Personalized patient empowerment and shared decision support for cardiorenal disease & comorbidities

Funded by the EU FP7 research and innovation programme under grant agreement No 61440

WHAT?

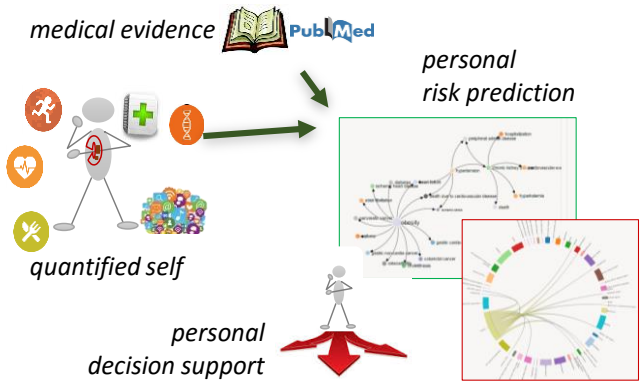
CARRE project investigates information and communication technologies for empowering patients with multiple co-occurring medical conditions, or persons with increased risk of such conditions, especially in chronic heart and kidney disease.

WHY?

Chronic heart and kidney health problems are serious and common diseases. They often appear simultaneously and they can cause each other, while they share a multitude of underlying risk conditions, such as obesity, diabetes, and hypertension. Current studies estimate that 9-16% of the general population is at risk or at the onset of chronic kidney disease; chronic heart failure amounts to 1-2% of total healthcare costs and end-stage renal disease for more than 2% of total healthcare expenditure. Major leading causes for these conditions include diabetes and high blood pressure, both very common conditions: in the developed world, about 8 people out of a 100 suffer diabetes, while about one third of the population is estimated to suffer from hypertension.

HOW?

CARRE uses commonly available personal sensors, such as activity trackers, scales and personal health records, to collect information about the person, which is then projected against current medical knowledge. This produces a personalized risk prediction model. The patient can interact with the graph to understand health risks and plan lifestyle changes. This personal risk is also used to alert the patient for self-monitoring and everyday lifestyle related activities.



WHO?

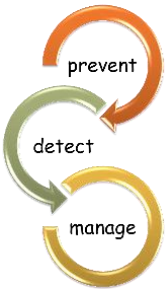
CARRE launched in November 2013 as a 3-year research project funded by European Union's FP7-ICT programme under grant agreement No. 614440. The research is conducted by a consortium of 6 partners from 4 EU countries: the School of Medicine, Democritus University of Thrace (GR), the Open University (UK), the University of Bedfordshire (UK), Vilnius University Hospital Santariškių Klinikos (LT), Kaunas University of Technology (LT), and the Industrial Research Institute for Automation and Measurements (PL).
Project site: www.carre-project.eu

CARRE for patients

CARRE puts the citizen on the center. The approach of "first understand, then conquer, then decide" is implemented with an interactive graph that shows the particular risks customized for each individual based on their status as derived from their personal medical data and also from personal mobile sensors, such as activity meters, scales and blood pressure or glucose monitors. The graph can be used to plan best lifestyle changing regimes to lower risks, improve odds for disease progression and delay disease deterioration. CARRE also offers a range of intuitive alerts to help patients or people at risk of chronic heart or kidney disease to apply efficient self-monitoring and take educated decisions on their lifestyle and health management.

CARRE for medical professionals

CARRE has developed a novel system to describe current medical evidence on risk factors in a comprehensive and intuitive way, including concise tabular and interactive graphical views. New evidence on risk factors can be incorporated in this dynamic reference database via a simple to use interface and following a transparent rigorous peer review process. Additionally, experts can use the personalized patient models to explain complex health conditions to the patients and collaborate towards informed co-design of personalized care plans.



CARRE for technology experts

CARRE research outcomes include a number of scientific and technological innovations, all provided as open access technologies from the project site:

- ✓ a novel risk factor ontology;
- ✓ a medical risk factor database and respective management system with web user access and open APIs;
- ✓ aggregators for personal medical sensors, personal health records, educational resources, and scientific literature;
- ✓ new sensors and signal processing algorithms: wrist watch activity meter and body composition scale;
- ✓ advanced visual analytics for exploring complex risk factor trajectories;
- ✓ decision support engine and personalized services;
- ✓ patient empowerment cognitive model;
- ✓ a privacy-by-design approach for personal ehealth applications;
- ✓ standards deployment