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An Innovative Approach to Type 2 Diabetes Management in Primary Care: The PACE-DM Model (Almoutaz Model)

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Abstract

Background: Type 2 diabetes mellitus (T2DM) management is progressing beyond HbA1c-centred treatment toward comprehensive care addressing cardiovascular and kidney disease, obesity, hypoglycaemia, habits and behaviours, and patient-reported outcomes. Advances in cardiorenal-protective therapies, weight management, continuous glucose monitoring, digital health, and artificial intelligence offer opportunities for more proactive, customized primary care.

Objective: To propose the PACE-DM (Predict–Assess–Customize–Engage) model as a groundbreaking framework for proactive, personalized, and digitally supported T2DM management in primary care.

Approach: PACE-DM integrates four interrelated components. Predict uses clinical data, longitudinal trends, and validated risk tools to identify future glycaemic, cardiovascular, renal, and metabolic risk. Assess evaluates the patient comprehensively, including glycemia, obesity, cardiovascular and kidney disease, lifestyle, mental health factors, and personal considerations. Customize applies phenotype-directed pharmacological and lifestyle interventions, including weight management and, where appropriate, consideration of diabetes remission. Engage incorporates shared decision-making, multidisciplinary care, continuous glucose monitoring, telehealth, and digital technologies to strengthen self-management and longitudinal support.

Conclusion: PACE-DM shifts primary diabetes care from reactive, glucose-centered management toward proactive, risk-driven, phenotype-directed, and person-centered care. Implementation studies are required to evaluate its clinical effectiveness, feasibility, scalability, and cost-effectiveness within real-world primary care settings.

Keywords: Type 2 diabetes; primary care; PACE-DM; personalized care; digital health.

Introduction

Type 2 diabetes mellitus (T2DM) remains one of the most important chronic diseases encountered in primary care [1]. Historically, diabetes management has largely focused on glycaemic control, with glycated haemoglobin (HbA1c) as the principal marker of treatment success [2]. Clinicians typically review patients periodically, measure HbA1c, and intensify glucose-lowering therapy when the target is not met [1]. Although this approach has improved glycaemic management, contemporary evidence demonstrates that T2DM is considerably more complex than an isolated disorder of blood glucose [1]. People with type 2 diabetes often have other health issues, like being overweight, having high blood pressure, abnormal cholesterol levels, kidney disease, heart failure, and cardiovascular disease [1]. They may also have liver problems and struggle with behaviours that aren't good for them [1]. So, focusing only on blood sugar control doesn't necessarily mean they're getting the best care overall. To really take care of someone with type 2 diabetes, you need to look at all these related health issues, not just their blood sugar levels. Good blood sugar control is only part of the picture; you also must address these other health problems to help them stay healthy. The contemporary primary-care approach should consequently shift from reactive glucose management toward proactive cardiometabolic health management. Primary care is particularly suitable for this transformation because it provides continuity, prevention, early detection, chronic disease management and coordination between different healthcare professionals.

To operationalise this concept, the PACE-DM model (Figure 1) is proposed as an innovative framework for T2DM management in primary care:

P - Predict

A - Assess

C - Customise

E - Engage

These four interrelated components create a recurrent cycle in which risk is predicted, the whole patient is assessed, treatment is customised according to clinical phenotype and patient priorities, and the patient stays actively engaged through multidisciplinary and digitally supported care.

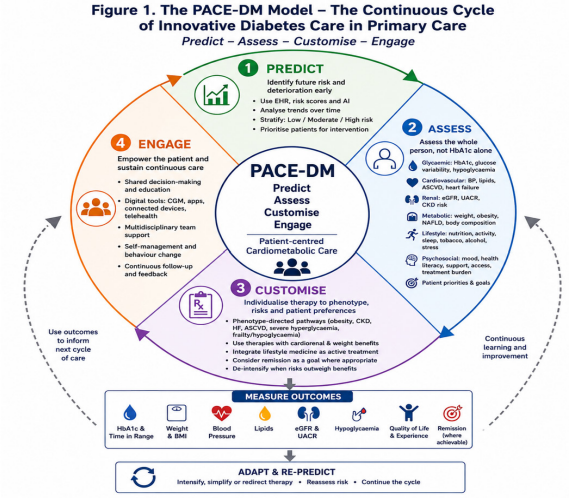

Figure 1: *The PACE-DM model (Predict - Assess - Customize - Engage)*

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Practical implementation of the model

P - Predict

Move from Reactive to Predictive Diabetes Care is a new concept. The **(Predict–Assess–Customize–Engage) -** PACE-DM model or Almoutaz model is an innovation shifts care from treating abnormalities after they occur to identifying patients at risk of deterioration before complications become established. When health care providers assess how well someone is managing their diabetes, they usually check a few key things: blood sugar control, blood pressure, and cholesterol levels. But these days, electronic health records contain much more information that could help predict future health outcomes.

