cholecystitis and the father of the same patient has been ill with acute viral respiratory infection for the past three days.

- Determine the persons in the town, who require laboratory investigations.
- Determine the content of laboratory investigations for each person.

- Determine the need for laboratory investigations of environmental factors.
- Determine the responsible body to organize laboratory investigations and where they will be done.
- Distinguish the epidemiological link between the detected cases and argue the answer.

Problem No. 10. A 28-year-old patient with fever of 38.2 ℃, headache, insomnia, loss of appetite, discomfort, general weaknesses, visited a family doctor. The epidemiological anamnesis found out that 10 days before he had returned from vacation, during which he had traveled with a touring group. During the trip they slept in tents, consumed canned food, drinking water from hygienically unsafe sources. Based on clinical and epidemiological data, the physician made a preliminary diagnosis typhoid fever. The sick person works in a grocery store, his wife works at a footwear factory. A five – year – old daughter, attends the kindergarten. At this time, the wife and daughter are healthy. The family lives in a furnished two- bedroom apartment.

- List the methods of diagnosis confirmation and organize appropriate anti-epidemic measures.

RECOMMENDED LITERATURE

Basic literature:

1. Prisacari Viorel. Special epidemiology. Chișinău, 2017.
2. Prisacaru V., Guțu L., Paraschiv A. Epidemiology in tests. Chișinău, 2013.
3. Lecture material.

Additional literature:

1. Tratat de epidemiologie a bolilor transmisibile. Sub redacția prof.dr.Aurel Ivan, Bucuresti, Polirom, 2002.
2. Брико Н.Н., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В., Эпидемиология. Том II, Москва, 2013
3. Зуева Л.П., Яфаев Р.Х.. Эпидемиология. Санкт-Петербург, 2005.

THEME 2: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN SALMONELLOSIS

Relevance of the subject

Currently, salmonellosis is the most widespread zooanthroponosis, causing serious clinical manifestations through its sporadic spread as well as epidemic outbreaks.

Purpose of practical study

To study epidemiological features, principles of organization and implementation of measures for the prevention and control of salmonellosis, drawing up plans for anti-epidemic measures.

Practical work plan

1. Introduction and answers to students' questions.
2. Assessment of students' initial knowledge.
3. Discuss the results of epidemiological investigations in epidemic outbreaks of salmonellosis.
4. Solving epidemiological cases;
5. Analysis of the results of solving epidemiological cases and the content of comprehensive plans to combat and prevent salmonellosis;
6. Familiarize with the main instructive methodical documents, which regulate the practical activity of combating and prophylaxis of salmonellosis;
7. Assessment of knowledge by testing.

Material provided for the class

1. Practical Guide on Epidemiology.
2. Instructive methodical documents, which regulate the measures on combating and prophylaxis of salmonellosis in the Republic of Moldova.
3. Tests for assessing students' knowledge of practical work.

The student needs to know

1. Epidemiological features of salmonellosis.
2. Principles of epidemiological investigation in the epidemic outbreaks with salmonellosis.
3. Principles of organization of epidemiological surveillance in salmonellosis;
4. The main measures to combat and prevent salmonellosis;
5. The role of specialists of the Center for Public Health in the organization of epidemiological surveillance of salmonellosis;

6. Principles of implementation of comprehensive plans for combating and prevention Salmonella;

Practical skills

1. Epidemiological investigation in epidemic outbreaks of salmonellosis.
2. Early detection of new cases of salmonellosis in people who have been in similar epidemic situations or are highly susceptible to infections;
3. Conducting the medical surveillance in epidemic outbreaks of salmonellosis.
4. Organizing anti-epidemic measures and eradicating the epidemic outbreak.
5. Performing the epidemiological analysis of the manifestations of the epidemic process of salmonellosis.
6. Development of comprehensive plans for combating and prevention of salmonella.
7. Performing epidemiological surveillance of salmonellosis.

Exercises

Questions for self-control

1. What is characteristic of the etiological structure of salmonellosis?
2. What are the potential sources of infection in salmonellosis?
3. Determine the degree of contagiousness of different sources of infection in salmonellosis.
4. Explain the particularities of salmonellosis transmission.
5. Describe the features of epidemic manifestations in salmonellosis.
6. Determine the importance of laboratory investigations in surveillance of epidemiological evidence of salmonellosis at the current stage.
7. Explain the main measures to combat and prevent salmonella.
8. Exhibit the main directions of epidemiological surveillance in salmonellosis.
9. Describe the structure and content of the comprehensive plan to combat and prevent salmonellosis.
10. Explain the most important elements to promote health and education in the prevention of salmonellosis.

Problems of epidemiological situations

Problem No. 1. At a vacation camp, 90 of the 150 people in the camp had fallen ill for two days. The preliminary diagnosis of food poisoning was made. The children ate vegetable soup and beef croquettes for lunch.

- Do the epidemiological analysis and propose necessary anti-epidemic measures.

Problem No. 2. A 30-year-old man became severely ill. The family doctor made a preventive diagnosis of acute shigellosis and the man was admitted to the department of contagious diseases of the district hospital. As a result of clinical and paraclinical investigations, physicians made the diagnosis of salmonellosis. The epidemiological anamnesis found out that the day before the illness, the patient had visited relatives, where he had had vegetable salad with sour cream, baked duck and homemade cake. Based on the conversation with the patient, it was found out that five more people who also had had dinner had become ill with the same symptoms.

During the past two days, eight persons with the symptoms of intestinal dysfunction were admitted to the internal diseases department of the district hospital. As a result of bacteriological investigations, six patients were diagnosed with *S. enteritidis.*

- Assess the epidemiological situation and determine the possible cause of the epidemic eruption.
- A plan of anti-epidemic measures has to be developed.
- Predict anti-epidemic measures to be taken in the hospital in order to prevent the spread of infection.

Problem No. 3. The family doctor was invited to visit two sick children, aged three and five, at home. The illness started acutely at the night and was manifested by repeated vomiting, diarrhea, and fever. Taking into account the epidemiological features of the outbreak, the doctor made the diagnosis of food poisoning. It is worth mentioning that the children's mother has been staying at home for two days, diagnosed by the same family doctor, with angina lacunaris. In the evening, the mother prepared dishes for children, gave them warm milk, which was stored in the refrigerator, and had been bought from the store the day before. The expiration date was valid.

- As a family doctor, organize anti-epidemic measures required.

Problem No. 4. About 120 kg of chicken were brought to the canteen of a hostel on September 15, 2017. The chicken meat was stored in three refrigerators of the canteen. On September 17, 2017 it was found that the refrigerator did not maintain the proper temperature. In this situation, the head of the canteen decided to use the meat stored in the refrigerator as a matter of urgency to prevent it from being spoiled. Thus, on the 18th of September, 2017 using the meat kept in the defective refrigerator, the soup was prepared for lunch and macaroni with meat for dinner.

On the morning of September 19, 2017 fifteen students of the boarding

school had symptoms of gastrointestinal disease. During the next seven days, 157 students of different groups fell ill. All students had had the mentioned lunch and dinner. Of the total of cases, the diagnosis of acute salmonellosis in severe form, was made in 83 children.

On September 23, 2017 *Salmonella typhimurium* was identified as a result of bacteriological investigations of samples taken from hospitalized patients.

- Identify the errors in maintaining the anti-epidemic regime in this educational institution and anti-epidemic measures to locate and eliminate the outbreak.

Problem No. 5. As a result of the epidemiological investigation of an epidemic outbreak, a two-year-old child diagnosed with food poisoning. Later he was admitted to the infectious disease department of the district hospital. From the mother's statement, fried duck meat bought in the market was served for dinner. The child's health has worsened during the night, and now it is considered severe. Disorders of the gastrointestinal system are also present in other family members. The child's mother is admitted for treatment and care, her father and sister, aged 8, are under the supervision of the family doctor at home.

- Determine the course of actions of the family doctor in this situation.

Problem No. 6. A 400kg poultry meat lot was brought to the central market. The results of the bacteriological analysis carried out by the departmental laboratory specialists, identified *S. enteritidis* in three out of ten samples taken.

- Propose the necessary anti-epidemic measures to be taken in this exact situation.

Problem No. 7. At 7:30 am, a 27-year-old patient with symptoms of acute diarrheal disease (multiple diarrhea and repeated vomiting) was brought into the in-patient department of the district hospital. It was found based on the anamnesis that the patient's state of health worsened during the night. The patient said that the previous evening, after work, she had had kebab purchased from a vending booth, which visually and organoleptically had not had any suspicious signs. During that day, she had not consumed any other food, except in the morning she had tea with biscuits.

- As a doctor in the hospital, outline the course of further actions.

Problem No. 8. A patient hospitalized in the infectious disease department of a district hospital was diagnosed with salmonellosis. The results of bacteriological investigations confirmed the clinical diagnosis, *S. typhimurium* being identified. From the epidemiological anamnesis it is established that the patient is transferred from the internal disease department where he was treated for chronic somatic pathology. During the treatment he had food from the hospital food block as well as the food brought to the hospital by relatives and friends. The patient complied with the rules of hygiene.

- Determine the possible cause of the disease and necessary anti-epidemic measures to be undertaken.

Problem No. 9. On Monday, October 21, 2017, the Center for Public Health received an emergency information about a case of acute enterocolitis in a three-year-old child attending a preschool institution. As a result of the epidemiological investigation, it was found that the last attendance of the preschool institution was on the 18th of October, 2017. The child was brought from home to the in-patient department of the contagious diseases hospital by ambulance. During the weekend, there were no cases of acute diarrheal diseases recorded in the children attending the pre-school institution concerned.

The child was admitted for treatment and care to the department of digestive tract infections. On the 24th of October, 2017 the results of laboratory investigations were received that identified *S. enteritidis.*

The child lives with his parents and older sister in a separate apartment. The parents work in a clothing factory; the sister attends a gymnasium.

- Assess the limits of the epidemic outbreak and determine the volume of required anti-epidemic measures.

Problem No. 10. During the three days (6-9 February, 2018), at the District Center for Public Health, 16 emergency notifications regarding enteritidis of unknown origin were received from different localities of the district.

There are 75,000 people living in the district. In all localities there are shops, gymnasiums, high schools, and kindergartens. There is also a textile factory, banquet hall with a small hotel, canteen, market for agricultural products, different warehouses, repair shops and other small businesses.

The population of the district villages are supplied with drinking water from wells, the population of the central district receives water from wells and water supplied through aqueducts. Water from the aqueduct is delivered with interruptions. The Centralized sewerage system is only in the district center that supplies the center of the locality with water.

Over the past five years, acute diarrheal disease morbidity is above the average for the entire country.

On February 10, 2018 the first laboratory results were obtained. The samples taken from patients hospitalized in the District Hospital on February

6, 2018 determined the etiology of five of six hospitalized patients. Three persons were identified with *S. enteritidis*, one person – with *S. enteritidis* and enterotoxigenic*E. coli*, and one more person with enterotoxigenic*E. coli*. In one person the results of the laboratory investigations remained negative.

- Do the epidemiological analysis in this situation.
- Make up the list of necessary anti-epidemic measures.

RECOMMENDED LITERATURE

Basic literature

1. Prisacaru Viorel. Special epidemiology. Chișinău, 2017.
2. Prisăcaru V., Epidemiologia specială. Chişinău, 2015.
3. Prisacaru V., Guțu L., Paraschiv A. Epidemiology in tests. Chișinău, 2013.
4. Lecture material.

Additional literature

1. Tratat de epidemiologie a bolilor transmisibile.Sub redacția prof. un. Aurel Ivan. Bucuresti, Polirom, 2002.
2. Брико Н.Н., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В.,Эпидемиология. Том II, Москва, 2013
3. Зуева Л.П., Яфаев Р.Х.. Эпидемиология. Санкт-Петербург, 2005.

THEME 3: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SUPERVISION IN SHIGELLOSIS, ESCHERICHIOSIS AND OTHER DIGESTIVE INFECTIONS, INCLUDING ETIOLOGICALLY NON-DETERMINED

Relevance of the subject

Shigellosis and other acute diarrheal diseases (ADD), including etiological undetermined, are a major public health issue, especially due to their high incidence. The sanitary and epidemiological situation in this group of diseases remains strained, both in the country and in the world, and requires further targeted prophylactic measures.

Purpose of practical study

To obtain knowledge about epidemiological features, principles of organization and implementation of measures to combat and prevent *Shigella* and other ADD, development of anti-epidemic action plans.

Practical work plan

1. Introduction and answer to student questions.
2. Evaluation of the initial level of knowledge.
3. Discuss the results of epidemiological investigation in epidemic outbreaks with shigellosis and other acute diarrheal diseases;
4. Solving the epidemiological cases;
5. Development of comprehensive plans to combat and prevent shigellosis.
6. Analysis of the results of the encountered situations, and the content of the comprehensive plans to combat and prevent *Shigella*;
7. Familiarization with the main instructive methodical documents, which regulate the practical activity of combating and prophylaxis of shigellosis;
8. Assessment of knowledge by testing.

Required materials

1. Practical guide on epidemiology.
2. Instructive methodical documents, which regulate the measures to combat and prevent *Shigella*and acute diarrheal diseases in the Republic of Moldova.
3. Tests for assessing students' knowledge obtained in the practical work.
4. Epidemiological cases.

The student is required to know

1. Epidemiological features of shigellosis and other acute diarrheal diseases.
2. Specific characteristics of epidemiological investigation in epidemic outbreaks with shigellosis and other acute diarrheal diseases.
3. Principles of organization of epidemiological surveillance in shigellosis.
4. The main measures to combat and prevent shigellosis.
5. The role of specialists in the Center for Public Health and other medical institutions in organization and implementation of prevention and control measures for shigellosis.
6. Principles for the development of prevention and control plans in case of shigellosis and acute diarrheal diseases.

Practical skills:

- Learning the investigative techniques and surveillance of epidemic outbreaks with shigellosis and other acute diarrheal diseases;

- Learning early detection methods for new cases of shigellosis contact persons, and the people who have been in similar situations or at increased risk of infection;
- Organization of anti-epidemic measures and eliminating epidemic outbreak;
- Doing the epidemiological analysis of manifestations of the epidemic process of shigellosis;
- Development of comprehensive plans for combating and prevention of shigellosis and other acute diarrheal diseases;
- Determination of the main directions of epidemiological surveillance in shigellosis.

Exercises

Questions for self-assessment

1. Give the epidemiological features of infectious germs of shigellosis;
2. List the potential sources of infection in shigellosis, escherichiosis and other acute diarrheal diseases;
3. Compare the period and degree of contagiousness of the sources of infection in shigellosis, escherichiosis and other acute diarrheal diseases;
4. List the differential features of mode of transmission of shigellosis, escherichiosis and other acute diarrheal diseases;
5. List the differential features of the epidemic process of shigellosis, escherichiosis and other acute diarrheal diseases;
6. Prove the importance of laboratory investigations in epidemiological surveillance of shigellosis, escherichiosis and other acute diarrheal diseases;
7. List the main measures to combat and prevent shigellosis, escherichiosis and other acute diarrheal diseases;
8. What are the main directions of epidemiological surveillance of shigellosis, escherichiosis and other acute diarrheal diseases?
9. Outline the structure and content of the comprehensive plan to combat and prevent shigellosis, escherichiosis and other acute diarrheal diseases;
10. What are the main directions in health promotion and education as important elements in fighting shigellosis, escherichiosis and other acute diarrheal diseases?

Problems of epidemiological situations

Problem No. 1. During the period September 3-5, 2017, three infants with

the diagnosis of acute enterocolitis, moderate form, were hospitalized in the Infectious Diseases Department of the District Hospital. All patients are classmates in the secondary school in locality X. On the 6th of September, 2017 the results of laboratory investigations identified *Sh. sonnei* in the child admitted on the 3rd of September, 2017.

- Outline the components of the epidemiological investigation in the described epidemic outbreak.

Problem No. 2. In a district center in a preschool institution with 140 children on the list, there was an epidemic outbreak with dysentery caused by *Sh. sonnei.* During the first three days, 17 children and four teachers were hospitalized in the infectious disease section. In most cases (14 children and 2 adults) the disease had a severe form with repeated vomiting, diarrhea, fever, headache, loss of appetite, general weaknesses and signs of dehydration.

- Based on this information, propose an investigation plan to improve the epidemiological situation in the institution and to devise measures for its recovery.

Problem No. 3. A family doctor examined a patient who had been recently discharged from the hospital with the diagnosis acute dysentery, moderate form. The extract from the observation file notes full recovery, the results of laboratory investigations at discharge are negative. The patient works as a chef in a local canteen.

- Describe further actions to be taken by the family doctor.

Problem No. 4. A patient who had been recently discharged from the Infectious Diseases Department of the District Hospital was sent to the Health Center. In the extract from the observation sheet from the in-patient unit, the diagnosis acute dysentery in severe form (*Sh. sonnei*) is specified. The patient was discharged from the hospital after a course of treatment in a satisfactory condition. She works as a teacher at the kindergarten in the locality.

- Draw up a plan for medical supervision of her convalescence period.

Problem No. 5. The results of bacteriological investigations carried out according to the epidemiological indications of the canteen staff of a production enterprise, indicated the presence of enterohemorrhagic*E. coli* O104 in the samples collected from the canteen. At the time, the person concerned did not have any symptoms, but subsequent rectoromanoscopy revealed solitary haemorrhages on the intestinal mucosa. The person lives at home with her family.

- Draw up an anti-epidemic action plan.

Problem No. 6. The family doctor was asked to visit two sick children aged three and five at home. The illness began acutely during the night and manifested by repeated vomiting, diarrhea, fever. Taking into account the clinical features, the doctor made the preventive diagnosis „food poisoning" and proposed the admission of the children for the treatment in the specialized department. It should be mentioned that the mother of the children is on sick leave for two days with the diagnosis dysentery, mild form. In the evening the mother fed the children with the meals prepared during the day.

- Argue the diagnosis of food poisoning in children from an epidemiologic point of view.
- If you were an epidemiologist of the CPH how would you assess the family physician's action?
- Determine the measures that must be taken by the family doctor to diagnose the mother's dysentery.

Problem No. 7. In the epidemiological investigation of an outbreak of multiple cases (5 cases) of enteritis and acute enterocolitis, it is necessary to identify the source of the infection and the possible transmission factors that caused the contamination in the outbreak. The outbreak is recorded in a secondary school in a rural area.

- Why is additional information necessary to determine the possible source of infection?
- What evidence must be collected for the laboratory investigation?
- In what laboratory will the evidence be collected for the investigation?

Problem No. 8. Nine children with the diagnosis of food poisoning were hospitalized within two days (July 5-6, 2017) from a vacation camp. The epidemiological investigation showed that after dinner on the 4th of July, 2017 the children had a home-made birthday cake. The child's mother, who is a housewife, was treated for shigellosis three weeks ago.

- Analyze the epidemiological situation, determine the causes of the epidemic outbreak occurrence and necessary intervention measures.

Problem No. 9. On Monday, September 5, 2017 a five-year-old child was admitted to Toma Ciorbă Clinical Hospital of Infectious Diseases with the diagnosis of acute colitis, in severe form. The child was brought to the hospital admission department by the parents by car. The bacteriological examination of the sample collected for the investigation identified *Sh. flexneri.* The child attends a kindergarten. The last attendance of the preschool institution was on September 2, 2017. The parents are workers. The mother works at

a tailoring workshop, the father is a microbus driver. The family lives in an apartment.

- Analyze the epidemiological situation and propose a plan of anti-epidemic measures.

Problem No. 10. A 25-year-old patient with symptoms of abdominal cramps, repeated diarrhea and low-temperature fever was examined by a family doctor. The doctor made the diagnosis of acute enterocolitis and prescribed an outpatient treatment. The patient works as a kindergarten teacher. She is currently on leave for child care.

- Draw up the investigation plan for the epidemic outbreak.
- Evaluate the accuracy of actions of the family doctor.
- Draw up a plan of anti-epidemic measures.

Problem No. 11. A child with suspicion of dysentery was hospitalized in the contagious disease section. The child lives with his family in a private house, attends the kindergarten in the area. The epidemiological investigation of the outbreak has established that the anti-epidemic regime in the preschool institution concerned, is respected and followed. The locality does not have any aqueduct and sewerage. Water for all needs is used from wells. Two days after the patient's hospitalization, the results of laboratory investigations identified *Sh. flexneri.*

- Identify the factors that could cause the epidemic outbreak and draw up an anti-epidemic action plan.

Problem No. 12. A child with diarrhea was isolated in X kindergarten on May 13, 2017. The next day at the morning medical exam, made before the children's admission, the nurse refused to admit three children to the kindergarten. These children said that they had had diarrhea or abdominal pain during the night. Four children were not present in the kindergarten group for unknown reasons.

- Evaluate the actions of the nursing staff.
- List the correct actions in this case.

RECOMMENDED LITERATURE

Basic literature

1. Prisacaru Viorel. Special epidemiology. Chişinău, 2017.
2. Prisăcaru V., Epidemiologia specială, Chişinău, 2015;
3. Prisacaru V., Guţu L., Paraschiv A. Epidemiology in tests. Chişinău, 2013.

4. Lecture material.

Additional literature

1. Tratat de epidemiologie a bolilor transmisibile. Sub redacția prof. univ. Aurel Ivan, Bucuresti, Polirom, 2002.
2. Брико Н.Н., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В., Эпидемиология. Том II, Москва, 2013
3. Зуева Л.П., Яфаев Р.Х.. Эпидемиология. Санкт-Петербург, 2005.

THEME 4: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN VIRAL HEPATITIS WITH FECAL-ORAL TRANSMITTING MECHANISM, POLIOMYELITIS AND OTHER ENTEROVIRUSES

Relevance of the subject

Infectious diseases caused by enteroviruses are a public health issue due to their high incidence and the diversity of clinical and epidemiological aspects.

The Republic of Moldova is now considered by the WHO as a polio-free country due to epidemiologically targeted prophylaxis measures carried out over several decades.

Another consequence of anti-epidemic activities is the further decrease in the incidence of viral hepatitis A, due to the results of several prophylactic measures, including vaccination against viral hepatitis A, according to epidemiological guidelines.

However, infections caused by enteroviruses, including Coxsackie and ECHO viruses, remain current and require strict epidemiological surveillance through the implementation of new preventive and anti-epidemic methods.

Purpose of practical study

Learning epidemiological features, principles of organization and implementation of measures to combat and prevent infections caused by enteroviruses, development of anti-epidemic action plans.

Practical work plan

1. Introduction and answer to students' questions.
2. Assessment of students' initial knowledge.
3. Discuss the results of epidemiological investigations in epidemic outbreaks with infections caused by enteroviruses;
4. Solving the issues caused by epidemiological cases;

5. Development of comprehensive plans for combating and preventing infections caused by enteroviruses.
6. Discussing the solution of epidemiological cases and contents of comprehensive plans to combat and prevent infections caused by enteroviruses;
7. Familiarization with the main instructive methodical documents, which regulate the practical activity of combating and prophylaxis of infections caused by enteroviruses;
8. Assessment of knowledge by testing.

Material provided for the class

1. Practical guide on epidemiology.
2. Instructive methodical documents, which regulate the measures of prophylaxis and combating enterovirus infections in the Republic of Moldova.
3. Tests for assessing students' knowledge of practical work.
4. Epidemiological cases.

The student needs to know

1. Epidemiological characteristics of infections caused by enteroviruses;
2. Principles of epidemiological investigation in outbreaks of enteroviral infections;
3. Principles of organizing epidemiological surveillance in infections caused by enteroviruses;
4. The main measures to combat and prevent infections caused by enteroviruses;
5. The role of specialists in the Center for Public Health and other medical institutions in organizing and carrying out epidemiological surveillance in enterovirus infections;
6. Characteristics of the epidemiological investigation and implementation of the measures in epidemic outbreaks with enterovirus infections;
7. Principles of developing plans to combat and prevent infections caused by enteroviruses;

Practical skills:

- Epidemiological investigation of epidemic outbreaks with enteroviruses;
- Learning the methods for early detection of cases of viral hepatitis A, poliomyelitis and other infections caused by enteroviruses (Coxsackie,

ECHO) in persons who were in similar situations or at increased risk of infection;
- Learning the principles of medical surveillance in epidemic outbreaks with infections caused by enteroviruses;
- Organization of anti-epidemic measures to eradicate epidemic outbreaks;
- Doing the epidemiological analysis of manifestations of epidemic process of infections caused by enteroviruses;
- Development of comprehensive plans for combating and preventing infections caused by enteroviruses;
- The direction of supervision of epidemiological surveillance in infections caused by enteroviruses.

Exercises

Questions for self-control

1. List the epidemiological features of pathogens in enteroviral infections;
2. List the potential sources of infection of poliomyelitis, viral hepatitis A, Coxsackie and ECHO infections;
3. Compare the period and degree of contagiousness of sources of pathogen agents in various infections caused by enteroviruses;
4. List the differential characteristics of transmission mode in infections caused by enteroviruses;
5. List the differential characteristics of the epidemic process due to various enterovirus infections;
6. Evaluate the importance of laboratory investigations in epidemiological surveillance of infections caused by enteroviruses at the current stage;
7. List the main measures to combat and prevent infections caused by enteroviruses;
8. What are the main directions of epidemiological surveillance in enterovirus infections?
9. Draw the structure and content of the comprehensive combat and prevention plan for enterovirus infections;
10. What are the main directions in health promotion and educational elements that are important in fighting infections caused by enteroviruses?

