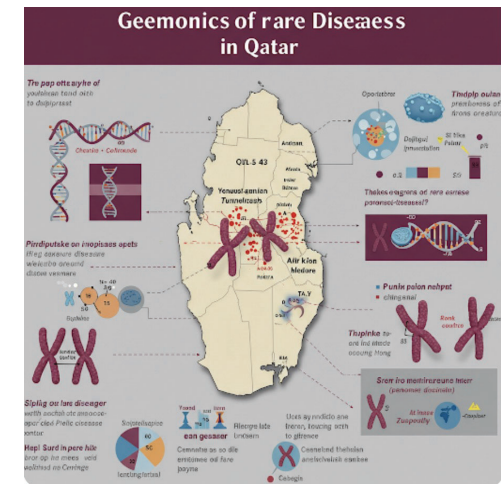




Navigating Precision Medicine Implementation in Qatar and the Region

Khalid A. Fakhro

Chief Research Officer & Chair - Precision Medicine Program, Sidra Medicine

Head of Laboratory of Genomic Medicine

Professor of Genomics, CHLS, HBKU & DGM, WCMQ/NY

2nd NASEM-KFAS Precision Med Workshop – 14 Oct 2025

@kfakhro

kfakhro@sidra.org

Disclosure Slide

I have NO actual or potential conflicts
of interest to disclose

Objectives

- To describe at high level the Qatari Biomedical Research Ecosystem
- To introduce Sidra Medicine as an academic medical center advancing Precision Medicine for women and children
- To describe implementation of Precision Medicine in clinical practice
- To describe the regulatory and ethical pathways governing (enabling) clinical implementation
- To invite future collaborations on biomedical and health research in the region

Qatar's Biomedical Research Landscape

Qatar Foundation's Education City



Key Biomedical Stakeholders



Sidra Medicine

Women and Children's Research Hospital

Sidra Medicine Tripartite Mission

Patient Care
Research
Education

Vision

To be a beacon of learning, discovery and exceptional care, ranked among top **academic medical centers** in the world.

Sidra Medicine in Numbers

- 400 beds
- 250,000 patient visits per year
- >90% pediatric tertiary care
- 37 clinical sub-specialty
- ~3500 staff (~250 in Research)
- >260 active research studies (incl.
>80 international collaborations)



Sidra's Research Programs and Platforms

Translational Research Programs (Gold Cohorts)

Rare Metabolic and Mendelian Disorders



Childhood Diabetes
Inborn Errors of Met.
Newborn Seq

Neurological Disorders



Autism
Epilepsy
Neuromuscular

Cancer



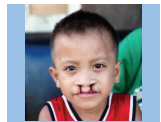
Pediatric Solid Tumors
Leukemia

Immune Dysregulation



Inborn Errors of Immun.
Immune Deficiencies
IBD

Congenital Structural Malformations



Craniofacial Disorders
Congenital Heart Dis.
Genitourinary Malform.

Reproductive & Perinatal Health



Infertility
Pre-term birth
Gestational Diabetes

Core Research Platforms (National Cores)

Diagnostic Cores (Dx)

- **National Genome Lab:**
WGS (short + LR)
- **Zebrafish**
- **Microbiome**
- Biorepository
- Cytometry
- Advanced Microscopy

Therapeutic Cores (Tx)

- **GMP Facility**
- **Cell and Gene Therapy Core**
- **iPS Core**
- Clinical Trials Office
- Biostats Core

