Nazarbayev University Medicine as a Research and Development hub in the Ministry of Health Medical-Pharmaceutical Clusters

Massimo Pignatelli, MD, PhD
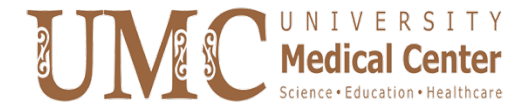*Vice-President for Medicine*

October 26, 2022

СК-ФАРМАЦИЯ

UMC UNIVERSITY Medical Center
Science • Education • Healthcare

NAZARBAYEV UNIVERSITY

SCHOOL OF MEDICINE

Key Elements in Astana to implement and support the MOH Medical Pharmaceutical Clusters

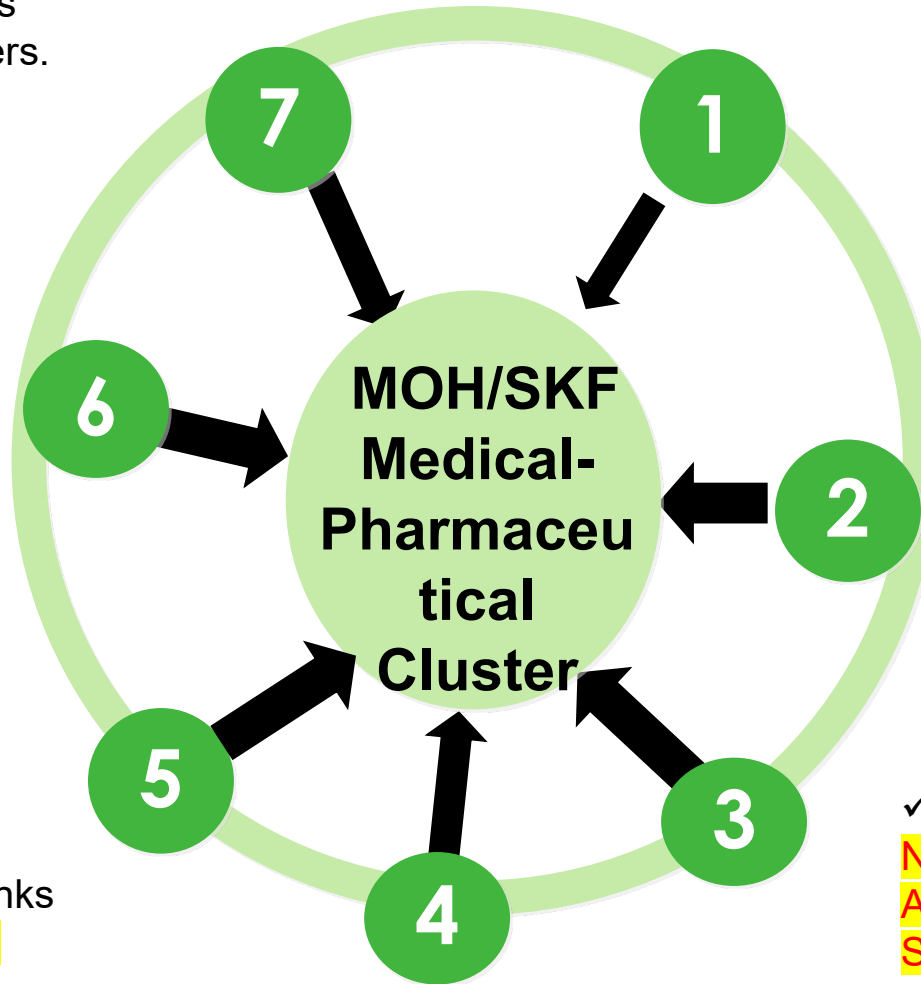**Central hub:** MOH/SKF Medical-Pharmaceutical Cluster

7.
- Innovation and Technology Groups, with start-ups, innovative companies collaborating with faculty, researchers.
- Tax and custom benefits
- University Technopark and Business Campuses

6.
- Translational Clinical Engine where new technology, products, services, patents are developed and tested to improve diagnostics, therapeutics and disease prevention –
- Clinical network of hospitals and clinics in Astana to evaluate and implement the discoveries and innovation of the cluster MOH, SK Pharmacy, Medical Universities

5.
- An Information Technology Platform to integrate health data, demographic, biobanks and research data - MOH, SK Pharmacy, Medical Universities

