DOW DOGANA ADVANCED MOLECULAR GENETICS AND GENOMICS RESEARCH & TREATMENT CENTER

DOW UNIVERSITY OF HEALTH SCIENCE

STRATEGIC PLAN

(2024 – 2027)

Pioneering Excellence | Inspiring Innovation

To Heal | To Educate | To Discover

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DIRECTOR'S MESSAGE

Since the completion of the Human Genome Project, panoply of data is emerging in the context of genomic profiling of various diseases and healthy states. This has been a groundbreaking change in the field of diagnostics, therapeutics & research. Identification of genetic makeup is becoming pivotal in analyzing not only the disease patterns but also to identify genomic landscape of population to decipher meaningful insights into health care policy making. Moreover, with the advent of cutting-edge techniques such as Next-Generation Sequencing (NGS) as well as high-throughput clinical analytical pipelines, it is becoming highly effective to identify disease-associated genetic variants of actionable importance, the basics of practicing personalized medicine.

With the challenges associated with these high-end techniques, their use in healthcare is highly promising and a major leap forward in patient management and that also to a personalized level. However, it is important to utilize the available resources and expertise in a concerted fashion to maximize the utility as well as output from such cutting-edge facilities. One such example could be the Spoke-&-Hub model whereby a central Genomics facility facilitates sequencing and profiling samples coming from various parts of the country. This approach will not only be fruitful in terms of resource utilization but will also allow country-wide physicians and researchers an opportunity to explore these newly available technological advancements to devise better patient care and to answer more complicated research questions.

The Dow University of Health Sciences has taken a lead in establishing the facility which is equipped to perform Next Generation Sequencing, Sanger Sequencing and other Molecular techniques which will be an asset for the whole country in terms of better patient care as well as by generation new knowledge in the field.

Our goal is to position DUHS at the forefront of global genomic research, fostering international collaborations and utilizing cutting-edge technologies like AI, CRISPR, and cloud-based genomic data sharing to address critical healthcare challenges.

Prof. Dr. Muhammad Asif Qureshi
Founding Focal Person
DOW DOGANA ADVANCED MOLECULAR GENETICS AND
GENOMICS RESEARCH & TREATMENT CENTER

EXECUTIVE SUMMARY

Inaugurated in early 2023, the Dow University of Health Sciences (DUHS) genomic facility is equipped with advanced technologies like Next-Generation Sequencing (NGS), Sanger Sequencing, and molecular diagnostic tools. Its goal is to advance personalized medicine and address healthcare challenges in Pakistan.

The facility aims to lead global genomic research, foster international collaborations, and leverage AI, CRISPR, and cloud computing to revolutionize healthcare. It provides diagnostic services for various genetic conditions, including solid and hematological malignancies, and serves as a hub for genomic research and capacity building.

By enabling genomic testing and research, DUHS is at the forefront of personalized healthcare, encouraging collaboration among researchers and clinicians. The facility also focuses on AI-driven data analysis, quality, innovation, and workforce training to contribute to global genomic research and address Pakistan's healthcare needs.

ABOUT DOGANA

The Dow Graduate Association of North America (DOGANA) is a 501-3C non-profit organization founded by Dr. Inayat and Dr. Sultan Ahmed during the 2nd IMANA meeting in 1970 in Chicago. It consists of alumni from Dow University of Health Sciences (DUHS) who reside across North America, with a strong presence in the United States.

DOGANA is the largest medical alumni group from Pakistan and is affiliated with the Association of Physicians of Pakistani Descent of North America (APPNA). Its members serve communities across the U.S., contributing to healthcare and medical advancements.

The association is dedicated to fostering connections among Dow University graduates and supporting various community initiatives.

INTRODUCTION & OVERVIEW

The idea for establishing a Genome facility at the DUHS came into discussion early in 2018 when the Vice Chancellor discussed that this is the need to handle upcoming challenges associated with personalized medicine. A team of dedicated consultants started working on the idea and the Higher Education Commission of Pakistan supported the establishment of this facility. The facility was also partially funded by the DOGANA administration.

