

CHRONIOUS

An Open, Ubiquitous and Adaptive Chronic Disease Management Platform for COPD and Renal Insufficiency

CHRONIOUS is a highly innovative Information and Communication Technologies (ICT) research Initiative that aspires to implement its vision for ubiquitous health and lifestyle monitoring of people with chronic diseases at European level.

Objectives of the Project

Chronic diseases are the leading causes of death and disability for a large amount of people in most industrialized nations. Chronic diseases have also a deep impact on today's society costs. Adopting healthy behaviours can prevent or control the devastating effects of these diseases.

CHRONIOUS implements a system architecture that offers continuous monitoring easily adaptable to any chronic disease management programme.

The main project's goals are:

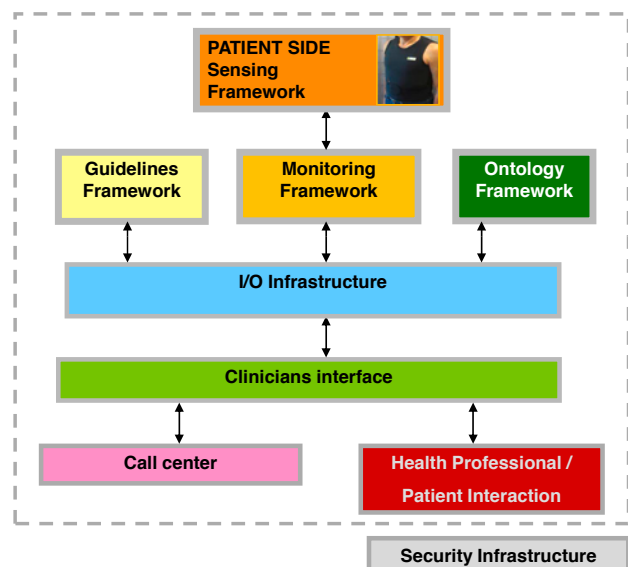
- Raising quality of life and providing highly qualified and efficient health-care services to all EU citizens
- Being not invasive patients' monitoring
- Advancing medical research through the provision of advanced disease prediction and diagnosis tools and the exploitation of the monitored parameters
- Increasing the prevention, diagnosis and prognosis of diseases, immediate intervention in emergency or time critical situations
- Reducing formal care burdens, improving formal care by reducing the patients visits for routine examinations
- Improving the informal care effectiveness without increasing intrusion
- Reducing costs of informal care, which is particularly high for people suffering from chronic diseases
- Involving the care recipient in health promoting activities and decision-making
- Reducing the time of intervention in time-critical situations
- Penetrating neighbouring future markets and creating new business opportunities

Project Description

The project goals will be achieved by developing a *modular and flexible system* design that integrates state of the art sensors and services in order to cover both patients and healthcare professional's needs.

Data will be collected by using monitoring sensors, mostly wearable, that control continuously vital signals, dietary habits and plans, drug intake, environmental parameters, biochemical parameters, activity and social context.

The CHRONIOUS system will report deviations and all conditions differing from those that are expected. Healthcare professionals will be then provided with decision support and data analysis tools.



SCENARIO

For testing purposes, CHRONIOUS will focus on two major chronic conditions: *chronic obstructive pulmonary disease (COPD)* and *chronic kidney disease (CKD)*, these being widespread and highly expensive in terms of social and economic costs.

The test activities will be done in Italy and Spain involving old patients that usually meet many difficulties to reach hospital centres for routine controls: they represent the main category which will take advantage of the highest benefits foreseen in terms of management of scientific and technical result. Patients will be trained at the use of CHRONIOUS and assisted by healthcare providers and experts.

The main elements of the project that have to be highlighted are:

- use of integrated wearable sensors;
- development of very simple and friendly interfaces;
- implementation of new algorithms and methodologies for assessing information coming from the different sensors;
- new decision mechanisms and instruments aiming at enhancing both patients and physicians possibilities in deciding in real time how to react;
- *Decision support system* and *ontologies* support;
- collection and management of appropriate and validated medical knowledge;
- interoperability with existing systems based on common standards to exchange useful information.

In the first test phase, a clinical validation protocol will be used in real environment but with “dummy” patients. Measurable indicators will be identified in order to understand and assess system performance. The system will be extensively tested both from the technical point of view as well as from the user point of view and the final system will be produced. Finally, the system will be validated by the healthcare professionals according to pre-defined validation protocol. 70 patients will be recruited, and randomised into two groups. First, as the control, will be treated conventionally, and the second will be monitored by the CHRONIOUS platform.

Project Status

The CHRONIOUS project team has achieved great progress in the field of sensors, and system modules. The wearable body sensor network, was introduced, with all the advanced sensors needed for monitoring framework, and other crucial hardware modules, such as data handler or environmental monitoring, was created.

Several meetings and many distant discussions were held by the consortium partners to find a common ground between scientists, doctors and technicians, for project design and development.

Discussions on ontology framework, core system modules, and all other supporting modules of the system to make it better, and continuously refine all aspect of the project.

Expected Results & Impacts

Foreseen impacts on **patients life** are: 1) reduction of diagnostic routine visits to hospitals; 2) life-style improvement through integrated reminding and alerting service linked to particular behaviours such as drug intake, eating and daily activities performed; 3) reducing the intervention time when a critical situation occurs.

Concerning the **local health institutions, professionals and hospitals**, the expected outcomes are: 1) decrease of the number of acute events up to 40%; 2) reduction of costs connected to acute events up to 30%; 3) reduction of the number and duration of hospitalization up to 20-30%; 4) control of the medical prescriptions for diagnostic routine examinations up to 60%; 5) increase of the home care assistance required up to 35%-60%.



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Timetable: from February 2008 to January 2012

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KEYWORDS

Wearable medical systems, Ontology, Chronic disease, Telemedicine, Biomedical informatics