

Practical Precision Medicine

Nothing is more expensive than a missed opportunity



معهد دسمان للسكري
Dasman Diabetes Institute



أحد مراكز
Center

**NASEM-KFAS Meeting
DC, USA**

16th October 2025



**Dr Ebaa Al Ozairi, BMSc (hons), MD, MRCP, CCT,ABPNS, FACN
Chief Medical Officer, Dasman Diabetes Institute
Fulbright Scholar- Harvard Medical School
Rabkin Fellowship-Medical Education- Harvard Medical School
Chair Clinical Care Committee- World Obesity Federation**

Nothing is
more
expensive
than a
missed
opportunity.

Who said this?

1. Warren Buffet
2. Elon Musk
3. J.P. Morgan
4. Michael Milkin



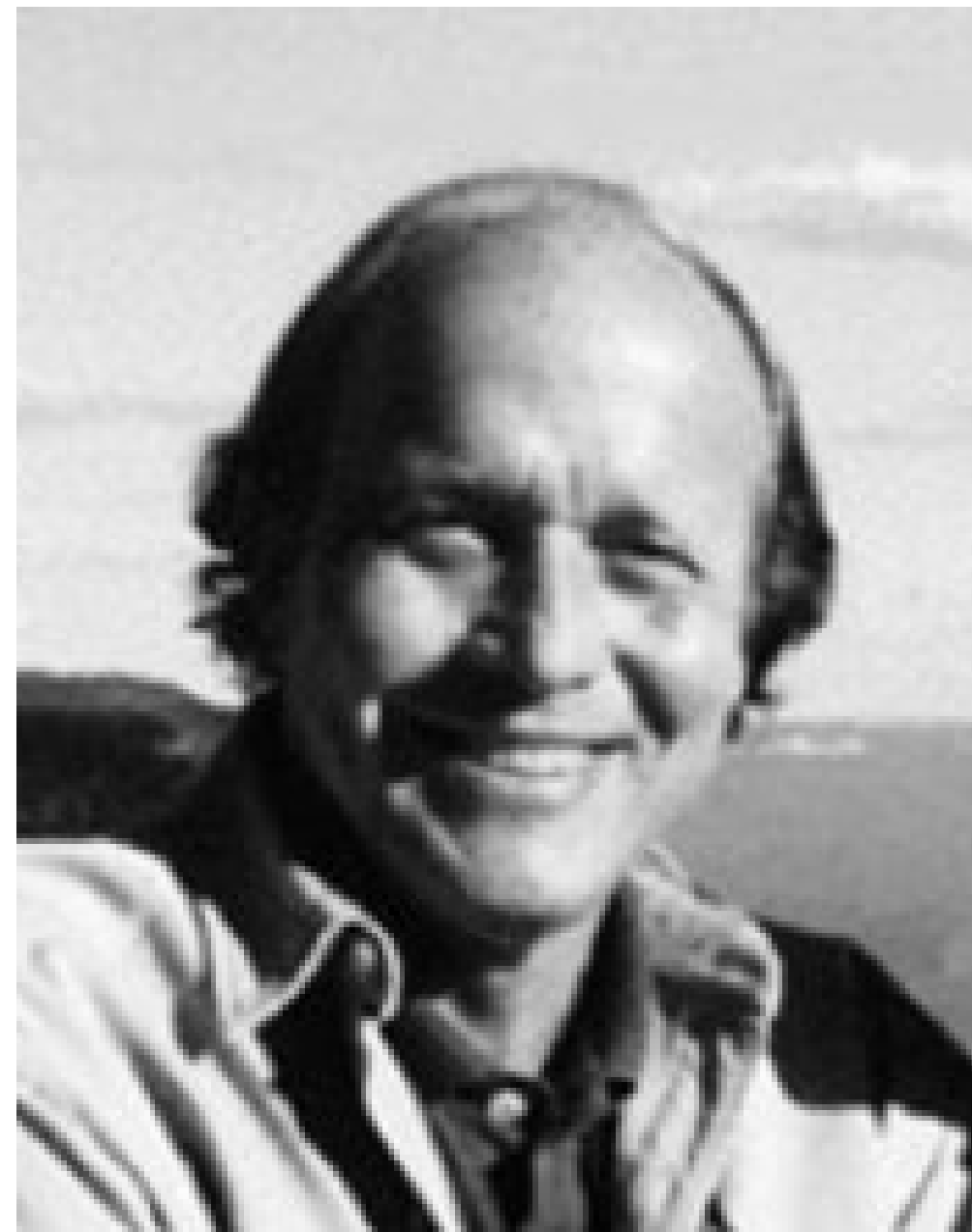
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مؤسسة الكويت للتقدم العلمي
Kuwait Foundation for the Advancement of Science

