Al-Farabi Kazakh National University

Faculty Medicine and Health Care

Education program on specialty:

"M 10109 Public Health"

PROGRAM OF THE FINAL EXAM IN THE DISCIPLINE OF COURSE "GENERAL EPIDEMIOLOGY"

6 credits

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Almaty, 2024

Study topics for the exam: The final exam will be in writing form as a case study. The thematic content covers all types of work: topics from lectures and seminars, as well as assignments for master's students' independent work.

The outcome of learning:

1. To demonstrate knowledge and understanding of the principles of Epidemiology as a science in Public Health.
2. To distinguish concepts of causality in epidemiology.
3. Demonstrate skills to estimate Population Health.
4. To demonstrate knowledge and skills in understanding the hierarchy and design of epidemiologic studies.
5. To show the ability to plan and provide an investigation of Infectious Diseases

List of examination items for preparation to exam

Module I. Bases and Concepts of Epidemiology
Class 1. Introduction to Epidemiology. Definition of Epidemiology. History of Epidemiological methods and concepts. Core Epidemiologic Functions. Causal thinking. Core The Epidemiologic Approach.
Content. Epidemiology is the study of the frequency and determinants of diseases that are distributed in a specific population group. In recent years, epidemiology has become an increasingly important approach in both public health and clinical practice. Epidemiology is the basic science of disease prevention and plays a major role in the development and evaluation of public policy and social and legal arenas. Epidemiology studies using epidemiologic studies in Medicine. So Epidemiology and Clinical Epidemiology have close relationship for solving problem of People's health. Quantitative and Qualified Epidemiology.
Class. 2. Concepts of Disease Occurrence. Natural History and Spectrum of Disease. Chain of Infection. Epidemic Disease Occurrence.
Content. A critical premise of epidemiology is that disease and other health events do not occur randomly in a population. Some models of disease causation have been proposed. The traditional model for infectious disease consists of an external **agent**, a susceptible **host**, and an **environment** that brings the host and agent together. In this model, disease results from the interaction between the agent and the susceptible host in an environment that supports the transmission of the agent from a source to that host.
Class 3. Quantitative and Qualified Epidemiology. Measures of risk. Frequency Measures. Morbidity and Mortality Frequency Measures. Natality (Birth) Measures. Measures of Association. Measures of Public Health Impact.
Content. Quantitative and qualitative research use different research methods to collect and analyze data, and they allow you to answer different kinds of research questions. For quantitative data, statistical analysis methods were used to test relationships between variables, and for qualitative data, it used methods such as thematic analysis to interpret patterns and meanings in the data. Qualitative vs. quantitative research. A descriptive research design use a wide variety of quantitative and qualitative methods to investigate one or more variables. The researcher observes and measures variables related to disease and their outcomes of.

Class 4. Epidemiological Investigation. Investigating an Outbreak.
Content. Outbreaks of disease is the occurrence of more cases than expected or occur frequently. Each day, health departments learn about cases or outbreaks that require investigation. One way is to analyze surveillance data is reports of cases of communicable diseases that laboratories and healthcare providers routinely send to health departments. Investigation indicated that the increase in gastroenteritis was This is probably attributable to the consumption of spoiled meat during the power failure. The steps of outbreak investigations are Prepare for field work, Establish the existence of an outbreak, Verify the

diagnosis, Construct a working case definition, Find cases systematically and record information, Perform descriptive epidemiology, Develop hypotheses, Evaluate hypotheses epidemiologically, As necessary, reconsider, refine, and re-evaluate hypotheses, Compare and reconcile with laboratory and/or environmental studies, Implement control and prevention measures, Initiate or maintain surveillance, Communicate findings.

Class 5. Public Health Surveillance.

Content. The health department is responsible for protecting the public's health using a program called Public Health Surveillance, which has the function of surveying and controlling population health. The objectives of PHS are Identifying Health Problems for Surveillance, Collecting Data for Surveillance, Analyzing and Interpreting Data, Disseminating Data and Interpretations, Evaluating and Improving Surveillance, Summary, and

Module П. Methodological Approaches in Epidemiology

Class 6. Concepts and Design of Epidemiological Studies. Descriptive studies: case reports, case series, ecological and cross-sectional.

Content. Epidemiologic studies are divided into observational and interventional. Observational studies can be descriptive and analytical. Descriptive studies identify patterns among cases and in populations by time, place and person. From these observations, epidemiologists develop hypotheses about the causes of these patterns and about the factors that increase the risk of disease. Descriptive research answers what, when, where, when, and how questions, but not why and how questions. Hypotheses are formed based on descriptive studies. In other words, epidemiologists can use descriptive epidemiology to generate hypotheses.

Class 7. Design of Epidemiological Studies. Descriptive studies. Descriptive studies: case reports, case series, ecological and cross-sectional.: strength and limitations.

