Titolo: A Participatory Approach to Support Glucose Tolerance Tracking in Real-Life of Patients with Type 2 Diabetes (GluToTrack)

Codice MUR: P2022XSFA7

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Budget UNIPD: 119.073,00 €

Abstract del progetto: Diabetes Mellitus (DM) represents one of the major and fastest growing global health emergencies of the 21st century, leading to heavy consequences on affected individuals -health level- and healthcare systems -economic-, with its numbers projected from the actual 537 million to 643 million by 2030 (and to 783 million by 2045) and current direct costs for health expenditures close to one trillion USD (and will exceed this figure by 2030).

Approximately 90% of the individuals with DM are affected by type 2 diabetes (T2D), whose management usually begins with lifestyle interventions, then progressing to one or more oral antihyperglycemic agents (non-insulin treated T2D - approximately 85-90%), while only ultimately moving to insulin therapy (insulin-treated T2D).

Recent evidence has shown that lifestyle interventions, like exercise, healthy diet and education, is effective in reversibility of the disease in non-insulin treated T2D, but also in preventing the transition to T2D in high-risk (healthy) individuals. Nevertheless, so far only a few approaches have been developed to exploit modern diabetes and information technologies (IT) to support patients' engagement over their own health, in line with participatory medicine, and thus progressively catalyze the enhancement of healthcare systems.

Here, the aim of the project is to combine bioengineering mathematical models and IT solutions to provide information about lifestyle interventions to individuals with non-insulin treated T2D in real-life conditions and support to clinicians for patient's therapy management. To achieve this aim, mathematical modeling tools, exploiting minimally-invasive continuous glucose monitoring (CGM) and patient generated health data (PGHD), will be used to track glucose tolerance in real-life conditions on a patient's level, as well as the impact of lifestyle interventions like physical activity, on it. This, in turn, will require building an integrated IT platform supporting the automatic gathering of PGHD and CGM data and incorporating the developed mathematical tools for patient monitoring and management in real-life conditions. Finally, to both validate the proposed mathematical modeling tools and the IT infrastructure, we will conduct a small-scale study involving individuals with non-insulin treated T2D.

Hence, the final goal of the project is to provide an easily interpretable and accessible tool tracking the metabolic (glycemic) status, and its relation with lifestyle interventions, in patients with non-insulin treated T2D from modern diabetes and information technologies during real-life conditions. This will empower participatory medicine in these individuals, but also will provide clinicians with information about therapy assessment and, potentially, disease progression. As a matter of fact, this would potentially translate in improving long-term survival and wellbeing in this population and reducing healthcare costs.