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## ABSTRACT

for Nazarbayev Adilet's dissertation work on the topic: "The state and assessment of financing of drug provision for the adult population at the primary health care level", submitted for the degree of doctor (PhD) in the specialty 8D10101 – "Public Health"

Relevance of the research topic. Primary health care (PHC) is aimed at ensuring the highest possible level of public health and well-being, meeting the medical needs of all patients at the community level, combining care, prevention and medical education [2]. Universal health coverage includes measures to improve the health care system in order to ensure equity and improve the functioning of health systems by reducing overall health care costs, while improving public health and access to it [3]. International and intra-national studies confirm the connection of PHC with a more equitable distribution of medical services among the population [4].

One of the essential tasks of PHC is to provide essential medicines, which should be available in sufficient quantities at all times [5]. According to the World Health Organization (WHO), drug provision includes the study of the production, distribution, prescription and use of medicines in society, taking into account their social, medical and economic consequences [6]. The tasks of drug provision include not only meeting the demand for medicines, but also compliance with the rules of drug circulation within a medical organization in the light of the requirements imposed on this specific group of goods [7]. Improper use of drugs leads to inefficient use of medical resources, increases the risk of side effects, and worsens clinical outcomes. In more than 50% of countries, there are no effective measures to promote the rational use of medicines. In developing countries, less than 40% of patients in the public sector and 30% in the private sector receive treatment in accordance with clinical guidelines [7, pp. 3-38]. One of the main problems in the Republic of Kazakhstan is the incorrect formation of drug demand by medical organizations [8].

Cash payments or out-of-pocket payments represent a serious obstacle to the fair access of the population to vital medicines. Household surveys in Kazakhstan indicate an increase in cash payments for outpatient medications, including those covered by the Guaranteed Volume of Free Medical Care (GVFMC) and Compulsory Social Health Insurance system (CSHI).

The growth of the elderly population, along with non-communicable diseases, requires an in-depth study of the issues of providing medicines and expanding its list [9] at the PHC level. Some countries are reviewing drug provision models by involving a multidisciplinary team [10, 11]. Thus, the relevance of this study lies in the analysis of drug provision at the PHC level in the context of the growing needs of the population and the increase in the number of noncommunicable diseases, the

identification of barriers, as well as in assessing the degree of satisfaction of the population with the state of drug provision at the outpatient level.

**The purpose of the dissertation research.** Analysis of financing and management of drug provision at the primary health care level, study of the degree of public satisfaction with the availability of medicines.

**Research objectives:**

1. To explore international and domestic experience in providing medicines at the primary health care level.
2. Analysis of the financing of the drug supply system for the population of the Republic of Kazakhstan in the period from 2019 to 2022.
3. To study the organization of the drug supply system at the primary health care level.
4. To assess the degree of public satisfaction with the medical provision of the adult population at the outpatient level.
5. To study the pocket expenses of the population for medicines in Almaty and the Almaty region.

**Research methods:**

- information and analytical method;
- the sociological method;
- statistical method.

**Objects of research:** drug provision, pocket expenses, public satisfaction, access to medicines, policy in the field of drug provision.

**Research subjects:** the processes of financing, organizing and managing drug provision at the primary health care level, as well as public satisfaction with the availability of medicines and the impact of pocket expenses on their availability.

**The main provisions submitted for defense:**

1. In the period 2019-2022, the structure of ALO financing in the Republic of Kazakhstan showed a tendency towards an increase in the share of expenses covered by compulsory social health insurance.
2. The COVID-19 pandemic in 2020-2021 had a significant impact on the structure and volume of ALO among the adult population of the Republic of Kazakhstan, which resulted in a sharp increase in purchases of antibacterial, anticoagulant and hormonal drugs, consistent with international clinical guidelines and global practice.
3. The distribution of drug costs shows significant discrepancies: 5% of the population receives prescription drugs covered by the GVFCM and CSHI, which accounts for almost three quarters of all costs. Among children, the main diseases contributing to high spending were rare hereditary diseases and malignancies, while in adults, cancer and diabetes were the main drivers of spending.
4. The main problems of the drug supply system at the PHC level, such as insufficient funding, disruption of logistics, insufficient participation of key

specialists in the formation of drug demand, as well as the need for additional training of medical staff, require the development of appropriate measures by health care organizers.

