

Л. П. Мамчиц

Эпидемиология

Epidemiology

Допущено
Министерством образования Республики Беларусь
в качестве учебного пособия
для иностранных студентов учреждений высшего образования
по специальности «Лечебное дело»



Минск
«Вышэйшая школа»
2021

УДК 616-036.22(075.8)-054.6

ББК 51.9я73

М22

Рецензенты: кафедра эпидемиологии УО «Белорусский государственный медицинский университет» (доцент кафедры кандидат медицинских наук *О.А. Горбич*); доцент кафедры инфекционных болезней УО «Гродненский государственный медицинский университет» кандидат медицинских наук, доцент *Ю.В. Кравчук*

Мамчиц, Л. П.

М22 Эпидемиология = Epidemiology : учебное пособие / Л. П. Мамчиц.
– Минск : Вышэйшая школа, 2021. – 191 с. : ил.
ISBN 978-985-06-3373-6.

В учебном пособии представлен основной программный материал по общей эпидемиологии. На современном уровне освещены теоретические основы эпидемиологии и принципы организации противоэпидемической работы, а также система организации эпидемиологического надзора. Приведены практические задачи и тестовые задания для студентов по изучаемой дисциплине.

Предназначено для проведения практических занятий по эпидемиологии со студентами факультета иностранных студентов в медицинских учреждениях высшего образования Республики Беларусь.

УДК 616-036.22(075.8)-054.6

ББК 51.9я73

ISBN 978-985-06-3373-6

© Мамчиц Л.П., 2021

© Оформление. УП «Издательство
“Вышэйшая школа”», 2021

FOREWORD

Teaching epidemiology in the system of higher medical education aims to form students' preventive thinking and acquire scientific knowledge about the patterns and features of the epidemic process of infectious diseases that are relevant for the population of the Republic of Belarus. It is also aimed at mastering practical skills and abilities of preventive and anti-epidemic measures by students.

Further advancement of student training requires improving the arrangement, concretising the content and practical orienting of the self-study of learners while studying the discipline.

The proposed textbook on general epidemiology is the result of generalising the experience of teaching this academic discipline at Gomel State Medical University. The textbook covers all units, and its chapters corresponding to the topics of the curriculum that was made in accordance with the requirements of the current State Educational Standard of higher professional education in medical specialities.

Situational tasks, algorithms for self-study, assessment tests to check course content mastering and practical recommendations for conducting preventive and anti-epidemic measures take a significant place in the textbook. This allows one to guide, organise and control the individual cognitive activity of students while studying the discipline.

The textbook is made in accordance with the standard curriculum in epidemiology for the medical faculty. It can be used to have classes for students of the medical and medical diagnostic faculties.

The author will gratefully accept all comments and suggestions aimed at improving the textbook.

LIST OF KEY TERMS AND CONCEPTS USED IN EPIDEMIOLOGY

Analytical (Gr. “analysis” – decomposition, dissection) **epidemiological methods** – methods designed to establish the causes of the occurrence and spread of diseases, i.e. risk factors. Analytical population studies include the establishment of statistical relationships (correlation analysis) and comparative studies. Currently, the latter include “case-control” and cohort studies.

A biological species – an aggregate of natural populations united by a single gene pool.

A natural factor in epidemiology – a combination of abiotic and biotic elements of the external environment, which directly or indirectly (through changes in social conditions) have an activating or inhibiting effect on the epidemic process.

An uncontrolled epidemiological experiment – an epidemiological study based on the results of the intervention in the development of the epidemic process by carrying out anti-epidemic measures while providing for the allocation of control groups. To evaluate the results, equivalent teams or periods of time are selected that differ in their application (non-application) or the quality of the events.

Anti-epidemic measures – a set of scientifically grounded and justified by practical activities measures to combat emerging infectious diseases among people.

Anthroponoses (Gr. “anthropos” – human + “nosos” – disease) are infectious diseases in which humans are the reservoir of the causative agent.