4.
- Education and Training of workforce (doctors, nurses, researchers, administrators, innovators)
- MOH, SK Pharmacy, Medical Universities

1.
- Understanding disease processes and pathways
- Identifying targeted molecules
- Drug discovery, design, development
- Multidisciplinary teams of biomedical scientists, biologists, pharmacologists, clinicians, engineers, data scientists

2.
- Pre-clinical testing
- Laboratory infrastructure for biochemical, cellular, molecular biology, immunological analysis
- Animal experimentation – *Vivarium* MOH. SK Pharmacy, Medical Universities

3.
- Clinical Trials (Phase I to Phase IV)
- Nationally and Internationally (eg JCI) Accredited Academic Medical Centers, MOH, SK Pharmacy, Medical Universities

Biomedical Laboratory Infrastructure
Medical School and University Campus Facilities

Master of Pharmacology and Toxicology
Master in Sports Medicine and Rehabilitation
Master of Public Health
Master in Molecular Medicine

Doctor of Medicine (MD)

PhD in Biomedical Research
PhD in Global health

Bachelor of Medical Sciences
Bachelor of Science in Nursing
Bachelor in Nursing
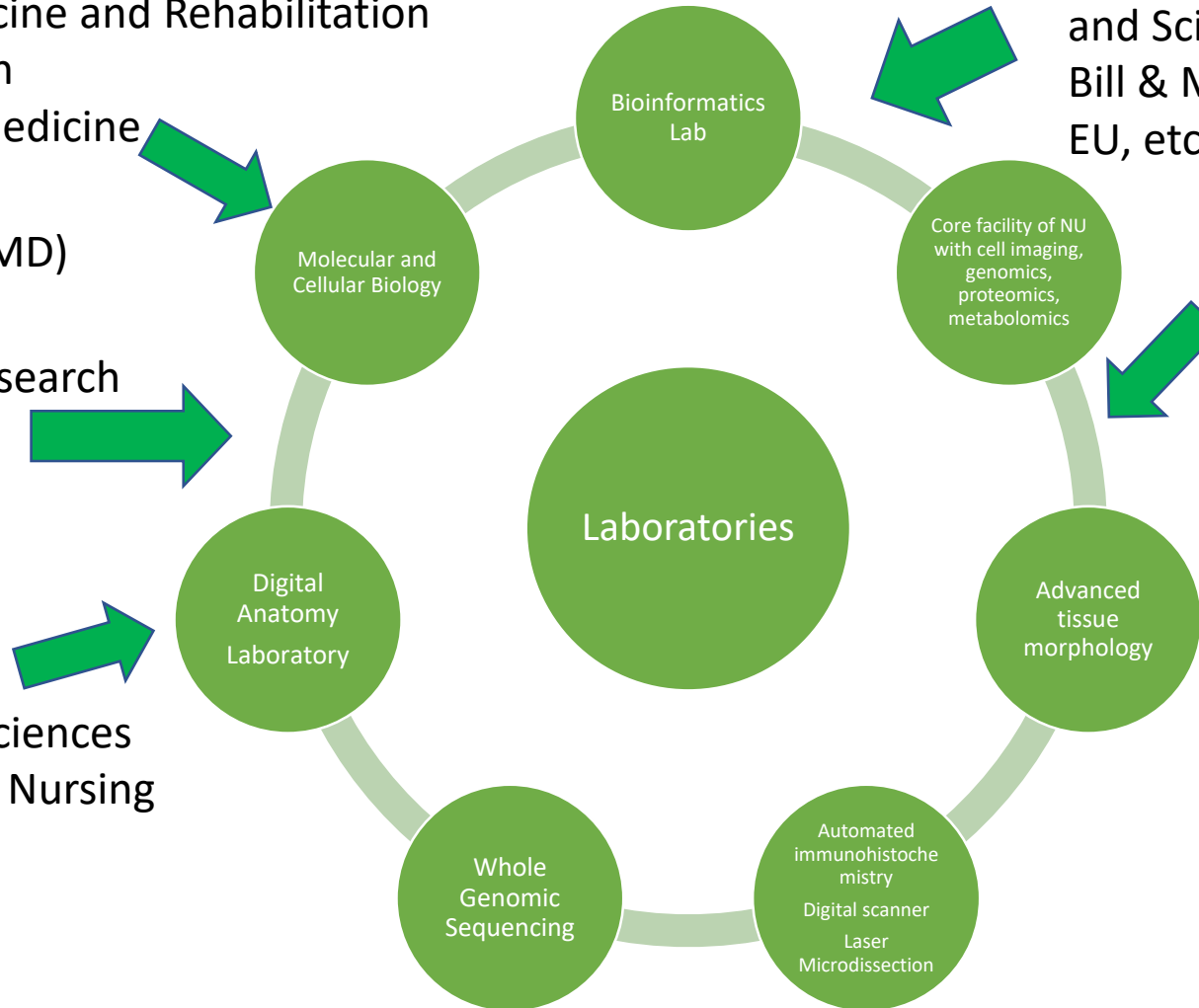
External grants: Ministry of Education and Science, Ministry of Health, NATO, Bill & Melinda Gates Foundation, NIH, EU, etc   NU Internal grants: SPG, CRP, FDCRGP

