

Policy Brief

Assessment of the Insulin Use Efficiency and Quality Assurance Across the Supply Chain

1. Background and rationale

Kyrgyzstan is experiencing a growing burden of noncommunicable diseases (NCDs), with cardiovascular diseases accounting for more than 50% of adult mortality.

Diabetes mellitus (DM) is a major risk factor for these conditions. Reducing the burden of diabetes and strengthening its management are established national health priorities through 2030.

Insulin is procured through the national budget and provided to patients free of charge. A well-functioning supply chain is essential to ensure continuous patient access to safe, effective, and quality-assured insulin.

Ensuring equitable access to affordable and quality insulin is directly dependent on supply chain resilience — from demand forecasting and procurement to storage, transportation, and dispensing. Disruptions at any stage may lead to treatment interruptions and adverse health outcomes.

In recent years, Kyrgyzstan has experienced supply delays, limited availability, and interruptions in dispensing, generating concern among patients, healthcare providers, and policymakers.

An effective supply system should ensure transparency of processes, reliable demand data, robust logistics and storage conditions, a competitive and well-regulated market environment, and coordinated engagement of all stakeholders — from public institutions to patient organizations.

2. Study aim and objectives

To assess the efficiency of insulin and other glucose-lowering medicines use and evaluate quality assurance across all stages of the supply chain.

Objectives

- Assess availability of insulin for patients with diabetes and evaluate efficiency of use: forecasting, needs assessment, procurement, distribution, storage, and accounting.
- Conduct a comprehensive assessment of the national supply chain with a focus on quality and accessibility.
- Identify gaps and challenges; formulate short/medium/long-term solutions.
- Develop recommendations to improve efficiency of public spending and strengthen the supply chain, including possible expansion of a pharmacy-based distribution model.

3. Methodology

The assessment included:

- A review of regulatory frameworks, national statistics, and international best practices in pharmaceutical supply chain management, including insulin.
- Technical consultations with stakeholders.
- Field research in selected healthcare organizations.
- Preparation of an analytical report and policy recommendations to strengthen the supply chain performance.

4. Study findings

Key indicators

According to the International Diabetes Federation (IDF), 10.5% of the global adult population (approximately 537 million people aged 20–79) are living with diabetes, and nearly half remain undiagnosed (IDF, 2021) or are unaware they have the disease (IDF, 2021). Three out of four adults with diabetes live in low- and middle-income countries. By 2045, one in eight adults worldwide (approximately 783 million people) is projected to be living with diabetes — representing a 46% increase.

Indicator	Global data	Kyrgyzstan
Diabetes prevalence	10.5% of the adult population aged 20–79 (537 million) (IDF, 2021)	1.2% registered patients (84,020) (2023)
Projection	783 million by 2045 (+46%)	Growth in registered cases: +6.5% annually (2018–2023); >6,000 new cases per year
Undiagnosed population	Nearly half of adults with diabetes remain undiagnosed	Estimated true prevalence reaches 8.8% of the population (WHO)
Mortality	Diabetes caused 1.6 million deaths (2021)	Decrease from 9.8 (2020) to 6.3 per 100,000 population (2023)

Insulin supply chain

Effective management of pharmaceutical and medical product supply chains is fundamental to improving the quality, safety, and efficiency of healthcare delivery.

The healthcare supply chain is a network of interconnected institutions and processes that ensure timely and equitable access to medicines and medical products for populations in need.

The insulin supply chain consists of defined stages, similar to supply chains for other medicines and medical products.

Performance across all supply chain stages and the effectiveness of coordination mechanisms directly influence rational insulin use and quality assurance throughout the system.

Core stages of the logistics cycle include:

- Product selection.
- Quantification (forecasting and needs estimation) and budget planning.
- Procurement of medicines and medical devices.
- Inventory management: warehouse management systems, data quality, and data management.
- Storage, distribution, and transportation.
- Monitoring and evaluation.

Key stages of the logistics cycle in the Kyrgyz Republic

Product selection

Insulin selection is based on national clinical guidelines and includes medicines listed in the National Essential Medicines List approved by the Cabinet of Ministers and updated every two years.

All medicines must be registered in the country; at the time of the study (2024), 24 insulin products were registered, including 18 originators and 6 biosimilars.