Anthropurgical (Gr. “anthropos” – human + “ergon” – activity, action) **focus of infection** – a focus of zoonotic infection formed in connection with human activities.

A randomised controlled trial (RCT) – an epidemiological trial that is usually organised as a cohort study with a randomised sample.

A reservoir (Lat. “reservare” – to preserve, conserve) **of an infectious agent** is a set of conditions that make up the natural habitat of the pathogen and ensure the maintenance of its populations. The reservoir of the causative agents of anthroponosis is the human organism, of zoonoses – the organism of animals, the reservoir of saproponoses is the external environment.

A social factor in epidemiology – a set of social connections and relationships that have an activating or inhibiting effect on the epidemic process.

Biocenosis (Gr. “bios” – life + “koinos” – common) – the cumulative, evolutionarily formed existence of different species of living beings in the same environment.

Cohort analytical epidemiological study – a study based on the comparison of the incidence in equal groups (cohorts) exposed and not exposed to a hypothetical risk factor.

Contagiosity (Lat. “contagiosus” – contagious) – 1) contagiousness; 2) a species property of a pathogen characterised by the probability of movement (transmission) from one host individual to another (others).

Controlled infections – infectious diseases for which scientifically based measures have been developed and their effectiveness has been shown. There are groups of infections controlled by 1) means of immunoprophylaxis, 2) sanitary and hygienic measures, and 3) other types of measures.

Dynamics (Gr. “dynamikos” – having force) **of the epidemic process** – the change in the incidence of infectious diseases in people over the years (cyclicality), months during the year (seasonality) and shorter intervals during a single epidemic. It is determined by social, biological and natural factors.

Elimination (Fr. “Élimination” – destruction) of infection – the eradication of the nosological form of an infectious disease due to the destruction (eradication) of the pathogen as a biological species on a global scale. Global elimination goes through the stages of its regional elimination, achieved by the destruction of the pathogen within the administrative territories and the creation in these territories of conditions that prevent the rooting of the pathogen in the event of importation.

Epidemiological diagnosis – causes (risk factors) of the occurrence and spread of pathological conditions.

Epidemic tendency – the main directions of changes in the intensity of the epidemic process in long-term dynamics. Reflects the stabilisation, increase or decrease in the incidence.

Epidemic year – an interval that includes the first month of a seasonal increase in incidence in one calendar year and the month preceding a new seasonal increase in incidence in the next calendar year.

Epidemiological surveillance – a continuous assessment of the state and development trends of the epidemic process in order to determine the reasons for its development and timely decision-making, ensuring that measures are taken adequate to the situation.

Evidence-based medicine – a branch of medicine based on epidemiological diagnostic methods that involves the search, comparison, synthesis and wide dissemination of the evidence obtained regarding the effectiveness of means and methods of the disease prevention and treatment.

Experimental epidemiological methods – methods used to show epidemiological hypotheses and assess the effectiveness of anti-epidemic measures. Based on artificial intervention in the natural development of the epidemic process.

Immunity (Lat. “immunitas” – liberation from something) – a specific immunity to infectious agents and their toxins, produced by the interaction of the body with the antigen.

Immunogenicity (“immune” + Gr. “genes” – born) – a specific property of a parasitic pathogen that manifests itself in the ability to cause certain forms of immunity in the host organism.

Immunological structure of the population – the distribution of people in the population by the presence or absence of immunity, and the immune stratum – by the strength of immunity.

Invasion – 1) infection with protozoa and helminths; 2) the process of interaction between the host organism and a parasite belonging to protozoa or helminths. Can manifest in a manifest form of varying degrees of severity or develop asymptotically.

Infectious diseases – diseases that develop as a result of the introduction, reproduction and vital activity of viruses and prokaryotes in the body of patients. The nosological form of the disease is determined by the species specificity of the pathogen.

Infectious Disease Control (ID) – a system of continuous epidemiological surveillance in a health-care facility with epidemiological analysis of the results of this surveillance and targeted measures based on epidemiological diagnosis to improve the quality of medical care.

