

Al-Farabi Kazakh National University Faculty  
Medicine and Healthcare Chair on Epidemiology,  
biostatistics and evidence-based-medicine

**PROGRAM OF THE FINAL EXAM  
ON COURSE**

# **EVIDENCE-BASED MEDICINE**

5 CREDITS

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**TMC OF COURSE IS CONFIRMED**

**On Academic Council of Medicine and Public Care Faculty**

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**Department**

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**Recommended by the faculty methodical bureau**

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## **PROGRAM OF THE FINAL EXAM ON COURSE EVIDENCE-BASED MEDICINE**

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

### **Outcome of results:**

In preparation for the exam, it is necessary to review the main theoretical content of the course, terminology and methods.

Based on the results of studying the course, a master's student should be able to:

- identify health problems, formulate clinical questions and search for information in scientifically proven databases;
- selects epidemiological research methods based on the level of evidence to address diagnostic, etiological, prognostic and theoretical challenges to public health;
- critically evaluates the planning, implementation and analysis of the conducted epidemiological study;
- critically evaluates the statistical measures of the study conducted;
- evaluate clinical practice guidelines and recommendations based on the AGREE system.

### **List of examination items for a preparation to exam**

#### **Topic 1. Definition of Evidence-based medicine. Formulation of a clinical question.**

Definition and reasons for the emergence of evidence-based medicine. Formulation of a clinical problem. Types of questions. Evidence-based medicine databases.

#### **Topic 2. Clinical epidemiology. 5 steps of evidence-based medicine: Step 1 - formulating a clinical problem and transforming a clinical problem into a question according to PICOT framework.**

Clinical epidemiology concept. 5 steps DM. PICOT structure. Compliance of research methods with the PICOT provisions on the hierarchy of evidence.

#### **Topic 3. The second step of EBM is to search for and obtain the highest quality evidence available through the Internet and electronic databases. System for bibliographic search of medical information - PubMed.**

Searching. Organization and search stages in MEDLINE, Best Evidence, Clinical Evidence, EMBASE, Cochrane Library. Medical Subject Headings Index (MeSH Translation Table). Using logical operators of Boolean algebra.

#### **Topic 4. Clinical trial design. Types, advantages and limitations of crossover, cohort and case-control studies.**

Observational and interventional studies. Descriptive and analytical research. Case report, case series, case-control, cohort studies. Measurement measures: arithmetic mean, standard deviation, confidence interval, incidence, prevalence and mortality rates. Proportions. RR, OR. P-value.

**Topic 5. Experimental research. Planning and design of randomized controlled trials: scope, interpretation of results, benefits and limitations.**

Experimental research. RCT and non-RCT. Primary, secondary and tertiary endpoints. Outcomes. Clinical and statistical significance.

**Topic 6. Diagnostic and screening tests:**

Sensitivity and specificity, likelihood ratio and predictive value (negative and positive). The reliability of individual measurements. Validity. Reproducibility. Accuracy.

**Topic 7. Principles of Evidence-Based Medicine in Diagnostic, Etiological (Risk Assessment), Prognostic and Therapeutic Purposes in Medicine (DEPTH Model).**

The principles of evidence-based medicine in diagnostic (sensitivity, specificity, positive predictive value, negative predictive value), etiological (risk assessment, OR), predictive and therapeutic purposes (RR) in medicine.

**Topic 8. Search and analysis of systematic review and meta-analysis in the electronic database Cochrane Database of Systematic Reviews.**

The concepts of "systematic review" and "meta-analysis". Features of systematic reviews and meta-analyzes.

**Topic 9. GxP concepts, search and analysis: GLP, GCP, GMP, GPP, GDP and GSP.**

Principles of Good Clinical Practice (GCP), GLP, GCP, GMP, GPP, GDP and GSP.

**Topic 10. Hierarchy of research in evidence-based medicine.**

Evidence levels: A, B, C, D. Evidence value of the design of various clinical trials. Classes of recommendation: I, II, II-a, II-b, III.

**Topic 11. Basic statistical knowledge required for the interpretation of evidence-based medicine data. Statistical analysis of  $2 \times 2$  tables in diagnostic studies.**

Root mean square (standard) deviation, mean (standard) error of the arithmetic mean. Determination of the confidence interval. Determination of the required size of the sample. Average values. Fashion, median. The arithmetic mean and its properties. Correlation coefficient.

**Topic 12. 3 stage of evidence-based medicine. Critical assessment and analysis of scientific publications from the point of view of evidence-based medicine.**

Questions for critical evaluation of the publication methodology. Relevance, research design. Evaluation of various research designs for therapeutic, diagnostic, etiological and prognostic questions. Assessment of statistical methods of analysis. evaluation of research results. Research bias. Critical Appraisal Skills Program for Different Studies.

**Topic 13. 4 and 5 stages of evidence-based medicine. Applying evidence-based interventions in the current clinical environment. Evaluating the effectiveness and usefulness of EBM practice.**

The application of evidence-based interventions in the current clinical environment. Assessing the effectiveness and usefulness of EBM practice.

**Topic 14. Clinical practice guidelines (CRG). Search for CRC in a scientifically proven database.**

Definition, conditions of creation; purpose, opportunities, classes, advantages and disadvantages of the CRC.

