**APPROVED**
by decision of the Board of Trustees
"University Medical Center"
Corporate Fund
from "___" _____ ____
Protocol No. ____

# STRATEGIC PLAN OF "UNIVERSITY MEDICAL CENTER" CORPORATE FUND FOR 2024 – 2028

**Astana, 2024**

# GLOSSARY AND ABBREVIATIONS

- AMC – Academic Medical Center;
- BP – budget program;
- IRD – internal regulatory document of UMC;
- CMF - Congenital malformations of the fetus;
- HTMC – high-tech medical care;
- GVFMC- guaranteed volume of free medical care
- MIS - medical information system;
- Ph.D. - Doctor of Medical Sciences;
- IAMC – integrated Academic Medical Center;
- IT – information technologies;
- CAD - Clinical Academic Department, a structural unit of UMC, integrated for the purpose of carrying out clinical, educational and research activities, as well as advanced training of medical personnel of the relevant clinical profile;
- MSc - Candidate of Medical Sciences;
- LIS "Ariadna" - laboratory information system for automation and information support of the technological process of a clinical diagnostic laboratory;
- Medicines, medical devices – medicines, medical products;
- MoH RK - Ministry of Health of the Republic of Kazakhstan;
- NPJSC – non-profit joint stock company
- National project – state sectoral program document “Quality and affordable healthcare for every citizen “Healthy Nation””;
- NRCSC – National Research Cardiac Surgery Center / UMC Heart Center;
- NRCMChH – National Research Center for Maternal and Child Health / UMC Mother and Child Center;
- NRCHD - Republican state enterprise with the right of economic management “National Research Center for Health Development named after Salidat Kairbekova” of the Ministry of Health of the Republic of Kazakhstan;
- NU – Autonomous educational organization “Nazarbayev University”, founder of UMC;
- CSHI - compulsory social health insurance;
- Orphan diseases are rare, serious diseases that threaten human life or lead to disability, the frequency of which does not exceed an officially defined level. The list of orphan diseases is approved by the Ministry of Health of the Republic of Kazakhstan;
- OECD – Organization for Economic Co-operation and Development;
- PET, CT, MRI - positron emission tomography / computed tomography, magnetic resonance imaging;
- RBP 024 – republican budget program 024 “Targeted contribution to Nazarbayev University”;
- RDC - Republican Diagnostic Center / UMC Diagnostic Center;
- RK - Republic of Kazakhstan;
- Media – mass media;
- SMP - specialized medical care;
- SOP – standard operating procedures;
- NS - nursing staff (including nurses, midwives, laboratory technicians, x-ray technicians)
- FLR - Fund for Labor Remuneration
- SHIF - Social Health Insurance Fund;
- HCS - Heart Center in Shymkent / UMC Heart Center Shymkent;
- NUSoM– School of Medicine of Nazarbayev University;
- PC. unit - unit of staff number of employees of the organization;
- 1C is an information system that automates management and accounting tasks - accounting, warehouse, payroll, personnel records, etc.;
- AAMC - Association of American Medical Colleges
- AAHCI – international alliance AMC (Alliance of Academic Health Centers International);
- ACGME – Accreditation Council for Graduate Medical Education;
- AMEE – Association for Medical Education in Europe;
- ISO – international organization for standardization;
- CRP - Nazarbayev University grant funding program;
- ECAQA and IQAA - non-profit institutions in the field of assessing the quality of educational organizations and educational programs - “Eurasian Center for Accreditation and Quality Assurance in Higher Education and Health Care”; “Independent Agency for Quality Assurance in Education”;
- ERC - European Resucitation Center;
- HIMSS EMRAM - Healthcare Information and Management Systems Society Electronic Medical Record Adoption Model
- Fellowship – clinical training fellowship program for residency graduates;
- JCI – Joint Commission International for accreditation of healthcare organizations in the field of quality and patient safety;
- Moodle – information program / platform for managing electronic distance learning;
- NLA – Private institution “National Laboratory Astana” of Nazarbayev University;
- PACS - DICOM image transmission and archiving systems (Picture Archiving and Communication System);
- PDP professional development program in the specialty “Nursing”, implemented by NUSoM (Professional Development Program);
- PR - public relations;
- RCA, FMEA and PDCA - analysis methodologies in management to improve processes and prevent recurrence of failures (Root Cause Analysis; Failure Mode and Effects Analysis; Plan, Do, Check, Act);
- UMC – corporate foundation “University Medical Center”;
- "UMC Medical Assistance" - medical assistance of JSC "Insurance Company "Jusan Garant"
- UPMC – University of Pittsburgh Medical Center, USA (University of Pittsburgh Medical Center);
- WFME - World Federation of Medical Education

# PASSPORT

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|---|---|
| Type of document | The UMC strategic plan for 2024-2028 is an internal regulatory document of UMC |
| Basis for development of the document | The UMC strategic plan for 2024-2028 was developed in alignment with the directives outlined in the following key strategic documents:<br>- Nazarbayev University Strategy for 2018-2030 (approved by the decision of the Supreme Board of Trustees of the autonomous educational organization "Nazarbayev University" No. 6 dated December 1, 2018);<br>- Rules and procedures for strategic planning in the autonomous educational organization "Nazarbayev University" (approved by the Governing Council of the autonomous educational organization "Nazarbayev University" dated March 10, 2023);<br>- Strategic plan of the Nazarbayev University School of Medicine (approved by the decision of Academic Council of the autonomous educational organization "Nazarbayev University" No.2226 dated December 21, 2022);<br>- Development program of the research university of the autonomous educational organization "Nazarbayev University" for 2021 - 2025 (approved by Decree of the Government of the Republic of Kazakhstan No. 923 dated December 23, 2021).<br>- National project "Quality and affordable healthcare for every citizen "Healthy Nation"" (approved by Decree of the Government of the Republic of Kazakhstan No. 725 dated October 12, 2021);<br>- Concept for the development of healthcare in the Republic of Kazakhstan until 2026 (approved by Decree of the Government of the Republic of Kazakhstan No. 945 dated November 24, 2022).<br>- Development plan of the Ministry of Health of the Republic of Kazakhstan for 2023 - 2027 (approved by order of the Ministry of Health of the Republic of Kazakhstan No. 250 dated April 28, 2023).<br>- Recommendations of the strategic partner - UPMC for 2018-2023. |
| Structural unit responsible for development | UMC Strategy Department |
| Implementation deadlines | 2024-2028 |

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# INTRODUCTION

The Corporate Foundation "University Medical Center" was developed in alignment with the decision of the Board of Trustees of the autonomous educational organization "Nazarbayev University" dated September 20, 2015.

UMC today combines 4 clinics - 3 innovative medical centers in the city of Astana: The Republican Diagnostic Center, the National Research Center for Maternal and Child Health and the National Research Cardiac Surgery Center, and from 2024, the Heart Center in Shymkent NPJSC.

In 2016 – 2021 The UMC also included the National Research Center for Oncology and Transplantology and the National Center for Children's Rehabilitation (transferred to the Ministry of Health of the Republic of Kazakhstan in 2019 and 2021). In 2021, the National Research Cardiac Surgery Center became part of the UMC.

This UMC Strategic Plan for 2024-2028 is a logical continuation of the UMC Strategic Plan for 2019-2023 (Plan for Transforming UMC into an Academic Medical Center), developed in collaboration with NU's strategic partner - the University of Pittsburgh Medical Center (UPMC, The University of Pittsburgh Medical Center, Pittsburgh, USA).

The AMC transformation plan identified stages covering up to 2030 *("Restructuring and optimization" (2019–2021); "Sustainable development" (2022–2024); "Leadership (2025–2030)"*). During 2019-2023 UMC implemented the activities of the first and partially the second phase of transformation into the AMC.

The UMC development strategy for 2024-2028 builds on the foundation established during the first and second phases. It aims to continue advancing UMC as an IAMC within NU Medicine, part of NU's integrated academic health system.

## Results of the implementation of the UMC Strategic Plan for 2019-2023 (Plan for Transforming UMC into an Academic Medical Center)

UMC is part of the integrated academic healthcare system of Nazarbayev University (NU Medicine), which aims to advance the healthcare of Kazakhstan through the integration of clinical, educational and research activities. NU Medicine integrates the intellectual resources and base of UMC, NUSOM, and NLA.

In connection with these tasks, UMC in 2019 began transformation into an AMC - a center of excellence and experience, the development of a patient-oriented system of medical care, taking into account the synergy of research, educational and clinical activities.

During 2019-2023 UMC implemented the goals and objectives of the 1st and partially 2nd stage of transformation into the AMC *("Restructuring and optimization" (2019–2021); "Sustainable development" (2022–2024).* So, UMC in 2019-2023 planned to achieve 5 goals on the path of transformation into the AMC:

**For Goal 1 Outstanding quality and innovation in patient-centered and family-centered care:**

- 12 CADs have been created, providing emergency medical care and high-tech medical care, implementing educational programs and research projects.

- areas of outpatient medical care have been expanded, including “one-day discharge” surgery, ophthalmology and day hospital;
- associated professors of NUSoM were involved in the top positions of 3 CADs (pediatrics, women's health and laboratory medicine);
- to strengthen the role and significance of the nursing stuff, a new model of nursing activities has been introduced;
- to improve overall safety and patient satisfaction at UMC, activities such as employee training and incident reviews are conducted. The mechanism for filing incidents by employees has been simplified (*the total number of registered incidents increased by 3.2 times - from 1419 in 2019 to 4571 in 2022), including potential errors - 4.1 times*).
- UMC centers maintain the level of compliance with JCI standards (in 2021, UMC is accredited by JCI as a single organization);
- the “Plan for Continuous Professional Development of UMC Nurses” was adopted.

**For Goal 2 Financial sustainability:**

as a part of the development of mechanisms for increasing UMC income

- new departments - “Interventional Radiology”, “Multidisciplinary Surgery”, “Complex Somatics and Arrhythmology” were opened;
- “UMC Medical Assistance” was launched (*medical assistance JSC "Insurance Company "Jusan Garant"*), and from 2022, NU students have been included in the voluntary health insurance program (the number of insured persons increased from 9.5 thousand. up to 10.2 thousand clients in 2023);
- collaborative initiatives with regional medical organizations aim to enhance access to high-quality medical care for regional populations and attract patients to UMC (“UMC Days in the Regions”);
- adjustment factors for tariffs for medical services for UMC were determined (*from 2021, organizational and methodological expenses will be reimbursed; academic adjustment factor; scientific and innovation correction factor*).
- the list and volume of income from the provision of educational services is expanding (*from 57.4 million tenge in 2019 up to 187.3 million tenge in 2023*); maintenance of IT infrastructure of third-party medical organizations (*from 0 tenge in 2019 until 58 million tenge in 2023*);
- a wide selection of electronic payment options has been provided (*the share of non-cash payment methods has increased from 43% in 2019 and 83% - in 2023*).
- continuous marketing activities, branding events, have been carried out (*site traffic increased from 646 thousand views in 2019 to 1.7 million in 2023. The number of publications on social networks increased from 27 publications in 2019 to580 in 2023)*.

As part of cost reduction/expense management in the UMC system:

- regular analysis of unprofitability/profitability of treated cases has been carried out, tariffs are revised;
- personalized write-off has been implemented for drugs and medical devices in the 1C system, and MIS has been integrated with the 1C system;

## Introduction

- the 1C system implements the functionality of plan-fact analysis of budget execution, reports on the execution of the budget of income and expenses, integration of MIS and 1C is implemented.

### For Goal 3 Outstanding quality in medical science, education and training of healthcare professionals:

- UMC residency programs has been improved and expanded (*from 11 in 2019 to 23 specialties in 2023*). UMC is the clinical base for residency and fellowship programs at NUSoM;
- measures are being implemented to align the residency programs of UMC and NUSoM with ACGME standards;
- together with NUSOM, the development of the UMC joint program in the PDP and Bachelor of Nursing programs are continuing; participation of the joint program in research projects; implementation of adapted international clinical guidelines in nursing practice;
- a new model of nursing activity has been introduced, nurses are rotated, new directions and functions are gradually transferred to the joint program, expanding their area of responsibility (*about 40 medical functions were transferred*);
- career plans and promotion schemes for joint programs are applied (competency management and career ladder system);
- training on conducting biomedical research was provided (*103 specialists trained in 2019-2023*.);
- specialists at UMC have the opportunity to study in leading foreign centers within the framework of funds 024 RBP (*in 2019-2023 158 specialists were trained in foreign centers*). Also, as part of a strategic partnership with UPMC, administrative and clinical specialists improved their skills on related issues to AMC development (*in total for 2018-202389 UMC specialists trained at UPMC medical centers*).

### For Goal 4 Integration of medical care, research and educational activities:

- as part of the structural and functional integration of clinical, research and educational activities at UMC:
- duplicate functions in previously independent UMC Centers were consolidated, and the principle of “single organization in three locations” was implemented. The policies and procedures of UMC centers were standardized, changes were made to policies and procedures in all areas of UMC activity;
- 12 CAD have been created and are being developed, the leaders of which combine clinical, as well as educational and research responsibilities, uniting specialized specialists from UMC centers. CAD is a centralized medical group that has the authority to independently select medical personnel;
- a mechanism for “dual appointment” has been developed, allowing doctors/researchers/teachers to work in several organizations of the NU Medicine system (*15.5% of UMC clinicians are involved in teaching activities at NUSOM, 1.3% in research activities at NU/CLS*).

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### For Goal 5 Effective corporate management system:

- a new Regulation on remuneration and motivation of employees was adopted;
- management structures have been optimized and the competencies of management bodies have been revised, all business processes have been standardized.
- duplicating structural units were gradually optimized and the bed capacity was expanded. Integration of outpatient and inpatient services according to the profile into one CAD was carried out;
- a unified UMC information infrastructure has been created. MIS is integrated with external information systems of the Ministry of Health of the Republic of Kazakhstan; LIS Ariadne; 1C; PACS; artificial intelligence platform Cogna Medical Imaging, mobile operator Mobizon;
- the security and fault tolerance of the UMC IS are enhancing constantly (a*ccording to IBM's 2023 Information Security Audit Report, the overall security score is 8.5 out of a possible 10 points*)
- during 2019-2023 network, server and peripheral equipment were updated by 20%;
- the "Electronic Queue" IS, the "Helpdesk" system, "Surgical Operations Status Board", and a system for filing and processing incidents were introduced. UMC provides IT outsourcing services to other healthcare organizations in Astana and Shymkent;
- uniform standards for human resource management have been introduced at UMC, as well as individual employee assessment ("*UMC Personnel Guidelines", 2019.*).

The integration process of UMC clinics will continue, and therefore it is planned to further improve measures to introduce effective management and merger systems.

**Thus,** the main goals and objectives of the UMC Strategic Plan for 2019-2023 (Transformation Plan for the AMC) were implemented successfully.

At the same time, the epidemiological situation in connection with COVID-19 has influenced to stagnation in a number of clinical areas, as well as in educational and innovation activities.

As part of the vision for the development of UMC as an integrated AMC for 2024-2028, it is imperative to continue and activate several objectives that were not implemented in the previous period.

