

UDC 338.5:615.252.349.7]-025.28:616.379-008.64(477)

<https://doi.org/10.26641/2307-0404.2025.2.333711>

**I.O. Vlasenko**<sup>1\*</sup>,   
**V.V. Gladyshev**<sup>2</sup>,   
**O.M. Zaliska**<sup>3</sup>,   
**L.L. Davtian**<sup>1</sup> 

## STUDY OF AFFORDABILITY OF PHARMACEUTICAL PROVISION FOR TYPE 2 DIABETES THERAPY IN UKRAINE

Shupyk National Healthcare University of Ukraine<sup>1</sup>

Dorohozhytska str., 9, Kyiv, 04112, Ukraine

\*e-mail: vlasenkoiryna5@gmail.com

Zaporizhzhia State Medical and Pharmaceutical University<sup>2</sup>

Marii Prymachenko ave., 26, Zaporizhzhia, 69000, Ukraine

e-mail: mail@mphu.edu.ua

Danylo Halytsky Lviv National Medical University<sup>3</sup>

Pecharska str, 69, Lviv, 79010, Ukraine

e-mail: office@meduniv.lviv.ua

Національний університет охорони здоров'я України імені П. Л. Шупика<sup>1</sup>

вул. Дорогожицька, 9, Київ, 04112, Україна

Запорізький державний медико-фармацевтичний університет<sup>2</sup>

бул. Марії Примаченко, 26, Запоріжжя, 69000, Україна

Львівський національний медичний університет імені Данила Галицького<sup>3</sup>

вул. Пекарська, 69, Львів, 79010, Україна

**Цитування:** Медичні перспективи. 2025. Т. 30, № 2. С. 247-254

**Cited:** Medicni perspektivi. 2025;30(2):247-254

**Key words:** affordability, diabetes melitus, glucose-lowering drugs, reimbursement, solvency adequacy ratio, pharmaco-economic research

**Ключові слова:** доступність, цукровий діабет, цукрознижувальні препарати, відшкодування, коефіцієнт адекватності платоспроможності, фармако-економічні дослідження

**Abstract.** Study of affordability of pharmaceutical provision for type 2 diabetes therapy in Ukraine. Vlasenko I.O., Gladyshev V.V., Zaliska O.M., Davtian L.L. Increasing the availability and affordability of medical and pharmaceutical care to the population is the most important task of all levels of government. The purpose of the work is to study the affordability of glucose-lowering drugs for the treatment of type 2 diabetes in Ukraine. Research materials are: State Register of Medicinal Products and price of glucose-lowering drugs. Marketing, analytical, graphic and pharmaco-economic analysis were used. On the pharmaceutical market of Ukraine 161 glucose-lowering drugs are registered, which contain 16 international non-proprietary names and 8 international non-proprietary names combinations. It was established that the cost of Defined Daily Dose for mono glucose-lowering drugs varies from UAH 1,1 for glibenclamide up to UAH 90,7 for liraglutide. Most of the Ukrainian-made and foreign drugs are highly affordable, but foreign preparations of modern groups are moderately affordable, only one foreign drug, Liraglutide, is unaffordable ratio. But the analysis of affordability for pensioners only metformin (Ukrainian production), glibenclamide, gliclazide, and glimepiride are highly affordable, three of which are already subject to reimbursement. Modern glucose-lowering drugs, both of foreign and Ukrainian production, is scarcely affordable, which makes it practically impossible to use them in the majority of retirees with diabetes. Thus, the analysis showed that in order to implement modern treatment schemes for type 2 diabetes, which according to the current legislation can be used in Ukraine, it is necessary to expand the list of glucose-lowering drugs included in the reimbursement program. This will improve treatment results, which in turn will reduce the development of diabetes complications and improve the quality of life of patients.

**Реферат.** Вивчення доступності фармацевтичного забезпечення терапії цукрового діабету 2 типу в Україні. Власенко І.О., Гладисhev В.В., Заліська О.М., Давтян Л.Л. Підвищення доступності медичної та медико-ментозної допомоги населенню є найважливішим завданням усіх рівнів влади. Метою роботи стало вивчення цінової доступності цукрознижувальних препаратів для лікування цукрового діабету 2 типу в Україні. Матеріали та методи дослідження – інформація Державного реєстру лікарських засобів та ціни цукрознижувальних препаратів в аптеках. Застосовували маркетинговий, аналітичний, графічний та фармако-економічний аналізи. Встановлено, що в Україні, з урахуванням дозування, кількість цукрознижувальних препаратів становить 161 торгову назву, які містять 16 міжнародних непатентованих назв та 8 їх комбінацій. Вартість визначеної добової дози для цукрознижувальних препаратів коливається від 1,1 грн для глібенкламіду до 90,7 грн для ліраглутиду. За коефіцієнтом адекватності платоспроможності для працездатного населення більшість цукрознижувальних препаратів як українського, так і закордонного виробництва є високодоступними, але закордонні препарати сучасних груп є середньодоступними,

малодоступним є тільки один закордонний препарат «Ліраглутид». Для пенсіонерів високоступним є тільки метформін (українського виробництва), глібенкламід, гліклазид, глімепірид, три з яких і так підлягають відшкодуванню. Сучасні цукрознижувальні препарати, як закордонного, так і українського виробництва, є малодоступними, що робить практично неможливим їх застосування більшістю пенсіонерів, хворих на цукровий діабет. Аналіз показав, що для впровадження сучасних схем лікування цукрового діабету 2 типу, які, згідно з чинним законодавством, можливо застосовувати в Україні, необхідно розширити перелік цукрознижувальних препаратів, що включені до програми реімбурсації. Це сприятиме покращенню результатів лікування, що, у свою чергу, знизить розвиток ускладнень цукрового діабету та покращить якість життя хворих.