Content. Descriptive studies: ecological and cross-sectional studies. Estimation of advantages and disadvantages. Using in Medicine. Measurement of associations.An ecological study design is used to monitor population health, make large-scale comparisons, study the relationship between population-level exposure to risk factors and disease, or to look at the contextual effect of risk factors on the population. In a cross-sectional study, the investigator measures the outcome and the exposures in the study participants at the same time on the inclusion and exclusion criteria set for the study. The investigator follows the study to assess the exposure and the outcomes.

Class 8. Analytic studies are then undertaken to test specific hypotheses. Subject samples are identified, and information about exposure status and outcome is collected.

The essence of an analytic study is that groups of subjects are compared to estimate the magnitude of the association between exposures and outcomes. This is a case-control study.

Class 7. Analytical studies. Cohort study: strength and limitations, measure association, using in Medicine. Practical work: analysis of case-control study using scientific articles from websites as an example. Evaluation and measurement of the occurrence of diseases. Exposure measurement in studies: RR, OR, AR, AR%, PAR, PAR%. Practical work using scientific articles from websites as an example.

Content. Analytic studies are then undertaken to test specific hypotheses. Samples of subjects are identified, and information about exposure status and outcome is collected. The essence of an analytic study is that groups of subjects are compared to estimate the magnitude of association between exposures and outcomes. This is a cohort study.

Class 8. Analytical studies. Case-control study: strength and limitations, using in Medicine. Measures of association or measures of excess risk. OR, RR, AR, AR%, PAR, PAR%. Content. The cohort study is

the main analytical study focusing on the exposition of risk factors. They were open and closed, retrospective and prospective. Evaluation and measurement of the occurrence of diseases. Exposure measurement in studies using RR, OR, AR, AR%, PAR, PAR%. Practical work using scientific articles from websites as an example. Summary measures of population health are measures that combine information on mortality and non-fatal health outcomes to represent the health of a particular population as a single number. A wide array of summary measures have been proposed (for example, active life expectancy, disability-free life expectancy, dementia-free life expectancy, disability-adjusted life expectancy, health-adjusted life expectancy, healthy life-years, Years of Healthy Life, disability-adjusted life years, etc.). Based on a simple survivorship curve, these measures can be divided broadly into two families: health expectancies and health gaps.

Class 9. Experimental studies. Randomized controlled trial and non-randomized trial. Stratified, crossover, factorial design, and group randomization. Design of clinical trials (phases, safety, and effectiveness of drugs).

Content. Experimental studies are studies in which the investigator artificially manipulates study factors

or subjects, such as a therapeutic regimen or some other parameter. An experimental study is the preferred means of hypothesis testing in most laboratory settings, and relevant methods are subject to continuing improvements. Types of experimental studies are randomized and non-randomized trials. Class 10. Bias and confounding factors in studies. Overview of epidemiological studies. Practical work using scientific articles from websites as an example.

Content. Bias may be defined as any systematic error in an epidemiological study that results in an incorrect estimate of the true effect of an exposure on the outcome of interest. Bias results from systematic errors in the research methodology. More than 50 types of bias have been identified in epidemiological studies, but for simplicity, they can be broadly grouped into two categories: information bias and selection bias. Confounding provides an alternative explanation for an association between an exposure (X) and an outcome. It occurs when an observed association is, in fact, distorted because the exposure is also correlated with another risk factor (Y). This risk factor Y is also associated with the outcome but independently of the exposure under investigation, X. As a consequence, the estimated association is not the same as the true effect of exposure X on the outcome.

Module III. Module III. Types of Epidemiology Class 11. Diagnostic and screening tests. Sensitivity and specificity of tests.

Content. A diagnostic test is used to determine the presence or absence of a disease when a subject shows signs or symptoms of the disease. A screening test identifies asymptomatic individuals who may have the disease. The diagnostic test is performed after a positive screening test to establish a definitive diagnosis. The probability of having the disease, given the test results, is called the predictive value of the test. Positive predictive value is the probability that a patient with a positive (abnormal) test result actually has the disease. Negative predictive value is the probability that a person with a negative (normal) test result is truly free of disease.

Sensitivity is the ability of the test to identify correctly those who have the disease. Specificity is the ability of the test to identify correctly those who do not have the disease. Class 12. Statistical methods in Epidemiology. Meta-Analysis. Practical work using scientific articles from websites as an example.

Content. Statistical methods and techniques used in Epidemiology. The study design and data type determines epidemiologic studies. Principles of Data Analysis, Statistical Thinking, Multivariate Analysis, Handling of Data Problems, Meta-Analysis. Class 13. DEPTH model in Medicine. Implementation of epidemiologic studies in Medicine: Practical work using scientific articles from websites as an example. Content: DEPTH model in Medicine. Diagnostic, etiologic, prognostic, and therapeutic research are used to solve Clinical Medicine problems.

Class 14. Exposure-Oriented Epidemiology: Occupational, Environmental, Nutritional, Radiation, Physical Activity Epidemiology.