A predictive diabetes assessment could integrate [1]:

- Age and diabetes duration
- HbA1c and previous HbA1c trajectory
- Glucose variability and hypoglycaemia
- Body mass index and weight trajectory
- Blood pressure
- LDL cholesterol and other lipid parameters
- Smoking status
- Estimated glomerular filtration rate (eGFR)
- Urine albumin-to-creatinine ratio (UACR)
- Previous cardiovascular disease
- Heart failure
- Medication history
- Adherence
- Socioeconomic and psychosocial factors

The important innovation is not simply collecting these measurements, but combining them to answer a clinically meaningful question:

What complication is this patient most likely to develop?

What can primary care do now to prevent it?

For example, a patient may have an HbA1c of 6.8% and therefore appear to have “controlled diabetes.” However, progressive albuminuria, declining eGFR, obesity and uncontrolled blood pressure may indicate substantial future renal and cardiovascular risk.

A glucose-centered approach could classify this patient as adequately controlled, whereas a predictive model would classify the individual as requiring intensified cardiorenal intervention.

Artificial Intelligence (AI) and Predictive Analytics:

Artificial intelligence and machine learning can help improve how we diagnose and treat diabetes [3]. Through analysing large amounts of patient data over time, these systems can spot patterns that may not be obvious to doctors. For example, they can see whether someone's blood sugar levels are slowly worsening, whether they're gaining weight, or whether their kidneys are being damaged. They can even notice if someone is having lots of low blood sugar episodes or if their treatment plan isn't working. This can help health care providers catch problems early and modify treatment plans before things get worse. It's like having a super-smart computer that helps us take better care of people with diabetes.

AI could also support identification of care gaps, for example:

CKD + no appropriate kidney-protective therapy → clinical review; repeated HbA1c elevation → treatment-intensification review; recurrent hypoglycaemia → medication de-intensification review; increasing UACR → renal-risk review; obesity + inadequate metabolic control → weight-management review.

AI systems should support health care providers decisions, not replace them. This is because health care providers need to consider many factors, such as the patient's other health problems, why a treatment might not be suitable, what the patient wants, and the bigger picture of the patient's health. AI can provide helpful suggestions, but a health care providers expertise is still needed to make the final decision.

Predictive AI Model for Diabetes Care:

From Reactive Management to Anticipatory Intervention: The Predictive Diabetes Care Model

The new Predictive Diabetes Care Model – Artificial Intelligence (PDC-AI) , is changing the way we manage diabetes. Instead of focusing only on blood sugar levels and waiting for problems to arise, this model intends to predict when a patient might develop complications.

It asks two important questions:

Which complication is the patient most likely to get?

What can doctors do now to prevent it?

This approach is more proactive, looking at the big picture to keep patients healthy. By doing so, it can identify potential problems early and enable prompt interventions, which can greatly reduce the risk of complications. The goal is to provide better care and improve clinical results.

PDC-AI brings together health information from six main areas:

Who are the patient and what diseases they have

Blood sugar levels

Risk of heart problems

Kidney health

Changes in body size

How they're treated, including their behaviour and psychological health.

Some important details it looks at include how old the patients are, how long they've had diabetes, their current and past blood sugar control, how much their blood sugar levels vary, if they've had low blood sugar, their body mass index and weight changes, blood pressure, cholesterol levels, if they smoke, how well their kidneys are working, if they've had heart disease or heart failure, what medicines they're taking, if they're taking their medicines as prescribed, and other social and mental health factors that can affect their care.

Model Design

The model functions through five sequential stages (figure 2):

Figure 2: *The five stages that run the model.*

The AI system should examine current values and how they change over time [3]. For instance, if the UACR keeps going up, it could be a sign of a problem even before kidney disease gets bad. Similarly, if HbA1c gets worse slowly, or if someone has low blood sugar a lot, or if they gain weight, or if their eGFR keeps going down, it could mean that the treatment is not working or that new problems are coming up, even before the usual warning signs appear. This can help health care providers catch and fix issues early, before they become serious.

By tracking these changes, the AI can identify potential problems and alert doctors to act sooner.

The predictive layer generates separate probabilities for clinically important outcomes [4], including:
Chronic kidney disease progression
Atherosclerotic cardiovascular disease
Heart failure
Severe or recurrent hypoglycaemia
Sustained glycaemic deterioration
Obesity-related metabolic deterioration
Overall diabetes-related complication risk
Rather than producing a single generic risk score, PDC-AI creates an individualized risk phenotype. A patient might therefore be classified as "high renal risk/moderate cardiovascular risk/low hypoglycaemia risk," allowing treatment priorities to reflect the dominant predicted complication.

From Prediction to Clinical Action

Prediction alone has limited value unless it results in actionable care. The model therefore includes a clinical-action layer that links detected risks to evidence-based review prompts (Table 1).
Examples include:
Rising UACR + falling eGFR → renal-risk review
CKD + absence of appropriate kidney-protective therapy → cardiorenal treatment review
Repeated HbA1c elevation or worsening trajectory → treatment-intensification review
Recurrent hypoglycaemia → medication de-intensification and safety review
Obesity + deteriorating metabolic control → structured weight-management review
Uncontrolled blood pressure + high cardiovascular risk → cardiovascular-risk intensification
Smoking + elevated cardiorenal risk → intensive smoking-cessation intervention
The system should additionally identify missed monitoring, overdue laboratory investigations, medication non-adherence, therapeutic inertia, and potentially inappropriate treatment combinations.