According to the International Diabetes Federation, the number of people with diabetes in the world is 537 million adults (December 2021). In Ukraine, the prevalence of diabetes is 7,1%. Most (87-95%) are patients with type 2 diabetes (T2D) [1].

Increasing the availability and affordability of medical and pharmaceutical care to the population is the most important task of all levels of government, especially in the context of the modernization of health care.

The pharmaceutical system operates within a complex health system, where pharmaceutical provision can be viewed as a component of health systems strengthening necessary to support Universal Health Care. Availability and affordability of medicines and medical devices is a prerequisite for Universal Health Care. This is one of the components of an established health care system and an important prerequisite for obtaining better results for the health of both an individual patient and the population as a whole [2].

Medicines are often paid out-of-pocket in many countries, putting individuals and their households at risk of having poor access to treatments [3, 4]. In a PURE publication were disparities in the availabilities and affordabilities of essential medicines for diabetes among lower-income countries, middle-income countries, and high-income countries. For example, the availability of metformin was 100% in high-income countries, 88.2% in upper-middle-income countries, 86.1% in lower-middle-income countries, and 64.7% in lower-income countries [5].

Drug availability is a combination of two dimensions of availability: market availability and drug affordability [6]. Ensuring the availability of drugs, the use of which is provided by the standard of treatment, is their state registration in the country, and reimbursement of the cost of drugs (by the state or an insurance company) increases the social affordability of treatment. With the help of reimbursement, the health care system affects the affordability of drugs for the population [7].

The current legislation of Ukraine allows doctors to use modern international clinical guidelines for the treatment of T2D, while the Unified Clinical Protocol for T2D approved by the Ministry of Health of Ukraine in 2012 continues to apply. But in Ukraine, the situation needs to be studied, since 87% of patients with T2D are in a state of decompensation [8].

Therefore, it is important to investigate the availability of pharmaceutical support for the treatment of T2D.

The purpose of the work is to study the affordability of glucose-lowering drugs (GLDs) for the treatment of T2DM in Ukraine.

To realize the the purpose, it is necessary to solve several tasks:

- conduct a marketing analysis of the assortment of GLDs registered in Ukraine, excluding insulins.
- to determine which of the GLDs are subject to reimbursement by the state;
- study the prices of GLDs, the cost of their average recommended dose
- calculate the socio-economic affordability of the GLDs for the population of Ukraine based on the solvency adequacy ratio.

#### MATERIALS AND METHODS OF RESEARCH

The objects of the study were information from the State Register of Medicinal Products (<http://www.drlz.com.ua>) and information about the presence of drugs and their prices on the Internet search service in pharmacies ([www.tabletki.ua](http://www.tabletki.ua), [www.liki24.com](http://www.liki24.com)) as of February 10, 2022. The Anatomical Therapeutic Chemical (ATC) classification was used. Insulin preparations are also used in the treatment of diabetes, but they were not included in the study. Bibliosemantic, marketing, analytical, graphic, generalizing analyzes were used. Pharmacoeconomic analysis of cost for 1 Defined Daily Dose (DDD) due to World Health Organization (WHO) index of ATC/DDD and analysis of solvency adequacy ratio were used. The solvency adequacy ratio ( $C_{a.s.}$ ) was determined by dividing the average retail price of drugs for a certain period (month) by the average salary for the corresponding period (month) [9].

$$C_{a.s.} = \frac{\bar{P}}{W_{a.w.}} \times 100\%$$

where:  $C_{a.s.}$  – solvency adequacy ratio;  
 $\bar{P}$  - the average retail price of drugs for a certain period of time;  
 $W_{a.w.}$  – average salary/pension for the relevant time period.

Data from the State Statistics Service of Ukraine (<http://www.ukrstat.gov.ua>) on average wages and pensions were used in the calculations.

#### RESULTS AND DISCUSSION

The current legislation of Ukraine allows doctors to use modern international clinical guidelines for the