Content. Epidemiology has been defined as the study of the effects of workplace exposures on the frequency and distribution of diseases and injuries in the population. Thus, it is an exposure-oriented discipline versus outcome–oriented Epidemiology, such as Epidemiology of Infectious diseases,

cardiovascular diseases, etc. Types of Exposure-Oriented Epidemiology are Occupational, Environmental, Nutritional, Radiation, and Physical Activity Epidemiology. Class 15. Outcome-Oriented Epidemiology: Infectious Disease Epidemiology, Cardiovascular Disease and Health, Cancer Epidemiology, Epidemiology of Diabetes, Epidemiology of Psychiatric Disorders.

Content. Outcome-oriented epidemiology, such as Infectious Disease Epidemiology, Cardiovascular Disease And Health, Cancer Epidemiology, Epidemiology of Diabetes, and The epidemiology of Psychiatric Disorders, is based on the results of outcomes related to exposure determinants (reasons and risk factors). They are the major causes of burden: morbidity, mortality, and disorders.

EXAM RULES

1. Bachelor students are authorized in the Moodle LMS and get access to the task "Final exam in the discipline" at the time set by the teacher.

2. Learn the topics of the instructor's essay.

3. Perform the task within 3 hours

4. Load the completed work on the case study into the LMS Moodle for this:

4.1 Students should be authorized in LMS Moodle,

4.2 open the element "Final exam in the discipline",

4.3 select the item "Add an answer to the task",

4.4 upload their works in the file upload field,

4.5 click "Save".

The form of the final control (exam):
WRITTEN- ESSAY

Form of conducting final control (exam) *.	Used platform	For whom recommend	Availability of proctoring, video recording, verification for plagiarism	Possibility generating tickets of questions	How is done verification of works
WRITTEN: – case study	LMS MOODLE	bachelors	Video recording at individual work - not required. Mandatory check for plagiarism in the works of doctoral students. Provided automatic check work for availability plagiarism with using two services: Antiplagiarism (required) and Strike Plagiarism (if necessary).	no	1. Teacher discipline gets ready files / responses in DLS Moodle. 2. Evaluates the work, checks on the presence of plagiarism. 3. Puts points in DLS MOODLE. 4. Transfer points to

The form of the final control (exam):

Form of conducting final control (exam) *.	Used platform	For whom recommend	Availability of proctoring, video recording, verification for plagiarism	Possibility generating tickets of questions	How is done verification of works

The Typology and approximate content of examination tasks:

Each exam ticket includes three questions on the above course topics.
1) key competency; 2) general competency relates to a certain circle of subjects and educational areas; 3) subject competency relates is private in relation to the two previous ones, having a specific description and the possibility of forming educational subjects.

Blocks			

Grading

Traditional grades	Scores	Requirements
Excellent	90-100	The work was done independently and at a high scientific and methodological level. The text of the response shows that the doctoral student is capable of reflecting (evaluating and processing), mastering scientific methods and activities, and offering concepts and models and using new methods and professional tools. The work presents the author's vision of the problem and the corresponding argumentation. The work is done neatly. The doctoral student owns professional terminology when writing scientific papers.
Good	75-89	The work is generally well-written, but the author does not. Disclose or not fully illuminate individual topic questions. The work does not present the author's vision. There are some inaccuracies, but they do not relate to the main content of the work. The answer reveals knowledge and understanding of the material by no less than 75%.
Satisfied	50-74	The task was generally completed, but the author did not demonstrate problem-analysis skills and did not disclose or highlight individual topic questions. The work does not represent the author's vision of the problem. The author does not know enough about the methodology of scientific research. The answer contains inaccuracies related to the main content of the question.
Unsatisfied	0-49	The task was not completed or completed in less than 50%. The task was not completed correctly.

Required and Recommended Reading Required reading:

1. Aschengrau A., Essentials of Epidemiology in Public Health, 3rd Edition, 2008 **Recommended reading**:

1. Gordis: Epidemiology, 5th Edition, Saunders 2013
2. Rothman K., Modern Epidemiology, 3rd Edition, 2008
3. Pickles A. Epidemiological Methods in Life Course Research, 1st Edition, 2007
4. Webb P and Bain C. Essential Epidemiology: An introduction for Students and Health Professionals. Second Edition. Cambridge University Press. 2011. Учебно-методический комплекс дисциплины «Вакциноуправляемые инфекции. Иммунопрофилактика» Составитель: и.о. доцента Искакова Ф.А.., 2019-2020 уч. г.
5. Wolfgang, A. Handbook of Epidemiology. Vol.1//Ahrens Wolfgang, Peugeot Iris. - 2 ed.- Springer Reference, 2014.- 469 p.
6. Principles and methods of Epidemiology. 3-d Edition. R. Dicker Ooffice of epidemiologic program СДС, USAID. -2012.-457 P.
7. Principles of Epidemiology in Public Health Practice. Third Edition. An introduction to Epidemiology and Biostatics.US, CDC, Atlanta. -2012.-6-75 p.
8. Hennekens, C., & Buring, J. (1987). Epidemiology in Medicine, Boston/Toronto: Little, Brown and Company.
9. Kelsey, J., Whittemore, A., Evans, A. & Thompson, D. (1996). Methods in Observational Epidemiology, Second Edition, New York: Oxford University Press.

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10. www.who.org
11. www.cdc.gov
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13. www.cockraine.library
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