DOW INSTITUTE OF RADIOLOGY
(DIR)
DOW UNIVERSITY OF HEALTH SCIENCE

STRATEGIC PLAN

(2024 – 2027)

Pioneering Excellence | Inspiring Innovation

To Heal | To Educate | To Discover


بسم الله الرحمن الرحيم

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DIRECTOR'S MESSAGE

Prof. Dr. Nasreen Naz
Head of Department
Dow Institute of Radiology

Since its establishment in 2009, the Dow Institute of Radiology at DUHS has stood as a beacon of excellence in education, research, patient care, and service provision. It is with great privilege and honor that I acknowledge the unwavering dedication of our institute to these core principles. Our mission is clear: to advance the field of radiology through innovative imaging techniques, compassionate patient care, and cutting-edge research initiatives.

At the heart of our department lies a steadfast commitment to providing exceptional diagnostic and interventional radiology services to our patients. We strive to leverage the latest technological advancements to ensure accurate and timely diagnoses, all while prioritizing the safety and comfort of our patients. I am proud to lead a team of distinguished faculty, technologists, and support staff who work collaboratively to uphold the highest standards of care for every individual who walks through our doors.

Education stands as a cornerstone of our department's ethos. We are deeply committed to training the next generation of radiologists, technologists, and healthcare professionals through comprehensive educational programs. Whether through residency training, fellowship opportunities, or continuing education initiatives, our goal is to equip learners with the knowledge, skills, and ethical principles necessary for success in the field of radiology.

Our state-of-the-art equipment ensures precision and clarity in every examination, ranging from conventional X-ray, Fluoroscopy and Ultrasound to advanced modalities such as MRI, CT scan, and interventional procedures, all offered at very nominal rates.

Furthermore, research is integral to our mission as we continually strive to push the boundaries of knowledge and innovation in radiology. Our faculty and trainees engage in a diverse range of research endeavors, from basic science investigations to clinical trials and translational studies. Through collaboration and interdisciplinary partnerships, we seek to translate scientific discoveries into tangible improvements in patient care and outcomes.

Looking ahead, our department remains committed to fostering a culture of excellence, collaboration, and continuous improvement. We are dedicated to advancing the practice of radiology, embracing new technologies and methodologies, and adapting to the evolving needs of our patients and the broader healthcare landscape.

In summary, the Dow Institute of Radiology at DUHS is driven by a shared commitment to excellence in patient care, education, and research. We are proud to be at the forefront of advancing the field of radiology and improving the lives of those we serve.

EXECUTIVE SUMMARY

The Dow Institute of Radiology (DIR) at DUHS has embarked on a comprehensive strategic planning process aimed at fortifying our position as a leading institution in education, research, patient care, and service provision in the field of radiology. With a steadfast commitment to excellence and innovation, our strategic plan delineates a roadmap to propel our institute forward while embracing emerging opportunities and challenges.

Our strategic priorities are anchored in four key areas. Firstly, Clinical Excellence is central to our mission. We are dedicated to providing exceptional diagnostic and interventional radiology services to our patients. By integrating state-of-the-art technology and a dedicated team of professionals, we aim to ensure precise, timely, and compassionate care, prioritizing patient safety and comfort at every juncture.

Secondly, Education and Training stand as cornerstones of our institute's ethos. We are committed to nurturing the next generation of radiologists, technologists, and healthcare professionals through comprehensive educational programs. Through expanding residency training, fellowship opportunities, and continuing education initiatives, we endeavor to equip learners with the knowledge, skills, and ethical principles essential for success in the dynamic field of radiology.

Thirdly, Research and Innovation drive advancements in our field. From basic science investigations to translational studies, our diverse research endeavors aim to translate scientific discoveries into tangible improvements in patient care and outcomes. Our strategic plan emphasizes fostering a culture of inquiry and innovation while nurturing collaborative partnerships to maximize impact.

Lastly, Operational Efficiency is crucial in delivering high-quality care. Our plan highlights the optimization of processes and workflows. By leveraging technology and adopting best practices, we aim to enhance the quality, safety, and efficiency of service provision, ensuring optimal outcomes for our patients and stakeholders.

Looking ahead, our strategic plan underscores our unwavering commitment to fostering a culture of excellence, collaboration, and continuous improvement. We are dedicated to advancing the practice of radiology, embracing new technologies and methodologies, and adeptly responding to the evolving needs of our patients and the broader healthcare landscape.

In summary, the strategic plan of the Dow Institute of Radiology at DUHS articulates our vision for the future, rooted in a shared commitment to excellence in patient care, education, research, and service provision. Through strategic alignment, innovation, and collaboration, we are poised to navigate the complexities of the healthcare landscape while remaining at the forefront of advancing the field of radiology.

ABOUT THE INSTITUTE

The Radiology Department, initially established as the Dow Radiology Complex on 6th June 2009, underwent significant development, culminating in the establishment of the Dow Institute of Radiology on 28th February 2012. The formal approval for the institute was granted during the 64th Academic Council meeting on 9th September 2015. Subsequently, additional outreach campuses were established to facilitate local public, including the LEJ Campus on 25th December 2014 while the NCC Campus on 16th March 2016, and the MALIR Campus in 2018.

The transformation from a department to an institute marks a milestone in its evolution. Equipped with cutting-edge technology, the institute offers a range of diagnostic modalities such as Advanced MRI, CT scan, X-ray, Mammography, DEXA scan, Ultrasound, and VIR. These facilities enable the provision of prompt and dedicated services, delivering accurate diagnosis reports for various diseases at competitive rates accessible to the public.

In addition to its main campus, the institute has expanded its reach through satellite campuses, including the LEJ Campus, Nazimabad Campus, Malir Campuses, and Ultrasound facility at Hussainabad DOW Lab, strategically positioned to serve local communities.

The Dow Institute of Radiology offers a spectrum of educational programs aimed at training professionals in the field, , including Fellowship of College of Physicians and Surgeons (FCPS) introduced in 2009, Diploma in Medical Radiology and Diagnosis (DMRD) initiated in 2012, MD program established in 2014 and Bachelor of Science in Radiological Technology (BSRT) launched in 2016, These programs contribute to the institute's mission of advancing radiological education, research, and clinical practice.

INTRODUCTION AND OVERVIEW

The Dow Institute of Radiology endeavors to set the benchmark in healthcare services, diagnostic capabilities, and knowledge dissemination. Our distinguished faculty, experienced sonologists, technologists, trainees, and postgraduates, are recognized as some of the most accomplished individuals in the field of Radiology.

At Dow Institute of Radiology, we provide a dynamic and innovative environment for work and training, ensuring accessibility and personalized care for all healthcare needs. Our mission at DIR is succinct yet profound: " "To bring scientific advances in medical imaging to clinical application" This guiding principle underscores our commitment to bridging the gap between cutting-edge research and practical healthcare delivery, ultimately benefiting patients and medical practitioners alike.

ACCOMPLISHMENTS IN THE LAST THREE YEARS

CLINICAL SERVICE ACHIEVEMENTS:

I. Enhancement in Services:

II. In MRI: Introduced New Procedures / Protocols

Gamma Knife MRI Services In DIR-DUHS, OJHA Campus

- MRI Thorax With & Without Contrast
- MRI Neuronavigation With Contrast
- MRA Thoracic Aorta with And Without Contrast
- MRA Abdominal Aorta with And Without Contrast
- MRI Pelvis without Contrast for MSK Protocol
- MRI Pelvis with And Without Contrast for MSK Protocol
- MRI Lumber Pluxes with & Without Contrast
- MRI Brain Perfusion
- MR Spectroscopy Evaluation

A. In Intervention Radiology

- Soft Tissue Injection Sclerotherapy
- Microwave Ablation of Soft Tissue Tumor

B. In Ultrasound:

- Joints Ultrasound

C. Breast Imaging

- Liga Clip Placement for Breast masses before Chemotherapy
- US Guided Breast Needle Localization

III. Extension of Services:

- Started Ultrasound Services in Evening and Sundays at:
- Main Ojha Campus
- LEJ Campus
- NCC Campus

IV. New Radiology Services to facilitate more patients at:

- Established Dedicated Breast Imaging Section, Inaugurated by Health Minister Dr. Azra Fazal Pechuho on December 20, 2024.
- Established A New Seminar Hall, 70-seat seminar hall was built in 2024 for educational activities.
- Trauma Radiology:24/7 Radiology Services including:
  X Rays, ultrasound, Bi-Plane angiography, CT and MRI
- OICD OJHA Campus: CT scans and Ultrasound facilities
- New OPD –DUHS: Ultrasound and X-Ray Services
- Ultrasound Services in Hussainabad and Khayban-e-Jami Dow Lab
- OPG Services at DIR OJHA Campus and NCC Campus.

V. Promotion and discounts to facilitate more visiting patients:

- Mammography in the Month of October
- Underprivileged located Radiology Malir Campus
- 10% Discount on CT plain study and MRI screenings

VI. Developed new sops for better patients' centeredness and quality service

- Information counter to meet and greet as well as to guide the patients
- Queue Management System (QMS) to maintain patient's flow
- The appointment system for MRI contrasts to minimizing waiting time

- 24/7 communication services via WhatsApp to facilitate patients
- Implementation of HMIS efficient source of data storage and retrieval
- Patient portal where all reports can be accessed online

VII. Initiate and approved Incentive Plan for DIR department in Year 2022

VIII. Refund Policy of DIR Studies (Inpatients/ Outpatients) in Year 2022

ACADEMIC ACHIEVEMENTS:

I. Improve Academic Program By:
- Revised Curriculum of UG (BSRT) and PG (DMRD)
- Assessment Method Improved by Introducing:
  - MINI- IPX
  - RAD- DOPS

II. Initiated Fellowship in Neuro Imaging first time in public sector institute

III. Enhanced Research work
- 2021 to 2024 = 61 Research Publications
- 2016 to 2020 = 42 Research Publications

IV. Continuing Medical Education (CME) presentations / lectures

V. Conducted Workshops and Seminars at Different Occasions e.g. Breast Screening seminars / workshop

VI. The International Symposium on emergency Radiology was held on 18th June 2023 along with Pre-Symposium ultrasound hands on Workshop (Acute Emergency cases, Emergency Gynae & Obs, Emergency MSK, and VIR Procedure) that was held on June 17, 2023.

VII. DIR received a Grant of 1.4 million received from SHEC to conduct above International Symposium.

STUDENT ACHIEVEMENTS:

Recognition in Leadership

- Tooba Malik (BSRT student) completed a leadership course on October 30, 2024.
- Tuba.....

Award-Winning Research.

- BSRT students secured first prize at Health Asia 2024 for research on radiology technologist-patient interactions.
- Full Scholarship (100%) Received by our two students of BS in Radiologic Technology- Batch of 2022, master's in medical Imaging and Radiological Science at Chang Gung University in Taiwan

GRADUATION RATE:

BSRT Students: 133 out of 135 (98.5 %)

Graduation rate above 98%

FACILITIES AT DIR:

I. Academic Facilities:

- Full-time Program Coordinators / office staff with computer, printer and intercom.
- Three seminar rooms available for all academic programs.
- Multimedia and Projector, for short video lectures and for power point presentations.
- Structured curriculum and Well-articulated timetable for all academic programs.
- For clinical practicum workstations available in MRI, CT, X-ray, Fluoroscopy, Mammography, Ultrasound, DEXA and Angiography machines these facilities utilized by students for hands on practice.
- Central library available books and journals.
- Departmental library is available for Radiology cases.
- Digital library is available for E-access for books and journals.

