Approved by Vice-Rector
for research activities
_____B. Zhussupov
«06» _____2018

ENTRANCE EXAMINATION PROGRAM FOR MASTERS ON SPECIALTY 6D110100 - MEDICINE FOR 2018 - 2019 ACADEMIC YEAR

Almaty 2018.

The program was approved at the meeting of the Department of Biostatistics and Basic of Scientific Research
Protocol № 11 from «24» 05 2018.

Head of the department _____ Aimakhanova A.Sh.

The program was approved at the meeting of the Educational Programs Committee of the School of General Medicine
Protocol № 10 from «05» 06 2018.

Chairman of the EPC _____ Nuftieva A.I.

The program was approved at the meeting of the Academic Council of KazNMU
Protocol № 6 from «14» 06 2018.

Chairman _____ Baildinova K.Zh.

Introduction

The development of priority areas of medical science and practical health care requires highly qualified scientific personnel, which are the guarantor of the implementation of research at a high scientific level. Due to the staff of the highest scientific qualification, a worthy scientific and methodical level of training doctors in educational institutions is maintained, which ensures them competitiveness in the market of educational services, including international. The State Health Development Program of the Republic of Kazakhstan "Densauly" for 2016-2019, which sets itself the tasks of developing the public health system, pays special attention to the development of medical science and the training of scientific and medical personnel on the basis of modernizing methodological approaches by transferring advanced world standards and concepts to domestic health care.

The main problem is staffing and, of course, the quality of training. For this purpose, much attention is paid to the development of new scientific knowledge, the conduct of original research and the expansion of the boundaries of scientific activity through the training of scientific and pedagogical personnel in the medical specialties of group 6D110100 - "Medicine". Currently, there is a development and further improvement of the training process in doctoral studies, where an important aspect is the assessment of the preliminary level of preparedness of applicants. Improving the health care system by strengthening the human resources capacity is a key aspect of the healthcare movement towards strengthening the competitiveness of the Republic of Kazakhstan.

Purpose of the entrance examination:

Define the knowledge of those who come to the questions of evidence-based medicine, biostatistics, scientific research in medicine, and the organization and management of the health care system on a scientifically-evidence-based basis.

The program of entrance exams is developed on the basis of the State Obligatory Standard of Residency in Medical Specialties (State Standard of Health of 2015, Ministry of Health of the Republic of Kazakhstan), takes into account modern requirements to the level of training of students based on the system of continuous professional development of human resources of the health system and has the goal: to determine the level of knowledge of the applicant in the field modern approaches and requirements for the organization and conduct of scientific research, based on evidence-based scientific evidence.

The objectives of the entrance examination:

- To determine the level of knowledge and preparedness in the field of the methodology of scientific research;
- To determine the level of knowledge and preparedness in the field of biostatistics;
- To determine the level of knowledge and preparedness in the field of pedagogy.

The entrance exam is conducted in two stages: 1) testing in the disciplines:

biostatistics, the fundamentals of the methodology of scientific research, pedagogy; 2) presentation of the annotation of the planned dissertation research (Appendix 1, 2).

Biostatistics

Introduction to biostatistics. Basic concepts of probability theory. Estimation of parameters of sets. Basics of testing statistical hypotheses. Studying the relationship between qualitative and quantitative characteristics. Fundamentals of variance analysis. Parametric and nonparametric criteria. Method of standardization, its meaning and application. Correlation analysis.

Graphical images in a statistical study. The use of computer technology in the processing of statistical material. The use of measurement scales in a medical-biological experiment. Aggregated estimates. Comprehensive estimates. Analysis of the use of statistical methods in articles and dissertational research. Health statistics of the population. Statistics of the health system. Statistics of medical and biological research.

Fundamentals of the methodology of scientific research

Fundamentals of national and international law in the field of scientific research: QPBR, GLP, GLP, GCLP, etc. Scientific research in medicine. Scientific and research programs on sources of financing. Search and attraction of grants. Writing scientific projects and grant applications. Research methodology. Descriptive and analytical studies. A systematic review. Meta-analysis. Collection of information. Data processing. Analysis of research and formulation of conclusions and proposals. Introduction of research results, protection of intellectual property rights (patenting). General requirements and rules for registration of research work. Reviewing of research works.

