

## **Methodological recommendations for practical classes in the discipline "Statistical Methods in Pharmacy"**

Class 1. Statistical data is not necessary for the use of statistics.

Belgilerdin zhiktelui. Types of population. Sampling population. Basic requirements for sampling. Types of population. Sampling population. Basic requirements for sampling. Software for data analysis and processing. Application of Ms. Excel in medical statistics. Construction of formulas. Statistical functions. Logical function "If".

Class 2: Variation series. Mean values. The concept of variability in statistical analysis. Software for data analysis and processing. Application of Ms. Excel in medical statistics. Construction of formulas. Statistical functions. Logical function "If". SZ 2. Variation series. Construction of variation series. Sturges formula. Performing basic operations with data in SPSS. Data selection. Data transformation. Calculating new variables.

Class 3. Class 3: Nature of distribution option. Normal distribution. Characterization of population units. Descriptive statistics. Software for data analysis and processing. Application of Ms Excel in medical statistics. Analysis package. SZ 3. Mean values. Weighted arithmetic mean. Moda. Median.

Class 4: The concept of reliability. Types of statistical observations. Statistical probability. Non-parametric methods of assessing the reliability of two independent samples. Rosenbaum's Q-criterion. Algorithm of application of Mann-Whitney U-test. NW 4. The concept of variability in statistical analysis. Calculation of standard deviation.

Class 5: Parametric criteria for assessing the reliability of differences between two independent samples. Algorithm of application of Student's t-criterion NW 5. The nature of the distribution of the variant. Normal distribution. Characteristics of population units. Descriptive statistics. Software for data analysis and processing. Application of Ms Excel in medical statistics. Analysis package. Statistical criteria for testing distribution in SPSS.

Class 6: Parametric criteria for assessing the reliability of differences between two dependent samples. Algorithm of Student's paired t-criterion. NW 6. Parametric criteria to evaluate the reliability of disagreements of repeated measurements. Algorithm of application of Student's paired t-criterion. Parametric tests in SPSS. Comparisons of dependent groups.

Class 7: Nonparametric methods for assessing the reliability of two dependent samples. Signs criterion. Algorithm of application of Wilcoxon's T-criterion. NW 7. Parametric criteria to evaluate the reliability of differences between two independent samples. Algorithm of application of Student's t-criterion. Parametric tests in SPSS. Comparisons of independent groups.

Class 8: Non-parametric methods of assessing reliability. Comparison of three and above independent samples. Kruskal-Wallis criterion. Comparison of several groups: repeated measurements. Algorithm of application of Friedman's criterion. SP 8. Analysis of qualitative features. Conjugacy tables:  $\chi^2$  criterion. Fisher's exact test. Statistical criteria for conjugacy tables in SPSS.

Class 9: Parametric criteria for assessing validity. Analysis of variance. NW 9. Non-parametric methods for assessing the reliability of two dependent and independent samples. Signs criterion. Algorithm of application Wilcoxon's T-criterion. Rosenbaum's Q-criterion. Algorithm of application of Mann-Whitney U-Test. Non-parametric tests in SPSS.

Class 10. Analysis of variance of repeated measures. NW 10. Analysis of dynamic series. Basic indicators of dynamic series.

Class 11. Analyzing qualitative features. Conjugacy tables:  $\chi^2$  criterion. Methods of equalization of dynamic series. Determination of seasonality indices.

Class 12. Analyzing qualitative traits: Fisher's Exact Test and McNemar's Criterion. Determining dependence and relationship between phenomena. Pearson's correlation coefficient. Spearman's rank correlation coefficient. Linear regression analysis.

Class 13. Determination of dependence and relationship between phenomena. Pearson's correlation coefficient. Spearman's rank correlation coefficient. Basic demographic indicators.

Class 14. Linear regression analysis. Construction of survival curve by the Kaplan-Meier method.

Class 15. Analyzing dynamic series. Basic indicators of a dynamic series Methods of equalization of a dynamic series. Determination of seasonality indices. International Classification of Diseases.

## References

### The main

1. Aviva Petrie, Caroline Sabin. Visual medical statistics. Textbook for universities. Moscow, GEOTAR-Media, 2015. 168 c.
2. Nasledov A. N31 IBM S P S S Statistics 20 and AMOS: professional statistical analysis of data. - SPb.: Peter, 2013. 416c.
3. Elizabeth De Poy, Laura N. Gitlin; per. from Engl. ed. by V.V. Vlasov. Vlasov. Methods of scientific research in medicine and public health - M.: GEOTAR-Media, 2017. - 432 c.
4. Koichubekov, M. A. Sorokina, A. S. Bukeeva [et al] ; KSMU. Biostatistics in examples and tasks : textbook for universities / B. K.- Almaty : Evero, 2016.
5. Koichubekov B.K. Biostatistics : textbook. -Evero, 2015.

### THE ADDITIONAL

6. Grzhibovsky A.M., Ivanov S.V., Gorbatova M.A. Descriptive statistics using the packages of Statistica and SPSS statistical programs: distribution verification // Science and Health. 2016. № 1. C. 7- 23.
7. Grzhibovsky A.M., Ivanov S.V., Gorbatova M.A. Comparison of quantitative data of two independent samples using Statistica and SPSS software: parametric and nonparametric criteria // Science and Health. 2016. № 2. C. 5-28.
8. Grzhibovsky A.M., Ivanov S.V., Gorbatova M.A. Comparison of quantitative data of two paired samples using Statistica and SPSS software: parametric and nonparametric criteria // Science and Health. 2016. № 3. C. 5-25.
9. Grzhibovsky A.M., Ivanov S.V., Gorbatova M.A. Comparison of quantitative data of three and more independent samples using Statistica and SPSS software: parametric and nonparametric criteria// Science and Health Care. 2016. № 4. C. 5-37.
10. Grzhibovsky A.M., Ivanov S.V., Gorbatova M.A. Comparison of quantitative data of three and more paired samples using Statistica and SPSS software: parametric and nonparametric criteria // Science and Health. 2016. № 5. C. 5-29.

## Research infrastructure

### 1.Computer lab 6A

Professional research databases

[www.gapminder.com](http://www.gapminder.com)

[www.cdc.gov](http://www.cdc.gov)

### Internet sources

<http://elibrary.kaznu.kz/ru>

<https://www.stat.gov.kz/>

### Software

excel

spss