Example of Predictive Reclassification

Clinical scenario:

Consider a patient with an HbA1c of 6.8%. A traditional glucose-centered assessment may classify diabetes as adequately controlled. However, if the same patient demonstrates progressively increasing albuminuria, declining eGFR, increasing body weight, and persistent hypertension, PDC-AI would recognize a trajectory toward cardiorenal deterioration.

The clinical output could therefore read:

Current glycaemic status: Controlled.
Predicted dominant risk: High renal and cardiovascular risk.
Trajectory: Deteriorating.
Priority: Cardiorenal prevention.

Recommended action:

Review blood pressure control, kidney-protective therapy, weight management, medication adherence, renal monitoring, and overall cardiovascular-risk reduction.
So, the model keeps the current disease management separate from the risk of future complications.

Table 1: *Proposed PDC-AI Risk Matrix.*

Clinical domain	AI Input	Predicted signal	Primary-care response
Glycaemia	HbA1c, trajectory, glucose variability	Future glycaemic deterioration	Review adherence and intensify therapy
Hypoglycaemia	Episodes, glucose data, medications	Severe/recurrent hypoglycaemia	De-intensify or modify treatment
Kidney	eGFR, eGFR slope, UACR trajectory	CKD progression	Cardiorenal review
Cardiovascular	BP, LDL-C, smoking, CVD history	ASCVD events	Intensify cardiovascular prevention
Heart failure	HF history, CKD, medications, comorbidities	HF deterioration/admission	HF-focused treatment review
Weight	BMI, weight trajectory	Obesity-related deterioration	Structured weight-management intervention
Treatment	Medication history, adherence	Therapeutic failure/inertia	Medication optimization
Psychosocial	Socioeconomic and psychological factors	Reduced adherence/self-management	Targeted multidisciplinary support

Human-in-the-Loop Decision Support

PDC-AI is meant to help health care providers make decisions, not make decisions on its own. It looks for patterns, estimates how likely something is to happen, and flags things that need attention. Then it suggests areas that need review. But the doctor is still in charge of understanding what the AI is saying and making the final decisions. This distinction matters because AI may not completely capture treatment contraindications, multimorbidity, frailty, adverse effects, patient preferences, affordability, social circumstances, or prior treatment failure. Consequently, every recommendation should allow clinicians to accept, modify, defer, or reject the suggested action and document the reason.

Proposed AI Output

Predictive Dashboard for Primary Care

For regular health check-ups, the Diabetes Predictive Dashboard Profile gives health care providers a clear, concise overview of a patient's current health status and possible risks (figure 3). For example, a patient might seem to be handling their condition well right now, but the dashboard might show their health is worsening over time. It

might even predict that they're at risk of developing chronic kidney disease. The dashboard considers many factors, including kidney and heart health, blood sugar levels, and the risk of low blood sugar. It also considers things like high blood pressure, obesity, and smoking. What's useful is that the dashboard identifies areas where the patient needs more care, such as protecting their kidneys, controlling blood pressure, quitting smoking, and losing weight. This helps doctors prioritize what to do to prevent serious health problems, like heart and kidney disease, from worsening. By using the dashboard, doctors can turn predictions into action and create a significant impact in their patients' lives.

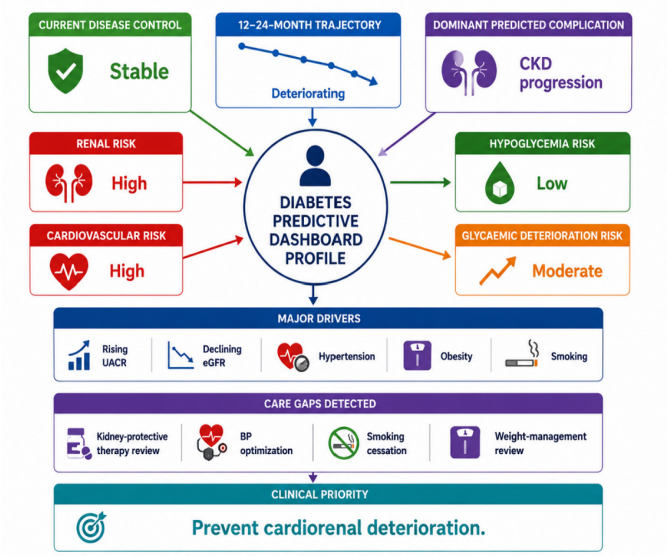

Figure 3: *Predictive Dashboard for Primary Care.*

Conceptual Equation

Diabetes risk is more than just about blood sugar levels. It's about the whole picture, including how your health changes over time, other health problems you might have, the treatments you're on, your lifestyle, and how you're feeling emotionally. By putting all these pieces together, doctors can get a better idea of your risk of developing diabetes complications and start you on a personalized plan to prevent them (figure 4). This approach, called PACE-DM, helps doctors understand that diabetes risk is complex and always changing, and that it's not only about one thing, like blood sugar control. It's about looking at everything that's going on with your health and using that information to plan that's just right for you.

