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POLICY BRIEF

REDUCING FUTURE COSTS: ADULTS AND PREGNANT WOMEN WITH TYPE 1 DIABETES NEED INSULIN PUMPS

*«An economically sound solution
that saves health and reduces costs.»*

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Contents

3	ABOUT THE AUTHOR
4	EXECUTIVE SUMMARY
7	PUMPS AS A BARRIER AND AN OPPORTUNITY: UNEQUAL ACCESS AND ITS CONSEQUENCES
9	GLOBAL TREND: TRANSITION TO SYSTEMATIC PROVISION OF INSULIN PUMPS
11	PUMPS TODAY – SAVINGS TOMORROW: LONG-TERM BUDGET BENEFITS
13	MORE THAN JUST TREATMENT: HOW INSULIN PUMPS ARE CHANGING HEALTH, THE ECONOMY, AND TRUST
15	POLICY, FINANCE, AND PARTNERSHIPS: CONDITIONS FOR A SUCCESSFUL LAUNCH
17	STRATEGY TODAY – HEALTH TOMORROW

ABOUT THE AUTHOR

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ABOUT DIARCOM

The Diabetes Parents' Committee (DIARCOM) Public Foundation is Kazakhstan's leading NGO in the field of diabetes. We advocate for the interests of families with children living with type 1 diabetes and promote systemic changes in healthcare. The Foundation combines expert knowledge, international connections, and parents' practical experience, transforming them into successful projects, from educational camps and school programs to national-level advocacy campaigns. We are a reliable partner for government, businesses, and international organizations, capable of professionally implementing projects of any complexity and achieving real changes in the lives of patients.

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EXECUTIVE SUMMARY

Including insulin pumps for adults and pregnant women with type 1 diabetes in the list of free and subsidized services is not a medical detail, but a strategic decision capable of transforming Kazakhstan's healthcare system. Currently, state support is limited to children, while thousands of adults and women with high-risk pregnancies are forced to either independently purchase expensive equipment or return to outdated and less effective injection regimens. This directly leads to worsening glycemic control, increased complications, disability, and a growing burden on the system. International experience—from the US and EU countries to Russia—demonstrates that pumps are included in state insurance, provided even when target HbA1c levels are not met, and enable systemic reductions in treatment costs. Kazakhstan risks lagging behind this trend. Estimates show that providing 1,000 patients with this equipment will require approximately 700 million to 1 billion tenge per year, but will save billions on dialysis, amputations, and other serious complications. The cost per QALY¹ for pump therapy falls within the internationally recognized cost-effectiveness threshold, and the reduction in disability benefits not only the budget but also employment and demographics. Recommendations include amending the regulatory framework, providing funding through the Compulsory Health Insurance Fund (CHI)/State Fund for the Benefit of Medical Care (GKBMP), launching a pilot project in 2025–2026, training specialists, implementing monitoring, and engaging patient organizations. Today's decision to support pump implementation means reducing mortality tomorrow, improving quality of life, and strengthening trust in the healthcare system.

¹ QALY (Quality-Adjusted Life Year) – это единица измерения, которая отражает количество прожитых лет с учётом их качества. 1 QALY = 1 год жизни в полном здоровье. Если человек живёт год с болезнью, ухудшающей качество жизни на 50%, это считается как 0,5 QALY. Используется для оценки эффективности медицинских вмешательств.

Abbreviations

Abbreviation	Explanation
DM1	Diabetes mellitus type 1
HbA1c	Glycated hemoglobin
DKA	Diabetic ketoacidosis
GVFMC	Guaranteed volume of free medical care
OSMS	Compulsory social health insurance
SK-Pharmacia	Unified distributor of medicines and medical devices in the Republic of Kazakhstan
QALY	Quality-Adjusted Life Year
ICER	Incremental Cost-Effectiveness
WHO	World Health Organization
IDF	International Diabetes Federation

Key terms

Term	Definition
Insulin pump	A medical device that provides continuous insulin delivery to the body for more accurate glucose control in patients with type 1 diabetes.
Type 1 diabetes mellitus (T1D)	An autoimmune disease in which the pancreas stops producing insulin. Requires lifelong insulin therapy.
HbA1c	A measure of average blood glucose levels over the past 2–3 months. It is the primary measure of diabetes control.
Hypoglycemia	A condition in which blood glucose levels fall below normal. Can be dangerous and cause loss of consciousness.