Systemic challenges persist, including limited assurance of therapeutic equivalence of generics, insufficient transparency of registration processes, incomplete implementation of good pharmaceutical practices, and low patient trust in biosimilars.

Quality control

Quality control is conducted at the importation stage only. Routine monitoring of storage conditions in healthcare facilities is not systematically implemented, despite regulatory requirements.

This gap weakens public trust in medicines and indicates limited enforcement of regulatory standards.

Forecasting and planning

Forecasting determines procurement volumes, financial requirements, and timelines necessary to ensure uninterrupted supply.

Requests should be informed by data from the national diabetes registry; however, data utilization remains incomplete and is not integrated with inventory management systems.

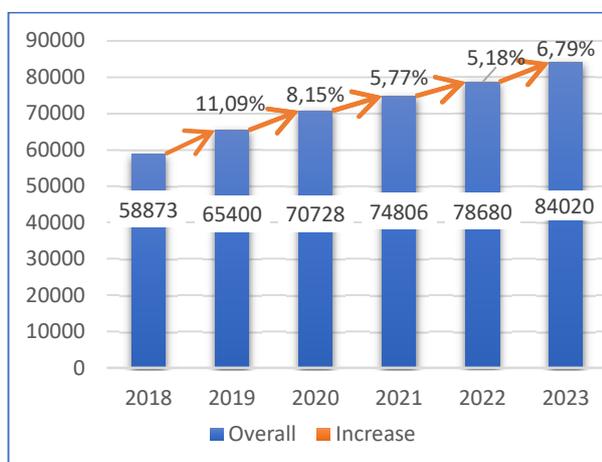
Needs estimation relies on reporting forms and an assumed annual increase in diabetes prevalence of 10%.

Calculations are differentiated by diabetes type, age group, insulin type, and dosage form.

Methodological limitations include insufficient consideration of individualized treatment regimens and demographic structure, reliance on manual calculations, and absence of real-time data validation.

Budget planning is conducted for a three-year period, with projections for subsequent years based on a 10% annual increase in patient numbers.

Figure 1. Increase in the number of patients with diabetes, 2018–2023.



This approach does not incorporate detailed information on insulin types, treatment regimens, demographic characteristics, and other variables that can only be captured through a comprehensive and integrated diabetes registry.

Procurement

Until 2023, insulin procurement was conducted through the national electronic public procurement portal.

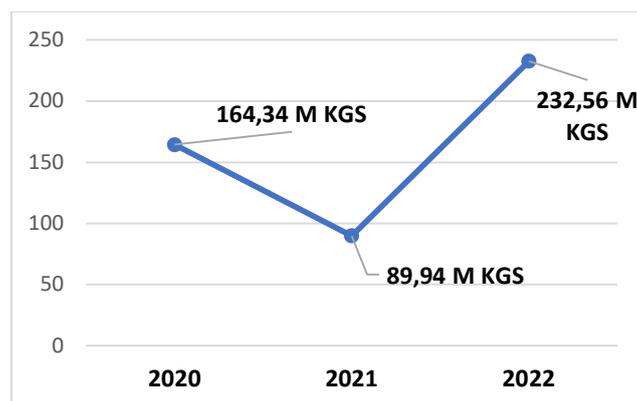
Challenges persisted, including technical limitations in procurement processes, supplier participation, and procurement planning.

Insufficient procurement volumes in 2021 resulted in a critical national insulin shortage, exacerbated by the absence of supply through private pharmacy channels.

Lack of tender bids in 2021 resulted in a sharp decline in procurement value from 164.34 million KGS in 2020 to 89.94 million KGS in 2021.

In 2022, procurement reached 232.56 million KGS (Figure 2).

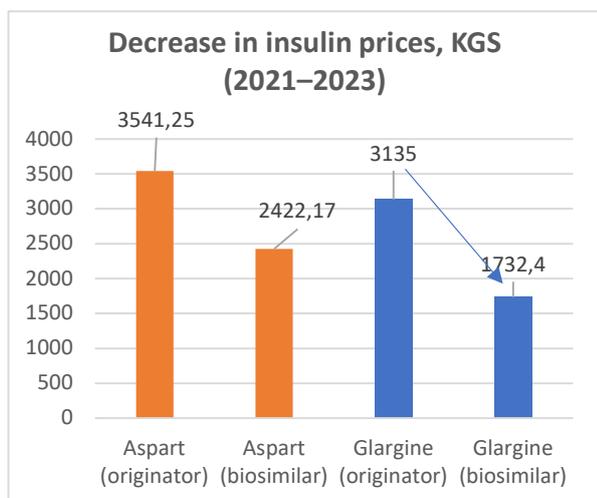
Figure 2. Insulin procurement volumes (2020–2022).