Facilities	Classrooms are equipped with:	The adequacy of faculty offices
• Seminar Halls: 03 • Computer Labs 01 • Departmental Library • Rest room	• Automatic Multimedia Projectors • Computer Systems with UPS backup and speedy Internet connection • ACs and Fans • Sound System • Whiteboards • Comfortable Chairs	All faculty members have the following facilities • Allocated offices and cubicles • Reporting air-conditioned hall for the faculty and residents with Barcode monitors and PACS system • Computer and Internet facility • Landline extension • Shelves and stationery

II. Equipment Facilities:

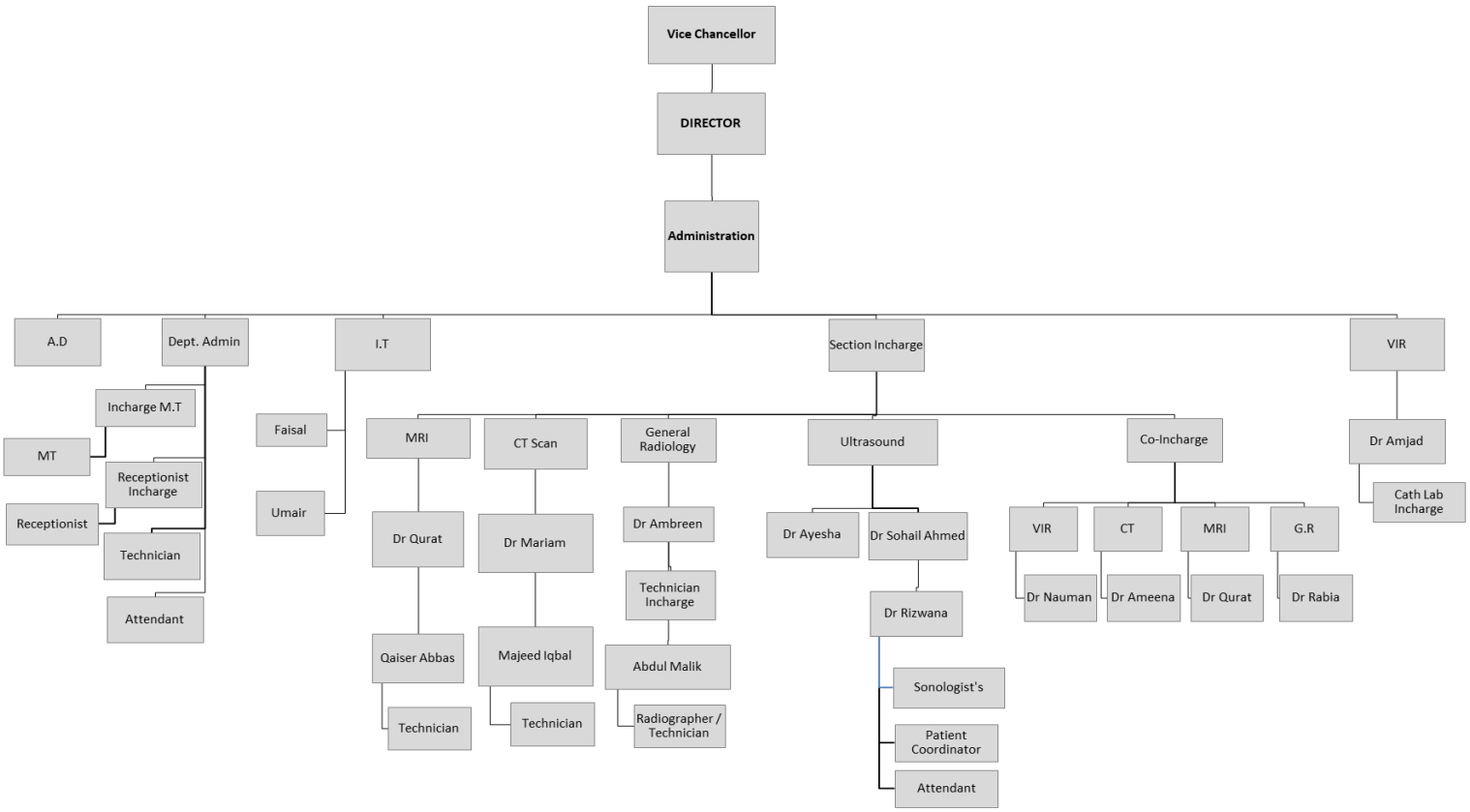
S. No	Equipment Name	Machine	Location	Qty	Total Quantity
1	Magnetic Resonance Imaging (MRI)	1.5 T General Electric	OJHA Campus (updated System)	1	8
			Trauma Center (New Machine)	1	
			LEJ Campus (New Machine)	1	
		0.4 T Hitachi	OJHA Campus	1	
			LEJ Campus	1	
		0.25 T Hitachi	OJHA Campus (New Machine)	1	
			Malir Campus (New Machine)	1	
			Nazimabad Campus (New Machine)	1	
2	Vascular Interventional Radiology	Artis 1 Siemens	OT Complex	1	2
		Angiography Toshiba		1	
3	Computed Tomography (CT scan)	16 Slice General Electric	OJHA Campus	1	6
		128 Slice GE	Campus	1	
		16 Slices Hitachi	Nazimabad Campus	1	
		192 Slices Siemens	Trauma Center	1	
		128 Slice CT Siemens	OJHA Campus	1	
		16 Slices Toshiba	Trauma Center	1	
4	X-Ray	Conventional	OJHA Campus (Main radiology)	3	20
			Nazimabad Campus	1	

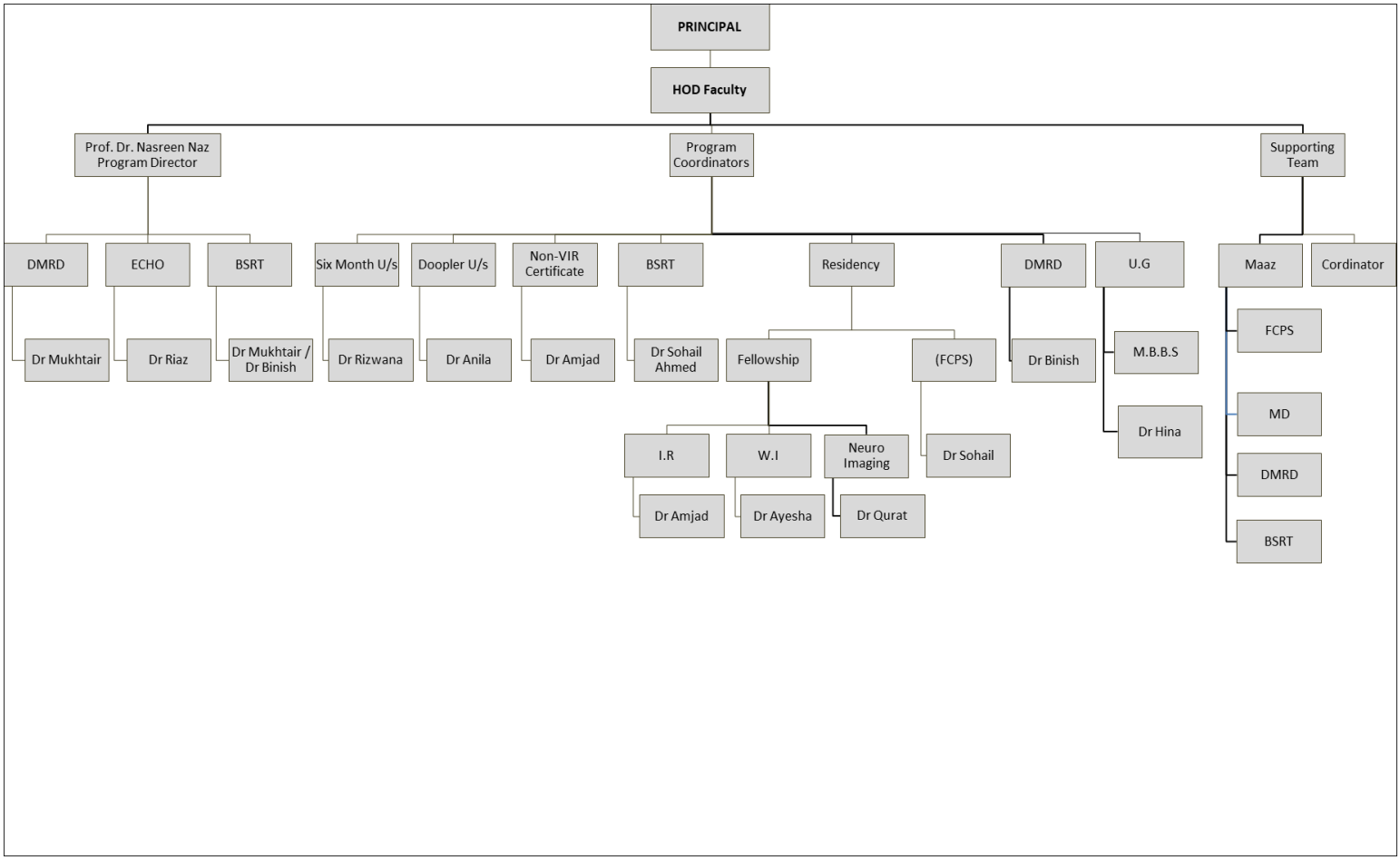
			Malir Campus	1	
			OPD Block	1	
			Trauma Center	1	
			DHA Campus	1	
			LEJ Campus	1	
		Fluoroscopy	OJHA Campus	1	
			NILGID	1	
		C-ARM	NILGID	1	
			OT Complex	2	
		Bi-Plane Angiography	Trauma Radiology	1	
		Portable	DUH, OJHA	4	
			OT Complex	1	
			DUH, ICU	1	
5	Mammography	Hologic Machine	OJHA Campus	1	3
		Siemens	LEJ Campus	1	
		GE 3D Mammo	OJHA Campus (NEW)	1	
6	Dexa Scan	General Electric	OJHA Campus	1	1
7	O.P.G & Cephlo machine	Owandy, I max Touch	OJHA Campus, DIR	1	2
			Nazimabad Campus	1	

III. Services and Procedures:

Available at DIR website with name, charges, instructions and location.

INSITUTIONAL ORGANOGRAM




PRINCIPAL
HOD Faculty
Prof. Dr. Nasreen Naz
Program Director
Program Coordinators
Supporting Team
DMRD
ECHO
BSRT
Six Month U/s
Doopler U/s
Non-VIR Certificate
BSRT
Residency
DMRD
U.G
Maaz
Cordinator
Dr Mukhtair
Dr Riaz
Dr Mukhtair / Dr Binish
Dr Rizwana
Dr Anila
Dr Amjad
Dr Sohail Ahmed
Fellowship
(FCPS)
Dr Binish
M.B.B.S
Dr Hina
FCPS
MD
DMRD
BSRT
I.R
W.I
Neuro Imaging
Dr Sohail
Dr Amjad
Dr Ayesha
Dr Qurat

NUMBERS OF FACULTY & STAFF:

S. No	Designation	QTY
1	Professor	01
2	Associate Professor	02
3	Assistant Professor	13
4	Senior Instructor	05
5	Senior Registrar	05
7.	Lecturer	01
8.	Sonologist	23
9.	Admin Incharge Evening	01
10.	Administrative Officers	04
11.	Assistant Administrative Officers	03
12.	Accountant	01
13.	Academic Coordinators	02
14.	Technicians/ Technologists	50
15.	Radiographers	21
16.	Patient Coordinator	2
17.	Receptionists	44
18.	Attendant	37
19.	Medical Transcriptionist	08
20.	Clerks	02
21.	Medical Physicist	01
22.	Warehouse In charge	01
23.	Aid nurse	03
21	Peon	3

SECTION I: OVERVIEW OF THE STRATEGIC PLANNING PROCESS

Given the fact that DUHS is the largest and most comprehensive health sciences institution in Pakistan, we share an unprecedented responsibility and enormous potential to continue to shape the future of health care in this region. Accordingly, Professor Muhammad Saeed Quraishy, Vice Chancellor, DUHS mandated that all key stakeholders in the University and the community be involved in the development of this Master Strategic Plan. The Executive Strategic Planning Workgroup (see below) was therefore constituted with this mandate in sight and the process of development of this Plan was informed and influenced not only by their active participation but also the valuable feedback that was actively sought from the faculty, staff, students, and members of this community.

The following guiding principles were used in the development of this Master Strategic Plan, and it is anticipated that this will be incorporated within the planning process that will be subsequently employed by various academic and administrative units in the development of their own complementary strategic plans. It was envisioned that the Plan should be:

- Consistent with and contribute to the achievement of the DUHS's vision, mission, and core values
- Developed in a participative and collaborative manner and shared with all key stakeholders
- Reflect high but achievable and realistic aspirations as well as demonstrate creativity and innovation in setting forth goals and strategic thrusts for the University
- Based on measurable goals and strategies and include appropriate performance metrics
- Take into consideration available resources
- Include a component on objective monitoring/evaluation

A key component of the planning process was its genesis and review by a knowledgeable and appropriately constituted Executive Strategic Planning Workgroup1. This review process ensured that all plans were conceptually and structurally sound, demonstrate high aspirations, creativity and innovative thinking, and contribute to the accomplishment of overall

University goals. Recognizing both the time constraints of the planning schedule and the diversity of issues faced by a rapidly expanding University, the overall intent of this process was to keep it as simple as possible and provide appropriate flexibility in achieving the stated goals.