Term	Definition
Diabetic ketoacidosis (DKA)	An acute and potentially life-threatening complication of T1D caused by insulin deficiency. Requires emergency hospitalization.
QALY (quality-adjusted life year)	A measure of life expectancy adjusted for quality of life. Used in economic evaluations of the effectiveness of medical interventions.
ICER (Marginal Cost-Effect Ratio)	An indicator that shows the cost of one additional unit of benefit (e.g., one QALY) gained using a new technology compared to current practice.
Pump therapy	A method of insulin therapy using an insulin pump that mimics natural insulin secretion.
Preferential provision	A mechanism for financing medical devices or drugs using government funds for certain groups of patients.

PUMPS AS A BARRIER AND AN OPPORTUNITY: UNEQUAL ACCESS AND ITS CONSEQUENCES

Chapter 1. Problem Description

Type 1 diabetes mellitus (T1D) in adults and pregnant women is an acute medical and social problem requiring constant glycemic monitoring and insulin therapy. Insulin pumps are a recognized method worldwide for improving T1D control, reducing the risk of complications, and improving patients' quality of life². **However, in Kazakhstan, access to state-funded pumps is limited to children only:** after age 18, patients with T1D lose their subsidized provision and are forced to either purchase expensive equipment and consumables themselves or return to less effective multiple injections.

Lack of access to pump therapy for adults and pregnant women leads to:

- **Deterioration of glycemic control.** Without a pump, average HbA_{1c} levels in adult patients are significantly higher, and dangerous blood sugar fluctuations are more common. For example, injections have been shown to increase HbA_{1c} by 1–2 % compared to levels previously achieved with a pump. This can lead to accelerated development of diabetes complications.
- **Increased acute complications and hospitalizations.** Adults without pumps are more likely to experience episodes of diabetic ketoacidosis (DKA) and severe hypoglycemia requiring hospitalization. Data show that **the incidence of DKA in pump patients is lower** than in those receiving multiple injections³. The lack of pumps leads to an increase in ambulance calls and intensive care units.
- **Increased costs of treating complications.** Treatment of retinopathy (laser photocoagulation, vitrectomy), nephropathy (dialysis, transplantation), and diabetic foot syndrome (amputation) is expensive for the healthcare system. These complications occur more frequently and earlier in patients with poor control. Without pumps, the costs of complications steadily increase.

2 Feig DS, Murphy HR, Donovan LE, Corcoy R, Barrett JFR, Sanchez JJ, et al.; CONCEPTT Collaborative Group. Pumps or Multiple Daily Injections in Pregnancy Involving Type 1 Diabetes: A Prespecified Analysis of the CONCEPTT Randomized Trial. *Diabetes Care*. 2018 Dec;41(12):2471–2479. doi:10.2337/dc18-1437. PMID:30327362.

3 Everett EM, Copeland TP, Moin T, Wisk LE, et al. *Insulin Pump-related Inpatient Admissions in a National Sample of Youth With Type 1 Diabetes*. *J Clin Endocrinol Metab*. 2022 May 17;107(6):e2381–e2387. PMID:35196382; PMCID:PMC9113825.

- **Social losses.** Young people with type 1 diabetes without appropriate treatment are more likely to become disabled and to drop out of the labor force. Deteriorating health leads to a decrease in work capacity and quality of life, and the number of sick leaves and social benefits for disability increases. Families experience stress, and the birth rate among women with diabetes declines (due to complications during pregnancy).

Reasons for the current situation:

- **Limited funding:** The state budget for diabetes programs covers pumps only for children, with no provision for expanding coverage to adults. Funds allocated for subsidized diabetes care are only sufficient for insulin and basic consumables (test strips) for adults, but not for pumps.
- **Regulatory barriers:** Pumps for adults are not included in the official list of free medical supplies, so there is no mechanism for their procurement and distribution. There are no updated regulations that would allow clinics to provide pumps to adults, even if funds are available.
- **Lack of awareness:** Funding decisions are made by people who are not fully informed about the benefits of pump therapy. It is possibly perceived as «too expensive/not urgent» due to the lack of clear cost-benefit calculations.
- **Previous lack of clear economic justification:** Until now, no comprehensive cost-benefit analysis for pumps for adults has been presented, making it difficult to defend the budget for this program. Such calculations are now available (see below).

If this problem is not addressed, Kazakhstan will face an increasing burden of diabetes: increased disability at a young age, costs for high-tech treatment of complications, and demographic losses due to complicated pregnancies. This will jeopardize the implementation of state plans to reduce mortality and increase life expectancy.