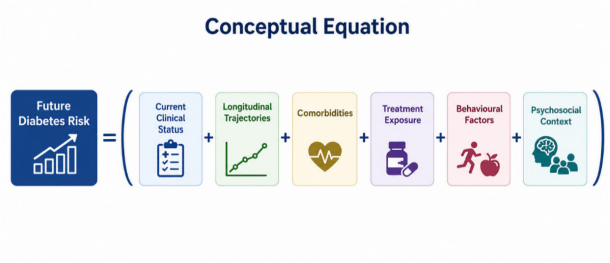

Figure 4: *Conceptual Equation.*

So, what makes PDC-AI innovative isn't just about using machine learning with diabetes data. The main benefit is that it takes the clinical information that's normally collected and turns it into a personalized prediction of what's likely to happen next. Then it provides a recommendation doctors can understand, telling them what they can do now to prevent it. This matters because it helps primary care providers act early. The idea is to use the information already available to drive genuine change in patient care. By doing this, PDC-AI is changing how we treat diabetes, making it more focused on preventing problems before they start.

This approach could move diabetes management from episodic treatment of abnormal measurements toward continuous, anticipatory, personalized, and complication-focused care (Figure 5).

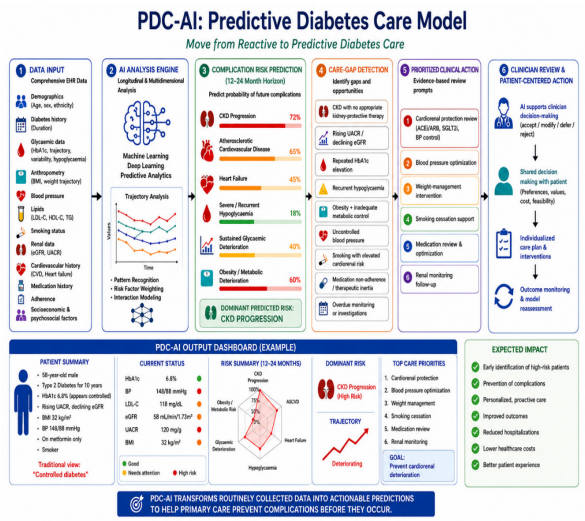

Figure 5: *Predictive Diabetes Care Model: PDC – AI.*

A - Assess: The second component of PACE-DM is comprehensive assessment. Modern diabetes care requires concurrent consideration of glycaemic, cardiovascular, renal, metabolic, lifestyle and psychosocial health (Figure 6). The purpose is to determine the patient's dominant clinical phenotype.

Glycaemic Domain Assessment includes HbA1c, fasting and postprandial glucose (where appropriate), hypoglycaemia, glucose variability, and continuous glucose monitoring information when available. HbA1c remains important, but it becomes one component of a larger clinical picture rather than the sole measure of diabetes control.

Cardiovascular Domain:

Assessment should identify hypertension, dyslipidaemia, smoking, established ASCVD, heart failure and other cardiovascular risk factors. Heart health is especially important in type 2 diabetes. The truth is that heart disease is still a leading cause of illness and death for people with this condition. So, stopping heart attacks, strokes, and heart failure should be a top priority when managing diabetes - it's not just a side issue, but a key part of the overall treatment plan.

Renal Domain:

Kidney health should receive similar attention. Knowing how well your kidneys are working is important. Two important tests, eGFR and UACR, help us better understand what's going on. Even if your kidneys are still filtering well, you might already be losing protein in your urine, which is a sign of kidney disease. If we catch kidney disease early, we can start treating it before it's too late and your kidneys are permanently damaged. This way, we can try to prevent serious problems. It's all about acting early to protect your kidneys.

Metabolic and Obesity Domain:

Obesity should no longer be regarded simply as a lifestyle issue accompanying diabetes. In many individuals, excess adiposity represents a central driver of insulin resistance and metabolic disease. Assessment should therefore consider:

- BMI
- Waist circumference where appropriate
- Recent weight change
- Previous weight-management attempts
- Medications causing weight gain;
- Eating behaviour

• Physical activity
• Functional capacity
• Readiness for weight-management intervention

This allows the clinician to shift from a purely glucose-lowering strategy to a weight-centered metabolic strategy where appropriate.

Lifestyle Domain:

Every structured diabetes assessment should consider the major modifiable lifestyle determinants of health: Nutrition – Physical activity – Sleep – Tobacco – Alcohol – Stress – Social connection.

Instead of documenting simply "lifestyle advice given," clinicians should identify which behavioural factor is currently contributing most strongly to the patient's metabolic risk.