Membership of the Strategic Planning Workgroup:

i. Prof Dr Nasreen Naz ..... Chairperson
(Director & HOD, DIR)
ii. Ms. Rahila Arshad Ali ..... Member
(Administrative officer)
iii. Mr. Maaz Shamsi ..... Member
(Academic officer)
iv. Miss Bisma Fatima ..... Member
v. Tuba Karim ..... Co-Member
(BSRT Student)
vi. Dr. Arfa ..... Co-Member
(FCPS Resident)
vii. Mr. Saqib ..... Co-Member
(Technologist)

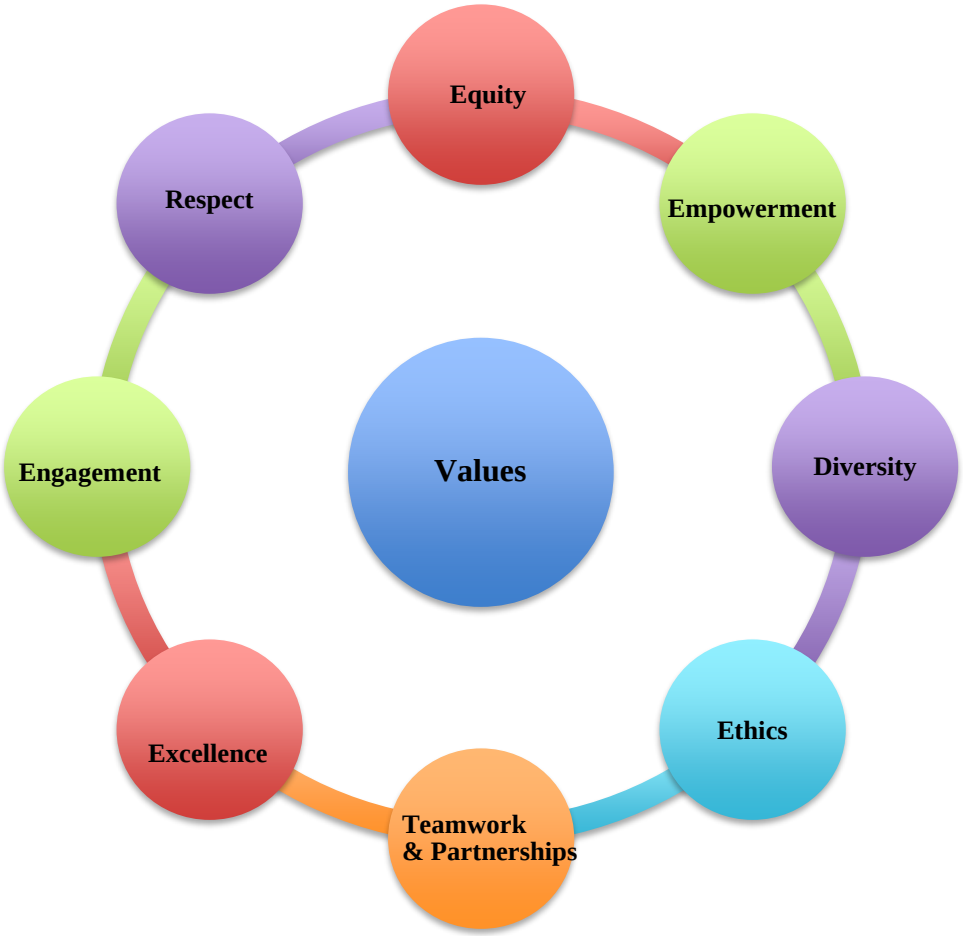
SECTION II: VISION, MISSION & VALUES

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
  - Put students first
- Empathy & Compassion
  - Understand before you judge
  - 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:

The Dow Institute of Radiology aims to provide top-tier medical imaging services while advancing research and education in the field of radiology. Through state-of-the-art facilities, practical clinical experience, and a commitment to innovation, we strive to produce skilled professionals who contribute to the improvement of healthcare outcomes globally and to achieve goals and objectives of DUHS.

SECTION III: ASPIRATIONAL INSTITUTIONS

REGIONAL: The Aga Khan University (AKU):

Aga Khan University Hospital is renowned for its world-class quality healthcare, expertise, advanced technology, research & innovation, patient-centeredness care along with international recognition.

Overall, aspiring to be treated at AKUH means placing your health in the hands of a trusted institution known for its commitment of excellence.

INTERNATIONAL: John Hopkins:

Johns' Hopkins hospital is a pioneer in medical advancement, credited with many groundbreaking discoveries and innovations in various fields of medicine. People are inspired by Johns Hopkins because of its unwavering commitment to excellence, innovation and compassionate patient care making it a beacon of hope and healing for individuals facing complex medical challenges.

SECTION IV: STRATEGIC GOALS

Goal 1: **Enhance Quality Care and Patient Satisfaction.**

Objective 1: Establish Effective Communication Channels.

Objective 2: Improve clinical documentation.

Objective 3: Strengthen Patient Confidentiality and privacy

Objective 4: Maintain a safe and clean environment.

Goal 2: **Excel in Education and Research.**

Objective 1: Nurture Educational Excellence.

Objective 2: Promote Lifelong Learning via (CME) Programs.

Objective 3: Foster Interdepartmental Collaboration.

Objective 4: Encourage Research, Innovation.

Goal 3: **Enhancement in Technology and Training**

Objective 1: Integration of Cutting-Edge Technologies

Objective 2: Offer Comprehensive Training programs.

Objective 3: Enhancement in Educational activities

Goal 4: **Increase Operational Efficiency**

Objective 1: Increase Staff Productivity and Equipment Utilization

Goal 5: **Upgrade and Maintain Advanced Radiology Equipment.**

Objective 1: Maintaining and optimizing advanced radiology equipment.

Objective 2: Collaborating with marketing for service promotion.

Goal 6: **Enhance Community Radiology Services.**

Objective 1: Raise public awareness and educate communities about common health issues to improve overall health outcomes.

Objective 2: Establish more peripheral centers to less privileged areas.

OBJECTIVES OKRs & KPIs

Strategic Goal 1: Enhance Quality Care and Patient Satisfaction							
Goal Statement: Provide high-quality care, foster patient satisfaction, and ensure a safe, confidential, and well-communicated healthcare experience.							
OKR (Objective and Key Results)							
Objective 1: Establish Effective Communication Channels							
Objective	**Key Results**	**KPI**	**Measurement Method**	**Target**	**Person Responsible**	**Resource Requirement**	**Timeline**
Implement standardized communication protocols for patients, faculty, and staff. (Prepare SOP Document staff training).	KR 1.1: Streamlined workflow	Training & feedback to implement communication protocols.	Regular tracking and document protocol implementation in each section using checklists and reports.	100% implementation on SOPs	Admin Officers, IT officers, Quality Assurance Officer, Section Incharges, Faculty, IT Support.	Online Reporting Tool and Data Analytics for protocol standardization - Collaboration with Audit Teams for protocol validation - Training for Section In-charges on new protocols	Bi-Annually
	KR 1.2: Improvement of staff communication						
Digitalization of workflow management systems, Electronic Health Record (EHR) system.	KR 1.3: Overall improve operational efficiency by the end of year	60% of staff trained by the end of Q2					
Objective 2: Improve clinical documentation.							
Objective	**Key Results**	**KPI**	**Measurement Method**	**Target**	**Person Responsible**	**Resource Requirement**	**Timeline**
Implement regular cleaning rounds, safety protocols, and staff training to maintain a hygiene and secure environment.	KR 2.1: Standardized procedure protocols and structured reporting by Q2.	Percentage of departments using standardized protocols.	System usage logs.	100 % implementation in upcoming years	Admin Officers, Section In-charge W&S	Online Reporting Tool and Data Analytics for protocol standardization - Collaboration with Audit Teams for protocol validation - Training tools	Quarterly
Conduct audit to continuously improve the working environment.		At least 2 audits to be conducted	Follow-up on audit reports.		Admin officers/ Patient Coordinator, QA Officer, W&S		Bi-Annually

Objective 3: Strengthen Patient Confidentiality and privacy							
Objective	**Key Results**	**KPI**	**Measurement Method**	**Target**	**Person Responsible**	**Resource Requirement**	**Timeline**
Regularly review and update patient confidentiality protocols.	KR 3.1: To maintain the integrity of a patient and trust development	80% Compliance rate with following confidentiality protocols by the end of Q1..	Policy review documentation.	100 % compliance in upcoming years	Section In-charge/ Admin Officers, Patient Coordinator	Internal & External Trainers with expertise in patient confidentiality - Standardized Guidelines for training content - Facilities for training sessions (e.g., meeting rooms, online platforms)	Quarterly
Train staff on the importance and methods of maintaining confidentiality during imaging procedures.		Regularly audit confidentiality practices during imaging procedures.	Confidentiality audit reports & Incident reporting system	100 % compliance in upcoming years	Section In-charge/ Admin Officers, Patient Coordinator	Online Audit Tool and Data Analytics for compliance monitoring - Section In-charges and Admin Officers trained in confidentiality auditing.	Quarterly
Objective 4: Maintain a safe and clean environment.							
Objective	**Key Results**	**KPI**	**Measurement Method**	**Target**	**Person Responsible**	**Resource Requirement**	**Timeline**
Standardize procedure protocols and structured reporting	KR 4.1: Conduct monthly safety and cleanliness audits in all radiology departments.	90 % Standardize procedure protocols and structured reporting by Q1.	System usage logs, Surveys/ Feedback, Follow-up on audit reports	100 % implementation	Radiology Leadership, Section in-charge/ Audit Team	Online Reporting System/ Dow Connect. Development and integration of an Online Reporting System	Quarterly

Strategic Goal 2: Excel in Education and Research							
Goal Statement: Promote educational excellence, encourage lifelong learning, foster interdepartmental collaboration, and support research and innovation.							
OKR (Objective and Key Results)							
Objective 1: Nurture Educational Excellence							
Objective	**Key Results**	**KPI**	**Target**	**Measurement Method**	**Person Responsible**	**Resource Requirement**	**Timeline**
Continuously review and update the curriculum in alignment with HEC and university guidelines.	KR 1.1: Updated curriculum as per standard guidelines	90% of curriculum updated by the end of 12 months	100 % compliance in upcoming years	Curriculum Integration Tracking, Faculty Training Records: Student Assessment Scores	Prog Director, Prog Coordinators, Academic Coordinator/ Faculty	- HEC and university guidelines documentation . - Time allocated for review meetings/ Data Analytics	Annual
Increased in departmental education activities e.g., MnM, Case discussion and journal club	KR 1.2: Knowledge enhancement	Monthly test, OSCE & Feedback	100 % implementation in upcoming years	Meeting records logs		Agenda Planning Tools, Meeting space - Audio-visual equipment - Meeting minutes documentation	
Objective 2: Promote Lifelong Learning via (CME) Programs							
Objective	**Key Results**	**KPI**	**Target**	**Measurement Method**	**Person Responsible**	**Resource Requirement**	**Timeline**
Organize Continuing Medical Education (CME) sessions, workshops, and hands-on training for faculty, technologists, and students.	KR 2.1: Professional development & capacity building	3 Number of CME sessions conducted by Q2.	6 CME Annually	Workshop/ Conferences schedules and feedback forms. Workshop/ Conferences attendance records.	Academic Coordinator, Admin Officers for logistics Faculty & Staff Workshop Facilitator - Technical Support, Academic Coordinator	Agenda Planning Tools, Meeting space - Audio-visual equipment - Meeting minutes documentation	Bi-Annual
		2 Number of hands-on workshops conducted by Q2	4 Hands on workshops Annually				

Objective 3: Foster Interdepartmental Collaboration							
Objective	**Key Results**	**KPI**	**Target**	**Measurement Method**	**Person Responsible**	**Resource Requirement**	**Timeline**
Conduct regular multidisciplinary meetings to nurture a culture of collaboration among departments.	KR 3.1: Increase knowledge and clinical care to improve clinical care	Data of multidisciplinary meetings conducted.	100 % implementation	Meeting records.	Director, Faculty, Administrative Officer, Academic Coordinator	Online tool (LMS), Data Analytics	Annual
Objective 4: Encourage Research, Innovation							
Objective	**Key Results**	**KPI**	**Target**	**Measurement Method**	**Person Responsible**	**Resource Requirement**	**Timeline**
Promote joint research projects and shared learning opportunities.	KR 4.1: Increased research publications and interdepartmental calibration	Joint project completed	Increase 40% publications annually	Monitor research group formation and analysis records.	HOD, Faculty, Research Coordinator	Research officer, Budget allocation for research faculty, Research Papers and Presentation Tools. Journal subscriptions	Annual
Support faculty and students in publishing research in reputable journals and presenting at conferences.	KR 4.2: Increased research publications and participation	increase the number of research publications and presentations in seminar		Publication records in reputable journals			
		Increase number of research grants/funding secured.	One grant annually	Funding approval documents.			