Infectious process – a process of interaction between a parasitic pathogen and a host (human, animal), manifested by a disease or illness.

Infection (Lat. “infectio” – infection) – 1) infectious process; 2) nosological form of infectious disease; 3) a specific infectious disease.

Health care-associated infections, or “nosocomial” and “hospital” infections – infections that affect patients in a hospital or other health-care facility, and are not present or incubating at the time of admission. They also include infections acquired by patients in the hospital or facility but appearing after discharge, and occupational infections among staff.

Heterogeneity (Gr. “heterogenes” – heterogeneous, of different origin) of a population is the heterogeneity of the individuals that make up the population. Phenotypic heterogeneity is genetically determined.

Homogeneity (Gr. “homogenes” – homogeneous, of the same origin) of a population – the relative homogeneity of individuals (clones) according to the analysed trait.

Localisation (lat. “localisatio” – location) **of a pathogen** in a specific host – the location of the pathogen in an infected organism, determined by the pathogen’s tropism, which determines the mechanism of transmission. Four types of main localisation are typical of anthroponotic pathogens: on the mucous membranes of the respiratory tract, in the intestines, on the skin and external mucous membranes, and in the blood. Possible, along with the main localisation, is secondary (a pathogenetic pattern during the development of an infectious or invasive process, or its complication, in particular penetration into the fetus).

Manifestation of infection – the proportion of infected people with manifestations of the disease characteristic of certain nosological forms of infectious diseases. It is determined by the specific characteristic of the pathogenicity of the pathogen, the specific degree of its virulence, the structure of the human population according to the degree of susceptibility, as well as the likelihood during the development of the epidemic process of infection with doses of the pathogen leading to manifestation.

Meta-analysis (synthesis of information) – a review that summarises data from several population studies using a quantitative method of assessment (mainly randomised controlled trials) devoted to one problem, and the final result is presented as one summary indicator.

Mortality – an index that reflects the number of deaths among patients with any nosoform, expressed as a percentage.

Mortality rate – an index that reflects the number of deaths from any nosoform in the population, most often expressed as a rate per 100,000 population.

Natural focus – 1) a part of the territory of the geographical landscape, within which, among wild animals, the pathogen is transmitted from the donor to the recipient; 2) a population of the pathogen formed independently of human activity, together with populations of vertebrate hosts that support it (with transmissible infections and populations of arthropods, with sapronosis and specific environmental conditions).

Operational epidemiological analysis – a dynamic assessment of the state and development trends of the epidemic process, designed to identify not sustainable trends, but emerging outbreaks (epidemics). It is carried out with the help of constant analysis of the registration of emerging diseases (assessment of the dynamics in time, space, in different population groups) and the establishment of statistical links with a factor that could cause an outbreak (epidemic). It includes epidemiological examination of foci, various laboratory diagnostic methods. Operational analysis is an integral part of epidemiological surveillance.

Parasitic agents – 1) eukaryotes (fungi, protozoa, helminths and arthropods) that have a pathogenic effect on the organism; 2) parasites of all systematic groups capable of causing disease.

Pathogenicity (Gr. “pathos” – suffering, disease + “genes” – born) – a specific property of a parasitic pathogen, characterised by its ability to cause disturbances in the host’s normal physiological processes, i.e., illness. It is provided with the mechanisms of adhesion, invasion, reproduction and distribution, as well as the production of specific functional active substances (pathogenicity factors), including toxins.

Population (Lat. “populatio”) – an aggregate of individuals of a biological species, relatively isolated in its natural life from other aggregates of individuals of this species.

Population immunity – a specific protection against any parasite of the population or its individual groups. It is determined by the specific gravity of immune people.

Preventive measures – a set of scientifically grounded and justified by practical activities, designed to prevent the emergence and spread of any pathological conditions among people.

Pro-epidemic – the formation of a high level of population immunity as a result of active circulation of the pathogen due to asymptomatic forms of infections or lungs, undiagnosed diseases.

Randomisation – a way to control interfering factors by randomly distributing the studied persons or phenomena into groups.