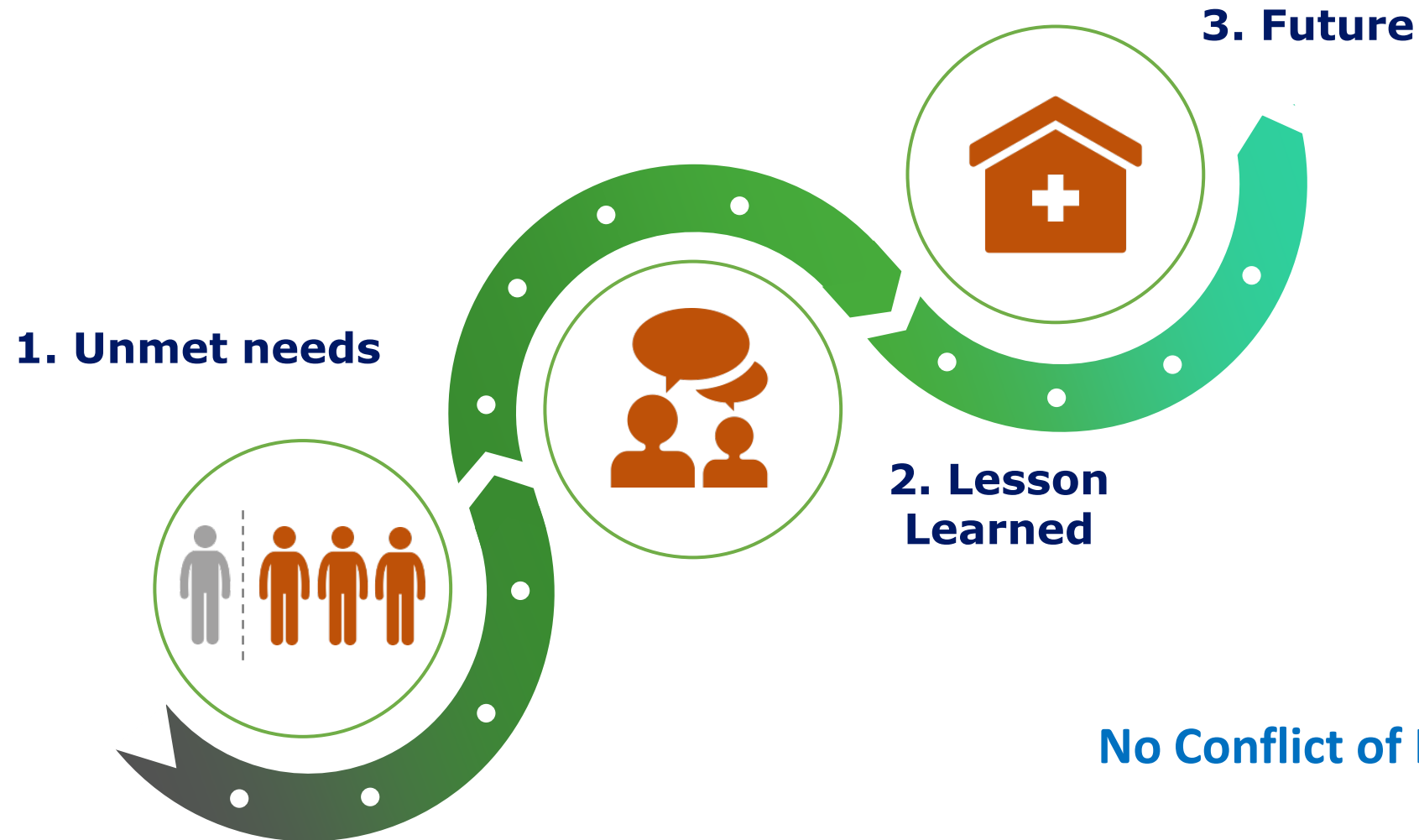
Horace Jackson
Brown, Jr.



A great age of enlightenment is dawning... biologic enlightenment



Outline



Who We Are

Dasman Diabetes Institute (DDI), established by the Kuwait Foundation for the Advancement of Sciences (KFAS) in 2006, is a leading not-for-profit institution dedicated to healthcare, research, and education, with a focus on the prevention, control, and treatment of diabetes and related conditions in Kuwait.



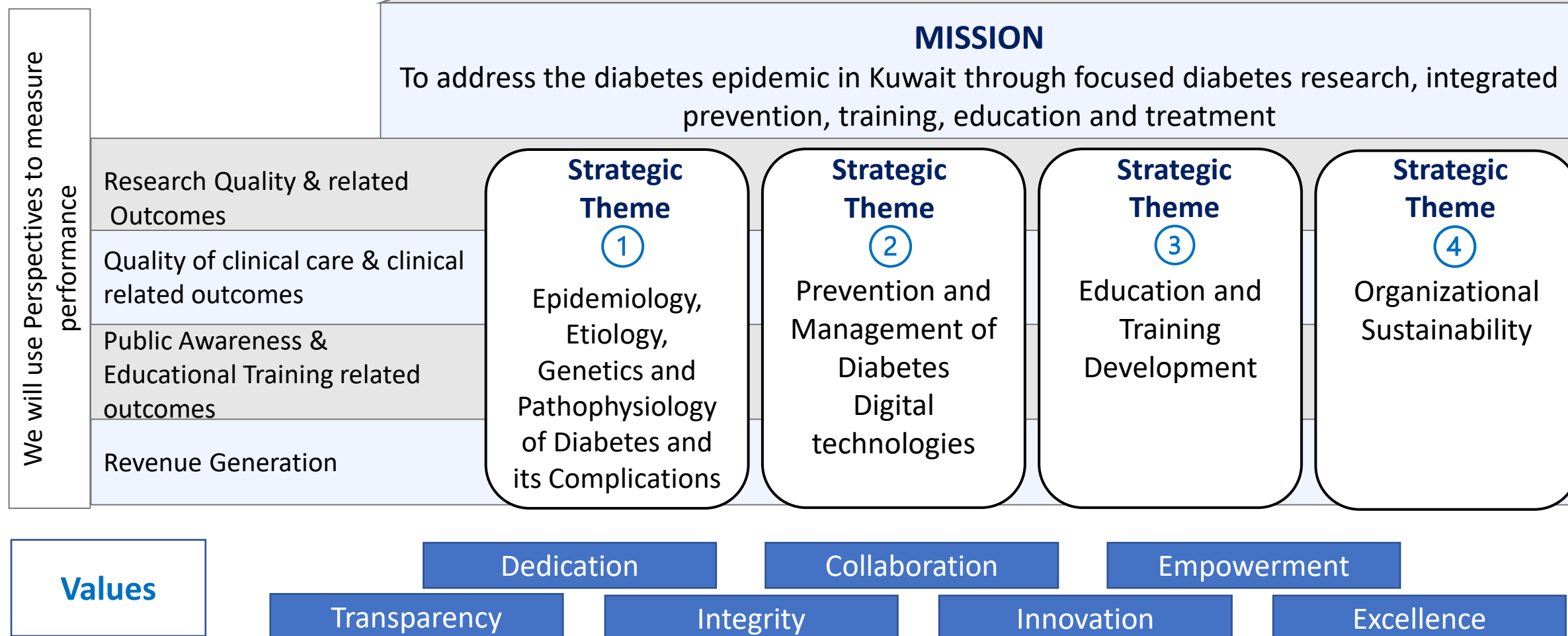
**Funded as a
subsidiary of KFAS
and MOH**

**Significant contributions to Kuwait
scientific advancements related to
diabetes and related comorbidities**

**Recognized as a
Center of Excellence**

DDI Strategy Summary

Perspectives



DDI Accreditations



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Center for the Advancement of Science



In 2024, DDI has consistently met all applicable standards to maintain its College of American Pathologists (CAP) accreditation, with the accreditation continuously renewed and valid until January 2026.



