

PMAS/21/01 – The iDiabetes Platform: Enhanced Phenotyping of Patients with Diabetes for Precision Diagnosis, Prognosis and Treatment.

5% of the Scottish population have diabetes, of which 90% have type 2 diabetes, a condition more common in socio-economically disadvantaged individuals. Diabetes, which is associated with the potential for major adverse health outcomes, is diagnosed solely by increased blood sugar level. Why someone has developed diabetes is rarely tested. This applies when diagnosing type 1 diabetes (resulting in some patients being misdiagnosed and treated with insulin unnecessarily) and when diagnosing type 2 diabetes (when little attempt is made to work out if someone developed diabetes due to reduced insulin production, reduced insulin action, or both). Similarly, for diabetes patients, we are poor at identifying and treating patients who are high risk of developing heart or liver, or kidney disease, yet we know that some medications work better than others in those at risk of these conditions. A more precise approach to diagnosis and treatment is required.

The intelligent Diabetes (iDiabetes) platform will add precision approaches to improve outcomes of patients with diabetes. 'Enhanced phenotyping' of patients with diabetes will be undertaken during routine reviews. Additional clinical measures will be taken, and new tests undertaken automatically on routine blood samples – including two tests of heart function (BNP and hsTroponin) and tests for liver fat and fibrosis (scarring), as well as tests for insulin production and insulin resistance. We will also include DNA tests to allow the use of 'genetic risk scores' to flag people at increased risk of heart disease despite no other obvious signs.

We will also use genetic results to inform on the best diabetes treatment for patients. We will use the enhanced phenotyping results to inform on precision care. For patients with type 1 diabetes, we will assess insulin production, risk of very low blood sugars and diabetes complications. We will reassess the diagnosis of patients with substantial insulin production and consider stopping or reducing insulin. For patients with type 2 diabetes, we will inform patients of their individualised risks; and inform patients and their doctors what diabetes treatments might be best. We will identify patients with diabetes who have pre-symptomatic markers of heart, liver or kidney disease and recommend treatments that reduce these risks.

Importantly, by randomly allocating groups or clusters of patients to iDiabetes or standard care we will test if the iDiabetes platform is effective and cost-efficient, enabling the roll out of precision diabetes care beyond Tayside.