Main currently funded research areas

- Ageing and healthy Lifespan
- Cancer biomarker development
- Cardiovascular diseases
- Athletic talent selection using WGS
- Genomic Medicine (cancer, orphan diseases)
- Big Health Care Data (KZ)
- Sports science, talent selection
- Autoimmune and inflammatory diseases
- Stem cells, regenerative medicine
- Infectious diseases (SARS CoV2, HIV, TB)

Laboratories

Bioinformatics Lab

Core facility of NU with cell imaging, genomics, proteomics, metabolomics

Molecular and Cellular Biology

Digital Anatomy Laboratory

Advanced tissue morphology

Whole Genomic Sequencing

Automated immunohistochemistry
Digital scanner
Laser Microdissection

NU Research Animal Facilities
(to be completed by November 2023)

Total area: 5613,03 m²

1st floor – Laboratory of Experimental Surgery
Facilities for keeping large animals (Sheep - 5, Pigs - 3, Dogs - 4, Calves - 3)
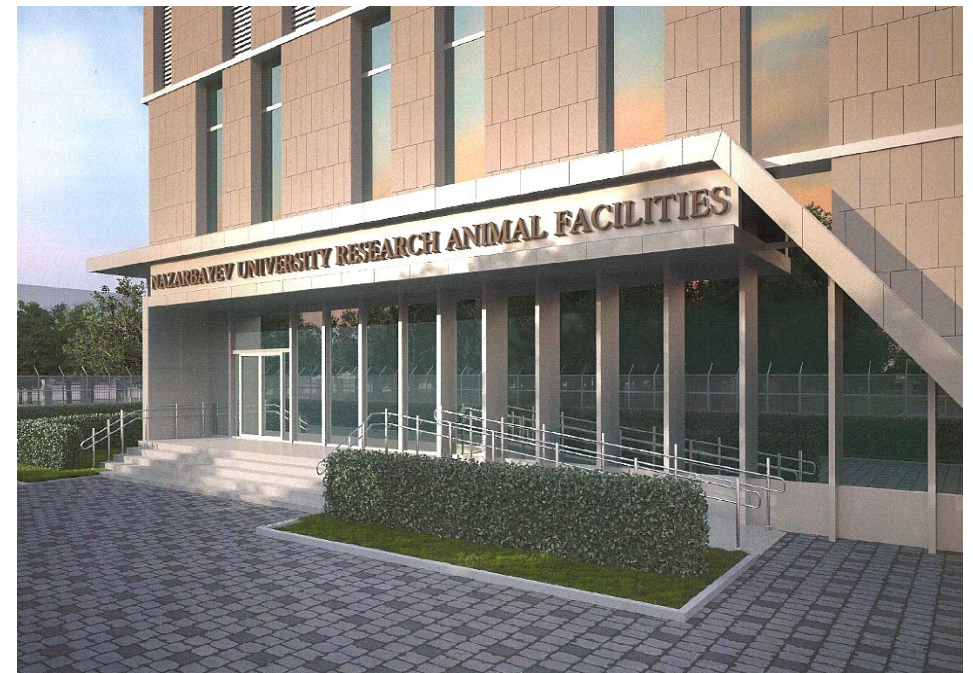Offices and technical rooms

2nd floor – Small animals
3400 mice - 5 per cage, 1200 rats - 6 per cage, 200 mice without immune - 5 per cage, 25 rabbits - 1 per cage.