DDI has upheld its Health Insurance Portability and Accountability Act (HIPAA) verified approval, earning the HIPAA Seal of Compliance. The current Seal of Compliance certification was renewed in August 2024 and remains valid until August 2025.



DDI Maintained Accreditation Canada (AC) Diamond Level Certification Achieved in the third AC cycle of the QMENTUM Accreditation program.

DDI Reference Center for GCC and IDF Center of excellence



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Kuwait e technology award-KFAS

Award: Arab e Summit Tech award

Harvard Dubai grant- Digital
screening

Breakthrough grant for T1DM-
obesity and GLP1



© iStockphoto/Thinkstock

> [Diabet Med.](#) 2022 May;39(5):e14758. doi: 10.1111/dme.14758. Epub 2021 Dec 16.

Choosing the duration of continuous glucose monitoring for reliable assessment of time in range: A new analytical approach to overcome the limitations of correlation-based methods

Nunzio Camerlingo ¹, Martina Vettoretti ¹, Giovanni Sparacino ¹, Andrea Facchinetti ¹, Julia K Mader ², Pratik Choudhary ³ ⁴, Simone Del Favero ¹; Hypo-RESOLVE Consortium

Affiliations + expand

PMID: 34862829 DOI: [10.1111/dme.14758](#)

Randomized Controlled Trial > [BMC Public Health.](#) 2018 Nov 12;18(1):1249.

doi: 10.1186/s12889-018-6136-8.

Diabetes and TelecommunicationS (DATES) study to support self-management for people with type 2 diabetes: a randomized controlled trial

Ebaa Al-Ozairi ¹ ², Katie Ridge ³, Etab Taghadom ², Nicole de Zoysa ³, Clare Tucker ³, Kurtis Stewart ³, Daniel Stahl ³, Khalida Ismail ⁴

Randomized Controlled Trial > [JMIR Mhealth Uhealth.](#) 2020 Jul 15;8(7):e15448.

doi: 10.2196/15448.

A Wearable Technology Delivering a Web-Based Diabetes Prevention Program to People at High Risk of Type 2 Diabetes: Randomized Controlled Trial

Emily Staite ¹, Adam Bayley ¹, Ebaa Al-Ozairi ², Kurtis Stewart ¹, David Hopkins ³, Jennifer Rundle ⁴, Neel Basudev ⁵, Zahra Mohamedali ¹, Khalida Ismail ¹

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STAR TREK



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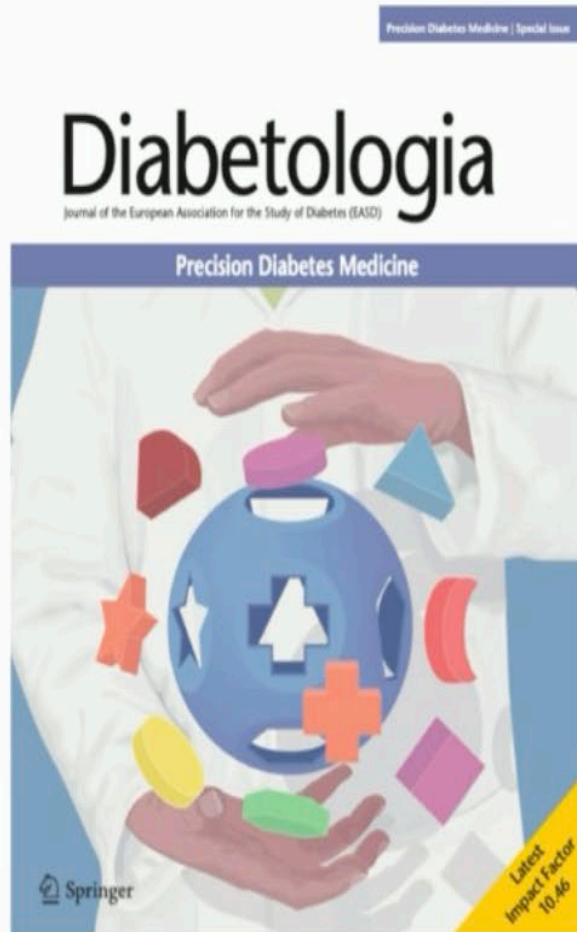


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Precision Diabetes

Precision Diabetes - the tailoring of diabetes treatment to the individual characteristics of the patient



Patient centred

Practical

Precision Medicine in Diabetes



Tailoring diagnostics, treatment and prevention to individual variability



Technologies: genomics, diagnostics, pharmacogenomics, AI-driven decision support



Goal: improve outcomes, reduce harm, and optimize cost-effectiveness

There is an unmet need for therapies that reduce CV events and support weight management