The facility was officially inaugurated early in the year 2023 and it is equipped to perform high-end Genomic tests including Next-Generation Sequencing (NGS), Sanger Sequencing, and synthesis of Oligomers along with baseline techniques routinely used in Molecular Diagnostics.
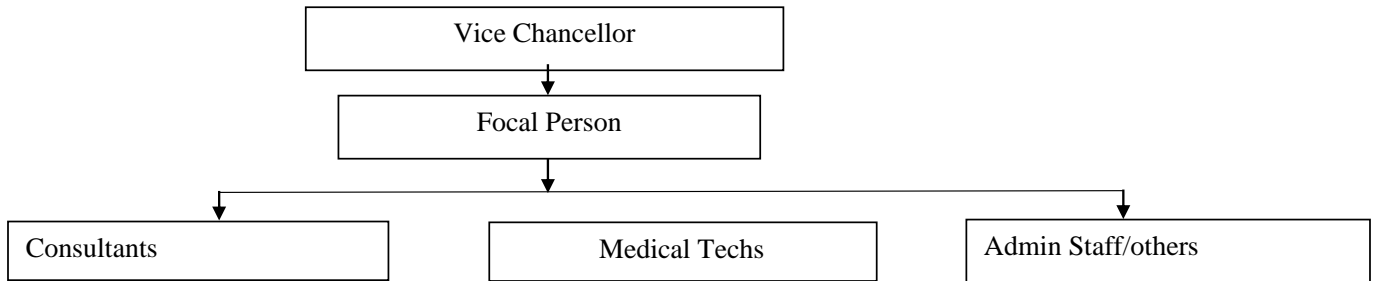
The vision for this facility includes Genomic testing for solid as well as hematological malignancies, as well as other diseases such as errors of metabolism. Moreover, provision of research facilities is another domain to be offered at this facility.

The team working at the facility will include reporting consultants who will interpret genomic findings *in lieu* of actionable variants. Moreover, research consultants at the facility will be pivotal in generating new knowledge. The administrative and technical team will be the major task force to perform the bench work required for the reporting.

We aim to undertake highest quality genetic testing which is time and accurately reported following international standards, is data driven and evidence based.

The facility will integrate AI-driven tools for variant annotation, risk prediction, and personalized therapeutic recommendations, ensuring international compliance and innovation.

INSTITUTIONAL ORGANOGRAM

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                    │     Vice Chancellor     │
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│ Consultants  │      │  Medical Techs   │      │ Admin Staff/others│
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SECTION I: OVERVIEW OF THE STRATEGIC PLANNING PROCESS

The strategic planning process for the facility was led by the Executive Strategic Planning Work Group, consisting of key members:

Prof. Dr. M. Asif Qureshi   Chairperson
Focal Person Dow Genomic Centre

Dr. Mohsin Wahid   Member
Associate Professor of Pathology, DIMC

Dr. Salman   Member
Assistant Professor, DCOB

The group was facilitated by **Prof. Kashif Shafique**, Director of ORIC, who supported the team throughout the process. Multiple meetings were held among the workgroup members and with the facilitator to draft the strategic plan. The process began with a SWOT analysis, which informed the identification of strategic goals based on key findings and Objectives and Key Results (OKRs). These goals were then shaped to align with the facility's long-term vision and objectives.
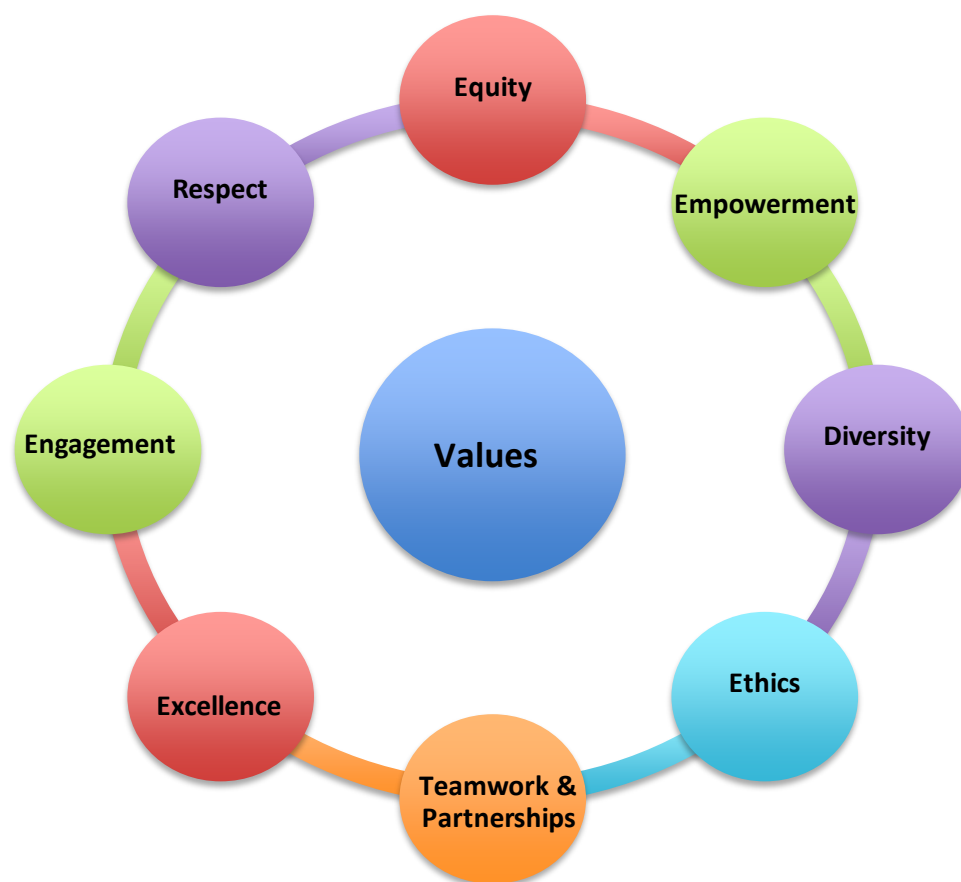
SECTION II: VISION, MISSION & VALUES