Strategic Goal 3: Enhancement in Technology and Training							
Goal Statement: Integrate cutting-edge technologies and provide comprehensive training to enhance educational and operational effectiveness.							
OKR (Objective and Key Results)							
Objective 1: Integration of Cutting-Edge Technologies							
Objective	**Key Results**	**KPI**	**Target**	**Measurement Method**	**Person Responsible**	**Resource Requirement**	**Timeline**
Upgrade imaging equipment to the latest standards.	KR 1.1: Enhancement of Imaging Quality, Increased operational efficiency and revenue	60 % of equipment was upgraded by the Q2.	80 % upgradation annually	Equipment inventory and upgrade logs.	Radiology. Procurement, Finance, BMED	Allocation of budget for purchasing or leasing advanced imaging equipment, Contracts with vendors. procurement and legal department support for contract management.	BI-Annually
Objective 2: Offer Comprehensive Training programs.							
Objective	**Key Results**	**KPI**	**Target**	**Measurement Method**	**Person Responsible**	**Resource Requirement**	**Timeline**
Offer hands-on workshops and application training on new imaging techniques and modalities.	KR 2.1: Trainees demonstrate improved proficiency in imaging techniques Professional Development	At least 2 workshops were conducted. By the end of Q2 70% Percentage of staff trained on new modalities by the end of Q2	4 to 5 Workshops Annually. 85 0% of staff trained on new modalities in upcoming years	Training schedules and attendance records.	Director, Faculty, Administrative Officer, Section In-charges	Collaboration with modality vendors for specialized training programs, allocation of staff time for training sessions, and development of training schedules that minimize disruption to daily operations.	Annual
Objective 3: Enhancement in Educational activities							
Objective	**Key Results**	**KPI**	**Target**	**Measurement Method**	**Person Responsible**	**Resource Requirement**	**Timeline**
Initiation of On Job Technologist Sunday prog	KR 3.1 Capacity Building	Number of admissions, Professional development	100% implementation by Q2	Monitoring attendance records and competency evaluations.	Director, Faculty, HR, Academic Officer	Budget allocation for Faculty and Academic coordinator	Annual

Strategic Goal 4: Increase Operational Efficiency							
Goal Statement: Optimize staff productivity and equipment utilization to enhance operational performance and service delivery.							
OKR (Objective and Key Results)							
Objective 1: Increase Staff Productivity and Equipment Utilization							
Objective	**Key Results**	**KPI**	**Target**	**Measurement Method**	**Person Responsible**	**Resource Requirement**	**Timeline**
Develop performance evaluation Forms to Monitor staff performance	KR 1.1: Increase in staff productivity by the end of every Quarter	80 % increase in staff productivity by the end of Q2	100 % productivity in upcoming years	Performance evaluation reports and productivity metrics.	Director, Faculty, Section in-charges, Admin officers	Training resources, performance tracking tools, Staff productivity tracking tools, performance evaluation software/ Service & Business Manager, Data Analytics	Bi-Annually
		Number of performance reviews conducted by the end of each quarter	100% implementation in upcoming years				
Optimize scheduling and resource allocation to maximize equipment utilization.	KR 1.2: Increase equipment utilization to 90% during peak hours by optimizing scheduling.	Variable, depends on workflow	90 % utilization in upcoming years	Scheduling software, equipment usage data		Resource allocation tools, patient scheduling data, Patient scheduling system, wait time tracking tools	
	KR 1.3: Reduce patient wait times		40% reduced in waiting time.	Data monitoring tools			

Strategic Goal 5: Upgrade and Maintain Advanced Radiology Equipment							
Goal Statement: Ensure the continuous maintenance and optimization of advanced radiology equipment while collaborating with marketing to promote services.							
OKR (Objective and Key Results)							
Objective 1: Maintaining and optimizing advanced radiology equipment							
Objective	**Key Results**	**KPI**	**Target**	**Measurement Method**	**Person Responsible**	**Resource Requirement**	**Timeline**
Develop and maintain effective relationships with vendors and manufacturers for timely upgrades and maintenance.	KR 1.1: Operational efficiency enhancement to provide quality services	Maintenance compliance rate.	Achieving 100% scheduled maintenance compliance	Resource requirement records	Director, Vendors, Section In-charge/ Bio Medical team, Admin Officers	Service & Business Manager, Budget allocation for routine and emergency maintenance contracts with certified vendors/ Accurate Schedules timeline in advance	Bi-annual
		Number of vendor partnerships established.		Vendor contracts and partnership agreements.		Legal and administrative support for contract negotiations and partnership agreements.	
Regularly calibrate and service equipment to ensure accurate imaging and diagnosis.		Percentage reduction in equipment downtime.	Reduce equipment downtime by 15%	Equipment with downtime records and service reports.		Continuous professional development for the biomedical team on advanced maintenance techniques.	
		Percentage of equipment calibrated and compliance with standards.	100 % compliance	Calibration records and compliance checks.		Service & Business Manager, Procurement of advanced diagnostic tools for equipment calibration and performance monitoring.	
Objective 2: Collaborating with marketing for service promotion							
Objective	**Key Results**	**KPI**	**Target**	**Measurement Method**	**Person Responsible**	**Resource Requirement**	**Timeline**
Work with the marketing department to showcase radiology services and technological advancements.	KR 2.1: Increase in operational efficiency and revenue enhancement	Number of campaigns, feedback	100% implementation in upcoming years	Campaign plans and launch metrics. Update logs. Marketing material records.	Director/ Marketing Representative / Admin officers	Service and business manager, Budget for creative agencies, digital marketing tools, and promotional materials. Data Analytics, Development of informational content, including videos and brochures, highlighting new technologies.	Quarterly

Strategic Goal 6: Enhance Community Radiology Services:							
Goal Statement: Increase public awareness of health issues and expand radiology services by establishing centers in underserved areas.							
OKR (Objective and Key Results)							
Objective 1: Raise public awareness and educate communities about common health issues to improve overall health outcomes.							
Objective	**Key Results**	**KPI**	**Target**	**Measurement Method**	**Person Responsible**	**Resource Requirement**	**Timeline**
Launching Social media Campaign Conducting Awareness sessions and workshops Introducing subsidized rates/discount campaigns	KR 1.1: Increase in patient turnover approx. 20%	Increase awareness and increase patient turnover by end of Q2	20% increase in patient turnover in upcoming years	Engagement metrics & track the numbers of lead	Radiology leadership, Marketing, HR, Finance IT	Budget for marketing campaign, marketing associate	Quarterly
	KR 1.2: Increasing community knowledge about common health problems		Conduct at least two sessions in a year	Feedback forms & referral Tracking	Radiology leadership, administration		Bi-Annual
Subsidize rates for evening CT / MRI	KR 1.3: Enhancement in overall population accessing quality imaging		20% discount in Q1	Analyze the number of new customers	Radiology leadership, Finance, Marketing		As Needed
Objective2: Establish more peripheral centers to less privileged areas.							
Objective	**Key Results**	**KPI**	**Target**	**Measurement Method**	**Person Responsible**	**Resource Requirement**	**Timeline**
Establish more peripheral Centers to less privileged areas	KR 2.1: Improved community health services and to cater to more patients	Increase in Numbers of centers and patients	At least two Ultrasound/ X-rays setup at the existing Laboratories in a year	Market survey, Tracking of service utilization data, Project data management	Radiology leadership, Marketing, HR, Finance IT, BMED	Business/ Service Manager, Budget allocation	Annual

SECTION V: RESORCE PLANNING FOR ACHIEVING STRATEGIC GOALS

With rapid change in technology investigation, there is a continuously changing demand in the field of radiology and imaging service.

- Resulting in advanced, and detailed systematic planning and organizing
- Having a foresight into future developments and requirements.

Visionary Planning for the Current Year:

I. Introducing new specialized services in Breast Imaging:
   1. Contrast-Enhanced Tomo
   2. Stereotactic Breast Biopsy
II. Establish executive radiology services to meet the needs of high-priority patients (Initiate premium radiology services for executives).
III. Opening of more ultrasound facilities with Dow Labs in different locations.
IV. Upgradation of state-of-the-art machine with AI capabilities & Optimizing Scheduling & equipment maintenance time
V. Initiation of On Job Radiographers Program, Construction of new seminar room and Faculty / Research Offices

Requirements:

S.NO.	Human Resource / Staffing	Planned Infrastructure	Equipment	Finance
I.	Radiologist (WI Fellow)	-	Training on contrast-enhanced Tomo and Stereotactic Breast Biopsy mammography services IT Assets	Forecasting of financial expenditure
II.	Radiology Service Manager Patient Coordinator Receptionist Attendant	Well-designed waiting area Separate Cash Counter	ACs Water Dispenser, LED etc... IT System	Forecasting of financial expenditure
III.	2-3 Sonologists as per need Attendant Receptionist	Modification in Dow Labs	Varies at least 2-3 for new service IT System	Forecasting of financial expenditure
IV.	Experienced Radiologists and Technologists	Modification made as per requirements	CT 128 Slice & MRI 1.5 T under installation process IT System	Forecasting of financial expenditure
V.	Faculty Research Assistant Hiring	Construction of Seminar Hall and Offices	Projector IT system	Forecasting of financial expenditure

Short Term Strategic Plan (One ~ Three Years):

I. Dedicated Women Imaging Section:

We are performing mammography, breast ultrasound, breast interventions procedures (Biopsies, Liga clipping, wire localization etc.). The number of patients visiting breast imaging and breast interventions are increasing day by day. Keeping in view of the increasing trend of the breast imaging a dedicated women Imaging Section has been established in October 2024 and running smoothly. To enhance further Breast services, we need to initiate contrast-enhanced Tomo and Stereotactic Breast Biopsy services for better performance and as well as to centralize the breast imaging affairs.

Dedicated Women Imaging Section at LEJ Campus to cater and facilitate more patients, in process

II. Upgradation of ultrasound machine for better patient diagnosis and service excellence.

III. Neuro-imaging intervention in collaboration with interventional neurologists to provide timely management of stroke patients is in process.

IV. Initiation of executive services

V. To reinforce quality assurance by increasing the workforce

VI. To enhance revenue and marketing hiring of Business Manager

VII. Research data analyst: to facilitate faculty to promote research

VIII. Quality assurance officer to maintain & record KPI'S.

Academic Program:

I. Initiation of On Job Radiographers Program

II. Masters in Radiology Technology

III. MSc in ultrasound

SECTION VI: IMPLEMENTATION AND MONITORING OF STRATEGIC PLAN

ACTION PLAN:

GOAL 1: Enhance quality care and patient satisfaction

- Monthly meeting with section in charges and corrective actions on the areas of improvement.
- Patient consent form
- Maintained patient privacy (Separate u/s and changing rooms)
- Random/routine rounds to monitor constant hygienic practices.
- Follow standard procedure protocols and structured reporting to improve clinical documentation.
- MnM meetings, Case discussion to provide input on diagnostic imaging results to minimize the complaints and improve the clinical diagnoses of visiting patients.
- Participating in quality assurance workshops and meetings
- Patient satisfaction survey (Monthly / Quarterly)

GOAL 2: Excel in education and research

- Continuously review and develop the curriculum according to the need and new development, and in accordance with the HEC and university rules and regulations.
- Support faculty and students in publishing research in reputable journals and presenting at conferences
- Interactive mode of teaching.
- Encourage Lifelong learners by CMEs and workshops.
- To Educate Faculty, technologists and students for new imaging techniques and technologies to improve patient outcomes
- Hands on Ultrasound Workshops
- National / International Conferences.
- Promote joint research projects and shared learning opportunities
- Radiology Society Meetings. Journal clubs etc.

- Tumor Board meeting

GOAL 3: Enhancement in technology and training

- Encourage advanced education and training of qualified clinical faculty and staff by enrolling in different programs (MHPE/ CHPE and certificate courses).
- To get equipment, software, qualified radiologist, credentialing and to collaborate with healthcare facilities.
- Applications Training on new techniques / modality.
- Promote joint research projects and shared learning opportunities

GOAL 4: Increase operational efficiency

- Follow and maintained policy and protocol
- Corrective and preventive measures for service excellence
- Regular check on OSL dosimeter badges according to the PNRA guidelines.
- Increase patient turnover by updated data and visiting patients' feedback.
- Monitoring performance goals of faculty/staff and offering corrective measures.
- Conduct market surveys to ensure that radiology services are provided in a cost-effective manner.
- Build strong collaboration with marketing department to showcase radiology services and its expansions regularly

GOAL 5: Upgrade and maintain advanced radiology equipment

- Regular PPM to maintain the efficacy of the equipment.
- Ensure that imaging equipment is properly calibrated for accurate image interpretation.
- Upgradation of machines and induction of new imaging equipment as well as providing support for emergency procedures requiring imaging services.

GOAL 6: ENHANCE COMMUNITY RADIOLOGY SERVICES

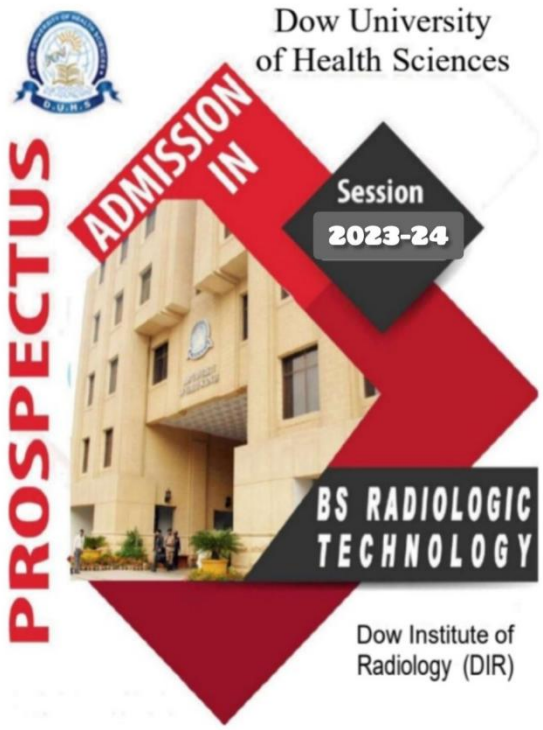
- Encourage and reward faculty, staff, and students to volunteer services
- Develop continuing education programs to address identified and emerging educational and technological needs of the community
- Participate in projects related to economic and social development of the local communities
- Organize free camps and awareness sessions (seminars / workshops)

SECTION VII: LIST OF APPENDICES

No.	DESCRIPTION
A	BSRT Curriculum
B	DMRD Curriculum
C	List Of Existing Research Projects
D	List Of Publications
E	SWOT Analysis
F	TOWS Matrix

APPENDIX A: BRT CURRICILUM

BSRT:



SEMESTER-1:

Anatomy
Mathematics & Statistics
Functional English
Sociology
Application of Information and Communication Technologies
Ideology and Constitution of Pakistan

SEMESTER-2:

Physiology
Mathematics & Statistics
Expository Writing
Philosophy
Radiology for Medical Technologist-1
Clinical Practicum 1

SEMESTER-3:

Pharmacology
Biology
Islamic Studies/Ethics
Medical Imaging Physics-1
Radiology for Medical Technologist-2
Clinical Practicum 2

SEMESTER-4:

Pathology
Entrepreneurship
Civic and Community Engagement
Medical Imaging Physics-2
Radiology for Medical Technologist-3
Clinical Practicum 3

SEMESTER-5:

Radiology for Medical Technologist-4
Advanced Fluoroscopy
Cross Sectional Anatomy-1
Medical and Research Ethics
Clinical Practicum 4

SEMESTER-6:

Nuclear medicine
Biotechnology
Echocardiography
Biostatistics and Research Methodology-1
Clinical practicum 5

SEMESTER-7:

Ultrasound
Advanced Computed Tomography
Biostatics and Research Methodology-2
Clinical Practicum 6

SEMESTER-8:

Cross sectional Anatomy 2
Advance Magnetic Resonance Imaging
Intervention Radiology (Angiography & Cardiac Imaging)
Biostatistics and Research Methodology-3
Clinical Practicum 7

APPENDIX B: DMRD CURRICULUM

Foreword:

It is a great honor for me to share my thoughts for Dow Institute of Radiology, one of the many institutes of the Dow University of Health Sciences.