Psychosocial and Social Domain:

Diabetes management also depends upon health literacy, psychological health, financial circumstances, family support, medication access, cultural preferences, and the patient's ability to self-manage. A theoretically ideal treatment that the patient cannot afford, understand, or sustain is unlikely to deliver meaningful long-term benefit.

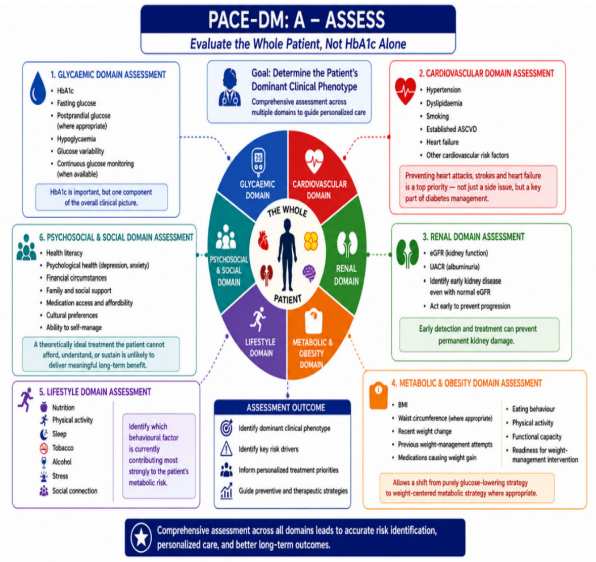

Figure 6: *PACE – DM: A – Assess.*

Customize: Phenotype-Directed Diabetes Management.

This part of the approach matters because it marks a major shift from how diabetes was treated in the past. Rather than asking only: "Which medication should be added next to lower HbA1c?" PACE-DM asks: "What is the dominant clinical problem in this individual, and which intervention provides the greatest overall benefit?" This creates multiple practical treatment pathways (Figure 7).

Obesity-Predominant Phenotype:

For patients in whom obesity is a major driver of metabolic dysfunction, treatment ought to prioritize clinically meaningful weight reduction alongside glycaemic control. Management may include structured nutritional intervention, physical activity, behavioural therapy, appropriate obesity pharmacotherapy, and metabolic/bariatric surgery for eligible individuals [1]. Modern GLP-1–based therapies have further changed the therapeutic landscape because appropriately selected patients can now attain significant weight reduction while simultaneously improving glycemia [1].

Chronic Kidney Disease (CKD) -Predominant Phenotype:

For patients with albuminuria or reduced kidney function, renal protection becomes a major therapeutic priority. Management may include optimized blood-pressure control, renin-angiotensin system blockade where indicated, SGLT2 inhibition, and other evidence-based cardiorenal therapies according to clinical eligibility [5]. The treatment objective changes from: "Lower glucose." to: "Preserve kidney function while simultaneously managing glucose and cardiovascular risk."

Heart-Failure Phenotype:

When it comes to treating people with heart failure, doctors should choose medications that have been proven to help with heart failure, if it's the right choice for the patient. Recently, a new class of medications called SGLT2 inhibitors has changed how we approach this [6]. These medications not only lower blood sugar levels but also grant other benefits that can greatly improve heart health.

Atherosclerotic cardiovascular disease (ASCVD) -Predominant Phenotype:

Patients with established ASCVD or very high cardiovascular risk require aggressive management of the entire cardiovascular risk profile. This entails managing blood pressure, controlling lipid levels, helping patients quit smoking, encouraging physical activity, and guiding healthy eating. It also includes choosing diabetes medications shown to benefit heart health, when necessary [7].

Hyperglycaemia-Predominant Phenotype:

When patients present with very high glucose levels, symptoms of hyperglycaemia, or signs of the body breaking down, doctors need to act fast. First, they need to get the patient's glucose levels back under control [1]. This might mean using a combination of treatments or insulin, depending on how difficult the situation is and what's going on with the patient.

Frailty/Hypoglycaemia-Predominant Phenotype:

Innovation does not always mean adding treatment. For older adults, patients with frailty, cognitive impairment, multimorbidity or recurrent hypoglycaemia, the most appropriate intervention may be de-intensification and simplification [8]. The goal becomes safe, sustainable glycaemic management while reducing hypoglycaemia, polypharmacy, and treatment burden [8]. Customized therapy means striking the right balance: knowing when to add treatment and when to step back and simplify.

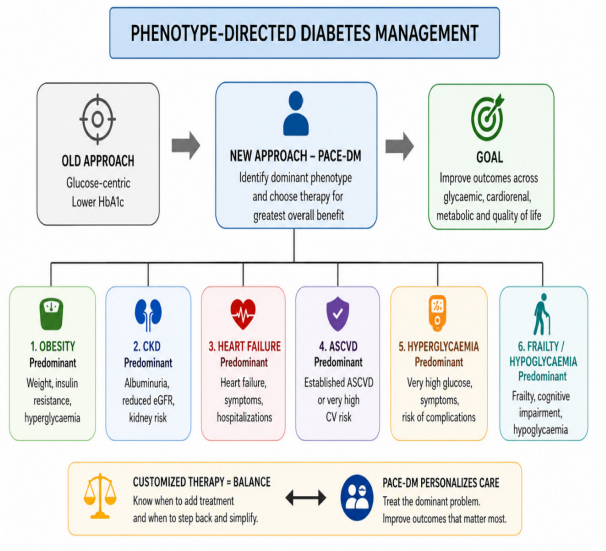

Figure 7: *Customize P- phenotype – Directed Diabetes Management.*

E — Engage: From Episodic Visits to Continuous Care.