Problems of epidemiological situations

Problem No. 1. The family doctor diagnosed viral hepatitis A in a 30-year-old woman on the second day of the jaundice period. The patient's family consists of three people. The 35-year-old husband suffered viral hepatitis A in childhood. The son, aged 9, is in a five-day vacation camp.

- Evaluate the actions of the family physician and the epidemiologist.

Problem No. 2. On January 19, 2017 the medical worker of a kindergarten informed the CPH of suspected of viral hepatitis A in a five-year-old child who had been absent from the kindergarten from January 9 to January 16, 2017. From the anamnesis taken by the nurse, it was determined that the child became ill on January 8, 2017 when the diagnosis of acute viral respiratory disease was made.

- Develop the anti-epidemic measures to be taken in this situation.

Problem No. 3. In a six-year-old child hospitalized in the department of traumatology and orthopedics of a district hospital, the diagnosis of viral hepatitis A was made. The patient was hospitalized six days ago in the department, where 30 more patients were treated. The child is in the room with three more children with different pathologies.

- Describe the tactics of the head of the traumatology and orthopedics section in this epidemiological situation.
- List the anti-epidemic measures.

Problem No. 4. An epidemic outbreak with AAD due to water and sewerage accident was recorded in the locality during the last two weeks. The epidemic outbreak has been stopped.

- Determine whether there is a risk of encountering other cases of infectious diseases due to this accident and what measures are necessary to be taken to prevent possible infectious diseases in the locality.

Problem No. 5. During the first two weeks of September, five students of high school were diagnosed with viral hepatitis A. In three students, the severity of the disease was mild and moderate. The students had breakfast at the school canteen. At the canteen, the breakfast is cooked by two chefs, who passed the medical check in August this year and were diagnosed to be healthy.

- List the stages of the epidemiological investigation in this situation and draw up the plan of anti-epidemic measures.

Problem No. 6. On the 20th of September, 2017 a 9-year – old child with the diagnosis of viral hepatitis A, moderate form, was hospitalized in the contagious disease section of a district hospital. The last day of attending the school was September 18, 2017.

It is established from the epidemiological history that the child and his parents spent the last two weeks of July at a vacation area outside the country. It is also found out from the epidemiological anamnesis that on August 27, 2017 they attended a party with a family where there were two children. According to the mother, one of the two children did not go to school due to health reasons on September 1, 2017.

- Determine the source of the infection.
- Develop the comprehensive anti-epidemic measures in this situation.

Problem No. 7. A doctor from the territorial center of family doctors suspected poliomyelitis in an eight-year-old child, a second-grade pupil, and transmitted the information to the CPH. The epidemiological investigation has determined that in the pupil's class suspected of having polio, a pupil has been absent for unknown reasons for a few days. The child with suspected polio has not been vaccinated against poliomyelitis.

- List the components of epidemiological activity in the epidemic polio site.

Problem No. 8. Five days ago, a child from another locality without the information about previous immunizations was admitted to a kindergarten where one of the children was diagnosed with a mild form of polio.

- Taking into account the situation at hand, draw up the investigation plan of this epidemiological situation in the institution and develop measures applicable to this situation.

Problem No. 9. A case of acute outbreak of acute polio was recorded at a boarding school in locality D.

- Determine the actions of the epidemiologist and the family doctor in this case.

Problem No. 10. A three-year-old child, unvaccinated against poliomyelitis because of the parents' refusal, was in contact with a child with the diagnosis of poliomyelitis.

- Determine the tactics to protect the child.

Problem No. 11. An eight – month – old baby was vaccinated with only one dose of polio vaccine. The other vaccinations were administered according to the National Schedule of Planned Vaccinations.

- Develop the vaccination plan against poliomyelitis for the child.

Problem No. 12. On July 3, 2017 a 23-year-old person was examined by a family doctor, who diagnosed the presence of acute viral respiratory infection. The family doctor prescribed him home treatment. The next day, the

patient called the family doctor again because of worsening health conditions. The symptoms of viral respiratory infection were accompanied with intestinal dysfunctions. The epidemiological anamnesis of the patient, established that his two colleagues were on sick leave for health reasons.

- Evaluate the accuracy of the family doctor's action.
- Determine the possible etiology of the described pathology.
- Draw up the comprehensive anti-epidemic action plan based on the situation described.

RECOMMENDED LITERATURE

Basic literature

1. Prisacari Viorel. Special epidemiology. Chișinău, 2017.
2. Prisacaru V., Epidemiologia specială, Chișinău, 2015.
3. Prisacaru V., Guțu L., Paraschiv A. Epidemiology in tests. Chișinău, 2013.
4. Lecture material.

Additional literature

1. Tratat de epidemiologie a bolilor transmisibile. Sub redacția prof. univ. Aurel Ivan, Bucuresti, Polirom, 2002.
2. Брико Н.Н., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В., Эпидемиология. Том II, Москва, 2013
3. Зуева Л.П., Яфаев Р.Х.. Эпидемиология. Санкт-Петербург, 2005.

THEME 5: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES AND EPIDEMIOLOGICAL SURVEILLANCE IN DIPHTHERIA AND WHOOPING COUGH

Relevance of the subject

As a result of the implementation of vaccines in the medical practice, the morbidity of diphtheria and whooping cough has considerably declined. However, the problem of diphtheria carriage state, the record of diphtheria cases among adults, the maintenance of whooping cough morbidity among children, confirms that these infections still require a significant attention of healthcare workers.

Purpose of practical study

To develop knowledge on the epidemic process in diphtheria and whooping cough, the acquiring the principles of the epidemiological surveillance

and development of skills in the investigation of outbreaks, planning and implementation of prophylactic and anti-epidemic measures and understanding of the healthcare workers role in the surveillance process.

Practical work plan

1. The assessment of the students' initial knowledge in the discussion process and/or test.
2. Discussions on the epidemiological, prophylactic and anti-epidemic measures based on outbreak epidemiological surveys.
3. Solving the epidemiological situations cases. Discussions. Comments. Evaluation.
4. Determination and discussion of the main surveillance directions in diphtheria and whooping cough.
5. Final assessment of students' knowledge.

The student needs to know

1. Actuality, epidemiological, medical and socio-economic significance of diphtheria and whooping cough.
2. Current features of the epidemic process of diphtheria.
3. Current features of the epidemic process of whooping cough.
4. The categories of sources of causative agents in diphtheria and whooping cough and their epidemiological significance.
5. Laboratory and epidemiological principles of diagnosis in diphtheria.
6. Principles of laboratory and epidemiological diagnosis in convulsive cough.
7. The content and organization of epidemiological surveillance in diphtheria.
8. The content and organization of epidemiological surveillance in whooping cough.
9. The specificity of the work of medical workers in different fields in order to reduce the diphtheria and whooping cough morbidity.
10. The system of prophylactic and anti-epidemic measures for prevention and combating diphtheria and whooping cough at the current stage.

The student must be able to:

1. carry out the investigation of epidemic outbreak of diphtheria and whooping cough;
2. analyze the manifestations of the epidemic process;
3. intervene with prophylactic and anti-epidemic measures in the process of prevention and control of diphtheria and whooping cough morbidity according to the specificity of the future students' activity;
4. evaluate the quality of the anti-epidemic measures undertaken at the population level.

Exercises

Questions for self-control:

1. What are the features of manifestations of the epidemic process in diphtheria at the current stage?
2. Name the epidemiological features of the diphtheria causative agent.
3. List the sources of pathogens in diphtheria.
4. Describe the mechanism and transmission routes of the pathogen in diphtheria.
5. Name the laboratory methods of diagnosis in diphtheria.
6. What are the isolation criteria of patients with diphtheria.
7. What are the admission criteria in the collectives of people, who recovered after diphtheria?
8. Specify the anti-epidemic measures undertaken in order to stop the spreading diphtheria pathogen.
9. Describe the specific system of prophylactic measures in diphtheria according to the National Immunization Program.
10. Describe the features of the epidemic process in whooping cough.
11. Name the epidemiological features of the whooping cough causative agent.
12. List the sources of pathogens in whooping cough.
13. Name the contagious period in coughing patients.
14. Name the laboratory methods of diagnosis in whooping cough.
15. List the preventive measures in whooping cough.
16. List anti-epidemic measures undertaken in the hotbed of whooping cough.

Tests for self-control:

1. What are the elements pointing to an unfavorable epidemiological prognosis in diphtheria?

a) recording of sporadic cases
b) increasing number of lethal cases
c) increasing proportion of severe forms
d) the preponderant recording of mild clinical forms
e) recording of a high number of people with 0.03/ml AU of antibodies

2. What is characteristic of the epidemic process of diphtheria when the vaccination coverage of the population is reduced?

a) record of the epidemics of diphtheria
b) predominant registration of cases in children under three years of age
c) prevalence of severe clinical forms
d) absence of the carriers of toxigenic corinebacteria
e) record the toxigenic corinebacteria carriers.

3. Choose the people from the diphtheria outbreak who must be vaccinated

a) people non-vaccinated against diphtheria
b) people who must be vaccinated or revaccinated according to the vaccination schedule
c) adults who were revaccinated less than 10 years ago
d) persons with antibody level less than 0.01 / ml AU
e) people with antibody level more than 1.0 / ml AU

4. Choose the people who must be investigated bacteriologically in order to establish the presence of C. diphtheria?

a) patients with lacunar tonsillitis
b) the sick with pneumonia
c) patients with paratonsillar abscess
d) children before tonsillectomy
e) the contact person with a diphtheria patient.

5. In diphtheria the incubation period is:

a) up to 24 hours
b) up to 2 hours
c) 2 – 10 days
d) 1 – 7 days
e) 10 – 15 days

6. A diseased person with diphtheria is contagious:

a) in the last days of incubation period
b) just in the incubation period
c) starting with the clinical manifestations
d) the whole clinical manifestation period
e) in recovery

7. The transmission routes of diphtheria are:

a) by solid aerosols
b) by liquid aerosols
c) by habitual contact

d) by food
e) by vectors

8. Choose the laboratory methods used in diagnosing diphtheria:

a) clinical and epidemiological methods
b) bacteriological method
c) cutaneous test
d) serological method (DAT test);
e) latex-agglutination test

9. Choose the indicators for the decision on immunization of the population against diphtheria:

a) the high level of morbidity
b) the level of lethality caused by diphtheria
c) the simplicity of the transmission mechanism;
d) major economic damage as a result of the epidemic spreading;
e) the recommendations of WHO to include vaccination against diphtheria into the National Program of Immunization

10. To detect early patients with diphtheria, the family doctor is required to perform the following:

a) clinical examination of diphtheria suspected patients
b) bacteriological examination of the patients with lacunar tonsillitis;
c) active surveillance of the patients with tonsillitis;
d) serological Direct Agglutination Test of diphtheria suspected persons
e) virological examination of the contact persons

11. The patient with the whooping cough is the most contagious:

a) at the end of the incubation period
b) the first two weeks of spasmodic coughing
c) the last two weeks of spasmodic coughing
d) during the whole period of spasmodic coughing
e) in recovery

12. *In whooping cough the postinfectious immunity lasts:*

a) 5 years
b) 10 years
c) 15 years
d) 20 years
e) long life.

13. The seasonality of whooping cough is:

a) winter

b) winter and spring
c) spring and summer
d) summer and autumn
e) autumn and winter

14. Choose the age group when the immunization against whooping cough is performed:

a) 2 months – 3 years
b) 3 months – 3 years
c) 2 months – 4 years
d) 3 months – 5 years
e) 3 months – 6 years

15. Currently, in the Republic of Moldova the epidemic process of whooping cough is characterized by:

a) morbidity rate reduction
b) eradication of whooping cough cases
c) increased number of carriers
d) recording of severe evolution forms
e) recording of mild evolution forms
f) predominant registration of cases in children under one year of age
g) increased morbidity among adults
h) record of morbidity ascending cycles;
i) lack of periodic evolution phenomenon;
j) record of seasonal spreading of the disease
k) lack of seasonality in the epidemic spreading

16. Which of the given below is used in the post-exposure prophylaxis of whooping cough:

a) DTP
b) DT
c) DT
d) immunoglobulin
e) antibiotics

Problems:

Problem Nr.1

A five-year-old child, who attends the kindergarten, was diagnosed with pharyngeal diphtheria. The child lives in a two-room flat with his parents. His 40-year-old father is an engineer; a 37-year-old mother is a kindergarten educator. What measures are to be taken:

a) in relation to the diseased child
b) in relation to family members
c) in the kindergarten?

Problem Nr.2

In one of the special schools for children with special educational needs a seventh grader was diagnosed with diphtheria.

1. Determine the measures that are necessary to be taken in relation to the sick child.
2. List the measures that are to be taken at the institutional level.

Problem Nr.3

During the epidemic spreading of diphtheria in a locality, a 10-year-old pupil from a local school, visited a family doctor and was suspected of diphtheria.

From anamnesis: the contacts with diphtheria patients are excluded. He was absent from the school last two days. The child's mother is a nurse, the father is a maxi-taxi driver.

1. Determine the source of causative agents and the actions that should be applied for this.
2. Plan anti-epidemic measures in the hotbed.

Problem Nr.4

As a result of bacteriological investigations according to epidemiological indicators (after a contact with the diphtheria suspected child) two cases of a carriage state of toxigenic form of the Corinebacterium diphtheria and one with non-toxigenic form were diagnosed in the children from the same kindergarten group there.

List the anti-epidemic measures related to carriers and argue the answer.

Problem Nr.5

A 4-year-old child was diagnosed with lacunar tonsillitis by a family doctor. The patient does not attend the kindergarten and it is known that the child is often sick. There is also a 5-month-old child in the family.

1. Describe the further physician's tactics.
2. List the anti-epidemic measures to be taken in case of:
   a) bacteriologically confirmed diphtheria;
   b) identification of carriers of toxigenic forms of Corinebacteria;
   c) identification of carriers of atoxigenic forms of Corinebacteria.

Problem Nr.6 Choose from the list below the persons provided with healthcare in outpoint conditions. Argue yours answer.

a) patients with mild evolution form of diphtheria
b) patients with moderate evolution form of diphtheria
c) patients with severe evolution form of diphtheria
d) carriers of toxigenic forms of Corinebacterium
e) carriers of atoxigenic forms of Corinebacterium

Problem Nr.7

As a result of the bacteriological investigation, a child referred to the ORL department for tonsillectomy, was diagnosed as a carrier of atoxigenic form of Corinebacterium

– What are the necessary measures in this case?

Problem Nr.8

As a result of the bacteriological investigation, provided according to epidemiological indications, two carriers of toxigenic Corinebacterium were isolated in the children collective after a child had been diagnosed with nasal form of diphtheria.

– What are the necessary measures in this case?

Problem Nr.9

On the March 5, 2018 a first-grader was diagnosed with diphtheria. The patient was isolated in the infectious diseases hospital on the 7th of March 2018. The epidemiological anamnesis: the child is non-vaccinated, the last day at school was on the 6th March. His mother is employed at the milk enterprise; his father is a coach of children football team.

– Define the borders of the focus.
– List the anti-epidemic measures in this case in order to stop the spreading of the epidemic process.

Problem Nr.10

During two months a diphtheria outbreak was recorded in a rural locality. A child aged under one year, a two-year-old child, four children aged 4-6, five children aged 10-14, four adolescents aged 15 and 18 and 3 adults were involved in the epidemic process. The most common clinical form was pharyngeal diphtheria.

– Draw up the vaccination plan for the local population.

Problem Nr. 11

A child was diagnosed with pharyngeal diphtheria. The patient is a second grader. During the bacteriological investigations as the medical surveillance of the classmates, two children with acute tonsillitis and another two – with exacerbation of chronic tonsillitis were detected.

Determine the necessary measures to be taken:

a) in relation to children with acute tonsillitis
b) in relation to children with exacerbation of chronic tonsillitis
c) in relation to other children, who were in contact with the patient with diphtheria.

Problem Nr.12

A three-year-old child, who was not vaccinated against diphtheria because of the parents refusal was diagnosed with diphtheria. The epidemiological anamnesis: the family lives in a three-room flat. The child's mother is unemployed, the father – is a chief of an enterprise.

– Plan anti-epidemic measures to be taken in the hotbed.

Problem Nr.13

On the 15th of March 2018 an eight-year-old non-vaccinated child was diagnosed with whooping cough. The child is sick since the 7th of March. The last day when he attended the school was the 9th of March of 2018. The child was cared on an outpatient basis. The family lives in a two-room apartment. In the family there is also a five-year-old child attending kindergarten, who was vaccinated and revaccinated against whooping cough. The parents suffered whooping cough in childhood.

Set the boundaries of the outbreak.

– Draw up a plan of anti-epidemic measures to limit and eliminate the outbreak.

Problem Nr.14

On the 10th of April 2018 a five-year-old child, who had been coughing for 7 days was diagnosed with tracheitis and prescribed the symptomatic treatment by the family doctor. After 7 days, paroxysms of cough appeared and the doctor changed the diagnosis for whooping cough.

The epidemiological anamnesis: the child attends kindergarten; the last day of attending was on the 14th of April. The child was vaccinated and revaccinated by using DTP. No more cases were recorded in the kindergarten, but in the same group, the increased number of cases accompanied by cough was recorded within the last 3.5 months. The family live in their private apartment. In the family there is also a 4-year-old vaccinated and revaccinated child, attending the kindergarten.

– Evaluate the tactics of the family doctor.
– Set the boundaries of the outbreak
– Draw up a plan of anti-epidemic measures in the outbreak

Problem Nr.15

As a result of the bacteriological investigation, provided according to epidemiological indications, a four-year-old child was diagnosed with whooping cough. The child is sick for 14 days. During the last 7 days he did not attend kindergarten. He was vaccinated and revaccinated against by using DTP according to the schedule. He is a single child in the family. All 28 children from the kindergarten group had been vaccinated and revaccinated against whooping cough. There were no any other cases of whooping cough in the child's group. But, in the same kindergarten 3 more cases of the disease were recorded. The playrooms are at the different levels of the building. According to the epidemiological anamnesis, one month before that there had been organized a theatrical performance for all children of the kindergarten.

- list probable sources of pathogens and spreading conditions of whooping cough.
- Draw up a plan of anti-epidemic measures in the outbreak.

Problem Nr 16

A three-year-old child was diagnosed with mild evolution of whooping cough based on the result of the bacteriological investigation. During few days the mother of the patient should be discharged from the maternity.

- What measures must be taken in this case?

Problem Nr.17

The family doctor suspected whooping cough in a 6 and a half-month-old child, who had been coughing for 10 days. The laboratory investigations showed that the child was ill. He was not vaccinated against the disease. The epidemiological anamnesis: there is another 7-year-old child in that family. The older child was not vaccinated against whooping cough and he was not ill. But, he had been diagnosed with ARVI and treated before.

- Draw up a plan of anti-epidemic measures in the outbreak

Problem Nr.18

From the list below choose the patients with whooping cough who require isolation in the infectious diseases hospital. Argue the answer.

a) a seven-year-old pupil, vaccinated with DTP. His parents had whooping cough in childhood. The family live in their own 2-room flat.
b) a six-month-old child, non-vaccinated against whooping cough. His mother suffered the disease in the childhood. The family live in a one-room flat.
c) a five-year-old child, vaccinated with DTP attends the kindergarten. His brother is 8 years old, the parents do not remember if they suffered whooping cough before; the family live in a 2-room flat.

RECOMMENDED LITERATURE

Basic literature

1. Prisacari Viorel. Special epidemiology. Chișinău, 2017.
2. Prisăcaru V. Epidemiologiespecială. Chișinău, 2015.
3. Prisacaru V., Guțu L., Paraschiv A. Epidemiology in tests. Chișinău, 2013.
4. Lecture material.

Additional literature

1. Tratat de epidemiologie a bolilor transmisibile. Sub redacția prof. univ. Aurel Ivan, Bucuresti, Polirom, 2002.
2. Брико Н.Н., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В., Эпидемиология. Том II, Москва, 2013
3. 3. Зуева Л.П., Яфаев Р.Х.. Эпидемиология. Санкт-Петербург, 2005.

THEME 6: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN TUBERCULOSIS, STREPTOCOCCAL AND MENINGOCOCCAL INFECTIONS.

Relevance of the subject

Since 1993 tuberculosis has been declared by the World Health Organization as a public health emergency. The Republic of Moldova is one of the 18 countries in the world facing a high burden of tuberculosis and one of the 27 WHO European countries with a high level of multidrug-resistant forms of tuberculosis.

Despite all efforts taken by specialists ofthe Republic of Moldova in the implementation of the National TB Control Programmes, this pathology continues to be a major public health problem for the population of our country.

Streptococci of A and B groups are also found in the list of causative agents with a major impact on public health all over the world, including the Republic of Moldova. The antimicrobial treatment of streptococcal infections was initiated in the middle of the last century. However, streptococcal infections continue to be a threat to the public health. The typological multitude (which causes various infections), virulence (caused by the numerous enzymes and toxins), high spread and numerous healthy carriers, diversity of the transmission routes and entrance gates, different location of the infections, cross-immunity phenomenon attributed to a similarity with human

genetic structures, antibiotic resistance are the currentcharacteristics of the epidemic process caused by streptococci.

The specificity of meningococcal infection is the development of severe forms of meningitis or meningococcemia, the lethality being between 3-10% and in severe fulminant forms reaching 60-70%.

Taking into consideration the mentioned above, all these pathologies are a challenge for public health, a problem that must be studied, the importance of knowledge of the epidemiological characteristics of the epidemic process being obvious and, also, the capacity building in planning prevention and control measures.

Purpose of practical study

The purpose of practical study is to develop the knowledge on the epidemic process in tuberculosis, streptococcal infection and meningococcal infection in current conditions and skills in planning and implementation of prophylactic and anti-epidemic measures.

Practical work plan

1. assessment of the initial knowledge in the discussion process and/or test.
2. discussions on the epidemiological, prophylactic and anti-epidemic measures based on outbreaks epidemiological surveys.
3. solving the epidemiological situations cases. discussions. comments. evaluation.
4. determination and discussion on the main surveillance directions in diphtheria and whooping cough.
5. final assessment of knowledge.

The student needs to know

1. Actuality and medical and socio-economic significance of tuberculosis, streptococcal and meningococcal infections.
2. Clinical forms caused by pathogens of tuberculosis, streptococcal and meningococcal infections and their epidemiological peculiarities.
3. Features of the epidemic process of tuberculosis, streptococcal and meningococcal infections at different periods of the time and at the contemporary stage.
4. Features and epidemiological characteristics of pathogens of tuberculosis, streptococcal and meningococcal infections.
5. Categories and epidemiological importance of different sources of causative agents (sick persons, carriers) in tuberculosis, streptococcal and meningococcal infections.

6. Mechanism and transmission routes of the causative agents of tuberculosis, meningococcal and streptococcal infections.
7. Laboratory principles and epidemiological diagnosis in tuberculosis, streptococcal and meningococcal infections.
8. The anti-epidemic measures system in tuberculosis, streptococcal and meningococcal infections.
9. The activity of diverse health care specialists in the implementation of the anti-epidemic measures in different epidemiological situations.
10. Main areas of the epidemiological surveillance in tuberculosis, streptococcal and meningococcal infections.

The student must be able to:

1. Carry out the investigation of epidemic outbreak of respiratory infections;
2. Intervene with prophylactic and anti-epidemic measures in the process of prevention and control of morbidity from tuberculosis, streptococcal and meningococcal infections according to the specifics of their future activity;
3. Evaluate the quality and efficiency of the anti-epidemic measures undertaken at the population level.

Exercises

Questions for self-control:

1. What are the features of manifestations of the epidemic process from the trends of the epidemic process development and manifestations forms at the current stage?
2. List the clinical features of the infections mentioned above.
3. List the sources of pathogens in tuberculosis, streptococcal and meningococcal infections.
4. What are the population groups vulnerable to tuberculosis, streptococcal and meningococcal infections?
5. List the nosologic forms of the infectious caused by streptococci.
6. Describe the features of the pathogens transmission mechanism in tuberculosis, streptococcal and meningococcal infections.
7. What are the identifying methods of the sources of causative agents in tuberculosis, scarlet fever, meningococcal infection?
8. Specify the patient hospitalization criteria in tuberculosis, scarlet fever, meningococcal infection.
9. Specify the anti-epidemic measures taken in the epidemic outbreaks caused by mentioned above causative agents.

10. Explain the notion and essence of DOTS programs.
11. Draw upthe areas of epidemiological surveillance in tuberculosis, streptococcal and meningococcal infections.

Tests for self-control:

1. Choose the probable sources of causative agent of scarlet fever:

a) patient in recovery period, accompanied by the desquamation of palms and soles;
b) patient with acute rhinitis;
c) patient with acute otitis as a complication of lacunar tonsillitis;
d) patient in the recovery period after tonsillitis and regional lymphadenitis;
e) patients with purulent conjunctivitis.

2. What are the infectious diseases which can be spread by more than respiratory mechanism?

a) influenza;
b) tuberculosis;
c) meningococcal infection;
d) diphtheria;
e) chicken pox.

3. In meningococcal meningitis more dangerous sources of pathogens are:

a) patients with meningococcal nasopharyngitis;
b) healthy carriers of N. meningitidis;
c) patients with meningococcal meningitis;
d) patients with meningococcemia;
e) patients in the recovery period after meningococcal infection.

4. Chemical disinfection is not performed in the meningococcal outbreaks due to:

a) a high resistance of the pathogen in the environment;
b) a very low resistance of the pathogen in the environment;
c) a resistance of the pathogen to the chemical and disinfectant solutions;
d) the lack of the pathogen in the environment as a result of its non elimination by de source;
e) a high cost of this measure.

