ABSTRACT

The thesis is presented in 85 pages. It contains 2 appendixes and bibliography of 29 references. 29 figures and 6 tables are given in the thesis.

Topic relevance. Nowadays, the choice of optimal strategy for laboratory diagnostics in accordance with its diagnostic and economic efficiency is becoming a global problem, because each of us wants to be treated better and cheaper. Therefore , it is necessary to carry out determine factors' studies that affect to the efficiency of diagnosis of respiratory viral infections using each strategy.

The assessment of the economic efficiency of health care resources has a significant impact because our country is now at a stage when it is aware of the best European methods of diagnosis \ treatment, but there are no full implementation in national medicine. Therefore, test hypotheses in the management of clinical and diagnostic center in order to reduce the number of false-provided diagnosis results and treatment of uncertainty indicators of diagnosis and treatment strategies for clinical diagnostic and management of infectious human diseases have a significant importance in the development of domestic medicine.

With the selection and processing small samples values (obtained by the selected test) based on medical records and laboratory internal control we can enhance the analytical quality tests can improve the accuracy of the appointment of treatment and diagnosis of diseases, increase efficiency of treatment of infectious human diseases.

Thesis connection to scientific programs, plans, and topics.

The thesis was prepared according to the scientific research plan of the Applied Mathematics Department of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" and within the retrieval research "Optimization strategies for diagnosis, prevention and treatment of viral infections based on clinical laboratory and pharmacoeconomic and pharmaco epidemiological studies" (№ state registration 0115U002161) .P .L. Shupyk National medical Academy of Postgraduate education of Ukraine.

Research goal and objectives. The goal of this thesis is to is to develop methods of mathematical modeling allows to evaluate rationality. Election diagnostic strategies for detection of viruses To improve the quality of laboratory diagnostics and reduce costs for additional diagnostic procedures.

To accomplish this goal, the following objectives were reached:

– forecasting the economic efficiency of medical technology used in clinical diagnostic management of infectious human diseases;

– assessment of the rational choosing of a medical technology that is optimal strategies in choosing clinical-diagnostic management of infectious human diseases;

– reducing the number of false results provided diagnosis and treatment of uncertainty indicators of diagnosis and treatment strategies for clinical diagnostic and management of infectious human diseases;

– improving the accuracy of the appointment of treatment and diagnosis of diseases, increasing the effectiveness of treatment of infectious human diseases.

Object of research is the process of formalization and mathematical processing of numerical data to influence decisions when choosing strategies for clinical diagnostic and management of infectious human diseases.

Subject of research is is mathematical model that describes the changing state of health of the patient, depending on the selected treatment strategies with regard to infectious diseases diagnostics and indicators of the previous treatment.

Methods of research. To solve the task, the following methods were used: mathematical modelling, optimization methods, methods of system analysis and analytical modelling.

Scientific contribution consists of the following:

– developed mathematical model of the impact the performance diagnostic test's characteristics for choosing the treatment strategy that is different from the existing schemes, taking into account the serial and parallel testing for the presence of pathogens, and diagnostic test systems spectra can be smooth, and contain cross each other.

– algorithm of multivariate analysis, based on using exogenous characteristics for diagnostic test systems that takes into account the cost of purchasing and storing the required number of tests.

Practical value of obtained results.

Through study of the effect of quantitative and qualitative indicators of diagnostic test to state models of inventory control can calculate the cost-effectiveness of its use and achieve improve the accuracy of the appointment of treatment and diagnosis of diseases by assessing the rationality of choice of treatment strategy and optimize with the use of diagnostic test systems reduce total cost of diagnosing infectious diseases.

Approbation of the thesis results. Basic ideas and results of the research were presented at the International scientific and technical conference “Artificial Intelligence. Intelligent systems” (2016), and at the «AMC-2017”.

Publications. Thesis results are published in 5 scientific works:

– in 2 papers in scientific journals included in the List of Professional Scientific Journals of Ukraine (technical sciences);

– in 2 papers in proceedings of international scientific conferences.

Keywords: acute viral infection, diagnostic strategy, diagnostic spectrum really true (really negative) results, the method of "cost-effectiveness", the expected utility or effectiveness of diagnostic tests, the predictability of the outcome, the specificity of diagnostic test, pharmacoeconomics.