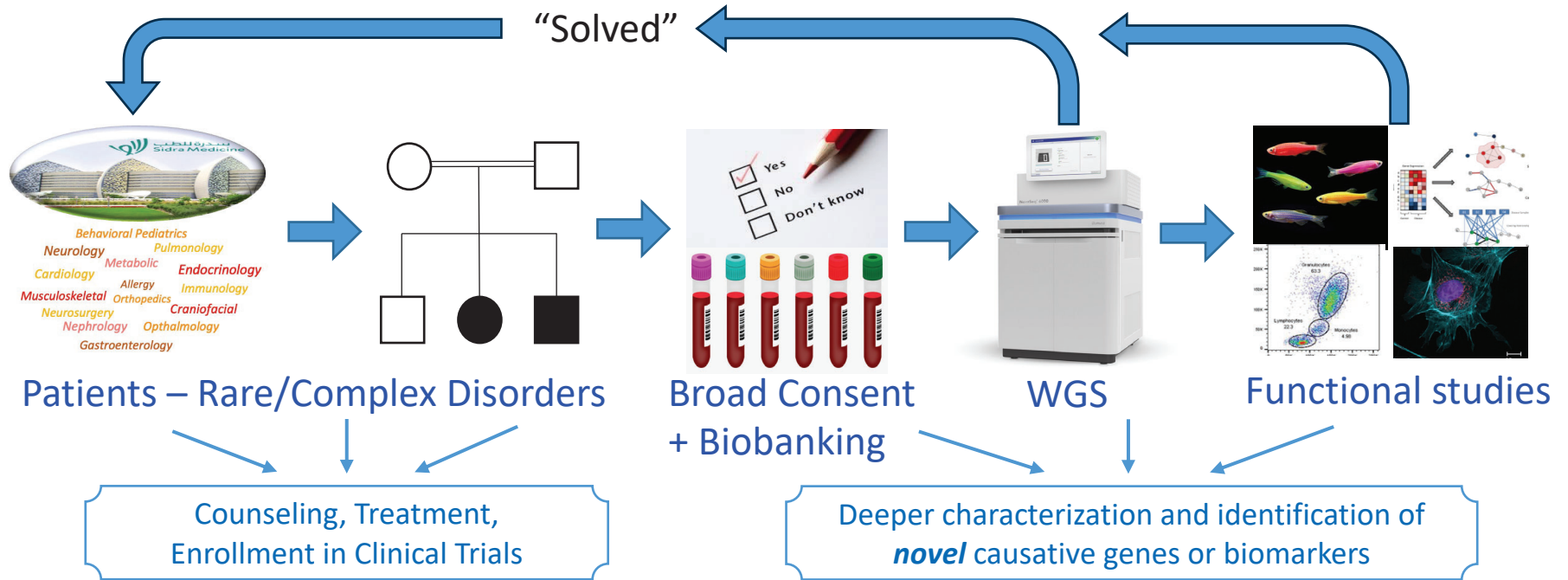


Sidra's Core Genome Lab



- National Reference Lab for Genomics
- Industry-leading sequencers/automation
 - Incl Long- & Ultra-Long Read Seq.
 - Certified service provider for PacBio
- CAP-accredited clinical Whole Genome Sequencing (cWGS)
- High-throughput biobanking/processing of many types of biological samples
- Integrated Bioinformatics & Data Science
- Array-based & qPCR-based panel testing
- Multi-omics discovery platforms
- Single-cell workflows

Sidra's Precision Medicine Program



- “Solved” families are fed back to the healthcare system,
 - Work with pharma/biotech to bring advanced therapies to Qatar
- “Unsolved” families undergo further research
 - Multi-omics, zebrafish, functional cellular assays, etc.

سد
dicine

High impact discoveries over the years...

- Publish ~100 papers per year on population genomics and rare disease; Avg IF ~8.7

First journal cover (2016)

Research

Indigenous Arabs are descendants of the earliest split from ancient Eurasian populations