GLOBAL TREND: TRANSITION TO SYSTEMATIC PROVISION OF INSULIN PUMPS

Chapter 2. International Experience

Many countries have already included insulin pumps in public funding systems, having seen their long-term effectiveness:

- **USA:** Pumps are covered by insurance plans (both public and private) for all ages when indicated. This approach has been shown to **reduce hospitalizations** and acute complications, saving money in the long run⁴.
- **Europe:** In most EU countries, pumps are standard care for type 1 diabetes. For example, in Germany and the UK, pump costs and consumables are fully reimbursed by insurance if target HbA_{1c} is not met with injections⁵. **This results in a significant reduction in complications and treatment costs.** Scandinavian countries almost universally provide pumps to patients, achieving some of the best diabetes control in the world.
- **Russia:** Federal subsidies for pumps have been expanded – since 2019, pumps have been available to people with diabetes, and since 2023, the procedure for providing consumables has been clarified⁶. Some regions have begun installing pumps for adults under compulsory medical insurance. This indicates a shift from providing only children to also covering high-risk adult groups.
- **Other countries:** Canada and Australia have pump subsidy programs (full or partial) for patients with type 1 diabetes, often with a focus on young people and pregnant women. This has led to increased pump coverage and, consequently, improved health outcomes. **International consensus:** pumps are effective and appropriate for type 1 diabetes, and their funding is justified to reduce complications⁷.

4 Insulin Pump Utilization in 2017–2021 for More Than 22,000 Children and Adults with Type 1 Diabetes: A Multicenter Observational Study Kajal Gandhi, Osagie Ebekozien, Nudrat Noor, Ryan J. McDonough, Susan Hsieh; Brian Miyazaki, Selorm Dei-Tutu, Lauren Golden, Marisa Desimone, Holly Hardison, Saketh Rompicherla, Halis K. Akturk, Manmohan K. Kamboj, <https://doi.org/10.2337/cd23-0055> PubMed:38230341

5 Foundation of European Nurses in Diabetes; International Diabetes Federation; Primary Care Diabetes in Europe. *Diabetes: The policy puzzle – Is Europe making progress?* 3rd ed. Luxembourg: DG Health & Consumers, European Commission; 2011. Available from health.ec.europa.eu/.../policy_puzzle_2011.pdf.

6 Министерство здравоохранения Российской Федерации. Минздрав России разъяснил порядок льготного обеспечения расходными материалами к инсулиновой помпе? письмо Минздрава РФ № 25–3/3088179–5969 от 11.09.2023 // Мед. ст-во «Панацея». Режим доступа: <https://www.mco-panacea.ru/news/minzdrav-rossii-raz-yasnil-poryadok-lgotnogo-obespecheniya-rashodnymi-materialami-k-insulinovoy-pompe>

7 Pease A, Zomer E, Liew D, Lo C, Earnest A, Zoungas S. Cost-effectiveness of health technologies in adults with



For Kazakhstan, the experience of countries with state insurance is particularly relevant: it has been shown that **investments in pumps pay off**. In an analysis of 35 economic studies, 56 % found pumps to be **cost-effective** (acceptable in terms of price/quality of life), especially for patients with high HbA_{1c} and frequent hypoglycemia. Our neighbors are also moving in this direction, and Kazakhstan risks falling behind if it doesn't take action now.

type 1 diabetes: a systematic review and narrative synthesis. *Syst Rev*. 2020 Aug 3;9(1):171. doi:10.1186/s13643-020-01373-Y. PMID:32746937; PMCID:PMC7401226.

PUMPS TODAY – SAVINGS TOMORROW: LONG-TERM BUDGET BENEFITS

Chapter 3. Economic Justification

Key Argument: Pumps cost money today, but will save money tomorrow.