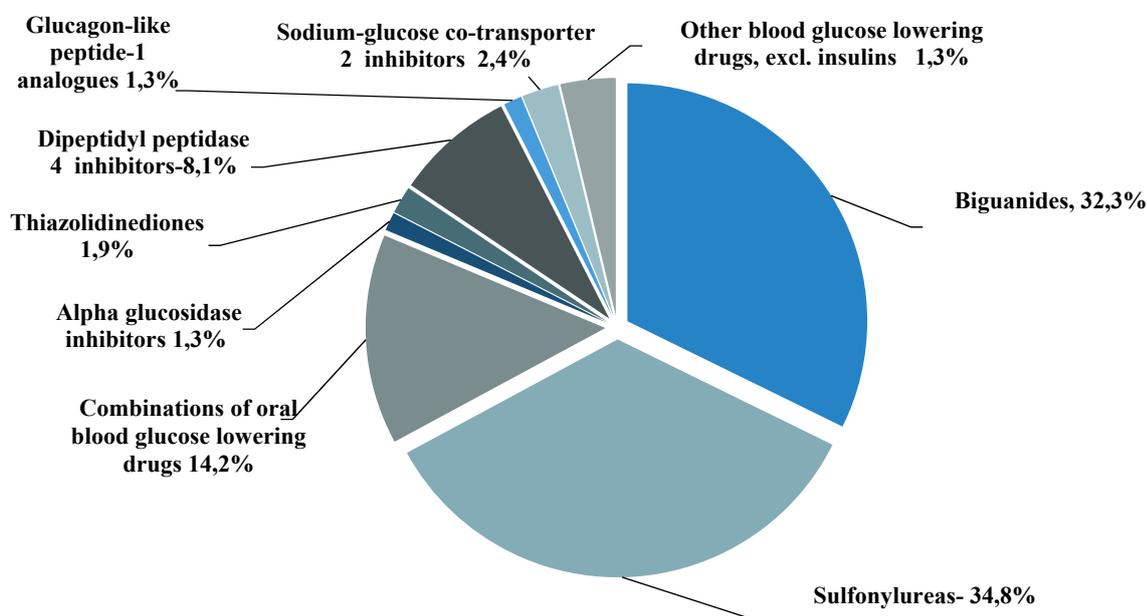
treatment of T2D, while the Unified Clinical Protocol for T2D approved by the Ministry of Health of Ukraine in 2012 continues to apply.

With the use of the ATC/DDD Index 2022 guide of the WHO Collaborating Center for Drug Statistics Methodology Norwegian Institute of Public Health, the assortment of GLD was defined and structured for further analysis according to the ATC classification.

The group of drugs *A10B* – Blood glucose lowering drugs, excl. insulins, which according to the ATC classification is included in group *A* – Alimentary tract and metabolism (*A10* – Drugs used in diabetes) was studied.

It was established that in Ukraine, taking into account the dosage, the number of GLD is 161 trade

names (TN), which contain 16 international non-proprietary name (INN) and 8 combinations of them. *Biguanides (A10BA)*: Metformin (52 TN); *Sulfonylureas (A10BB)*: Glibenclamide, Gliclazide, Glimepiride (56 TN); *Combinations of oral blood GLD (A10BD)* (23 TN); *Alpha glucosidase inhibitors (A10BF)*: Voglibose (2 TN); *Thiazolidinediones (A10BG)*: Pioglitazone (3 TN); *Dipeptidyl peptidase 4 (DPP-4) inhibitors (A10BH)*: Sitagliptin, Vildagliptin, Saxagliptin, Linagliptin, Gemigliptin (13 TN); *Glucagon-like peptide-1 (GLP-1) analogues (A10BJ)*: Liraglutide (2 TN); *Sodium-glucose co-transporter 2 (SGLT2) inhibitors (A10BK)*: Dapagliflozin, Empagliflozin (4 TN); *Other blood glucose lowering drugs, excl. insulins (A10BX)*: Repaglinide (6 TN) (Fig. 1).



**Fig. 1. Segmentation of trade names of glucose-lowering drugs of the *A10B* group on the pharmaceutical market of Ukraine (2022)**

64.0% (103 TN) of the assortment of drugs are GLDs. The leaders in the supply of sugar-lowering drugs are: India (14 drugs), Poland (11 drugs), Germany (10 drugs), Italy (9 drugs), Turkey (8 drugs) and France (8 drugs) (Fig. 1). In Ukraine, 8 pharmaceutical enterprises produce are GLDs. PJSC "Farmak" (18 drugs) and LLC "Kusum Farm" (14 drugs) produce the largest number of sugar-reducing drugs.

Small groups in terms of the number of INN are the subgroups of modern drugs: *A10BF*; *A10BG*; *A10BJ*; *A10BX*, which are represented by only one name. As can be seen from the figures 1 on the pharmaceutical market of Ukraine, there are GLDs from all subgroups of the *A10B* group. Almost a third of the entire range (32.2%) consists of Metformin drugs, represented by 52 TNs, both of Ukrainian and

foreign production. This corresponds to the objectives of increasing social accessibility, that in addition to the availability of drugs, health care institutions should provide the opportunity to choose drugs and offer high-quality generics at a moderate cost.

The Sulfonylureas drugs subgroup consists of 56 TN, which according to the INN have only 4 names, including Glimepiride, which is contained in 40 drugs (TN) of different manufacturers.

Taking into account that reimbursement of the cost of pharmaceuticals increases their affordability, the list of pharmaceuticals that are subject to reimbursement by the state was analyzed.