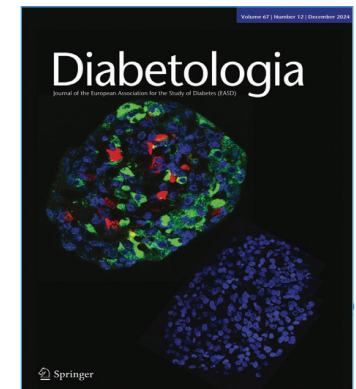
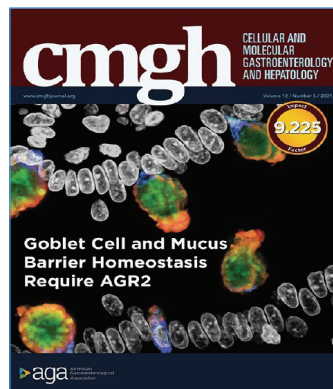
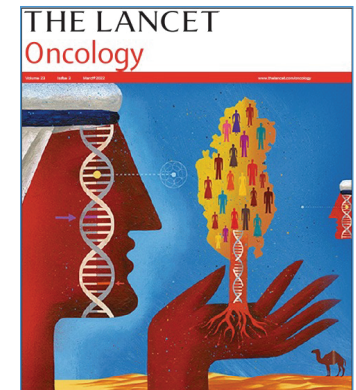
...

Latest journal cover (2025)

nature genetics

Article

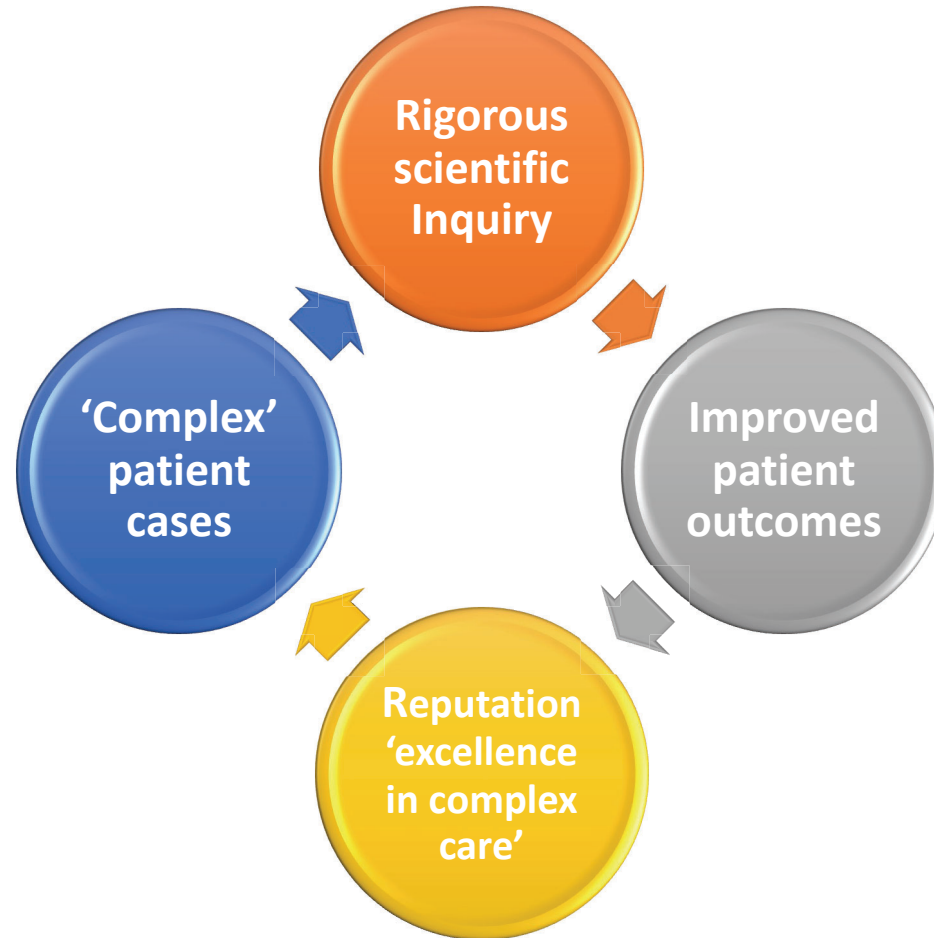
Near-complete Middle Eastern genomes refine autozygosity and enhance disease-causing and population-specific variant discovery



