



ABOUT PROVIDE

Provide is a cooperation of European Union countries in the field of reduction of deaths due to cardiovascular diseases in patients with diabetes and prediabetes by developing a system for rapid screening of early CVD risk. The project started in 2023 and will last 3 years.

PROVIDE IN NUMBERS:

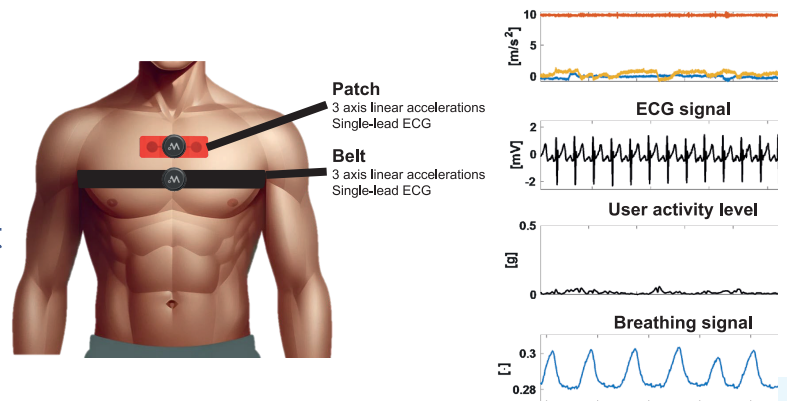
655,560.11 Euro – total cost

524,444.00 Euro - EU Contribution

3 years – project duration

7 stakeholder organisations

all EU Member States will implement guidelines and best practices



BACKGROUND

Approximately **360 million people** had diabetes mellitus (DM) in 2011, of whom **more than 95%** would have had **type 2 DM**, and this number is estimated to increase to **552 million by 2030**. More than half the mortality and a vast amount of morbidity in people with DM is related to cardiovascular disease (CVD). Given that cardiovascular diseases are **the number one cause of death globally**, the combination of these two diseases can lead to increased mortality risk.

Currently, according to ESC guidelines, screening for cardiovascular disease in diabetes requires a **complex algorithm, were instrumental testing** (exercise ECG, echocardiography, Holter monitoring, etc.) together with **metabolic markers are collected and analyzed** to determine the CVD risk in diabetic patients.

The project aims to automate and simplify this process by using **innovative telehealth technology of wearable ECG devices**, equipped in a cloud-based application for advanced ECG analysis.



TARGETED PROBLEMS:

- Screening for cardiovascular disease in diabetes requires a **complex and costly procedure**.
- Lack of **biomarkers and diagnostic strategies** useful for the early detection of coronary artery disease (CAD) in asymptomatic patients.
- Lack of **methods to predict the CVD risk** in people with pre-diabetes.



OBJECTIVES

- **To develop a system** for the rapid screening of early cardiovascular disease (CVD) risk to improve the quality of clinical monitoring in patients with diabetes mellitus (DM)
- **To improve the classification** of cardiovascular risk of patients at different levels of disease severity (healthy, pre-diabetes and diabetes type 2)
- **To develop algorithms/decision trees** to define and validate diagnostic pathways that tailor therapy towards individual patients' needs overcoming the "one-size-fits-all" approach.



The system is based on a combination of:

- **fast, low- cost** and widely available technique (electrocardiography);
- **innovative telehealth technology of portable devices** allowing for easy ECG recording tested in a vast amount of data collected by a network of collaborating hospitals in several EU countries;
- **advanced ECG analysis** based on a battery of nonlinear dynamics measures and machine learning models;
- **measurement of standard markers of diabetes** (glucose, HbA1c, lipid, blood pressure, body mass index, waist circumference) and diabetic kidney disease markers (albuminuria, serum creatinine); lipid metabolomic analyses;
- **novel biomarkers** such as adipokines and inflammatory markers.



CONSORTIUM

Project coordinator:

Universita degli Studi dell'Aquila (UNIVAQ)

Partners:

AGH University of Krakow (AGH)

Università Campus Bio-Medico di Roma (UCBM)

Polish Mother's Memorial Hospital Research Institute (PMMHRI)

Sapienza University of Rome (UNIROMA1)

IRCCS San Raffaele Roma SRL (HSR)

Andalusian Health Service - Costa del Sol Hospital (SAS-HUCS)

Medical Services Institute (MSI)

Polish Diabetes Association (PDA)

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