Preparation of scientific materials for publication in the press. Publications in peer-reviewed journals, general rules for writing articles Assessment of methodological quality, the main types of errors in scientific research. Mechanisms for practical transfer of research results into health care practice and policy.

Pedagogy

The object and subject of pedagogy. Tasks of the pedagogical science. The system of pedagogical sciences. Relationship of pedagogical science with other sciences. The main categories of pedagogy. The state and problems of education in Kazakhstan at the present stage. Indicators of the quality of education. Reforming the education system in line with world standards. International criteria of education. State program for the development of education in the Republic of Kazakhstan for 2011-2020. Experience in implementing distance education technologies in Kazakhstan. General theory of personality development. Theory of the development of the personality. Personality development and its factors. Problems of public education, the laws of the influence of the social environment on the formation of the individual. Practical organization of public education. Social pedagogy. Problems of family education, family crisis. Typical models of relations between adults and

children in families.Перечень вопросов для вступительного экзамена для специальности

List of questions for the entrance examination for the specialty 6D110100 – MEDICINE

On discipline "Biostatistics":

1. The concept of statistics - as a science. The concept of biological statistics.
2. The subject, purpose and objectives of biological statistics.
3. Data types: continuous, discrete, ordinal, nominal.
4. Corrective scales. The concepts of dependent and independent variables.
5. Concepts of the general population and the sample. The concept of representativeness.
6. Concepts of options, frequency, relative frequency, aggregate volume.
7. Measurement of the central trend: mean and median of the sample.
8. Measurement of variability (variability) of data: standard deviation (variance), span, percentiles.
9. Coefficient of variation. Quartiles, interquartile interval. The standard error is average. Confidence interval for the population average.
10. The concept of a normal distribution. Parameters describing the normal distribution. Graph of the normal distribution. The Gauss curve.
11. Selective distribution of the proportion in the sample. The standard error for the proportion. Confidence interval for the population ratio.
12. Graphical representation of discrete and continuous data.
13. Definition of a statistical hypothesis. Types of hypotheses.
14. Concepts of the statistical criterion and statistics of the criterion. Determination of errors of the first and second kind.
15. Parametric and nonparametric criteria. The concepts of the significance level of the criterion, the power of the criterion, and their numerical values.
16. Concepts of the critical area, the area of acceptance of the hypothesis, the critical point of the criterion.
17. Pairwise t-test: definition, limits of applicability. Calculation and interpretation of t-statistics and the value of p (p-value). Confidence interval method.
18. Student's unpaired t-criterion: definition, boundaries of applicability. Confidence interval method: 95% CI for the difference of the mean of two independent populations. Calculation and interpretation of t-statistics and the value of p (p-value).
19. Nonparametric analogue of the unpaired Student's test: Mann-Whitney criterion. Ranking option: definition, ranking rules. Calculation of the total amount of ranks. Conditions for the application of the Mann-Whitney test.
20. Nonparametric analogue of the paired Student's test: Wilcoxon's criterion. Ranking of pairwise differences. Conditions for the application of the Wilcoxon test.
21. The concept of variance analysis, its types, scope.

22. Concepts of intergroup and intragroup dispersions. Determination of the factor, factor level, response.
23. Comparison of proportions in two independent populations: z-test.
24. Consistency criterion: Pearson ч2-square.
25. Fisher's exact test.
26. Measures of association: relative risk, risk difference, odds ratio. Interference factors and effect modifiers. Stratified analysis.
27. Linear correlation. Selected Pearson correlation coefficient, its properties. Spearman's rank correlation coefficient. Determination of the strength and nature of the correlation dependence from the value of the correlation coefficient. Testing the hypothesis of the significance of the correlation coefficient.
28. Linear regression. Estimation of linear regression parameters by the method of least squares. The concepts of direct and reverse regression. Interpretation of the regression coefficient. Selective equation of the direct regression line.
29. Censored data. Events and time of life. Kaplan-Meier method for survival analysis. Survival function, its properties. Survival curve. Survival rate in the population, median survival.
30. Method of standardization. Standardized coefficients. Direct method of standardization.
31. Dynamic series and the definition of the main indicators of the dynamic series. Momentary dynamic series. Interval dynamic range. Methods for aligning the dynamic series.
32. Health indicators of the population and the health care system. Network and staff indicators.
33. Indicators of outpatient and polyclinic organization. Indices of hospital activities. Performance indicators of various health services.