Since 2016, a reimbursement system has been operating in Ukraine, and since 2019, pharmaceutical reimbursement is carried out based on electronic

prescriptions (Resolution of the Cabinet of Ministers of Ukraine 17.03.2017 p. No. 152). The Ministry of Health of Ukraine defined a list of drugs under INN that are reimbursed under the Program of State Guarantees of Medical Care for the Population. In the "Diabetes" section for reimbursement included of 3 INN and 54 TN of GLGs for T2D treatment. Metformin and 2 sulfonylurea drugs (INN) – Glibenclamide, Gliclazide – are subject to reimbursement. It is important that modified-release tablets with a prolonged effect (metformin, gliclazide) are included in the list of reimbursed drugs. But GLDs from other groups and no combined drug are not subject to reimbursement in Ukraine. According to the State Register of medicines that are subject to reimbursement under the program of State Guarantees of Medical Care of the population, Gliclazide of two Ukrainian manufacturers and 6 drugs of its modified forms of foreign production are reimbursed; Glibenclamide – 3 drugs of Ukrainian manufacturers and Metformin – 11 drugs of Ukrainian manufacture and 6 drugs of foreign production and 2 drugs of prolonged form of Ukrainian manufacturers.

Based on the results of the analysis of the State of registration and reimbursement of GLDs in Ukraine, a sufficient assortment is registered and actually

available, which allows the use of modern schemes of treatment of diabetes, according to international standards. But the small number of GLDs (3 INN) that are subject to reimbursement makes access to these modern treatment schemes limited due to the financial burden on the patient.

That is, in order to increase the affordability of GLDs and the introduction of modern treatment schemes in Ukraine, it is necessary to increase the list of INN for reimbursement, which will contribute to a better result of treatment of diabetes and affect the general health of patients.

Since the costs of treatment with modern drugs are financed by the patient himself, the prices of mono GLDs were investigated by DDD (DDD is not established for combined GLDs), the cost of DDD and their socio-economic availability based on the coefficient of adequacy of payment capacity was studied. Considering that a significant part of T2DM patients are elderly people, it was reasonable to calculate Ca.s. not only for the working population but also for pensioners.

It was established that the cost of DDD for mono GLDs varies from UAH 1.1 for glibenclamide (the cheapest group) up to UAH 90,7 for liraglutide (the most expensive group of GLDs) (Table).

**Cost of defined daily dose and solvency adequacy ratio of glucose-lowering drugs for the treatment of T2D**

International Nonproprietary Names of drugs	DDD	The cost of DDD, UAN		Solvency adequacy ratio, %			
				for the working population		for pensioners	
		ukrainian	foreign	ukrainian	foreign	ukrainian	foreign
Glibenclamide	10 mg	1.1	2.8	0.23	0.58	0.82	2.10
Metformin	2 g	3.0	7.5	0.62	1.54	2.26	5.64
Gliquidone	60 mg	-	-	-	-	-	-
Gliclazide	60 mg	1.5	3.9	0.31	0.80	1.13	2.93
Glimepiride	2 mg	3.0	4.0	0.62	0.82	2.25	3.01
Voglibose	0.6 mg	19.0	-	3.91	-	14.28	-
Pioglitazone	30 mg	12.5	-	2.57	-	9.39	-
Sitagliptin	0.1g	-	57.5	-	11.83	-	43.22
Vildagliptin	0.1 g	23.4	-	4.82	-	17.59	-
Saxagliptin	5 mg	-	36.4	-	7.49	-	27.36
Gemigliptin	50 mg	-	-	-	-	-	-
Liraglutide	1.5 mg	-	90.7	-	18.67	-	68.18
Dapagliflozin	10 mg	-	37.6	-	6.91	-	25.26
Empagliflozin	17.5 mg	-	38.8	-	7.99	-	29.17
Repaglinide	4 mg	-	26.6	-	5.47	-	19.99

A comparative analysis of the value of the DDD showed that 4 names of TN, which are presented on the pharmaceutical market of both Ukrainian and foreign production, differ significantly (Fig. 2). Thus,

the cost of Ukrainian DDD is almost 2.5-2.6 times higher than that of domestic GLDs, and glimepiride is 1.3 times higher.