Clinical Implementation of Precision Medicine

The virtuous cycle of Precision Medicine

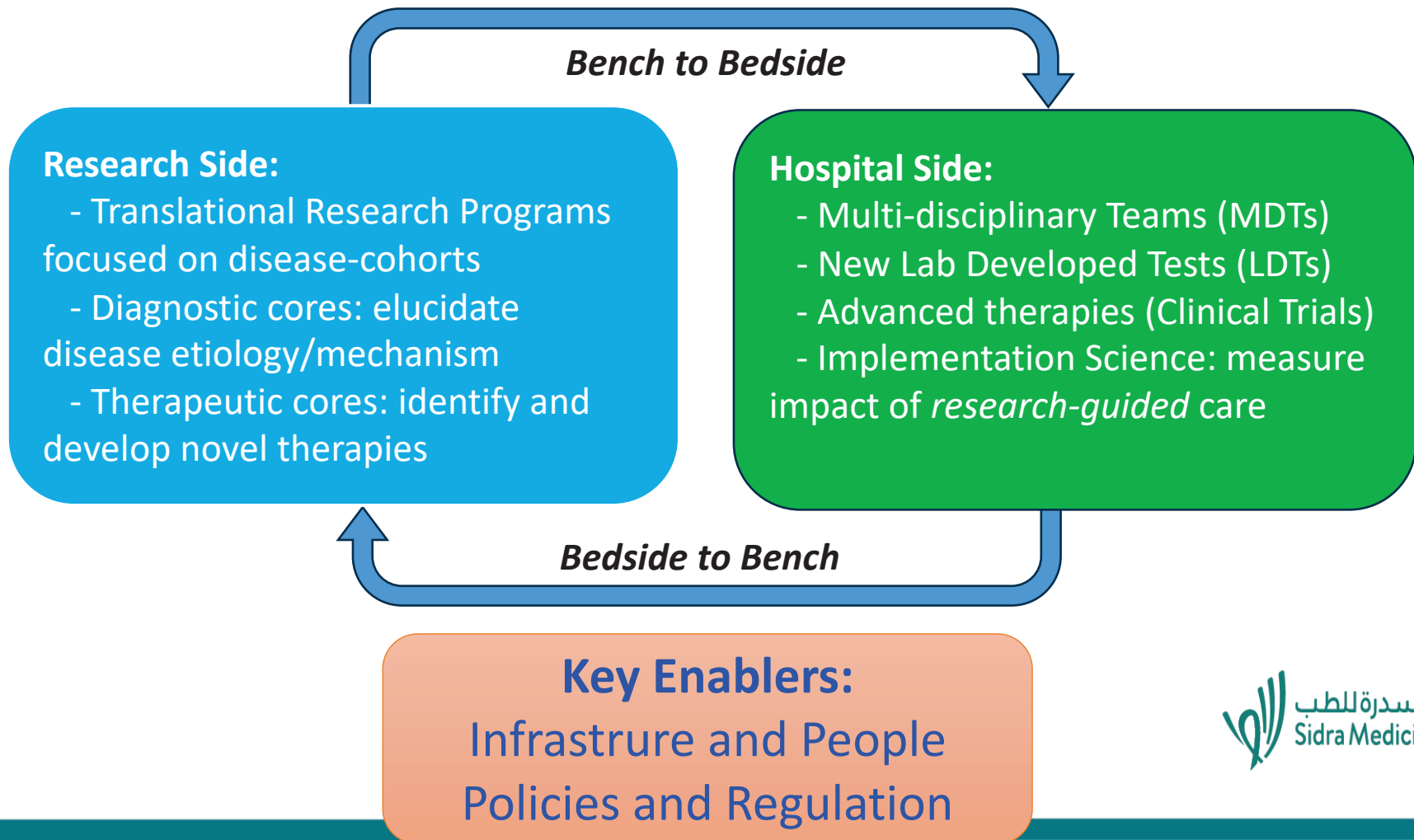
Precision Medicine = Research-guided care



'Every medical device, biomarker or lab test was once a research study'