The Dow Institute of Radiology is dedicated to providing outstanding patient-centered care by merging excellence in diagnostic imaging, educational programs, and research with state-of-the-art equipment. This institute is headed by a professional team of experienced and highly qualified full-time faculty members and experienced technologists. We offer a wide range of diagnostic and interventional facilities and services at very affordable and competitive rates as compared to other institutes of similar standards. Our major objectives are to achieve and maintain excellence in patient care, teaching, and research in the fields of Medical Imaging and imaging-related procedures. Along with other formal educational programs, we also provide continuing medical education (CME).

Prof. Dr. Nasreen Naz
Director / HOD
Dow Institute of Radiology

Objective of the DMRD:

The aim of this two-year DMRD course is to equip medical graduates with relevant professional knowledge, skills and ethical values, to enable them to apply their acquired expertise at primary and secondary health care organizations as non-academic radiology consultants.

DMRD Learning Outcomes:

Upon successful completion of two-year training, the student should be able to:

1. Interpret common radiological findings in a systematic manner while keeping in mind the logical reasoning and justification for clear understanding of the clinicians.
2. Perform recommended conventional radiological procedures with expertise.
3. To perform ultrasound and identify common pathologies occurring in the upper abdomen, pelvis (male & female) and obstetrical ultrasound and basic Doppler imaging including emergency/acute conditions
4. Comprehend the basics of computed tomography (CT) history taking, CT protocols and interpret major Computed Tomography findings including emergency and acute conditions
5. Practice basic radiation protection ALARA principles and measures.
6. Understand the basics principles of nuclear medicine and procedures.
7. In addition to basic knowledge of radiology, the candidate is expected to attain appropriate

Knowledge of soft skills includes ability to access computerized medical databases, electronic mail systems and the internet, appropriate basic knowledge of medical ethics and communication skills.

DMRD Nomenclature:

The name of the diploma course should be Diploma in medical radiology retained as DMRD. This name has been recognized and established by Pakistan medical and dental council. The duration of courses should be two years of structured training in a recognized department under an approved supervisor having a total of 72 credit hours

Course Title: DMRD (Diploma in Medical Radiology)

Training Centers: 1) Dow institute of Radiology (OJHA Campus)
2) Department of Radiology Dr. Ruth K. M. Pfau Civil Hospital Karachi / Trauma center CHK

Credit hours: 72 credit hours

Course Duration: Two Years

DMRD training program is structured according to the other DUHS two years diploma programs. The course duration & rotations are revised and approved by the BOS.

Year-I: 12 months
Year-II: 12 months (details mentioned in the course scheme)

Program Director: **Prof. Nasreen Naz**
Professor/ Head of Department
Dow Institute of Radiology (OJHA Campus)
Chairperson Radiology Department
Dow University of Health Sciences, Karachi.

Program Coordinator: **Dr. Umme Aymen**
(OJHA Campus)/DIMC: Assistant Professor Radiology

Program Coordinator: **DR. Rehana Shiekh**
(Civil Hospital)/DMC **Assistant Professor Radiology**

Eligibility Criteria:

- MBBS or Equivalent qualification registered with the PMDC.
- One year house job in an institution recognized by the PMDC.
- No Objection Certificate (NOC) from current employer with through proper channel application (For Govt. employees)

Selection:

Based on written entry test and interview (Rights of selection/admission reserved with Dow University)

Methods of Teaching and Learning:

As a policy, active participation of candidates at all levels will be encouraged.

Following teaching modalities will be employed:

1. Didactic Lectures on Power point presentations
2. Small Group discussion
3. Demo of Radiological procedures
4. Case presentations
5. Journal clubs and Morbidity and mortality meetings
6. Hands on training in Radiological procedures at workstation
7. Hands on Demo especially in ultrasound and non-vascular interventions.
8. Basic Life Support Workshop is mandatory for every candidate.

SCHEME OF THE COURSE

Part	Duration	Posting place	Theory	Practical	Assessment
YEAR-I	12 Month	Dow institute of Radiology OJHA Campus	*Radiological physics *Radiological Anatomy *Radiological positioning *Radiological techniques	*Practical positioning and techniques *Handling machines and departmental equipment care *Monthly Clinical Postings *CT history / protocol (1month) *Fluoroscopy (1 month) *X-ray (2months) *Ultrasound (2 months)	Informal ---log book / Monthly test (BCQS/OSCE) Summative---exit exam after completion of one year Theory paper comprising BCQS: 1- 50 BCQS physics 2- 50 BCQS Anatomy 3- 50 BCQs of Radiological techniques/positioning Total Marks: 150
		Dow institute of Radiology OJHA Campus	Clinical Radiology *Chest and CVS *Gastrointestinal *Skeletal system *Head & neck and Soft-Tissue *CNS *Genitourinary Pediatric Breast /soft tissues	Monthly Clinical Postings Ct scan reporting *Mammography (1month) *Ultrasound (2 month)	
		Nuclear medicine at KIRAN hospital	Nuclear medicine (1month)	One trainee will be on elective rotation at a time	
YEAR -2	2 Months	SMBB Institute of Trauma	Emergency radiology	Emergency Radiology esp. Cross sectional and vascular interventional radiology	At the end of year 2 1- 50 BCQS Emergency Radiology 2- 50 BCQS Clinical Radiology 1 3- 50 BCQs of Clinical Radiology 2 Total Marks: 150 OSCE & viva
	10 Month	Radiology Department R. K. M. Pfau CHK	Clinical Radiology 1 & 2 *Chest and CVS *Gastrointestinal *Skeletal system *Head & neck and Soft-Tissue *CNS *Genitourinary Pediatric Breast /soft tissues	Clinical Posting *CT Reporting (2months) *X-ray (2 months) *Fluoroscopy (2months) *Mammography (1months) *Ultrasound (3months)	

COURSE CODES AND CREDIT HOURS

YEAR	COURSE CODE	SUBJECT	Credit Hours	No. of Questions
Year One	DMR-ANA-601	Radiology Anatomy	12	50
	DMR-PHYC-602	Radiology Physics	12	50
	DMR-BRP-603	Basic Radiological Procedure/positioning	12	50
Year Two	DMR-ECR-701	Emergency Clinical Radiology	12	50
	DMR-CR1-702	Clinical Radiology 1	12	50
	DMR-CR2-703	Clinical Radiology 2	12	50

Year one = 36 CH

Year Two = 36 CH

Total Credit Hours of the Program = 72

Passing % required in each subject = 63%

ASSESSMENT:

1. Informal Assessment
2. Formal Assessment (Formative & Summative)

1. Informal Assessment:

There will be no formal allocation of marks for this component. It will include:

- Punctuality
- Work during positioning
- Participation in interactive session

2. Formal Assessment:

Formal assessment comprises of structured, scored & preplanned assessment of students by the faculty, which includes:

- Formative Assessment: Monthly test at the end of each unit, WPBA assessment RA-DOPS, MINI-IPX (BCQS /OSCE) and Log book
- Summative Assessment: At the end of year (year-I & II) / Exit exam BCQS, OSCE and Table viva

Summative Assessment Part-I:

Theory	50 BCQS in Each Paper Paper-I Radiological physics Paper-II 2.Radiological Anatomy Paper III 3. Radiographic positioning and Radiological Techniques.	Passing Criteria: • Passing percentage will be 63% for each theory paper as per DUHS policy • Candidate has to pass all papers-I II & III. Exam retake Policy: • In case of failure of any one paper, candidate will reappear only in the respective paper in retake examination and continue year 2 training. • The candidate, however, would be expelled from program in case of failure of two retake examinations.

Summative Assessment Part-II:

Theory	1- 50 BCQS Emergency Radiology 2- 50 BCQS Clinical Radiology 1 3- 50 BCQs of Clinical Radiology 2 Total Marks: 150	Passing Criteria: • Passing percentage will be 63% for each theory paper and viva separately as per DUHS policy • Candidate must have cleared Year-I to be eligible to appear in Year-II examination • Candidate has to clear Year-II examination in maximum three attempts (one annual + two retake) • Candidates who qualify in theory will be called for clinical components. Exam retake Policy: • In case of failure of Clinical component, candidate will reappear in retake examination max. 03(one annual + two retake)
Clinical	Film reporting session /OSCE	
	Viva Voce:	

Logbook Sample:

The trainee must maintain a logbook and get it signed regularly by immediate consultant /supervisor. A complete and duly certified logbook will be a requirement for part 2 examination, however, not be scored in the end. The format of logbook is given below:

Syllabus:

Radiological Anatomy:

Physics

Topic	MOT
The X-ray Imaging System	Lectures
The X-ray Tube	Lectures
X-ray Production	Lectures
X-ray Emission	Lectures
X-ray Interaction with Matter	Lectures
Concepts of Radiographic Image Quality	Lectures
Control of Scatter Radiation	Lectures
Screen-Film Radiography	Lectures
Screen-Film Radiographic Technique	Lectures
Computers in Medical Imaging	Lectures
Computed Radiography	Lectures
Digital Radiography	Lectures
Digital Radiographic Technique	Lectures
Viewing the Digital Radiographic Image	Lectures
Digital Radiographic Artifacts	Lectures
Mammography	Lectures
Fluoroscopy	Lectures
Digital Fluoroscopy	Lectures
Computed Tomography	Lectures
Radiation Protection	Lectures
Introduction to Ultrasound Physics	Lectures

Topic	MOT
Head & Neck: Conventional / Cross Sectional Anatomy of skull, PNS, orbit, ear, thyroid, pharynx and larynx	Didactic Lectures/ presentation
Chest: Conventional / Cross Sectional Anatomy of thoracic cage, diaphragm, pleura, lung, mediastinum, heart	Lectures/presentation
CNS+ Spinal Cord Conventional / Cross Sectional Anatomy brain, pituitary, meninges, vascular supply of brain, vertebral column, spinal cord	Lectures/presentation
Abdomen: Conventional / Cross Sectional Anatomy of stomach, small and large intestine, hepato-biliary, kidneys, adrenals, peritoneum	Lectures/presentation
Pelvis: Conventional / Cross Sectional Anatomy of bony pelvis, lower urinary tract, male female reproductive organs	Lectures/presentation
Upper Limb: Conventional / Cross Sectional Anatomy of bones and joints, muscles and vascular supply	Lectures/presentation
Lower Limb: Conventional / Cross Sectional Anatomy of bones and joints, muscles and vascular supply	Lectures/presentation
Breast: Conventional / Cross Sectional Anatomy	Lectures/presentation

Radiographic Positioning:

SYSTEM	TOPIC	MOT
GENERAL PRINCIPALS	Positioning Terminology Imaging Principles Positioning Principle	Lectures
UPPER LIMB	Radiographic positioning of humerous, radius and ulna Radiographic positioning of Shoulder/Scapula/elbow Radiographic positioning of hand /wrist	Lectures/Hands on
LOWER LIMB	Radiographic positioning of femur, tibia, fibula Radiographic positioning of the knee and ankle Radiographic positioning of Calcaneum/foot	Lectures/Hands on
VERTEBRAL COLUMN	Radiographic positioning of the Cervical spine Radiographic positioning of the Thoracic spine Radiographic positioning of the Lumbar spine, Radiographic positioning of the sacrum and Coccyx	Lectures/Hands on
THE THORAX	Different views of positioning of the Chest/ribs	Lectures/Hands on
SKULL AND FACIAL BONES	Radiographic positioning of skull. Radiographic positioning of the Facial bones Radiographic positioning of the Paranasal Sinuses, Radiographic positioning of the Mastoids/ Temporal bone/TM joint	Lectures/Hands on
THE ABDOMEN	Radiographic positioning of different views of the Abdomen	Lectures/Hands on
THE PELVIS	Radiographic positioning of views of the Hip Radiographic positioning of views of the Pelvis Radiographic positioning of views of the Sacroiliac joint	Lectures/Hands on