- **Direct Implementation Costs:** Providing pumps to approximately 1,000 adults and pregnant women is estimated to require approximately **700 million – 1 billion tenge per year** (with gradual expansion over 3–5 years). This is feasible within the healthcare budget.
- **Complication Savings:** Intensive diabetes management with a pump prevents complications that are much more expensive to treat. One dialysis patient costs approximately 5 million tenge per year; one vitrectomy – up to 1 million tenge; treatment of one diabetic foot – hundreds of thousands. **Pumps help avoid many of these complications**, saving millions. A DCCT study showed that good control (as with the pump) saves ~\$90,000 (≈40 million tenge) per patient over 30 years on healthcare services⁸.
- **QALY:** The cost per quality-adjusted life year gained thanks to the pump is within acceptable limits. The estimated **ICER is ~\$50,000/QALY**⁹, which is less than three times Kazakhstan's per capita GDP—the classic criterion for feasibility. In other words, the health gained for this cost is worth it.
- **Labor productivity:** Patients on the pump are less likely to get sick and work longer. Reduced temporary disability and extended work activity provide an indirect economic effect (taxes, economic contribution). According to international data, this translates to up to **\$2,000–\$3,000 per person** in additional GDP per year due to maintained productivity.
- **Social burden:** Fewer disabilities mean fewer benefits and Pension Fund expenses. Each prevented disability saves the state an average of **1.5–2 million tenge per year** in social security payments (pensions, benefits, and privileges). Pumps will help reduce the number of new people with diabetes-related disabilities.

8 Campbell RAS, Colhoun HM, Kennon B, McCrimmon RJ, Sattar N, McKnight J, et al. *The 30-Year Cost-Effectiveness of Alternative Strategies to Achieve HbA1c Targets in Type 1 Diabetes*. Diabetes Care. 2019 Jun;42(10):1885–1893. PMID: PMC6481926.

9 Herman WH, Braffett BH, Kuo S, Lee JM, Brandle M, Jacobson AM, Prosser LA, Lachin JM, DCCT/EDIC Research Group. *The 30-year cost-effectiveness of alternative strategies to achieve excellent glycemic control in type 1 diabetes: An economic simulation informed by the results of the DCCT/EDIC*. J Diabetes Complicat. 2018 Oct;32(10):934–939. doi:10.1016/j.jdiacomp.2018.06.005. PMID:30064713; PMID:PMC6481926.



Therefore, **the long-term benefits outweigh the initial investment**. Funding for pumps is essentially a **preventative measure** that works like an investment: pay now to avoid paying more later. In 5–7 years, the program will begin to pay for itself in monetary terms, not to mention the lives saved.

Furthermore, **international support** is available: there are grants and programs (for example, through the WHO and IDF) that can partially finance the installation of pumps or staff training. This will reduce the burden on the budget in the initial period.

MORE THAN JUST TREATMENT: HOW INSULIN PUMPS ARE CHANGING HEALTH, THE ECONOMY, AND TRUST

Chapter 4. Benefits of Pump Therapy

For the healthcare system: Improved disease control will lead to a reduction in complications, hospitalizations, and emergency room visits¹⁰. Long-term costs for treating chronic diabetes complications will be reduced. Resource efficiency will increase—investments will be directed toward improving care rather than treating preventable complications.

For patients: Improved quality of life—fewer painful injections, more freedom in daily routine, and improved well-being. The incidence of hypoglycemia and associated fainting episodes is reduced¹¹. People can engage in more active sports and social activities without fear of sharp drops in blood sugar. Pregnant women will be able to carry their babies to term more safely. Overall, patients feel more confident and secure knowing they have modern treatment.

Socioeconomic effects: Reduced disability means more people will remain able to work. Increased employment among patients with type 1 diabetes will have a beneficial effect on the economy, as they continue to work and pay taxes instead of relying on social benefits. A reduction in the incidence of complications is an investment in the country's human capital. Furthermore, **social justice** will be restored: vulnerable groups will receive the necessary support, which will strengthen public trust in the government.

Demographics: Improving pregnancy outcomes for patients with type 1 diabetes will increase the likelihood of having healthy children and reduce maternal and perinatal mortality. Although small in absolute terms, this is an important demographic improvement – a contribution to the health of future generations.

10 Gandhi K, Ebekozi O, Noor N, McDonough RJ, Hsieh S, Miyazaki B, et al; T1D Exchange Quality Improvement Collaborative. Insulin Pump Utilization in 2017–2021 for More Than 22,000 Children and Adults With Type 1 Diabetes: A Multicenter Observational Study. *Clin Diabetes*. 2024 Winter;42(1):56–64. doi:10.2337/cd23-0055. PMID:38230341; PMCID:PMC10788665.

11 Feig DS, Murphy HR, Donovan LE, Corcoy R, Barrett JFR, Sanchez JJ, et al.; CONCEPTT Collaborative Group. Pumps or Multiple Daily Injections in Pregnancy Involving Type 1 Diabetes: A Prespecified Analysis of the CONCEPTT Randomized Trial. *Diabetes Care*. 2018 Dec;41(12):2471–2479. doi:10.2337/dc18-1437. PMID:30327362.