5. Choose the high risk persons for Tb, included in the list of patients, mandatory investigated by the chest X-ray:

a) HIV positive persons;
b) persons from Tb outbreaks;
c) women in the first month of pregnancy;

d) mental patients before isolation in the hospitals;
e) as a prophylactic measure used for general population before.

6. Active detection of Tb assumes:

a) systematic identification of Tb suspected persons from a target groups, by using diagnostic tests;
b) identification of Tb patients among persons with subfebrility and cough lasting more than 3 months and weight loss greater than 10%;
c) identification of Tb patients during the compulsory annual chest X-ray investigations in population;
d) active detection of Tb patients in outbreaks;
e) detection of Tb patients during compulsory investigations before the marriage registration;

7. Choose the true statements regarding the tuberculin test:

a) the sample is considered as a positive one when the papule size is over 10 mm;
b) it is applied subcutaneously;
c) it is also defined as Mantoux test and is applied intradermally;
d) repeated administration of tuberculin can be a cause of negative to positive conversion of the test;
e) the Mantoux test may be negative as a result of allergic reaction.

8. Choose the measures that must be undertaken in a scarlet fever outbreak:

a) 7-day medical surveillance of 7-8-year-old children after hospitalization of the patient;
b) 21-day medical surveillance of 7-8 years aged children who have been in contact with a patient treated in an outpatient basis;
c) terminal disinfection in the outbreak;
d) immunoglobulin prophylaxis;
e) bicillin prophylaxis.

9. Choose the contact persons from the scarlet fever outbreak, who need to be included in the process of medical surveillance:

a) a 3-year-old patient's sister who did not suffer scarlet feverpreviously;
b) a 11-year-old patient sister who previously suffered scarlet fever;
c) patient's mother – working as a laboratory technician at the dairy products company;
d) patient's father – working as a surgeon;
e) patient's grandmother – retired.

10. Which of the following children who did not suffer scarlet fever will not be admitted to children groups as the contact person with the patient:

a) two-year- old child, who attends the kindergarten;
b) five-year-old child, who attends the kindergarten;
c) a seven-year-old child,first grader;
d) a nine-year-old child, third grader;
e) a 15-year-old teen, ninth grader.

11. Choose the actions within medical surveillance measures that are indicated in a scarlet fever outbreak:

a) skin inspection;
b) nasopharyngeal mucosa inspection:
c) daily thermometry;
d) determination of size of theliver;
e) diuresis monitoring.

12. Choose the probable source of infection from the list of contact persons in the scarlet fever outbreak:

a) a child treated of the tonsillitis, with desquamation of the skin of the palms;
b) a child with acute rhinitis;
c) a child with otitis, as a result of tonsillitis;
d) a recovered child with lymphadenitisafter tonsillitis;
e) a child with chronic pyelonephritis.

13. Which of the following patients must necessarily be hospitalized:

a) a patient with meningococcemia;
b) a patient with meningoencephalitis;
c) a patient with purulent meningitis;
d) a patient with nasopharyngitis;
e) a healthy meningococcal carrier.

14. The following measures are required in the outbreak of meningococcal infection:

a) a10-day medical supervision of the contact persons;
b) bacteriological investigation of the contact persons;
c) hospitalization of the patient with nasopharyngitis, according to epidemiological indications;
d) hospitalization and sanitation of meningococcal carriers;
e) post-exposure prophylaxis of meningitis by using vaccine.

15. Choose the elements of the epidemiological surveillance in respiratory infections:

a) retrospective and operative analysis of morbidity;

b) analysis of lethality;
c) identification ofhigh-risk groups;
d) studying the biological (serological and biochemical) features of causative agents;
e) evaluation of results of the serological and microbiological investigations.

16. Choose the elements of the epidemiological surveillance applied in Tb:

a) studying of the morbidity and lethality;
b) identification of high-risk groups;
c) early detection of affected persons;
d) treatment of the affected patients and their future medical surveillance;
e) implementation of the international programmes of the treatment and prophylaxis.

17. Choose the elements of the epidemiological surveillance in streptococcal infection:

a) monitoring of scarlet fevermorbidity dynamics;
b) monitoring of tonsillitis morbiditydynamics;
c) monitoring of streptococcus strains and their biological properties;
d) planning and implementation of programmes on nonspecific prophylaxis of streptococcal infection among primary grader pupils;
e) evaluation of the quality of anti-epidemic measures, applied at the population level.

18. Choose the elements of the epidemiological surveillance in meningococcal infection:

a) monitoring of the morbidity dynamics through meningococcal infection predominant in the children population;
b) surveillance of the meningococcal circulation in the human population;
c) monitoring of dynamics of meningococcal resistance to medications from sulfanilamide group;
d) application of the National Programme of Immunization;
e) evaluation of the quality of specific prophylactic measures in meningococcal infection.

Problems:

Problem Nr.1

In the locality of B, tuberculosis was diagnosed in a 32-year-old person. Laboratory investigations showed an abundant elimination of mycobacte-

rium.The patient is unemployed. The 30-year-old wife works as a kindergarten teacher. There are two children else in the family aged 4 and 6, who attend the local kindergarten. The family lives in a single-room flat.

a) Determine the category of epidemic outbreak. Argue the answer.
b) Draw up the epidemiological investigation plan.
c) Draw up the scheme of measures to liquidate the outbreak.

Problem Nr.2

On the discharge from the maternity hospital, a newborn was not vaccinated against Tb because of clinical contraindications.

1. List the further family doctor tactic.
2. What will the conditions for the vaccine administrationbe?

Problem Nr.3

A child, who was born on January 11, 2018 was not immunized against Tb at the maternity hospital. Afterwards, the family doctor planned to administer the BCG vaccine on the 12th of April, 2018. On the 6th of April, 2018 the Mantoux test was done, which was rated as negative on the 9th of April, 2018.

Evaluate the family doctor's tactics.

Problem Nr.4

In a group of 5 children who were vaccinated against Tb, two resultswere rated as negative during the evaluation of the Mantoux test.

Comment the results.

Problem Nr.5

During the laboratory investigations of a teenager from a tuberculosis outbreak, pathological changes in his lungs were noted on the chest X-ray. The young man was referred to the pulmonologist for consulting.

a) Name the main Tb causative agent type in human population.
b) List laboratory methods for the microbiological diagnostic
c) List substrates that need to be collected for bacteriological investigations according to the clinical form. List the requirements for the transportation of samples.
d) Name and characterize the medication, used for the specific prophylaxis of Tb.

*Problem Nr.6*A positive Mantoux reaction (papule diameter was 12 mm) was determined in a 4-year-old child, who attended the kindergarten. It is worth mentioning that previous tests were negative.

Comment on the situation and draw up the plan of measures to be taken.

Problem Nr.7

A 6-year-old child attending the kindergarten was diagnosed with scarlet fever. The patient has a second grader brother. The children's mother works as a nurse in the neonatal department, the father is working abroad.The epidemiological anamnesis: the child with scarlet fever had a contact with a neighbor's child, who recovered after otitis.

1. Determine the probable source of infection.
2. Draw up the plan of measures in order to eradicate the outbreak.

Problem Nr.8

Two children with scarlet fever were diagnosed among the first two classes of primary school pupils in the city of T. The epidemiological investigation: children study in the same room but in two shifts. They are getting together in class when come and leave the school. The children of both classes have the same teacher. The teacher suffered tonsillitis about a week ago, but he did not ask for medical assistance or sick leave. He self-medicated and did not interrupt the didactic process. It was also established that sick children sat at the first desks in the classroom, just in front of the teacher's table.

1. Determine the probable source of infection. Argue the answer.
2. Draw up the anti-epidemic measures plan.

Problem Nr.9

A lady, with her 5-year-old child in a serious condition were waiting for a consultation of a family doctor in the hall of the medical institution for a half of hour. During that time the child's state was getting worse gradually. Finally, scarlet fever was identified. While waiting for the doctor, the sick child had contact with 4 children of different age.

- Draw up the anti-epidemic measures plan.
- Determine the difficulties in complying with the anti-epidemic regime in the medical institution

Problem Nr.10

A 3-year-old child with paronychia of the forefinger was hospitalized in the surgery department. On the 8th day of treatment, the child's state was getting worse, the fever and rashes on the face and body skin occurred. During the examination, the signs of tonsillitis were also detected. The infectionist made the diagnosis of scarlet fever.

1. Determine the probable source of infection.
2. List the actions to be taken in relation with the patient.
3. Draw up the plan of anti-epidemic measures to be taken in the surgery department.

Problem Nr. 11

A 6-year-old child, attending the kindergarten, was diagnosed with scarlet fever. In anamnesis: there are two children else in the family – a 3-year-old child, who attends the nursery and a 12-year-old child, the fifth grader.

a) Determine the necessary anti-epidemic measures to be taken in the kindergarten.

Problem Nr.12

Among the first grade pupils, two children from the Mihai Eminescu gymnasium were diagnosed with scarlet fever. There are 26 pupils in the class.

1. Indicate the terms of isolation of sick children.
2. List the persons requiring isolation.
3. Indicate the term of medical supervision of pupils.

Problem Nr.13

A lady, who is working as a pediatrician, asked for a consultation with a doctor. During the clinical examination, the doctor made the diagnosis of purulent tonsillitis. In anamnesis: the woman has a 5-year-old child who suffered scarlet fever 3 weeks ago.

- List the investigations to be done.
- Determine the period of time when the pediatrician can return to work.

Problem Nr.14

A 2-year and 10 months – old child was hospitalized with the diagnosis of purulent meningitis. In anamnesis: the child attends the local kindergarten.

- Indicate the quarantine duration at the kindergarten.
- List the necessary investigations to be taken in relation to children from the group.
- List preventive measures to be taken at the kindergarten.

Problem Nr.15

A 19-year-old student from the State University was diagnosed with meningococcal infection. In anamnesis: the young man lives with other 3 colleagues and shares the bathroom and hall. During the last month, 2 colleagues from a neighboring room, diagnosed with IRA and nasopharynghitis, had been treated, respectively.

- Determine the outbreak borders.
- Draw up the epidemiological investigation plan to be taken in the outbreak.

- Determine the liquidation measures of the outbreak.

Problem Nr 16

An outbreak of meningococcal infection was diagnosed in the local kindergarten. A total number of 150 children attend the kindergarten. Thirty eight adults, including teachers, nurses and cooks are employed in the kindergarten. Two cases with meningitis, two cases with meningococcemia and 42 carriers there were identified during the eruption within laboratory investigations.

- Draw up an anti-epidemic actions plan.

Problem Nr.17

During the medical surveillance, which was applied to contact persons in an outbreak with meningococcal infection, one child with meningitis, another one with allergic rash and two children with rhinitis were identified. The results of bacteriological investigation are delayed.

- List the anti-epidemic measures in order to locate and liquidate the outbreak.

Problem Nr.18

A 3-year-old child was diagnosed with meningococcal meningitis. In anamnesis: the child attends the kindergarten. The last day of attending kindergartenwas the previous day. He also has a 4-year-old brother, who attends the same kindergarten. His mother is an employer in a clothes store, the father – is working as an electrician.

Draw up the plan for anti-epidemic measures in the relation to:

a) children and employers of kindergarten;

b) family members.

Problem Nr.19

Six cases of meningococcal infection were identified among the students of one of the colleges in the locality of B. The first four patients were identified on the 14th, 25th, 27th and 31 of October, 2018. All of them are the first-year students, study in the same group and live in the same roomin the campus.

On the 24th and 26th of November, 2018 two students from the parallel group sought medical assistance. All patients were hospitalized.

In anamnesis: each student uses 1.7 m2 of the dorm room, in the morning the room temperature reaches + 30 ° C; there is a high level of humidity inside as a result of the failure of the ventilation system.

The cases of meningococcal infection occurred after an acute respiratory

infection and newcomers were involved in the process.

The students and the teaching staff underwent bacteriological investigations in order to detect the *Neisseria meningitidis.* The contact persons were examined by the otorhinolaryngologist. Of a total number of 1579 investigated persons 210 persons were found to be meningococcal carriers. In 148 persons the otorhinolaryngologist identified inflammatory processes of the nasopharynx.

1. Assess the epidemiological significance of sources *Neisseria meningitidis* in the eruption's development.
2. Determine the factors that contributed to carriage state.
3. Determine the transmission mechanism and factors in the epidemic process.
4. Draw up the anti-epidemic measures in order to locate and liquidate the outbreak.

Answers keys for the tests:

1. a, c, d
2. a, b, d
3. a, b
4. b
5. a, b, d
6. a, b, d, e
7. c
8. a, e
9. a, b, c, d
10. a, b, c
11. a, b, c
12. a, c, d
13. a, b, c
14. a, b, c
15. a, b, c, e
16. a, b, c, d
17. a, b, c
18. a, b, c

RECOMMENDED LITERATURE

Basic literature

1. Prisacari Viorel. Special epidemiology. Chișinău, 2017.
2. Prisăcaru V. Epidemiologiespecială. Chișinău, 2015.
3. Prisacaru V., Guțu L., Paraschiv A. Epidemiology in tests. Chișinău, 2013.
4. Lecture material.

Additional literature

1. Tratat de epidemiologie a bolilor transmisibile. Sub redacția prof. univ. Aurel Ivan, Bucuresti, Polirom, 2002.
2. Брико Н.Н., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин
3. В.В., Эпидемиология. Том II, Москва, 2013
4. 3. Зуева Л.П., Яфаев Р.Х.. Эпидемиология. Санкт-Петербург, 2005.

TEHEME 7: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN MEASLES AND RUBELLA.

Relevance of the subject

Measles remains a wide-spread infection all continents of the world infection and is one of the importanest public health issues, being one of the leading causes of the children death at the global level, despite the measures taken, during the years. In 2014, 114900 deaths as a result of measles were reported especially among children under 5 years of age.

Rubella is another priority problem of public health. Being a viral infection, usually with a mild evolution among children and adults, it can cause serious complications in pregnant women, resulting in the fetal death or development of congenital malformations, defined as Congenital rubella syndrome (CRS). Over 100,000 children are born with CRSin the world yearly. There is no specific treatment for rubella, but it is an infection that can be prevented by immunization.

The Regional Committee of the World Health Organization adopted the objective aimed at elimination of the endemic measles and rubella in the European region.

In 2005 the Regional Committee for Europe of WHO mentioned in its resolution the possibility of elimination of measles and rubella in the European Region, as well as the ability of congenital rubella prevention by children immunization and maintaining the high level of immunization coverage in women of fertile age.

On the 17th of September, 2014, the member states of the European Region of WHO, including the Republic of Moldova, unanimously adopted the action plan related to the elimination of measles and rubella, which, besides ensuring the vaccination against measles and rubella of major risk groups, provides for the consolidation and assurance of the functionality of an effective system of the epidemiological surveillance and anti-epidemic measures in measles and rubella outbreaks.

Purpose of practical study

To develop knowledge on characteristics of the epidemic process in measles and rubella, as well as the capacities to organize and apply anti-epidemic measures in order to eliminate infections in population.

Practical work plan

1. The assessment of the initial knowledge in the epidemiology of measles and rubella.

2. Discussion of outbreak investigation outcomes.
3. Solving the epidemiological situations cases. Discussions. Comments. Evaluation.
4. Determination and discussion on the main surveillance directions in measles and rubella.
5. Final assessment of students' knowledge.

The student needs to know:

1. Epidemiological and socioeconomic impact of measles and rubella;
2. The characteristics of the epidemic process in measles and rubella at the prevaccinal and current stage;
3. Epidemiological features of the pathogen of rubella and rubella.
4. Sources of causative agents in measles and rubella and their epidemiological significance.
5. Laboratory methods used in measles and rubella diagnosing.
6. The organizational structure, current methods and means in prophylaxis of measles and rubella.
7. Anti-epidemic measures in measles and rubella outbreaks.
8. Criteria and indicators of efficacy of prophylactic and anti-epidemic measures in measles and rubella.
9. Main directions of the epidemiological surveillance and control measures in measles and rubella. The european vaccine action plan.
10. National legislative acts on prevention and control of measles and rubella.

The student must be able to:

1. Carry out the investigation of measles and rubella epidemic outbreak;
2. Intervene with prophylactic and anti-epidemic measures in the process of prevention and control of morbidity according to the specifics of their activity;
3. Evaluate the quality and efficiency of the anti-epidemic measures undertaken at the population level.

Exercises

Questions for self-control:

1. Describe the characteristics of the epidemic process manifestations in measles and rubella at the current stage.
2. What are the tendencies of the epidemic process development at the current stage?
3. Name the epidemiological features of the causative agents of measles and rubella.

4. Describe the sources of pathogens in measles and rubella.
5. What are the transmission particularities in measles and rubella?
6. Describe the categories of susceptible population and high risk groups for measles and rubella.
7. What is the essence of specific prophylaxis in measles and rubella according to the National Immunization Program,?
8. What is the essence and content of post-exposure prophylaxis in measles?
9. Why do the measles eruption expand more rapidly than that of the whooping coughingin the same children's community? Argue the answer.
10. What are the reentrancy criteria of patients after measles in collectivities?
11. What are the main directions of the epidemiological surveillance in measles and rubella?

Tests for self-control:

1. The features of the epidemic process of measles are:

a) periodic increase of morbidity;
b) uniform spread of morbidity throughout the year, regardless the season;
c) seasonal increase of the epidemic process;
d) uniform morbidity among population of different age groups;
e) uniform morbidity over the years.

2. What population categories are in the high risk to develop measles?

a) preschool children;
b) teenagers;
c) adults;
d) males;
e) females.

3. In the measles epidemiological surveillance is based on:

a) retrospective and operative analysis of morbidity ;
b) studying the level and causes of population lethality;
c) determination of risk groups for respiratory infections at the population level;
d) studying the serological and biochemical features of the causative agent;
e) evaluation of the serological and microbiological investigations.

4. Measles is an infectious disease from the group of:
a) anthroponoses of viral etiology
b) zooanthroponoses of viral etiology
c) sapronoses of viral etiology
d) sapronoses of bacterial etiology
e) anthroponoses of bacterial etiology.
5. The causative agent of measles is:
a) Paramyxovirus, genus Paramyxovirus;
b) Paramyxovirus, genus Morbillivirus;
c) Paramyxovirus, genus Pneumovirus;
d) Picornavirus, genus Enterovirus;
e) Picornavirus, genus Rhinovirus.
6. In measles the minimal incubation period is:
a) 1-2 days;
b) 3 days;
c) 8 days;
d) 11 days;
e) 14 days.
7. The maximal incubation period of measles in vaccinated persons is:
a) 11 days;
b) 14 days;
c) 17 days;
d) 20 days;
e) 21 days.
8. Choose the evolution type most common for measles:
a) acute;
b) latent;
c) chronic;
d) an acute one with persistence of the virus in the parenchymal organs;
e) an acute one with persistence of the virus in the Central Nervous System.
9. The complication of measles is:
a) Subacute SclerosingPanencephalitis;
b) Creutzfeldt-Jacobs disease;
c) Kuru disease;
d) Juvenile systemic sclerosis;
e) infectious mononucleosis.

10. Measles post-infectious immunity lasts:
a) whole life;
b) up to 20 years;
c) about 10 years;
d) 5-6 years;
e) 1-3 years.
11. Which of the following tests is used to evaluate the anti-infectious immunity level in medical practice:
a) complement fixation test;
b) direct agglutination test;
c) indirect agglutination test;
d) immunofluorescence method
e) ELISA
12. The periodic increase of measles morbidity in the pre-vaccine period was diagnosed each:
a) 1-2 years;
b) 2-3 years;
c) 3-4 years;
d) 5-7 years;
e) the cyclicality of epidemic process manifestations was not characteristic.
13. In measles the protective titer of antibodies is:
a) 1:4
b) 1:10
c) 1:20
d) 1:40
e) 1:60
14. According to WHO recommendations, the coverage with the vaccine against measles in children under the age of two must be:
a) 50%;
b) 60%;
c) 75%;
d) 80%;
e) 95%.
15. In rubella the main combating measure is:
a) isolation of patients with rubella;
b) terminal focus disinfection;

c) current focus disinfection;
d) vaccination;
e) administration of immunoglobulin to persons in hotbed of rubella.

16. The interval between immunoglobulin and measles vaccine administration must be:

a) 10 days;
b) 2 weeks;
c) one month;
d) 1.5 month;
e) several months.

17. When rash appears the isolation of the patient with measles will be stopped after:

a) 2 days;
b) 4 days;
c) 7 days;
d) 9 days;
e) 10 days.

18. Choose the anti-epidemic measures to be taken in measles:

a) isolationof the diseased;
b) terminal disinfectionin the focus;
c) immunoglobulin administration to unvaccinated persons,due to contraindications;
d) immunization of contact persons in the hotbed;
e) revaccination of the persons with the protective immune titer higher than 1:10 IU.

Problems:

Problem Nr.1

On the evaluation of the vaccination of children with ROR vaccine in nurseries Nr. 5 and 21, it was established that the coverage index was 98% and 92%, respectively.

Evaluate the epidemiological situation in both nurseries and, in case of some findings list measures in order to improve the situation. List legislative acts to be implemented.

Problem Nr.2

A case of measles has been recorded in one of the groups of the local kindergarten.

1. Name the medical surveillance time of children who have been in contact with the measles patient.

2. List the measures to be taken in order to locate and liquidate the outbreak.

Problem Nr.3

A 5-year-old child who attends the kindergarten was diagnosed with measles on the 10 th of February, 2018. In anamnesis: the child has been sick since the 8th of February, 2018. On the day of epidemiological investigations in the hotbed, applied on the11th of February, 2018 the kindergarten attended 17 from 25 children who are on the list. All children were vaccinated according to the vaccinations schedule and isolation of groups is respected.

The child and his family live in a two-room apartment. The parents suffered measles in childhood.

1. Determine the outbreak borders.
2. Propose the anti-epileptic measures to be taken at home and in the kindergarten.

Problem Nr.4

On the 25th of October, 2018 measles was diagnosed in a student from Technical University, based on characteristic eruptions on the body. In anamnesis: the last day when the patient was at the university was the 22th of October, 2018. On the 15th of October, 2018thestudent visited his relatives and there he was in contact with a 5-month-old child. On the 17th of October, 2018a 10-year-old brother, who came from the city of B. and felt bad, visited him. The studentshares the campus room with three colleagues.

1. Determine the probable source of pathogens.
2. Draw up the plan of anti-epidemic measures to be taken in concerned epidemiological situation.

Problem Nr.5

A woman in the 11th week of pregnancy, who was in contact with a rubella patient more than a month before, is advised to interrupt the pregnancy.

Which results of serological investigations can argue this procedure:

a) IgG antibodies to rubella virus;
b) IgM antibodies to rubella virus;
c) the absence of antibodies to rubella virus.

Problem Nr.6

Rubella was diagnosed in a 3-year-old child. In anamnesis: the child attends the kindergarten. His mother is 28 weeks pregnant; she was not vaccinated against rubella and did not suffer it before.

1. Determine the measures to be taken by the family doctor.

2. Argue the answer.

Problem Nr.7

A 5-year-old child was diagnosed with measles (face eruptions) after 23 days of treatment in the department of traumatology.

Draw up the anti-epidemic measures action plan.

Problem Nr.8

A child with pneumonia was admitted to the department of pulmonology of the municipal hospital. In anamnesis: the child had been diagnosed with measles by an infection diseasesdoctor 12 days before and pneumonia developed as a complication.

Is it possible the patient with pneumonia to be a source of measles for the children of the department? Argue the answer.

Problem Nr.9

A 6-year-old child was diagnosed with measles when rashes occurred on the face. The last day of attendance of the kindergarten was the 20th of October, 2018.

1. Determine the contagious period of the patient.
2. Determine the duration of the patient's isolation period.
3. Determine the length of medical supervision of people in the kindergarten.

Problem Nr.10

On the15th of February, 2018 a 3-year-old child,who attends the kindergarten, had a contact with a neighbor's child with measles.In anamnesis: the child concerned was not vaccinated and did not suffermeasles.

What will further family doctor actionsbe?

Problem Nr. 11

A 9-year-old child was diagnosed with measles on the 20th of March, 2018 based on the appearance of eruptions on the face and body. In anamnesis: the child is a fourth grader; the last day of the school attendance was on March 18th, 2018. There are 32 children in the class, 24 of them – were vaccinated and revaccinated against measles, 5 children suffered measles in the pre-school period, 2 were absent because of complications after influenza. The child's family live in a 4-room apartment, the parents suffered measles in childhood, the brother under 3 years of age attends the same kindergarten and was not vaccinated according to contraindications.

Determine the measures to be taken:

a) at school;

b) at home.

Answers at the tests:

1. a, c	10. a
2. a, b	11. c, e
3. a	12. b
4. a	13.b
5. b	14. e
6. c	15. d
7. e	16. b
8.e	17.b
9. a	18. a, c, d

RECOMMENDED LITERATURE

Basic literature

1. Prisacari Viorel. Special epidemiology. Chişinău, 2017.
2. Prisăcaru V. Epidemiologiespecială. Chişinău, 2015.
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4. Lecture material.

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2. Брико Н.Н., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин
3. В.В., Эпидемиология. Том II, Москва, 2013
4. 3. Зуева Л.П., Яфаев Р.Х.. Эпидемиология. Санкт-Петербург, 2005.

THEME 8: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN INFLUENZA AND MUMPS.