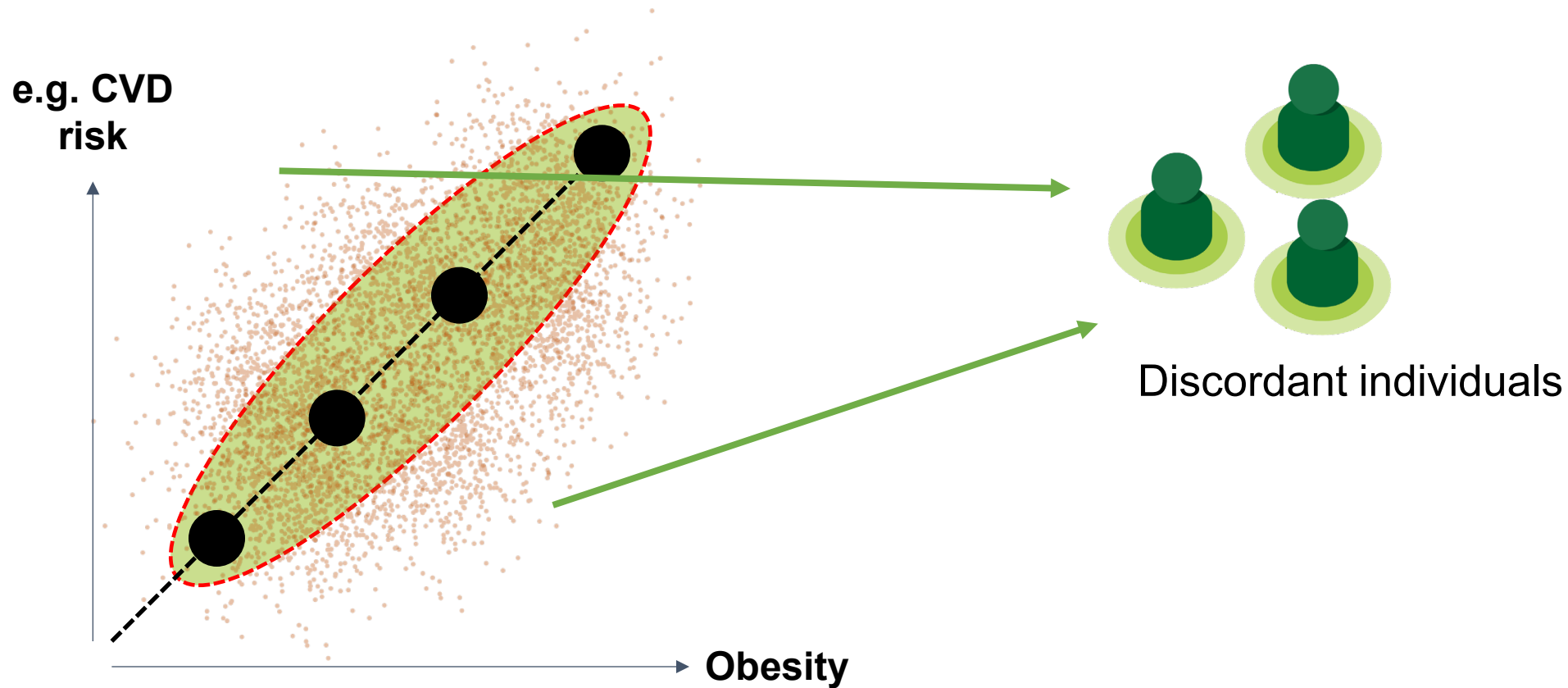


Effective interventions that lower CV events & death in this population are greatly needed!⁴

Conditions included in CVD definition may vary. CHD, coronary heart disease; CV, cardiovascular; CVD, cardiovascular disease.

1. Roth GA et al. J Am Coll Cardiol 2020;76:2982–3021; 2. WHO. Fact sheet – CVDs. Available at: [https://www.who.int/en/news-room/fact-sheets/detail/cardiovascular-diseases-\(cvds\)](https://www.who.int/en/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)). Accessed January 2023; 3. World Obesity Federation. World obesity atlas 2023. Available at: <https://www.worldobesity.org/resources/resource-library/world-obesity-atlas-2023>. Accessed August 2023; 4. GBD 2015 Obesity Collaborators. N Engl J Med 2017;377:13–27.

What we know: Risk doesn't always follow BMI



Remote Diabetes Care

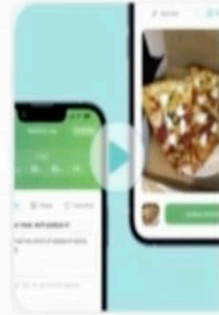
- Technology is enabling us to connect with PWD in new ways
- Remote diabetes services :
 - Virtual Visits/Telehealth
 - Remote Physiologic Monitoring

Diabetes related education/coaching/support can be off these services

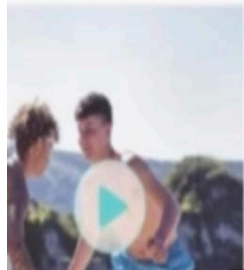




AI in Mobile Apps



Glucose management app that helps track daily glucose performance, understand how lifestyle impacts glucose levels and help predict the future of your blood sugar management



Understanding Lifestyle Insights

1 min 13 sec

AI-driven insights that help you understand your





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What is needed to deliver precision medicine
for type 2 diabetes in the clinic?

What is needed to deliver precision medicine for type 2 diabetes in the clinic?

Evidence supporting a 'precision approach' in diabetes

- Dissecting the aetiology of diabetes
 - Monogenic diabetes
- Treatment choice in type 2 diabetes
 - Identifying patients who are high risk for CVD
 - Identifying which drug lowers glucose best for an individual
- Genetics and cardiometabolic disease outcomes
 - Clopidogrel and CYP2C19
 - Metformin, CUBN and B12 deficiency
 - Digoxin, ABCB1 and Mortality

Tackling the implementation gap

- iDiabetes – implementing precision diabetes care

Precision Diabetes in Type 2 diabetes

Drugs differ



Patients differ



Multiple classes of glucose lowering agents

Mechanism of glucose lowering differs between classes,

Side-effects differ between classes

Non-glycaemic benefits differ between classes

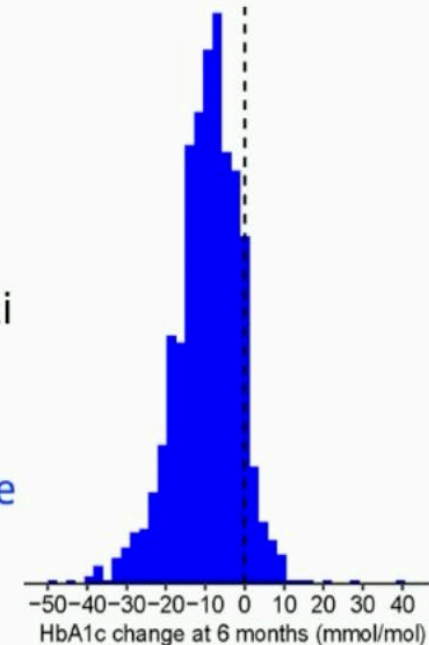
Precision prescribing

Based on patient characteristics occurs now:

Non-glycaemic benefits: e.g. Heart Failure SGLT2i

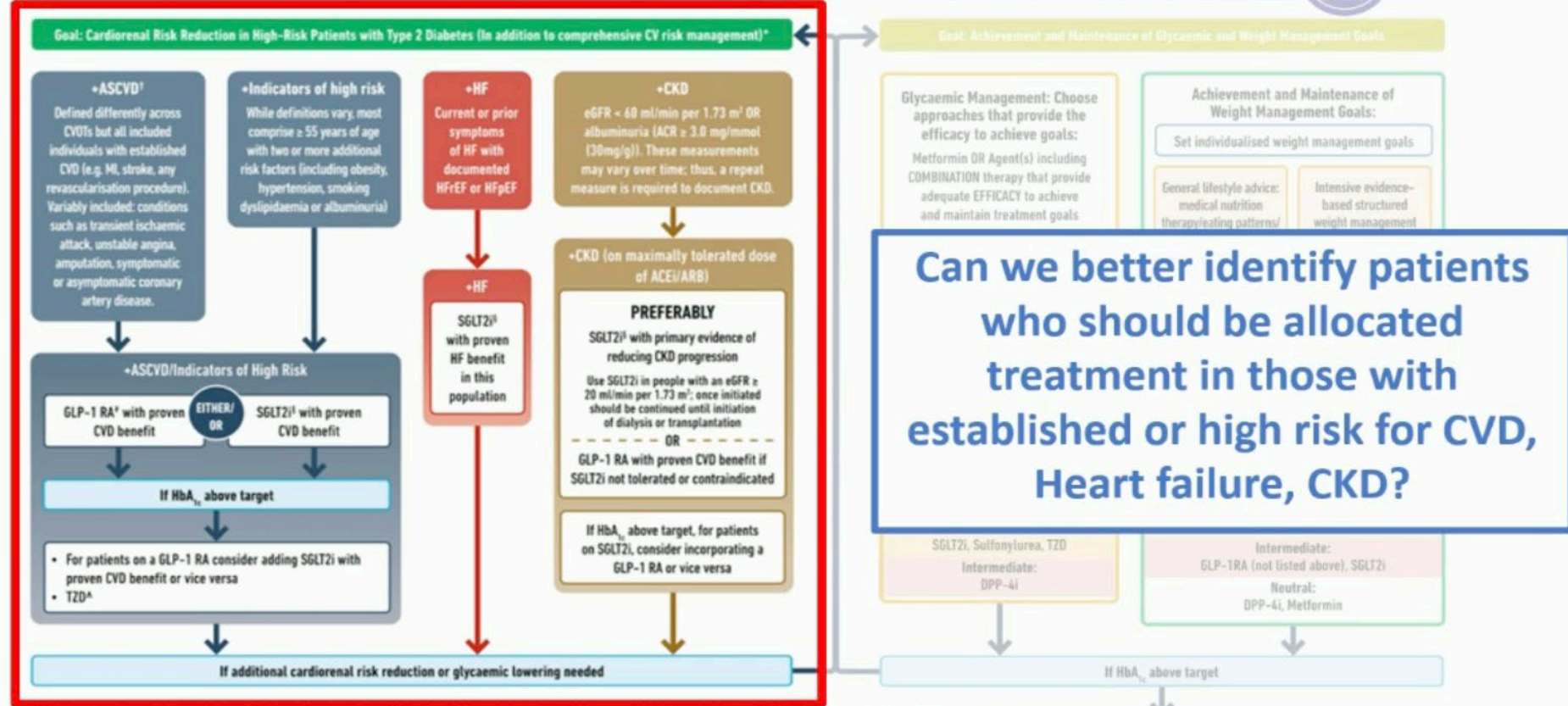
Side-effects: e.g. recurrent thrush avoid SGLT2i

Glucose lowering: NOT KNOWN and very variable



USE OF GLUCOSE-LOWERING MEDICATIONS IN THE MANAGEMENT OF TYPE 2 DIABETES

HEALTHY LIFESTYLE BEHAVIOURS; DIABETES SELF-MANAGEMENT EDUCATION AND SUPPORT (DSMES); SOCIAL DETERMINANTS OF HEALTH (SDOH)