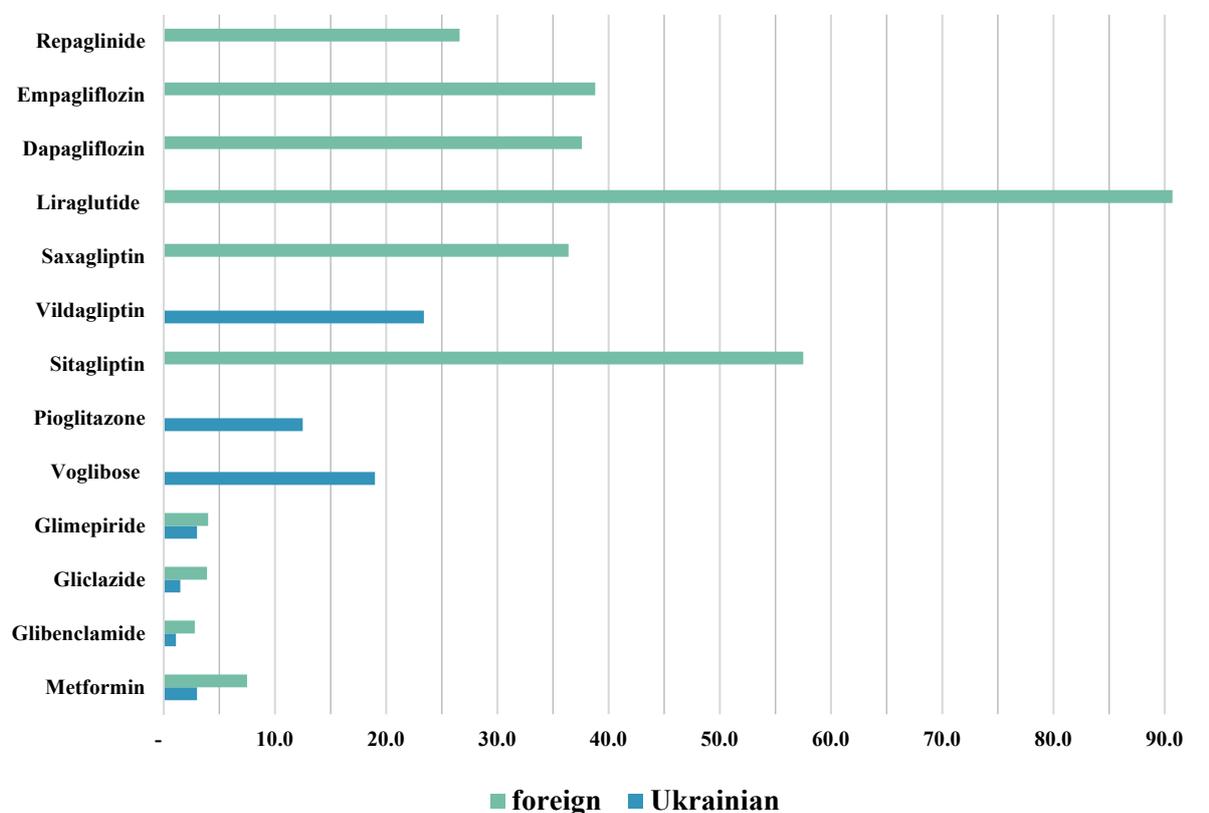


Fig. 2. The cost of the defined daily dose of glucose-lowering drugs (UAH)

Indicator  $C_{a.s.}$  characterizes the affordability of the drug and the possibility of sale in conditions of low solvency of the population. When determining the solvency adequacy ratio of socio-economic affordability of the GLDs, the average salary and pension index was used. The calculated solvency adequacy ratio ( $C_{a.s.}$ ) shows that an index below 1.0 ensures the availability of the drug for the patient. The higher the value of the solvency adequacy ratio ( $C_{a.s.}$ ) coefficient, the more expensive the drug is and, accordingly, less accessible to the consumer [10].

According to the determined indicators of accessibility, GLDs were divided into highly affordable, moderately affordable, and poorly affordable. Highly affordable drugs –  $C_{a.s.} < 5\%$ ; moderately affordable –  $5\% < C_{a.s.} < 15\%$ ; scarcely affordable –  $C_{a.s.} > 15\%$  [11].

Table data 1 show that only one foreign drug, Liraglutide, is unaffordable for the able-bodied population according to the solvency adequacy ratio. Most of the Ukrainian-made and foreign drugs are

highly affordable, but foreign preparations of modern groups are moderately affordable, which does not contribute to the use of modern treatment schemes.

The results of calculations of the solvency adequacy ratio for the GLDs are presented in Fig. 3.

A different picture is observed in the analysis of affordability for pensioners, which showed that only metformin (Ukrainian production), glibenclamide, gliclazide, and glimepiride are highly affordable for them, three of which are already subject to reimbursement. Modern GLDs, both of foreign and Ukrainian production, is scarcely affordable, which makes it practically impossible to use them in the majority of retirees with diabetes.

Pharmacotherapy for T2D is a highly relevant medical and social issue in today's world. The limited effectiveness and safety concerns associated with existing medications necessitate the continuous search for optimal treatment regimens by pharmacologists and clinicians.