Relevance of the subject

Acute respiratory infections (ARVI) determine the morbidity of 40-60% of infant and 30-40% of preschoolers and schoolchildren. The lethality induced by respiratory viruses is obvious in case of influenza, adenoviral and paragripal infections and as a result of syncytial respiratory virus action. Patients aged over 65, being up to 80-90% among all diseased, take a special position in the lethal structure. Over the years, outbreaks and even mumps

epidemics started to appear,against the background of the high coverage with mumps vaccination. The worsening of the epidemiological situation regarding mumps was observed also in the USA, England, Canada, Spain, Australia, the Republic of Moldova and many other states.

Therefore, currently, it is very important to study the epidemiological surveillance and control measures, applied in influenza and mumps.

Purpose of practical study

to develop the knowledge on the epidemic process in influenza and mumps, as well as the formation of the skills of organization and realization of the prophylactic and anti-epidemic measures at the population level, including in the outbreaks with these infections.

Practical work plan

1. The assessment of the students' initial knowledge in the discussion process and/or test.
2. Discussions on the epidemiological, prophylactic and anti-epidemic measures based on outbreak epidemiological surveys.
3. Discussions on the anti-epidemic measures system to be taken in influenza and mumps.
4. Solving the epidemiological situations cases. Discussions. Comments. Evaluation.
5. Determination and discussion on the main surveillance directions in measles and rubella.
6. Final assessment of students' knowledge.

The student needs to know:

1. Epidemiological and socioeconomic impact of influenza and ARVI;
2. Epidemiological, social and economic impact of mumps;
3. Characteristics of the epidemic process in sezonier, pandemic and avian flu.
4. The epidemiological features of sources of the pathogen in influenza;
5. The mechanism of the development of the epidemic process of mumps in the pre- and post-vaccinationperiod;
6. Sources of causative agents in mumps and their epidemiological significance.
7. Measures to be taken in order to reduce the morbidity of influenza, mumps and other acute viral respiratory infections;
8. Actions of different fields health care workers in the achievement of anti-epidemic measures in diverse epidemiological situations;

9. The main directions of the epidemiological surveillance and control measures in influenza;
10. The main directions of the epidemiological surveillance and control measures in mumps;
11. The national and international legislative acts for the prevention and control of influenza and mumps.

The student must be able to:

1. Carry out the investigation of epidemic outbreak of influenza;
2. Carry out the investigation of epidemic outbreak of mumps;
3. Analyze epidemic process manifestations in influenza;
4. Analyze epidemic process manifestations in mumps;
5. Intervene with prophylactic and anti-epidemic measures in the process of prevention and control of morbidity of influenza, arvi and mumps;
6. Evaluate the quality and efficiency of the anti-epidemic measures undertaken at the population level.

Exercises

Questions for self-control:

1. What are the characteristics of the epidemic process manifestations in pandemic influenza?
2. Describe the epidemiological features of causative agents of influenza.
3. Name the sources of pathogens in influenza and mumps.
4. What are the transmission features in influenza and mumps?
5. Describe the categories of susceptible population and high risk groups for influenza and mumps.
6. Name the reporting criteria in influenza and mumps.
7. What are the indications for hospitalization of patients with influenza and mumps?
8. Name the remedies, used for specific prophylaxis of influenza and mumps.
9. List the anti-epidemic measures applied in influenza and mumps outbreaks.
10. What are the main directions of the epidemiological surveillance in influenza and mumps?

Tests for self-control:

1. Choose the causative agents sources in pandemic influenza:

a) patient in clinical manifestations' period;

b) patient in recovery;
c) animals;
d) birds;
e) all mentioned above

2. The transmission mechanism of causative agents of influenza is:
a) respiratory;
b) direct contact with the patient with influenza;
c) fecal-oral;
d) parenteral;
e) all mentioned above

3. Choose the infectious diseases, the pathogens of which can be transmitted by other than the respiratory mechanism routes:
a) influenza;
b) Tb;
c) meningococcal infection;
d) diphtheria;
e) chickenpox.

4. What are the criteria of patients' discharge in influenza:
a) the patient's recovery;
b) the term of 5 days of general health improvement;
c) laboratory diagnostic results are not the discharge criteria;
d) negative laboratory diagnostic tests;
e) microradiography of the lungs.

5. Choose the groups of people who need to be vaccinated primarily against flu:
a) persons aged over 50;
b) persons with chronic cardiovascular, respiratory and endocrine diseases;
c) new-born children;
d) persons with blood group II and IV;
e) family members of the patient with influenza.

6. Express diagnosis of influenza is based on:
a) thick smear drops test;
b) immune fermentative test;
c) virological method;
d) DAT;
e) PCR.

7. The confirmation of the laboratory diagnosis of influenza shall be carried out by:

a) thick smear drops test;
b) immune fermentative test;
c) positive PCR test;
d) virological method;
e) DAT.

8. The features of the type A virus of influenza are:
a) It is the most virulent virus type;
b) animals can be a reservoir of pathogens;
c) the capacity for pandemic spreading;
d) shift type of modification of the virus structure;
e) the high level of sensibility for antiviral treatment.

9. The features of the type B virus of influenza are:
a) it is the most virulent virus type;
b) only humans can be a reservoir of pathogens;
c) the capacity for epidemic spreading;
d) shift type of modification of the virus structure;
e) the low level of sensibility for antiviral treatment.

10. The features of the type C virus of influenza are:
a) it is the most virulent virus type;
b) animals can be a reservoir of pathogens;
c) the capacity for epidemic spreading;
d) drift type of modification of the virus structure;
e) no sensibility for usual antiviral treatment.

11. Choose the population high risk groups for pandemic influenza:
a) education system employers
b) health care workers
c) children
d) adults with chronic pathology
e) the whole population, regardless of age and pathology in anamnesis

12. What are the criteria for virological investigations for suspect cases of influenza in the preepidemic period?
a) multiple ARI outbreaks similar with cases of influenza;
b) increase of all acute respiratory infections with severe evolution;
c) increase of the number of cases of respiratory infections with severe evolution among pregnant women;
d) increase of the number of deaths as a result of respiratory infections;
e) increase of the incidence of respiratory infections in children relative to the adult population.

13. The system of prophylactic measures in seasonal influenza includes:
a) free seasonal vaccination of high risk population
b) free vaccination of the whole population
c) assurance of the population access for influenza vaccine
d) information of the population about the epidemiological situation of influenza and its education in prevention
e) hospitalization of all diseased and suspected with influenza

14. Choose the measures to be taken in mumps outbreak:
a) terminal disinfection
b) cleaning and ventilation of rooms
c) daily examination and thermometry of contact persons
d) specific passive prophylaxis
e) vaccination of contact persons during the first 72 hours after the contact with the diseased

15. Choose the measures to be taken in mumps outbreak:
a) isolation of the diseased
b) urgent immunoprophylaxis
c) urgent prophylaxis with antibiotics
d) terminal disinfection
e) serological investigations in contact persons

16. In a mumps outbreak the following persons will be isolated:
a) a six-year-old child, who was vaccinated previously against mumps
b) a five-year-old child, who was not vaccinated against mumps and was not sick previously
c) a seven-year-old child, who suffered mumps two years before
d) a 11-year-old child, who was not vaccinated against mumps and did not suffer it previously
e) a 17-year-old teenager, who was not sick but was vaccinated and re-vaccinated against mumps previously

17. Medical supervision of people who were not vaccinated against mumps and did not suffer it but had contact with diseased person is applied for:
a) 14 days
b) 9 days
c) from the 10th to the twenty first day after the contact
d) 18 days
e) 21 days

18. Choose the basic combating measure in mumps:

a) isolationof the patient
b) disinfection
c) vaccination

Problems:

Problem Nr.1

There were recordered cases of acute respiratory infections and flu among the animal and human populations. The cases were characterized by rapid spread in the European region in a 3-week period. The cases were preponderantly diagnosed among adults. Lethal cases were recorded among humans and sinantrope birds as a result of the severe evolution of the disease.

1. Determine the type of influenza
2. Evaluate the epidemiological situation in the European region
3. Draw up the set of prophylactic and anti-epidemic intervention measures in the described epidemiological situation.

Problem Nr.2

During a 3-week period in Asia, African countries and the European region there was recorded a big number of cases of acute respiratory infections and influenza with a rapid spread of the epidemic process in the human population. Adults with chronic pathologies and children under the age of two are the most affected population groups. Lethal cases, as a result of severe evolution of the disease, were reported to be among the adults, including pregnant women,.

1. Name the influenza type.
2. Propose the set of prophylactic and anti-epidemic measures to be taken at the country level.

Problem Nr.3

The public health center of the city of C. recorded a 30% increase of influenza cases confirmed by laboratory investigations after 7 days. At the same time, the increase of number of ARVI cases in the educational institutions of the locality was recorded.

1. Assess the epidemiological situation.
4. Develop the plan of prophylactic and anti-epidemic measures to be taken at the municipality's level.

Problem Nr.4

During the epidemic period of recording the influenza cases in health care institution, the number of family doctors who had been trained by the infectious physician and the epidemiologist about clinical signs, influenza treat-

ment and anti-epidemic intervention increased. The medical institution is provided with disposable protective masks for all employees.

1. Determine the additional anti-epidemic measures that need to be taken in this situation.

Problem Nr.5

At the beginning of influenza epidemic in the locality of B., a flu outbreak had been recorded in the maternity hospital.

Propose the plan of measures necessary to be taken in order to localize and liquidate the outbreak.

Problem Nr.6

During the influenza epidemic period, the decision on the hospitalization of patients with influenza in a municipal hospital was made.

Determine the necessary measures to be taken in the hospital department in order to reduce the risk of spreading influenza in the whole clinic.

Problem Nr.7

A X-th grader was diagnosed with influenza with moderate evolution, during the recording of cases of pandemic flu. The teen's family, where there are other 2 children aged 3 and 6, live in a 4-room apartment.

1. Determine the epidemiological criteria which can permit the patient treatment of home.
2. Propose the anti – epidemic measures, which would reduce the risk of infection spreading infection in the outbreak.

Problem Nr.8

A child with mixed infection of viral hepatitis A and epidemic parotiditis was hospitalized in the Infectious Diseases Hospital. Mumps associated with hepatitis A on the 7th of December.

Propose the measures to redress the described epidemiological situation.

Problem Nr.9

A 20-year-old student has been diagnosed with submandibular lymphadenitis. Three days before, one of the student's colleagues was identified with epidemic parotiditis. In anamnesis: the young man lives with his parents aged 40 and 43, whose infectious and vaccination anamneses are not known). The patient is married. The 19-year-old wife, who was vaccinated against epidemic parotiditis in childhood and did not suffer the disease, and their 10-month-old daughter, who did not suffer the disease before, live in the same 3-room apartment.

1. Determine the outbreak borders.

2. List the anti-epidemic measures to be taken in order to localize and liquidate the outbreak.

Problem Nr.10

A child was diagnosed with epidemic parotitis in the kindergarten.

Determine the anti-epidemic measures to be organized in the children collective which the patient belongs to.

Problem Nr. 11

A child aged 8 years has been diagnosed with mumps. There are three other children in the family: a 6-year-old brother, who did not suffer the disease before and was vaccinated at the age of 2; a 5-year-old sister, who also did not suffer the disease but was not vaccinated due to medical contraindications; a 11-month-old brother who did not suffer the disease and was not vaccinated earlier.

Determine the anti-epidemic measures to be taken in order to localize and liquidate the outbreak.

Problem Nr. 12

A case of mumps was recorded in a child, who attends the kindergarten. The patient was hospitalized. There are two other children of 12 years and 1 year and 7 months in the familywho did not suffer epidemic parotiditis before.

1. What are the outbreak borders?
2. Draw up the plan of anti-epileptic measures to be taken in the outbreak.

Problem Nr. 13

A family doctor was called to consult a 9-year-old child with a fever of 39.8 ° C, clinical signs of affected salivary glands (swelling, pain mainly during mastication and swallowing). In anamnesis: the family live in a comfortable two-room apartment and consists of father, mother and the child in question.

Draw up the plan of anti-epileptic measures to be taken.

Problem Nr. 14

During medical examination of recruits deployed in the barracks, one of them was identified with signs of mumps (swelling of the sublingual and submandibular glands, orchitis).

1. What laboratory investigations are required for the confirmation of diagnosis.
2. Specify the infectivity term of the patient.
3. Draw up the anti-epidemic measures to be taken in the barracks.

RECOMMENDED LITERATURE

Basic literature

1. Prisacari Viorel. Special epidemiology. Chișinău, 2017.
2. Prisăcaru V. Epidemiologiespecială. Chișinău, 2015.
3. Prisacaru V., Guțu L., Paraschiv A. Epidemiology in tests. Chișinău, 2013.
4. Lecture material.

Additional literature

1. Tratat de epidemiologie a bolilor transmisibile. Sub redacția prof. univ. Aurel Ivan, Bucuresti, Polirom, 2002.
2. Брико Н.Н., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин
3. В.В., Эпидемиология. Том II, Москва, 2013
4. 3. Зуева Л.П., Яфаев Р.Х.. Эпидемиология. Санкт-Петербург, 2005.

THEME 9: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN VECTOR-BORNE INFECTIONS: EPIDEMIC TYPHUS, BRILL DISEASE AND MALARIA

Relevance of the subject

Vector-borne infections represent more than 17% of all infectious diseases, causing more than 1 million deaths annually. For example, malaria, causes more than 600,000 deaths each year globally, most of them being children under 5 years of age. Only in 2015 were registered 214 million new cases of malaria, of which 430,000 cases were fatal. About 88% of all cases occur in African countries. Other diseases – leishmaniasis, schistosomiasis, Chagas disease etc. – affect hundreds of millions of people around the world. Many of these can be prevented through general awareness measures.

Purpose of practical work

Learning of clinical and epidemiological features, principles of organization and implementation of measures to prevent and combat blood-borne infections: epidemic typhus, Brill disease and malaria; drawing up complex plans of prophylactic and anti-epidemic measures.

Practical work plan

1. Introduction and answers to students' questions.
2. Evaluation of the initial level of students' preparation for practical work by oral discussion and testing.
3. Solving the problems of epidemiological situations.

4. Drawing up complex plans for combating and preventing vector-borne infections.
5. Analysis of results of the problem solving, content of complex plans to combat and prevent vector-borne infections.
6. Familiarization with the main instructive methodical documents, governing the practical work to combat vector-borne blood infections.
7. The final assessment of knowledge through testing.
8. Summarizing the practical work.

Material provided for the class

1. Statistical reports on the incidence of malaria, epidemic typhus and pediculosis.
2. Instructive methodical documents governing the practical work to combat vector-borne blood infections.
3. Tables regarding the content and organization of prophylactic and anti-epidemic measures in epidemic typhus and malaria.
4. Tests for initial evaluation and final knowledge of students.
5. Additional informative material for solving epidemiological problems.

The student needs to know

1. General features of vector-borne infections.
2. Epidemiological and socio-economic importance of epidemic typhus, malaria.
3. Clinical and epidemiological features of vector-borne infectious: epidemic typhus, Brill disease and malaria.
4. Organization of epidemiological surveillance, measures to combat and prevent vector-born infections.
5. The Role of Public Health Centers and Outpatient Health Service in the surveillance and control of these infections.
6. Main directions of epidemiological surveillance and control in epidemic typhus and malaria.

Students must know the following aspects of each nosological form

- development of life cycle of the pathogen;
- the scheme of the development of epidemic process and its manifestations;
- characteristics of epidemiological outbreak investigation and organization of anti-epidemic measures;

- principles of drawing up complex plans to combat and prevent vector-borne infections;
- directions of epidemiological surveillance.

Practical skills

1. Conducting the epidemiological investigation in outbreaks of epidemic typhus and malaria.
2. Active detection of cases of pediculosis, epidemic typhus and malaria.
3. Organization of anti-epidemic measures in order to locate and liquidate the outbreak of epidemic typhus and malaria.
4. Conducting the epidemiological investigation of manifestations of the epidemic process in epidemic typhus and malaria.
5. Drawing up complex plans for combating epidemic typhus, recurrent typhus, malaria and Brill disease.
6. Implementation of epidemiological surveillance in vector-borne blood infections.

Exercises

Questions for self-control

1. Describe the biological cycle of the pathogenic agent of epidemic typhus in nature.
2. List the sources of pathogenic agents in epidemic typhus and recurrent typhus.
3. What are the favorable conditions for the appearance and spread of epidemic typhus in human population?
4. Determine the biological properties of the vectors transmitting the pathogenic agents of epidemic typhus, recurrent typhus and malaria. Mode of human contamination.
5. Evaluate the actual level of manifestation of epidemic process in epidemic typhus, recurrent typhus and malaria.
6. Formulate anti-epidemic and prophylactic measures in epidemic typhus and malaria.
7. What are the causes of global spreading of epidemic typhus and malaria?
8. List the necessary conditions for realization of the biological cycle of the pathogenic agent of malaria (sporogonic cycle and erythrocytic schizogony).
9. List the measures to prevent malaria within the territory of Moldova, taking in consideration its eradication.

10. What measures must to be taken if at the moment of epidemiological surveillance of contacts from the outbreak of epidemic typhus pediculosis was detected?
11. Can the samples of patient's blood collected for the serological reaction in order to identify typhoid and parathyroid fever be also tested in the passive haemagglutination reaction for the diagnostic of rickets?
12. What conditions determine the spread of malaria on a territory?

Tests for self-control

1. In epidemic typhus the sources of infection are:

a) a patient at the onset of the disease;
b) a patient during the clinical manifestations of the disease;
c) a convalescent on the 3rd – 4th day of normal temperature
d) a convalescent 1 month after the disease.

2. The information required to confirm the diagnosis of epidemic typhus are:

a) clinical;
b) epidemiological;
c) serological;
d) bacteriological.

3. The pathogenic agent of epidemic typhus is transmitted by:

a) fleas;
b) mosquitoes;
c) head lice;
d) body lice;
e) ticks.

4. Which of the following is necessary for an early detection and prophylaxis of patients with epidemic typhus:

a) regular hygiene of the body;
b) examination of adolescents in organized groups and all hospitalized people for pediculosis;
c) bacteriological blood analysis in patients with fever lasting more than 5 days;
d) examination of persons with fever lasting more than 5 days, using the passive haemagglutination reaction test and the complement fixation reaction test with rickettsia;
e) vaccination against epidemic typhus.

5. In epidemic typhus lice begin to be contagious after:

a) 1 day after feeding blood of a sick person;

b) 2 days after feeding blood of a sick person;
c) 3 days after feeding blood of a sick person;
d) 4 days after feeding blood of a sick person;
e) 5 days after feeding blood of a sick person.

6. Factors that contribute to the manifestation of epidemic process are:
a) mild forms of epidemic typhus;
b) typical forms of disease;
c) Brill disease; „
d) pediculosis in the population;
e) breach of food processing technology.

7. Malaria is a:
a) sapronosis;
b) anthroponosis;
c) zoonosis;
d) zooanthroponosis.

8. The source of malaria infection is:
a) a sick person;
b) a sick animal;
c) mosquitoes of the genus *Anopheles;*
d) mosquitoes of the genus *Culex;*
e) a carrier.

9. The mechanisms of transmission of pathogenic agent in malaria are:
a) respiratory;
b) faecal-oral;
c) contact;
d) natural parenteral;
e) vertical;
f) artificial parenteral.

10. Chemoprophylaxis of malaria aims to prevent:
a) contracting infection;
b) contamination;
c) severe clinical forms;
d) falling ill;
e) preventing subsequent treatment that is long lasting;

Problems of epidemiological situations

Problem no. 1. A 57-year-old patient was isolated from a passenger train wagon at a railway station in a serious condition with rozeolic-petechial

rashes on the body and in confusion. Clinical examination revealed intense pediculosis. Based on clinical and epidemiological anamneses the patient was diagnosed with epidemic typhus.

- Draw up the plan of anti-epidemic measures necessary in this epidemiological situation.

Problem no. 2. A large number of epidemic typhus cases have been registered in a locality.

- Draw up a complex plan to eliminate the disease in this locality.

Problem no. 3. Based on the data from table 1, do an epidemiological analysis of malaria cases in the years 1973-1993 in the Republic of Moldova, indicating the years with high risk of spreading of imported cases, distribution of cases among different categories of citizens, etiological structure and geographical area from where they were imported.

Problem no. 4. A patient with chronic bilateral adnexitis who had been hospitalized in a severe condition received blood transfusions from 15 donors, including a 50-year-old donor (on 30.04.2017). On 21.07.2017, periodic fever appeared (39.5-40.5°C) every 72 hours. Blood samples for laboratory investigation was collected on the 16.08.2017, but on 17.08.2017 the diagnosis of quarta malaria was made.

- Identify the causes of late diagnosis.
- Specify the possible source of invasion and ways to detect it.
- Draw up the plan of anti-epidemic measures.

Problem no. 5. On 17.07.2017, 12 days after returning from an Asian malaria endemic country, a patient with complaints of weakness and fever (39.3°C) called an ambulance. He had been treated for acute upper respiratory tract infection for 7 days, but his condition worsened due to fever attacks with 48-hour intervals. 14 days after the beginning of the disease diagnosis of malaria was suspected and the parasitological blood test was done. It revealed P. vivax.

- Specify the risk of spreading malaria from the imported case;
- Draw up the anti-epidemic measures plan, including the hospital where the patient with malaria will be treated.

Problem no. 6. A group of tourists are going to an African country where tropical malaria and other forms of malaria are spread. According to the official information, in this country, pathogenic agents of all forms of malaria have no resistance to delagil and novahin.

- Determine the necessary measures to be done for emergency prophylaxis.

Table 1. Imported malaria cases in the Republic of Moldova, registered in the period of 1973-1993

Years	Total number of affected territories	Total numbers of cases	Inclusive		Distribution of cases		Etiological structure				Where it came from		
			Sick persons	Carrier of parasites	Citizens of the RM	Foreign citizens	P.vivax	P.falciparum	P.malariae	P. ovale	Africa	Asia	Latin America
1973	5	5	5	-	5	-	4	-	1	-	3	1	-
1974	4	14	12	2	14	-	2	-	12	-	1	1	-
1975	1	7	2	5	-	7	-	3	3	1	6	1	-
1976	3	3	3	-	2	1	-	1	2	-	1	-	-
1977	2	5	2	3	1	4	2	3	-	-	3	2	-
1978	4	16	4	12	2	14	1	12	2	1	13	3	-
1979	4	24	13	11	2	22	2	21	1	-	21	2	1
1980	3	29	15	14	8	21	1	27	1	-	24	3	2
1981	12	26	22	4	13	13	13	11	-	2	13	13	-
1982	20	41	34	7	26	15	26	12	-	3	15	26	-
1983	16	42	34	8	22	20	20	19	2	1	20	21	1
1984	21	59	42	17	40	19	39	20	-	-	20	39	-
1985	25	74	53	21	42	32	45	28	-	1	26	46	2
1986	21	59	40	19	33	26	36	21	-	2	23	36	-
1987	14	62	25	37	19	43	18	42	-	2	42	20	-
1988	17	54	33	21	26	28	24	28	-	2	30	24	-
1989	13	56	25	31	15	41	14	42	-	-	41	14	1
1990	1	1	-	1	-	1	-	1	-	-	-	-	-
1991	3	9	7	2	2	7	3	6	-	-	5	3	1
1992	1	1	1	-	-	1	-	1	-	-	1	-	-
1993	1	1	1	-	-	1	-	1	-	-	-	1	-

Problem no.7. The diagnosis of epidemic typhoid was made to a 30-years-old washerwoman on the 8th day of disease (12.03.2017). Last time she was at work on March 9. On March 10, she was at home with the diagnosis of flu. On the 12th of the March, the patient was admitted to the hospital. The family lives in a 2-bedroom apartment (a 35-year-old husband works at public bath, a 6-year-old daughter attends the kindergarten, a 65-year-old mother is retired).

- Determine the anti-epidemic measures necessary in this epidemiological situation.

Problem no. 8. On the third day after returning from Guinea, ayoung African man, who studies at the University of Medicine and lives in student's hostel, had fever of 40°C. The condition of the young man is moderate. The ambulance doctor diagnosed the flu and did not hospitalize him.

- Evaluate the actions of the doctor.
- Specify the necessary actions to be taken in this situation.

Problem no. 9. A crewmember of a ship, who arrived at the harbor Giurgiulesti, was hospitalized in the infectious disease hospital with suspected malaria. In the epidemiological anamnesis, it was found out that the ship had been in the South-East Asian waters, with stops in different harbors.

- Draw up the complex of antiepidemic measures necessary to be done in this situation.

Problem no. 10. On July 27, 2017, a man was admitted to the infectious diseases hospital in a moderate condition – with chills, sweating, and fever. Based on the results of clinical examination and laboratory investigations, the man was diagnosed with tertian malaria. The epidemiological anamnesis: the village where lives this man lives is located in a swampy area and he was bitten by mosquitoes. It was also found out, that in the village builders from Central Asia worked. Previous cases of malaria in the area were not recorded before.

- Draw up the plan of antiepidemic measures required to be made.

Answers to tests

1 – a, b, c;
2 – a, b, c;
3 – d;
4 – a, b, d;
5 – e;
6 – a, b, c, d;
7 – b;
8 – a, e;
9 – d, e, f;
10 – a, d, e.

RECOMMENDED LITERATURE

Basic literature

1. Prisacari Viorel. Special epidemiology. Chişinău, 2017.
2. Prisăcaru V. Epidemiologiespecială. Chişinău, 2015.
3. Prisacaru V., Guţu L., Paraschiv A. Epidemiology in tests. Chişinău, 2013.
4. Lecture material.