# 1. ANALYSIS OF THE CURRENT SITUATION

## 1.1. External analysis

National strategic documents emphasize healthcare as a crucial element ensuring social security by safeguarding the health of the population and fostering personal responsibility among citizens for their well-being. The main national strategic health care indicators tended to “roll back” due to the COVID-19 epidemic, its impact on the health of citizens and the congestion of the industry

UMC stands as Kazakhstan's premier specialized healthcare, secondary education, and organizational-methodological center, particularly excelling in pediatrics, pediatric surgery, oncohematology, obstetrics, women's health, cardiology, cardiac surgery, and advanced care services. Its comprehensive activities (directly or indirectly) influence Kazakhstan's Global Competitiveness Index ratings and healthcare strategic priorities.

Addressing ongoing industry challenges necessitates continual advancement in technology, enhancing diagnostic and treatment quality across various medical services. This commitment aims to safeguard the well-being of both children and adults while managing social and medical expenditures.

In line with global advancements in healthcare and emerging its threats, informed data analysis is prioritized for management decisions regarding medical care organization, resource preservation, technology integration (digital, managerial, etc.).

Internationally renowned centers, such as Academic Medical Centers (AMCs), integrated with university schools and faculties, play a pivotal role in national healthcare systems' evolution. AMCs are evaluated both by Medical School Rankings and independently by JCI accreditation as medical centers - AMCs that provide clinical training and research opportunities for Medical School students and faculty.

For a comprehensive examination of external factors, please refer to the appendix accompanying this UMC Strategic Plan for 2024-2028.

## 1.2 Internal analysis

In accordance with the UMC **Charter**, **the main goal** of UMC is to provide safe, effective and high-quality medical care, development, implementation and dissemination of modern technologies in the field of medical science, education and practice, including at the republican level.

**Subject of activity** UMC are:

- ✓ provision of medical services
- ✓ testing, implementation and transfer of medical technologies at UMC;
- ✓ examination of the quality of medical services provided by UMC;
- ✓ development and implementation of protocols for the treatment and diagnosis of diseases based on the principles of evidence-based medicine;
- ✓ participation in voluntary health insurance of the population of Kazakhstan;

## Internal analysis

✓ providing targeted training for highly professional and competitive UMC employees;

✓ conducting health research; implementation of the obtained results of scientific activities in UMC;

✓ organization of forums, symposiums, conferences, seminars, trainings and other educational and scientific-practical events;

✓ organization of a pharmacy network for the sale of medicines and medicines, etc.

**UMC management structure:**

- ✓ supreme governing body - Founder (Nazarbayev University);
- ✓ collegial governing body - Board of Trustees;
- ✓ executive body (collegial) – Management Board;
- ✓ body for medical activities - Medical Council;
- ✓ control body – Audit Commission/auditor;
- ✓ other bodies created by decision of the Board of Trustees.

**UMC structure** is represented by 3 medical centers in the city of Astana comprising a single organization with a capacity of 778 beds and 500 outpatient visits, located in different locations within a radius of 1.5 km (see Fig. 1). Since 2024, the Shymkent Heart Center NJSC has also come under the management of UMC.

National Research Center for Maternal and Child Health- **529 beds**

Republican Diagnostic Center - more than 500 visits per day - **49 beds** (day hospital)

National Research Cardiac Surgery Center - **200 beds**

Heart Center of Shymkent - **158**

Figure 1. UMC structure.

Clinical processes in UMC centers have been integrated (inpatient and outpatient services; primary, specialized and high-tech medical care; diagnostic service, etc.).

The main functional structural unit of UMC is the clinical academic departments (CAD), which, along with clinical educational and scientific activities in the specialty.

Nursing activities are centralized and moved from units managed by physicians to the Department of Nursing, managed by senior nursing staff (NS). Also, the operational management of the activities of medical centers is integrated: quality management, finance, personnel appointments, management of educational and scientific programs, procurement, management of buildings and medical equipment; IT; marketing, hospital service, office work, etc.

**Human resources** of 3 UMC centers in Astana account for more than 3.4 thousand employees, including about 740 doctors and 1.4 thousand nursing staff. The

## Internal analysis

Heart Center in Shymkent employs about 400 employees, including 97 doctors and 200 nursing staff.

Professional development of clinical and managerial staff is carried out regularly, in accordance with legal requirements. UMC specialists are trained in domestic and foreign educational and scientific organizations, university centers through short-term training programs, exchange of experience with key international partners, and diversification of staff professional skills. At the same time, budget funding (024 RBP) of educational programs aimed at introducing new medical technologies at UMC gives a significant competitive advantage to UMC's human resources.

In order to improve the level of competence of the NS in comparison with accepted international nursing practice, UMC collaborates with SMNU on PDP programs developed with the assistance of UPMC.

**Finance**

Based on the results of 2023, **UMC's** income structure consists of:

- by sources of financing - 61% - services provided under government orders; 21% - paid services; 18% - other services;

- by type of activity – 80.5% - medical, 17.8% - other; 1.1% - educational and 0.6% - scientific activities.

Paid medical services are 56% represented by outpatient medical services (27% - advisory, 73% - diagnostic).

UMC expenses amounted to: wage fund - 45%; LS, MI – 28%; other expenses – 5%, depreciation and maintenance of buildings – 22%. In 2023, compared to 2021, the increase in total UMC expenses was 7%, and the increase in salary expenses was 28%.

The cost of 1 UMC bed-day was 122 thousand tenge (271 US dollars as of 02/28/2024), inventory turnover was 35 days.

UMC investments are primarily aimed at medical equipment (*fixed asset depreciation rate - 75%*).

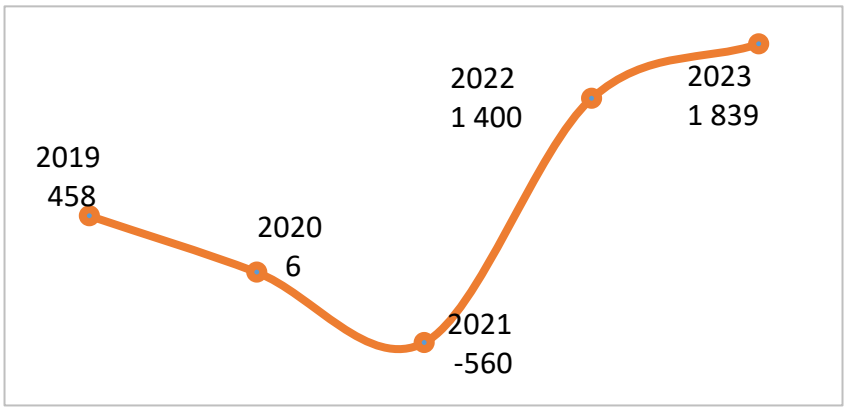


Figure 2. Financial result of UMC for 5 years, in million tenge.

In 2023, taking into account the merger of the Heart Center with UMC, the financial result increased 4 times (see Fig. 2), the return on assets was 4%.

The current business model, where about 2/3 of the income comes from the services of the guaranteed volume of medical care and compulsory medical insurance, ensures short-term self-sufficiency of UMC with funds to cover current obligations.

## Internal analysis

**Intangible resources**

In its activities, UMC has and maintains a high level of intangible resources, such as:

- corporate images of UMC and its Founder;
- brands of UMC centers (UMC Mother and Child Center; UMC Diagnostic Center; UMC Heart Center and UMC Heart Center Shymkent);
- patents, acts of introduction of new medical technologies and publications;
- certificates - about adherence to national accreditation standards in the field of healthcare; JCI; ISO; ECAQA and IQAA;
- confirmation of membership in internationally recognized associations and organizations in the field of medical education;
- memorandums and cooperation agreements with strategic partners, as well as other intellectual property.

## NU Integrated Academic Health System (NU Medicine) and Academic Medical Center

The Nazarbayev University Strategy for 2018–2030 defines one of the goals (IV) as "Creating a model of an integrated academic healthcare system."

The Nazarbayev University Integrated Academic Health System (NU Medicine) integrates all programs in the field of health and biomedicine that are implemented by Nazarbayev University, UMC, NLA, as well as with other NU schools and research centers (see Fig. 3).

NU Medicine strives to become the flagship of the modernization of the healthcare system of Kazakhstan through the integration of clinical, educational and research activities, implementing:

- training doctors, nurses, researchers and other healthcare professionals who can compete in the global market;
- advanced fundamental and applied research, which will benefit not only the people of Kazakhstan, but also the whole world;
- advanced clinical programs.

**The strategic priorities of the IAHS are:**

- *Human capital of NU teachers, researchers, medical workers;*
- *Biomedical research based on the four principles of modern medicine (4Ps): predictive, preventive, personalization and participatory;*
- *Education and training in professional programs in medicine, nursing, public health, pharmacy, sports medicine;*
- *Patient- and Family-Centered Care—Providing high-quality, safe, and effective evidence-based care for patients and families.*

UMC, as an AMC, is a key element of NU Medicine, and in connection with the above priorities, it is taking measures to become a center of excellence and experience, developing a patient-oriented system of medical care, taking into account the synergy of research, educational and clinical activities.

Since 2018, activities to transform UMC into AMC and its development have been implemented jointly with NU's strategic partner - UPMC

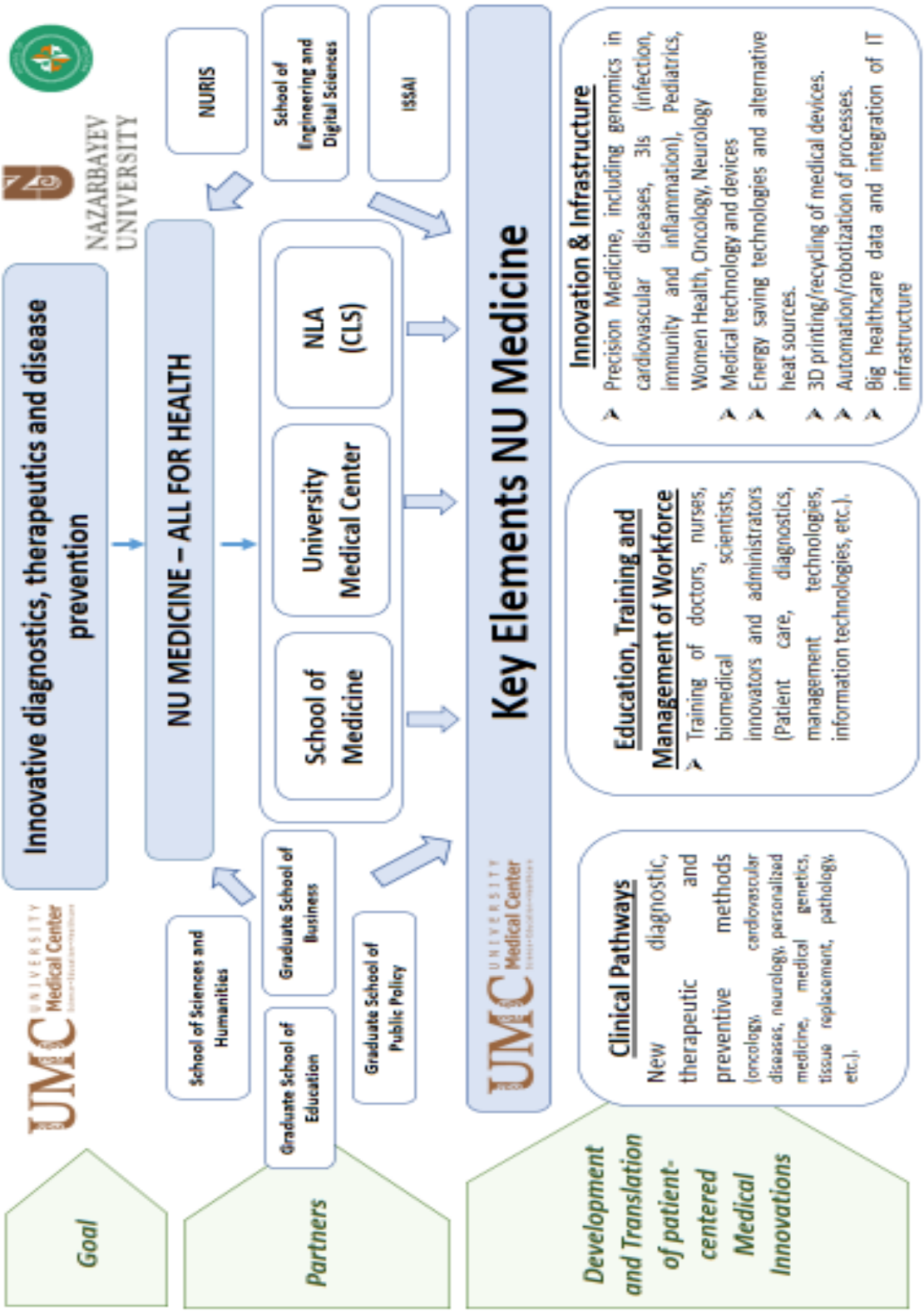


Figure 3. Nazarbayev University Integrated Academic Health System (NU Medicine)

## Clinical activities and achievements of UMC

Main clinical areas of UMC activity: Pediatrics; Neonatology; Obstetrics and gynecology; Pediatric oncology and oncohematology; ECO; Adult and pediatric surgery; Urology; Cardiology; Cardiac surgery; Internal medicine, Consultative and diagnostic medical care for adults and children; PET, CT; Interventional radiology.

*For reference: Annually at UMC:*

*more than 29 thousand patients receive medical care in UMC hospitals*

*more than 857 thousand patients receive outpatient services*

*more than 4 thousand births are attended*

*More than 12.5 thousand operations are performed in hospitals; 11.2 thousand operations – at the outpatient level (including ophthalmology); 600 interventions*

*About 2.6 thousand open heart operations and more than 9.8 thousand interventional procedures and studies are performed*

*In 2023, 63 transplantations were performed (bone marrow (40), kidney (18), liver (1), heart (3), lung (1)); 305.6 thousand laboratory services were provided, as well as 74.3 thousand diagnostic studies PET, CT, MRI.*

The activities of all clinical departments of UMC are based on the principles of the Clinical Academic Department, which combines inpatient and outpatient care according to the profile. UMC CAD (*12 CAD in 2023*) operate on the basis of the trinity, carrying out innovative clinical tasks, educational programs and carrying out scientific research.

A new model of nursing service has been introduced at UMC, ensuring the independent role of the SP as an equal partner of the doctor.

UMC is preparing to undergo, for the first time in Kazakhstan, international accreditation according to JCI standards as an academic medical center.

As the legal successor of the National Medical Holding, UMC continues to introduce and develop new medical technologies (clinical, managerial and other technologies in healthcare) in Kazakhstan. Between 2010 and 2023, the centers that are currently part of the UMC introduced 247 new medical technologies, of which about 90 technologies were “transferred” to the regions.