Since 2023, procurement has been conducted by the state enterprise Kyrgyzpharmacia through direct negotiations with manufacturers.

In 2023, significant price reductions were achieved through procurement of biosimilars (Figure 3).

Figure 3. Average procurement prices for insulin, KGS (2021–2023).



However, key challenges remain: procurement decisions are frequently driven by price considerations rather than clinical criteria; patients and healthcare providers remain cautious regarding biosimilars; and the absence of legal supply through private pharmacies limits patient choice and contributes to cross-border purchases or informal distribution channels.

Inventory management and distribution

Regulations require healthcare facilities to maintain a strategic insulin reserve equivalent to at least six months of supply.

In practice, distribution is managed by a Ministry of Health commission, with data collected manually.

After delivery to regional level, insulin is distributed to district primary care facilities and dispensed to patients against signature.

Key challenges include lack of real-time stock visibility, misalignment between allocated quantities and storage capacity, and absence of an integrated national stock monitoring system.

Storage and record keeping

Insulin must be stored at +2 to +8°C without freezing.

In practice, primary healthcare facilities often lack adequate refrigeration capacity, deliveries are typically made as annual supplies, leading to overcrowded refrigerators, temperature deviations, and risks to product quality.

Inventory is maintained separately by each healthcare facility without a unified national system or data integration.

Centralized procurement and distribution arrangements have altered reporting and information flows and increased operational complexity.

Transportation

A fully centralized transport system is not in place: regional and district facilities remain responsible for collecting insulin from the central warehouse in Bishkek.

Special transport vehicles are used irregularly, and healthcare facilities bear administrative and financial responsibility for transport.

At district level, transportation is conducted in thermal containers using standard vehicles, which does not reliably ensure maintenance of cold chain integrity.

5. Key Findings

The analysis identified multiple systemic weaknesses affecting insulin supply chain performance and quality assurance:

Fragmentation and insufficient coordination across supply chain functions, including product selection, forecasting, procurement, storage, transport, and distribution.

Limited use of integrated digital systems and inconsistent data quality constrain effective demand planning and inventory management.

Inadequate maintenance of storage and transport conditions poses risks to product stability and therapeutic effectiveness.

Regulatory and institutional constraints limit market competition and reduce affordability and availability of insulin.

Limited engagement of patients and health professionals in the supply chain management, alongside limited contribution of diabetes education programmes and patient organizations.

6. Policy options and strategic opportunities

The insulin supply chain requires comprehensive modernization through transition to an integrated, system-wide model covering forecasting, procurement, logistics, and dispensing. Strengthening digital infrastructure, formalizing financing of logistics, enhancing regulatory oversight, and leveraging private sector capacity will improve system resilience and sustainability.

- **Forecasting and data systems:** develop forecasting methodologies grounded in clinical and epidemiological evidence and establish or modernize an integrated diabetes registry linked to electronic medical records and e-prescriptions.
- **Logistics and storage:** institutionalize financing mechanisms for logistics and consider outsourcing selected logistics functions to accredited pharmacy organizations with public reimbursement.
- **Implement standard operating procedures** across all supply chain stages.
- **Regulatory framework:** strengthen regulatory pathways for biosimilar registration and use; and establish clear governance mechanisms for public–private collaboration in pharmaceutical distribution.
- **Workforce and patient engagement:** expand the role of patient organizations and diabetes education programs and strengthen training of healthcare professionals in pharmaceutical storage, handling, and supply chain management.
- **Financial sustainability:** implement a phased transition to a pharmacy-based insulin-dispensing model combining centralized public procurement with progressive reimbursement mechanisms to enhance access, continuity of supply, and long-term sustainability.

Full report available at the Health Policy Analysis Center website: www.hpac.kg