Resistance (Lat. “resistentia” – resistance, elasticity) – the immunity of individuals to a disease, not depending on the specific factors of immunity. Determined by genotype and phenotypic factors.

Retrospective epidemiological analysis – is carried out in order to establish the main trends in the nature and causes of the development of the epidemic process. The analysis is carried out using statistical methods for researching hypotheses about risk factors. The final stage of the retrospective analysis is the epidemiological conclusion about the causes and conditions that determine the incidence rate in the

territory. The results of the analysis are used to develop plans for complex organisational, sanitary and anti-epidemic measures.

Sapronoses – infectious diseases, the reservoir of pathogens of which is the external environment.

Source of infection (source of the infectious agent) – 1) the natural environment of the parasitic pathogen; 2) the infected human or animal organism from which the patient became infected (in facultative parasitism – objects of the environment).

Spatial characteristic – the distribution of frequency indicators (intensity) over the territory.

Specific prophylaxis – the artificial creation of immunity in individuals or population immunity.

Susceptibility – a species-specific property of a specific host to respond with an infectious process to the introduction of an infectious agent. The degree of susceptibility is determined by non-specific protective factors and immunity.

Systematic reviews – a literature review that critically assesses and summarises the results of primary research on a specific issue.

The biological factor in epidemiology – the evolutionary nature of the population relations of biological species, parasite and host. The biological factor reflects the specificity of the epidemic process.

The time of risk – the period of increased morbidity rates.

Virulence (Lat. “virulentus” – poisonous) – a measure (degree) of pathogenicity of a pathogen.

Ways of transmission of the pathogen – specific elements of the external environment or their combinations, which ensure the transfer of the pathogen from one organism to another under specific conditions of an epidemic situation.

Zoonoses (Gr. “zoon” – animal + “nosos” – disease) – infectious diseases whose pathogen reservoirs are animals (“diseases from animals”). The human body is more often a biological dead end.

LIST OF ABBREVIATIONS

AEFI – adverse events following immunisation
AIDS – acquired immunodeficiency syndrome
ALAT – alanine aminotransferase
ASAT – aspartate aminotransferase
BA – biological agents
BCG – Bacillus Calmette-Gurin
BDO – biological defence organisations
BM – biological means
BW – biological weapons
CCM – cold chain monitor card
GBS – Guillian-Barré syndrome
DOT – direct observed therapy
DT – diphtheria and tetanus toxoids
DTaP – diphtheria and tetanus toxoids and acellular pertussis
DTP – diphtheria toxoid, tetanus toxoid, and pertussis
ELISA – enzyme-linked immunosorbent assay
HepB – hepatitis B
HEV – hepatitis E virus
Hib – haemophilus influenzae type b
HIV – human immunodeficiency virus
HDCV – inactivated, human diploid cell rabies vaccine
HIV – human immunodeficiency virus
IgM – immunoglobulin M
IgG – immunoglobulin G
ID – intradermal
IBD – immunobiological drugs
IB – immune blotting
IIV – inactivated influenza vaccine
IPV – inactivated poliovirus
LAIV – live, attenuated influenza vaccine
MMR – measles, mumps, and rubella
MMRV – measles, mumps, rubella and varicella
OPV – oral polio (myelitis) vaccine
PAT – portable appliance testing
PCV13 – pneumococcal conjugate vaccine
PPSV23 – pneumococcal polysaccharide vaccine

PRP – polyribosylribitol phosphate
PCECV – inactivated, purified chick embryo cell rabies vaccine
PVH – parenteral viral hepatitis
RIG – rabies immunoglobulin
RV – rotavirus vaccines
RT-PCR – reverse transcriptase polymerase chain reaction
SCID – severe combined immune deficiency
STD's – sexually transmitted diseases
Td – tetanus and diphtheria toxoids
Tdap – tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis
TIG – tetanus immune globulin
TTA – tetanus toxoid adsorbed
TT – tetanus toxoid
TB – tuberculosis
WHO – World Health Organisation