*For reference: In total, during the period 2010 - 2015, the centers of JSC NMH introduced 344 new methods of diagnosis, treatment, rehabilitation and prevention in the main clinical areas, more than 12 thousand patients were treated. 186 innovative technologies were introduced into the regions of Kazakhstan, about 600 master classes were held, more than 11 thousand specialists were trained, more than 1 thousand consultations of emergency patients with air ambulance flights.*

*In total, during the period 2016 - 2023, UMC centers introduced 104 new medical technologies (including the National Center for Children's Rehabilitation and the National Scientific Center for Oncology and Transplantology), 23 technologies were transferred to the regions.*

*From 2016 to 2023, the National Scientific Cardiac Surgery Center introduced 21 new medical technologies, 3 of them were transferred to the regions.*

The UMC Heart Center has introduced several particularly significant innovative technologies, including: *heart and lung transplantation; heart-lung complex; installation of a left ventricular assist device (LVAD); transcatheter aortic valve implantation (TAVI), mitral valve clipping, extracorporeal membrane oxygenation and others*. From 2012 to 2023, specialists from the UMC Heart Center implanted 460 long-term mechanical circulatory support devices - artificial left ventricle (heartMate III type), performed

86 heart transplants and 17 lung transplants. The Heart Center is the only clinic in Kazakhstan and Central Asia that performs lung transplantation.

The UMC Mother and Child Center has carried out *transplantation of kidneys, liver, hematopoietic stem cells; reconstructive plastic surgery on the larynx, trachea and bronchi and for exstrophies and epispadias in children; in vitro fertilization, implantation of an electromagnetic hearing aid, early diagnosis of congenital malformations of the central nervous system of the fetus (previously, patients were sent abroad for treatment), as well as methods and technologies in oncology of solid tumors and oncohematology (adult and pediatric), and others*.

The UMC Diagnostic Center has unique capabilities in medical genetic laboratory diagnostics, computer, magnetic resonance, positron emission tomography, as well as outpatient surgery, including ophthalmic surgery.

Currently, UMC is a platform for the transfer of advanced technologies and treatment of severe categories of patients, increasing the availability and quality of medical care for citizens of Kazakhstan.

Today, UMC provides services for 46 types of high-tech medical care and annually makes proposals to the Ministry of Health of the Republic of Kazakhstan to make additions to the list of HTM services provided.

UMC is also the curator of regional medical organizations at the republican level and provides them with organizational and methodological assistance in accordance with the orders of the Ministry of Health of the Republic of Kazakhstan, participates in the implementation of Roadmaps of the Ministry of Health of the Republic of Kazakhstan (*on issues of reducing maternal and infant mortality in the Republic of Kazakhstan; mortality from cardiovascular diseases, pediatric oncohematology, diagnosis and treatment of orphan diseases; on the development of organ donation and transplantology and others*).

Work is being conducted in collaboration with the Ministry of Health of the Republic of Kazakhstan to improve the regulatory legal framework for the organization of obstetrics, gynecology, and neonatal care; cardiac and cardiac surgery care; the actual direct costs of new high-tech medical technologies; and clinical diagnostic and treatment protocols.

UMC specialists travel via air ambulance to provide emergency medical care to patients from the regions. In 2022 - 2023 - 57 sorties, 64 UMC specialists were involved. Thus, in just 2022-2023, more than 350 patients were admitted to UMC from the regions via air ambulance.

Consultation of patients from the regions is also carried out using telemedicine communication tools. In 2022-2023, with the supervised regions and in general, more than 2,230 teleconsultations of critical patients were conducted throughout Kazakhstan.

UMC is a Competence Center for the Republic of Kazakhstan:

*for the treatment of retinopathy of prematurity (200 children per year, about 400 operations);*

*on issues of fetal protection (prenatal diagnosis of congenital malformation of the fetus);*

*for the treatment of malformations of the larynx, trachea, and lower jaw in children;*

*for the treatment of osteogenesis imperfecta in children (106 children under observation);*

*for the treatment of inflammatory bowel diseases in children (130 children under supervision);*

*on kidney and liver transplantation in children (144 children under supervision;)*

*on intervention in the treatment of children with solid tumors (4 children);*

*on reducing mortality from cardiovascular diseases.*

*UMC is also, on behalf of the Ministry of Health of the Republic of Kazakhstan, a center of competence for the treatment of children diagnosed with spinal muscular atrophy.*

In addition, 14 leading UMC employees (19%), according to the order of the Minister of Health of the Republic of Kazakhstan, have the status of chief freelance specialists of the Ministry of Health of the Republic of Kazakhstan and provide coordination and methodological guidance in the areas under their supervision.

*For reference:*

*There are a total of 75 specialties and areas for which the Ministry of Healthcare has identified the main freelance employees of the Ministry of Health of the Republic of Kazakhstan (obstetrics and gynecology (children), obstetric service; allergology and immunology (adults), anesthesiology and resuscitation (adults); resuscitation-intensive care for obstetrics; cardiology (adults) , children); cardiac surgery (adults, children); prenatal ultrasound diagnostics of pregnant women; radiation diagnostics and interventional radiology; rheumatology (pediatric); traumatology (pediatric); urology (pediatric)).*

In 2024, the Shymkent Heart Center also came under the management of UMC *(until 2018 it was called the "Regional Cardiology Center" of the South Kazakhstan region).*

*For reference:*

*The Shymkent Heart Center was opened in 2000 (the first Regional Cardiology Center in the southern region of the Republic of Kazakhstan).*

*In 2000, the center for the first time in the Republic of Kazakhstan introduced the determination of a biomarker of myocardial necrosis - troponin T.*

*In 2007, the center became the only organization in the Republic of Kazakhstan included in the European Register of Acute Coronary Syndrom.*

*Since 2008, the center began to perform stenting of coronary arteries.*

*In 2009, a new building of the center's cardiac surgery building was put into operation and coronary artery bypass surgery was performed for the first time.*

*Since 2012, the center has had an arrhythmology department.*

*In 2014, the center for the first time held a series of master classes with the participation of the Astana Heart Center (formerly NNCC) on congenital heart defects.*

*Since 2015, the center has been performing heart surgeries with minimally invasive access.*

*In 2023, the center successfully performed a heart transplant for the first time in the southern region (under the leadership of the Chairman of the Board of UMC Y.V. Pya, the UMC team and the staff of the Heart Center in Shymkent).*

*Every year the number of operations performed at the center increases, and in 2023 more than 1,300 operations were performed (on open heart, coronary artery bypass grafting, for heart defects, aortic aneurysms, etc.), 4.5 thousand coronary angiographies, 2.4 thousand angioplasties and stentings, 550 procedures in interventional arrhythmology, 18 ECMO, 6 LVAD, and others.*

**Thus,** since its inception, UMC has been dedicated to developing a wide range of clinical areas, introducing new diagnostic and treatment technologies, and significantly contributing to the provision of medical care for socially significant pathologies to both UMC patients and all citizens of Kazakhstan.

## Educational activities

Educational activities at UMC are carried out according to postgraduate, additional and informal medical education programs. The total number of teachers involved in the educational process is 256 people, of which 20 are doctors of medical sciences, 37 candidates of medical sciences and 121 specialists with the highest qualification category.

## Educational activities

UMC has ECAQA and IQAA certificates for passing institutional and specialized accreditation of residency programs.

Postgraduate training of resident doctors has been carried out since 2016 and residency training is currently conducted in 20 specialties.

*For reference:*

*The number of resident doctors in 2023 was 304, graduation - 64 people, expected graduation in 2024 - 103 resident doctors. In total, over the past 2019 - 2023, 298 UMC resident doctors have graduated in 15 clinical specialties.*

Work continues on transferring new diagnostic and treatment methods to regions across the Republic of Kazakhstan. Educational services at the level of additional professional education encompass a wide range of activities, including training cycles, master classes, seminars, on-the-job internships, and training sessions. These are conducted both at UMC centers and on-site at other organizations. Every year, more than 1 thousand specialists from regional organizations undergo training, including distance learning programs using Moodle. Thus, from 2019 to 2023, UMC teachers trained more than 4,500 students in advanced training cycles from the regions.

A unique opportunity to develop the potential of UMC is provided by budget program 024 “Targeted contribution to Nazarbayev University” (subprogram “Technology Transfer”). Every year, UMC employees, through this program, improve their skills in the best foreign centers. Also, mentoring programs and master classes are organized with the involvement of international experts from leading foreign organizations at the UMC base. Since 2016, specialists at UMC centers have mastered and successfully implemented the latest diagnostic and treatment technologies in the field of obstetrics and gynecology, oncohematology, cardiology and cardiac surgery, pediatric traumatology, transplantation, pediatric rehabilitation, etc. The training was conducted on the basis of leading centers Israel, France, Lithuania, Japan, Switzerland, Singapore, Germany, Russian Federation, etc.

Since 2016, with the assistance of NUSoM and UPMC is held transformation of UMC into AMC. A Joint Steering Committee was created, consisting of the executive leadership of NU, UPMC and UMC, and annual agreements were concluded between NU and UPMC on advisory and technical support for the further development of the integrated academic health care system (NUSoM, UMC, NLA). In collaboration with UPMC, a plan was prepared with recommendations on relationships, governance, organizational structure, administrative functions and processes, roles and responsibilities of NU and UMC.

UMC become the official representative of the European Resucitation Center (ERC) in the Central Asian region. The Center of Excellence in Emergency Management Training, Research and Innovation has been established at UMC. In total, 19 certified instructors and about 800 UMC employees were trained. At the above-mentioned Center, citizens and healthcare professionals will be able to learn essential technical skills and knowledge in the field of resuscitation through ERC-accredited programs.

## Research activities

UMC is a premium member of AMEE - the Association for Medical Education in Europe, and also, as the clinical base of NUSoM, participates in the events of AAHCI - the International Alliance of AMC.

## Research activities

UMC is accredited as a subject of scientific and scientific-technical activities until 2026. UMC annually takes part in competitions (national, international) to obtain funding for research work; 10 applications for grant funding and 3 for CRP were submitted in 2023.

The share of UMC clinicians involved in research activities at NU/CLS over the past 5 years has averaged 4.3%.

On the basis of UMC in 2023, 10 projects were implemented with PI - UMC employees, 4 international multicenter clinical studies with the participation of foreign research centers. In total, in 2023, UMC implemented 39 research projects, including 10 projects started and 8 projects completed.

In total, in 2019-2023, 33 research projects and clinical studies were implemented at UMC centers with grant funding from the programmatically targeted financing of the Ministry of Education and Science of the Republic of Kazakhstan, CRP and other sources.

The publication activity of UMC employees increases every year. Thus, from 2019 to 2023, UMC published 175 articles in international peer-reviewed journals with an impact factor, and the Heart Center published 95 articles (see Fig. 4, 5). The number of citations of employee publications in the Scopus, Web of Science, and Google Scholar databases exceeded 3,800. Additionally, approximately 40 protection documents were obtained.

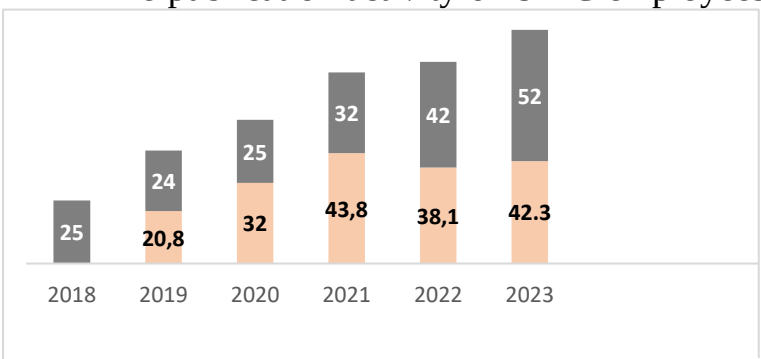


Figure 4. Publications by UMC staff, 2018 - 2023

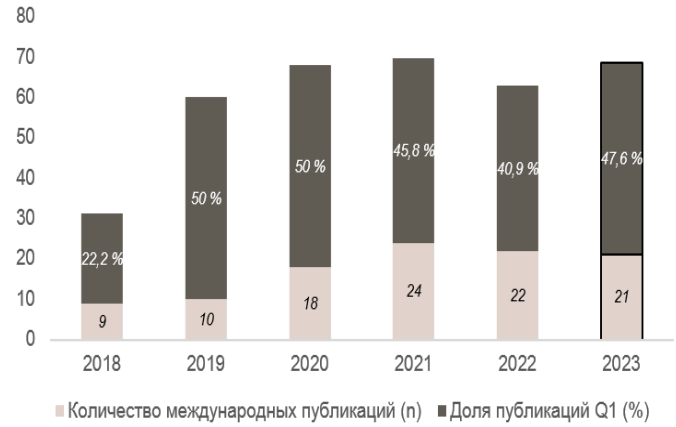


Figure 5. Publications UMC Heart Center 2018-2023.

UMC Heart Center hosted several significant events, including the III Research and Practical Conference of Young Scientists, the 10th Anniversary Conference of the Heart Center: “Based on Experience, We Strive for New Goals,” and the “Quo Vadis? Horizons of Pediatric Cardiology and Cardiac Surgery” conference, among others. Additionally, UMC researchers presented at international conferences

such as the ISHLT, ASAIO Annual Conference, European Society of Cardiology Heart Failure Congress, and IAEA General Conference. Also, a large-scale international conference "Transplantation in Central Asia: Innovation, Cooperation, Compassion" was held, bringing together leading experts in transplantation services and organ donation from the USA, Canada, Spain, Turkey, Belarus, Lithuania, Uzbekistan, Tajikistan and Kazakhstan.

A team of doctors at the Astana Heart Center has developed a unique device for the preservation, long-term transportation and treatment of donor organs outside the body - "ALEM". The device is capable of maintaining the viability of a donor organ for 24 hours. Preclinical studies of this device were conducted in 2022-2023.

**Thus,** UMC has sufficient human resources, significant intangible resources and clinical innovative achievements at both the national, regional and global levels. The educational activities of UMC are carried out according to national programs, and also, together with NUSOM, according to international standards. The research activities of UMC within the NU Medicine system have clearly defined priorities that correlate with national indicators in the field of healthcare.

At the same time, it is necessary to diversify UMC's sources of income and increase turnover, as well as intensify scientific activities.

## 1.3. SWOT ANALYSIS

UMC assesses objectively its weaknesses and threats to seize opportunities in a timely manner, capitalize on the organization's strengths, and work collectively to mitigate risks.