VISION

To be a pre-eminent academic institution committed to changing and saving lives.

MISSION

Providing outstanding patient-centered education, training, and clinical care informed by cutting-edge research and innovation generating and disseminating new knowledge.

VALUES

- Customer Service
  - o Put students first
- Empathy & Compassion
  - o Understand before you judge
  - o Be concerned for the sufferings and misfortunes of others

- Excellence
    - Be the best and commit to exceptional quality and service
- Innovation
    - Encourage curiosity, imagine, create, and share
- Teamwork
    - Engage and collaborate
- Integrity & Leadership
    - Be a role model and influence others to achieve their best
    - Have the courage to do the right thing
    - Hold yourself and others accountable
- Respect & Collegiality
    - Be kind
    - Listen to understand

Value different opinions

STATEMENT Of PURPOSE

To lead in molecular genetics and genomics through cutting-edge research, advanced diagnostic services, and innovative technologies for personalized medicine.

SECTION III: ASPIRATIONAL INSTITUTIONS

- Cambridge Genomic Services, UK

- West German Genome Center, Germany

- Aga Khan University Hospital

- National Human Genome Research Institute (NHGRI)" for benchmarking international best practices.

SECTION IV: STRATEGIC GOALS

Goal I: To offer diagnostic services using sequencing platforms including NGS and Sanger sequencing.

Objective 1: To initiate NGS based testing at the DUHS.

Goal II: To offer research services in the field of Genomic Sciences.

Objective 1: To contribute new knowledge in the field of Genomics.

Goal III: Utilization of the facility as a training center to upscale country-wide capacity building in the field of Genomics.

Objective 1: To provide training in the field of Genomics and on Molecular Diagnostics.

Goal IV: Recruit, retain, educate and train quality workforce in strategic areas of need.

Objective 1: To recruit relevant and skilled workforce.

Goal V: Expand and sustain the diagnostic services across all provinces of Pakistan.

Objective 1: To offer NGS based diagnostic as well as research-based testing as a centralized lab for testing

Goal VI: Strategic development of innovative projects and programs that are of commercial importance and provide enduring fiscal sustainability.

Objective 1: To model and design self-suitability via various approaches including funding, philanthropy etc.

Goal VII: To Deploy AI to analyze NGS data for faster, more accurate variant annotation.

Objective 1: To generate AI powered algorithms to analyze NGS produced datasets

Goal VIII: To Integrate cloud computing for collaborative genomic research and secure data sharing.

Objective 1: To generate AI powered algorithms to analyze NGS produced datasets

OBJECTIVES, OKRs & KPIs

Goal 01: To offer diagnostic services using sequencing platforms including NGS and Sanger sequencing.							
Goal Statement: To establish advanced diagnostic services through NGS and Sanger sequencing for reliable molecular diagnostics.							
Objectives & Key results (OKRs)							
Objective 1: To initiate NGS based testing at the DUHS							
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline
To initiate NGS based testing at the DUHS.	KR1: Finalize and validate at least one NGS testing panel with SOPs	KPI 1: Development and validation of NGS testing panels and relevant SOPs	No. of tests performed	50 tests/year	HoDs, Finance Directorate, VC office	Kits & consumables	yearly

Goal 02: To offer research services in the field of Genomic Sciences.							
Goal Statement: To drive innovative research and contribute new knowledge in genomic science.							
Objectives & Key results (OKRs)							
Objective 1: To contribute new knowledge in the field of Genomics							
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline
To contribute new knowledge in the field of Genomics	Development of Research proposals, SOPs and collaborations	Number of research grants/collaborations & publications from the facility	No. of research activities/publications/seminars/collaboration	2 per year	HoDs, Finance Directorate, VC office	Funding for research	yearly