Navigating Clinical Implementation

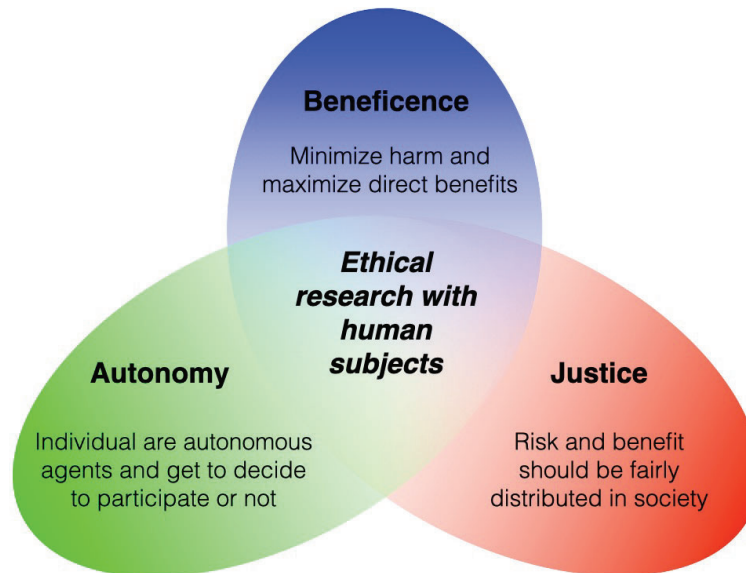
- Clinical Implementation of Precision Medicine is a ***constant feedback loop*** between bench and bedside



Policy and Regulation governing Clinical Implementation of Precision Medicine

Regulatory Landscape

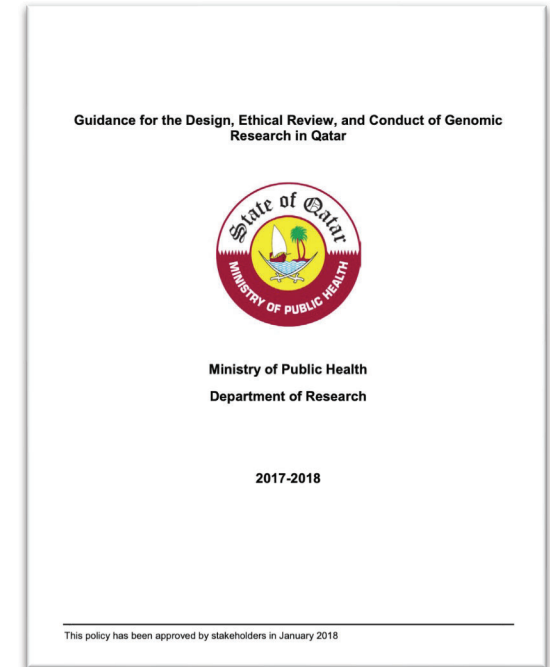
- Regulation and Ethics are key factors to govern, and enable, research-driven care
- In the Qatar/GCC, the 2 sources of regulatory authority are:
 - Ministry of Health – IRB (secular authority)
 - Religious Law – Islamic Bioethics (religious authority)