UMC is a key element of NU Medicine and over the next five years will participate in the creation of the future IAMC model, which will make healthcare in Kazakhstan better and more efficient. The following SWOT analysis outlines the strengths, weaknesses, opportunities and potential threats that UMC currently faces as it transforms into IAMC.

| **STRENGTHS** | **WEAKNESSES** |
|---|---|
| ✓ Affiliation with Nazarbayev University, included in the overall Times Higher Education World Universities Ranking (2024) ("501-600**", top 30% of global research universities); as well as a ranking in the subject "Clinical Sciences and Healthcare" ("501-600**");<br>✓ Full membership in the NU Medicine system;<br>✓ Brand of UMC and the centers within it;<br>✓ Status of the Republican Medical Center - curator of the regions of Kazakhstan on issues of maternal and infant mortality, mortality from cardiovascular diseases; status of a center of competence for a number of orphan diseases;<br>✓ Commitment to JCI international quality standards; ISO; ECAQA and others; membership in AMEE, AAHCI;<br>✓ Availability of human potential to perform, HTMS including unique medical services in Kazakhstan (transplantation of heart, lungs, bone | ✓ Lack of a full range of forms and types of medical care in UMC;<br>✓ Lack of internationally recognized clinician-researchers;<br>✓ Obsolete medical products (75% worn out) and high cost of services;<br>✓ Insufficiently developed IT system (MIS issues; optimization of data management on volumes of services, income and expenses; integration and transformation of a clinical data bank into a clinical knowledge bank);<br>✓ Dependence on budget funding and the predominance of income from services provided under the State Fund for Medical Care / Compulsory Medical Insurance over paid services (61/21%);<br>✓ Insufficient integration of research, education and clinical practice in the UMC CAD;<br>✓ Insufficient integration activity within NU Medicine to mutually attract teachers, clinicians and |

## SWOT ANALYSIS

| | |
|---|---|
| marrow, liver and kidneys), trained in leading medical centers at the expense of RBP 024;<br>✓ Strategic partnerships with UPMC, other leading foreign medical centers and universities; | researchers from NUSoM, NLA, UMC and other NU organizations<br>✓ Insufficient sharing of resources within NU Medicine (simulation center, biobank, vivarium, high-tech research equipment); |
| **OPPORTUNITIES**<br>✓ Partnership with UPMC in the implementation of clinical and educational projects, scientific programs and clinical research;<br>✓ Expanding the coverage (attraction) of patients (from regions of the country and nearby countries);<br>✓ Determination of the status of UMC by the Ministry of Health of the Republic of Kazakhstan, as IAMC, allocation of an academic correction factor to the tariff of medical services;<br>✓ Construction of the 350-bed UMC Children's Surgical Center;<br>✓ Possibility of introducing new medical technologies and treatment methods to improve the quality of services. | **THREATS**<br>✓ Underfunding of the industry, imperfection of the reimbursement system and low tariffs for medical services provided under the guaranteed volume of medical care / compulsory medical insurance; low coefficient to the GVFMC/OSHI tariff for JCI; academic and research activities; underfunding of Nazarbayev University;<br>✓ Inflation and rising prices for drugs and medical supplies;<br>✓ Expensive infrastructure and increased investment in medical technology;<br>✓ Closing of budget funding for the program for the development of new medical technologies at UMC (RBP 024);<br>✓ Rising labor costs and staff shortages, “brain drain”, “burnout” of specialists;<br>✓ Threat to information security regarding personal data of patients and financial data of UMC;<br>✓ Global pandemics and epidemics, quarantine restrictions; political instability and changes in industry policy (in relation to the departmental subordination of UMC centers).<br>✓ Competition with other medical organizations in popular high-tech medical areas. |

# 2. UMC DEVELOPMENT STRATEGY

## 2.1. Stages of further development of UMC

As it was reflected in section 1.3, UMC achieved the main goals and objectives of stage 1 ("Restructuring and optimization" (2019–2021)), as well as, partially, stage 2 ("Sustainable development" (2022–2024)).

Maintaining continuity in the development of UMC as an integrated AMC and key element in NU Medicine, UMC will continue to implement objectives on the foundation laid at the 1st and 2nd stages of transformation into the AMC.

As part of the **"Sustainable Development" stage, in 2024** the results and quality of treatment will improve, and the reputation of UMC as "a single center in three locations" will be strengthened.

The following initiatives will continue to be implemented:

- development of clinical areas that are strengths and generate high income; investing in these areas, purchasing modern equipment, conducting intensive marketing campaigns, etc. Along with existing ones, developing new clinical areas and new partnerships;
- strengthening efforts to diversify sources of financing and financial analytics; management of patient flows, volume and quality of provided services, supply chain (logistics), lean manufacturing system and restrictions.
- expanding cooperation with international partners in the field of research activities; close work with the pharmaceutical industry in conducting international multicenter clinical trials; development of projects with commercial potential; actively publishing articles in priority research areas, hiring renowned research scientists, etc.;
- further work to improve Kazakhstani resident training programs through the introduction of best international practices in the field of medical education.

**Leadership stage (2025–2030):** During the growth and leadership phase, UMC must become a JCI-accredited integrated AMC. UMC will focus on positioning itself as the nation's leading clinical organization in its chosen areas, competitive and evolving in line with global healthcare trends.

The following initiatives will continue to be implemented:

- aggressive implementation of marketing strategy in the domestic and international markets;

- expansion of international recruitment, attraction and retention of the most talented employees, activation of the mechanism of "dual" positions ("dual appointment"), working part-time at NUSOM, NLA and other NU schools;

- creation of an international network of research partners through the integration of Kazakh and global research organizations, centers, universities;

- creation of an International Advisory Council with the involvement of leading domestic and foreign scientists; development of integrated flagship projects on the most pressing national and global issues, approved within the framework of national programs;

- further implementation of organizational programs that stimulate the creation of a unified culture, taking into account the mergers and acquisitions of UMC medical organizations.

### UMC development strategy

UMC's primary focus will be on strengthening its reputation, differentiation, growth and expansion, achieving financial independence and increasing revenue in the face of rising healthcare cost trends. By this stage, UMC will have accumulated sufficient resources for the further implementation of the Strategic Plan. UMC will continue its active participation in the voluntary insurance system and plan to build a network of national and international specialized centers. Efficiency will be determined by treatment outcome indicators, increasing the volume of services, increasing brand awareness, research projects, participation in the collection and use of biobank data and other initiatives aimed at positioning UMC as a leading medical organization - IAMC in Kazakhstan and beyond.

As an AMC and with a social responsibility to society, UMC follows WHO policy and strategic documents, including the recommendations of the WHO Regional Office for Europe "Environmentally sustainable health systems" (2017), to preserve and improve the environment for the health and well-being of current and future generations.

## 2.2. Mission, vision, core values and development goals of UMC

### UMC Mission –

to care for patients and promote their healing, to learn continually and train future healthcare professionals, and to research and invent innovative treatments; all this for improving the quality of life of the population.

### UMC Vision

**UMC**– a leading integrated academic medical center in Kazakhstan and in the region, impacting the health of the people and the healthcare system through:

- providing outstanding medical care,
- training of healthcare professionals based on recognized international programs,
- initiation and participation in advanced scientific and innovative research, with translation of results into practice.

## Mission, vision, core values and development goals of UMC

### UMC core values

UMC has defined its core values as empathy, respect, honesty, responsibility, commitment to improvement, and serving the community (see Fig. 6).

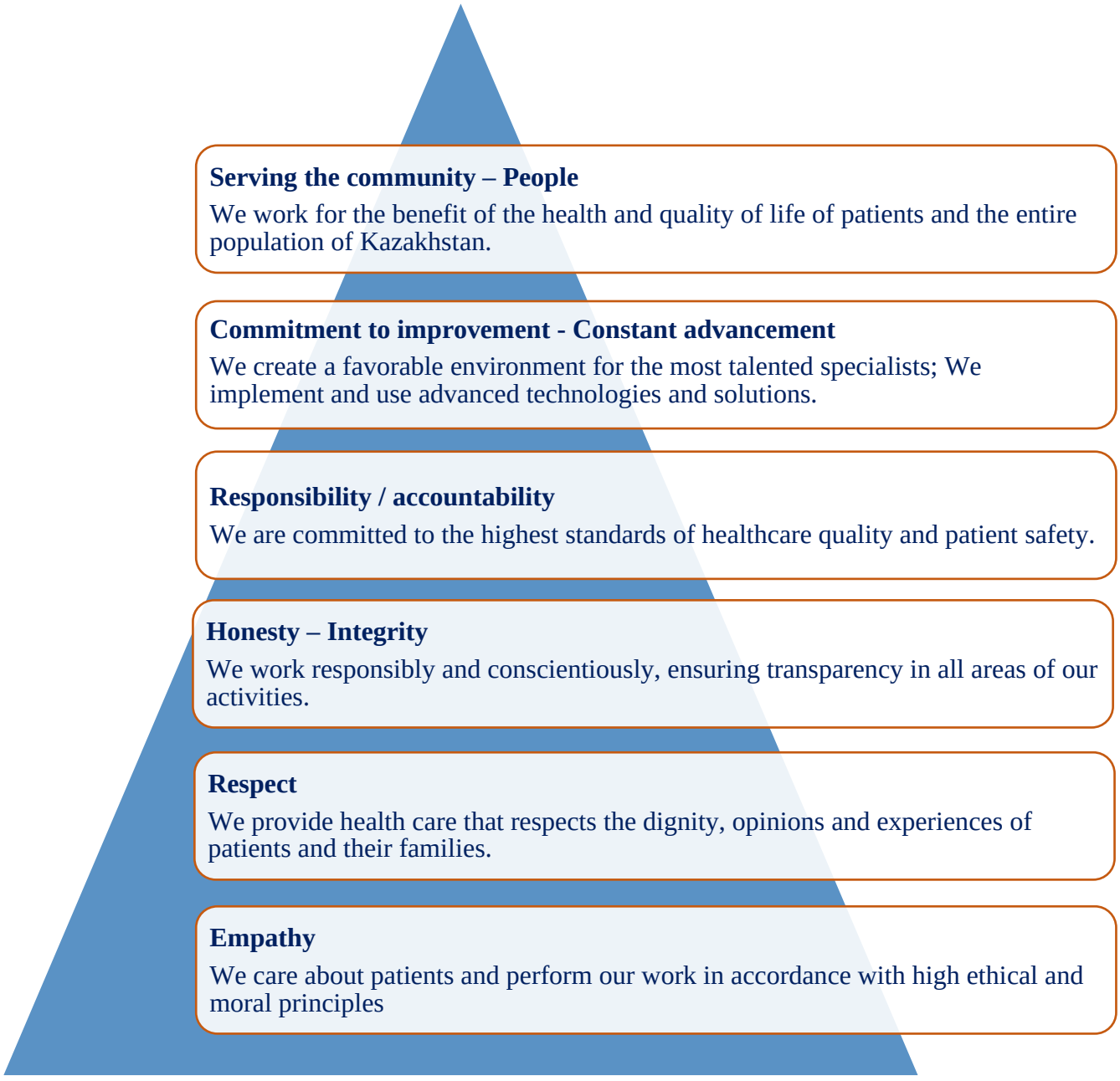


Figure 6. UMC core values

## Strategic goals and objectives of UMC

## Strategic goals and development objectives of UMC for 2024-2028.

| | |
|---|---|
| Goal 1. | **Improving the healthcare delivery system with a focus on patient needs** |
| Objectives: | |
| 1.1. | Providing advanced medical care |
| 1.2 | Quality and patient safety |
| 1.3 | Perfect nursing care |
| 1.4 | Patient-centered services / analysis of the experiences of patients and their families |

| | |
|---|---|
| **Goal 2.** | **Quality and innovation in education and practical training of healthcare professionals** |
| Objectives: | |
| 2.1. | Integration of educational programs and processes of UMC and NUSoM |
| 2.2 | UMC is a unique platform for training medical personnel |
| 2.3 | Nursing education |

| | |
|---|---|
| **Goal 3.** | **Research activities** |
| Objectives: | |
| 3.1. | Research activities within NU Medicine |
| 3.2 | Development of research infrastructure and resources |
| 3.3 | Nursing researches |

| | |
|---|---|
| **Goal 4.** | **Ensuring financial stability and effective management system** |
| Objectives: | |
| 4.1 | Financial stability |
| 4.2 | Effective management |
| 4.3. | Human capital and culture of the IAMC |
| 4.4 | UMC is a “data-driven” healthcare organization |
| 4.5 | Proper infrastructure |

### Goal 1. Improving the healthcare delivery system with a focus on patient needs

**Objectives:**

1.1. Providing advanced medical care

1.2 Quality and patient safety

1.3 Perfect nursing care

1.4 Patient-centered services / analysis of the experiences of patients and their families

**KPI:**

1.1. Patient satisfaction level

1.2. Accreditation of UMC for compliance with JCI standards as an Academic Medical Center

1.3. Number of new medical technologies introduced into clinical practice

1.4. Maternal mortality

## Strategic goals and objectives of UMC

UMC is committed to provide outstanding clinical care by combining a multidisciplinary CAD approach with evidence-based clinical practices to ensure efficiency, quality, patient safety and continuity of care.

UMC in the organization of medical care relies on advanced medical technologies and takes into account the patient experience, making decisions based on evidence.

**Objective 1.1. Providing advanced medical care**

UMC strives to achieve a new level of clinical care through the continuous and innovative development of the CAD by expansion of existing profiles and the provision of new medical services, also expanding new service lines by working actively with medical organizations.

CADs, along with widely demanded types of medical care, strive to develop unique (in their field) methods and services.

The horizontal integration of activities among the three centers in Astana, as well as the "Heart Center of Shymkent" NJSC, which merged with UMC in 2024, will continue by creating clinical service lines composed of interdisciplinary teams of specialists.

UMC will expand the range and scope of medical care “outside hospital walls”, strengthening outpatient services, developing a “one-day dicsharge” hospital and follow-up telemedicine programs, etc.

The activities of the surgical day hospital will expand according to the “one day surgery” principle, including interventional radiology, minimally invasive phlebology and angiosurgery.

UMC is intensifying genetic research, including early diagnosis of congenital malformations of the fetus; preimplantation genetic diagnosis, whole-genome/exome sequencing. Issues of organizing testing for carriage of genes for hereditary diseases of people planning pregnancy, as well as screening of pregnant women and newborns for the purpose of early diagnosis of orphan diseases will be worked out.

UMC will launch a Pain Management program that includes management and control of pain in children in the postoperative period and management of chronic pain.

Areas that require a multidisciplinary approach will be developed, including gynecological oncology; pediatric gynecology, fetal medicine, interventional methods of treating placental pathology; treatment of patients with dysfunction (pathology) of the pelvic floor, as well as programs for managing patients at risk in the postpartum period (after discharge).

Further development of transplantology at UMC will include issues of pancreas transplantation, kidney transplantation from an ABO incompatible donor to highly sensitized recipients, and simultaneous transplantations.

As part of the planned construction of a new multidisciplinary Pediatric Surgical Center with 350 beds, UMC will work on the following issues:

expansion of pediatric surgery (general, neonatal; head/neck surgery; orthopedics; polytrauma; plastic and angiosurgery; urology, etc.);

opening new directions for UMC (emergency pediatric surgery; pediatric cardiac surgery; pediatric neurosurgery and neuroorthopedics; combustiology and

purulent surgery; pediatric cardiology, etc.).

The organization of UMC medical care will be based on a coordinated multidisciplinary approach, as well as ensuring effective interaction between doctors, nurses and other clinical and non-clinical personnel at all levels.

The principles of providing medical care at UMC are based on commitment to clinical standards based on leading world practice and the principles of evidence-based medicine. In this direction, UMC will carry out constant work together with the National Research Center for Healthcare Development on the development, revision and improvement of clinical protocols.

As a republican organizational and methodological center on maternal, infant mortality, mortality from diseases of the circulatory system, as well as a center of competence for a number of nosologies, UMC will continue the transfer and implementation of new and innovative technologies for the diagnosis and treatment of diseases in practical healthcare. UMC will continue to participate in the formation of a list of HTMSs in supervised clinical areas.