Radiographic Techniques:

SYSTEM	TOPICS	MOT
Gastrointestinal tract (GIT)	Barium Swallow	Lecture/Hands on
	Barium Meal	Lecture/Hands on
	Barium follows through	Lecture/Hands on
	Small Bowel Enema	Lecture/Hands on
	Barium Enema	Lecture/Hands on
Genitourinary (GUT)	I.V. U	Lecture/Hands on
	Retrograde Urethrogram	Lecture/Hands on
	Micturating Cystourethrogram	Lecture/Hands on
	Ante grade Pyelography	Lecture/Hands on
Miscellaneous	Sialography	Lecture/Hands on
	Dacrocystography	Lecture/Hands on
Hepatobiliary (HPT)	T-tube Cholangiography	Lecture/Hands on
	PTC	Lecture/Hands on
	ERCP	Lecture/Hands on
Miscellaneous	Sinogram/Fistulogram	Lecture/Hands on
Female imaging	Hysterosalpingography	Lecture/Hands on

Clinical and Emergency Radiology Syllabus:

S#	Topics	MOT
01	CHEST IMAGINGL: Knowledge of manifestation of thoracic disease as demonstrated by conventional radiography and CT. Signs in Chest Radiology (Air bronchogram, Air crescent sign, Deep sulcus sign, Continuous diaphragm sign, gloved finger sign, sillhouette sign, scimitar sign, hilum overlay sign, double density sign) Pluero pulmonary Infection Interstitial Lung Disease/Alveolar Lung Disease Atelectasis, Airway and Obstructive Lung Disease Mediastinal masses Pulmonary Nodules Benign and Malignant Neoplasm of Lung Chest trauma Chest Wall, pleura and Diaphragm Congenital lung diseases Pulmonary vasculture abnormalities Monitoring support devices (Endotracheal tube, NG tube, Pacemaker etc)	Lectures/ SGD/ Case presentation
02	SOFT TISSUE AND BREAST IMAGING: Knowledge of breast pathology and understanding of radiographic techniques employed in diagnostic mammography. Congenital abnormalities, inflammatory /infective, benign and neoplastic breast conditions Implants Radiology Soft tissue inflammatory, infective and benign and malignant neoplastic lesions	Lectures/ SGD/ Case presentation

S#	Topics	MOT
03	**GASTROINTESTINAL IMAGING and HEPATOBILIARY:** Knowledge of gastrointestinal disease as demonstrated by conventional radiography and CT and practice relevant to clinical radiology **Pharynx:** Web, Diverticula, Foreign bodies, Trauma, Benign and malignant neoplastic lesions, Motility disorders **Esophagus:** Diverticula, Foreign bodies, Trauma, Benign and malignant neoplastic lesions, Motility disorders, Drug induced/caustic strictures **Stomach:** Gastritis, peptic ulcer Trauma, Benign and malignant neoplastic lesions **Small intestine:** Diverticula, Trauma, Benign and malignant neoplastic lesions, intestinal ischemia, intussception, inflammatory /infective bowel disease. malabsorption **Rectum and Colon/appendix:** Appendicitis, Diverticula, Trauma, Benign and malignant neoplastic lesions, intestinal ischemia, intussception, inflammatory /infective bowel disease. **Liver:** Trauma, Fatty infiltration, Cirrhosis, Budchiari, Portal hypertention, Benign and malignant neoplastic conditions, Infections **Pancreas:** Trauma, Acute and chronic Pancreatitis, calcifications differential diagnosis, Benign and malignant neoplastic lesions **Gall bladder and Bile ducts:** Acute and chronic cholecystitis Cholelithiasis Choledhocholithiasis Carolis disease Cholangitis Strictures (benign /malignant)	Lectures/ SGD/ Case presentation
S#	**Topics**	**MOT**
04	**HEAD AND NECK IMAING:** Knowledge of head and neck disease as demonstrated by conventional radiography and CT and c practice Relevant to clinical radiology.	Lectures/ SGD/ Case presentation

	Eye, orbit, ear, temporal bone and petrous apex inflammatory, infective and neoplastic lesions Larynx trauma, infection, benign and malignant lesions Salivary glands inflammatory and neoplastic lesions Thyroid inflammatory and neoplastic lesions Lacrimal gland inflammatory conditions Vascular abnormalities e.g carotid body tumor	
05	MUSCULOSKELETAL IMAGING: Knowledge of musculoskeletal disease as demonstrated by conventional radiography and CT and practice relevant to clinical radiology. Fractures/ Trauma: Congenital abnormalities (Telipesequinivarus, pes planus, pescavus, osteogensisimperfecta, Achondroplasia, Osteopetrosis, Osteopoiklosis,Malrheostosis,Metaphyseal/Dyphysealdysplasia . Tumors like conditions: Fibrous dysplasia, pagets disease, Neurofibromatosis Benign /Malignant tumors: NonOssifyingFibroma,Fibrouscorticaldefect,Hemangioma,Enchondroma,Osteochondroma,simple /Aneurysmal bone cyst, Osteosarcoma, Chondrosarcoma,Ewings sarcoma, Giant cell tumor Inflammatory /Infective conditions: Bacterial and tuberculosis infections ,Brodie's abceses,Sclerosing osteomyelitis Metabolic conditions: Rickets, Osteomalacia, Renal osteodystrophy,Acromegaly,Thlassemia ,sickle cells disease Arthitis: Osteoarthritis ,Rheumatoid arthritis, Psoriasis ,Ankylosing spondylitis, Gout	Lectures/ SGD/ Case presentation
S#	**Topics**	**MOT**
06	PAEADIATRIC IMAGING: Knowledge of pediatric diseases demonstrated by conventional radiography and CT and practice relevant to clinical radiology. Identify normal/abnormal airways and mediastinal structures on chest x-ray of the infant or old child Identify abnormalities associated with congenital heart disease on the chest radiograph of the infant/older child	Lectures/ SGD/ Case presentation

	Identify normal versus abnormal skeletal structures (especially extremities on a bone survey) Establish bone age on the basis of radiographic findings Know the proper procedure for fluoroscopy of infant/ older child and identify abnormalities related to GIT and hepatobiliary system. Identify the pathology related to Genitourinary system of child /older children. CNS and head and neck abnormalities of infant /older child on x-ray and cross-sectional imaging CT	
07	NEURORADIOLOGY: Knowledge of manifestations of CNS diseases as demonstrated by conventional radiography and CT and their clinical implication Infections: Meningitis, Abscess, Subdural and Epidural empyema Trauma: Hemorrhages, edema, contusion Cerebrovascular: Infarctions, hemorrhages, Aneurysm Benign and malignant neoplasm	Lectures/ SGD/ Case presentation

S#	Topics	MOT
08	**GENITOURINARY IMAGING:** Knowledge of the urinary tract diseases manifestation and their Ct and conventional radiographic appearance with clinical significance Congenital abnormalities:(horse shoes, medullary sponge, crossed fused ectopia, neurogenic bladder, uretrocele) Inflammatory/infective:(acute and chronic pyelonephritis, xanthogranulomatous pyelonephritis) Neoplastic: Benign and malignant tumors of kidney Nephrolithiasis: Metabolic: Renal osteodystrophy, nephrocalcinosis Trauma: renal, ureteric, bladder Prostate, testes scrotum inflammatory/infective and neoplastic lesions Uterus and ovaries, fallopian tubes inflammatory/infective and neoplastic lesions	Lectures/ SGD/ Case presentation
09	**NUCLEAR MEDICINE:** Regulatory aspects of radiopharmcentreal use, dose, QA, Storage, Waste handling, radiation protection Chest: V/Q scans, pulmonary embolism, Cardiac and Coronary scans Hepatobiliary and Spleen / Pancreas and GI tract study Renal tract: Morphologic and functional studies Bone and marrow, WBC, RBC scans Endocrine: Thyroid, parathyroid, Adrenals, carcinoids	Lectures/SGD

Recommended Books:

1) Bushong S. C. **Radiological Sciences for Technologist**: 10th edition
2) Rayan S. **Anatomy for Diagnostic imaging**:2nd edition
3) Clark. **Clark's Textbook of Positioning in Radiography**: 12th edition
4) Sutton D. **Text book of Radiology and Imaging**: latest edition
5) Chapman S. and Nakielny R. **A guideline to Radiological Procedures**: 5th edition
6) Chapman and Nakielny. **Aids to radiological differential diagnosis**: 5th edition

APPENDIX C: LIST OF EXISTING RESEARCH PROJECTS

S.NO	RESEARCH
01	THE INNOVATION OF SKULL BASE VIRTUAL DISSECTION IN MEDICAL COLLEGE.
02	SONOGRAPHIC FINDINGS AND CLINICOPATHOLOGICAL CORRELATION OF BREAST CANCER IN YOUNG WOMEN.
03	APPROPRIATENESS AND JUSTIFICATION OF PLAIN CT PARA NASAL SINUSES: AUDIT AT TERTIARY CARE HOSPITAL.
04	CRITICAL ROLE OF ULTRASOUND IN DETECTING MALIGNANCY IN PATIENTS PRESENTING WITH PATHOLOGIC NIPPLE DISCHARGE AND NEGATIVE OR INCONCLUSIVE MAMMOGRAMS.
05	IAGNOSTIC ACCURACY OF COLOR DOPPLER ULTRASONOGRAPHY FOR THE DIAGNOSIS OF POSTOPERATIVE VASCULAR COMPLICATIONS IN RECIPIENTS OF LIVING DONOR LIVER TRANSPLANTATION TAKING CT ANGIOGRAPHY AS GOLD STANDARD.
06	THE ALBERTA STROKE PROGRAM EARLY CT SCORE (ASPECTS): DIAGNOSTIC ACCURACY OF CT BRAIN IN ACUTE ISCHEMIC STROKE
07	IMAGING GAMUTS IN PATIENTS PRESENTING WITH NEUROLOGICAL MANIFESTATION OF DENGUE FEVER IN A TERTIARY CARE HOSPITAL.
08	PERFORMANCE ASSESSMENT OF AI-TRAINED MODELS FOR MAMMOGRAM INTERPRETATION COMPARED TO RADIOLOGIST REPORT
09	MAGNETIC RESONANCE CHOLANGIOPANCREATOGRAPHY: PANCREATIC DUCT ANATOMIC VARIATIONS AND DEVELOPMENTAL ANOMALIES IN PAKISTANI POPULATION
10	DIAGNOSTIC ACCURACY AND INTEROBSERVER AGREEMENT IN DETECTION OF CERVICAL RADICULOPATHY THROUGH CERVICAL SPINE SCREENING MRI
11	INTEGRATED APPROACH USING CONVENTIONAL ULTRASOUND, DOPPLER, STRAIN AND SHEAR WAVE ELASTOGRAPHY IN DETECTION OF BREAST CANCER IN YOUNG WOMEN
12	RADIOLOGICAL EVALUATION OF CLINICAL BREAST PROBLEMS AMONG MEN, A RETROSPECTIVE STUDY FOCUSING ON IMAGING FEATURES OF BREAST MALIGNANCIES

13	ULTRASOUND EVALUATION OF SUBCENTIMETER SUSPICIOUS BREAST LESIONS.CORRELATION WITH HISTOPATHOLOGICAL FINDINGS AND HORMONE RECEPTOR STATUS _ SUBMITTED IN PJMS
14	ROLE OF MRI IN CLASSIFYING DIFFERNET TYPES OF FISTULA IN ANO FOR BETTER MANAGEMENT, KEEPING SURGICAL FINDINGS AS GOLD STANDARD
15	CT AND MRI DWI ASPECTS: A DIAGNOSTIC AND COMPARATIVE STUDY
16	SPECTRUM OF MRI FINDINGS AMONG FEMALES PRESENTING WITH PRIMARY AMENORRHEA AT RADIOLOGY DEPARTMENT OF A PUBLIC SECTOR TEACHING HOSPITAL IN KARACHI
17	CORRELATION AND RELIABILITY OF BONE DENSITY AT CT WITH BONE MINERAL DENSITY (BMD) AT DEXA SCAN
18	TO DETERMINE THE DIAGNOSTIC ACCURACY OF CONTRAST-ENHANCED CT OF PARANASAL SINUSES FOR DETECTING SINONASAL POLYPOSIS KEEPING HISTOPATHOLOGY AS THE GOLD STANDARD
19	VARIATION IN PANCREATIC DUCT ANATOMY ON MRCP IN PAKISTANI POPULATION
20	ANATOMICAL VARIATION IN TEMPORAL BONE ANATOMY ON CT.