5. The costs of purchasing medicines out of one's own pocket, as well as the continuing problems with the availability of medicines, indicate the need to review the processes of drug provision at the PHC level.

#### **Description of the main research results:**

An analysis of the outpatient drug supply system in Kazakhstan has identified key legal and organizational elements that ensure the availability and effectiveness of medicines. The main regulatory acts are the Constitution of the Republic of Kazakhstan and the Code "On the Health of the People and the Healthcare System", as well as orders of the Ministry of Health of the Republic of Kazakhstan, which define the lists and rules for the provision of medicines under the GVPMC and CSHI. Kazakhstan maintains a list of medicines, medical devices, etc., which are funded both from the state budget and through the CSHI system. The Ministry of Health regularly updates this list to ensure that it is up-to-date and meets the needs of citizens suffering from various diseases.

In the period from 2019 to 2022, Kazakhstan significantly expanded the outpatient drug supply system, covering 137 diseases by 2022 and spending 578.69 billion tenge for these purposes. These funds were used to provide medicines to 3.96 million patients, through 54.32 million prescriptions. In 2019, the cost of outpatient medication amounted to only 83.23 billion tenge, and coverage was limited to 47 diseases. At the same time, the number of compensated medicines and medical devices increased 1.3 times during this period. Nevertheless, despite the significant increase in funding, there is a significant gap between government spending and citizens' own spending. According to the National Health Accounts, in 2022, government spending on outpatient medicines through the GVPMC and CSHI amounted to 200.4 billion tenge, while the population spent 450.7 billion tenge on the purchase of medicines — almost three times more. This imbalance highlights the limitations of the existing reimbursement system in Kazakhstan.

A particular problem in Kazakhstan is the high cost of treating rare diseases such as Duchenne muscular dystrophy and mucopolysaccharidosis. In 2022, 22.4% of all expenses among high-cost patients were directed to the treatment of these diseases. This is a significant share of total healthcare costs, which indicates the need for a more effective approach to orphan disease treatment. A study of expenses by drug category revealed that in the Republic of Kazakhstan, the largest costs are for medicines for the treatment of non-communicable diseases such as cancer, diabetes, hypertension, coronary heart disease, as well as diseases associated with rheumatoid disorders in women and hereditary blood diseases in men. Among children, the highest expenses are for the treatment of orphan diseases, such as cystic fibrosis.

Despite the measures introduced in Kazakhstan to control the prices of medicines, this policy has not yet led to a significant reduction in rising costs, especially for orphan drugs. Gender differences in morbidity, such as the high proportion of rheumatoid arthritis and mental illness costs among women, as well as hereditary coagulation factor deficiencies and male forms of mucopolysaccharidosis among men, indicate the importance of a gender-based approach in healthcare to optimize costs and improve treatment effectiveness.

An analysis of the data showed that the 20 most expensive international nonproprietary names account for 35% of all ALO costs, and 80% of all costs come from less than 100 INN. These data highlight the concentration of costs on a limited number of drugs, which opens up opportunities for more efficient procurement management and cost optimization in Kazakhstan's healthcare system.