Chapter 1

GENERAL EPIDEMIOLOGY

UNIT 1. Review of the epidemic process. Preventive and anti-epidemic measures of outpatient and hospital health care organisations

Motivational characteristics of the topic. The arrangement of anti-epidemic control of the population plays an important role in preserving the health of population. Its aim is to reduce the infectious morbidity of the population until the complete elimination of certain infections. The tasks of arranging the system of anti-epidemic control include the analysis of morbidity among the population, carrying out scientifically based anti-epidemic measures. Doctors of any speciality should be able to apply knowledge of the principles of anti-epidemic measures when they register cases of infectious diseases in various situations.

Aims:

1. To study the characteristics of the dissemination of infectious diseases in the Republic of Belarus.
2. To study the general principles of the arrangement of preventive measures.
3. To study the system of anti-epidemic control of the population.

Tasks:

1. To study the theoretical basis of epidemiology, epidemiological terms, definitions, concepts, epidemiology topics, its place in the structure of the medical sciences and public health practice.
2. To study the general regularities of distribution, the causes and conditions, the mechanism of development and signs of the epidemic process of infectious and parasitic diseases.
3. To examine the main areas of the arrangement and carrying out anti-epidemic measures.
4. To study the general characteristics of the main groups of disinfectants, methods and types of disinfection and sterilisation.
5. To learn the principles of anti-epidemic measures in health care.

Requirements for the initial level of students' knowledge. Students shall review the material from the following key points:

1. Microbiology, Virology, Immunology: “Fundamentals of the doctrine of infection; aetiology of bacterial and viral infections; the most important properties of pathogens (heterogeneity of populations, stability in the external environment, sensitivity to disinfectants, antibiotics, temperature factor); microbiological basics of antiseptics, disinfection and sterilisation; immunodiagnosis and immunisation of infectious diseases”.

2. General Hygiene: “Environment as a set of natural and social elements, their impact on public health; personal hygiene problems; sanitary and epidemiological conditions in health care; risk factors for the health of the population”.

3. Medical Biology and Genetics: “Biological and social aspects of human adaptation to living conditions”.

4. The Normal Human Physiology: “Physiological mechanisms of adaptation and their role in ensuring the functioning of the body”.

Test questions from the related disciplines:

1. What are the main features of the dissemination of infectious diseases among people?

2. What are the main results of the interaction of microorganisms and human body?

3. What is the impact of natural and social factors on the spread of infectious diseases?

4. What factors affect human immunity against infectious diseases?

Assessment questions:

1. Definition of Epidemiology, subject and aims of Epidemiology of Infectious Diseases as a science.

2. Structure and content of epidemiological methods of the research.

3. Review of the epidemic process.

3.1. The theory of the mechanism of infectious agents' transmission

3.2. The theory of self-regulation of the epidemic process.

4. Signs of the epidemic process on a qualitative and quantitative basis: sporadic morbidity, epidemic, pandemic, breakout, endemic and exotic morbidity. Morbidity intensity, dynamics, structure and spatial characteristics.

5. Anti-epidemic measures and means. Main and additional groups of anti-epidemic measures.

6. Criteria for the selection of anti-epidemic measures. The quality and efficiency of anti-epidemic measures.

7. Arrangement of anti-epidemic control for the population.

8. Disinfection: methods and means, indications for assigning. Disinsection. Deratisation.

9. Sterilisation: methods, indications, quality control.

LEARNING MATERIAL FOR THE UNIT

1.1. Definition of epidemiology, subject and aims of epidemiology of infectious diseases as a science

Epidemiology (from Gr. “epi” (over), “demos” (people) and “logos” (science)) is a fundamental medical science related to the field of preventive medicine and studying the causes and peculiarities of the spread of diseases in society in order to apply the acquired knowledge to solve healthcare problems. It includes two sections with a single study methodology: epidemiology of infectious diseases and epidemiology of non-communicable diseases. Both of these units have a common subject of study – morbidity (a population level of pathology arrangement), a single scientific method – epidemiological and general goal – ill-health prevention.