Additional literature

1. Tratat de epidemiologie a bolilor transmisibile sub redacţia prof. univ. Aurel Ivan, Bucuresti, Polirom, 2002.
2. Lia Monica Junie, Infecţii bacteriene, virale, parazitare, fungice. UMF „Iuliu Haţieganu", Cluj-Napoca, 2011.
3. Red Book. 26th Edition, American Academy of Pediatrics, 2003.
4. Брико Н.И., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В. Эпидемиология. Том II. М., 2013.
5. ПокровскийВ.И., ПакС.Г., БрикоН.И., Данилкин Б.К.. Инфекционные болезни и эпидемиология, 3-е издание, Москва, 2013
6. Медицинская дезинфекция, дератизация, дезинсекция. Под редакцией В. В. Шкарина, В. А. Рыльникова, Нижний Новгород, 2016.

THEME 10: EPIDEMIOLOGY, PROPHYLAXIS AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE OF BLOOD-BORNE INFECTIONS: PARENTAL VIRAL HEPATITES AND HIV/AIDS.

Relevance of the theme

Blood infections are considered to be a global public health issue. There are spread by contamination with blood and other body fluids. The most common infections are parenteral hepatitis B, C, D and HIV infection, etc. According to World Health Organization data, 2 billion of the world's population aquired hepatitis B virus, of which 350 million people are chronically infected, about 170 million people are infected with hepatitis C virus and more than 10 million with hepatitis D virus .

HIV infection is another serious problem for all the world. Thus, in 2014, 1.2 million of people died as a result of this infection. At the end of 2014, there were 36.9 million people infected with HIV infection, including 2.0 million of new cases.

Both parenteral viral hepatitis and HIV infection are actual problems for the Republic of Moldova as well.

Purpose of the practical lesson

The purpose of the lesson is to learn clinical and epidemiological features of parenteral viral hepatitis and HIV infection and their global trends, manifestations of the epidemic process in the Republic of Moldova, principles of organization and implementation of prevention and control measures, elaboration of prophylactic and anti-epidemic measures in the focus and standard precautions for patients and medical staff.

Plan of the practical lesson

1. Introduction and discussion on student's questions.
2. Evaluation of the initial knowledge level of student by oral discussion and testing.
3. Discussion about epidemiological features, prophylactic and anti-epidemic measures based on epidemic outbreaks investigation.
4. Study of instructive methodical documents, which regulate the practical activity in prophylaxis and combating parenteral viral hepatitis and HIV infection.
5. Solving of epidemiological situation problems with drawing up plans to combat and prevent blood-borne diseases with artificial mechanisms of transmission;
6. The analysis of problem solving results, the content of complex plans of combating and prevention of blood-borne infectious diseases.
7. Final assessment of student's knowledge through testing.
8. Summerizing the practical lesson.

Materials provided for the class

1. Statistical reports on the population morbidity of viral hepatitis B, C, D, and HIV infection recorded in Republic of Moldova;
2. Instructive methodical documents, which regulate the measures of combating and prophylaxis of parenteral viral hepatitis and HIV-infection in the Republic of Moldova;
3. Tests for initial and final assessment of students' knowledge during the practical lesson.
4. Additional information material for case studies.

The student needs to know

1. General features of blood-borne infections;
2. Classification of blood infections according to the mechanism and routes of transmission;

3. The social and economic impact of parenteral blood infections with artificial mechanisms of transmission on the population health;
4. The structure of virus in parenteral viral hepatitis and HIV-infection.
5. Clinical and epidemiological features of blood-borne infectious diseases with artificial mechanism of transmission: parenteral viral hepatitis and HIV infection.
6. Specific factors and conditions of pathogen transmission in blood-borne infectious disaeses with artificial mechanism of transmission.
7. Organization of epidemiological surveillance, prophylactic and control measures in blood-borne infectious diseases with artificial mechanism of transmission.
8. The role of population screening in active detection of patients with viral hepatitis and HIV.
9. The role of the Center for Public Health and other medical institutions in the epidemiological surveillance of parenteral viral hepatitis and HIV infection.
10. Directions of epidemiological surveillance in blood-borne infectious diseases with artificial mechanism of transmission.

Student must know the following aspects of each nosological form:

- etiological and epidemiological features;
- the scheme of the epidemic process development and its manifestations;
- features of the epidemic focus and organization of anti-epidemic measures;
- principles of drawing up combating and preventing plans;
- National Program for Viral Hepatitis Prevention and Control;
- Standard precautions for the prevention of blood-borne infectious diseases;
- Post-exposure measures in case of accidental needle piercing of medical staff;
- testing and counseling of people infected with parenteral viral hepatitis and HIV infection;
- the main directions of epidemiological surveillance and control.

Practical skills

- to carry out the epidemiological investigation of the focus with parenteral viral hepatitis and HIV infection;

- active detection of patients with parenteral viral hepatitis and HIV in people who consulted a doctor and other population of high risk;
- the management in case of potential exposure to blood or biological fluids;
- organization of anti-epidemic measures aimed to localize and eliminate the focus with blood-borne infectious diseases;
- doing the epidemiological analysis of epidemic process manifestations in parenteral viral hepatitis and HIV infection;
- drawing up the control and prophylaxis plan in blood-borne viral hepatitis and HIV infection;
- implementation of epidemiological surveillance of blood-borne viral hepatitis and HIV infection.

Exercises

Questions for self-control

1. What current trends are specific for the spread of blood-borne infections?
2. What historical facts about the discovery of hepatitis viruses with parenteral artificial transmission mechanism (HBV, HCV, HDV, G, TTV, SEN and HIV/AIDS) do you know?
3. Characterize the reservoir and sources of pathogens in HBV, HCV, HDV, G, TTV, SEN and HIV/AIDS infection.
4. What mode, factors and transmission ways are characteristic of HBV, HCV, HDV, G, TTV, SEN and HIV/AIDS?
5. Characterize the epidemic process in HBV, HCV, HDV, G, TTV, SEN and HIV/AIDS in the Republic of Moldova.
6. List the methods of screening and laboratory diagnosis in HBV, HCV, HDV, G, TTV, SEN and HIV/AIDS infection.
7. What laboratory investigations of the medical staff are required before the employment according to the hospital profile.
8. Give the definition of „safe injection", „injection complication, „local post-injection complication", „general post-injection complication".
9. What standard precautions are recommended to follow in case of HBV, HCV, HDV, G, TTV, SEN and HIV/AIDS infection?
10. What specific and non-specific prophylaxis measures are necessary to be taken in HBV, HCV, HDV, G, TTV, SEN and HIV/AIDS infection?
11. What groups are considered to be of high-risk in HBV, HCV, HDV, G, TTV, SEN and HIV/AIDS infection?

12. What measures are necessary to be taken in case of exposure to the risk of contamination with HBV, HCV, HDV, G, TTV, SEN and HIV/AIDS infection?
13. How can the risk of infection in bloodborne infections be assessed?
14. What anti-epidemic measures are taken in case of HBV, HCV, HDV, G, TTV, SEN and HIV/AIDS infection?
15. What directions of epidemiological surveillance are specific for HBV, HCV, HDV, G, TTV, SEN and HIV/AIDS infection?
16. The role of the Center for Public Health in HBV, HCV, HDV, G, TTV, SEN and HIV / AIDS and collaboration with other health care institutions in the country.

Tests for self-control

1. The medical staff who are dealing with blood or blood components are examined for HBsAg:

a) before the employment;
b) once a year;
c) every two years;
d) quarterly;
e) in case of job resignation.

2. Examination of the pregnant woman for HBsAg is performed:

a) on the first two weeks of pregnancy;
b) during the first recording of pregnant women at doctor (8 weeks of pregnancy);
c) on the 16th week of pregnancy;
d) on the 32 week of pregnancy;
e) before delivery.

3. Choose the group with high risk of contamination with hepatitis B from the list given bellow:

a) pediatrician;
b) surgeon;
c) emergency health care personnel;
d) blood transfusion staff;
e) the staff of bacteriological laboratory;
f) the staff of clinical laboratory;

4. Choose the prophylactic measures in viral hepatitis B:

a) use of disposable syringes;
b) control of the compliance with the sterilization regime of the medical instruments reusable in medical practice;

c) vaccination of people with high risk of infection;
d) hygienic control of the water supply system;
e) epidemiological surveillance of the canteen;
f) control of the HbsAg carriage among people with high risk.

5. HIV infection is:

a) sapronosis;
b) anthroponosis;
c) zoonosis;
d) zooanthroponosis.

6. Choose the biological fluids with the highest concentration of the HIV virus:

a) blood;
b) urine;
c) breast milk;
d) semen;
e) vaginal mucosa
f) saliva

7. A HIV-infected person is a source of infection only during the period of:

a) clinical manifestations;
b) final stage of the disease;
c) the asymptomatic stage (II b);
d) the stage of acute infection (II a);
e) lifelong.

8. The transmission mechanism of HIV infection is:

a) respiratory;
b) fecal-oral;
c) parenteral;
d) habitual contact.

9. The way of transmission of HIV infection is:

a) by breathing;
b) by food;
c) by blood;

10. HIV infection is developed as a result of:

a) disorderly heterosexual and homosexual relationships;
b) sexual intercourse with condom use;
c) the presence of other sexual transmitted diseases in the partner;
d) sexual intercourse during the menstrual cycle;
e) large number of sexual partners.

11. HIV infection can occur in case of:

a) blood transfusions;
b) sexual intercourse;
c) natural breastfeeding of the child;
d) sharing the bath;
e) participation in childbirth in a HIV-infected women.

12. The contamination of the medical staff with HIV can occur in case of:

a) conducting parenteral procedures;
b) emergency interventions;
c) performing physiotherapeutic procedures;
d) removing dental calculus;
e) preparation of the oral cavity to the prosthesis.

13. The diagnosis of HIV is based on the following methods:

a) microscopic;
b) virological;
c) immunological;
d) genetic;

14. Which of the following methods can be used to detect HIV infected person during the screening of the population with high risk:

a) direct haemagglutination reaction;
b) compliment fixation test;
c) immunofermentative analysis;
d) immunoblotting;
e) immune electrophoresis.

15. What measures are used for the protection of laboratory staff who are dealing with HIV virus investigation?

a) wearing protective glasses;
b) glasses are not required;
c) wearing the protective mask;
d) wearing disposable rubber gloves;
e) wearing double layered rubber gloves;
f) use of automatic micropipettes for blood sampling;

Case studies

Case study No. 1. Can a 45-year-old citizen, who had viral hepatitis B, be accepted for blood donation?

Case study No. 2. During the examination of a 37-year-old patient, the family doctor dignosed viral hepatitis B. What paraclinical investigations are required to confirm the diagnosis?

Case study No. 3. A drop of blood has reached the mucous membrane of a reanimatologist during the resuscitation procedure of the HIV positive patient. Describe the post-exposure management in this situation.

Case study No. 4. During the local anesthesia of an HIV-infected patient, the physician pierced a finger with the needle. What post-exposure measures should be taken in this case.

Case study No. 5. What actions are necessary to take if a drop of blood from a person infected with HIV got in the dentist's eye during therapeutic procedures?

Case study No. 6. The physician pierced his rubber glove during opening the oral cavity abscess in a stage IIIB HIV-infected patient. When he took off the glove, he noticed the bleeding finger. List the doctor's actions and develop post-exposures measures.

Case Study No. 7. The patient had the transfussion of blood 3 months ago. He was found to be infected with HIV. The donated blood was tested by the immunofluorescent assay (IFA) method and the result of HIV test was negative. List the causes of contamination in this situation.

Case Study No. 8. Evaluate the risk of contamination with HIV, HBV, HCV if a doctor pierced a finger after the contact with contaminated needle from the infected patient .

Problems on epidemiological situations

Problem No. 1. Viral hepatitis was suspected in a patient from the tuberculosis unit., It was found in the epidemiological history that 50 days before the patient had undergone a surgical intervention due to umbilical hernia in the department of abdominal surgery of the municipal hospital.

- Specify the necessary investigations to make the final diagnosis and determine the contamination conditions?
- List the necessary anti-epidemic measures to be taken in the hospital.

Problem No. 2. A 65-year-old patient was admitted to the surgery unit of the Municipal Clinical Hospital. On the 10th day after cholecystectomy, the surgeon recommended a consultation of a specialist because of suspition of viral hepatitis. The wound healed quickly without postoperative complications. During the postoperative period, the patient was transfused blood twice and once-native plasma. Donors are known. At the same time, the patient received conservative treatment in the internal disease unit of the same hospital three months ago. The infectionist found viral hepatitis and recommended to perform specific investigations and treatment at Clinical Hospital for Infectious Diseases.

- Specify the place of contamination with viral hepatitis.
- Draw up the epidemiological investigation plan and anti-epidemic measures in the medical institution.

Problem No. 3. On the 28.08.2016 a patient in a critical condition admitted to the district hospital was diagnosed with viral hepatitis B. The primary diagnosis made by the doctor from the emergency unit was Intoxication of unknown origin. The patient was hospitalized in the infectious diseases unit. The taken epidemiological anamnesis found that the patient had had a surgery in the general surgery unit of the same hospital in the period from 20.03-11.04.2016.

- Determine the place of infection of the patient;
- Draw up the plan for the epidemiological investigation of the outbreak.
- Draw up the anti-epidemic action plan based on the described epidemiological situation.

Problem No. 4. Based on the information presented in Table 2, draw a conclusion about the ways of HIV/AIDS transmition.

Table 2

Rate of transmission ways (%) of HIV/AIDS cases recorded in 1996-2005

Ways of transmission / Years	Homo-sexual contact	Hetero-sexual contact	Intravenous drug users (IDUs)	Vertical	Unknown
1996	-	16.6	83.4	-	-
1997	-	10.5	88.1	0.2	1.2
1998	-	13,3	81.3	0.2	5.2
1999	0,6	7.7	86.5	-	5.2
2000	-	14.9	83.9	0.6	0.6
2001	-	20.2	76.8	-	0.3
2002	1.5	27.6	69.9	1.0	-
2003	0.4	43.4	54.6	1.6	-
2004	-	48.2	50.2	1.6	-
2005	0.9	54.6	42.8	1.7	-

Problem No. 5. The positive result of HIV infection was found after the investigation of donor blood by the immunoblotting test in the reference laboratory.

– List the necessary measures to be taken.

Problem No. 6. What actions will be taken by the hospital manager, if the proportion of medical staff infected with HBV is 20% and most of them are nurses?

– Draw up the plan of anti-epidemic measures.

LITERATURE

Basic

1. Prisăcaru V. Special epidemiology. Chişinău, 2016.
2. Prisăcaru V., Epidemiologia specială, Chişinău, 2015, 412 p.
3. Ghid de supraveghere şi control în infecţii nosocomiale, sub redacţia V.Prisacari, Ediţia II. Chişinău, 2009, 312 p.
4. Prisăcaru V., Guţu L., Paraschiv A., etc. Epidemiology in tests. Chisinau, 2013.
5. Course material.

Additional literature

1. Prisacari V., Paraschiv A., Spînu C., Holban T., etc. Hepatitele virale parenterale şi cirozele hepatice-epidemiologia, clinică, diagnosticul, tratamentul, prevenirea şi controlul. Chişinău, 2013.
2. Ghidul practic „Siguranţa injecţiilor". Chişinău, 2015, Chicu V., Obreja G., Prisacari V. Epidemiologia de intervenţie. Chişinău 2008.
3. Chicu V. Supravegherea şi controlul bolilor infecţioase. Chişinău, 2007, 173p.
4. Tratat de epidemiologie a bolilor transmisibile.Sub redacţia prof. un. Aurel Ivan. Polirom, 2002.
5. Pântea Victor. Hepatite virale acute şi cronice. Chişinău, 2015. Брико Н.И., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В. Эпидемиология. Том I. М. 2013
6. В.И.Покровский, С.Г.Пак, Н.И.Брико, Б.К.Данилкин. Инфекционные болезни и эпидемиология, 3-е издание. Москва, 2013.
7. Руководство к практическим занятиям по эпидемиологии инфекционных болезней. Под редакцией Брико Н.И, Покровский В.И. Москва, 2006

THEME 11: EPIDEMIOLOGY, PROPHYLACTIC AND ANTI-EPIDEMIC MEASURES, EPIDEMIOLOGICAL SURVEILLANCE IN ZOOANTHROPONOSIS

Relevance of the subject

Zooanthroponosis is the largest group of infectious diseases. Due to intense ecologic relations between humans and animals, they can occur everywhere. In addition, depending on the persistence of the determinants, many of these infections are endemic, while the others are characterized by the formation of natural focus. As the reservoir of pathogenic agents is largely represented by multiple species of animals (domestic, synantropic, xenatrope),it is mandatory to know both epidemiology and epizootology of these infections.

Zooanthroponosis differes from anthroponosis not only by the variety of sources of pathogens but also by the diversity of mechanisms of transmission, clinical forms, prophylactic and control measures, and directions of epidemiological surveillance.

It must be taken in consideration that many infectious diseases from zooanthroponosis group can spread largely into animal population with a serious economic impact, but also into human population with severe form of infections and high lethality. According to WHO, most of them (anthrax, yellow fever, plague, tularemia and hemorrhagic fevers etc.) are included in the list of the most dangerous infections and they can be used as a biological weapon due to high virulence of pathogenic agents of these infections.

Purpose of practical work

Learning the epidemiology of zooanthroponosis and prophylactic measures, investigation of focus and realization of anti-epidemic measures, organization of epidemiological surveillance in zooanthroponosis.

Practical work plan

1. Evaluation of the initial level of student preparation for practical work by oral discussion and testing.
2. Epidemiological features of different bacterial and viral zooanthroponosis (anthrax, brucellosis, leptospirosis, tularemia, borreliosis, rabies, hemorrhagic fevers etc.).
3. Specificity of the intervention measures in different zooanthroponosis.
4. Familiarization with the main instructive methodical documents, regulating the practical work on prophylaxis and of zooanthroponosis.

5. Solution of situational problems on the theme.
6. Analysis of the results of the problem solving, content of comprehensive plans to combat and prevent of different zooanthroponosis.
7. Final evaluation of students' knowledge about zooanthroponosis epidemiology.

Material provided for the class

1. Statistical reports on population morbidity of zooanthroponosis.
2. Instructive methodical documents regulating preventive and control measures in various zooanthroponosis in the Republic of Moldova.
3. Tests to assess the knowledge of students on the theme.
4. Informative materials to solve problems.

The student needs to know

1. Epidemiological classification of infectious diseases according to the source of infections.
2. Definition of zooanthroponosis.
3. Etiological and epidemiological features of different zooanthroponosis (anthrax, brucellosis, leptospirosis, tularemia, plague, borreliosis, rabies, hemorrhagic fevers etc.).
4. Manifestation of infectious process in relation to the mode of transmission.
5. Theory of natural focality in zooanthroponosis. Definition. Features of natural focus in different zooanthroponosis.
6. Specific characteristic of the epidemiological investigation in zooanthroponosis.
7. Prophylactic and anti-epidemic measures in different zooanthroponosis.
8. Main directions of epidemiological surveillance in different zooanthroponosis.

Practical skills

1. Epidemiological risk assessment in different zooanthroponosis.
2. Development of epidemic process scheme in various zooanthroponosis.
3. Conducting the epidemiological investigation of the focus in different zooanthroponosis.
4. Drawing up the anti-epidemic and liquidation plan of the focus in different zooanthroponosis.
5. Cooperation with veterinary medical staff in conducting the epide-

miological investigation and organization of prophylactic and control measures in different zooanthroponosis.
6. Determination of epidemiological surveillance directions in different zooanthroponosis.

Exercises

Questions for self-control

1. What does the term "zooanthroponosis" mean?
2. What are the characteristics of classification of anthroponosis and zooanthroponosis?
3. List the classification of zooanthroponosis.
4. Explain the formation and maintenance of natural focus.
5. List the source of pathogenic agents in anthrax.
6. List the source of pathogenic agents in leptospirosis.
7. List the source of pathogenic agents in tularemia.
8. List the source of pathogenic agents in rabies.
9. List the source of pathogenic agents in natural plague.
10. List the source of pathogenic agents in Lyme disease.
11. What animal species are the pathogenic agent's reservoir in Ebola hemorrhagic fever?
12. What infections are characterized by the formation of natural outbreaks?
13. Explain the reasons why anthrax, plague, yellow fever, Ebola hemorrhagic fever are referred to the group of very dangerous infections.
14. What is the difference between the anti-epidemic measures in anthrax and those in brucellosis, tularemia or rabies?
15. Describe the content and management of epizootic and epidemiological surveillance in zooanthroponosis.

Tests for self-control

1. Anthroponosis is:
a) tularemia;
b) rabies;
c) diphtheria.
2. Zoosis is:
a) anthrax;
b) leptospirosis;
c) swine plague.
3. Zooanthroponosis is:

a) anthrax;
b) dog plague;
c) shigellosis.
4. In zooanthroponosis the source of infections can be:
a) human;
b) animals;
c) soil and water.
5. Zooanthroponosis that can be transmitted from xenatropic animals are:
a) trichophytosis, nocardiosis;
b) ornithosis, brucellosis;
c) tularemia, rabies.
6. Natural focality is characteristic of:
a) brucelosis, ornotosis;
b) rabies, leptospirosis;
c) brucellosis, tetanus.
7. Telluric foci are characteristic of:
a) salmonelosis;
b) anthrax;
c) Lyme disease.
8. Anthropological foci are characteristic of:
a) Leptospira *pomona;*
b) Leptospira *grippotyphosa;*
c) tularemia.
9. Match the serogropups of leptospiroses and their reservoir:
1. Pomona a) catlle
2. Hebdomadis b) rodents
3. Icterohaemorrhagiae c) swine
4. Grippotyphosa d) grey rats.
10. Factors favoring the spread of Lyme disease are:
a) the cold season of the year;
b) the warm season of the year;
c) presence of natural focus;
d) the density and activity of the ticks;
e) insufficient protection of the body from arthropod attack.

Problems of epidemiological situations

Problem nr. 1. A calf fell ill in A's household. As the arrival of a veterinarian was delayed and the condition of the animal worsened, the man sacrificed the

calf. The man's son and the neighbor participated in slaughtering the animal and cutting the meat. The veterinarian arrived after slaughtering the calf and made the diagnosis of anthrax.

- Elaborate the plan of measures for localization and liquidation of the focus.

Problem nr. 2. After the serological examination of the cattle in the bovine herd of a collective enterprise, an animal with positive Wright reaction with titer 1:800 was found. The Hedelson reaction was determined positive before that. The cattle was imported from abroad.

- Make the diagnosis of the disease.
- Draw up the plan of measures for localization and liquidation of the focus.

Problem nr. 3. Into village situated on the both banks of a small river, cases of Pomona leptospirosis were recorded among humans. The first case was diagnosed on July 13, 2016, second – on July 14, 2016. Until the 25th of July 2016, in total 35 cases of leptospirosis were recorded. The epidemiological investigation revealed that a temporary pig farm had been set up in May, in 2 km from the village, on the river bank. The village residents use the lake near the forest where the river flows, as a recreational area.

- Determine the type of leptospirosis eruption.
- List the factors that have conditioned the eruption of leptospirosis.
- Determine the possible ways of contamination.
- Draw up the plan of measures for liquidation of leptospirosis focus.

Problem nr. 4. A 52-year-old woman went to a doctor with an injury caused by the dog. The woman visited the neighbors when the tied dog bit her in the leg. The bite was singular and the injury was superficial. The dog had no signs of disease and his behavior after the incident did not change.

- Indicate the necessary measures in this case.
- Determine the rabies vaccination schedule in this case.

Problem nr. 5. On February 20, 2016, a 40-years-old man with a fox bite in his leg (man was hunter) went to a doctor. Clinical examination found that he had a deep injury. The fox that bit him was only injured and it managed to run away.

- Indicate the necessary measures in this case.
- Determine the male antirabies vaccination schedule in this case.

Problem nr. 6. A 30-year-old was attacked by a stray dog, and as a result he has multiple and deep injuries in the head and palm region. The dog run away.

- Indicate the necessary measures in this case.
- Determine the male antirabies vaccination schedule in this case.

Problem nr. 7. In a village, 13 cases of tularemia were registered between July 25 and August 10, 2016. All cases are associated with grass mowing in marshy places. In 7 patients the bubonic form was diagnosed, in 3 patients – the angioglandular form, in 2 patients – the gastrointestinal form and in 1 patient – the oculoglandular form. In this village, the last cases of tularemia occurred 6 years ago, and then a vaccination campaign against this infection was organized in the surrounding villages. In the following years, the lack of cases led to the interruption of vaccination of the residents. During this period, the population has significantly renewed in the area.

- Identify the type of tularemia outbreak, the mode and condition of spreading the infection.
- Draw up the plan of actions to locate and liquidate the outbreak of tularemia.

Problem nr. 8. In a village, located in the territory of a natural focus of plague, the doctor was called to a patient with fever (40^{0}C). The doctor suspected pulmonic plague. There are three people in the family (wife and two children).

- Determine the actions of the doctor who suspected pulmonic plague
- Determine the characteristics of the outbreak investigation.
- Draw up the plan of intervention measures for localization and liquidation of outbreak.

Problem nr. 9. A group of workers (50 persons) goes to work into a region with natural foci of yellow fever. After the interval of 2 years, 20 of these 50 persons go for the second time to this region.

- Determine the necessary prophylactic measures.

Problem nr. 10. At the border crossing point, a citizen who traveled to Central Africa was suspected of having Ebola hemorrhagic fever.

