A Citizen Telemonitoring Strategy as Envisaged for Central Greece

George E. Dafoulas[1], George Gorgogetas[2], Kalliopi Liatou[2], Kostas Karampoulas[2], George Vallas[3], and Pantelis Angelidis[4]

[1] Faculty of Medicine, University of Thessaly, Greece
[2] e-trikala SA, Municipality of Trikala, Greece
[3] Cities Net SA, Digital Municipal Community of Central Greece
[4] Faculty of Engineering Informatics and Telecommunications, University of Western Macedonia, Greece
{gdafoulas,ggorgogetas,kliatou,kkarampoulas}@e-trikala.gr, gvallas@citiesnet.gr, pantelis@vidavo.gr

Abstract. Renewing Health, a Pilot A, CIP/PSP project, funded from the European Commission, aims at implementing large-scale real-life test beds for the validation and subsequent evaluation of innovative telemedicine services using a patient-centric approach and a common rigorous assessment methodology. The services offered are designed to give patients a central role in the management of their own diseases, fine-tuning the choice and dosage of medications, promoting compliance to treatment, and helping healthcare professionals to detect early signs of worsening in the monitored pathologies. The current paper discusses the telemonitoring strategy as envisaged for Central Greece in the framework of the Renewing Health project.

Keywords: telehealth, telehomecare, telemedicine.

1 Introduction

The world population is growing while in Europe it is decreasing due to ageing. The number of people over 65 will rise nearly 40% between 2010 and 2030 and the number of people over 80 will have doubled by 2050 [1]. Associated with this ageing demography, the cost of healthcare is rapidly increasing while the tax base in increasingly at stake. People over the age of 65 receive four times the number of medical tests as others [2]. There will be even fewer economic ''producers'' to support the social and health costs related to Europe's population of retirees.

Health spending is rising faster than GDP and it is estimated to reach 16% of GDP by 2020 in OECD countries [3].

Recent research has suggested that the health ICT industry has the potential to be the third largest industry in the health sector with a global turnover of €50-60 billion, of which Europe represents one third [3]. By 2010, a double digit growth rate of up to 11% is foreseen as driven by a search for more productivity and performance [4]. However, this potential growth might not occur if the existing barriers to the market are not removed together with more evidence of its effectiveness.

J. Lin and K.S. Nikita (Eds.): MobiHealth 2010, LNICST 55, pp. 11–16, 2011.

It is not only ageing which matters, but also the pattern of disease is changing. 60% of all deaths are due to chronic diseases [5]. This imposes even greater workload on healthcare providers and resources at a time when mobility and individualism have diminished the traditional family carer's potential. Without actions to address these causes, deaths from chronic diseases will increase by 17% over the next years. In the USA, 85% of all hospital costs and 69% of all physician costs are spent on treating chronic diseases. In Europe, chronic diseases are estimated to amount to over 70% of healthcare costs. But today, chronic diseases are not yet managed appropriately. According to the World Health Organisation (WHO), at least 80% of all cardiovascular disease and type II diabetes and over 40% of cancer could be avoided.

Telemedicine and homecare is the segment with the greatest potential for financial and clinical impact [6] and is due for immediate expansion. Homecare telehealth moves beyond the hype and is considered a serious solution by healthcare purchasers. Protocols and technologies to help implement and provide advanced mobile telehomehealth care applications are under development.

Nevertheless, these applications-telemedicine and free movement of electric health data – poses a series of open questions regarding: a clear definition of telemedicine services, legal framework and liability issues , harmonization of diagnosis related groups that can be treated by telemedicine, accreditation of health professionals who provide telemedicine applications, interoperability issues, cost effectiveness, and reimbursement for telemedicine services [7,8].

2 Initiatives on European Level to Deal with Challenges of Telehomecare

In 2010, the European Commission, via its Competitiveness and Innovation Programme, issued a call [9] to support a large-scale telehomemonitoring pilot project for up to 7 M€ of EU contribution. This will include a network of procurers and payers of healthcare services.