The fourth pillar recognizes that patients manage diabetes every day,

while customary healthcare interacts with them only intermittently (figure 8). People can easily spend thousands of hours every year figuring out what to eat, how to stay active, when to take their meds, and how to keep their glucose levels in check. But when it comes to talking to healthcare professionals, it's usually just a handful of hours. The innovative primary-care model should therefore create a continuous connection between patient and healthcare team. Continuous Glucose Monitoring CGM represents an important example [9,10]. Instead of relying exclusively on HbA1c-which provides an average over several months-CGM can demonstrate:

- Time in range
- Glucose variability;
- Nocturnal glucose patterns;
- Postprandial excursions;
- Frequency and duration of hypoglycaemia;
- Responses to food, activity and medication

This can change how doctors talk to patients, from looking at one test result to understanding the bigger picture of their glucose levels.

Connected Devices:

Future primary-care systems could integrate: CGM + home BP + weight + physical activity + medication adherence + patient-reported outcomes into one digital platform.

The objective is not to overwhelm clinicians with data. Instead, algorithms could flag exceptions that need attention.

For example: Stable patient → routine monitoring; Rapid weight increase → automated review flag; Repeated hypoglycaemia → urgent medication review; Increasing glucose trajectory → earlier intervention; Increasing home BP → cardiovascular-risk review. This creates an exception-based monitoring system, permitting healthcare teams to focus attention on patients who need intervention most.

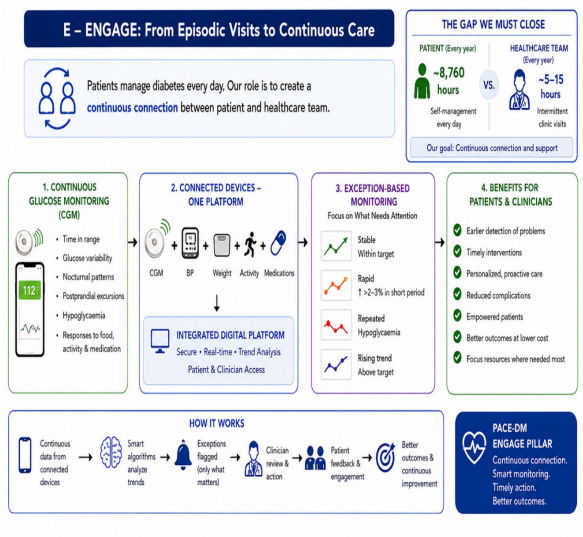

Figure 8: *Engage - from Episodic Visits to continuous care.*

Multidisciplinary Micro-Team Care.

The volume and complexity of T2DM make a physician-only model increasingly difficult to sustain. PACE-DM therefore proposes a primary-care diabetes micro-team, potentially comprising (Table 2):

Not every patient requires every professional. The intensity of multidisciplinary support should correspond to risk. Low-risk stable patients may primarily receive digitally supported self-management and routine reviews, while patients with uncontrolled disease or multiple complications receive more intensive multidisciplinary intervention.

Table 2: *Function of the multidisciplinary team.*

Multidisciplinary Team Member	Core Function
Family Physician	Provides clinical leadership, coordinates care, and manages multimorbidity.
Nurse	Conducts clinical monitoring, patient education, and structured follow-up.
Pharmacist	Optimizes pharmacotherapy, identifies medication-related problems, and supports adherence.
Dietitian	Provides individualized medical nutrition therapy tailored to clinical and lifestyle needs.
Diabetes Educator	Develops diabetes self-management knowledge, skills, and confidence.
Health/Lifestyle Coach	Supports behavioural goal setting, motivation, lifestyle change, and long-term maintenance.
Specialist	Provides targeted expertise and consultation for complex or advanced disease.

Multidisciplinary Versus interdisciplinary Approaches to Diabetes Care

Diabetes mellitus is a complex chronic disease requiring management of glycemia, cardiovascular risk factors, lifestyle behaviours, psychological well-being, and diabetes-related complications. Consequently, efficient diabetes care frequently requires input from several healthcare disciplines. However, multidisciplinary (11) and inter disciplinary [12] approaches differ in how much professionals collaborate and integrate their care.

In a multidisciplinary approach [11], physicians, diabetes nurses, dietitians, pharmacists, psychologists, podiatrists, and other professionals contribute their expertise to patient care, but may assess and manage the patient relatively independently. Each discipline develops recommendations within its expert domain, and coordination often occurs through referrals, clinical documentation, or periodic team communication. Although this model provides access to specialist expertise, it can also lead to piecemeal decision-making and duplication of care.