- Determine the possible conditions of contamination.
- List the intervention measures necessary to be taken according to The International Sanitary Regulations and the Territorial Sanitary Protection Rules.

Problem nr. 11. In a village, 15 cases of *Grippotyphosa* leptospirosis were registered within a week. The epidemiological investigation found that all sick persons are men who had attended the grassmowing in marshland in early July.

- Identify the type of leptospirosis outbreak.
- Indicate the possible ways of catching the infection.
- Draw up the plan of anti-epidemic measures.

Answers to tests

1. – c;
2. – c;
3. – a;
4. – b;
5. – c;
6. – b;
7. – b;
8. – a;
9. – 1c; 2a; 3d; 4b;
10. – b, c, d, e.

RECOMMENDED LITERATURE

Basic literature

1. Prisacari Viorel. Special epidemiology. Chișinău, 2017.
2. Prisacaru V., Guțu L., Paraschiv A. Epidemiology in tests. Chișinău, 2013.
3. Lecture material.

Additional literature

1. Tratat de epidemiologie a bolilor transmisibile. Sub redacția prof. univ., dr. Aurel Ivan. Polirom, 2012, 837 p.
2. Брико Н.И., Зуева Л.П., Покровский В.И., Сергиев В.П., Шкарин В.В. Эпидемиология. Том II. М., 2013, 654 с.
3. Зуева Л.П., Яфаев Р.Х. Эпидемиология. Санкт-Петербург, 2005, 745с.
4. Присакарь В.И. Эпидемиологический надзор за лептоспирозами. Кишинэу, 1993, 156 с.
5. Частная эпидемиология. Том II. Под редакцией академика Б.Л.Черкасского. М., 2002, 385 с.
6. Шляхов Э.Н. Практическая эпидемиология. Издание пятое. „Штиинца". Кишинэу, 1991, 566 с.
7. Шляхов Э.Н., Присакарь В.И. Эпидемиологический надзор за сибирской язвой. Кишинэу, 1989, 240 с.

THEME 12: EPIDEMIOLOGY, PREVENTION AND EPIDEMIOLOGICAL SURVEILLANCE IN NON-COMMUNICABLE DISEASES

Relevance of the subject

At present, noncommunicable diseases are responsible for approximately 36 million of deaths annually, accounting for 63% of all deaths. Cardiovascular, oncological and endocrine diseases have an epidemic or even a pandemic spread. Physical and chemical factors, physical inactivity, smoking, alcohol abuse, salt, poor nutrition are only the few important factors in causing non-communicable diseases. According to WHO rejuvenation of non-communicable disease leads to the increase of premature mortality.

Purpose of practical work

Knowledge and training of practical skills in epidemiology of non-communicable diseases, studying their risk factors, appreciation of epidemiological situation, realization of epidemiological surveillance and control of non-communicable disease.

Plan of practical lesson

1. Evaluation of the initial level of students' preparation for practical work by oral discussion and testing.
2. Discussion about the relevance and epidemiological features of non-communicable diseases, of different system of organs.
3. Solving of situational problems, drawing up complex plans of prophylactic measures, for different systems of organs.
4. Discussion about the results of situational problems and drawing up complex plan of prophylactic measures.
5. Drawing up procedures for evaluation of prophylactic and control measures in non-communicable diseases.
6. Final evaluation of students' knowledge.

Material provided for the class

1. Statistical reports about morbidity of non-communicable diseases in the country, municipalities and districts.
2. Tables, cartograms of the spread of noncommunicable diseases in Republic of Moldova.
3. A set of legislative documents: laws, government decisions, Health ministry orders, guides and non-communicable diseases related protocols.
4. Situational cases with non-communicable disease.

The student needs to know

1. Social-economical and epidemiological features of non-communicable diseases, also based on systems and nosologic forms.
2. Characteristics of epidemic process in non-communicable diseases (cardiovascular, oncologic etc.).
3. Risk factors in non-communicable diseases. Sources of aggressive factors for human health.
4. Manifestation of epidemic process in non-communicable diseases.
5. Organization of control and epidemiological surveillance in non-communicable diseases.
6. Role of non-communicable disease surveillance and health determinants department of PHC.

Practical skills

1. Evaluation of epidemiological situation with non-communicable diseases.
2. Drawing up the list of the most prevalent non-communicable diseases in the Republic of Moldova.
3. Determination of risk factors in triggering non-communicable diseases.
4. Formulation of epidemiological diagnosis based on epidemiological studies.
5. Developing prophylactic and control plans/programs in non-communicable diseases.
6. Evaluation of efficacy of prophylactic and control measures in non-communicable diseases.

Exercises

Questions for self-control

1. What is the general structure of the epidemic process in non-communicable diseases?
2. List the common and differential features between epidemic process in communicable and non-communicable diseases.
3. List and characterize the structural factors of epidemic process in non-communicable diseases.
4. Explain the modes and ways of transmission of causal agents in non-communicable diseases.
5. Explain based examples the notions: receptivity, immunity and adaptability.

6. List the determinants and favoring factors in non-communicable diseases.
7. What are the manifestations of epidemic process in non-communicable diseases?

Tests for self-control

1. Chemical and drug use are:

a) dynamic-favoring factors;
b) determinants factors;
c) socio-economic factors.

2. Sources of aggressive agents in non-communicable disease are:

a) chemical use and urban agglomerations;
b) demographic structure and toxic wastes;
c) informational systems and unhealthy life style;
d) power plants;
e) none of the listed above factors.

3. Transmission mode of aggressive, physical and/or chemical agents, from a generating source to the human body can be:

a) direct;
b) imperative;
c) indirect.

4. Depleting of the ozone layer and the appearance of the phenomenon of excessive retention of solar heat is called the:

a) photoelectric effect;
b) leverage effect;
c) greenhouse effect;
d) placebo effect;
e) stylistic effect.

5. Choose the true definition of receptivity of human body to non-communicable diseaes:

a) the mass of body is reduced due to its exit from the earth's gravity field;
b) the condition or tendency of the body to react improperly to aggressions from the environment;
c) the condition of the body of excessive emission of bioenergy due to the intervention of a counter-sense force.

6. Depending on the cause of mortality, cardiovascular diseases are on the:

a) second place;
b) first place;

c) third place;
d) they are not among the top 10.

7. Choose the "three major" causal factors of cardiovascular disease morbidity:
a) smoking, physical inactivity, hyperlipidemia;
b) smoking, alcoholism, stress;
c) genetics factors, hypertension, obesity in adults.

8. In screening for early identification of cancer, the Pap-test detects:
a) cervical cancer by urine laboratory examination;
b) cervical cancer by detecting changes in cervix cells;
c) cervical cancer by ultrasound gynecological examinations.

9. Protective factors against breast cancer are:
a) regular use of aspirin;
b) combined oral contraceptives use;
c) breastfeeding;
d) diet rich in fruit and vegetables.

10. Screening for early detection of breast cancer includes:
a) breast self-examination;
b) presence of peripheral arteriopathies;
c) annual mammography.

11. The body mass index (BMI) formula is:
a) BMI=Weight(kg) -Height^2(m^2);
b) BMI=Weight(kg) +Height^2(m^2);
c) BMI=Weight(kg)/Height^2(m^2).

12. Early detection of obesity in children and adults includes:
a) genetic screening performing;
b) calculation of obesity incidence in children and adults;
c) calculation of obesity prevalence in children and adults;
d) measuring the BMI;
e) registration of new cases of disease in various risk groups.

13. Z-score is:
a) a quantitative measure that determines a child's BMI deviation from the BMI of a reference population of children of the same age and sex;
b) a qualitative measure that determines a child's BMI deviation from the BMI of a reference population of children of the same age and sex;
c) a share part that determines a child's BMI deviation from the BMI of a reference population of children of the same age and gender.

14. WHO targets to prevent obesity by 2025 are:

a) no increase in the prevalence of obesity during childhood;
b) a 30% reduction of low birth weight;
c) a 3% reduction in the prevalence of obesity during childhood.

15. Weight loss is possible through:
a) a diet rich in fruit and vegetables;
b) a diet rich in potatoes, rice, pasta;
c) sufficient amounts of food and high-fat drinks;
d) physical exercises;
e) smoking.

16. Hippocrates's statements are:
a) obesity is a cause of infertility in women;
b) obesity is a risk for health;
c) sudden death is more common in the obese than in the weak;
d) obesity is a blood anomaly which favors fat deposition;
e) obesity is caused by eating too much food rich in fat.

17. Risk factors of diabetes mellitus development are:
a) excess body weight > 10% of the ideal weight;
b) excess body weight > 20% of the ideal weight;
c) type 2 diabetes mellitus in first-degree relatives.

18. The important factors that modulate the epidemiology of gastric and duodenal ulcers are:
a) infection with *Helicobacter pylori;*
b) coffee and chocolate consumption;
c) non-steroidal anti-inflammatory drugs consumption;
d) aspirin consumption.

19. Consequences of iron deficiency anemias are:
a) immune function disorders;
b) retention in physical development;
c) retention in psychomotor development.

20. The National Programme on reduction disorders caused by the deficiency of iron and folic acid provides fortification with iron and folic acid of:
a) food of animal origin;
b) alimentary products for children;
c) wheat flour;
d) dairy products.

Problems of epidemiological situations

Problem nr. 1. The mayor of a locality requested the district Public Health Center to conduct a study on the health of the local population due to high mortality

- Draw up the study plan.

Problem nr. 2. In 1812, the Chisinau municipality had a population of 7,000, in 1913 – 116,500, in 1972 – 400,000, in 2012 – 800,000 and in 2015 – 809,600.

- Calculate the absolute population growth for the whole period and for each period.
- Calculate the average annual population growth rate for the mentioned periods.
- Draw a chart of population evolution.
- Evaluate the results.

Problem nr. 3. In 1950, the Republic of Moldova had a population of 2,341,000, in 1960 – 3,003,000, in 1970 – 3,594,000, in 1980 – 4,010,000, in 1990 – 4,361,600, in 2000 – 3,643,500, in 2010 – 3,563,700, in 2015 – 3,555,159.

- Calculate the absolute population growth for the whole period and for each period.
- Calculate the average annual population growth rate for the mentioned periods.
- Draw a chart of population evolution.
- Evaluate the results.

Problem nr. 4. The National Public Health Center conducted an epidemiological analysis of deaths in the Republic of Moldova, at the order of the Health Minister.

- Evaluate the health situation in the administrative territory based on the data shown in Table 1.
- Propose measures to improve the situation.

Problem nr. 5. Specialists of the Public Health Center determined that all 3,450 residents of locality B use the water from wells with high concentration of nitrates.

- Determine the range of possible diseases that may develop due to the use of drinking water.
- Propose measures to improve the situation.

Table 1
Mortality rates and causes of death (per 100 000 population) in the Republic of Moldova

Development region, municipality / district	Total deaths	Causes of deaths:				
		Cardiovascular diseases	Cancer	Digestive system disease	Accidents, intoxications and traumas	Respiratory system disease
Total	**1110,51**	**642,5**	**167,92**	**101,73**	**85,34**	**48,00**
inclusive:						
Mun. Chişinău	***777,18***	***427,25***	***157,62***	***62,33***	***53,53***	***23,79***
North	***1298,23***	***802,08***	***181,26***	***89,82***	***90,13***	***60,22***
Mun.Bălţi	891,26	447,29	175,32	85,99	71,33	32,66
Briceni	1544,33	1013,72	185,92	94,99	84,14	113,99
Donduşeni	1767,94	1158,7	236,8	75,87	114,95	114,95
Drochia	1380,14	785,25	185,83	115,58	108,78	77,05
Edineţ	1474,69	940,12	165,9	87,25	117,98	90,94
Făleşti	1213,84	787,09	151,32	82,74	69,67	46,81
Floreşti	1432,77	891,1	196,77	117,61	100,64	61,07
Glodeni	1271,64	806,81	179,29	74,7	79,69	56,44
Ocniţa	1487,42	980,02	179,52	111,74	98,92	43,96
Rîşcani	1352,44	856,4	198,42	91,91	84,62	53,98
Sîngerei	1154,01	748,43	158,99	61,65	98,42	12,98
Soroca	1274,7	773,21	195,8	80,92	79,92	68,93
Center	***1156,92***	***651,79***	***155,92***	***135,53***	***97,21***	***55,12***

Anenii Noi	1028,58	562,24	181,02	100,7	91,11	27,57
Călăraşi	1314,71	760,21	176,32	159,71	65,16	85,6
Criuleni	1129,3	612,16	160,17	119,45	116,73	66,51
Dubăsari	1061,17	601,52	156,05	124,84	104,98	45,4
Hînceşti	1159,68	673,65	152,09	123,16	107,45	45,46
Ialoveni	1028,77	551,59	154,76	131,94	92,26	37,7
Nisporeni	1182,18	644,13	148,53	131,86	98,51	93,97
Orhei	1193,37	684,09	163,64	159,65	89,4	58,27
Rezina	1320,24	821,48	131,05	144,74	103,66	58,68
Străşeni	1153,73	652,3	155,21	156,29	95,51	34,73
Şoldăneşti	1489,93	922,33	144,26	151,36	111,15	66,22
Teleneşti	1168,78	663,18	134,28	142,5	112,36	47,96
Ungheni	1047,1	537,61	151,65	119,28	93,72	64,75
South	***1161,76***	***651,82***	***169,54***	***116,64***	***102,62***	***50,66***
Basarabeasca	1008,62	582,84	150,07	73,29	87,25	48,86
Cahul	1046,81	585,57	158,02	113,1	79,41	59,36
Cantemir	1126,18	598,48	152,84	128,71	125,49	38,61
Căuşeni	1233,06	693,94	185,56	128,47	97,72	52,7
Cimişlia	1237,99	656,96	189,83	125,45	130,4	39,62
Leova	1172,73	717,19	154,36	116,71	109,18	28,24
Ştefan-Vodă	1246	721,07	145,34	111,48	122,77	64,91
Taraclia	1236,26	675,15	234,93	109,48	77,55	59,3
ATU Găgăuzia	***1122,79***	***634,62***	***205,77***	***100,11***	***75,39***	***37,69***

Problem nr. 6. An epidemiological study demonstrated that deaths caused by lung cancer and cardiovascular diseases among textile factory workers are more common among smokers (*Table 2*)

Table 2

Study results on deaths incidence of pulmonary cancer and cardiovascular diseases because of among smoking factory workers (%0)

Indicators	Smokers	Non-smokers	Total
Pulmonary cancer	1.3	0.07	0.94
Cardiovascular diseases	9.51	7.31	8.87

- Determine the deaths that are more associated with smoking based on the data in the table. Argue the answer.
- Using the data from the table, calculate the relative risk (RR) and attributable risk (AR) of smoking for lung cancer and cardiovascular disease. Comment on these indices.
- Calculate the number of lung cancer deaths per 1,000 population that occur annually due to smoking.
- Calculate the number of cardiovascular disease deaths per 1,000 population that occur annually due to smoking.
- Draw up conclusions on the effect of fighting against smoking and on morbidity caused by lung cancer and cardiovascular diseases.

Problem nr. 7. Evaluate the epidemiological and social significance of morbidity and mortality in different groups of diseases in town A based on the data from table 3. Develop proposals to organize prophylactic measures for these diseases.

Problem nr. 8. A 50-year-old woman came to the doctor with complaints of increased blood pressure. On the examination, the patient's blood pressure was 160/100 mmHg; laboratory results: total cholesterol – 6 mmol/l. Patient is smoker; BMI – 35 kg/m^2.

- Evaluate the risk of cardiovascular disease according to the SCORE chart.
- Identify the prophylactic measures and prescribe recommendations to the patient.

Table 3

Morbidity and mortality in different groups of diseases in town A., in the period 2000 – 2008 (average indices per 100,000 population)

Group of diseases	Morbidity (incidence)	Mortality
Cardiovascular diseases	316.8	818.6
Traumas and intoxications	521.3	229.6
Tumours	345.7	190.2
Respiratory diseases	1400.6	94.3
Other diseases	1389.7	158.1

Problem nr. 9. A screening of a group of workers provided the following health data:

a) a 25-year-old female: blood pressure – 120/90 mmHg, BMI – less than 10 kg/m^2, non-smoker, she goes swimming; her father died because of the heart attack at the age of 60;
b) 65-year-old male: blood pressure – 190/110 mmHg, BMI – less than 25 kg/m^2; smoker, and he does not do sport;
c) 50-year-old female has ischemic heart disease, blood pressure – 140/90 mmHg, BMI – 29 kg/m^2; non-smoker and she does not do sport.

- Identify the persons with high risk of illness and the priority of prophylactic measures in clinical practice.
- Argue the answer.

Problem nr. 10. It is known that victims of the Chernobyl disaster have a significantly higher risk of developing thyroid cancer and breast cancer due to radiation. In the nuclear explosions in Hiroshima and Nagasaki, the radiation increased the incidence of cancer of the esophagus, stomach, lung, bladder, leukemia and lymphoma.

- Explain the broad spectrum of tumors in people exposed to radiation in Japan, compared to those in Ukraine.

Problem nr. 11. As a result of the analysis of the dynamics of general morbidity in district B. over a period of 20 years, the epidemiologist found out a significant increase in malignant tumors morbidity.

- Determine the possible risk factors and measures for improving the situation.

Problem nr. 12. A medical student noticed that a group of young people smoked on the terrace of a restaurant.

- List the correct actions of the student in this case.

- List the provisions of legislative acts for individuals and legal entities in the fight against smoking.

Problem nr. 13. It is necessary to organize diabetes mellitus screening in village X.

- Determine the criteria, steps and ways to screen diabetes mellitius.

Problem nr. 14. The epidemiologist has the task to provide classes to promote healthy lifestyle in preventing nutrition of diseases in schools.

- Specify the basic elements that classes on primary and secondary nutritional diseases should contain.

Problem nr. 15. In school No. 2 of the City C., the physician of the institution together with the epidemiologist decided to carry out a screening of students' overweight and obesity.

- List the screening stages and criteria for evaluation of overweight and obesity.
- Propose measures for prevention of overweight and obesity among students.

Problem nr. 16. The data of an epidemiologist's analysis show that children's institutions in the district were supplied with high quality wheat flour containing 20 mg of iron within 2015.

- Appreciate the possible impact on children's health.

Answers keys of the tests:

1. b
2. a, b, c, d
3. a, c
4. c
5. b
6. b
7. a
8. b
9. a, c, d
10. a, c
11. c
12. a, d
13. a
14. a, b
15. a, b, d
16. a, c
17. b, c
18. a, c, d
19. a, b, c
20. c

RECOMMENDED LITERATURE

Basic literature

1. Prisacari Viorel. Special epidemiology. Chișinău, 2017.
2. Prisacaru V., Guțu L., Paraschiv A. Epidemiology in tests. Chișinău, 2013.

3. Lecture material.
4. Strategia Națională de Sănătate Publică pentru anii 2014-2020.
5. Strategia Națională pentru prevenirea și controlul bolilor netransmisibile pe anii 2012–2020.

Additional literature

1. Bocșan Ioan Stelian. *Epidemiologie generală.* Cluj-Napoca, 2006.
2. Brumboiu Maria Irina. *Metode epidemiologice de bază pentru practica medicală.* Cluj-Napoca, 2005.
3. Ivan Aurel, Teodorescu Traian, Teodorovici Grigore. *Epidemiologia bolilor netransmisibile.* București, 1981.
4. Managementul bolilor cardiovasculare *în diabetul și pre-diabetul zaharat. Ghid național, 2014.*
5. Tulburări mentale și de comportament legate de consumul de alcool. Protocol clinic național, 2008.
6. Accidentul vascular cerebral ischemic. Protocol clinic național, 2008.
7. Astmul bronșic la copil. Protocol clinic national, 2008.
8. Anemia fierodeficitară la copil. Protocol clinic national, 2013.
9. Tulburări mentale și de comportament legate de consumul de opiacee. Protocol clinic național, 2008.
10. Diabetul zaharat necomplicat. Protocol clinic național, 2008.
11. Ulcerul gastric și duodenal la adult. Protocol clinic national, 2014.
12. Ulcerul gastric și duodenal la copii. Protocol clinic national, 2011.
13. Триша Гринхальх. Основы доказательной медицины. М., 2008.
14. www.ms.md
15. www.statistica.md
16. www.justice.md

MODULE III: CLINICAL EPIDEMIOLOGY

THEME 1: CONTRIBUTIONS OF THE EPIDEMIOLOGICAL METHOD IN CLINICAL ACTIVITY

Relevance of the subject

In the current rapidly developing medicine, it has become evident that epidemiological methods for the evaluation of diagnosis, treatment and prophylaxis of disease can provide valuable information in solving clinical problems.

Both clinicians and epidemiologists realized that the possibilities of clinical medicine and epidemiology are limited without interaction between these two sciences. This led to the appearance of a new direction in contemporary epidemiology – clinical epidemiology.

Clinical epidemiology deals with the application of epidemiological methods for evaluation and solving clinical problems related to the causes of the diseases, diagnosis and prognosis of the disease, assuming the influence of methods and the means of treatment on disease progression, efficacy and safety evaluation of medicine, evaluation of health population, determining the risk of nosocomial infections etc.

Changing clinical practice by taking the evidence-based decision has the effect of improving the quality of healthcare, which is the main objective of any health system management.

Purpose of practical work

Future epidemiologists and clinicians will generate theoretical knowledge and practical skills in clinical epidemiology by organizing and conducting studies for the evaluation of morbidity, risk factors, efficiency of diagnostic methods, treatment and prophylaxis.

Practical work plan

1. Assessment of the initial level of knowledge.
2. Discussion on the essence and importance of clinical epidemiology in assuring the quality of healthcare.
3. Learning methods of epidemiological studies with the use in clinical epidemiology.

4. Solving of situational problems and their discussion.

Materials provided for the class

The study is done at the department. Exercises with the methods of epidemiological studies used in clinical epidemiology. Situational problems. Calculators.

The student needs to know

1. Theoretical basis of clinical epidemiology.
2. Contributions of epidemiology to clinical activity.
3. Clinical and epidemiological methods.
4. Epidemiological study methods used in medical practice.

Practical skills

1. Differentiating the notions of "normal" and "abnormal" in medicine.
2. Application of epidemiological methods of study in clinical activity.
3. Selection of the preferential type of clinical epidemiological investigation in different fields of medical practice: studying the morbidity, studying the natural evolution of the disease, finding the causes of the disease, evaluation of efficacy and efficiency of methods and means of diagnosis and treatment, determination of disease prognosis based on the influence of the causative factor or the specific treatment, realization of population screening, disease risk illness determination etc.

Exercises

Questions for self-control

1. Formulate the definition of clinical epidemiology.
2. Name the difference between clinical and epidemiological methods.
3. List epidemiological study methods used in medical practice.
4. What is the difference between observational and experimental method? Determine the types of observational and experimental studies.
5. What is the difference between descriptive and analytical studies?
6. List the types of studies that can be used in determination of disease causes.
7. Which type of epidemiological studies is the most rational to be used in assessing the efficacy of treatment?
8. Formulate the purpose of randomized controlled trials.
9. Formulate the definition of *screening.*
10. Explain the essence of population screening.
11. What do the terms "validity", "sensitivity", "specificity" used in a diagnostic test mean?

12. Specify the features of: "single-blind", "double-blind" and „triple-blind" randomized trials

Tests for self-control

1. Which of the investigations listed below refers to epidemiological studies?
   a) clinical investigation of the patient;
   b) paraclinical investigation of the patient;
   c) determining the natural evolution of the disease.
2. Which of the following indicators demonstrates the abnormal state of the body?
   a) the number of leukocytes – 1,755 /μL;
   b) the number of erythrocytes – 4,860 /μL;
   c) the number of thrombocytes – 4,860 /μL;
3. Which of the following indicators demonstrates the abnormal state of the body?
   a) hemoglobin (Hb) – 149 g/L
   b) eosinophils – 4,860 / μL;
   c) blood sedimentation rate – 30 mm/h.
4. Which of the following studies refers to descriptive studies?
   a) morbidity analysis;
   b) correlational analysis;
   c) randomized controlled trial.
5. Which of the following epidemiological studies is used in the comparative assessment of two drugs?
   a) descriptive study;
   b) correlational study;
   c) randomized controlled sudy.
6. Which of the following studies can be used to determine the causes of a disease?
   a) descriptive study;
   b) case-control study;
   c) randomized controlled study.
7. Which of the studies listed refers to the analytical studies?
   a) descriptive;
   b) correlational;
   c) randomized controlled.
8. The preferential type of research in population screening is:

a) case-control;
b) longitudinal;
c) cross-sectional.

9. Evaluation of the effect of a vaccination campaign refers to the:
   a) experimental controlled studies;
   b) experimental uncontrolled studies;
   c) natural experiment studies.
10. What is the purpose of prophylactic measures?
   a) maintenance of the normal state of the human body;
   b) elimination of abnormal state of the human body;
   c) both.
11. The result of an analytical study is:
   a) establishing the cause-effect association;
   b) morbidity description depending on time, territory and affected contingent;
   c) the number of diseases in the experimental group.
12. The attributable risk is:
   a) the frequency of new diseases in the control group;
   b) the difference between two absolute risks;
   c) the number of diseases in the experimental group.
13. The advantage of epidemiologic cohort studies compared to case-control studies is:
   a) high probability of obtaining reliable results;
   b) relatively lower costs;
   c) relatively shorter time to carry out the study.
14. Randomized controlled trials are used:
   a) to assess the efficacy and safety of drugs and immunological preparations;
   b) for the evaluation of therapeutic activity;
   c) to assess the validity of screening tests;
15. Choose the correct statement for "single-blind" randomized controlled trial:
   a) the patient is not aware of being a member of the basic or control study group;
   b) the doctor does not know of patient's being a member of the basic or control group;
   c) the doctors does not know the diagnosis of the patient.