The main outcomes of the pilot should:

- Provide patients with the means to manage their health conditions outside traditional care settings, by using innovative Personal Health Systems and integrated telemedicine services.
- Provide health professionals with more comprehensive monitoring and diagnostic data for decision making, thus facilitating personalised care for chronically ill patients
- Enable, on a large scale, continuity of care through enhanced interaction between patients and primary care settings as well as secondary care settings.

The pilot intents to develop sustainable business models, which will eventually harness the benefits of the targeted innovative eHealth set of tools and services. It will produce large scale, measurable, comparable and statistically significant results, regarding the effectiveness of the solutions tested, using a commonly agreed and scientifically sound assessment methodology.

The consortium of 9 Regional Health Authorities was selected to implement this large-scale pilot (called Renewing Health, www.renewinghealth.eu) for the validation of innovative telemedicine services using a patient centric approach and a rigorous assessment methodology common to all the pilot sites. Pilots will be carried out in

nine of the most advanced regions of the European Union belonging to 9 different Member States and will make use of advanced Personal Mobile Health Systems which follow the chronic patient wherever he/she is and which are integrated with the other clinical information systems already in place. The Project will give birth to a new paradigm for the deployment of innovative telemedicine services and will include a Randomised Control Trial with more than 8.000 patients. The Project is supported by the Health Authorities of the participating regions which have responsibility for the healthcare budget and which are fully committed to deploy the telemedicine services in their territory, once they have been validated and to co-operate among them to promote the uptake of the services at pan-European level.

RENEWING HEALTH, will use the evaluation MethoTelemed Guidance [10] (developed by study sponsored by the EC) which will be applied to measure the impact of the eHealth service deployed on a number of indicators which refer to Health Related Quality of Life, user satisfaction, clinical outcome and healthcare spending. This means the project will be able to build a convincing business case to be presented to National, Regional and Local Health Authorities, and stimulate them to speed up the deployment of patient-centred eHealth service solution. The deployment in other regions will be substantially eased by the openness of the Consortium to share with other regions the results of the Project and to assist them in implementing the services, maximising the chances of success and reducing time scales and costs.

MethoTelemed is a benchmark document, on how and to what extent telemedicine applications have been deployed in healthcare systems and it will provide a structured framework to assess the effectiveness of telemedicine applications and their contribution to quality of care.

3 Description of the Telehealth Project of Central Greece

Telemonitoring services of the Digital Community of Central Greece (11 Municipalities of Central Greece, representing more than 1.000.000 citizens), will be provided to individual citizens with chronic heart failure, chronic asthma, diabetes, arrhythmias, dementia and hypertension.

The equipment includes tele-electrocardiographs, tele-spirometers, tele-GPS trackers, tele-scales, tele glucose-meters and blood pressure meters.

Fig. 1. Operational diagram

The infrastructure and services will be operational within 2010 and are partly funded by the 4th Community Framework Support (CSF).

In particular, the Telehealth centre will provide telemonitoring services to chronic patients and the elderly as well as social services to the patients participating in the project. Novel telemedicine devices will be used, for the wireless transmission of vital signs to a web-based platform. Individual citizens will be equipped with light-weight handheld devices and record their vital signs at home which will then be transferred (via the telehealth centre) to the municipality hospital over internet or GPRS for review and feedback by the experts.

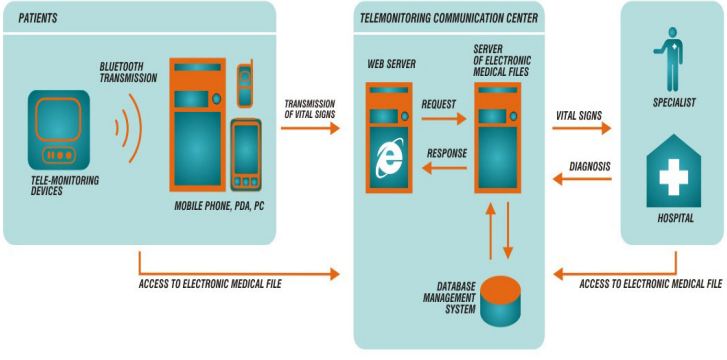

Fig. 2. Data flow Diagram

Through these Personal Health Systems and innovative types of telemedicine services, medical staff can monitor the health status of patients anywhere and anytime.