UMC, as an organizational and methodological center, will continue to interact with the Ministry of Health of the Republic of Kazakhstan, supervised by regional medical organizations of Kazakhstan in the areas of pediatrics, pediatric surgery, oncohematology and obstetrics, women's health, cardiology and cardiac surgery. Thus, UMC expands its activity as a center of competence for:

*treatment of retinopathy of prematurity;*

*fetal protection (prenatal diagnosis of fetal congenital malformation);*

*treatment of malformations of the larynx, trachea, lower jaw in children;*

*treatment of osteogenesis imperfecta in children;*

*treatment of inflammatory bowel diseases in children;*

*kidney and liver transplantation in children;*

*perineology, pathology of the placenta;*

*rare, orphan diseases in children (including those diagnosed with spinal muscular atrophy)*

*provision of medical care for acute myocardial infarction and cardiogenic shock; chronic heart failure; atherosclerosis and lipid metabolism disorders;*

UMC is initiating a program to provide medical care to patients with chronic kidney disease in the Republic of Kazakhstan.

UMC will expand the practice of “mentoring” for remote regional medical organizations in Kazakhstan, including the use of digital technologies for interaction with patients (online patient appointments, rounds, etc.).

**Objective 1.2. Quality and patient safety**

UMC will achieve quality of patient care and clinical performance comparable to the world's best organizations through its absolute commitment to JCI's highest standards of quality and safety.

UMC will carry out rigorous quality control and implement a “safety culture” through incident reporting, analysis, and continuous improvement. All employees will be supported through ongoing educational programs and access to necessary resources.

UMC will implement walkthrough standards (through/based on the AIDET (Acknowledge, Introduce, Duration, Explanation, and Thank You) communication platform)), as well as the principle of patient information management (visual boards; Care conference; Condition help (safety hotline)).

UMC will introduce an international system for comparative analysis of the quality of medical care, using measurements and comparisons of activities with the world's leading AMCs. Based on previous recommendations, UPMC UMC will update its patient satisfaction tracking programs.

UMC will prepare for accreditation according to JCI standards as an integrated AMC (including comparison at the AMC level; analysis and monitoring of improvement indicators based on industry best practices on the Power BI platform).

As part of ongoing internal clinical and non-clinical audit and control (including pharmaceutical audit), key SOPs will be updated

**Objective 1.3. Perfect nursing care**

UMC will continue to form an organizational structure taking into account the independence of nursing activities and processes that create an innovative environment for the development of effective professional practice. Evidence-based initiatives underpin the development of nursing practice.

Human and material resources such as numbers and skills, optimal ratio of nursing staff to patient, balanced workload, adequacy of equipment and adequate physical infrastructure have a major impact on the enabling environment of nurses.

UMC is committed to achieving excellence in nursing care. Thus, a policy document will be developed that includes strategic priorities for nursing practice, structural empowerment, model practice and processes, and innovation in nursing practice.

UMC develops leadership among nurses and the use of a multidisciplinary team model in patient care. Approaches to further improvement of nursing practice will be formed taking into account international experience and recommendations of the American Nurses Credentialing Center (ANCC), as well as the principles of the Magnet Recognition Program for nursing services.

Managing competencies and consistently promoting up the career ladder will be continued. As competency levels develop, nursing roles will expand (advanced practice) at UMCs by reinforcing self-administration and step-by-step expanding the zone of influence (functions and objectives). Also, the mechanism for rotation of nurses in inpatient/outpatient departments, between areas of clinical profiles, is being activated. UMC will work out approaches of applying the principle of “floating nurses” - involving and moving them between departments to meet staffing needs.

Taking into account international experience and partnerships with various organizations, UMC will revise the nursing SOPs and introduce nursing techniques/technologies. In clinical activities, UMC will introduce nursing rounds, as well as the principle of transferring patients between specialists of the outgoing and incoming shifts, Bedside shift report, which will increase the involvement of patients in the process of providing them with medical care.

Increasing the level of competence of the joint program will be reflected in their participation in the educational and research activities of the UMC (reflected in more detail in objectives 2.3 and 3.3).

To assist nurses with basic patient care and day-to-day tasks, UMC will be adding a "Nursing assistant" position to the unit. The nursing assistant is the link between patients and nurses and doctors - promptly transmits information about the patient's needs and problems. Expanding the area of influence (functions and tasks) of the nursing assistant will allow the nurses to shift the focus to competencies of a higher level of complexity.

UMC, guided by the advanced principles of nursing, caring for the patient, family and society, will lead the reform of the nursing system and serve as a source of knowledge and experience for providing nursing care for domestic healthcare organizations.

**Objective 1.4. Patient-centered services / analysis of the experiences of patients and their families**

UMC is grounded in the patient experience and understands and clearly articulates the importance of keeping patient experience at the core of the organization, its employees and patients.

Strict adherence to clinical management standards (sanitation, ventilation, temperature, lighting and noise) will be combined with the highest possible level of comfort for patients and their families.

Patients, being in a cozy environment, have access to continuous communication, Wi-Fi, and public computers (business center for patients). Patients are guaranteed access to their personal information, which is adequately protected to ensure confidentiality.

UMC works to promote activities to improve the patient experience as an integral part of the organizational culture. UMC promotes patient and family engagement to improve the quality of patient care as well as staff engagement.

Patient interaction tools (patient experience management platform) will be created/adapted, which will allow the implementation of individual programs to collect patient responses. UMC will ensure that a data collection system and effective reporting mechanisms are in place to track patient perceptions of care and experiences. To meet the highest level of expectations, the UMC Patient Experience will be analyzed regularly and monitored based on HCAHPS (*Hospital Consumer Assessment of Healthcare Providers and Systems (PressGaney)*).

To develop connections with patients and support patients after discharge from the UMC hospital, the possibilities of introducing digital technologies, a mobile application will be explored.

In parallel with digital tools, accessible visual means of patient engagement will be developed - information boards, explanatory handouts, etc.

The medical services provided by UMC will be oriented to other countries. Activities will continue to introduce hospital services, comply with international standards and promote UMC medical tourism services in the foreign market.

In order to increase patient engagement and improve disease management, elements of the Internet of Medical Things (IoMT) technology will be introduced: remote health monitoring, medication tracking, etc.

In addition, UMC makes emphasis on training of personnel to increase the level of patient service and to use data in order to take justified solutions

**Goal 2. Quality and innovation in education and practical training of healthcare professionals**

**Objectives:**

2.1 Integration of educational programs and processes of UMC and NUSoM

2.2 UMC is a unique platform for training medical personnel

2.3 Nursing education

**KPI:**

2.1. Percentage of UMC clinicians involved in teaching activities at NUSOM

2.2. Share of alumni of UMC residency who passed an independent assessment at the NCNE at the level of 75 points or higher (at a threshold of 50 points)

UMC will continue to develop the activities of the CAD, in which medical education and research programs are being implemented in parallel with clinical activities.

UMC is committed to the global WFME standards and ACGME recommendations in its educational activities. Committed to the principle of continuous improvement of the quality of residency programs, UMC is guided by the WFME Global Standards for Improving the Quality of Medical Education. Postgraduate medical education"

**Objective 2.1. Integration of educational programs and processes of UMC and NUSoM.**

The educational activities of UMC are focused on the harmonization of educational programs and the integration of clinical and teaching staff with NUSoM. The participation of NUSoM faculty members in educational programs of UMC, as well as UMC clinicians in the training of students, residents and fellows at NUSoM are intensifying.

UMC will continue activities to unify national residency programs with NUSoM programs, and will also open certification cycle programs, also to introduction fellowship programs together with NUSoM.

UMC will continue to hire international-level specialists with experience in training specialists at the postgraduate level, as well as significant clinical experience.

In order to ensure high quality education and patient safety, UMC will cooperate with the simulation center of NUSoM to develop practical skills of students.

**Objective 2.2 UMC is a unique platform for training medical personnel**

As clinical areas develop, UMC will continue to expand the specialties and topics of postgraduate and continuing medical education programs. Determining the optimal number of annual admissions of new UMC residents is based on an analysis of available resources and ensuring that the final competencies of residency graduates are achieved.

UMC will develop a competency-based model of the "Effective UMC Teacher" and will continue to train doctors in advanced educational technologies. The requirements and responsibilities for clinicians involved in educational activities will be strengthened, in parallel with the increasing role of motivational tools.

UMC will actively use educational resources on AMEE, ACGME, Coursera, and UPMC's Continuing Medical Education (CME) platforms to train educational technology residency faculty and educational program managers in international best practices for organizing residency programs. Individual AMEE membership will be supported for UMC employees involved in educational activities to ensure immediate and permanent access to modern world trends and innovations in the field of medical education.

UMC will provide free access for residents, teachers and specialists to educational resources UpToDate, PubMed and others. To develop educational programs, online resources Massive Open Online Courses (MOOCs) will be actively used; Open Access Resources; Free Open Access Medical Education (FOAMed) and others.

UMC will adapt advanced educational tools and technologies, and residents' participation in the Journal club; Noon conference and Grand rounds will continue.

UMC will implement gradually the guidelines of Entrustable Professional Activities (EPAs) in the development and implementation of residency programs (curricuum). The EPAs concept makes it possible to assess effectively the level of competency of residents and monitor their progress before admitting them to independent medical practice.

UMC will continue to send residents to internships through educational partnerships, including the Extended Observership Program at UPMC. All UMC residents participate in research projects to develop their skills and research potential.

UMC, as a republican organizational and methodological center in a number of areas, will continue training its specialists, as well as employees of regional medical organizations, in new and innovative technologies.

**Objective 2.3 Nursing education**

In collaboration with NUSoM, as well as with other medical educational organizations of the Republic of Kazakhstan, the training of UMC nurses will continue, using dual training.

UMC will open the "Center of Nursing Excellence" - a training center of model professional practice for nursing assistants, including nurses, midwives, laboratory technicians, x-ray technicians, as well as junior UMC staff. Continuing development programs for non-medical workers will also be developed.

Measures will be taken to increase the level of academic training of UMC nurses (up to masters/doctorates) until the share of nurses with postgraduate academic degrees approaches world standards and the AMC. Measures will also be continued to train nurses in international approaches to improve nursing care at UMC (JBI Nursing Journal club, JBI Evidence based practice, service design, etc.) until such approaches are introduced into routine daily practice.

## Strategic goals and objectives of UMC

### Goal 3. Research activities

**Objectives:**

3.1. Research activities within NU Medicine

3.2 Development of research infrastructure and resources

3.3 Nursing researches

**KPI:**

3.1. Percentage of UMC clinicians involved in research activities at NU/CLS

3.2. Number of publications in international peer-reviewed journals with impact factor and citescore

Research is one of the main activities of UMC and is designed to improve the health of citizens and promote the development of public health in the country. When organizing scientific research, UMC will continue to adhere to the national priority and specialized direction “Science of Life and Health” (including those defined for program-targeted financing of scientific, scientific and technical programs for 2023-2025).

As part of the Nazarbayev University Research University Development Program for 2021–2025, UMC is based on priority direction “3. Health and well-being."

**Objective 3.1. Research activities within NU Medicine**

Within the framework of the NU Medicine IAHS, the mutual involvement of researchers from NLA, NUSoM, and NU in UMC research projects will continue; as well as clinicians and researchers of UMC - in projects of NLA, NUSoM and other schools and organizations of NU. UMC will conduct research, including using the capabilities of the NU vivarium and biobank.

Great importance will be attached to the participation of UMC doctors in basic scientific research, together with NU.

UMC will collaborate with NUSoM to implement a doctoral program. UMC is intensifying national and international collaboration in research activities, including international multicenter clinical trials.

UMC's publication activity in international peer-reviewed journals will increase.

NUSoM master's and doctoral students will conduct research in the areas of clinical and organizational objectives and issues of UMC, under the joint guidance of UMC specialists.

From 2024, UMC will begin preparations to enter the phase of clinical research on the heart and preclinical research on the lungs and liver of the unique UMC device for the preservation, long-term transportation and treatment of donor organs outside the body - “ALEM”.

**Objective 3.2 Development of research infrastructure and resources**

To increase research potential UMC will develop policies and training programs for researchers, and access to the Collaborative Institutional Training Initiative (CITI Program) will be provided.

The professional level of clinical and research managers will continue to improve.

UMC researchers will actively participate and present the results of their research projects at world scientific events.

Research project management standards will be implemented, including the principles of Good Clinical Practice (GCP) and Good Laboratory Practice (GLP).

As part of the planned construction of a new Children's Surgical Center with 350 beds, UMC will work on the creation of a Center for Translational and Clinical Research (CTRC), where research will be conducted, including oncological immunology, endocrinology and metabolism, and phenotyping of molecular cells.

A research database that meets security and data protection requirements will be developed and integrated with MIS. As part of increasing the level of automation, UMC will improve the process of submitting documents for consideration by the local bioethics commission.

As part of the development of the research budget, UMC will actively attract additional sources of funding, including the resources of the Endowment fund being created at UMC.

UMC will develop a vision for the commercialization of research results, focusing on the development of highly competitive medical technologies (UMC Enterprise).

**Objective 3.3 Nursing researches**

Research development is based on evidence-based practice and evidence-based nursing principles.

Nursing research opportunities will be expanded and the involvement of nurses in research activities on clinical and managerial tasks of UMC, as well as their publication activity, will be intensified.

UMC nurses will actively participate in international nursing communities. International collaboration in nursing research promotes the use of contemporary nursing concepts and theories and contributes to the development of scientific knowledge in the field. Collaboration between nurses and researchers facilitates large-scale international research. Through networking, young researchers can also learn from more experienced scientists.

In addition to the participation of nurses in independent projects in the field of nursing practice, their involvement in clinical research at UMC is increasing.

## Goal 4. Ensuring financial stability and effective management system

**Objectives:**

4.1 Financial stability

4.2 Effective management

4.3. Human capital and culture of the IAMC

4.4 UMC is a “data-driven” healthcare organization

4.5 Proper infrastructure

**KPI:**

4.1. Financial stability ratio

4.2. Passing certification of UMC IT systems according to the 6th level of clinical implementation of HIMSS EMRAM

## Strategic goals and objectives of UMC

### Objective 4.1 Financial stability

UMC advances its social significance as an Academic Medical Center (AMC) by dedicating itself to enhancing the quality of life and well-being of the nation. All generated income will be directed to support resources and development of UMC potential.

UMC medical care is available primarily through government packages and insurance and other resources. High-tech medical care at UMC will continue to remain available to citizens of the Republic of Kazakhstan, and new methods and technologies introduced at UMC will remain an alternative to treatment abroad.

To ensure financial stability, UMC strives to increase the effectiveness of the services and to receive other sources of income. Measures will be implemented to reduce UMC's dependence on fluctuations in revenues associated with the state budget. Also, work will continue to obtain an academic adjustment coefficient for medical service tariffs for UMC as IAMC.

Income. UMC will expand the list and scope of medical services provided and will use tools for providing services "outside hospital walls," including using digital technologies (*Video visit; Teleconference appointment; Physician access to health*).

The use of digital solutions and platforms will also allow us to expand the range of educational services, including training specialists remotely. IT maintenance services and medical equipment for medical organizations in Astana will also be expanded. UMC's subsidiaries - IMEC LLP and National Medical Holding LLP will continue to ensure uninterrupted and safe operation of medical products and medical gases, as well as maintenance of buildings and structures, and transport support for UMC.