**Topic 15. AGREE system and clinical practice guideline assessment.**

Definition, structure and content of the AGREE for CRC questionnaire.

**EXAM RULES**

1. At the time set by the teacher, master's students are authorized in the Moodle LMS and get access to the task "Final exam in the discipline".
2. Read the topics of the instructor's case study.
3. Perform the task within 3 hours
4. Load the completed work on the case study into the LMS Moodle, for this:
  - students log into the Moodle LMS,
  - open the element "Final exam in the discipline",
  - select the item "Add answer to the task",
  - upload their works in the file upload field,
  - click "Save".

**The form of the final control (exam): Written case study**

<b>The form of a final control (exam):*</b>	<b>Used Platform</b>	<b>For whom Recommended</b>	<b>Availability of proctoring, video recording, verification for plagiarism</b>	<b>Possibility automatic generating tickets / questions</b>	<b>Verification form of works</b>
<b>WRITTEN</b> – case	СДО Moodle	For master's students	Proctoring no. Video recording at individual work not required. Mandatory check for plagiarism in the works of students. Provided automatic check work for availability plagiarism with using two services: Antiplagiarism (obligatory) and StrikePlagiarism (if it is necessary). One check by PTS	no	1. Teacher of discipline gets ready files / responses in LMS Moodle. 2. Evaluates the work, checks on the presence of plagiarism. 3. Puts points in LMS Moodle. 5. Transfer points to

			for 1 student's job. PTS can provide possibility of checking by using Antiplagiarism system – one attempt (teacher unes in system)		IS Univer statements
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**Typology and approximate content of examination questions:**

Block	Example question	Determination of the level of competence formation
Block 1. Questions aimed at definition cognitive competencies	Conduct a PICOT case study and form a clinical or research question	Students demonstrate the ability to discuss diagnostic, etiological, therapeutic and prognostic problems in medicine and public health.
Block 2. Questions defining systemic competence	Determine a strategy of searching for publications, conducting searches, and selecting appropriate publications.	Demonstrates ability to use search techniques, selection of search tools and suitable publications in electronic databases.
Block 3. Questions aimed at definition functional competence	Analyze and evaluate the quality of the methodology and the results of the selected publications. Provide recommendations for solving clinical issues	Able to evaluate the methodology and results of selected publications from the point of view of evidence-based medicine; and give advice on how to make decisions on these kinds of clinical issues.

**Grading strategy**

Traditional grades	Scores	Dependable performance
Perfect	90-100	The work was done independently and at a high scientific and methodological level. The response text shows that the student is capable of reflect (evaluate and process) mastered scientific methods

activities and is also able to offer concepts, models and use new ways and professional tools.

The work presents the author's vision of the problem and the corresponding argumentation.

The work is done accurately, the student owns

		professional terminology writing scientific papers.
Хорошо	75-89	The work is generally well written, but the author does not disclosed or not fully illuminated individual topic questions. The work does not present the author's vision. 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%.
Satisfactory	50-74	The task was generally completed, but the author did not demonstrated problem analysis skills, not disclosed or not highlighted individual topic questions. The work does not represent the author's vision of the problem. The author does not know enough the methodology of scientific research. The answer contains inaccuracies related to the main content of the question.
Unsatisfactory grade	0-49	The task was not completed, or completed in less than by 50%, The task was not completed correctly.

### Literature:

1. Trisha Trinhalk. Bases of Evidence-based Medicine, 2010.-222 p.
2. AGREE II VERSIONS & UPDATES AGREE II Original Public Release and Publication Date: 2009/2010 AGREE II Update: September 2013 AGREE II Update: December 2017
3. Evidence-Based Medicine Guidelines. John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex PO19 8SQ, England.- 2005.- 1343 p.
4. Users' Guides to the Medical Literature: Essentials of Evidence-Based Clinical Practice, Third Edition (Uses Guides to Medical Literature) by Gordon Guyatt, 2015.- 402 p.

### Additional Literature:

5. Key topics. Evidence-based medicine. D.P.V. MqGoverin, R.M. Valori, W.S.M. Summerskill, M. Levi, 2001.-167 p.
6. AGREE II. Instrument. The AGREE next steps consortium, 2017.- 52 p.
7. Sackett DL, Rosenberg WMC, Gray JAM, Haynes RB, RW Scott: Evidence based medicine: what it is and what it isn't. Editorial. BMJ 1996; 312: 71–2.
8. REVIEW ARTICLE Critical Appraisal of Scientific Articles Part 1 of a Series on Evaluation of Scientific Publications Jean-Baptist du Prel, Bernd Röhrig, Maria Blettner
9. Evidence Based Medicine – New Approaches and Challenges Izet Masic, Milan Miokovic, Belma Muhamedagic Faculty of Medicine, University of Sarajevo, B&H/PROFESSIONAL PAPER vol 16 no 4 DECEMBER 2008

### Electronic sources:

1. [www.who.org](http://www.who.org)      2/  
[www.cdc.gov](http://www.cdc.gov)
- 3/[www.gapminder.com](http://www.gapminder.com)
4. [www.medline](http://www.medline)
5. [www.cockraine.library](http://www.cockraine.library)
6. [www.PubMed](http://www.PubMed).