



## 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:

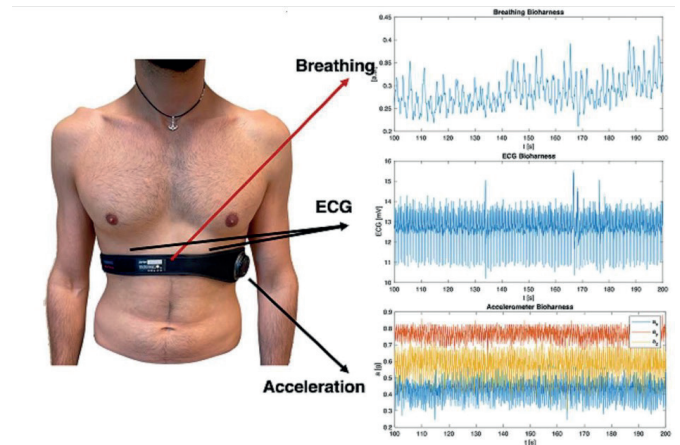
655,560.11 Euro – total cost

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 aim of the project is 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:

University of L'Aquila (UNIVAQ)

Partners:

AGH University of Science and Technology, Cracov

Campus Bio-Medico University of Rome (UCBM)

Institute "Polish Mother's Health Center" (ICZMP)

Sapienza University of Rome (UNIROMA1)

IRCCS San Raffaele Roma SRL (HSR)

Andalusian Health Service (SAS)

Medical Services Institute (MSI)

Polish Diabetes Association (PDA)

Contacts:

Prof. Marco Giorgio Baroni

Universita degli Studi dell'Aquila (UNIVAQ)

Palazzo Camponeschi, Piazza Santa Margherita 2

67100 L'Aquila, Italy

Tel. (+39) 338 5359772

E-mail: [diabetologiaaq@asl1abruzzo.it](mailto:diabetologiaaq@asl1abruzzo.it)

**Website:** <https://euprovide.weebly.com/>



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