Goal 03: Utilization of the facility as a training center to upscale country-wide capacity building in the field of Genomics.							
Goal Statement: To develop a national training hub for upskilling professionals in genomics and molecular diagnostics.							
Objectives & Key results (OKRs)							
Objective 1: To provide training in the field of Genomics and on Molecular Diagnostics							
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline
To provide training in the field of Genomics and on Molecular Diagnostics	Generation of trained workforce	Number of training events and individuals trained at the facility	No. of sessions arranged	2 per year	HoDs, Finance Directorate, VC office	Funding for event management	yearly

Goal 04: Recruit, retain, educate and train quality workforce in strategic areas of need.							
Goal Statement: To recruit and develop a skilled workforce in genomic sciences to support research and diagnostics.							
Objectives & Key results (OKRs)							
Objective 1: To recruit relevant and skilled workforce							
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline
Recruiting relevant and skilled workforce	Staff hiring and setting up appropriate workforce	Number of staff and faculty at the facility	No. of staff hired	5 skilled staff	HoDs, Finance Directorate, VC office	Funding for hiring	yearly

Goal 05: Expand and sustain the diagnostic services across all provinces of Pakistan							
Goal Statement: To provide NGS based testing (both diagnostic and research based) all across the country.							
Objectives & Key results (OKRs)							
Objective 1: To offer NGS based diagnostic as well as research-based testing as a centralized lab for testing							
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline
To offer NGS based diagnostic as well as research-based testing as a centralized lab for testing	Become a center of NGS testing	NGs tests from outside DUHS	Number of tests performed	At least 20 NGS based tests in the first half of the year 2026	HoD	Diagnostics test queries & Research grants to researchers for performing the tests	Half yearly

Goal 06: Strategic development of innovative projects and programs that are of commercial importance and provide enduring fiscal sustainability.							
Goal Statement: To create commercially viable projects ensuring long-term fiscal sustainability through diverse funding approaches.							
Objectives & Key results (OKRs)							
Objective 1: To model and design self-suitability via various approaches including funding, philanthropy etc.							
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline
To model and design self-suitability via various approaches including funding, philanthropy etc.	Revenue generation and self-sustainability	Revenue generation, funding, philanthropic aid	amount of funding received via various resources	enough for performing NGS tests as outlined in goal 1	HoD and VC office	Funding for performing tests	yearly

Goal 07: To deploy AI to analyze NGS data for faster, more accurate variant annotation							
Goal Statement: To develop in-house variant annotation and detection pipelines powered by AI.							
Objectives & Key results (OKRs)							
Objective 1: To generate AI powered algorithms to analyze NGS produced datasets							
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline
To develop in-house variant annotation and detection pipelines powered by AI.	Establishment of diagnostic and research pipelines powered by AI	AI powered algorithm effective and functional	Number of tests analyzed using the algorithm	All tests performed by the end of 2026 to be analyzed by these pipelines	HoD, consultants & technical teams	Achieving this objective is primarily dependent on the provision of required IT expertise. It is therefore by-enlarge dependent on provision of required/relevant IT infrastructure and human resource	yearly

Goal 08: To integrate cloud computing for collaborative genomic research and secure data sharing							
Goal Statement: To establish cloud-based data storage which is secure for sharing and international collaboration.							
Objectives & Key results (OKRs)							
Objective 1: To generate AI powered algorithms to analyze NGS produced datasets							
Objective	Key Results	KPI	Measurement Method	Target	Person Responsible	Resource Requirement	Timeline
To integrate cloud computing for collaborative genomic research and secure data sharing	Establishment of diagnostic and research cloud-based data storage and sharing	Functional cloud-based storage and sharing system	Quantity of data being stored at the cloud	All tests performed by the end of 2026 to be store at the cloud	HoD, consultants & technical teams	Achieving this objective is primarily dependent on the provision of required IT expertise. It is therefore by-enlarge dependent on provision of required/relevant IT infrastructure and human resource	yearly

SECTION V: RESOURCE PLANNING FOR ACHIEVING STRATEGIC GOALS

It is evident that appropriate resource planning is inevitable for any institution striving to achieve its goals. Importantly, the cost of reagents and consumables involved in a Genomic facility are on a very higher side posing a major challenge of sustainability. It is therefore very important to devise strategies for viable resource utilization. To do so, the following steps will be undertaken,

- Establishment of priorities for expenses which are informed and guided by (i) the strategic goals and plan, (ii) physician/researcher demands.