On the discipline "Fundamentals of the methodology of scientific research"

1. Definition of science. The main stages of the development of science. Functions of science. Classification of science, science.
2. Structure of scientific knowledge.
3 International and national standards and other normative acts regulating the rules and principles of scientific research.
4. The order and principles of ethical regulation of research in the field of health.
5. Scientific research and its methodology. Elements of a research project. Classification and stages of scientific research.
6. Theme, purpose and objectives of scientific research. Principles and rules for formulating the topic, purpose and objectives of scientific research.
7. Urgency and scientific novelty of the research.
8. Theoretical and experimental methods of investigation.
9. The essence of applied research.

10. Assessment of the methodological quality of scientific research.
11. The main types of errors in scientific research.
12. Collection of scientific information.
13. Reviewing and examination of scientific research works.
14. Design of scientific research, definition, rules and principles of development. Components of the design of scientific research.
15. Elements of scientific research: unit, object, object, scope of research.
16. Types of scientific research, a brief description of each species.
17. Cohort study, design, requirements for organization and conduct.
18. Study case-control, design, requirements for organization and conduct.
19. Randomized controlled trial, design, requirements for organization and conduct.
20. Meta-analysis, design, requirements for organization and conduct.
21. Systematic review, design, requirements for organization and conduct.
22. Formulation of conclusions and execution of reports on scientific research work.
23. Patent, patent information: types, aspects, content. Features and benefits of patent information.
24. Patent search, goals, types. The types of search in which patent information is used.
25. Objects of information-patent search. Stages of patent search and their sequence.
26. Medico-biological experiments, concept. Requirements included in the GCP standard. Experiments conducted with the participation of people.
27. Hypothesis of scientific research and the process of its justification.
28. Reviewing of research works.
29. Scientific and research programs on sources of funding.
30. General requirements and rules for registration of research work.
31. Practical approaches to the introduction of research results into health care practice and policy.
32. Types of scientific, educational and reference-information publications.
33. General rules for writing articles in peer-reviewed journals. Preparation of scientific materials for publication.

On the discipline of "Pedagogy":

1. The concept of methods of education.
2. Classification of methods of education.
3. Characteristics of methods of education.
4. Means of education.
5. Classification of means of education
6. Characteristics of the means of education.
7. The general concept of didactics.
8. The subject and tasks of didactics.
9. Basic didactic concepts.

10. The formation of modern didactic system
11. The concept and essence of learning.
12. The learning process as an integral system.
13. The cycle of learning.
14. Learning functions.
15. Teaching as a teacher's activity.
16. Teaching as the cognitive activity of the learner.
17. Developing training.
18. Technology of training.
19. The essence of learning control as a didactic concept.
20. Methods and forms of control.
21. Assessment of students' knowledge.
22. Student failure.
23. Diagnostics of training.
24. Testing of achievements and development.
25. The concept and essence of the content of education.
26. Sources and factors of formation of the content of education.
27. State standard of education.
28. Methods of teaching.
29. Classification of teaching methods.
30. The concept of a means of teaching.
31. Classification of teaching means, their characteristics.
32. The concept of the forms of organization of training and their classification.
33. Forms of the organization of training and their development in didactics.
34. Forms of organization of training in higher education.