APPENDIX D: LIST OF PUBLICATION

FY 2021- TO DATE

Prof. Nasreen Naz
Director & Chairperson Institute of Radiology
E-mail: nasreen.naz@duhs.edu.pk

RESEARCH & PUBLICATIONS:

2025

1. Giant pituitary macroadenoma with cavernous sinus invasion, 19.02.2025 DOI: 10.35100/eurorad/case.18882

2024

1. Evaluation of the Progress of Coronavirus Disease-19 Pneumonia using the British Society of Thoracic Imaging Reporting Model: A Validation Study – *National Journal of Health Sciences, 9, 33-38.* DOI: 10.21089/njhs.91.0033

2. The Accuracy and Precision of Plain CT Chest for Diagnosis of Anemia – *J Pak Med Assoc. 74(9):1593-7.* DOI: 10.47391/JPMA.8548

3. Digital Eye Strain and Its Associated Factors Among Radiology Physicians in Pakistan: A Cross-Sectional Survey Using Logistic Regression Analysis – *Annals of Medicine and Surgery, 86(4), 1933-1941.*

4. Percutaneous Transhepatic Biliary Drainage as a Viable Alternative to Failed Endoscopic Retrograde Cholangiopancreatography in Hepatobiliary Disorders: A Retrospective Analysis – *Pakistan Journal of Health Sciences, 198-204.*

5. Utility of Diffusion-Weighted Magnetic Resonance Imaging to Detect Non-Palpable Undescended Testis – *Pakistan Journal of Medical Sciences, 40(9), 2069.*

6. A 360-Degree Evaluation of the Professionalism and Communication Skills of Technologists Working in the Radiology Department of a Public Sector Tertiary Care Hospital in Karachi, Pakistan – *BMC Med Educ 24, 1176 (2024).* DOI: 10.1186/s12909-024-06045-2

2023

7. Utility of Unenhanced CT KUB: Beyond Urolithiasis – *March 2023, Volume 28(1), 265-270.*

8. Ultrasound-Guided Core Needle Biopsy of Breast Lesions with Radio-Pathological Concordance/Discordance: A Medical Audit of a Tertiary Care Breast Imaging Unit – *J Soc. Obstet. Gynaecol Pak. 13(1):323-326.*

9. Effectiveness and Complication of Local Anesthesia in Non-Vascular Interventional Radiology – *APMC, 17(1):62-66.*
10. Efficacy of Pigtails for the Management of Refractory Malignant Ascites or Effusion: A Systematic Retrospective Chart Review of an Institution – *Proceedings, 37(2):35-41.*

11. Relation of Intima Media Thickening of Carotid Arteries with Parameters of Lipid Profile in Chronic Hepatitis C Patients – *JBUMDC, 13(3):167-171.* DOI: 10.51985/JBUMDC2022032

12. Transarterial Chemoembolization for the Treatment of Hepatocellular Carcinoma – *S.Z.M.C. 37(3):1-7.*

13. Effective Strategy to Cope with Pain and Discomfort Among Women Undergoing Mammography - A Randomized Controlled Trial – *Pak J Med Sci, 39(5):1422-13428.*

14. Conventional Ultrasonography: A Remarkable Tool in Early Detection of Benign Ovarian Lesions in Comparison to Gold Standard MRI – *Pakistan Armed Forces Medical Journal, 73(2), 569–74.* DOI: 10.51253/pafmj.v73i2.10303

15. Role of Shearwave Elastography in Assessment of Placental Elasticity in Normal and High-Risk Pregnancies in the Third Trimester – *JPMA, 73(11), 2205-08.* DOI: 10.47391/JPMA.9314

2022

16. Diagnostic Accuracy and Imaging Appearance of Glioblastoma Multiforme on MRI and MRS – *Annals of PIMS, 18(3), July–September.*
17. Frequency of Patients Eligible for Liver Transplant According to MELD-Na Score in Chronic Liver Disease Due to Chronic Hepatitis B and C – *BMC J Med Sci, 3(2):99-102.*
18. Clinical Utility of Ultrasound-Guided Core Needle Biopsy of Axillary Lymph Nodes with Radio-Pathological Correlation – *J Soc. Obstet. Gynae Pak, 12(4):319-322.*
19. Diagnostic Accuracy and Imaging Appearance of Glioblastoma Multiforme on MRI and MRS – *Annals of PIMS, Vol. 18(3), July–September 2022.*
20. Frequency of Patients Eligible for Liver Transplant According to MELD-Na Score in Chronic Liver Disease Due to Chronic Hepatitis B and C – *BMC J Med Sci, Vol. 3 No. 2 (July-December 2022), 99-102.*

2021

21. To Determine the Diagnostic Accuracy of Magnetic Resonance Imaging in Detecting Rectal Cancer, Keeping Histopathology as a Gold Standard – *International Journal of Endorsing Health Science Research, Vol. 9 No. 3 (2021).*
22. PPE and the Impact on the Performance During the COVID-19 Pandemic – A Questionnaire-Based Survey Among Radiology-Related Healthcare Workers – *PJR, Vol. 3 (2021).*

Dr. Sohail Ahmed Khan:

1. Khan SA, Manohar M, Khan M, Asad S, Adil SO. Radiological profile of patients undergoing Chest X-ray and computed tomography scans during COVID-19 outbreak. Pakistan Journal of Medical Sciences. 2021 Sep; 37(5):1288.

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3. Munir S, Khan SA, Hanif H, Khan M. Diagnostic accuracy of magnetic resonance imaging in detection of intra-axial gliomas. Pak J Med Sci. 2021;37(1):125.

Dr. Binish Rasheed:

1. Rahim A, Rasheed B, Adil SO, Naz N, Aslam N. Effective strategy to cope the pain and discomfort among women undergoing mammography - A randomized controlled trial. Pak J Med Sci. 2023; 39(5):1422-1428. doi: https://doi.org/10.12669/pjms.39.5.750

2. Rasheed B, A.rahimetall. Does structured informational care reduce anxiety in patients undergoing MRI? A quasi-experimental study. Journal of Pakistan medical association JPMA Vol 73 no. 07. July 23

3. Jabeen N, Walid A, Rasheed B, Naz N, Rahim A, Siddiqui RQU. Conventional Ultrasonography: a Remarkable Tool in Early Detection of
4. Benign Ovarian Lesions in Comparison to Gold Standard MRI. Pak Armed Forces Med J 2023; 73(2): 569-574. DOI: https://doi.org/10.51253/pafmj.v73i2.10303

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Dr. Anila Rahim:

1. Rahim A, Rasheed B, Adil SO, Naz N, Aslam N. Effective strategy to cope the pain and discomfort among women undergoing mammography-A randomized controlled trial. Pakistan Journal of Medical Sciences. 2023 Aug 3; 39(5).

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4. Aziz S, Sattar A, Walid A, Rahim A, Naz N, Ara H. Sonographic Ultrasound Evaluation of Mastalgia and to Determine the Relationship between Breast Duct Diameter and Severity of Mastalgia. Journal of Liaquat University of Medical & Health Sciences. 2023 Jun 21;22(02):110-4.

5. Imtiaz S, Naz N, Walid A, Rahim A. Ultrasound Guided Core Needle Biopsy of Breast Lesions with Radio-Pathological Concordance/Discordance: A Medical Audit of Tertiary Care Breast Imaging Unit. Journal of The Society of Obstetricians and Gynaecologists of Pakistan. 2023 Apr 5;13(1):1-4.

6. Imtiaz S, Naz N, Rahim A, Walid A. GIANT PSEUDOANGIOMATOUS STROMAL HYPERPLASIA IN A YOUNG GIRL: A CASE REPORT. PJR. 2023 Mar 27;33(1).

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12. Rahim A, Sattar A, Adil SO, Khan SA. Positive predictive value of Birads IV Lesions on mammogram in detection of breast carcinoma. JPMA. The Journal of the Pakistan Medical Association. 2022 Sep;72(9):1750-4

13. Rahim A, Saleem O, Walid A, Zada TP, Sattar A, Reshamwala SJ. Accuracy of ultrasound guided wire localization of the residual breast cancer lesion for breast conservation surgery: Experience at a tertiary care hospital in Pakistan. Rawal Medical Journal. 2022 May 19;47(2):358-.

14. Jabeen N, Rasheed B, Imran M, Zaheeruddin Z, Rahim A. Mammographic density and its association with molecular subtype of breast cancer.

15. Ahmed H, Ahmed S, Rahim A, Perveen K, Saeed T, Ainuddin JA. To evaluate the dimensions of each lobe and total volume of thyroid gland by ultrasonography among pregnant and non-pregnant women in local population, Karachi. ANNALS OF ABBASI SHAHEED HOSPITAL AND KARACHI MEDICAL & DENTAL COLLEGE. 2021 Jun 23;26(1):251-6.

Dr. Ayesha Walid:

1. Aziz, S., Sattar, A., Walid, A., Rahim, A., Naz, N., & Ara, H. (2023). Sonographic Ultrasound Evaluation of Mastalgia and to Determine the Relationship between Breast Duct Diameter and Severity of Mastalgia. Journal of Liaquat University of Medical & Health Sciences, 22(02), 110-114.

2. Jabeen, N., Walid, A., Rasheed, B., Naz, N., Rahim, A., &uddin Siddiqui, R. Q. (2023). Conventional Ultrasonography: A Remarkable Tool in Early Detection of Benign Ovarian Lesions in Comparison to Gold Standard Mri. Pakistan Armed Forces Medical Journal, 73(2), 569-74.

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2. Imtiaz, S., Naz, N., Rahim, A., & Walid, A. (2023). GIANT PSEUDOANGIOMATOUS STROMAL HYPERPLASIA IN A YOUNG GIRL: A CASE REPORT. PJR, 33(1).

3. Naz, N., Imtiaz, S., Walid, A., & Rahim, A. (2022). Clinical Utility of Ultrasound Guided Core Needle Biopsy of Axillary Lymph Nodes with Radio-pathological Correlation: A Medical Audit of Tertiary Care Breast Imaging Unit. Journal of The Society of Obstetricians and Gynaecologists of Pakistan, 12(4), 324-327.

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Dr. Javerya Sattar:

Published Article and Dissertation:

1. Diagnostic accuracy and imaging appearance Glioblastoma Multiforme on MRI and MRS in Annals of PIMS July-September 2022 Vol.18 No.3.

Dr Nida Rafiq:

1. Qamari, N., Naz, N., Rafiq, N., Ahmed, F., Khalid, T., Riaz, F., & Zafar, N. (2023). Effectiveness and Complication of Local Anesthesia in Non-Vascular Interventional Radiology. Annals of Punjab Medical College (APMC), 17(1), 62-66. https://doi.org/10.29054/apmc/2023.1161

2. Rafiq N, Rasheed B, Naz N, Al Qamari N, Azmatullah U, Rahim A. Utility of Unenhanced CTKUB: Beyond Urolithiasis [Online]. Annals ASH & KMDC; 28(1)

3. Naz N, Chandani A, Fatima A, Rafique N, Sattar J. Diagnostic Accuracy and Imaging Appearance of Glioblastoma Multiforme on MRI and MRS. Ann Pak Inst Med Sci. 2022;18(3):153-158. Doi.10.48036/apims.v18i3.702

4. Sattar A, Hafeez M, Rafiq N, Aymen U. The efficiency of voice recognition versus transcriptionist in Radiology. Isra Med J. 2021;13(3):192-196.

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6. Azmat, U., Shaikh M., Ali A., Rafiq N., Omair U. (2021). Diagnostic accuracy of computed tomography in Wilm'stumour taking histopathology as a gold standard in symptomatic renal masses at a tertiary care hospital, Karachi. International Journal of Endorsing Health Science Research (IJEHSR), 9(1), 88-94.

Dr. Mahnoor Hafeez:

1. Hafeez M, Sattar A, Farooqui WA. Inter observer reliability for peritoneal carcinomatosis at computed tomography. JPMA. The Journal of the Pakistan Medical Association. 2023 May 1;73(5):973-7.

2. Hafeez M, Sattar A. Diagnostic accuracy of Non-ECG Gated Chest CT (NEGCT) for cardiac chambers' dimensions in comparison with echocardiography. Journal of Fatima Jinnah Medical University. 2022;16(2):53-7.

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RESEARCHES BEFORE 2021:

Prof. Nasreen Naz:

1. Radiological Evaluation of Collapse Vertebra / Vertebrae, Dissertation was submitted and approved by CPSP in March, 2007.

2. Radiological Features of Tuberculosis (T.B) Spondylitis, published in the Medical Channel in OCT. DEC. 2007.

3. Role of Plain Radiography in Diagnosis of KOCH's Spine published in the journal of Pakistan Orthopedic Association (JPOA) in FEB. 2008.

4. Skin Traction followed by Spica Cast Versus Early Spica Cast in Femoral Shaft Fractures of Children, published in Pakistan Journal of Surgery in Jan.-March, 2008

5. Sonological Assessment of Cervical length Changes during normal Pregnancy, published in the Medical Channel in April – June, 2008.

6. Juvenile Nasopharyngeal Angiofibroma, Role of Imaging in Diagnosis, Staging and Recurrence, published in the Journal of Surgery, Pakistan in DEC. 2009.

7. Utility of Breast Imaging in Mastalgia, published n the Journal or Liaquat University of Medical Sciences in April, 2010.

