Chapter 44

Exploring Personal Healthcare with the Help of Two Large European Framework Programs for Healthcare:
MyHeart and HeartCycle

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ABSTRACT

Personal healthcare enables prevention and early diagnosis in daily life and is centered on the patient. There is a need for a new personal healthcare paradigm in the treatment of chronic diseases. This will be achieved by new technologies that are currently explored (e.g., in European Research projects such as MyHeart and HeartCycle). These projects develop technologies and application concepts for the (self-) management of chronic diseases in patients' homes with special emphasis on usability and ease-of-use (e.g., wearable sensors and processing units that can even be integrated into the patient's clothes). These technologies allow empowering patients, fostering self-management and therefore reducing cost, and improving patients' quality of life.

INTRODUCTION

A healthy and preventive lifestyle as well as early diagnosis of heart diseases will save millions of life years each year and can significantly reduce the morbidity and simultaneously improve the quality of life of cardio-vascular patients. Prevention offers the opportunity to systematically fight the origin of cardio-vascular diseases as well as to improve the medical outcome after an event. Personal Healthcare enables prevention and early diagnosis in daily life and is believed to be a solution to reduce the overall costs of the current health care systems. The starting point is to gain knowledge on a patient's actual health status outside the institutional points of care, i.e. at home. To gain this information daily

monitoring of vital signs and symptoms is mandatory allowing detecting negative health trends and reacting timely.

Novel methods are therefore needed that provide continuous and ubiquitous access to medical excellence in a cost-effective way.

The challenges are to:

- Firstly identify the most promising applications in personal healthcare in the focal area of cardiovascular diseases (CVD),
- Secondly to develop intelligent systems and services that serve the needs of the identified applications and
- Finally to validate the developed solutions in medical field tests and studies.

This chapter describes how these challenges have been addressed with the help of two European projects. It outlines the multi-disciplinary approach how application specific information has been gained, shows the realized systems and validation results obtained.

BACKGROUND

According to the 2002 World Health Report, chronic diseases account for 85% of the deaths and 70% of healthcare costs in Europe. Theses healthcare expenditures are permanently increasing due to the aging of the population, consequently healthcare delivery will need to become more efficient and cost-effective.

Very often there is a lack of compliance of the patients with the requirements regarding lifestyle, nutrition, and medication that the chronic disease implies. However, even with patient compliance acute situations may occur, that have not been predicted beforehand. One reason that a worsening of the patient situation may not have been detected is inherent of the current healthcare system, as it can only offer intermittent care but no continuous monitoring of the patient.

This is why there is a need for a new paradigm in the treatment of chronic diseases, which can be summarized with the term Personal Healthcare. Personal Healthcare means that healthcare is centered on the patient and provided anytime, anywhere, inside and outside the institutional points of care. The most straightforward way to achieve this is to also physically place diagnostic as well as treatment means around the patient in his or her home environment. Personal Healthcare does not necessarily imply a permanent surveillance of the patient, but key to the concept is the focus on the self-management of the patient. The system educates and supports the patient in the self-management of his disease and thereby improves the patient outcome without putting an additional burden on the physicians and nurses. Nevertheless, frequent communication between the physicians or nurses and the patient plays a key role in the success of the treatment.

This will be enabled by new technologies that are currently explored, e.g. in European Research projects such as MyHeart and HeartCycle. These projects develop technologies and application concepts for the home use with special emphasis on usability and ease-of-use e.g. wearable sensors and processing units that can even be integrated into the patient's clothes. Technology trends, such as sensor miniaturisation, low power computing for wearable and portable devices, and communication technology allow access to medical care and support anytime and anywhere and enable the creation of services for patients to better manage their health. But more than anything, its success depends on patients accepting the practical aspects of personal healthcare. In the following the two projects MyHeart and HeartCycle are described in more detail.

MYHEART

In 2004 MyHeart, one of the largest European Research Projects in the healthcare area, a so-called

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