Recommended literature:

1. Glaser A. N. High-Yield Biostatistics, Epidemiology, and Public Health. – Lippincott Williams & Wilkins, 2013.
2. Wayne W.D., Chad L.C. Biostatistics: A foundation for analysis in the health sciences, - Wiley, 2013.
3. John McGready, Rakesh Aggarwal, Amita Aggarwal, Nikhil Gupte (2009) Introduction to Biostatistics http://ocw.jhsph.edu/index.cfm/go/viewCourse/course/introbiostats/coursePage/index/
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5. Раманқұлова А.А. Биологиялық статистика. Оқу құралы. Алматы: «Ақнұр», 2016.
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7. Васильева Л.А. Статистические методы в биологии, медицине и сельском хозяйстве: Учеб.пособие для вузов. - Новосибирск, Новосибирский Государственный университет, 2007. - 128 с
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10. Применение методовстатистического анализа для изучения общественного здоровья и здравоохранения. Под редакцией чл.-корр. РАМН, проф. КучеренкоВ.З. Учебное пособие. М.: «ГЭОТАР-Медиа», 2011г.
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13. В.И.Зайцев, В.Г.Лифляндский, В.И.Маринкин. Прикладная медицинская статистика. Учебное пособие.- С-Петербург, Фолиант, 2006.
14. Жидкова О.И. Медицинская статистика (конспект лекций). – М. «Эксмо», 2007.
15. Лукьянова Е.А. Медицинская статистика. – М: Изд. РУДН, 2002.
16. Денисов И.Н., Кича Д.И., Чернов В.И. руководство к практическим занятиям по общественному здоровью и здравоохранению. Учебное пособие.- М.:МИА, 2009г.
17. Шапиро Л.А., Шилина Н.Г. Руководство к практическим занятиям по медицинской и биологической статистике. Учебное пособие для студентов медицинских вузов. – Красноярск, 2003г.
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32. Pedagogy / Ed. PI.Pidkasistogo - M., 2010, 325 p.
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41. Suhomlinsky V.A. Parent pedagogy. M.- 1977

Additional literature (online):

1. OpenIntro Statistics, by David M. Diez, Christopher D. Barr, and Mine Cetinkaya-Rundel https://www.openintro.org/stat/
2. Online Statistics Education, by David M. Lane, David Scott, Mikki Hebi, Rudy Guerra, Dan Osherson, and Heidi Zimmer http://onlinestatbook.com/2/
3. HyperStat Online, by David M. Lane http://davidmlane.com/hyperstat/
4. StatPrimer, by B. Burt Gerstman http://www.sjsu.edu/faculty/gerstman/StatPrimer/
5. Bland M (2000) An Introduction to Medical Statistics (3rd ed). Oxford Medical Publications. http://www-users.york.ac.uk/~mb55/intro/introcon.htm (accessed 12 Sep 2014)

Annex 1

Annotation
planned candidate's thesis for doctoral studies

last name first name middle name
по специальности 6D_ _ _ _ _ _ - «Название специальности»

Topic Title:

Domestic scientific consultant:
Academic degree, position, full name, signature

Foreign scientific adviser:
Academic degree, Full name

Almaty, 2018 y.

Relevance of the topic
Purpose and objectives of the study
Research methodology (study design, research methods, research objects, prospective scope of research)
Scientific novelty
Theoretical and practical significance
Expected results
List of used literature

Annex 2

Rules for evaluating the annotation:
The maximum score for evaluating the annotation is 100 points.
Each section of the annotation is evaluated separately for the point system, the maximum score is 20 points.

Check list
EVALUATION OF THE ANNOTATION OF THE DISSERTATION RESEARCH

_____

(Full name of the applicant)

Research topic _____
The name of the specialty of the chosen doctorate
6D_____
_____

Sections of annotation	**Number of points**
Section 1. Relevance of the selected research topic	
Section 2. Purpose, research objectives	
Section 3. Evaluation of the design of the study	
Section 4. Scientific novelty, theoretical and practical significance of the expected results of the study	
Section 5. Achievability of scientific results	
Sum of points	

Comments, dissenting opinion of a commission member (if any):
_____
_____
_____
_____

Member of the commission
Full name_____
Signature_____
Date_____