Practical tasks

1. An epidemiological study included 1500 patients without viral hepatitis B. After 3 years of post-transfusion surveillance, 48 of 650 patients who received blood transfusion developed viral hepatitis (VHB); eight of 850 patients who did not receive blood transfusion in the same period, developed VHB.
   - Specify the type of epidemiological study.
   - Present the study data in the 2 ×2 contingency table.
   - Formulate the purpose of the study;
   - List the indices that can be calculated based on this study, calculate and comment the results obtained.
2. A randomized clinical trial was conducted to evaluate the efficacy and safety of a drug. The statistician, who evaluated the results, knew of the belonging of the patients to the base or control group. The statistician also worked at the pharmaceutical company who ordered the study.
   - Evaluate the fairness of the study.
   - Explain how such organization of the study can influence the results of the study.
3. Draw up the design of the randomized controlled clinical trial on the theme: "Studying the efficacy of drug "X" for the treatment of purulent septic infections". The drug refers to new antiseptics.
4. Evaluate the degree of association between the cause and effect after the Pearson correlation coefficient (r):
   1) r= +0,95;
   2) r= +0,75;
   3) r= +0,49;
   4) r= +0,22;
   5) r= +0,19;
   6) r= -0,89;
   7) r= -0,72;
   8) r= -0,56;
   9) r= -0,33;
   10) r= -0,11.
5. Draw up the case-control study plan for determining the risk factors for viral hepatitis B.
6. Draw up the cohort study plan for determining the risk factors of viral

hepatitis B.

7. Draw up the case-control study plan for determining the causes of stroke.
8. Draw up the cohort study plan for determining the causes of stroke.
9. The costs for the treatment of a patient with chronic HBV, high viral activity are 255 468 lei. The calculation was made in 2012. The annual inflation rate is 1.5%. Annually about 1500 patients with chronic hepatitis need the treatment.
   - Calculate the costs needed to treat patients with chronic viral HBV with high viral activity from 2008 to the present.
10. Determine the constituent factors of the epidemiological, medical, social and economic impacts in viral hepatitis B.
11. Determine the constituent factors of the epidemiological, medical, social and economic impacts in stroke.
12. Determine the constituent factors of the epidemiological, medical, social and economic impacts in the flu.
13. The costs for the treatment of a patient with posttraumatic osteitis is on average
7,648,780 lei. The calculation was made in 2012. The annual inflation rate is 1.5%. Annually, 175 patients with posttraumatic osteitis were treated.
14. Draw up the epidemiological longitudinal retrospective descriptive study plan to study diabetes morbidity.
15. Draw up the epidemiological longitudinal retrospective study to study HIV morbidity.

Answers to tests

1 – c;
2 – a;
3 – c;
4 – a;
5 – c;
6 – b;
7 – b;
8 – c;
9 – b;
10 – a;
11 – a;
12 – b;
13 – a;
14 – a;
15 – a.

RECOMMENDED LITERATURE

Basic literature

1. Prisacari Viorel. Special epidemiology. Chișinău, 2017.
2. Prisacaru V., Guțu L., Paraschiv A. Epidemiology in tests. Chișinău, 2013.
3. Lecture material.

Additional literature

1. Baicuș Cristian. Medicina bazată pe dovezi. Editura medicală. București, 2007, 143 p.
2. Bocșan Ioan Stelian. Epidemiologie generală. Cluj-Napoca, 2006, 115 p.
3. Brumbaru Maria Irina. Metode epidemiologice de bază pentru practica medicală. Cluj-Napoca, 2006, 119 p.
4. Fletcher R., Fletcher S., Wagner E. Clinical Epidemiology. Baltimore, 1996.
5. Гузеке Иохан. Современная эпидемиология инфекционных болезней. Вторая издание. ВОЗ. Европа, 2004, 276 с.
6. Общая эпидемиология с основами доказательной медицины.Руководство к практическим занятиям. Под ред. В.И. Покровского и Н.И. Брико. М., 2008, 399 с.
7. Триша Гринхальх. Основы доказательной медицины. 3 – е издание. Под редакций И.Н. Денисова, К.И. СайТкулова. М., 2008, 288 с.

THEME 2: THE ANTI-EPIDEMIC REGIME IN MEDICAL INSTITUTIONS. COMPONENTS OF THE CONTROL PROGRAM OF HEALTH CARE ASSOCIATED INFECTIONS (NOSOCOMIAL)

Introduction

Patients with various diseases, including infectious diseases, should benefit of guaranteed access to healthcare, including dental care. The treatment should improve the patient's health and exclude or reduce the risk of patient contamination and medical staff as well. The medical staff includes specialists of different profile, qualifications, etc as doctors, nurse, auxiliary staff and students/residents as well.

It is known that majority of medical personnel, regardless the specifics of the activity and the type of medical services they provide, are at risk to be infected with causative agents of various infectious diseases. This phenomenon occurs due to the contact of medical institutions employees with

contaminated biological materials or equipment, surfaces and other objects from the institutional environment and water or air. In these conditions, the pathogens of high risk are: parenteral viral hepatitis B and C, HIV infection, cytomegalovirus (CMV), herpes simplex virus, Ebola virus, Mycobacterium tuberculosis, Corynebacterium diphtheriae, Staphylococcus, Streptococcus, Acinetobacter, Pseudomonas, Klebsiella and other microorganisms that colonize ore contaminate the human body.

The purpose of the practical lesson

The purpose of the lesson is totrain knowledge and skills in future physicians which would help to prevent or reduce the potential risk of transmission of infectious diseases within medical institutions, including dental care units.

Plan of practical lesson

1. Initial assesment of students knowledge on health associated infections by discussion and testing.
2. Discussions on epidemiological features and risk factors in health care-associated infections.
3. Working in small groups on the theme: „Control Program in Nosocomial Infections. Evaluation of tasks. Comments.
4. Problem solving of case studies on nosocomial infections.
5. Discussion of case studies results and action plans recommended to prevent nosocomial infections.
6. Final testing of knowledge.

The student needs to know

1. The definition of health care-associated infections.
2. Nosological forms of health care-associated infections (nosocomial infections).
3. Etiological and epidemiological features of health care-associated infections.
4. Conditions for the transmission of causative agents of infectious diseases in medical institutions and dental practice.
5. The definition of Standard Precautions Measures (SPM). The SPM concept.
6. Components and application conditions of SPM.
7. Components of the Nosocomial Infection Control Program.
8. The administrative control and its essence. People responsable for administrative control.

9. Technical-engineering control. Components.
10. Environmental control. The importance of the environmental control and measures carried out. Personnel responsible and executives of these measures.
11. Active detection method and epidemiological analysis of health care associated infections.

The student must be able to:

- use different hand hygiene methods depending on the type of health care services and activities;
- possess practical knowledge and skills to use personal protective equipment (PPE) (steps of application, correct method of use and methods to remove it);
- manage correctly used medical equipment and waste resulting from medical activities.
- choose the appropriate method for disinfection/sterilization.
- apply prophylactic and anti-epidemic measures in the medical institution depending on the epidemiological situation in various infectious diseases.
- apply active diagnostic and method of epidemiological analysis of health care-associated infections.
- choose correctly the antibiotic in the prevention and treatment of septic-purulent nosocomial infections.

Additional information material

The transmission of causative agents in medical institutions, including dental care units, can occur in the following ways:

- direct contact with blood, biological fluids or other materials from infected patients;
- indirect contact with objects (medical instruments, equipment, medical devices, etc.) and contaminated surfaces;
- during unprotected sneezing and coughing, as well as during talking or breathing as a result of contamination of the mucous membrane of the mouth or nose with drops containing pathogenic agents of the infected person;
- through contaminated hands.

Regardless the type of the contact, the following conditions are required for the transmission and contracting of infectious diseases:

- the presence of the pathogen;

- the presence of the transmitting factor;
- the conditions for the pathogen transmission;
- the presence of the receptive person;
- the presence of the entrance gate which will ensure the penetration of the causative agent into the the receptive body;

Thus, in health care-associated infections the presence of such three components of the epidemic process as the source of causative agents, transmission mechanism and receptivity of the population is a condition for the development of the epidemic process is.

The role and effectiveness of infection control strategies is to interrupt the chain of the epidemic process through actions targeted at one or more components.

The recommendations of international specialized institutions, such as the Center for Disease Prevention and Control (CDC, Atlanta, USA), is focused on the control of nosocomial infections by reducing the risk of contracting, in particular, of blood-borne diseases (parenteral viral hepatitis and HIV) using Standard Precautions Measures. The Precautions Measures combine most of the universal precautionary activities designed to reduce the risk of transmission of blood-borne pathogens and the isolation of biological fluids. The standard precautionary principle is that biological blood and fluids are considered potentially contaminated with blood-borne pathogens, including HIV and hepatitis B, C viruses, irrespective of the status or presumed risks of the person.

Standard precautions are applied to:

- blood;
- all biological fluids, secretions and excretions, excluding sweat even it contain or does not contain the blood;
- non-intact skin;
- mucous membranes.

Prophylactic measures used to reduce the exposure to the blood include:

- precautionary handling of cutting and sharp instruments;
- hand hygiene;
- use of Personal Protective Equipment (gloves, masks, glasses), aprons and gowns).

In addition to standard precautions, there is a set of precautions applied to prevent septic-purulent and respiratory infections (tuberculosis, measles, diphtheria, varicella, flu, etc.).

It is strictly necessary to implement key elements of the Infection Control Program in order to ensure the harmlessness of medical and dental care, prevention and reduction of the risk of developing of health-care associated infections. These are organized by the administration of medical institutions, including dental care in collaboration with the District or Municipal Center of Public Health.

Components of the Infection Control Program of health-care associated infections:

I. Administrative control.

II. Technical-engineering control.

III. Environmental control.

IV. Disinfection and sterilization of instruments and other medical equipment used in the treatment or care of patients.

V. Anti-epidemic regimen.

VI. Personal Protective Equipment.

VII. Risk prevention and post-exposure prophylaxis.

VIII. Specific prophylaxis of infectious diseases;

IX. Epidemiological surveillance of nosocomial infections.

Administrative control

Administrative control provides policies, regulations and procedures to reduce the risk of infectious diseases contracting in medical institutions and it include:

- the concept of safety and organization of control measures regarding infections that can be developed as a result of medical interventions of high risk;
- organization of patient flow and restriction of unauthorized people's access in areas where healthcare is provided;
- regular training of the medical staff, working at a job with potential risk of infection, regarding occupational safety, compliance with the rules in case of accidental events at workplace and procedures for the primary processing of the potential contaminated wounds, skin and mucous;
- supply of medical workers with Personal Protective Equipment (gloves, gowns, masks, glasses, waterproof clothing, etc.) depending on the nature of medical procedures and the potential risk of infection;
- the well-organized and developed information system, recording and investigation of accidental events;

- organization of the Committee responsible for the evaluation of the Infections Control System.

Technical-engineering control *includes:*

- compliance with building regulations and rules on planning, the location and arrangement of the institution and offices, respecting patients flow;
- ensuring the optimum temperature and humidity in the rooms where diagnosis and treatment procedures are performed;
- ensuring the functionality of lighting, ventilation system, water and sewerage supply;
- arrangement of procedure rooms, operating rooms, laboratories, rooms for processing and sterilization of medical instruments with sink, hot water and other means necessary for hand hygiene and other needs;
- providing patients and medical staff with separate sanitary units and functional sanitary facilities;
- providing procedures cabinets with bactericidal lamps.

Environmental control **includes:**

- measures applied for the environment decontamination and disinfection, especially in the areas with high risk of contamination;
- collection of sampls for the monitoring of the environmental pollution with micro-organisms and efficacy of the disinfection;
- ensuring the decontamination and disinfection of linen;
- disinsection and deratization measures.

Protection of personnel

Protection of personnelincludes compliance with the rules for the Personal Protective Equipment using (gowns, caps, gown, gloves, medical masks, glasses or screen protectors, aprons, shoe covers, etc.) according to the nature of the procedure and the presence of the potential risk of contamination. Also, hand hygiene and instruments handling (Standard Precautions components) are of great importance.

Hand hygiene

According to the literature data, contaminated hands are a factor in transmitting the causative agents of infectious diseases, particularly of bacterial origin. Hand hygiene compliance is the most important element in the medical practice, which contributes to the reduction of pathogen transmission, including health-care associated infections. The notion of *hand hygiene* in-

cludes all types of decontamination actions, including handwashing with water and soap or by using disinfectant solutions.

According to the WHO recommendations, hand hygiene should be observed strictly in the following cases:

- before touching a patient;
- before aseptic procedures;
- after body fluid exposure risk;
- after touching a patient;
- After touching patient surroundings.

At the same time, it is important to comply with the rules of hand washing with or without disinfectant solutions using (steps, duration of exposure, hand drying process).

Particular attention will be paid to the breathing or coughing hygiene, including properly wear a mask. This measure must be carried out, esspecially, during intensification of epidemic process in respiratory infectious diseases.

Personal Protective Equipment (PPE).

The use of PPE is essential for the health and safety of both patients and health workers. The choice and use of PPE should be based on the risk assessment of the pathogen transmission to the patient and the health worker. As well, it is necessary to take into account the risk of contamination of the healthcare worker clothing, skin and mucous membranes with blood, body fluids, secretions and excretions The use of PPE is one of the most important elements of the Standard Preacautions Measures (SPM). It is very important to train all medical staff, including that of dental profile, regarding the PPE using and regardless of the activity specificity. The PPE decreases double the risk of contracting of infectious diseases. The benefit insludes the security of patients and healthcare providers.

Personal protective equipment includes:

- gloves;
- dressing gowns and hair covers caps;
- equipment that protects eyes, nose and mouth.

Risk prevention and post-exposure prophylaxis

In prophylaxis of health-care associated infections the handling of sharp and cutting tools is an important element.

The comliance with precaution measures is extremely important during health care services in order to avoid occupational exposure to causative agents of infectious diseases, especially parenteral. It is necessary to take into

account the fact that any persons consulted a healthcare unit can be the source of causative agents of various diseases. Thus, all activities related to the prevention and reduction of the exposure risk to infectious diseases of health workers are included in the SPM. Occupational exposure management, including cutting and sharp tools, is one of the elements of SPM, which is important to be applied in all medical institutions. Injuries caused by needles or other sharp objects are the most common types of medical accidents to be reported to Occupational Health Services. The highest risk of contamination at workplace is determined by the transmission of blood-borne infections through the contact with different sharp objects. Another mode of exposure to blood-borne pathogen is splash with blood, or other biological fluids, excreta, secretions, especially mucous membranes. Although, the risk level in these situations is considered to be low. Currently, there is no evidence that blood-borne infections can be transmitted through intact skin, by breathing or fecal-oral. At the same time, it is necessary to comply, strictly, with the SPM to prevent accidental events, especially because these is no effective treatment of these diseases or it is missing. Everyone, the patient or the employee, has an important role in increasing of safety and harmlessness in contracting the pathogen of infectious diseases in health care institutions. Implementation and compliance with the SPM is a crucial element regarding this issue.

The management of sharp instruments remain one of the major issues of medical institutions. Thus, first of all, the idea about using of disposable instruments and the proper management of the equipment is promoted.

At the same time, medical institutions, especially those of dental profile, use various types of medical instruments, which require special measures of decontamination in order to reduce the risk of health-care associated infections contracting. Depending on the transmission risk of infectious disease pathogens, medical objects are classified into the following groups: Critical (at high risk of infection), semi-critical (medium risk of infection), non-critical (with minimal risk of infection), (see „Theme: Sterilization").

Re-using medical insruments can be decontaminated by physical or chemical method (according to the operating instructions) or sterilized by the classic method. The quality of pre-sterilization can be assessed using amidopirin and azopiram tests that show the presence of blood or the phenolphthalein test that show the presence of detergents.

Post-exposure prophylaxis includes medical activities to prevent the development of parenteral viral hepatitis, HIV infection following the contact with biological fluids from known or suspected infected person.

Specific prophylaxis of infectious diseases

Immunoprophylaxis is a fundamental compartment of the Infection Control Program and must be implemented in all medical institutions, including of dental profiles. As a result of many studies, it was found that employees of dental medical institutions are exposed to the risk of occurring viral hepatitis B, flu, diphtheria etc. Immunization of the medical workers remains the most effective measure to prevent viral hepatitis B.

Epidemiological surveillance of infectious diseases associated with healthcare.

Epidemiological surveillance is a system for monitoring of the morbidity dynamics of nosocomial infections, factors and conditions that contribute and/or determine its development. Also, it includes the analysis of obtained indicators with the elaboration and subsequent implementation of measures for the prevention and control of nosocomial infections. The purpose of epidemiological surveillance is to draw up an objective conclusion on the epidemiological situation in nosocomial infections in the medical institution, which will serve as a basis for the optimization of prophylactic and anti-epidemic measures.

Exercises

Self-evaluation questions

1. What is the essence of Nosocomial Infection Control Program components.
2. Standard Precautions Measures. Indications and directions for use.
3. List primary measures used to reduce the development of health care associated infections.
4. List five important moments in hand hygiene.
5. List the types of medical instrument used in the medical institutions including dental units.
6. What does medical waste management in medical institutions and dental units include.
7. What does the active detection of nosocomial infections mean?

Tests for self-assessment

1. In dental health care institutions, infectious diseases with the following transmission mechanism are registered frequently:

a) fecal-oral;

b) parenterally;
c) respiratory.

2. Accidental needle stick or non-sterile instruments have the highest risk to develop:

a) HIV infection;
b) viral hepatitis B;
c) viral hepatitis C.

3. Biological indicator placed inside the instrument box is used:

a) to assess the sterilization quality;
b) to assess the quality of the presterilization stage.
c) to evaluate the autoclave work regime.

4. Choose the risk level of disease developing and spreading as a result of contact with contaminated areas in dental institutions:

a) there is no risk;
b) increased risk;
c) reduced risk.

5. Choose the level of the risk of tuberculosis transmition in dental units.

a) reduced risk;
b) increased risk;
c) there is no risk.

6. The purpose of a routine (daily) hand wash is:

a) to ensure hands sterility for a long period of time;
b) to ensure of hands sterility for a short period of time;
c) to remove visible impurities.

7. Choose the procees that can destroy causative agents of infectious diseases in the hospital environment:

a) sterilization process;
b) mechanical decontamination;
c) disinfection.

8. In the medical staff the skin contaminated with drops of blood can be disinfected by using:

a) ethyl alcohol;
b) Na sulfates;
c) furacilin.

9. Choose the elements of the Hand Hygiene Program.

a) washing hands;
b) systematic care of nails/manicure;

c) hand processing of substances containing alcohol;
d) soaking the skin with minerals;
e) surgical hand processing;

10. Gloves and other Personal Protective Equipment are used to:

a) reduce the risk of causative agents transmission from a patient to a medical staff;
b) substitute the hand washing procedure;
c) reduce the risk of skin damage;
d) reduce the risk of causative agents transmission from the medical staff to a patient;
e) increase the harmlessness of both doctors and patients to infectious pathology.

11. Choose the features of semi-critical instruments from the list given bellow.

a) they contact with wound and/or blood during it using;
b) they contact with mucous membranes and affect their integrity;
c) they require to be sterilized;
d) they can not affect their integrity being in the contact with the skin and/or the mucosa;
e) they do not need to be sterilized or disinfected.

12. Medical masks are used in dental units in the following cases:

a) in the case of an unfavorable epidemiological situation;
b) during the patient's treatment;
c) at the direction of the institution administrative unit;
d) at the epidemiologist's direction;
e) permanently.

13. Choose the remedies to be used after contamination of doctor's eye with biological fluids of the patient:

a) 6% hydrogen peroxide, potassium permanganate solution;
b) 3% hydrogen peroxid, 96% ethyl alcohol;
c) 3% hydrogen peroxide, running water;
d) running water, 1%boric acid;
e) running water, 3% protargol.

14. Which of the following can be considered accident at work place in the dental clinic?

a) Skin lesion with sharp objects;
b) spalsh of the patient's blood on the doctor's individual equipment;
c) Contamination of eye's conjunctiva, nasal or oral cavity of the doctor with the patient's biological fluids;

d) contamination of the doctor's skin with the patient's biological fluids;
e) injury of a doctor caused by a patient's bite.

15. The key elements of the system of prophylactic measures in dental health services are:

a) dental offices purchase clothes hangers for patients;
b) the presence and use of individual protective equipment;
c) use of individual tool kits for all patients;
d) installation of the sterilization equipment for medical instruments directly at the dentist's work place;
e) Periodically disinfection of dental instruments during the day.

16. Choose the actions taken after the use of sharp medical instruments:

a) household waste removal;
b) boiling and throwing it into the trash;
c) sinking instruments in the boiling water and throwing them into the trash;
d) sinking instruments in a disinfectant solution with it further destruction in the autoclave within an hour at + 132°C;
e) sinking instruments in a disinfectant solution with further disassembly and place it in box and their evacuation.

17. Choose the measures to prevent nosocomial infections among medical staff:

a) the use of personal protective equipment;
b) vaccination of medical staff;
c) immunomodulation;
d) the use of antibiotics;
e) application of protective means, such as a patch on the damaged skin.

Match letters with numbers

18. Types and examples of medical instruments used in dental institutions:

1. critical;
2. semi-critical;
3. non-critical;
   a) tensiometer, roentgen apparatus, dental chairs;
   b) syringes, channel needles;
   c) stomatologic mirror, forceps.

19. Types of indicators and purpose of their using:

1) phenolphthalein indicator;
2) azopiram indicator;
3) amidopirin indicator;

a) the presence of blood;
b) the presence of disinfectant solutions;
c) the presence of detergents.

20. The components of the Infection Control Program are:

1. control of infectious morbidity in medical institutions of dental profile;
2. sterilization measures;
3. post-exposure measures;
4. specific prophylaxis of infectious diseases;
   a) sorting, washing and drying of medical instruments;
   b) to carry out prophylactic measures in order to prevent the occurrence of infectious diseases, the early isolation of suspected sources of causative agents of infectious diseases;
   c) detection and monitoring of the victims resulting from the medical health care.
   d) vaccination of medical staff against influenza and viral hepatitis B.

Practical tasks

1. Describe the structure and functions of the Hospital Committee for Control of nosocomial infections in medical institutions.
2. Determine the criteria for detection of infections associated with health care assistance in medical institutions.
3. Describe the types of accidents regarding to health care-associated infections that can occur during professional activity.
4. Describe the waste management scheme resulting from medical activities of the general surgery unit.
5. Describe and show the stages of hand hygiene.
6. Describe the wound classification according to the contamination degree.
7. List all risk factors in nosocomial hospital infections.
8. Describe the risk factors of nosocomial infections that appeare in the Intensive Care Units (ICU).
9. Describe the risk factors of nosocomial infections that appeare in the hospital of orthopedics and traumatology profile.
10. Describe the risk factors of nosocomial infections that appeare in the maternity.
11. List the nosocomial septic-purulent infections that can develope in the following units:

a) general surgery;
b) traumatology and orthopedics;
c) intensive care unit;
d) maternity;
e) hemodialysis;
f) dental unit.

12. Fill in the record sheet and patient hystory sheet in case of accidental exposure with the risk for HIV, HBV and HCV.
13. Fill in the Questionnaire on Professional Contact with the material infected potentially with HIV, HBV, HCV.
14. Perform the epidemiological investigation of the patient with nosocomial infection.
15. Fill in the Reporting Protocol and Primary Evidence of the nosocomial infection case.
16. Fill in the epidemiological surveillance record of the nosocomial infection case in a newborn baby.
17. Carry out the epidemiological surveillance of the nosocomial infection case in a postpartum female.

Case studies

Case study No.1. During anesthetic administration, the doctor accidentally pierced a finger with a syringe needle. He saw blood under the glove. What actions should the doctor undertake in the given situation?

Case study No.2. During gloves removal, the medical worker touched the used glove with unprotected hand. What measures should the doctor undertake in this situation?

Case study No.3. The nurse shared the medical instrument after using it, then washed under the running water and place it in the pot with 3% chloramine solution. Evaluate the correctness of the nurse's actions.

Case study No.4. The chief nurse, working in the septic surgery unit, has given a task to a resident student to prepare a disinfectant solution. Evaluate if the resident student is entitled to perform this task. Explain the answer.

Case study No. 5. After using a syringe, the doctor threw it into the trash. Evaluate the correctness of the doctor's action.

Case study No.6. Before the examination of the patient, the dentist washed his hands with soap, dried them with a towel and put on gloves. Evaluate the correctness of dentist's actions.

Case study No.7. During the quality assessment of the pre-sterilization

procedure, the phenolphthalein sample was positive. Explain the result and indicate further actions.

Case study No.8. After sterilization of instruments in boxes, the indicator of the sterilization quality did not change the color. Determine whether these kits can be used.

Case study No.9. During the quality assessment of the pre-sterilization procedure, the amidopirin indicator was positive (of blue-green color). Evaluate the result and indicate further actions.

Case study No.10. A sterile box was brought to the bandage room from the sterilization unit. When taking aut the material, the nurse noticed that the box was opened. Evaluate the situation and indicate further actions.

Case study No. 11. After the medical intervention, the doctor threw the cotton wool swabs into the container. Evaluate the correctness of the doctor's action.

Case study No.12. During the dental extraction, the surface of the table was splashed with blood. Determine the necessary measures that should be performed in this situation.