The main subject of the epidemiological research, and hence epidemiology, is morbidity. At the same time, epidemiology studies the morbidity of the population with any diseases regardless of their origin.

Modern Epidemiology has the following *aims*:

- to describe the morbidity of population;
- to identify the causes of the occurrence and spread of certain diseases and groups of diseases;
- to forecast the morbidity of population for a short and a long term;
- to develop a concept (main directions, prevention programs, etc.) to fight against the spread of certain clinical entities and groups of diseases;
- to assess the potential effectiveness of the proposed measures against the spread of diseases.

1.2. Structure and content of epidemiological methods of the research

Epidemiology uses microbiological, experimental, biochemical, chemical, physical, mathematical, statistical and computer *methods*.

The Epidemiology of Infectious Diseases is *divided* into two units: General and Private Epidemiology. *General epidemiology* studies the theoretical and practical organisational framework for prevention of infectious

diseases. *Private epidemiology* studies the characteristics of individual infectious clinical entities.

Structure and content of epidemiological methods of research.

Comprehensive epidemiological method includes:

- epidemiological surveillance and inspection (descriptive);
- comparative-historical description (analytical);
- epidemiological experiment (experimental).

Epidemiological surveillance is carried out by:

- epidemiological surveillance of epidemic process;
- carrying out serological, immunological, microbiological, virological, parasitological, and other studies.

Epidemiological experiment means experiments on animals (testing new preventive medicines, the study of resistance to the new disinfectants and vaccine trials).

The epidemiological method was used for analysing the spread of diseases in space and time. The data obtained are intended to identify the causes, circumstances and mechanisms of the formation of disease in order to support activities for the prevention of the disease and evaluating their effectiveness. Practical application of the epidemiological method is called **epidemiological diagnosis**.

A new area of expertise – *clinical epidemiology* – was formed in the 80–90s of the 20th century. The main principle of clinical epidemiology is: “Every clinical decision should be based strictly on a proven scientific fact”. This principle is called “*evidence based medicine*”. Modern scientific research is carried out on the basis of evidence-based medicine.

1.3. Review of the epidemic process

1.3.1. The theory of the mechanism of infectious agents' transmission

The doctrine of the epidemic process includes three units:

- factors of the epidemic process;
- mechanisms for the development of the epidemic process;
- signs of the epidemic process.

There are biological, natural and social ***factors of the epidemic process***.

Biological factors are represented by the interaction of two populations – a pathogen and a person. The interaction of the infectious agent and the human populations occurs in certain social and environmental conditions.

Natural factors include:

- physical and geographical factors: geographical location, sun exposure, terrain, nature of the soil, the presence and nature of reservoirs, atmospheric conditions;
- climatic factors;
- natural disasters: hurricanes, tornadoes, floods, heat, landslides and others (Figure 1.1).



Figure 1.1. Natural factors

Natural factors affect the properties of pathogens such as pathogenicity and virulence variability. The characteristic vectors of pathogens transmissible diseases depend on natural factors.

Social factors are the following:

- demographic factors: population density and structure, fertility, migration, mortality, etc.;
- cultural and religious factors;
- social stability;
- material security of the population, education, family life, the level of sanitary culture, the nature of the power of the population (Figure 1.2, 1.3).

Epidemic process includes **three components**: a source of infection, the mechanism of transmission and a susceptible organism (Figure 1.4).

The source of infection is the object of the natural reproduction of the pathogen and the host, the natural environment of its habitat, ensuring the preservation of the pathogen as a species.