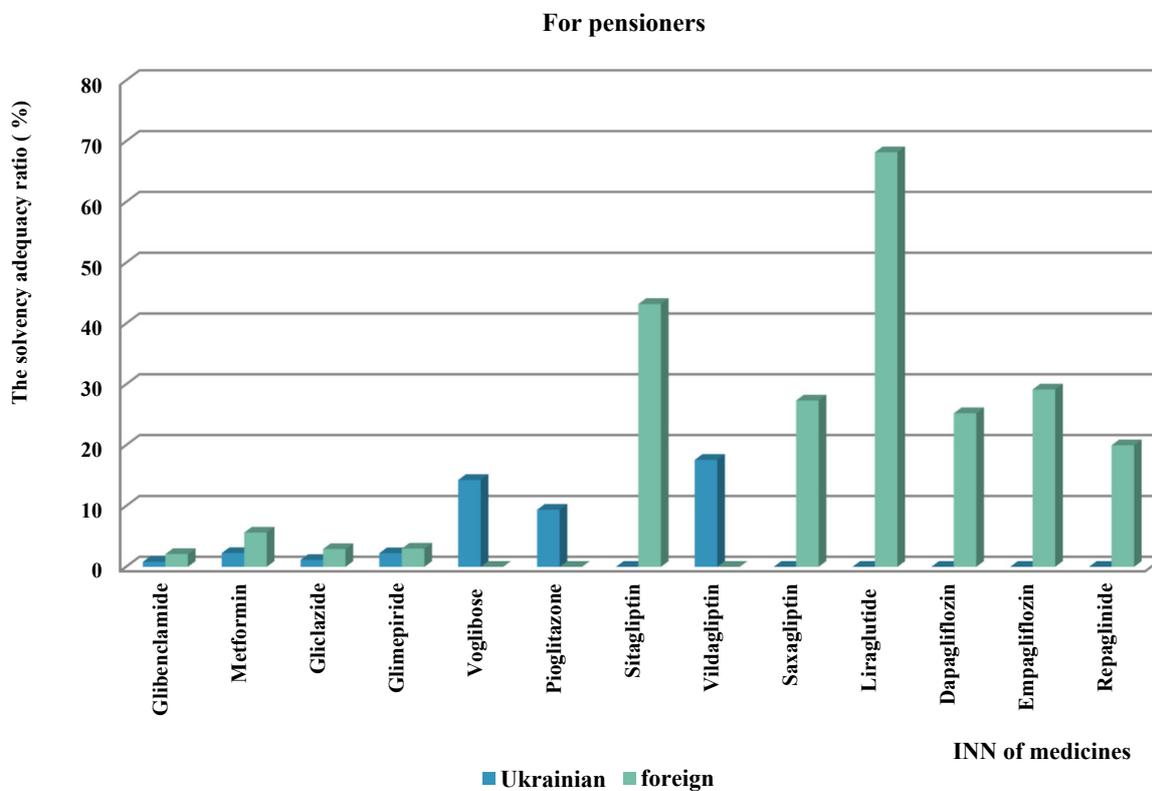
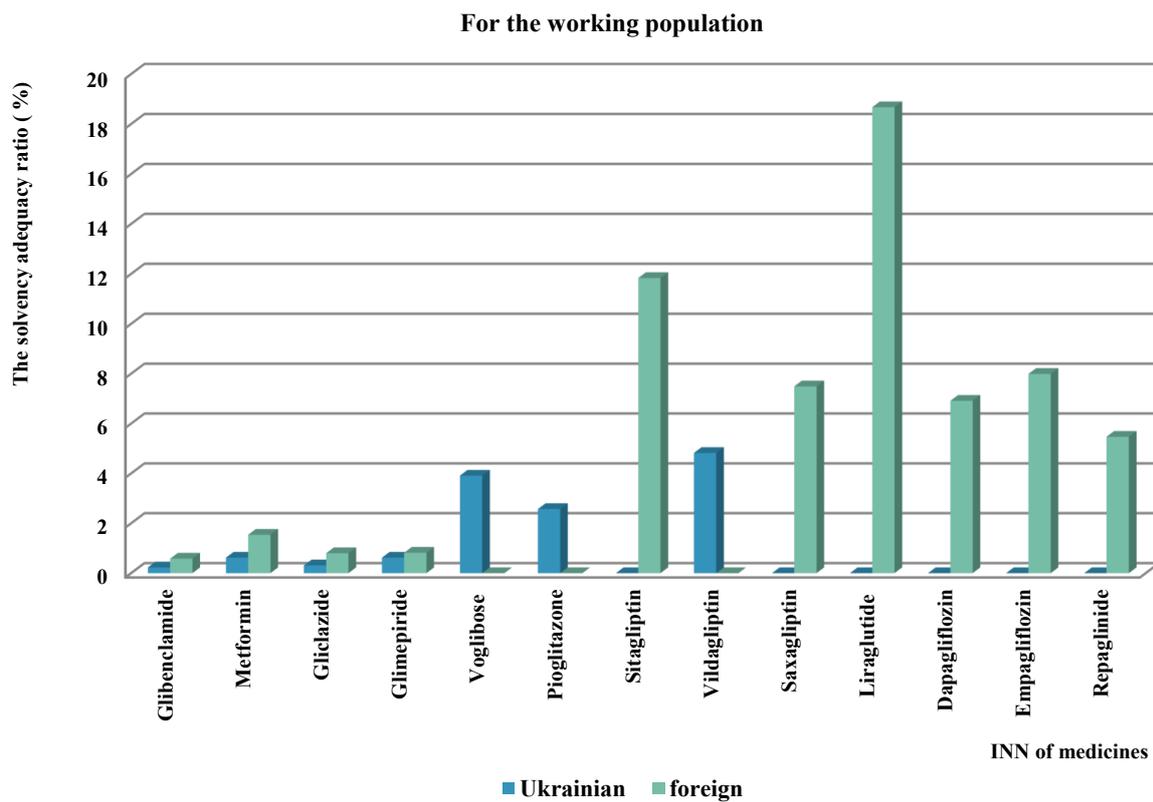


Fig. 3. The solvency adequacy ratio for the glucose-lowering drugs (%)

In Ukraine, the percentage of diabetes patients who achieve HbA1c control is alarmingly low, with only 12.8% of individuals with diabetes in Ukraine meeting glycemic goals. In contrast, 40% of patients in Poland and 67% in Great Britain have achieved glycemic control [12]. The reasons behind these discrepancies require further investigation.