8. Ultrasound categorization of breast masses published in the Pakistan journal of surgery, January – March 2012.

9. Chronic headache "Role of occiptomental view" published in Pakistan journal of otolaryngology in April 2012.

10. Diagnostic Accuracy of C.T Scan in Retinoblastoma published in Pakistan Journal of Surgery in July-Sept. 2013

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15. Diagnostic Accuracy of Mammography in Detecting Breast Cancer, Keeping Histopathology as Gold Standard in is published in Ann. Pak. Inst. Med. Sci, April - June: 2016 12(2); 118-121

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18. Diagnostic Role of Doppler Ultrasound in morbidly adherent placenta (MAP): an Obstetrical emergency is published in Journal of Obs. and Gynae JSOGP 6(4) Oct. – Dec. 2016

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20. Mammographic Parenchymal Patterns in Solid Breast Tumors is published in PJR Vol. 27, NO 3 (2017)

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23. Case Report on Abdominal wall Endometrioma; is published in Journal of Obs and Gynae JSOGP 2016; vol 2

24. A Case report on multi system atrophy is published in JPMA; vol: 2 2018

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26. Role of Modified CT Severity Index in Assessment of Acute Pancreatitis at Tertiary Care Hospital, JIMDC: 2018, vol3: 189-94

27. Diagnostic Accuracy of CT scan in detection of early bone erosion of mandible in Squamous Cell Carcinoma, Published in JCPSP: 2018

28. Diagnostic Accuracy of Color Doppler Ultrasonography to Diagnose Testicular Tumors Taking Histopathology as a Gold Standard, is published in JFMC; 2018; Vol 2

29. Role of Transient Elastography in liver Fibrosis, is published in PJR, 2019; Vol 1

30. Risk Factors for Injury to Recurrent Laryngeal Nerve in Thyroid Surgeries - A Tertiary Care Centre Experience, is published in JRMC; 2019; Vol 3

Dr Amjad Sattar:

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Dr Mariam Taufiq:

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Dr. Ameena Begum:

1. Presented a dissertation on "Role of Sonography in High Risk and Mammographically Dense Breast" as fulfillment of the requirements for FCPS-II Examination (November 2005).

2. Conducted a study on "Comparative Evaluation of Diagnostic Accuracy of 3-d Virtual Bronchoscopy with that of Fiber Optic Bronchoscopy in Patients having Symptomatic Respiratory Disorders".

3. Three Published papers are in credit.

Dr. Syed Ali Baqer Naqvi:

1. Role of imaging in staging of urological tumors

Dr Anila Rahim:

1. Hafeez M, Rahim A, Awais M, Sattar A. CT texture analysis (CTTA) parameters as imaging biomarkers for predicting histopathological and molecular features of carcinoma. Clinical Radiology. 2020 Dec 1;75:e2.

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Dr. Sameera Salman:

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Dr Roohi Mohammad Zai:

1. Parotid Venous Malformation Good Radiology Interpretation Can Prevent Unnecessary Intervention.

Authors:
1) Fatima Mubarak
2) Roohi Mohammad (2018, Jun 21)
URL: http://www.eurorad.org/case.php?id=15766
DOI: 10.1594/EURORAD/CASE.15766

2. Kienbocks Disease Role of MRI In Interpretation and Management to Prevent Progression Of The Disease.

1) Roohi Mohammad
2) Fatima Mubarak
URL: http://www.eurorad.org/case.php?id=15906
DOI: 10.1594/EURORAD/CASE.15906

3. Book Chapter Neuroimaging in Parkinsons Disease and Beyond a Neurocognitive Approach

1) Roohi Mohammad
2) Fatima Mubarak

4. Case report

Interesting case of bilateral paragangliomas neck in a 34 year old female.
URL: http://www.eurorad.org/case.php?id=16122
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1) Dr Roohi Mohammad
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Dr Javerya Sattar:

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2. Recurrent CNS haemangioblastomas with new onset of retinal angiomas in a female patient diagnosed as Von Hippel Lindau syndrome in PJNS (2018).

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Dr Nida Rafiq:

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Dr. Saira Yasmeen:

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Dr Sameera Khaliq-uz-Zaman:

Published Article and Dissertation:

1. Diagnostic Value of Mean Elasticity Index as a Quantitative Shear Wave Elastography Parameter for Prediction of Malignancy in Small Suspicious Solid Thyroid Nodules.
2. Multiple undergraduate as well as postgraduate medical books on various subjects under paramount publication.

Mohammad Imran Soomro:

1. Diagnostic accuracy of Multidetector Computed Tomography in Diagnosis of Cholangiocarcinoma:

Research Publications:

2. Diagnostic accuracy of Computed Tomogrpahy in hilar Cholangiocarcinoma

Dr Parvez Ahmed:

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APPENDIX E: SWOT ANALYSIS

STRENGTHS	OPPORTUNITIES
1. Visionary Leadership. 2. Brand name (International recognition). 3. High patient volume Institute. 4. Low-Cost Procedures. 5. Highly trained and experienced radiologists and technologists. 6. Accurate and quality reports. 7. Strong referral relationships with healthcare providers. 8. Performance Based Incentive. 9. Well-structured 4-year degree program under HEC guideline. 10. Comprehensive training program in Radiologic Technology. 11. Diverse learning environment provided by qualified faculty, senior technicians and junior technicians. 12. Accessible faculty and coordinators. 13. Offers 06 months paid internship after completion of graduation. 14. Offers Fellowship in Women Imaging (WI), Vascular Interventional Radiology (VIR) and Neuro Imaging (NI).	1. Increasing demand for diagnostic imaging services (Qualitative services/ quality care). 2. Advancements in imaging technology and reporting. 3. Growth in telemedicine and remote diagnostic services. 4. Increased awareness of preventive health screenings. 5. Investment in research and development for new imaging techniques. 6. Educational workshops for healthcare providers on the latest imaging technologies. 7. Expansion of infrastructure to facilitate the visiting patient. 8. Enhancement of existing outreach services and expansion into underprivileged areas. 9. Execute the Executive facility for elite class. 10. On job trainings for service excellence. 11. Effective research in the field of Radiology Technology.
WEAKNESSES	**THREATS**
1. Long waiting time for appointments due to high demand for specially MRI Limited capacity during peak hours. 2. Challenges in retaining and recruiting skilled staff. 3. Dependency on third-party suppliers for contrast agents. 4. High equipment maintenance costs. 5. Lack of adherence to the policies. 6. Inadequate utilization of available resources. 7. Inadequate IT infrastructure for data management. 8. Lack of safety & security plans/ awareness. 9. Anesthesia facility for MRI/CT scans. 10. Repair and maintenance support. 11. Supply chain disruptions. 12. Inappropriate culture towards professionalism/ ineffective preventive measures. 13. Lack of associate research faculty	1. Competition from other radiology providers. 2. Regulatory changes affecting reimbursement. 3. Increasing operational costs. 4. Data security and privacy concerns. 5. Economic downturn affecting patient volumes. 6. Changes in healthcare policies and regulations. 7. Rising healthcare costs. 8. Natural disasters and emergencies. 9. Non-market compatible salaries. 10. Recognition of programs at an international level is required. 11. Quality Assurance Accreditation (International).

APPENDIX F: TOWS MATRIX

	OPPORTUNITIES	THREATS
	1. Increasing demand for diagnostic imaging services (Qualitative services/ quality care). 2. Advancements in imaging technology and reporting. 3. Growth in telemedicine and remote diagnostic services. 4. Increased awareness of preventive health screenings. 5. Investment in research and development for new imaging techniques. 6. Educational workshops for healthcare providers on the latest imaging technologies. 7. Expansion of infrastructure to facilitate the visiting patient. 8. Enhancement of existing outreach services and expansion into underprivileged areas. 9. Execute the Executive Facility for elite class. 10. On job training for service excellence. 11. Effective research in the field of Radiology Technology.	1. Competition from other radiology providers. 2. Regulatory changes affecting reimbursement. 3. Increasing operational costs. 4. Data security and privacy concerns. 5. Economic downturn affecting patient volumes. 6. Changes in healthcare policies and regulations. 7. Rising healthcare costs. 8. Natural disasters and emergencies. 9. Non-market compatible salaries. 10. Recognition of programs at an international level is required. 11. Quality Assurance Accreditation (International).
STRENGTHS	SO	ST
1. Visionary Leadership. 2. Brand name (International recognition). 3. High patient volume Institute. 4. Low-Cost Procedures. 5. Highly trained and experienced radiologists and technologists. 6. Accurate and quality reports. 7. Strong referral	1. Support visionary leadership, leverage a renowned brand name, acquire state-of-the-art equipment, and foster strong referral relationships with healthcare providers to prioritize patient-centeredness and deliver high-quality care services. 2. Responding to the increasing demand for diagnostic imaging services and high patient turnover by offering low-	1. Address the challenge of retaining highly trained and experienced radiologists and technologists by aligning salaries with market standards to ensure competitiveness. 2. Enhancing support for state-of-the-art equipment repair and maintenance to mitigate the impact of increasing operational

relationships with healthcare providers. 8. Performance Based Incentive. 9. Well-structured 4-year degree program under HEC guideline. 10. Comprehensive training program in Radiologic Technology. 11. Diverse learning environment provided by qualified faculty, senior technicians and junior technicians. 12. Accessible faculty and coordinators. 13. Offers 06 months paid internship after completion of graduation. 14. Offers Fellowship in Women Imaging (WI), Vascular Interventional Radiology (VIR) and Neuro Imaging (NI).	cost procedures tailored to meet the needs of the community. 3. Encourage highly trained and qualified radiologists and technologists to engage in impactful research by investing in research and development for new imaging techniques and offering incentives to incentivize their participation. 4. Ensure skilled staff for quality care services and on-the-job training to enhance service excellence and prioritize improved communication skills and the production of accurate and timely reports. 5. Foster a diverse learning environment with qualified faculty and technicians, offering numerous comprehensive training programs in Radiology, and conducting educational workshops for healthcare providers on the latest imaging technologies and their applications. 6. Expand the existing infrastructure to establish centralized reporting facilities for Women Imaging (WI) and Echocardiography and increase capacity to accommodate additional students in accordance with organizational guidelines and requirements. 7. Establish partnerships with hospitals and clinics to promote tele-radiology and remote diagnostic services, facilitating the exchange of knowledge and skill development in	costs and supply chain disruptions impacting efficiency and the delivery of quality care services. 3. Expand outreach services to support underprivileged communities by offering affordable procedures, thereby facilitating access to care. 4. Address the challenge of achieving and meeting targeted budgets amidst low-cost procedures and rising operational and healthcare costs. 5. Expand well-structured undergraduate programs in accordance with HEC guidelines, provide comprehensive training in Radiologic Technology led by dedicated and qualified teaching faculty, and ensure international recognition for these programs. 6. Attract and retain interested and qualified faculty and technicians by offering incentives that encourage them to become proficient researchers and produce impactful research in the field of Radiology Technology. 7. Leverage visionary leadership, international recognition, and state-of-the-art equipment to attract high volumes of patients.

	the advancements of imaging technology to serve the community.	8. Address the challenge posed by inadequate repair and maintenance support, supply chain disruptions, and increasing operational costs through actionable solutions.
WEAKNESSES	WO	WT
1. Long waiting time for appointments due to high demand for specially MRI Limited capacity during peak hours. 2. Challenges in retaining and recruiting skilled staff. 3. Dependency on third-party suppliers for contrast agents. 4. High equipment maintenance costs. 5. Lack of adherence to the policies. 6. Inadequate utilization of available resources. 7. Inadequate IT infrastructure for data management. 8. Lack of safety & security plans/ awareness. 9. Anesthesia facility for MRI/CT scans. 10. Repair and maintenance support. 11. Supply chain disruptions. 12. Inappropriate culture towards professionalism/ ineffective preventive measures. 13. Lack of associate research faculty	1. Enhancement of outreach services and expansion into underserved geographic areas may reduce long waiting time at the limited facilities. 2. Adequate IT infrastructure for data management along with the advancement will improve work efficacy and minimize human error due to manual workload. 3. Inadequate utilization of available resources due to advancement in imaging technology should be considered. Equipment's upgradation will enhance high quality services and minimize the waiting time. 4. Anesthesia facility for MRI/CT scans should provide support to cater the pediatric patients' studies as well as to entertain the claustrophobic patients 5. Challenges in retaining and recruiting skilled staff can be catered while offering performance-based incentives and on job training. 6. Investment in research and development for new imaging techniques and research grants/ incentives will motivate our faculty/ technicians for effective research.	1. The extended waiting times for appointments might expose us to competition from other radiology providers offering faster scheduling, potentially resulting in patient loss. 2. Reducing dependency on third-party suppliers for contrast agents can mitigate uncertainty in availability and pricing, thus stabilizing costs and ensuring uninterrupted diagnostic services. 3. We need to address the underutilization of available resources resulting in advancements in imaging technology. 4. Upgrading equipment will enhance service quality and help reduce waiting times. 5. To address challenges in retaining and recruiting skilled staff, we must ensure Salaries are market-compatible and additionally, transitioning to longer-term contracts could improve retention. 6. Addressing high

		equipment maintenance costs and rising operational expenses are crucial, especially amid competition from other radiology providers. 7. Implementing comprehensive safety and security plans, enhancing awareness, adapting to changes in healthcare policies and regulations. 8. For natural disasters and emergencies, these are essential actions to address significant challenges. 9. Managing disruptions in patient turnover caused by natural disasters, emergency situations, and climate change requires a contingency plan, proactive planning and response measures. 10. Implementing strict disciplinary actions to 28. monitor and address inappropriate cultures towards professionalism and effective preventive measures enable management to ensure quality care services and meet customer expectations