Innovative image: The introduction of pumps will demonstrate that Kazakhstan is keeping pace with advanced medical technologies and is committed to the quality of medical care. This will positively impact the international image of Kazakhstan's healthcare system. It is also possible that the outflow of citizens abroad in search of better diabetes treatment will decrease.

To summarize, **the benefits** include medical (better control, fewer complications), economic (lower subsequent costs, preserved ability to work), social (improved family life, equality), and strategic (innovation development, demographics). These positive effects far outweigh the initial cost of the program.

POLICY, FINANCE, AND PARTNERSHIPS: CONDITIONS FOR A SUCCESSFUL LAUNCH

Chapter 5 Recommendations

1. **Amend the regulatory framework:** include insulin pumps and consumables for adults and pregnant women with type 1 diabetes in the list of the guaranteed volume of medical care/mandatory health insurance (GVMC). Update clinical guidelines by establishing criteria for pump prescription (elevated HbA_{1c}, frequent hypoglycemia, pregnancy planning, etc.).
2. **Determine the financing mechanism:** provide a separate budget line item in the GVMC or GVMC for the purchase of pumps and consumables. Centralized procurement through SK-Pharmacia is possible to standardize prices. Consider co-financing: for example, funds from the national budget + partial grants from international donors for the first stage.
3. **Launch a pilot project:** start with a limited number of pumps (e.g., 200–300) in 1–2 regions to refine the process (2025–2026). If the pilot project is successful, scale it up nationwide in 2026. Pilot groups will select patients with the highest risk (based on the findings of medical consultations).
4. **Training and support:** organize training courses for endocrinologists on pump therapy. Create «diabetes schools» for patients receiving pumps, train them on the correct use of the device, preventing diabetic renal failure, etc. Provide a technical support service (including a hotline) in collaboration with pump manufacturers.
5. **Monitoring and evaluation:** maintain a registry of all patients on the pump, track indicators (HbA_{1c} and hospitalizations). After 12 to 18 months, analyze the results: decrease in HbA_{1c}, reduction in hypoglycemia, savings on hospitalizations – and submit a report to the Ministry and financial authorities. This is necessary to support continued funding.
6. **Interagency collaboration:** jointly with the Ministry of Labor, assess the impact on disability and employment to factor in the impact in social programs. Engage the Ministry of Finance in planning sustainable funding for the program for years to come (taking into account the cost-effectiveness of the program).

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- 7. Information campaign and stakeholder engagement.** To successfully promote the program, it is important to secure community support. The goals and benefits of insulin pumps should be communicated to a wider audience through media and social media to reduce resistance and eliminate the perception of the program as a «luxury.» It is important to rely on patient organizations (e.g., the Diabetes Association of the Republic of Kazakhstan) and engage reputable doctors—their support will strengthen the argument. Economic calculations will help convince financiers. It would be advisable to initiate discussions in the Majilis and Senate, securing the support of deputies and international organizations.

STRATEGY TODAY – HEALTH TOMORROW

Chapter 6: Conclusion

Strategic Significance: Including insulin pumps in the list of subsidized services is not a narrowly technical issue, but a strategic choice for Kazakhstan's healthcare system. This is a step toward modern treatment standards and toward prioritizing the prevention of complications over costly treatment. It affects the interests of thousands of citizens, improves social justice, and enhances the quality of life of patients with type 1 diabetes.

Expected Results: The widespread implementation of insulin pump therapy improves the effectiveness of type 1 diabetes treatment, reduces the burden on hospitals, saves the state money in the long term, and, most importantly, **preserves the health and lives** of our citizens. Supporting this initiative today means preventing disabilities and deaths tomorrow.

Considering all the facts and calculations presented, **we recommend initiating changes to state programs as soon as possible** to include insulin pumps for adults and pregnant women with type 1 diabetes in the list of free medical services. Funding for the program must be secured and its phased implementation must begin. This measure will be supported by both the medical community and patients and the public, as its fairness and benefits are clear.

Proper investments in healthcare are measured not by immediate returns, but by the long-term well-being of the nation. Providing insulin pumps is precisely such an investment. It will allow Kazakhstan to avoid much greater costs in the future and give many families the chance to live a full life free from the severe consequences of diabetes. The time has come to take this step, so as not to miss the window of opportunity to improve the diabetes situation in our country.



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