The high cost of drugs poses a serious social problem in Ukraine, especially for pensioners [13]. The cost of medicines influences the choice of GLDs. However, doctors can not simply prescribe inexpensive GLDs; the prescribed drug must not only be available but also effective and easy to dose. Individualized therapy, considering the patient's comorbid conditions, is necessary.

Although there is a significant number of oral GLDs available for T2D treatment, the list of reimbursed drugs in Ukraine is limited to only three INNs: metformin, gliclazide, and glibenclamide.

It is worth noting that experts from the American Diabetes Association, in 2021, recognized a shift in the treatment emphasis for patients with diabetes. Alongside glycemic goals, doctors are now focusing on the health of the heart and kidneys. If a patient has cardiovascular disease, kidney disease, or is at high risk of these complications, the American Diabetes Association recommends the use of additional and/or alternative drugs, such as the glucagon-like peptide-1 (GLP-1) analogues and Sodium-Glucose Transport Protein 2 (SGLT2) inhibitors, to reduce health complications regardless of HbA1c levels or metformin use [14].

To minimize the risk of hypoglycemia, GLDs with a low risk of causing hypoglycemia, such as DPP4 inhibitors, GLP-1 analogues, SGLT2 inhibitors, and thiazolidinediones, should be prescribed [15].

The 2012 National Clinical Guideline for medical care "Type 2 diabetes mellitus," as well as international recommendations, propose metformin or sulfonylurea as the first-line therapy (with sulfonylureas being an option in cases where metformin is contraindicated). However, modern international guidelines recommend other groups of GLDs as the first-line therapy when metformin is contraindicated, including Dipeptidyl Peptidase 4 (DPP4) inhibitors, pioglitazones, sulfonylureas, or SGLT2 inhibitors [16]. These drugs are moderately affordable due to their cost, but they may still pose challenges for pensioners.

Furthermore, the low affordability of innovative GLDs (due to high prices and lack of reimbursement) may lead to premature transition to insulin treatment in cases where metformin and sulfonylurea drugs fail to produce satisfactory results. Insulin preparations are cost-effective and subject to reimbursement, which increases the accessibility of insulin therapy. However, insulin therapy increases the risk of

hypoglycemia, which can be particularly dangerous for older patients with cardiovascular disease.

For example, in the Republic of Kazakhstan, GLP-1, SGLT2, and DPP-4 inhibitors are included in the list of drugs prescribed free of charge to patients with obesity and cardiovascular disease risk factors. This has resulted in a 7% decrease in the need for insulin due to the availability of new, albeit expensive, GLDs [17].

Thus, the analysis showed that in order to implement modern treatment schemes for T2DM, which according to the current legislation can be used in Ukraine, it is necessary to expand the list of GLDs included in the reimbursement program. GLP-1, SGLT2, and DPP-4 should be included in the list of reimbursed GLDs.

This will improve treatment results, which in turn will reduce the development of diabetes complications and improve the quality of life of patients. These measures will reduce the burden of diabetes on the health care system in the years to come. The need for these measures is emphasized by the WHO Resolution 24 May 2021 on reducing the burden of non-communicable diseases by strengthening diabetes prevention and control.

Perspective. The study is based on realities prior to the war in Ukraine. This study would be useful for compare affordability and availability during army conflict and for understanding how humanitarian crises influences on pharmaceutical provision for people with diabetes.

## CONCLUSIONS

1. On the pharmaceutical market of Ukraine, 161 glucose-lowering drugs are registered, which contain 16 international non-proprietary name, and 8 international non-proprietary name combinations in Ukraine. The largest part (64.0%) of the range of glucose-lowering drugs registered in Ukraine is supplied by foreign manufacturers.

2. The study showed that there is a sufficient range of glucose-lowering drugs registered in Ukraine, which allows the use of modern treatment regimens for diabetes, but only a small number 3 international non-proprietary name of glucose-lowering drugs are subject to reimbursement, which makes access to modern therapy for patients limited.

3. It was established that the cost of Defined Daily Dose for mono glucose-lowering drugs varies from UAH 1.1 for glibenclamide up to UAH 90.7 for liraglutide.

4. Most of the Ukrainian and foreign drugs are highly affordable, but foreign preparations of modern groups are moderately affordable, which does not contribute to the use of modern treatment schemes. Only one foreign drug, Liraglutide, is unaffordable

for the able-bodied population according to the solvency adequacy ratio.

5. The analysis of availability for pensioners showed that only metformin (Ukrainian production), glibenclamide, gliclazide, and glimepiride are highly affordable for them, three of which are already subject to reimbursement. Modern glucose-lowering drugs, both of foreign and Ukrainian production, is of low available, which makes it practically impossible to use them in the majority of retirees with diabetes.

6. It is necessary to expand the list of glucose-lowering drugs included in the reimbursement program. The glucagon-like peptide-1, Sodium-Glucose Transport Protein 2 inhibitors, and Dipeptidyl Pep-

tidase 4 inhibitors should be included in the list of reimbursed GLDs.