CONTENTS

FOREWORD	3
LIST OF KEY TERMS AND CONCEPTS USED IN EPIDEMIOLOGY	4
LIST OF ABBREVIATIONS	9
CHAPTER 1. GENERAL EPIDEMIOLOGY	11
UNIT 1. Review of the epidemic process. Preventive and anti-epidemic measures of outpatient and hospital health care organisations	11
<i>Learning material for the Unit</i>	<i>13</i>
1.1. Definition of epidemiology, subject and aims of epidemiology of infectious diseases as a science	13
1.2. Structure and content of epidemiological methods of the research	13
1.3. Review of the epidemic process	14
1.3.1. The theory of the mechanism of infectious agents' transmission	14
1.3.2. The theory of self-regulation of the epidemic process	17
1.4. Signs of the epidemic process	21
1.5. Anti-epidemic measures and means	22
1.6. Criteria for the selection of anti-epidemic measures. The quality and efficiency of anti-epidemic measures	23
1.7. Arrangement of anti-epidemic control for the population	24
1.8. Disinfection: methods and means, indications for assigning. Disinsection. Deratisation	24
1.9. Sterilisation: methods, indications, quality control	27
<i>Tests for self-assessment of students' knowledge</i>	<i>28</i>
<i>Assignment 1</i>	<i>30</i>
UNIT 2. Preventive immunisation against infectious diseases: organisational foundations of immunisation against the infectious diseases	34
<i>Learning material for the Unit</i>	<i>37</i>
2.1. Definitions of "immunity", "immune response", "primary and secondary immune responses"	36
2.2. Classification and characterisation of immunobiological drugs (IBDs) used in vaccination. Vaccine and toxoid recommendations. Vaccine administration. Infection control	38
2.3. Vaccine storage and the "Cold chain"	41
2.4. Adverse events following immunisation (AEFI): causality assessment	47

2.5. Medical contraindications to vaccinations	53
<i>Tests for self-assessment of students' knowledge</i>	57
<i>Assignment 2</i>	61
UNIT 3. National Immunisation Schedule	62
<i>Learning material for the Unit</i>	63
3.1. National Immunisation Schedule of the Republic of Belarus	63
3.2. Tactics for preventive vaccination against hepatitis B	65
3.3. Tactics for preventive vaccination against tuberculosis	65
3.4. Tactics for preventive vaccination against poliomyelitis	67
3.5. Tactics for preventive vaccination against diphtheria, tetanus and pertussis	68
3.6. Tactics for preventive vaccination against measles, mumps and rubella	70
3.7. Tactics for preventive vaccination against haemophilus influenza type B	72
3.8. Tactics for preventive vaccinations against pneumococcal infection	73
3.9. Tactics for preventive vaccinations against influenza/flu	74
<i>Tests for self-assessment of students' knowledge</i>	75
<i>Assignment 3</i>	77
UNIT 4. Preventive immunisation against infectious diseases according to the epidemic indications	80
<i>Learning material for the Unit</i>	81
4.1. Vaccination on epidemic indications	81
4.1.1 Hepatitis A vaccinations	84
4.1.2. Chickenpox vaccinations	87
4.1.3. Yellow fever vaccinations	88
4.1.4 Rabies vaccinations	89
4.2. The tactics for preventive vaccinations not included in the National Immunisation Schedule of preventive vaccinations	93
4.2.1. Vaccinations against papillomavirus infection	93
4.2.2. Vaccination against rotavirus infection	94
4.3. Emergency tetanus prophylaxis	95
<i>Tests for self-assessment of students' knowledge</i>	98
<i>Assignment 4</i>	100
CHAPTER 2. PRIVATE EPIDEMIOLOGY	103
UNIT 5. Intestinal infections: the epidemic process, the basics of anti-epidemic and preventive measures	103