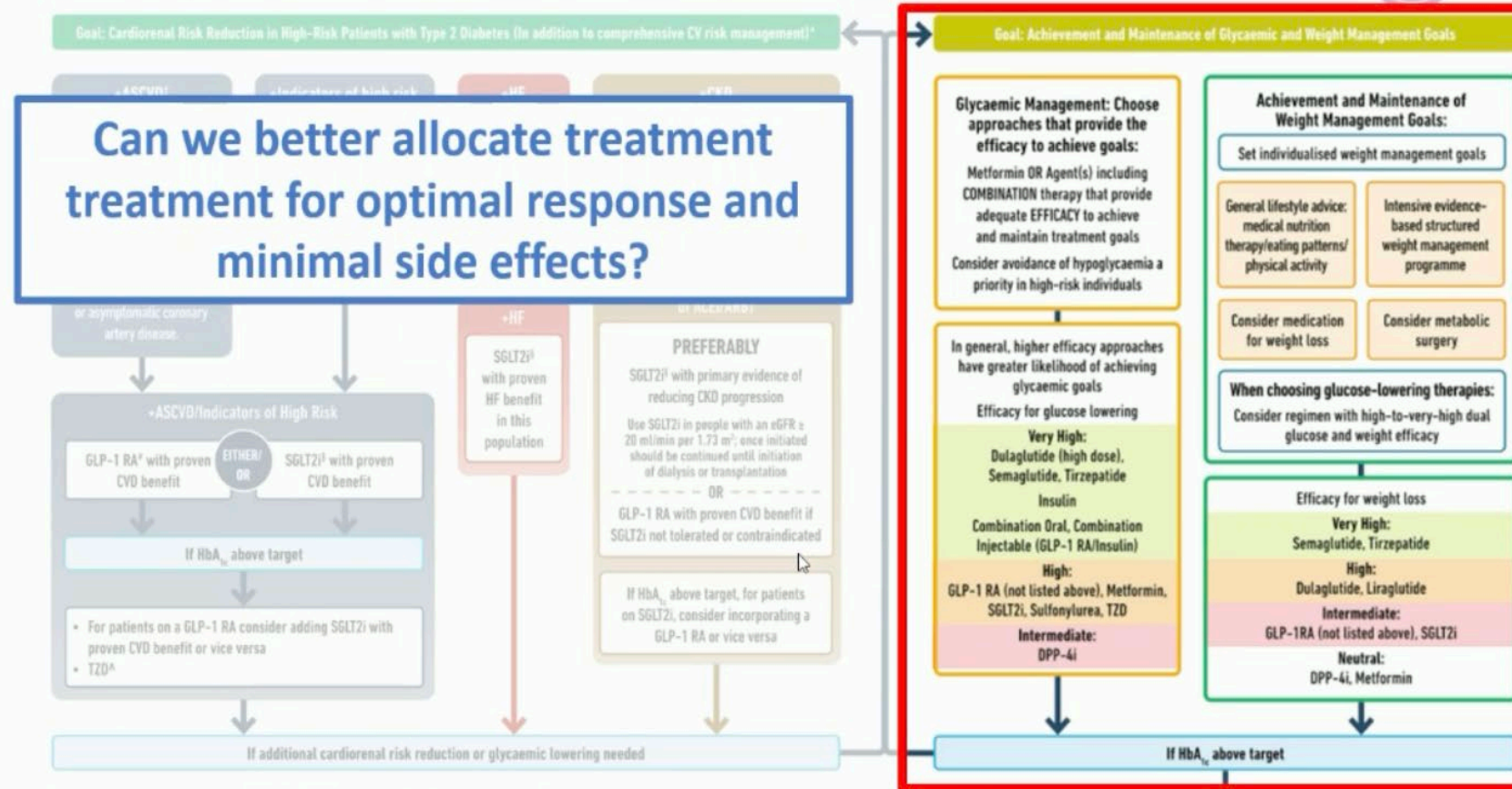


ACEi, Angiotensin-Converting Enzyme Inhibitor; ACR, Albumin/Creatinine Ratio; ARB, Angiotensin Receptor Blocker; ASCVD, Atherosclerotic Cardiovascular Disease; CGM, Continuous Glucose Monitoring; CKD, Chronic Kidney Disease; CV, Cardiovascular; CVD, Cardiovascular Disease; CVOT, Cardiovascular Outcomes Trial; DPP-4i, Dipeptidyl Peptidase-4 Inhibitor; eGFR, Estimated Glomerular Filtration Rate; GLP-1 RA, Glucagon-Like Peptide-1 Receptor Agonist; HF, Heart Failure; HFpEF, Heart Failure with preserved Ejection Fraction; HFrEF, Heart Failure with reduced Ejection Fraction; HF, Hospitalisation for Heart Failure; MACE, Major Adverse Cardiovascular Events; MI, Myocardial Infarction; SDOH, Social Determinants of Health; SGLT2i, Sodium-Glucose Cotransporter-2 Inhibitor; TZD, Type 2 Diabetes; TZD, Thiazolidinedione.

* In people with HF, CKD, established CVD or multiple risk factors for CVD, the decision to use a GLP-1 RA or SGLT2i with proven benefit should be independent of background use of metformin.† A strong recommendation is warranted for people with CVD and a weaker recommendation for those with indicators of high CV risk. Moreover, a higher absolute risk reduction and thus lower numbers needed to treat are seen at higher levels of baseline risk and should be factored into the shared decision-making process. See text for details.‡ Low-dose TZD may be better tolerated and similarly effective. § For SGLT2i, CV renal outcomes trials demonstrate their efficacy in reducing the risk of composite MACE, CV death, all-cause mortality, MI, HF and renal outcomes in individuals with T2D with established/high risk of CVD. ¶ For GLP-1 RA, CVOTs demonstrate their efficacy in reducing composite MACE, CV death, all-cause mortality, MI, stroke and renal endpoints in individuals with T2D with established/high risk of CVD.

USE OF GLUCOSE-LOWERING MEDICATIONS IN THE MANAGEMENT OF TYPE 2 DIABETES

HEALTHY LIFESTYLE BEHAVIOURS; DIABETES SELF-MANAGEMENT EDUCATION AND SUPPORT (DSMES); SOCIAL DETERMINANTS OF HEALTH (SDOH)



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Identify barriers to goals:

- Consider DSMES referral to support self-efficacy in achievement of goals
- Consider technology (e.g. diagnostic CGM) to identify therapeutic gaps and tailor therapy
- Identify and address SDOH that impact on achievement of goals

Development of a 5-drug model for glucose lowering



Model Development

UK routine clinical data, Jan 2004 – Oct 2020

People with type 2 diabetes aged 18-79

Any non-insulin initiation after first-line

N=100,107 drug initiations (development set)

Robust Independent validation

2 Independent UK clinical cohorts

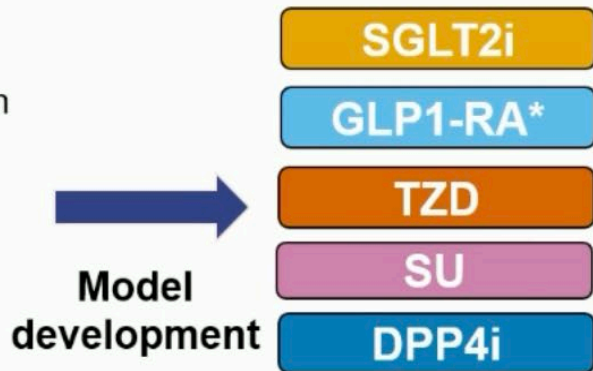
Geographical n=85,395 Temporal n=26,664

Trial Data: 3 large RCT

9 routine clinical features

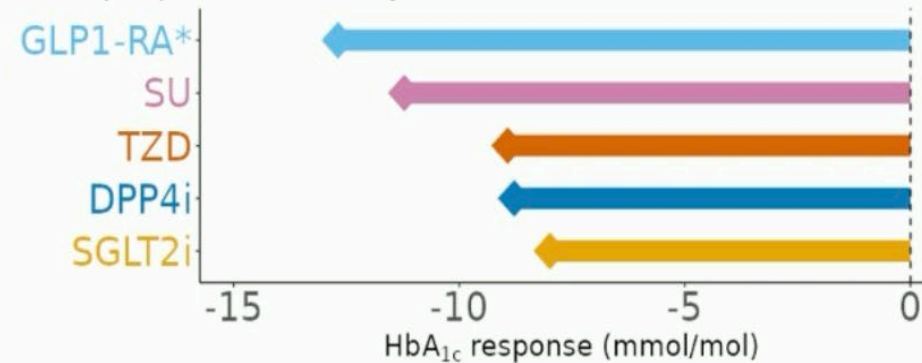
Current age
Sex
Diabetes duration
HbA1c
BMI
eGFR
HDL-c
Total cholesterol
ALT

5 drug classes



*excluding semaglutide

Predicted 12-month response



<https://www.diabetesgenes.org/t2-treatment/>

Or search "Exeter Diabetes App"