#### Contributors:

Vlasenko I.O. – conceptualization, investigation, data curation, writing – original draft;

Gladyshev V.V. – conceptualization, writing – review & editing;

Zaliska O.M. – methodology, writing – review & editing;

Davtian L.L. – conceptualization, writing – review & editing.

**Funding.** This research received no external funding.

**Conflict of interests.** The authors declare no conflict of interest.

## REFERENCES

1. Diabetes Atlas. International diabetes federation. 10th edition [Internet]. [cited 2024 Mar 01]. Available from: <http://www.diabetesatlas.org>
2. Ozawa S, Higgins CR, Yemeke TT, Nwokike JI, Evans L, Hajjou M, et al. Importance of medicine quality in achieving universal health coverage. *PLoS One*. 2020;15(7):e0232966. doi: <https://doi.org/10.1371/journal.pone.0232966>
3. Huang Y, Jiang Y, Zhang L, Mao W, van Boven JFM, Postma MJ, et al. Availability, use, and affordability of medicines in urban China under universal health coverage: an empirical study in Hangzhou and Baoji. *BMC health services research*. 2018;18(1):218. doi: <https://doi.org/10.1186/s12913-018-2993-1>
4. Onarheim KH, Sisay MM, Gizaw M, Moland KM, Norheim OF, Miljeteig I. Selling my sheep to pay for medicines-household priorities and coping strategies in a setting without universal health coverage. *BMC health services research*. 2018;18(1):153. doi: <https://doi.org/10.1186/s12913-018-2943-y>
5. Chow CK, Ramasundarahettige C, Hu W, Alhabib K, Avezum A, Cheng X, et al. Availability and affordability of essential medicines for diabetes across high-income, middle-income, and low-income countries: A prospective epidemiological study. *Lancet Diabetes Endocrinol*. 2018;6:798-808. doi: [https://doi.org/10.1016/S2213-8587\(18\)30233-X](https://doi.org/10.1016/S2213-8587(18)30233-X)
6. Nguyen TN, Yusuf S, Chow CK. Availability and Affordability of Medicines for Diabetes and Cardiovascular Disease across Countries: Information Learned from the Prospective Urban Rural Epidemiological Study. *Diabetology*. 2022;3(1):236-45. doi: <https://doi.org/10.3390/diabetology3010014>
7. Nemchenko A, Nazarkyna V. [Improvement of modern approaches to reference pricing for insulin preparations]. *Farmatsevtichnyi zhurnal*. 2020;5:23-33. Ukrainian. doi: <https://doi.org/10.32352/0367-3057.5.20.03>
8. Chumak I. [Intensification of therapy of type 2 diabetes according to modern guidelines]. *Diabetology, Thyroidology, Metabolic disorders*. 2021;1:53. Ukrainian.
9. [Solvency adequacy ratio]. [Internet]. [cited 2024 Mar 01]. Ukrainian. Available from: <https://www.pharmacycyclopedia.com.ua/article/8076/koef-iciyent-adekvatnosti-platospromozhnosti>
10. Zaliska O, Maksymovych N, Zabolotnya Z, Zalisky B. [Analysis of the list and availability of medicines used for the treatment of atopic dermatitis in Ukraine]. *Farmatsevtichnyi Zhurnal*. 2022;77(2):25-37. Ukrainian. doi: <https://doi.org/10.32352/0367-3057.2.22.03>
11. Yakovleva L, Matyashova N, Stalna O. [Analysis of the assortment and economic availability of means affecting the structure and mineralization of bones presented on the pharmaceutical market of Ukraine]. *Farmatsevtichnyi Zhurnal*. 2018;1-2:5-11. Ukrainian. doi: <https://doi.org/10.32352/0367-3057.1-2.18.01>
12. [Analysis of the treatment system and calculation of economic losses from diabetes in Ukraine]. Kyiv; 2020. 30 p. Ukrainian.
13. Chekman IS, Bondur VV, Klymenko OV. [Combined pharmacotherapy of type 2 diabetes]. *Ratsionalna farmakoterapiia*. 2016;2(39):25-31. Ukrainian.
14. American Diabetes Association. Standards of Medical Care in Diabetes-2021. *Diabetes Care*. 2021;44(1):S1-S2. doi: <https://doi.org/10.2337/dc21-Sint>
15. Kovalevska IV, Ruban OA, Yevtushenko OM. [Researches of the assortment of drugs for the treatment of diabetes II type on the pharmaceutical market of Ukraine]. *Farmatsevtichnyi Zhurnal*. 2019;2:13-23. Ukrainian. doi: <https://doi.org/10.32352/0367-3057.2.19.02>
16. American Diabetes Association. Pharmacologic Approaches to Glycemic Treatment: Standards of Medical Care in Diabetes. *Diabetes Care*. 2022;45(1):125-43. doi: <https://doi.org/10.2337/dc22-S009>
17. [On approval of the list of medicines and medical products for free and (or) discounted outpatient provision of certain categories of citizens of the Republic of Kazakhstan with certain diseases (conditions)]. [Internet]. [cited 2024 Mar 01]. Kazakh. Available from: <https://adilet.zan.kz/kaz/docs/V2100023885>

Стаття надійшла до редакції 12.09.2024;  
затверджена до публікації 09.03.2025