Analysis of outpatient drug provision data for 2019-2022 showed significant differences by gender and region: treatment costs for men consistently exceeded those for women, and the highest costs per patient were recorded in cities of national significance and sparsely populated areas with a high proportion of severe clinical cases, which indicates the heterogeneity of the use of medicinal resources and requires consideration in planning financing. The COVID-19 pandemic in 2020-2021 It significantly affected the structure and volume of ALO in the adult population, which resulted in a sharp increase in purchases of antibacterial, anticoagulant and hormonal drugs that comply with international clinical guidelines and global practice. During 2019-2022, there was an increase in the share of expenses covered by the CSHI, reflecting the transition of the healthcare system to an insurance model and the redistribution of the financial burden from the republican budget to the social insurance fund. Diseases with high mortality, such as cancer and diabetes, have been identified as the main drivers of treatment costs, but their distribution by gender has pronounced features. This highlights the need for a multidisciplinary approach in medical care, taking into account gender differences in morbidity and treatment costs. We also found that a small group of patients significantly affects healthcare costs, including the provision of medicines. For example, studies show that 5% of the population bear half of all costs. We also identified this trend for Kazakhstan. In 2022, 5% of PHC users accounted for 74% of all medical expenses.

An analysis of the gender and age distribution in high-cost and low-cost groups of outpatient drug users in Kazakhstan showed that there are no significant differences by gender, although men in the high-cost group tend to spend more money than women. It is noteworthy that almost half of the high-cost group falls into the age category of able-bodied and fertile age. The highest average costs are observed among children under 5 years of age, while in the low-cost group, costs increase with age. In both groups, the highest expenses fall on the age group of 61-65 years.

Lifestyle-related diseases such as diabetes mellitus, hypertension, and coronary heart disease consistently occupy leading positions in both groups. However, in the high-cost group, significant costs are associated with rare hereditary diseases and oncological diseases. More than half of the high-cost group experience polypragmasia by taking six or more types of medications annually. This highlights the need to develop targeted strategies to contain costs, including price regulation, adjusting reimbursement lists, and improving patient-centered methods to optimize treatment and monitoring.

An analysis of the factors affecting the availability of medicines at the PHC level in Almaty and the Almaty region revealed several key problems and factors that significantly affect the process of drug provision. The main problems include insufficient funding, especially for newly identified or newly arrived patients, as well as late delivery of medicines by external organizations. Additional difficulties are associated with the shortage of clinical pharmacologists, problems with the integration of new drugs into clinical protocols and their absence from updated drug lists. Logistic regression analysis has shown that the availability of medicines in the Almaty region and Almaty depends on a number of factors. Important are the responsibilities of department heads, pharmacies, and administrators, as well as the involvement of clinical pharmacologists and medical experts. Taking into account the opinion of the medical staff when making applications also helps to improve accessibility.

Managers consider the creation of a reserve of medicines for five years to be the solution to current problems in the field of drug supply, which would eliminate annual procurement restrictions and increase supply stability. It is also necessary to strengthen awareness-raising on regulations in the field of medicines, especially at the rural level, and strengthen the training of medical professionals, which reflects more than 80% of requests for advanced training in the preparation of applications for medicines.

The results of the study, which involved 2013 people, indicate significant differences in drug costs between residents of Almaty and Almaty region. Respondents from the Almaty region spent twice as much on medicines as residents of Almaty ( $p < 0.001$ ). This may be due to differences in the availability and level of healthcare in these regions. The largest number of respondents were insured in the CSHI system, while 20.7% of respondents belong to the privileged categories of the population, which also confirms the importance of state support in the healthcare sector ( $p < 0.001$ ). 61.9% of respondents report that they were forced to buy medicines at their own expense. The main reason for this is the lack of prescribed medicines in primary health care (52.5%), in particular, it was noted by participants from Almaty 87.9%. The next reason was the convenience of self-purchase of 45.4% medicines, while this answer was often found among the population of the Almaty region. This may indicate inconveniences related to the availability of pharmacies



and their opening hours ( $p=0.004$ ). In addition, 20% of respondents in both regions noted that doctors and pharmacists do not provide sufficient information on taking medications and do not help in obtaining the necessary drugs, which indicates the need to improve communication and awareness within the healthcare system. Thus, in order to improve the availability and effectiveness of medicines in Almaty and the Almaty region, it is necessary to eliminate problems with delays in the supply of medicines, improve logistics and coordination between healthcare organizations and pharmacies, as well as raise awareness among patients and medical professionals about the right to receive medicines and the rules of their use.