<i>Learning material for the Unit</i>	104
5.1. Factors, the mechanism of development and signs of the epidemic process in intestinal infections	104
5.2. Shigellosis, the mechanism of development and signs of the epidemic process	106
5.3. Salmonellosis, the mechanism of development and signs of the epidemic process, its prevention	108
5.4. Rotavirus infection, the mechanism of development and signs of the epidemic process	110
5.5. Hepatitis A, the mechanism of development of the epidemic process and anti-epidemic measures. Hepatitis E	111
5.6. Arrangement of anti-epidemic measures in the foci of acute intestinal infections	117
5.7. Arrangement of epidemiological surveillance for the acute intestinal infections	119
<i>Tests for self-assessment of students' knowledge</i>	120
<i>Assignment 5</i>	122
UNIT 6. Aerosol and herpes virus infections: the epidemic process, the basics of anti-epidemic and preventive measures	123
<i>Learning material for the Unit</i>	125
6.1. Factors, the mechanism of the development and signs of the epidemic process of aerosol infections	125
6.2. Meningococcal infection: the characteristics of the pathogen, the mechanism of the development and signs of the epidemic process, prevention and anti-epidemic measures	127
6.3. Streptococcal infection (scarlet fever): the characteristics of the pathogen, the mechanism of development and signs of the epidemic process, prevention and anti-epidemic measures	133
6.4. Influenza: characteristics of the pathogen, the mechanism of the development and signs of the epidemic process, prevention and anti-epidemic measures ...	135
6.5. Herpesvirus infections: epidemic process, the foundations of prevention ...	139
<i>Tests for self-assessment of students' knowledge</i>	142
<i>Assignment 6</i>	144
UNIT 7. Infections with a predominantly parenteral infection mechanism: the epidemic process, the basics of anti-epidemic and preventive measures	146
<i>Learning material for the Unit</i>	148

7.1. Factors, mechanism of development and signs of the HIV/AIDS epidemic process	148
7.2. Principles of arranging anti-epidemic support for HIV infection	151
7.3. Anti-epidemic measures in detecting a case of HIV infection.	154
7.4. The main directions of work on the problem of HIV/AIDS centres for hygiene and epidemiology	155
7.5. Hepatitis B, C, D and others: characteristics of pathogens, mechanism of the development of the epidemic process, signs of the epidemic process, prevention and anti-epidemic measures	156
<i>Tests for self-assessment of students' knowledge</i>	166
<i>Assignment 7</i>	168
UNIT 8. Military epidemiology. Characteristics of anti-epidemic efforts and means, basics of disease control and biological protection of troops . . .	170
<i>Learning material for the Unit</i>	171
8.1. General provisions of the arrangement of anti-epidemic efforts and measures in the Armed Forces. Regularities of the development of the epidemic process among the personnel of the troops	171
8.2. Epidemiological diagnostics in the system of anti-epidemic measures.	175
8.3. Content, organisation and procedure for carrying out anti-epidemic efforts and measures	178
8.4. Methods for assessing the epidemic situation in a military unit and the area of deployment, criteria for assessing the sanitary and epidemiological state of troops and the area of their deployment.	178
8.5. Biological weapons, characteristics of biological agents (BA), features of their damaging effect	180
8.6. General principles of arranging the protection of troops from biological weapons	181
<i>Tests for self-assessment of students' knowledge</i>	183
<i>Assignment 8</i>	185
REFERENCES	187

Учебное издание

Мамчиц Людмила Павловна

ЭПИДЕМИОЛОГИЯ EPIDEMIOLOGY

Учебное пособие для иностранных студентов,
обучающихся на английском языке

На английском языке

Редактор *В.И. Канопа*

Художественный редактор *В.А. Ярошевич*

Компьютерная верстка *Н.В. Шабуня*

Корректор *Ю.И. Варакса*

Консультант-переводчик *В.Ю. Соболевич*

Подписано в печать 01.11.2021. Формат 60×84/16. Бумага офсетная. Печать офсетная. Усл. печ. л. 11,16.
Уч.-изд. л. 13,0. Тираж 200 экз. Заказ 4913.

Республиканское унитарное предприятие «Издательство “Вышэйшая школа”».
Свидетельство о государственной регистрации издателя, изготовителя, распространителя
печатных изданий № 1/3 от 08.07.2013. Пр. Победителей, 11, 220004, Минск.
e-mail: market@vshph.com http://vshph.com

Открытое акционерное общество «Типография “Победа”».
Свидетельство о государственной регистрации издателя, изготовителя,
распространителя печатных изданий № 2/38 от 29.01.2014.
Ул. Тавлая, 11, 222310, Молодечно.