

$$\frac{dN}{dt} = (a - bN)N^2, \quad N(0) = N_0. \quad (1)$$

Line is the solution of this equation.

Fig. 1

Fig. 2 shows the changing of the population of Ukraine from year 1700 before year 2003. The equation (1) cannot describe decrease of the population in 2000. This requires another mathematical model. A growing portion of the schedule, you can describe a simpler equation

$$\frac{dN}{dt} = aN^2, \quad N(0) = N_0$$

The factor a determines the rate of population growth.

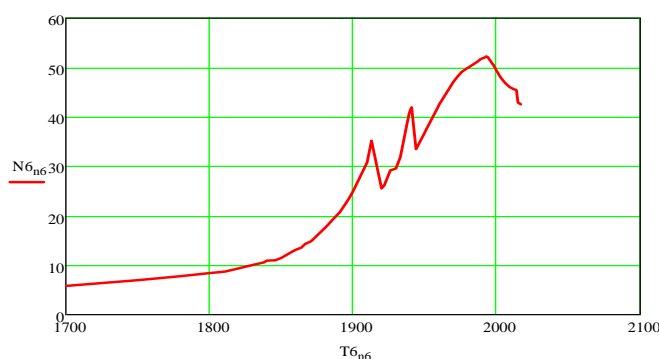


Fig. 2

Results and discussion. There was analyzed the evolution of the population in several countries of Europe and are made some conclusions about development trends in these processes.

MARKOV MODEL IN THE PHARMACOECONOMIC ANALYSIS.

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Introduction. In the 20th century, the modeling method has been used in various fields, plays a key role in the economic evaluation of health programs, since it allows the integration of clinical research data with economic indicators used in medical decision-making. As you know, modeling is an analytical methodology that consists of the development of events for a certain time in a population (population) and is based on data derived from primary and secondary sources, the main objective of which is to assess the effectiveness of pharmacotherapy for health and appropriate costs. The simulation methodology includes the following steps:

1. Development of the algorithm of the disease;
2. Determination of the probability of individual trends (phenomena, events, etc.);
3. Addition of each direction by economic data.

Aim. Models should be presented as decision-making tools, not as confirmation of a scientific fact. In accordance with the "Principles of Good Practice in Modeling Health Decision-Making Estimates" approved by the ITFED (ISROF), mathematical models for assessing drugs are used to synthesise data from different sources and provide cost and drug cost information for decision-making purpose for financing health care.

Materials and methods. The Pharmacoeconomic Analysis uses the Markov model. From the point of view of this analysis, all events are a transition from one state to another, taking into account that all people are healthy (full health - 1), and at the moment of the disease they pass into another state. Some

patients have early stages and go to later stages of the disease, and some - on the contrary, from late stages to the previous, through active treatment.

Results and discussion . Markovian models are estimated by matrix methods, that is, contour modeling or the Monte Carlo method. The time interval of the study is divided into identical units of time, which are called Markov cycles. The duration of the cycle is used so that the time interval has a certain value (for example, the stage of the disease). During each cycle, the patient moves from one state to another, that is, they determine the percentage of patients at each stage of the disease that is cured, complicated and / or dying. The Markov process is determined by the distribution of probabilities between the initial states and the degree of transition probability for individual patient groups, which is indicated in the table.

The transition between health conditions in the Markov model

Transition from one state to another	Jump to j			Sum
	Health status	Development of the disease	Death	
Health status	$1 - (tpR + tpS_n)$	tp R	tpS_n	1
Development of the disease	0	$1 - tpS_z$	tpS_n	1
Death	0	0	1	1

tpR - probability of transition from health to disease state;

tp S_n- probability of death due to natural causes;

tpS_z - probability of death due to the disease.

When constructing the simulation model of Markov, data is integrated from different sources and an increase in the coefficients of cost-efficiency is established.

Conclusions. Thus, using the Markov model in a pharmacoeconomic analysis allows solving a number of problems. In particular:

- analysis of the effectiveness and safety of the use of drugs at all stages of medical care;
- substantiation of the choice of drugs for the development of protocols for patient management, lists of basic medicines, forms of insurance;
- Formation of clinical and economic requirements at the state level to efficiency, safety, exchange of medicines;
- development and improvement of pharmacological services for patients with inpatient and outpatient treatment;
- Pharmacoeconomic substantiation of normative documents of the system of standardization of medical technologies taking into account the territorial features of Ukraine;
- Formation of the basis of the health insurance system.

PHARMACOKINETICS OF THE PROLONGED MEDICINAL FORMS.

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Introduction. Medicinal form - it is rational from a pharmacological point of view, convenient for receiving and storing the form of a medicinal substance, which provides the optimal therapeutic effect with a minimum of side effects. The dosage form is the structural unit of both pharmacotherapy and industrial production. The most important task in developing and manufacturing the dosage form is to provide optimal conditions for the release and subsequent absorption of the substance. The development of prolonged dosage forms, which can provide long-term action of a medicinal product with simultaneous decrease in its