**The scientific novelty of the research is determined by the following criteria:**

- for the first time, an analysis of the use of medicines in the Republic of Kazakhstan for the period from 2019 to 2022 was carried out, which revealed a high-cost group of patients. Despite the small proportion of the general population of patients receiving medical care under the ALO, these patients have a significant impact on the cost structure in the healthcare system.

- barriers to timely provision of medicines at the PHC level have been identified, which are associated with insufficient funding; problems with late delivery and delivery of medicines from external organizations, a shortage of clinical pharmacologists, as well as the absence of certain medicines included in clinical protocols and in the List approved by Order No. 75. These factors significantly affect the availability of medicines and require solutions to improve the PHC system.

- the factors influencing the availability of medicines related to the activities of the chief nurse; clinical pharmacologist and taking into account the opinion of medical staff, as well as the need for staff to train in the preparation of applications for medicines and conduct explanatory work on regulatory documents in the field of drug treatment (especially at the district level) are substantiated.

- the main reason for pocket expenses on medicines is demonstrated to be related to the lack of prescribed medicines in primary health care and convenience in terms of distance and accessibility to purchase drugs at their own expense ( $p=0.004$ ), in particular, this was found among the population aged 50-59 years in both regions.

**Theoretical and practical significance:**

1. A retrospective analysis of drug costs in the framework of outpatient drug provision to the population provides an opportunity to understand in depth the mechanisms and factors influencing the use of medicines in the healthcare system of the Republic of Kazakhstan. The practical significance of the dissertation lies in the fact that the results obtained can be used to develop and adjust state policy in the field of drug provision, as well as to optimize financial and organizational aspects in healthcare.

2. The study identifies key areas that require attention from health authorities, including the need to implement targeted strategies to contain drug costs, especially for high-cost groups of patients. The analysis of the factors influencing the cost increase, as well as the assessment of polypragmasy, can become the basis for optimizing the processes of prescribing and using medicines. The results obtained can be applied to develop programs to improve medical care and reduce the burden on patients and the state.

3. A survey of medical staff revealed the need for training in the preparation of drug applications, as well as seminars at the PHC level to clarify regulatory documents in the field of drug provision, especially among PHC staff at the district level of the Almaty region.

4. The identification of factors affecting the availability of medicines, such as the participation of specialists from medical organizations, as well as the reasons for the purchase of medicines at their own expense among the population, will make it possible to review existing PHC practices in order to improve the effectiveness of their functioning and optimize drug provision processes.

**The doctoral student's personal contribution** consists in the development of a theoretical and methodological research program, the formation of research goals, objectives, organization and conduct of research, direct participation in all stages of research, statistical data processing, writing dissertation sections, interpretation and discussion of results, formulation of provisions submitted for defense, as well as conclusions and practical recommendations.

**Based on the conducted research, the following conclusions are made:**

1. An analysis of the outpatient drug supply system in Kazakhstan has shown that, despite comprehensive legal regulation, there are problems with the availability of medicines, especially in rural areas, as well as with coordination between participants and price regulation. To optimize the system, it is necessary to improve the regulatory framework, eliminate existing barriers and strengthen interaction between government agencies, suppliers and patients.

2. The analysis of ALO data for 2019-2022 demonstrates that the COVID-19 pandemic has become a key external factor that has influenced both the structure and volume of drug consumption. A significant increase in the purchase of antibacterial, hormonal and anticoagulant drugs in 2020-2021 reflects the adaptation of Kazakhstan's healthcare system to the clinical realities of the pandemic and is confirmed by global data. These changes, along with increased coverage and funding, underscore the need for further development of the ALO system with a focus on resource management and preparedness for external epidemiological challenges.