UMC, within the framework of voluntary medical insurance, will develop long-term partnerships with insurance companies and corporate clients of UMC Medical Assistance.

UMC will carry out activities to strengthen the presence of the UMC brand as a "single organization in 4 locations", as well as implement an "aggressive" marketing strategy, a PR strategy for a multi-target audience, based on business analytics data.

UMC will develop a platform for developing a positive experience "UMC Patient Experience", as well as for internal communications and improving the experience of employees - "Employee experience".

Work will be strengthened and systematized to diversify and obtain additional sources of funding for various areas of UMC activity (charitable, donor sources, volunteer assistance) and by creation of Endowment fund.

Expenses. The main measures for the attraction of additional sources of incomes will be management of organization expenses. UMC will reduce costs by centralizing/increasing volumes and optimizing procedures for purchasing drugs and medical devices, non-medical equipment, and sharing "heavy" medical equipment. Resource saving will also be achieved through the introduction of modern operational management techniques.

UMC will improve and automate business processes in order to ensure optimal inventory of inventory balances.

Resource management. UMC will place its main emphasis on effective management of its own capital and assets, as well as investing in priority and high-tech clinical, educational and research areas.

To assess the current status and track cost and quality performance, UMC will implement cost management mechanisms. A “financial panel” will be introduced - a mechanism for monitoring clinical and financial indicators of procedures, which will allow tracking the income and expenses of clinical departments and contribute to their development as centers of financial responsibility.

UMC will continue to work together with the Ministry of Health of the Republic of Kazakhstan and the Federal Social Insurance Fund to improve the tariff setting methodology (diversification of clinical cost groups), implementing its objectives as a republican organizational and methodological center on maternal, infant mortality, mortality from diseases of the circulatory system, as well as a center of competence for a number of nosologies.

**Objective 4.2 Effective management**

Following global trends of integration and synergy, taking into account the accession to UMC of the Shymkent Heart Center NJSC, will work to develop its educational and research role in the integrated academic health care system NU Medicine, as well as standardize business processes, SOPs, and eliminate duplicative functions.

UMC will achieve economies of scale by reducing costs and increasing productivity by increasing volumes, providing a complete end-to-end patient care experience, and optimizing staffing and processes.

Modern technologies for operational management of medical organizations will be used (management of patient flows, volumes of services, supply chains, storage of materials, effective outsourcing and others), based on data analysis. Automation of processes for managing patient flows, creating an electronic database, and managing inventories of medicines and medical products will help reduce errors, speed up access to information and increase productivity.

Taking into account global climate change trends, worsening problems of water and energy resource management and environmental protection, which pose threats to public health, economic and social development, UMC will gradually introduce “green technologies” in its activities. Thus, areas such as energy-efficient buildings, equipment, waste management and recycling will be adapted and modernized; optimization of heating and air conditioning systems, environmentally friendly packaging and materials. UMC will explore the possibility of installing its own solar/wind power plant "UMC Energy" and charging stations for electric vehicles

Internal clinical and non-clinical audit and control will continue (including pharmacy management), activities within the risk management system will be intensified.

**Objective 4.3. Human capital and culture of the IAMC**

UMC's human capital is its primary and most valuable resource, possessing exceptional competence, motivation and moral principles.

The human resource management policy is implemented in accordance with the strategic goals of UMC and is based on the development of UMC’s corporate

culture, like the IAMC, “Culture of Impartiality”, “Culture of Excellence (Continuous Improvement)”.

The interaction of personnel at all levels is based on UMC values.

The organizational structure of UMC will ensure the efficiency of interaction between structural divisions, the availability and dissemination of information to each employee, and the transparency of reporting.

The staffing schedule and internal documents of UMC, regulating the activities of employees, will be based on an analysis of data on the workload of personnel and their effectiveness in accordance with the specifics of the work and clearly defined tasks performed.

UMC will gradually switch (for newly hired employees) to concluding employment contracts for limited periods, with the condition of full employment at UMC, as well as the trinity of tasks performed (medical care, education, research). The mechanism of “dual appointment” is also being activated, motivating doctors/researchers/teachers to work in several organizations of the NU Medicine system.

The system of recruitment, retention and development of employees will meet modern requirements and the best international experience. In order to improve the employee experience, UMC will improve adaptation programs and periodic assessment of new employees.

A system of talent management, admission and grading regulation, and performance assessment of structural units and employees will be developed (taking into account the personalized performance criteria). The system of remuneration and material motivation will encourage employees to achieve high-quality target performance indicators, engage in educational activities, research and publications.

UMC will adopt a volunteer program/policy.

New technologies (digital workforce) will be introduced that modernize work by eliminating routine administrative tasks, speed up decision making and reduce time spent on documentation (medical tablets; voice typing of medical documentation, etc.).

The system of continuous professional development of UMC employees will be built taking into account the tasks of structural units, individual plans/trajectories of specialist development and recommendations based on the results of annual certifications. UMC will continue training specialists in leading foreign and domestic medical centers and universities, including using distance learning methods. In addition, distance learning programs for employees on basic UMC policies, leadership and change management will be created on training platforms.

UMC will expand comprehensive incentive measures, including social, professional and moral-psychological aspects, to ensure motivation and maintain a high level of professionalism of employees. The internal UMC award system will be adopted.

The practice of professional liability insurance for medical workers performing high-risk procedures and operations (with a high risk of lawsuits) will continue. To protect the health, safety and well-being of employees, UMC will develop a support program that includes annual preventive examinations, rehabilitation, and

psychological assistance for professional burnout. UMC will provide comfortable and safe working conditions for medical and non-medical personnel.

In order to strengthen corporate culture, increase employee engagement and satisfaction, a resource for internal employee communications will be developed based on the Bitrix platform.

As part of the optimization of HR work, UMC will adopt a competency model for an HR specialist, and activities on digitalization and automation of processes and HR analytics will also continue.

**Objective 4.4. UMC is a "data-driven" healthcare organization**

UMC is committed to becoming a national leader in the use of health information technology. UMC integrates hospital and resource planning systems to provide advanced clinical solutions, improve patient safety and data storage.

UMC will approve the IT strategy of a "digital hospital", combining infrastructure, software systems and medical equipment in a harmonized environment that supports international standards.

UMC will take part in the development of a unified digital healthcare space - eHealth (health care interoperability platform of the Ministry of Health of the Republic of Kazakhstan). Also, the integration of MIS UMC with external information systems will continue.

The UMC information technology infrastructure will support cybersecurity, confidentiality and data availability at the advanced (Stage 6) levels of HIMSS EMRAM, reflecting the international objective methodology for measuring the maturity of UMC IT systems.

UMC, using Microsoft Power BI technologies, will create dashboards for data-driven decision making, business intelligence and reporting, and research. UMC will be able to continuously and in real time analyze performance indicators for patient treatment and productivity in the context of structural divisions, specialists, to coordinate the need, productivity and workload of personnel, technical resources etc.

UMC will introduce a platform for personnel training. UMC will strive to increase accessibility and patient engagement by introducing digital technologies for interaction with patients - online patient reception; Teleconference appointment; Physician access to health data via connected devices (doctor's access to patient's medical data through connected devices).

UMC will introduce a "patient's personal account" featuring medical data access, enabling patients to review doctor's records, examination data, and medical test results at their convenience.

UMC will introduce artificial intelligence technologies (in terms of radiology examinations and clinical data in general), which will automate routine tasks, diagnose diseases, analyze medical data with high accuracy, increasing staff productivity.

In connection with the expansion of UMC, work will continue in UMC centers on unifying the IT infrastructure, centralizing all information systems (MIS, LIS, PACS), and unified protection of the network perimeter.

In order to interact effectively with all UMC employees on IT development issues and increase the involvement of clinical staff in the digitalization process,

UMC will create “Clinical Informatics” working groups (in terms of business processes and modules), including clinical and IT staff.

**Objective 4.5. Proper infrastructure**

UMC Centers are human-centered buildings designed to provide effective medical care, a comfortable and safe stay for patients and their families, staff, researchers, residents and students.

UMC ensures the quality, safety, efficiency and uninterrupted operation of its infrastructure in accordance with the level of JCI standards. Systematic maintenance planning will ensure durability, safety, ergonomics, design, aesthetics and comfort. The area around the buildings of UMC centers will be planted with green spaces and equipped with areas for rest and unloading of staff and patients.

Effective equipment selection optimizes clinical and economic outcomes, while UMC ensures proper device commissioning, installation, maintenance and training.

The principles of organizing unassigned workplaces (Hot Desk) for “mobile” (working simultaneously in several UMC locations) doctors, nurses, other UMC employees and administrators will be applied.

Also, in the clinical departments, universal wards will be created, the equipment of which will make it possible to provide specialized assistance and care to patients with various pathologies, and also, if the condition worsens, to organize an on-site post and carry out resuscitation measures in the ward. This approach will allow hospitalization of patients in free departments and optimal use of UMC bed capacity.

National Medical Holding LLP will ensure the uninterrupted operation of UMC buildings and if necessary autonomous supply of water, heat and energy from city communications.

UMC's new 350-bed Children's Surgical Center (including the Translational and Clinical Research Center), equipment and systems will incorporate “green energy and technology principles” into planning.

# 3. EXPECTED RESULTS AND MONITORING THE IMPLEMENTATION OF THE UMC STRATEGIC PLAN for 2024-2028.

## Expected results

| | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 |
|---|---|---|---|---|---|---|
| **Goal 1. Improving the healthcare delivery system with a focus on patient needs** | | | | | | |
| **KPI 1st level (University-wide indicators)** | | | | | | |
| 1.1. Patient satisfaction level (%) | **91%*** | **87%** | **89%** | **90%** | **91%** | **92%** |
| 1.2. Accreditation of UMC for compliance with JCI standards as an Academic Medical Center | | V | | | V | |
| KPI 2nd level | | | | | | |
| 1.3. Number of new medical technologies introduced into clinical practice (no less than) | 5 | 5 | 5 | 5 | 5 | 5 |
| 1.4. Maternal mortality | 0 | 0 | 0 | 0 | 0 | 0 |
| **Goal 2. Quality and innovation in education and practical training of healthcare professionals** | | | | | | |
| **KPI 1st level (University-wide indicators)** | | | | | | |
| 2.1. Percentage of UMC clinicians involved in teaching activities at NUSOM (%) | **14,7%** | **15,4%** | **15,6%** | **15,7%** | **15,8%** | **15.9%** |
| KPI 2nd level | | | | | | |
| 2.2. Share of alumni of UMC residency who passed an independent assessment at the NCNE at the level of 75 points or higher (at a threshold of 50 points) | 60% | 62% | 64% | 66% | 68% | 70% |
| **Goal 3. Research activities** | | | | | | |
| **KPI 1st level (University-wide indicators)** | | | | | | |
| 3.1. Percentage of UMC clinicians involved in research activities at NU/CLS (%) | **3%** | **5,7%** | **6,0%** | **6,1%** | **6,2%** | **6,3%** |
| KPI 2nd level | | | | | | |
| 3.2. Number of publications in international peer-reviewed journals with impact factor and citescore | 69 | 70 | 75 | 80 | 85 | 90 |
| **Goal 4. Ensuring financial stability and effective management system** | | | | | | |
| KPI 2nd level | | | | | | |
| 4.1. Financial stability ratio (no less than) | 0,7 | 0,72 | 0,74 | 0,76 | 0,78 | 0,8 |
| 4.2. Passing certification of UMC IT systems according to the 6th level of clinical implementation of HIMSS EMRAM | | | | | | V |

* - based on the results of 2023, it is planned to introduce a new assessment methodology from 2024.

## Monitoring

Monitoring the implementation of the UMC Strategic Plan for 2024-2028. will be carried out in accordance with the requirements of the UMC Charter, the Rules and Procedures for Strategic Planning of "Nazarbayev University" AEO and the internal regulations of the UMC, at least once a year.

# 4. APPENDIX

## External analysis

Strengthening the health of the nation is one of the most important tasks of the state. The long-term **Development Strategy "Kazakhstan-2050"** identifies seven priorities, one of which is "new principles of social policy - social guarantees and personal responsibility." Healthcare is an important sector that provides social guarantees to the state in ensuring the protection of public health and supporting the personal responsibility of citizens for maintaining and strengthening their health.

Providing quality and affordable healthcare is identified as one of the national priorities in the **Strategic Development Plan of the Republic of Kazakhstan until 2025**. The Task "*Development of affordable and high-quality healthcare"* provides for the digitalization of the industry, an emphasis on primary health care, disease prevention and management, and the development of compulsory medical insurance. In order to modernize medical education and science, and integrate their results into practice, it is planned to continue the transfer of best practices through strategic partnerships with leading foreign universities. It is also planned to disseminate the experience of the Nazarbayev University School of Medicine in terms of the functioning of an integrated university center.

The national project **"Quality and affordable healthcare for every citizen "Healthy Nation"** for 2021-2025 is currently being implemented.

According to the results of the Global Competitiveness Index rating in 2019, Kazakhstan took 55th place, improving its position by 4 places (in 2018 - 59th place), including in the health factor - in 95th place out of 141 countries (in 2018 - 97th place) (*In 2020, the preparation of the GIC and the calculation of the country rankings were suspended in recognition of the extraordinary events of the pandemic, public health crisis and its socio-economic consequences*.)

The main indicators of achieving national strategic goals in the field of health are:

- increase in life expectancy of citizens from 71.37 years in 2020 to 75 years in 2025;
- increasing the level of population satisfaction with the quality of medical services from 53.3% in 2020 to 80% in 2025;
- infant mortality to 7.2 per 1000 live births in 2025;
- maternal mortality rate up to 10.0 per 100 thousand live births in 2025.

### Medical and demographic health indicators

**Life expectancy indicator (LE).** As a result of the implementation of a set of measures to improve the healthcare system and ensure the well-being of the population, the gap between the OECD countries and the Republic of Kazakhstan in terms of life expectancy has narrowed - if the difference in 2015 was 8.7 years (*OECD – 80.6 years, RK – 71.95 years*), then in 2019 the gap was reduced to 7.5 years (*OECD - 80.7 years, Kazakhstan - 73.18 years*). However, due to the coronavirus pandemic, the average life expectancy indicator has worsened to 70.23 of the year (in 2020 - 71.37 years) due to increased morbidity and mortality rates in the country. Over the past 2 years, life expectancy has decreased by 2.95 years, which corresponds to level of life expectancy in the country in 2013.

The main causes of mortality in Kazakhstan, as in other countries, are non-communicable diseases, in particular, diseases of the circulatory system (mainly coronary heart disease and cerebral stroke) (hereinafter referred to as CVD). Heart disease accounts for 35% of all deaths worldwide today[1]. In the **structure of mortality from CVD**, the leaders are coronary heart disease, from which 10.5 thousand people die per year in Kazakhstan (58.2 per 100 thousand population), as well as acute cerebrovascular accidents, from which 11 thousand people die per year (58. 9 per 100 thousand population).