Case study No.13. A patient from the intensive care unit was diagnosed with nosocomial pneumonia. Find out the possible risk factors.

Case study No.14. A patient was diagnosed with post-traumatic osteitis in the traumatology unit. Find out the possible risk factors.

Case study No.15. A patient with deep wound infection was diagnosed after cholecystectomy in the abdominal surgery section. Find out the possible risk factors.

Case study No.16. A three-day-old newborn baby was diagnosed with omphalitis in maternity hospital No. 1. Find out the possible risk factors.

Case study No.17. On the 6th day of the treatment, a patient was diagnosed with septicemia after the surgery. Find out the possible risk factors.

Case study No.18. A patient was diagnosed with superficial wound infection on the 5th day of postoperative care. Find out the possible risk factors.

Correct answers to tests:

1. b	6. c	11.b,c	16. d
2.b	7. c	12. a,b	17. a,b,c,e
3. a	8. a	13. d,e	18.1b 2c 3a
4.b	9. a,c,e	14. a,c,d,e	19.1c 2b 3a
5. a	10. a,c,d,e	15.b,c	20. 1b 2a 3c 4d

LITERATURE

Basic

1. Viorel Prisacaru. General epidemiology with medicine based on evidence. Chisinau, 2015, p. 95-119.
2. Viorel Prisăcaru. Special epidemiology. Chisinau, 2017, p.131-179.
3. V. Prisăcaru. Epidemiologie generală. Bazele medicinii prin dovezi. Manual. Chişinău, 2012. (Compartimentele: Dezinfecţia, Sterilizarea).
4. Ghid de supraveghere şi control în infecţiile nosocomiale. Sub redacţia prof. univ. V. Prisăcaru. Ediţia a II-a. Chişinău, 2009.
5. Course material.

Additional literature

1. Cathy MacLean. Infection Control Manual. Dalhousie University, 2006.
2. Brumboiu Maria Irina. Prevenirea infecţiilor nosocomiale. Cluj-Napoca, 2009, 226 p.
3. Guidelines for Infection Controlin Dental Health-Care Settings – 2003.
4. Morbidity and mortality Weekly Report. December 19, 2003. Vol.52. Centers for Disease Control and Prevention.
5. Guidelines on Infection Control,Australian Guidelines for the Prevention and Control of Infection in Healthcare published by the National Health and Medical Research Council NHMRC).
6. http://www.nhmrc.gov.au/publications/synopses/cd33syn.htm
7. Standard precautions. Guide for health care workers. Department of
8. Health and Human Services. Tasmanian Infection Prevention and Control Unit. www.dhhs.tas.gov.au
9. Standard Infection Control Precautions. Clinical Governance. V3 November, 2010. 28 p.
10. Planul Naţional de Acţiuni pentru securitatea injecţiilor în Republica Moldova 2004-2010, Chişinău, 2004. 25 p.
11. Брико Н.И.,Зуева Л.П., Покровский В.И., Сергиев С.П., Шкарин В.В. Эпидемиология. Том II. М. 2013, 654 с.
12. Зуева Л.П., Яфаев Р.Х. Эпидемиология. Санкт-Петербург, 2005, 752 с.
13. Шкарин В.В., Ковалишена О.В., Благонравова А.С. Эпидемиологический надзор за внутрибольничными инфекциями. Нижний Новгород, 2009, 124 с.
14. Н.Д. Ющук, Ю.В. Мартынов, Е.В.Кухтевич. Эпидемиология. Учебное пособие для студентов стоматологического факультета, зубных техников и гигиенистов стоматологических. Москва, 2009.

MODULE IV: EPIDEMIOLOGY IN EMERGENCY

THEME 1: ANTI-EPIDEMIC MEASURES IN CALAMITIES

Relevance of the subject

Exceptional situations caused by different calamities of natural, technogenic and social origin, can have a significant negative impact on public health. Depending on the scale of the phenomenon, the consequences may be different: considerable economical losses, impact on the health of the population in the disaster area and, in some cases, the high number of deaths among people affected. Another aspect of disasters is the appearance of epidemic outbreaks and significant increase in the incidence of infectious diseases.

The mentioned involves targeted actions, realized by different medical and non-medical structures. Well-defined action plans are needed for prevention of disaster situations and prompt intervention in case of epidemic outbreak.

Purpose of practical work

Learning the system of organization of anti-epidemic service and anti-epidemic activities in case of epidemiological emergency situations caused by disasters.

Practical work plan

1. Introduction and answers to the students' questions.
2. Evaluation of the initial level of students' preparation for the practical work.
3. Discussion on possible epidemiological situations and anti-epidemic intervention measures in natural and tehnogenic calamities.
4. Solving the problems of epidemiological situations and drawing up intervention plans in crisis situations.
5. Analysis of results of the problem solving and complex intervention plans in crisis situations.
6. Familiarization with the main instructive methodical documents, governing the practical work of intervention in crisis situations.
7. Assessment of final knowledge through testing.

Material provided for the class

1. Practical guide on Epidemiology.
2. Instructive methodical documents governing anti-epidemic activities in crisis situations in the Republic of Moldova.
3. Tests to assess the knowledge of students on the theme.
4. Problems of epidemiological situations.

The student need to know

1. Organizational structure of the services and departments involved in case of disaster situation.
2. Possible contagious diseases in disaster situations.
3. Epidemiological features of epidemic foci in disaster situations.
4. Methodology and criteria for assessing the epidemiological situation in the area of calamity.
5. Organization and sequence of anti-epidemic measures in epidemiological situation.
6. Principles of organization and carrying out of emergency and specific prophylaxis in exceptional situations.

Practical skills

1. Assessment of epidemiological situation in calamities zones.
2. Development of system of applying the anti-epidemic measures.
3. Technical-sanitary facilities correct use for liquidation of epidemic foci.
4. Drawing up the medical evacuation scheme at different stages.

Exercises

Questions for self-control

1. List the classification and features of the main disasters that can lead to the occurrence of epidemic crisis situations in the Republic of Moldova and in the world.
2. List the factors that may cause exceptional situations and worsening consequences.
3. What are the possible contagious diseases in exceptional situations?
4. Describe the features of epidemic foci and the methodology for assessing the sanitary-epidemiological situation in the area of calamity.
5. List the necessary medical-sanitary measures in case of danger or triggering emergencies.

Problems of epidemiological situations

Problem nr.1. On August 25, 2017, heavy rainscaused landslide in locality

C, that damaged the aqueduct and sewerage system, central road to the village and some residential houses. In the northern part of the locality, mine wells were blocked by an earth wave, but in the southern part, most of the wells were flooded. Since August 27, 2017, cases of intestinal dysfunction were registeredat the Health Centre of the village. The evolution was the following: 27.08.2017 – 4 cases, 28.08.2017 – 7 cases, 29.08.2017 – 11 cases, 30.08.2017 – 17 cases, 31.08.2017 – 26 cases. On September 1, 2017, the total number of registered patients was 106. Most patients were children under the age of 14. In 70% of cases, the disease onset was acute and in severe form. According to epidemiological and clinical indications, 75% of patients were hospitalized in the district hospital, infectious diseases ward.On September 1, 2017, the results of bacteriological investigations of patients admitted on August 27-29, 2017, were received: Sh. flexneriin 5 cases, Sh. sonnei – 1 case, conditioning pathogenic microorganisms-in 9 cases. In 7 cases the pathogenic agents remained unidentified.

- Evaluate the epidemiological situation in locality C and draw up the anti-epidemic measures plan.

Problem nr. 2. An earthquake of magnitude 7.5 points on the Richter scale, caused major damage of housing and industrial space in main industrial citiesof the country. At the moment, the exact number of deaths and injuries is not known, economic losses were not calculated, but it is assumed that about 100 people died and 250 people are under the rubble.

- Draw up the operative plan for medical evacuation of victims and complex anti-epidemic plan.

Problem nr.3. At an enterprise two bottles of chlorine exploded. Consequently, 190 persons received injuries of varying degrees of severity. The victims complained of pain in the eyes, watery eyes, paroxysmal painful cough, chest pain, nausea, breathing difficulties. Some persons have suffered second and third degree burns. You, being a doctor of enterprise, have to take the first steps for liquidation of consequences.

- Choose the actions that you will perform immediately after the event. Argue the answer:
  a) all actions will be guided by the company's management;
  b) organize first aid measures, pre-medical and medical helpat an appropriate stage;
  c) within the first hour after the event – organize teams to sort the victims;

d) filling a medical file for recording primary victims;
e) statement of the Commission for Emergency Situations of the Republic of Moldova Government.

Problem nr.4. During repairs to a residential block, there was an explosion of natural gas. In the apartments, the roof and some of the interior walls collapsed. The explosion triggered a fire. The rescuers arrived at the spot, managed to evacuate 50 people from the damaged building. The evacuation work is still in progress. Some of the victims have second and third degree burns. Two people complain of chest pain, have pale skin, signs of hemoptysis and epistaxis, dyspnea, cough. Two victims are unconscious and have shallow breathing. The medical examination detected muscle tension of the anterior abdominal wall.

Being a specialist in the Civil Protection and Emergency Situations Servicewho arrived on the spot, you are have to take some measures to eliminate the consequences.

- Choose the necessary activities. Argue the answer:

a) in the first hour after explosion, to calculate the number of triage teams for the organization of treatment and prevention measures;
b) to organize thetriage;
c) draw up a list of first aid steps, premedical and medical care should be given to victims;
d) to make a decision on the medical evacuation of the victims;
e) filling a medical file for recording primary victims.

Problem nr.5. On August 6, 2017, an earthquake of magnitude 8-8.5 points on the Richter scale affected city N., with the following consequences: residential buildings were destroyed by 50-60%. There are about 250-300 peopleunder the rubble. The aqueduct and the sewerage work partially. Some shops and other institutions of social importance were damaged.

The Municipal Hospital, Preventive Medicine Center, pharmacies were not affected by the earthquake, except the department of infectious diseases located in an old building.

- Evaluate the epidemiological situation and argue the possible epidemic consequences.
- Draw up the plan of actions to prevent the appearance and spread of infectious diseases in the populationof the city.

Problem nr.6. You work as an epidemiologist at the National Public Health Center, which is also the National Focal Point for the International Health

Regulations (IHR) in the country. Your responsibilities include disease surveillance and conducting rapid assessments of risks associated with acute public health events within the framework of the International Health Regulations (2005). Now there is a seasonal spread of influenza, while the neighboring countries are affected by the pandemic with a new type of virus.

- List the professional actions.

Problem nr.7. You work as an epidemiologist at the National Public Health Center, which is also the National Focal Point for the International Health Regulations (IHR) in the country. Your responsibilities include disease surveillance and conducting rapid assessments of risks associated with acute public health events within the framework of the International Health Regulations (2005). The incidence of acute diarrheal diseases has increaseddue to the current summer floods, while in the neighboring countries, solitary cases of cholera are recorded.

- List the professional actions.

RECOMMENDED LITERATURE

Basic literature

1. Prisacari Viorel. Special epidemiology. Chișinău, 2017.
2. Prisacaru V., Guțu L., Paraschiv A. Epidemiology in tests. Chișinău, 2013.
3. Lecture material.

Additional literature

1. Ciufecu C., Prisăcaru V. Vibrionul holeric – holera. Chișinău, 2005.
2. Ciobanu Gh., Pîsla M., Gornea F., Dumitraș V., Ghidul Național privind triajul medical în incidente soldate cu victime multiple și dezastre: Ghid practic. Chișinău, 2010, 36 p.
3. Dumitraș V., Dediu I., Cîrstea N. ș.a. Managementul medical al dezastrelor: Compendiu. Chișinău: Medicina, 2010, 194 p.
4. Managementul riscurilor și urgențelor de sănătate publică. Compendiu. Chișinau, 2013.

THEME 2: FEATURES OF THE EPIDEMIC PROCESS AND ORGANIZATION OF ANTI-EPIDEMIC MEASURES FOR THE MILITARY STAFF. SANITARY AND EPIDEMIOLOGICAL INTELLIGENCE

Relevance of the subject

Some characteristics of life and activity of the military staff can generate specific conditions for the development of the epidemic process caused by contagious diseases, especially in military campaigns. In general, factors that can influence the development of epidemic process in military troops can have different intensity both in peacetime and in permanent location of military units, redeployment of military units, movement of troops, military exercises in the field and in case of military conflicts.

Military medical specialists of different levels are bound to analyse permanently the epidemiological situation in the troops by an appropriate sanitary epidemiological intelligence.

Purpose of practical work

Learning the organizational system of the anti-epidemic service in the armed forces in relation to the specific activity of the military staff.

Practical work plan

1. Introduction and answers to students' questions.
2. Evaluation of the initial level of students' preparation for practical work.
3. Discussion about the features of epidemic process in military troops in peacetime and wartime.
4. Solving the problems of epidemiological situations.
5. Realization of epidemiological intelligence in the territory.
6. Discussion about the results of the practical work:
   - analysis of the results of the problem solving;
   - discussion on the results of the sanitary epidemiological intelligence.
7. Assessment of final knowledge through testing.

Materials provided for the class

1. Practical guide on Epidemiology.
2. Model scheme for carrying out sanitary epidemiological intell.
3. Problems of epidemiological situations.
4. Tests to assess the knowledge of students on the theme.

The student need to know

1. The organizational structure of military Medical Service in the Armed Forces.
2. Principles of organization of prophylactic and anti-epidemic activities in the military staff in peacetime and military conflicts.
3. Specificity of anti-epidemic regime at different stages of medical evacuation.
4. The concept of anti-epidemic protection of military staff. Methods and means of achieving them.
5. Sanitary-epidemiological intelligence: the content, purpose, objectives and succession of its realization.

Practical skills

1. Assessing the epidemiological situation in the military staff in peacetime and military conflict.
2. Drawing up the plan of epidemiological surveillance of military staff.
3. Drawing up the complex plan to prevent the importation of infectious diseases into the military staff.
4. Proper use of technical sanitary means for the eradication of epidemic outbreaks in the military staff.
5. Drawing up the medical evacuation scheme at different stages.
6. Drawing up the schematic map with the attached legend as a result of sanitary epidemiological intelligence.

Exercises

Questions for self-control

1. Describe the structure of Medical Service in the Armed Forces, in medical institutions and subdivisions. Their role and functions.
2. What are the principles of anti-epidemic assistance in the military staff?
3. List some features of the epidemic process and organization of anti-epidemic measures in the military staff.
4. What measures are included in anti-epidemic care in the military staff during peacetime?
5. What measures are included in anti-epidemic care in the military staff during military conflicts?
6. What does the sanitary epidemiological intelligence do and what are the principles of its organization and realization?
7. List the criteria for assessing the epidemiological situation as a result of sanitary-epidemiological intelligence.

8. List the criteria for organizing and carrying out anti-epidemic measures based on the sanitary epidemiological intelligence results.
9. List the principles of anti-epidemic protection of military staff in case of epidemic and pandemic spread of infectious diseases.
10. What measures do the anti-epidemic care of military staff in case of epidemic outbreaks and epidemic spread of infectious diseases include?

Problems of epidemiological situations

Problem nr.1. The commander of a motorized infantry brigade was ordered to remove the division from the battlefield and to straighten it behind the front line for rest and reinforcement of the staff. The division fought continuously for two weeks.

- The Chief of the Brigade Medical Service is required to do:
  - to formulate the main task of the brigade medical service in the anti-epidemic organization of the military staff.
- The epidemiologist of a sanitary anti-epidemic platoon is required:

a) to develop anti-epidemic measures during the troop movements and at the place of deployment of troops, which must be done by the medical service of regiment and sanitary anti-epidemic platoon;
b) to determine which subunits of the sanitary epidemiological detachment of the army should be used as a means of enhancing the anti-epidemic measures.

Problem nr.2. Two echelons of soldiers in number of 1200 persons arrived in one of the divisions. The soldiers were moved from the station by truck via the liberated localities, where according to the data sanitary-epidemiological intelligence, cases of infectious diseases with unknown etiology among the civilian population were observed. During the movement, the truck made short stops (30 minutes) near the localities. The soldiers underwent sanitation eight days ago.

- The Chief of the Regiment Medical Service is required:

a) to draw up the anti-epidemic measures plan;
b) to determine the functions of sanitary anti-epidemic platoon;
c) to specify which functional subunits of sanitary-epidemiologic detachment of the army should be used as a means of enhancing measures;
d) to list the antiepidemic institutions and their sub-units which should be used for taking measures among the civilian population and specify the volume of measures.

Problem nr.3. The Regiments of Motorized Infantry Division liberated the locality B. During the sanitary-epidemiologic intelligence, medical services detected a prison camp, where high morbidity of epidemic typhus and typhoid fever was found out on the first lines of battle at the distance of 5 km from locality B. Before withdrawing, the enemy released the prisoners from the camp. The most seriously ill prisoners were housed by locals, and those who were able to move joined the units of the division that had liberated the district.

- The Chief of the Division Medical Service and the commander of the sanitary-antiepidemic platoon are required to do the following:

a) to assess the epidemiological situation;
b) to draw up the plan of measures to prevent the spread of epidemic typhus among the military staff;
c) to determine function of the sanitary-epidemiological detachment in the liquidation of outbreaks among the civilian population.

Problem nr.4. In order to combat fungal infections, the chief medical officer of the military unit proposed the sanitary processing of bedclothes, underwear, equipment and footwear in the oven.

- List the objects for processing in steam ovens and steam ovens and formalin.

Problem nr.5. In a room of the military unit hospital, a soldier with the diagnosis lacunar angina was treated for three days. The patient was transferred to the contagious disease department of the Central Military Hospital due to worsening of his health, where he was diagnosed with pharyngeal diphtheria. In the same hospital room, there were other 11 soldiers in term and three contracted soldiers.

The staff of the military unit from which the soldier with pharyngeal diphtheria comes, is deployed in a three-story barrack of a military town. In the town, there are two other barracks.

- Draw up the anti-epidemic measures plan.
- Determine the necessity of emergency prophylaxis in the focus, medicines and methods of their application.

Problem nr.6. During the appointed outpatient visit at the medical point of a military unit, a soldier with symptoms of gastroenteritis was suspected the diagnosis of cholera. According to the civil sanitary authorities, in the nearest city unit cases of cholera among locals were reported.

Bacteriologists from the Preventive Medicine Centre of Ministry of Defense identified the culture of Vibrio El Tor in the water of the river passing through the village near the military unit.

- Imagine you are a head of the National Army Health Service. Draw up a complex plan of anti-epidemic measures to locate and liquidate the cholera epidemic outbreak in the military staff.

Problem nr.7. Imagine you a head of the Military Unit Medical Service. You received the order to organize disinfection measures in the barracks for recruits, from the epidemiologist specialist of the Preventive Medicine Center of the Ministry of Defense. To perform disinfection, 50 kg of lime chloride with the active chlorine concentration of 32% were provided by the Preventive Medicine Centre.

- Determine the type of disinfection.
- Assess the volume and concentration of the solution, if it is known that the barrack surface is 120 m².

RECOMMENDED LITERATURE

Basic literature

1. Prisacari Viorel. Special epidemiology. Chișinău, 2017.
2. Prisacaru V., Guțu L., Paraschiv A. Epidemiology in tests. Chișinău, 2013.
3. Lecture material.

Additional literature

1. Dumitraș V., Dediu I., Cîrstea N. Managementul sanitar în campanie: Manual. Chișinău: Medicina, 2009. 256 p.
2. Dumitraș V. Măsurile de tratament și evacuare la trupe în campanie: Monografie. Chișinău: Tipografia USMF „Nicolae Testemițanu", 1996, 79 p.
3. Мельниченко П. И., Огарков П. И., Лизунов Ю. В. – Военная гигиена и военная эпидемиология: Учебник. – М.: ОАО "Издательство "Медицина", 2006. – 400 с.

THEME 3:ANTI-BACTERIOLOGICAL PROTECTION OF POPULATION AND MILITARY STAFF. SANITARY-HYGIENIC AND ANTI-EPIDEMIC MEASURES DURING THE LIQUIDATION OF CONSEQUENCES OF WEAPONS OF MASS DESTRUCTION

The relevance of the subject

Bacteriological war is an intentional use of different microbial pathogens and their toxins in order to cause serious diseases and epidemic outbreaks among people, animals and plants crops.

Currently, a new version of the biological weapon (bacteriological) is bioterrorism that is a deliberate spreading of viruses, bacteria, toxins or other harmful agents to produce diseases or death to humans and animals.

In case of biological attack, it is necessary to know the features of the biological weapon, the methods of use, the consequences, as well as preliminary planning and response with intervention measures for the effective protection of the military and the entire population from biological weapon attacks

Purpose of practical work

Learning the features of biological weapons and protective measures.

Practical work plan

1. Introduction and answers to students' questions.
2. Evaluation of the initial level of knowledge of students for the practical work.
3. Discussions on the specific characteristic of epidemic process in bacteriological warfare.
4. Solving the problems of epidemiological situations.
5. Drawing up the plan of anti-epidemic measures in case of biohazard.
6. Analysis of results of the problem solving and complex interventions plans in case of biohazard.
7. Assessment of final knowledge through testing.

Material provided for the class

1. Practical guide on Epidemiology.
2. Tests to assess the knowledge of students on the theme.
3. Problems of epidemiological situations.

The student needs to know

1. Features and characteristics of the biological (bacteriological) weapon.
2. Epidemiological features of bacterial recipes and possible methods of application of biological weapon.

3. The main features of the artificial epidemic process.
4. Anti-bacteriological protection system of population and military staff.
5. Bacteriological intelligence and methods of indicating bacterial recipe.
6. The notions of observation, quarantine, and the criteria for their determination.

Practical skills

1. Indication methods of the bacterial cultures.
2. Use of existing antibacterial protection methods.
3. Making bacteriological recognition.
4. Use of criteria to assess the epidemiological situation in case of application of biological weapons.
5. Organization of observation and quarantine.

Exercises

Questions for self-control

1. Give historical examples of using biological weapons (bacteriological).
2. List the main pathogenic agents, which may eventually be used as a biological weapon.
3. List the possible methods of using biological weapon.
4. Describe the types and schemes of indication of the biological weapon.
5. Formulate the concept of bacteriological intelligence.
6. What are the criteria for assessing the epidemiological situation in case of use of biological weapon?
7. Formulate the concept of observation and quarantine.
8. List the contents of antibacterial protection measures.

Problems of epidemiological situations

Problem nr.1. On June 22, 2017, a commander of the Division Intelligence Service reported to the commander of the division of medical service that an artillery shell with unknown contents had been detected among the trophy ammunition captured in the district A. There are suspicions of bacterial recipe. The Division went into combat on May, 22 2017.

- Assess the epidemiological situation.
- List the tasks of the commander, the Chief of Staff and the head of the unit's medical service and commanders of specialized medical military institutions.

Problem nr.2. A head doctor of the medical unit reported to the commander of the division medical service on massive artillery bombardment on the

regimental advancement sector and on a forward stripe of the neighbouring division. On the battlefield compact dust clouds formed at a height of 40-70 centimetres from the surface of the earth. Sporadic splinter injuries occur.

Diseases caused by poisonous substances was recorded among soldiers. At the medical point of the regiment there are 17 injured, all transportable.

- Assess the situation.
- List the measures for anti-bacteriological protection of the military staff

Problem nr.3. As a result of the study of materials taken from the surface of tanks and trucks shipped in the sanitary anti-epidemic platoon of the division, bacterial cultures with pathogens of plaque and tularaemia were discovered. In the isolated medical battalion, there are 60 injured in the admission and triage department, of which 15 injured – with skull, forehead and chest wounds. Currently they are ready for evacuation in specialized hospitals.

- Draw up the work plan on antibacterial protection and quarantine of the military staff affected by biological weapon.
- Draw up the anti-epidemic measure plan in the condition of quarantine and make a list of medical detachments required for reinforcement (enhancement).
- Determine the possibilities and ways of evacuation of the wounded from the isolated medical battalion.

Problem nr.4. In the medical point of a motorized infantry brigade, accompanied by the health instructor, four cars with wounded soldiers arrived. The wounded arrived from the area where the biological (bacteriological) weapon had been used. In the affected zone, the bacteriological indication works are carried out at present. Two soldiers of those who arrived in the unit, complain of general weakness, headache, and fever. The doctor of the unit suspects an infectious disease contracted in the affected area.

- List the necessary measures to be taken at the infirmary of the unit.
- Draw up the wound evacuation scheme from the infirmary of the unit.

Problem nr.5. The intelligence detected the use of the bacteriological weapon in one of the localities. The situation is considered exceptional.

- Determine the actions to be taken: restriction or quarantine.
- Argue the answer.

Problem nr.6. On July 20, 2017, at 5:00 a.m., the intelligence service noticed oily droplets on plant leaves in the area of action of a military unit. The use of biological weapons was suspected.

- Determine the actions to be taken: restriction or quarantine.
- Determine the necessary measures to be taken in the outbreak.

RECOMMENDED LITERATURE

Basic literature

1. Prisacari Viorel. Special epidemiology. Chișinău, 2017.
2. Prisacaru V., Guțu L., Paraschiv A. Epidemiology in tests. Chișinău, 2013.
3. Lecture material.

Additional literature

1. Мельниченко П. И., Огарков П. И., Лизунов Ю. В. – Военная гигиена и военная эпидемиология: Учебник. – М.: ОАО "Издательство "Медицина", 2006. – 400 с.
2. Беляков В.Д. , Жук Е.Г. – Военная гигиена и эпидемиология. 2-е изд., М.: Медицина, 1988. – 320 с.