Regulatory Landscape

Regulation, IRB & Ethics

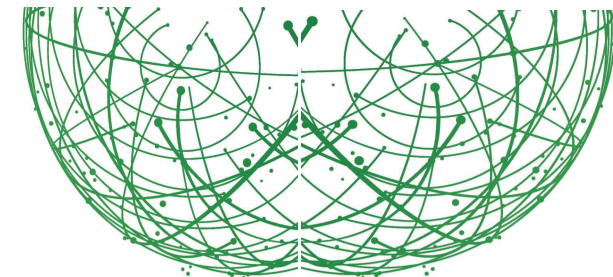
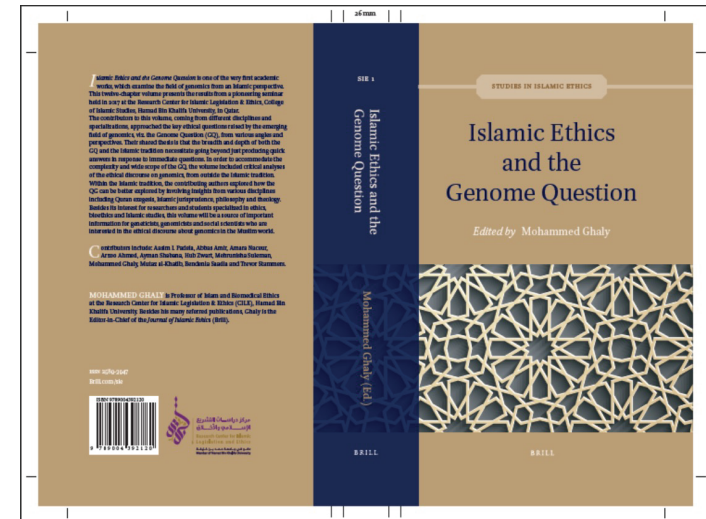
- Qatar's regulatory framework builds on the US 45 CFR 46 (Common Rule), Belmont Report and ICH-GCP
- Launched **Genomic Research** Guidelines in 2017:
 - Design and conduct of genomic studies
 - Biobanking + Data ownership, storage, and use
 - Patient Privacy, Risks, Ethical considerations
- Informed consent as the cornerstone of all biomedical research
 - Sample & data sharing
 - Commercialization including use by pharma
 - Recontact, future studies
- MoPH requires all IRB professionals to be certified (PRIM&R CIP)
- Flexible regulation (eg. stem cell use, expedited review categories)
- National reliance agreements facilitate multi-site collaborations
- Regular external audits/accreditations, including MoPH, JCI, AAHRPP



Regulatory Landscape

Islamic Ethics

- Biomedical research is a collective duty (*fard kifayah*), particularly as it stands to benefit society (*ummah*)
 - HGP: man's long journey to know oneself
- Guiding Principles: permissibility, beneficence and collective benefit (*maslaha*) over individual cost
- Higher Objectives of Shari'a:
 - Justice & equity, eg. in access to advanced diagnostics & access to new therapies
- Data sharing and return of actionable results is mandated where direct benefit or avoidance of harm, e.g. BRCA1/2
- Sensitive findings (e.g. non-paternity) – disclosure prohibited if harm outweighs benefit



علم الجينوم في منطقة الخليج:
إدارة النتائج العرضية من منظور
الأخلاق الإسلامية
تقرير خاص بالتعاون مع مركز دراسات التشريع الإسلامي والأخلاق

**GENOMICS IN THE GULF
REGION AND ISLAMIC ETHICS**
A Special Report in Collaboration with
the Research Center for Islamic Legislation and Ethics



محمد علي المحمدي
إبراهيم بن عبد الله
فؤاد الكبيسي
معدن زكري
سعيدة السليمان
توفيق بن عثمان

Mohammed Ghaly (editor)*
Emran Siddiqui
Fouzan Alkuraygi
Khafid Fahmy
Ma'n Zawal
Safid Jemal
Tawfiq Ben-Omran



Prof Mohammed Ghaly mghaly@hbku.edu.qa

Summary

- Prec. Med. thrives where research, care and ethics are **seamlessly integrated**
- In Qatar, multiple stakeholders work in tandem to **build capacity** and advance precision medicine implementation, from bedside to bench and back
- At Sidra Medicine, key **research programs** combine with **advanced core platforms** to turn research insights into improved patient outcomes
- Robust regulatory frameworks (IRB, genomic & clinical trial guidelines) **enable** responsible sharing, innovation, regular dialogue with regulatory bodies
- Islamic bioethics **encourages** scientific inquiry & participation in research
- Global collaborations and data sharing accelerate discovery & benefit patients not just within the region, but for the Arab diaspora globally

Contact info:

kfakhro@sidra.org

[@kfakhro](https://twitter.com/kfakhro)

Sidra's 11th Annual Precision Medicine Conference

Save the Date – 2-4 Dec, 2025



11 YEARS

**PRECISION MEDICINE
AND THE FUTURE
OF GENOMICS
PMFG SUMMIT 2025**

REGISTER NOW

2-4 DEC 2025
Doha, Qatar

سدر للطب
Sidra Medicine

سدر
medicine