3. An analysis of the gender and age distribution of outpatient drug users in Kazakhstan showed that there are no significant differences between PVZL and NSAIDs by gender, however, men in the high-cost group spend more money. In the

high-cost group, the highest costs are associated with children under 5 years of age and rare diseases, as well as with polypragmasia, whereas in the non-high-cost group, costs increase with age, with peak costs in the 61-65 age category. Analysis of outpatient drug consumption revealed a high cost asymmetry, which highlights the need to develop targeted cost containment strategies and improve approaches to patient treatment and monitoring.

4. According to PHC managers, the main problems of drug provision are related to insufficient funding (n=15), late provision of medicines by external organizations (n=20) and a shortage of clinical pharmacologists (2), as well as the inclusion of new medicines in the clinical protocol, but not included in Order No. 75. Managers offer solutions in the form of creating a reserve of medicines for a five-year period and eliminating annual funding limits.

5. Medical staff of Almaty and Almaty region trust the healthcare system and are ready to advise patients. The consideration of the staff's opinion in the preparation of applications is positively assessed. In Almaty, the examination of medicinal products is carried out by clinical pharmacologists, in the Almaty region — by expert doctors. Many respondents express the need for additional training in the preparation of applications for medicines.

6. The majority of respondents in Almaty and the Almaty region are satisfied with the information support from doctors and pharmacists, but about 10-15% from the Almaty region are dissatisfied with the conditions for providing medicines. About a third of the respondents face delays in receiving medicines and spend more than 10,000 tenge per month, while the costs in the Almaty region are significantly higher. The main reasons are the lack of medicines and the remoteness of pharmacies, which is especially important for the Almaty region. A multidimensional analysis revealed that the cost of medicines in Almaty is higher among people aged 50-59 years, with chronic diseases and income from 151,000 to 200,000 tenge, and in the Almaty region — among people aged 30-39 and 50-59 years, unmarried and with higher education. At the same time, women in both regions spend less.

#### **Approbation of the research results.**

1. Participation as a speaker in Panel Session 1: "The role of health technology assessment to improve the effectiveness of healthcare system financing", April 2022

2. Participation in the International Eurasian Pharmaceutical Forum, February 2023

#### **Publications:**

1. Nazarbayev A, Nurbakyt A, Omirbayeva B, Akhmetzhan A, Kosherbayeva L. Characteristics of High-Cost Beneficiaries of Prescription Drugs in Kazakhstan: A Cross-Sectional Study of Outpatient Data from 2022. Clinicoecon Outcomes Res. 2024;16:827-837. Published 2024 Nov 13. doi:10.2147/CEOR.S470632



2.Nazarbayev A.A., Nurbakhyt A.N., Akhmetzhan A.D., Imamatinova A.M. Study of drug provision of the adult population at the level of primary health care: through the prisma of consumers // Nauka i Zdravookhranenie [Science & Healthcare].2023, (Vol.25) 5, pp. 144-150. doi: 10.34689/SH.2023.25.5.019

3.Лекарственное обеспечение в первичной медико-санитарной помощи: мировой опыт// Фармация Казахстана. 2023. 4. С.155-162. doi: 10.53511/PHARMKAZ.2024.86.58.021

4.Current Experience of Primary Health Care Physicians on Drug Provision Issues //Journal of Health Development, Volume 4, Number 54 (2023) pp. 4-10. doi:10.32921/2225-9929-2023-4-54-4-10.

Methodological recommendation "Actual aspects of drug provision in primary health care", Almaty, 2025, 58 p., ISBN 978-601-246-828-1.

### **Scope and structure of the dissertation**

The dissertation work consists of an introduction, 5 sections, conclusions, conclusions, practical recommendations, and a list of references, including 163 literary sources. The dissertation is presented on 101 pages, illustrated with 23 tables, 14 figures, and contains 4 appendices.