When managing diabetes, a team-based approach can make all the difference. This means healthcare professionals work together, share information, and make decisions as a team, with the person with diabetes at the center. They talk regularly, set joint goals, and coordinate their efforts to help the person manage their condition. For instance, they might modify medications, provide guidance on healthy eating and exercise, help with weight management, offer emotional support, and work to prevent complications - all with the same overall objectives in mind. By working together, medical professionals can provide more comprehensive, tailored care that may lead to better outcomes for people with diabetes. This approach concentrates on cooperation, shared decision-making, and putting the person with diabetes in the driver's seat. It's a more holistic way to manage the condition, considering the physical, emotional, and social aspects of living with diabetes.

For contemporary diabetes management, interdisciplinary care may therefore offer advantages by improving care coordination, reducing fragmentation, and supporting individualized, comprehensive, and continuous diabetes management.

The Diabetes Digital Control Center.

A particularly innovative extension of PACE-DM is creating a Primary-Care Diabetes Digital Control Center. Rather than waiting for patients to attend scheduled appointments, a digital dashboard could continuously stratify the registered diabetes population.

Table 3: *The traffic-light risk stratification.*

Risk Level	Clinical Indicators	Recommended Action
GREEN — Stable	Stable HbA1c, blood pressure, kidney function, and weight	Routine follow-up and continued monitoring
AMBER — Deteriorating	Worsening HbA1c, increasing weight, rising albuminuria, elevated BP, or reduced treatment adherence	Early intervention by nurse, pharmacist, and/or family physician
RED — High Risk	Severe hyperglycaemia, recurrent hypoglycaemia, rapidly declining kidney function, or other high-risk deterioration	Expedited clinical assessment and appropriate escalation of care

Measuring What Matters: A Diabetes Outcome Dashboard

A major limitation of traditional diabetes quality measurement is excessive dependence on HbA1c [13]. Traditional diabetes quality assessment has relied heavily on HbA1c, which only partially captures the multidimensional burden of diabetes (13). The PACE-DM outcome dashboard broadens assessment beyond glycaemic control to incorporate obesity, cardiovascular and kidney health, lifestyle behaviours, treatment compliance and burden, patient-reported outcomes, and long-term disease trajectory (Table 4). Key measures include time in range and hypoglycaemia, weight and waist circumference, blood pressure and LDL-C, eGFR and UACR, lifestyle behaviours, quality of life, complications, and hospitalization. Where clinically appropriate, diabetes remission may represent an advanced outcome. This multidomain approach shifts quality assessment from a single biomarker to a person-centered evaluation of metabolic health, organ protection, treatment experience, and long-term outcomes, delivering a more comprehensive measure of diabetes care effectiveness.

Table 4: *PACE-DM proposes a broader outcome dashboard.*

Domain	Proposed measures
Glycaemia	HbA1c, time in range, hypoglycaemia
Obesity	Weight, BMI, waist circumference
Cardiovascular	BP, LDL-C, smoking status
Kidney	eGFR, UACR
Lifestyle	Activity, nutrition, sleep, tobacco
Treatment	Medication adherence and burden
Patient	Quality of life, self-management
Disease trajectory	Complications and hospitalisation
Advanced outcome	Diabetes remission where appropriate

This helps to create a better understanding of what it means to manage diabetes successfully. A patient whose HbA1c falls from 8.5% to 7.0% has clearly improved. However, a patient who simultaneously loses substantial weight, stops smoking, improves blood pressure and lipid control, reduces albuminuria, increases physical acivity and avoids hypoglycaemia has achieved a much broader health benefit.

10. The PACE-DM Clinical Cycle

The PACE-DM approach is a new way to manage diabetes, providing care in an ongoing sequence rather than in short, separate episodes. This system brings together multiple key elements, including predicting patient risk, assessing individual characteristics, creating bespoke treatment plans, encouraging patient involvement, monitoring outcomes from multiple angles (Table 5), and adjusting treatment as needed. Because it's designed to be cyclical, PACE-DM allows care to adjust and change as the patient's condition, treatment response, other health issues, and personal priorities evolve (Figure 9). This means care can be customized to the individual's particular needs and can shift as those needs change. By taking a more dynamic, responsive approach, PACE-DM intends to provide more effective, patient-focused care for people with diabetes.

Here's how it starts: health care providers try to predict what health problems a patient might develop in the future, like heart issues, kidney problems, or diabetes. This is called PREDICT. It's not only about checking blood sugar levels; it's about looking at the big picture to see whether the patient needs to take steps to prevent these problems or protect their organs. This helps doctors identify at-risk patients and connect them with the care they need sooner.