Dennis et al. Lancet 2025



Cardiometabolic disease & Type 2 diabetes

CHF

NT-proBNP
hsTroponin

SGLT2i

CAD

Clinical risk score
PRS

GLP-1RA or
SGLT2i

CKD

Cystatin C
Urine ACR

SGLT2i

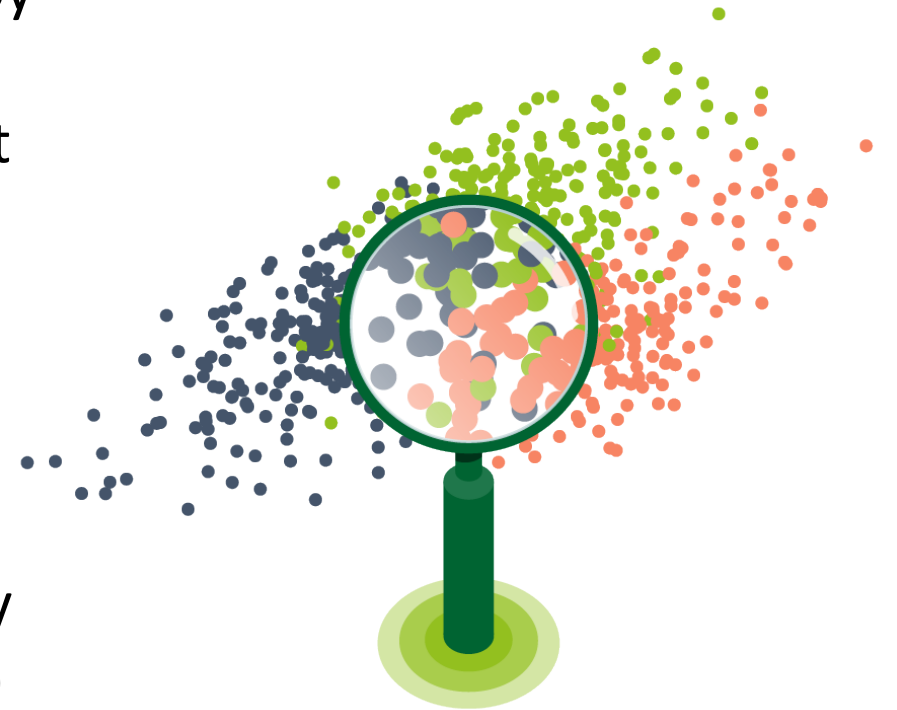
NAFLD/NASH

Fib-4
ELF

Pioglitazone or
Semaglutide

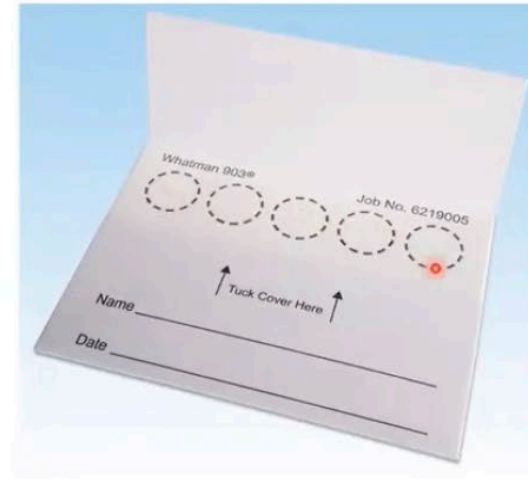
Changing how we understand Diabetes and obesity

- We uncovered different phenotypic profiles defined by specific patterns of biomarker discordance with BMI that were robustly replicated across four independent large-scale population-based cohorts
- Demonstrates substantial heterogeneity in the link between BMI and risk
- Conceptualizing these as different subtypes of obesity and diabetes requires further validation (future work)



Coral, le Roux et al
Nature Medicine
2024

Screening test – Dried Blood Spot



Clinical Immunology Services

Venous sample → DBS



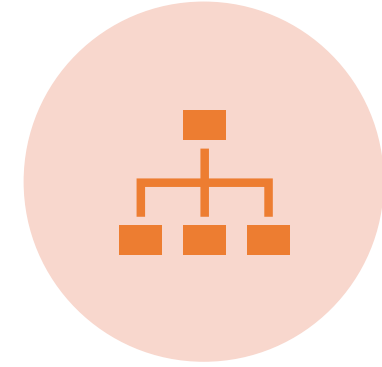
Kuwait: Healthcare Context (operational focus)



PUBLIC HEALTH SECTORS
WITH CENTRAL TERTIARY
HOSPITALS



OPPORTUNITIES:
CENTRALIZED ID,
GROWING DIGITAL
HEALTH INITIATIVES



CONSIDERATIONS:
WORKFORCE CAPACITY,
PROCUREMENT
PATHWAYS, REGULATORY
FRAMEWORK

Opportunities

- Study local population to study the pathophysiology, prevention and treatment of T2DM and Obesity
 - Unstudied very high T2DM risk population
 - High rate of consanguinity
 - High rate of patient retention in clinical studies
 - Initiate quality improvement/translational projects to improve the care of T2DM patients
 - Use of advanced imaging to stage adverse changes of diabetes and its complications

Barriers/challenges in implementation



Educational/Training gaps: Low confidence/
awareness in pharmacogenetics and lack of
guidelines
Limited workforce



Automation Elements

Implement automation for
improved workflow functions

Regulatory and ethical hurdles : Clear guidelines are need for
use AI and genetic data, Slow regulatory frameworks



Electronic Health Records Systems Enhancement

Data infrastructure and Quality:
Need for high quality, diverse data,
privacy concerns, Systems for data
capture



Capacity Building Program

Leadership training program with
international collaborations. Cultural and
clinician adoption: education, and
change management



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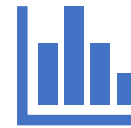
Clinical Workflow Integration (Future)



Patient
encounter ->
clinical
indication for
testing



Order placed in
EHR with
standardized test
codes



Sample
processing and
lab reporting
with structured
results



CDS highlights
actionable
findings at point-
of-care



Multidisciplinary
review and
documentation
of decisions

Let's prepare
for what's
coming.