Animal models for various diseases like epilepsy, diabetes, cancer, etc.)

Floor planning, constructive and technological solutions meet the accreditation standards of the AAALAC (Association for Assessment and Accreditation of Laboratory Animal Care) system.

Academic Medical Center

UMC UNIVERSITY Medical Center
Science · Education · Healthcare

NAZARBAYEV UNIVERSITY

SCHOOL OF MEDICINE

- **Areas of activity**
- Pediatrics and Pediatric oncology
- Surgery
- Obstetrics, Gynecology
- Cardiology and cardiac surgery
- Genetic laboratory
- Radiology and nuclear medicine
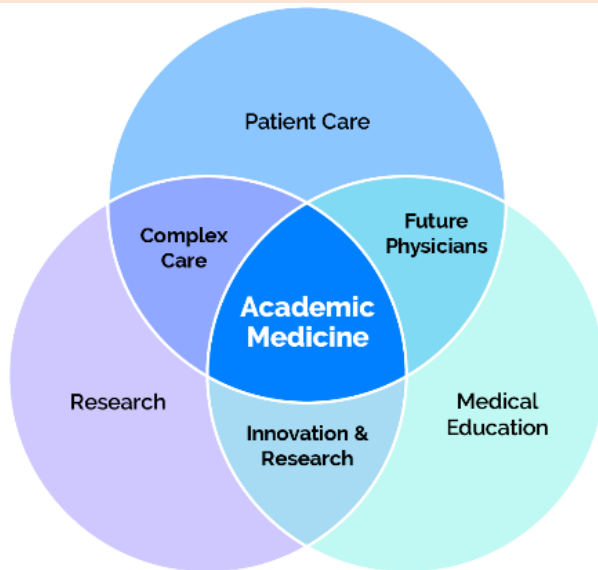
Medical service provided annually:
27 thousand patients in the hospital
1500 thousand patients in the day hospital
more than 4.6 thousand births
4 thousand rehabilitation services.
62 thousand outpatient visits
874.8 thousand diagnostic services
176.7 thousand laboratory services.

116 innovative medical technologies **were introduced** in 2016-2021 (about 12 technologies annually)

Clinical base:
Total capacity - 1072 beds
500 outpatient visits per shift
4 thousand staff units, incl. 850 doctors, 2000 nurses

National Research Center for Maternal and Child health – 520 beds
Total area - 52 549 m2

Republican Diagnostic Center
- 46 beds (day hospita;)
Total area - 18 294 m2

National Children's Rehabilitation Center - 306 beds
Total area - 38 293 m2

Kyzylorda branch (rehabilitation services) - 50 beds
Total area - 2 643 m2

National Research Cardiac Surgery Center-200 beds
Total area - 34 654 m2

Planned to include

Heart Center of Shymkent city- 158 beds
Total area - 10 210 m2

EDUCATION AND TRAINING **+** CLINICAL ACTIVITIES **+** SCIENTIFIC ACTIVITIES **+** BUSINESS ACTIVITIES

Information Technology Platform

❑ UMC uses 3 main information systems with medical data:

MIS

LIS

PACS

UMC ready to provide the information systems health data, including demographic, treatment, orders, diagnosis, vital signs, laboratory data/results, Xray and other types of radiology images, and artificial intelligence data where appropriate for Medical-Pharmaceutical Cluster.

❑ NU IT Department ready to provide support to the development of the integration platform/electronic registry in terms of profiles for Medical-Pharmaceutical Cluster to integrate health data with information systems of MOH and medical systems of the medical universities and satellite centers in the regions. Innovation through big data analytics and artificial intelligence to enhance knowledge-based decisions for patient care and health system governance, maximizing the use of real-world data to complement evidence obtained from clinical investigations and clinical trials

Favourable Site Characteristics:

Sufficiently large patient population

4 hospitals

Wide range of outpatient clinics

JCI Accredited Facilities

Experienced in Clinical Trials

Accredited by the MOH

Physicians certified in Good Clinical Practice

University infrastructure

SERVICES FOR THE INNOVATION COMMUNITY

TECHNOPARK

space and services for domestic and foreign innovative companies

- 4000 sq. m. of office and industrial space

- 27 resident companies

- promotes cooperation between NU faculty & students and innovative companies - residents

  of the Technopark

- tax and customs benefits within the SEZ "Astana-Technopolis"