Table 5: *PACE-DM innovative approach vs Traditional diabetes care*

Domain	Traditional diabetes care	PACE-DM innovative approach
Overall philosophy	Reactive disease management	Proactive, predictive and preventive care
Primary focus	Glycaemic control, particularly HbA1c	Whole-person cardiometabolic health
Clinical question	"Is HbA1c at target?"	"What is the patient's greatest future risk?"
Risk assessment	Current clinical parameters	Dynamic cardiovascular, renal, metabolic and glycaemic risk prediction
Patient assessment	Glucose, HbA1c and conventional complications	Glycaemic, cardiovascular, renal, obesity, lifestyle and psychosocial domains
Treatment selection	Stepwise glucose-lowering therapy	Phenotype- and risk-directed therapy
Obesity	Secondary risk factor	Major therapeutic target
CKD	Often managed after established disease	Early detection using eGFR/UACR and proactive kidney protection
Cardiovascular disease	Managed alongside diabetes	Integrated into diabetes treatment selection
Heart failure	Separate comorbidity management	HF phenotype directs therapeutic priorities
Lifestyle medicine	General diet and exercise advice	Structured nutrition, activity, sleep, stress, tobacco and social interventions
Treatment goals	Predominantly HbA1c-based	Individualised glycaemic, weight, cardiorenal and quality-of-life goals
Remission	Rarely considered a routine objective	Considered for appropriate patients, particularly early T2DM with excess adiposity
Patient role	Recipient of treatment recommendations	Active partner in shared decision-making
Monitoring	Periodic clinic appointments	Continuous or intermittent digitally supported monitoring
Technology	EHR and glucose meter	EHR + CGM + connected devices + apps + telehealth
Artificial intelligence	Limited role	Potential predictive analytics, risk identification and decision support
Clinical alerts	Usually triggered by abnormal results	Trend-based alerts for deterioration and therapeutic gaps
Follow-up	Appointment-driven	Risk-driven and needs-based
Care delivery	Predominantly physician-centred	Multidisciplinary primary-care micro-team
Treatment intensification	Mainly addition of medication	Intensify, redirect, simplify or de-intensify according to phenotype and response
Population management	Individual patients reviewed when attending	Population stratification: stable, at-risk and high-risk groups
Outcome measurement	HbA1c and complication screening	HbA1c/TIR, weight, BP, lipids, eGFR, UACR, hypoglycaemia, QoL and remission
Care cycle	Review → prescribe → next appointment	Predict → Assess → Customise → Engage → Measure → Adapt → Re-predict
Ultimate objective	Glycaemic control and complication management	Prevent complications, preserve organ function and improve healthy life expectancy

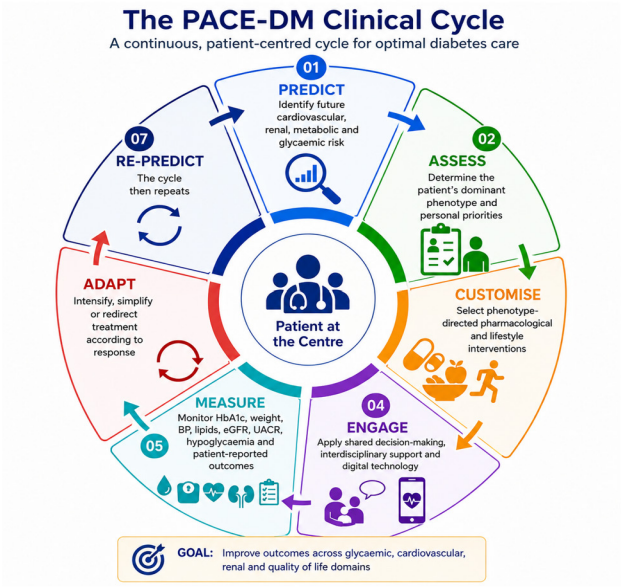

Figure 9: *The PACE -DM clinical cycle.*

Figure 10: *Diabetes Digital control Center in primary care.*

Conclusion

We need to change how we manage type 2 diabetes in primary care. We should no longer rely on checking blood sugar levels now and then and adding more medication when they get too high. Instead, we should view diabetes as an intricate condition that affects the heart and metabolism and requires a more proactive, individualized approach. This means predicting risk, assessing each patient's needs, creating customized treatment plans, and keeping patients involved and inspired throughout the process. By doing so, we can provide better care and improve outcomes for people with type 2 diabetes. The proposed PACE-DM model—Predict, Assess, Customize, and Engage-provides a functional framework for this transformation. Its central innovation is not any individual medication or technology. Rather, it integrates predictive risk assessment, phenotype-directed treatment, obesity management, lifestyle medicine, remission strategies, digital monitoring, multidisciplinary care, and patient engagement into a single continuous primary-care pathway. The fundamental clinical question consequently changes from: “Is this patient's HbA1c at target?” to: “What is this patient's greatest future health risk, what is driving it, and what can we do today to change that trajectory?” This represents a transition from glucose-centered care to whole-person cardiometabolic care, from episodic appointments to continuous monitoring, from standardized treatment sequences to personalized pathways, and ultimately from managing established complications to projecting and preventing them (Figure 10). The success of future diabetes care should therefore be measured not simply by glycaemic control, but by preserving cardiovascular and kidney health, maintaining a healthy weight, avoiding hypoglycaemia, improving quality of life, reducing treatment burden and, where achievable, sustaining diabetes remission.

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