Why Precision medicine Matters for Kuwait

In General

High Burden of Diabetes and metabolic diseases

Potential for early detection, prevention and more effective therapies

Strategy alignment: Kuwait health authorities , exploring Ai , genomics biomarkers



Medical Education, Training and Skill Development Programs

Patient Engagement

Public Engagement

Patient and Family Advisory Group

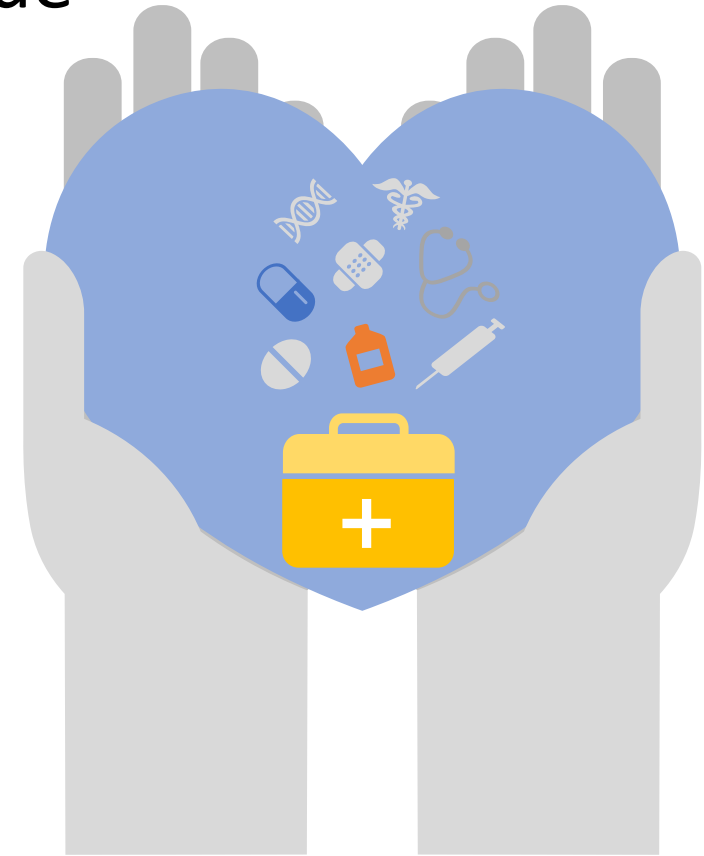
Largest Cohort for MRI in T1DM/ Collaborations

We are obliged for better outcome for our patients



Conclusions

- The future of Diabetes and obesity care will include
 - Recognising the biological basis for the disease
 - Needing more and different treatments for the subtypes of the disease
 - Not blaming our patients for their disease or if they don't respond
 - **Clients are at the Heart of our services:** Public awareness and engagement

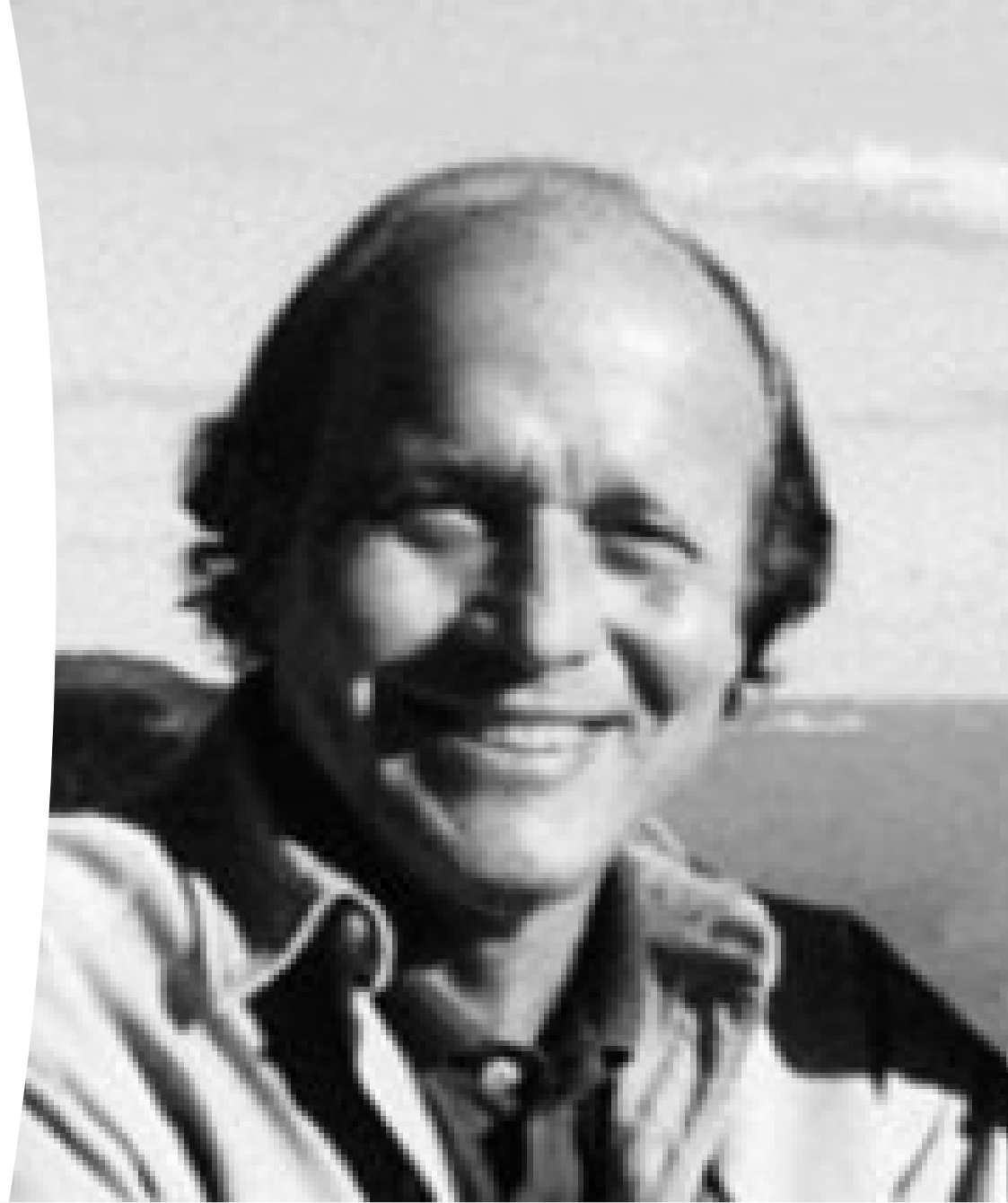


Business And Society

AI Won't Replace Humans — But Humans With AI Will Replace Humans Without AI



Twenty years from now you will be more disappointed by the things that you didn't do than by the ones you did do. So throw off the bowlines. Sail away from the safe harbour. Catch the trade winds in your sails. Explore. Dream. Discover."





Thank you

Ebaa.alozairi@dasmaninstitute.org