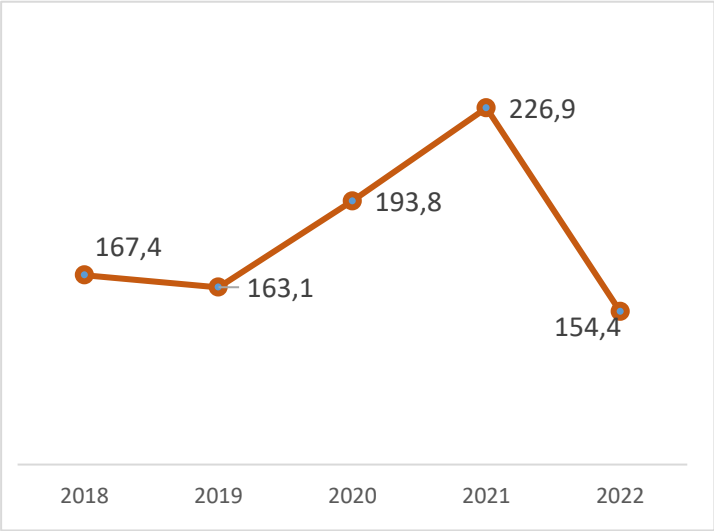


Figure 7. Mortality from CVD per 100,000 in KZ

Mortality from CSD has tended to decrease in recent years (2016 – 178.9 per 100 thousand population; 2019 – 163.1) (see Fig. 7). However, the disruption of the comprehensive health care cycle caused by the pandemic has led to an increase in mortality from chronic non-communicable diseases. So, in 2020 mortality from CVD increased to 193.8, in 2021 – to 226.9 per 100 thousand population, and in 2022 – decreased to 154.4 per 100 thousand population).

**Level of population satisfaction with quality of medical services** in the Republic of Kazakhstan is an important indicator of the healthcare system.

This figure for the Republic of Kazakhstan increased from 40% in 2016 to 53.3% in 2020. At the same time, part of the population notes an insufficient level of service and sanitary and hygienic conditions (37.1%) in medical organizations, as well as a low level of comfort; only 38.4% of patients are informed about the rights and responsibilities in the field of medicine. In 2022, population satisfaction with the quality and availability of medical services provided by medical organizations of the Republic of Kazakhstan amounted to 69.6% (see Fig. 8).

[1]British Heart Foundation Global Heart & Circulatory Diseases Factsheet, June 2023

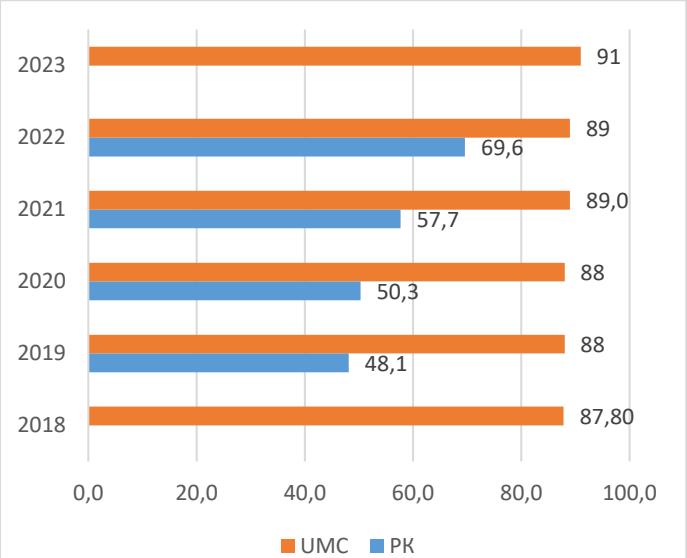


Figure 8. Population satisfaction with the quality and accessibility of medical services

UMC patient satisfaction with the quality of medical services is higher than the national average and, on average, is 89% over the past 5 years.

Preserving and strengthening the health of pregnant women and children is elements of national security. For 2015-2019 in the Republic of Kazakhstan, **maternal mortality** decreased by 16.5% (from 16.4 to 13.7 per 100 thousand live births). However, with the beginning of the pandemic in 2020, the maternal mortality rate increased 2.7 times (to 36.5 per 100 thousand live births), where in 56.4% the causes were coronavirus infection COVID-19 and pneumonia (see Fig. 9). In 2021, there were several waves of coronavirus infection COVID-19 and, accordingly, an increase in the number of diseases among women of fertile age and pregnant women by 2.4 times, as well as an increase by 2.5 times pregnant women with severe coronavirus infection. The maternal mortality rate increased by another 22.6% and amounted to 44.7 per 100 thousand live births. At the same time, the maternal mortality rate excluding mortality from coronavirus infection was 13.4 per 100 thousand live births, which is lower than the maternal mortality rate before the pandemic (2018 - 13.9, 2019 - 13.7, 2020 - 15.9 per 100 thousand live births).

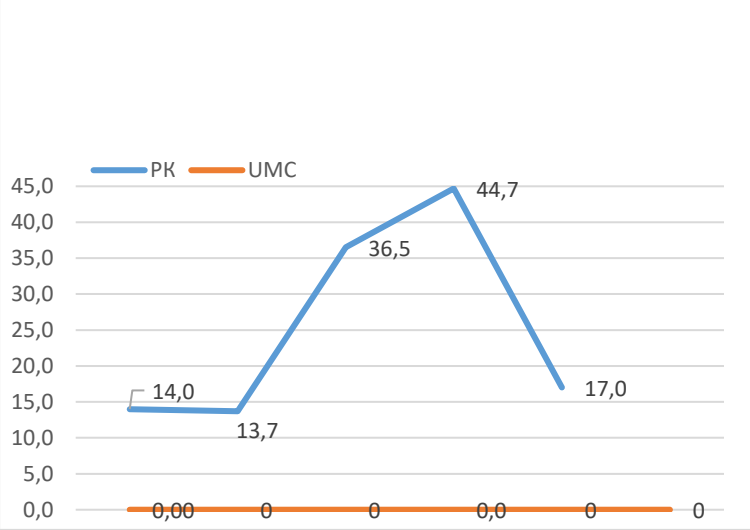


Figure 9. Maternal mor-+tality rate (per 100,000) in the Republic of Kazakhstan and the UMC Mother and Child Center

Excess maternal mortality from COVID-19 and post-Covid complications was directly related to the overload of the healthcare system, the consequences of strict quarantine measures, the more severe, fulminant course of COVID-19 in pregnant women, as well as concomitant diseases and late seeking of medical care by women, insufficient monitoring and quality services at the primary health care level and dynamic observation for patients with severe extragenital pathology due to poor continuity of primary health care, obstetric and specialized hospitals during this period.

In UMC, maternal mortality in 2018-2023 was not registered[2].

The country experiences instability in its **infant mortality** rate per 1,000 live births (see Fig. 10). In 2021, an increase in the infant mortality rate was registered compared to 2020[3]. In the structure of the causes of infant losses, 54% are conditions of the perinatal period, where in premature infants with a body weight of 500-999 grams. accounts for 48.3% of cases (*53.6% - for respiratory disorders, 33.4% - infections of the perinatal period, 42.7% - hemorrhagic disorders*). In 63.2%, infant losses occurred in the neonatal period; 57.7% of newborns weighed from 500 to 2499 grams.

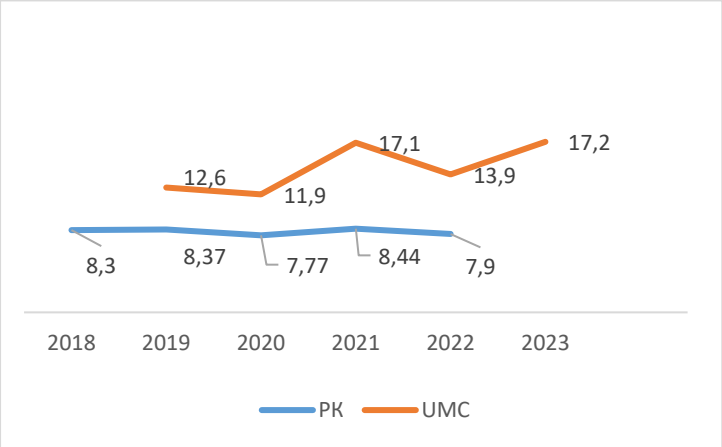


Figure 10. Infant mortality rate (per 1000 live births)

In recent years, congenital malformations have occupied second place in the structure of infant mortality, which requires improvement of prenatal ultrasound screening and development of neonatal surgery.

At UMC in 2018-2022. there are high indicators infant mortality, in 2021 - 2023, twice the republican average. This is due to the general increase in post-Covid complications, as well as the fact that UMC hospitalizes patients, including those with the most complex and threatening conditions (*UMC, interacting with the Ministry of Health of the Republic of Kazakhstan, is designated as the curator of a number of regional medical organizations in Kazakhstan on issues of organizational and methodological work, and also participates in the provision of emergency assistance through air ambulances*).

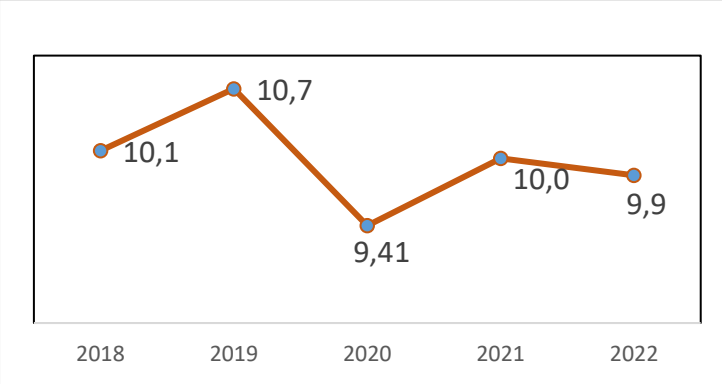


Figure 11. *Infant mortality rate in the Republic of Kazakhstan per 1000 births, Republic of Kazakhstan*

In Kazakhstan, thanks to systemic measures to improve and stabilize the health of children under 5 years of age, it was possible to reduce **the child mortality** rate over the past 5 years by 22.6% (2016 - 10.79, and in 2020 - 9.41 per 1000 births) (see Fig. 11). However, in 2021 there is an increase in infant mortality in the country to 10.04, in 2022 - 9.88 per 1000 births[4].

[2]https://stat.gov.kz/ru/sustainable-development-goals/goal/3/
https://nrchd.kz/files/%D0%BD%D0%BE%D0%B2%D0%BE%D0%B5%202023/%D0%A1%D0%B1%D0%BE%D1%80%D0%BD%D0%B8%D0%BA_%D0%B7%D0%B0%202021%20-2022%20%D0%B3%D0%B3.%20%D0%BE%D0%BA.pdf
[3]https://bala.stat.gov.kz/mladencheskaya-smertnost/
[4]https://nrchd.kz/files/%D0%BD%D0%BE%D0%B2%D0%BE%D0%B5%202023/%D0%A1%D0%B1%D0%BE%D1%80% D0%BD%D0%B8%D0%BA_%D0%B7%D0%B0%202021%20-2022%20%D0%B3%D0%B3.%20%D0%BE%D0%BA.pdf

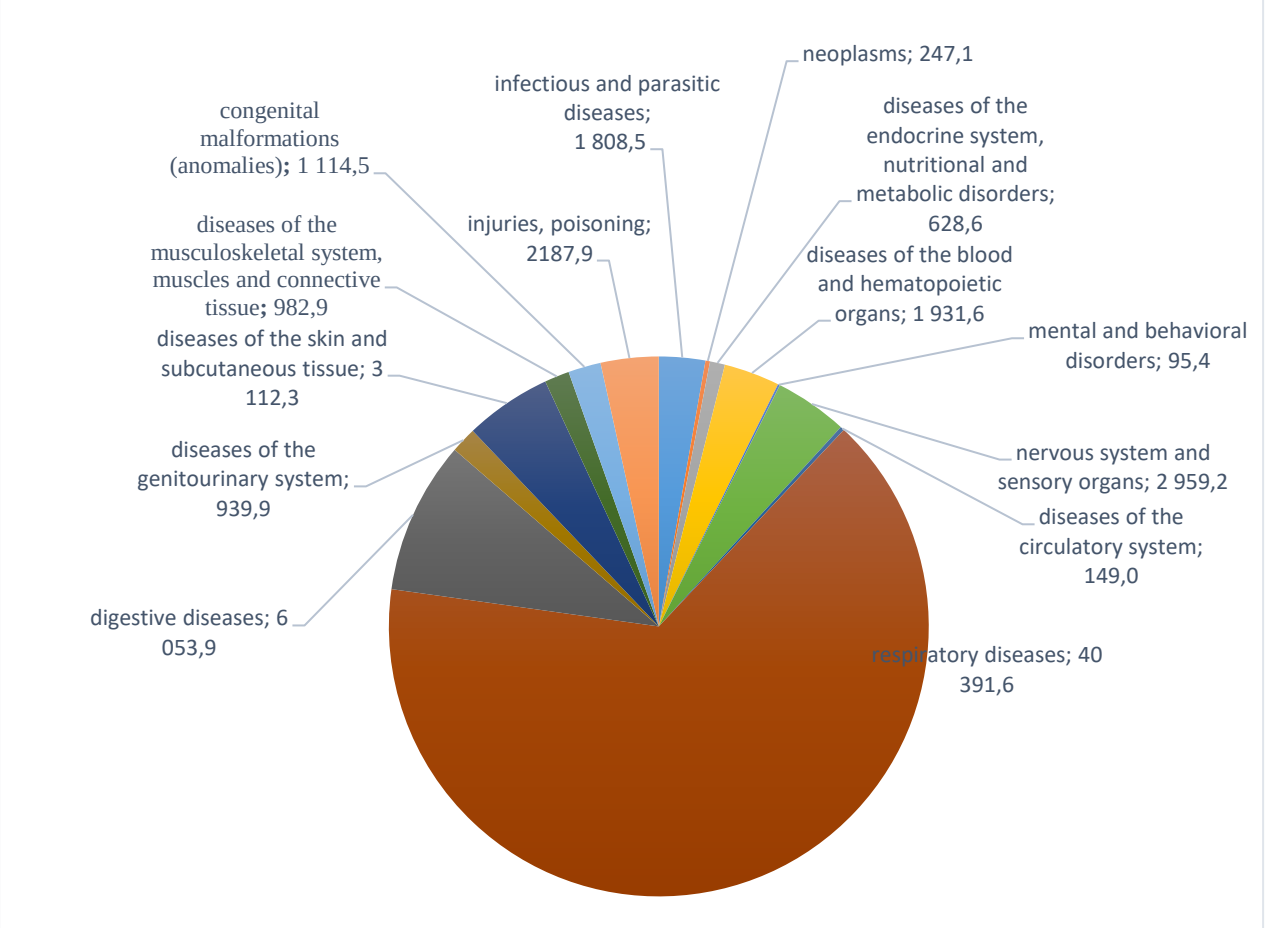


Figure 12. Primary incidence of children aged 0-14 years by main groups of diseases, per 100,000 children, Republic of Kazakhstan, 2022.