- Efficient utilization of available resources.

- Appreciation of extramurally funded projects, particularly for research.

- Looking for alternate funding opportunities, including collaborations, donations, and philanthropy.

- Adopt cloud-based genomic platforms to reduce infrastructure costs and scale operations efficiently."

SECTION VI: IMPLEMENTATION & MONITORING OF THE STRATEGIC PLAN

A strategic plan without implementation and monitoring is a static document. It is therefore highly relevant to identify monitoring matrix so that the implementation and execution of the plan can be timely and periodically evaluated.

To monitor the progress of this strategic plan, regular meetings (6 monthly) will be held amongst the committee members and progress reports will be submitted to higher authorities. Transparency and merit will be always advocated, and efforts will be made to establish a designated unit within the facility to monitor and evaluate the implementation of strategic plan. A dashboard powered by AI will be implemented to track KPIs, test performance, and resource utilization, ensuring proactive adjustments.

SECTION VII: LIST OF APPENDICES

No.	DESCRIPTION
A	SWOT ANALYSIS
B	TOWS MATRIX

APPENDIX A: SWOT ANALYSIS

STRENGTHS	WEAKNESSES
1. Hi-Tech and latest equipment. 2. Infrastructure. 3. Supportive leadership. 4. Already established diagnostic set up in the form of DDRRL. 5. Existing infrastructure is well-suited for AI integration in genomic analysis.	1. Lack of dedicated and appropriate number of staff. 2. Expensive reagents and consumables. 3. Availability of funding and self-sustainability. 4. Unknown Market Perception.
OPPORTUNITIES	**THREATS**
1. Industrial linkages and commercialization. 2. Personalized medicine opportunities. 3. Research opportunities including Whole Exome and Whole Genome Sequencing. 4. Academic and training opportunities for researchers and students across the country. 5. Expand into AI-driven drug discovery and CRISPR-based therapies.	1. Low pay scale for staff. 2. Competitors undertaking sequencing using different platforms other than Illumina.

APPENDIX B: TOWS MATRIX

	OPPORTUNITIES	THREATS
	1. Industrial linkages and commercialization. 2. Personalized medicine opportunities. 3. Research opportunities including Whole Exome and Whole Genome Sequencing. 4. Academic and training opportunities for researchers and students across the country. 5. Expand into AI-driven drug discovery and CRISPR-based therapies.	1. Low pay scale for staff. 2. Competitors undertaking sequencing using different platforms other than Illumina.
STRENGTHS	**SO**	**ST**
1. Hi-Tech and latest equipment. 2. Infrastructure. 3. Supportive leadership. 4. Already established diagnostic set up in the form of DDRRL. 5. Existing infrastructure is well-suited for AI integration in genomic analysis.	1. Use advanced technology and existing infrastructure to expand into personalized medicine, integrating AI and genomic analysis. 2. Utilize the established diagnostic setup (DDRRL) and supportive leadership to foster research opportunities, including Whole Exome and Whole Genome Sequencing. This can also be leveraged for academic training and development across the country. 3. Use existing genomic infrastructure to integrate AI and support CRISPR-based	1. Differentiate from competitors who use different sequencing platforms by emphasizing the precision and reliability of Illumina technology and integrating AI for better outcomes in genomic analysis. 2. Combat low pay scales for staff by offering a work environment with supportive leadership, career development, and opportunities to engage in cutting-edge genomic research and AI projects.

WEAKNESSES	WO	WT
therapies, drive innovative medical solutions and push forward industrial linkages and commercialization. (above, in upper row)		
	1. Capitalize on the academic and training opportunities to address the lack of a dedicated and appropriate number of staff. Collaborate with universities and research institutions to train the next generation of genomic researchers and technicians. 2. Tap into industrial linkages and commercialization opportunities to secure additional funding, ensuring self-sustainability and resolving the issue of expensive reagents and consumables. 3. Leverage research opportunities and collaborations to improve market perception and raise awareness about the quality and potential of the diagnostic services and technologies in use.	1. Address the staffing issue by exploring cost-effective staffing solutions and retention strategies while dealing with the threat of low pay scales. This could include offering non-monetary benefits like career development or research grants. 2. With expensive reagents and consumables, consider optimizing resource allocation or establishing partnerships for bulk buying to lower costs, ensuring that financial sustainability is maintained. 3. Diversify the genomic analysis offering by introducing other platforms or AI integration, mitigating the threat posed by competitors who are using different sequencing platforms.