**Primary morbidity in children aged 0-14 years** for 2022 (see Fig. 12) (total 71,993.6 per 100,000 children) is represented by the following main groups of diseases[5]. The mortality rate of children aged 0-14 years from certain causes of death in the Republic of Kazakhstan (see Fig. 13) was only 97.45 per 100,000 children[6].

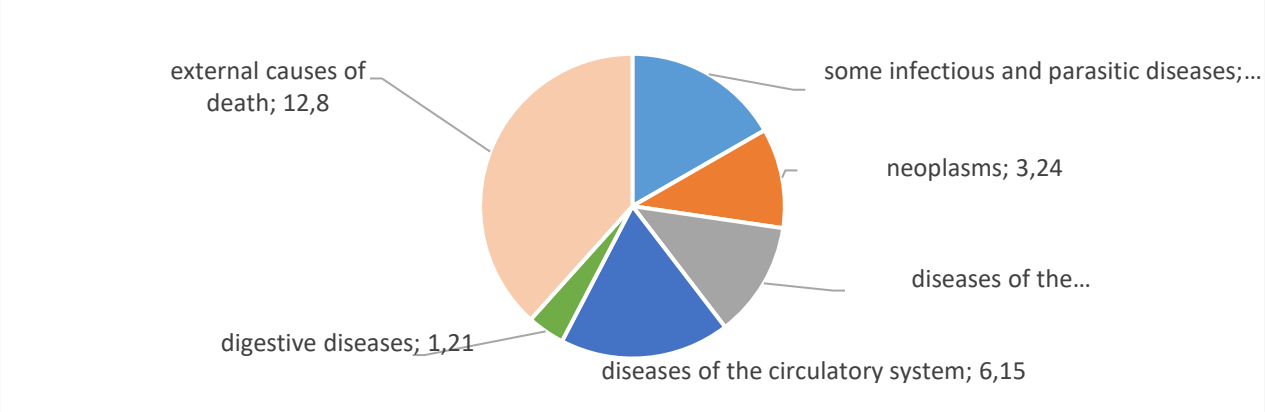


Figure 13. Mortality of children aged 0-14 years from selected causes of death per 100,000 children, Republic of Kazakhstan, 2022

[5]https://bala.stat.gov.kz/pervichnaya-zabolevaemost-detej-v-vozraste-0-14-let-po-osnovnym-gruppam-boleznej/
[6]https://bala.stat.gov.kz/smertnost-detej-v-vozraste-0-14-let-ot-otdelnyh-prichin-smerti/

The data presented above on primary morbidity and mortality in children aged 0-14 years characterize a wide range of diseases. At the same time, UMC provides medical care in many areas of pediatrics, oncohematology, pediatric surgery, traumatology, urology, endocrinology, pulmonology, gastroenterology, neurology and others. Since 2012, organ and tissue transplantation operations (liver, kidneys, bone marrow) have been carried out.

UMC is the republic's largest specialized clinical, research, educational, organizational and methodological center in the areas of pediatrics, pediatric surgery, oncohematology and obstetrics, women's health, cardiology and cardiac surgery, providing high-tech and specialized care to the population of the Republic of Kazakhstan.

**Thus,** the main indicators of national strategic goals in the field of healthcare tended to "roll back" due to the global epidemic of coronavirus infection, its direct and delayed impact on the health of citizens of Kazakhstan and the overload of the healthcare system.

All areas of UMC's activities have a significant impact (directly or indirectly) on the rating indicators of the Global Competitiveness Index of Kazakhstan and strategic national priorities in healthcare.

Continued industry challenges require further work to introduce the latest technologies, improve the quality of diagnosis and treatment in pediatric, obstetric and gynecological, cardiac surgery, oncohematological and other services to preserve the life and health of children and adults, and reduce social and medical costs.

## Main trends in the development of the global healthcare industry.

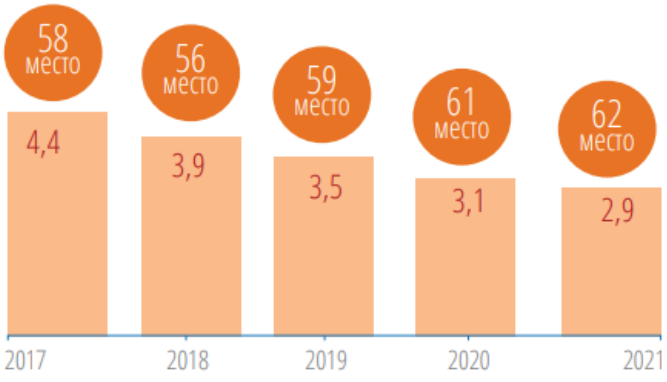


Figure 14. Dynamics of Kazakhstan's position. Total health care expenditures, % of GDP

Deloitte forecast for 2020[7], notes an acceleration in the growth rate of health care costs (up to 5% in 2019–2023, compared to 2.7% in 2014–2018).

At the same time, according to the domestic Institute of Economic Research[8] the dynamics of healthcare expenditures (see Fig. 14) shows that current expenditures in GDP are decreasing every year and in 2021 this figure amounted to 2.9% of GDP.

According to this indicator "Total health care expenditures", Kazakhstan in 2021 in the International Institute for Management Development "World" rating Competitiveness Ranking" took 62nd place among 64 countries, ahead of only

[7]Forecast for the development of the global healthcare industry in 2020. Foundation for the future. Link: https://www2.deloitte.com/kz/ru/pages/life-sciences-and-healthcare/articles/global-health-care-sector-outlook.htm l

[8]National Competitiveness Report. Kazakhstan in international rankings. Link: https://economy.kz/documents/Research_ERI/National_reports/National_Report_2021.pdf

Indonesia (63rd place) and Qatar (64th place). Kazakhstan ranks last in the group of comparable countries and, with Russia and Malaysia, is in the last quarter of countries, while Chile is in the second, and Argentina is in the first[9].

In the World Economic Forum "Global Competitiveness Index" rating, Kazakhstan took 95th place (out of 141 countries) based on the "Health" factor at the end of 2019[10].

Global trends in accelerating the growth rate of healthcare costs also have an impact on domestic healthcare, while the situation is aggravated by the situation with underfunding of the industry within the framework of compulsory medical insurance. The above poses a significant threat to the effective functioning of the system and requires optimization and management decisions.

Deloitte (2020) notes that there are numerous opportunities for the industry if the key factors influencing healthcare financial sustainability are addressed:

- a growing and aging population;
- an increase in the number of people with chronic diseases;
- expensive infrastructure and increased investment in medical technology;
- rising labor costs and personnel shortages;
- growing demand for broader ecosystem services.

Healthcare systems, according to Deloitte's analysis, should take into account the **following trends and recommendations** as a basis for future development:

- **Smart Health Communities** (SHCs) – the development of groups of public and commercial enterprises, as well as non-traditional players who operate primarily outside the traditional health care system.

What is recommended?

Use data-driven technologies (Internet of Things and Augmented/Virtual Reality) to make informed decisions, thereby increasing the scale of projects (remote health monitoring; Medication tracking; Internet of Things-based medical asset monitoring; Smart hospital space; Devices personal health monitoring and others).

- **Population health management** (PHM) - brings together public health understanding through big data, engagement and delivery of care. The focus is on strengthening primary health care and providing care "closer to home", which can help cope with growing demand.

What is recommended?

Market consolidation; Public private partnership; Attracting non-traditional players from industries such as technology, consumer goods, science and academia, etc.;

- **Innovative care model**

What is recommended?

Collaborate with other industry players to achieve maximum impact. Address inequalities in access, power, opportunity and affordability. Continue to provide inpatient services outside of hospital walls. Provide virtual health using digital technologies (AI-powered chatbot; Video visit; Teleconference appointment; Physician access to health).

- **Data management** in healthcare goes beyond data storage and focuses on extracting information that can be monetized, as well as population health management and value-based care.

With unprecedented advances in digital technology, cybersecurity remains a major concern for public and private healthcare institutions.

What is recommended?

Key areas that organizations should address:

[9]IMD World Competitiveness Yearbook 2017-2021.

[10]https://nationalbank.kz/ru/page/o-proekte-gik-vef.

Safety of medical equipment and wearable devices; Identity management and external device authentication; Telemedicine safety monitoring and behavioral analysis; Development, Security, Operations (DevSecOps); Training, awareness raising in the field of telemedicine safety.

- **The future of the profession** is the focus of healthcare leaders, many of whom are leveraging improved work environments, alternative employment models and innovative technologies to secure cost-effective talent models.

Staffing problems in healthcare (*failure to close the gap between supply and demand; time-consuming documentation; inability to remain "relevant"; lack of well-being*) require staff relief.

What is recommended?

Engage a digital workforce by introducing technologies that speed up decision making and eliminate routine administrative objectives.

Improve the qualifications of healthcare employees to implement and use technologies, analyze the readiness of employees for the digital future.

Cutting-edge technologies changing work in healthcare – Artificial Intelligence; Analytics; Blockchain.

Also, Deloitte (2018)[11]notes that many health systems are responding to new financial challenges by using tools to treat patients outside of traditional hospital settings (*reducing the share of revenue from inpatient services by 10% compared to 2004, giving preference to outpatient services in US hospitals).*

Other strategies to improve profitability include:

– combining traditional workforce planning approaches with predictive analytics to improve labor cost efficiency;

– revising revenue cycle strategies using new technologies and analytics tools;

– participation in mergers and acquisitions (M&A) and other schemes of interaction between organizations in order to achieve economies of scale. Provider organizations are working to expand their physician networks, expand their geographic reach, and diversify their offerings, creating a "closed-loop" supply chain through hospital acquisitions.

Research results from Deloitte Center for Health Solutions and the Healthcare Financial Management Association[12] note that hospital M&A activity has increased significantly over the past decade as buyers and sellers seek to create operational, strategic and financial value. The main driver is the desire for economies of scale, the ability to reduce unit costs or improve productivity and results through increased volume.

**Thus,** taking into account the growing threats and challenges, the healthcare industry is recommended to make management decisions on the organization of medical care, based on data analysis; on the conservation and development of resources and the introduction of innovative technologies (digital, management and others).

## Main trends in the development of academic medical centers.

AMCs carry out three types of activities: medical services, training of medical personnel and conducting scientific research. The main goal of the AMC, as world practice shows, is not to make a profit, but to provide socially significant medical services, train a new generation of medical personnel and conduct fundamental scientific research.

International experience demonstrates that AMCs are an integral part of healthcare systems - a "national brand" and occupy a special place in them. AMCs are widely represented in countries such as the USA, England, Australia, Canada,

[11]https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Life-Sciences-Health-Care/gx-lshc-hc-outlook-2018.pdf)

[12]https://www2.deloitte.com/us/en/pages/life-sciences-and-health-care/articles/hospital-mergers-and-acquisitions.html

Japan, the Netherlands, Singapore, etc., having differences in organizational structures and methods of financing, but demonstrating similarity in their main purpose - improving the well-being of the nation through the promotion of social missions.

Compared to conventional medical centers, AMC:

- provides services that are not provided in other organizations. For example, in the USA there are about 120 AMCs, which make up 5% of all healthcare organizations, while providing more than 30% of unprofitable but necessary medical services for the population. These services include, for example, the provision of services to patients with complicated diagnoses, combined pathologies, etc.;
- carries out a socially significant mission, training the future generation of medical personnel;
- engages in fundamental scientific projects to develop new knowledge in medicine. Investments in research do not produce immediate positive results and are perceived as unnecessary by policymakers/administrators. In cases of AMC, these costs are irreplaceable investments that form the foundation for education, innovation in medicine.

The key components of the AMC, according to world practice, are:

- referral center ("last resort") at the national and international levels (medical tourism model)
- information technology platform
- innovations (new technologies, products, services), advanced development of the industry
- research laboratories for translational, basic/clinical testing
- multidisciplinary (including primary care, emergency care).
- affiliation with the university.
- related schools, interdisciplinary teams
- highly qualified personnel (clinical, educational and scientific activities - Triple roles – Dual appointments)

The development of AMC has a significant social and economic effect on a national scale. Thus, US academic medicine (Schools of Medicine, teaching hospitals) contributed to US GDP of $728 billion in 2019 (approximately 3.2% of US GDP, or approximately $2,218 per person). AAMC member schools of medicine and teaching hospitals supported more than 7.1 million jobs in the United States in 2019 (approximately 4.4% of jobs nationwide)[13].

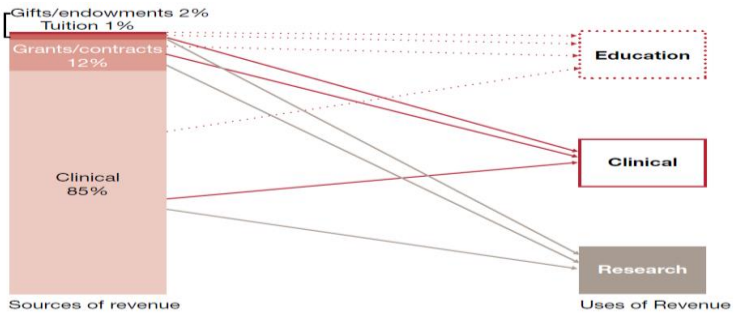


Figure 15. Cross-subsidization of AMC income in the USA.

Cross-subsidization of AMC income in the USA (see Fig. 15) allows you to direct income from the provision of medical services not only for clinical, but also for educational and research activities[14].

**Criteria for evaluating the activities of AMCs as part of Medical Schools**

[13]https://www.aamc.org/data-reports/teaching-hospitals/interactive-data/economic-impact-aamc-medical-schools-and-teaching-hospitals)

[14]PwC Health Research Institute | The future of the academic medical center: Strategies to avoid a margin meltdown, 2012.

As a site for clinical training and research, world-renowned AMCs are ranked according to Medical School Rankings *("US News & World Report Medical School Rankings"; "Times Higher Education World University Rankings for Clinical, Pre-Clinical & Health"; "QS World University Rankings by Subject - Medicine"; "Academic Ranking of World Universities (ARWU) - Clinical Medicine"; "Guardian University Guide - Medicine" and others*).

At the same time, the general aspects assessed are the indicators of "clinical partnership" - the availability of clinical practice, including:

- *access to clinical practice and experience working with patients in a clinical setting;*
- *the opportunity to conduct research on new drugs, treatments and medical technologies;*
- *professional learning - opportunities for on-the-job training and hands-on experience in a clinical environment;*
- *clinical expertise - availability of qualified personnel who can train and mentor future medical professionals, availability of resources for students;*
- *clinical innovation - interaction and exchange of knowledge between the AMC and clinical partners in the field of advanced clinical practices and medical innovations.*

Specialized accreditation for medical centers - AMC, carried out by JCI, evaluates, among others, the following criteria:

- *the center - the applicant is integrated with the medical school;*
- *the center - the applicant is the primary training location for undergraduate students, residents, and interns of the medical school in most medical specialty programs;*
- *the center - the applicant conducts basic, clinical and health research.*

**Thus,** the world's leading centers - AMCs, integrated with medical schools and faculties, are part of national healthcare systems and play a significant role in their development.

The world's leading AMCs are assessed both by Medical School Rankings and independently by JCI accreditation as medical centers - AMCs that provide clinical training and research opportunities for Medical School students and faculty.