The service will therefore allow enhanced interaction between patients and primary care settings (i.e. GPs) as well as secondary care settings (hospitals and/or specialists) The 5th Regional Health Authority (5th RHA), a beneficiary of the project, will ensure proper monitoring of the patients by specialists and it will provide support to the everyday clinical effort. In addition, the 5th RHA's HIS is under completion (Nov 2009 - 12 Hospitals + 1 University Hospital + 33 Health Centres) which will provide the means and infrastructure for putting innovative services to the task, performed by IT aware specialists.

The Telehealth Centre is located in the Municipality of Trikala, which has run a local telehealth service already for 3 years, partly funded by the 3rd Community Framework Support (CSF). Therefore the Municipality of Trikala is the Competence Centre for the Digital Community of Central Greece.

4 The Telehealth Project of the Region of Central Greece in the Renewing Health Project

The goals of the Telehealth Project of the Region of Central Greece align with the concept of RENEWING HEALTH project and with the Objective 1.1: ICT for patient-centred health service, of the call for proposals 2009 for Pilot Type A, Theme 1: ICT for health, ageing and inclusion.

The specific telehealth services to be included in the context of the RENEWING HEALTH project will focus on the major chronic diseases and specifically on Cardiovascular Diseases (CVD) - like Chronic Heart Failure, Hypertension and Arrhythmias; Chronic Obstructive Pulmonary disease (COPD) and Diabetes.

4.1 Interoperability / Ethical Issues

The service will fully respect the fundamental right to the protection of personal data, and in particular of personal data related to health, in line with the relevant EU and national legislation. Use of existing European, International or commonly agreed standards will ensure the interoperability of the service.

4.2 Health Technology Assessment

Chronic diseases management with telehomecare can introduce cost savings while improving quality of life and prognosis for the patient.

The validation and deployment of the service will be carried out in real life settings and using the same methodology for all cities of the Digital Community of Central Greece.

The evaluation of the pilot will be carried out using the MethoTelemed assessment model in all the participating regions/partners of RENEWING HEALTH project, including the telehealth services in Central Greece. The objective is to achieve a systematic and multidisciplinary assessment of the impact of the integrated telemedicine services, and to produce convincing and reliable results in accordance with scientific guidelines.

Apart from the difference in the clinical effectiveness, Health-related Quality of Life score between the Intervention and the Control Group will be also measured with the generic and diseases specific quality of life questionnaires. Patient Satisfaction with the telehealth service will be evaluated as well.

Difference in number of annual admissions to hospital between the Intervention and the Control Group, together with the difference in number of consultations with GPs between the Intervention and the Control Group, will be evaluated.

Through the above a cost–utility analysis will be performed in order to evaluate the prospective of the ability of the telehealth services as an alternative to the standard medical treatement of chronic diseases.

In order to achieve, measurable, comparable and statistically significant results, regarding the effectiveness of the telehealth solutions tested, the principles of clinical evaluation with use of the randomized clinical trial or controlled trial with intervention and control groups, will be used:

Table 1. Pathologies and patient basis of Renewing Health in Greece

Pathology		Patient basis
Diabetes	Intervention group (number)	100
	Control Group (number)	80
COPD	Intervention group (number)	100
	Control Group (number)	80
CVD	Intervention group (number)	100
	Control Group (number)	80
Total		540

Table 2. Economical evaluation of telehealth in patients with CHF/COPD and Diabetes type 2

Objective	To assess the cost-effectiveness and cost-utility of telehealth compared with usual care.
Perspective	Societal (alternatively, national health system).
Methodology	Cost-utility, cost-effectiveness analysis.
Primary outcome of economical evaluation	cost per quality adjusted life year (QALY) gained.
Secondary outcomes	total cost of the intervention, cost per clinical event avoided, cost per improvement in other clinical outcomes.
Discounting rate	3% for clinical and economical outcomes. Differential Timing of expenditure. Since the trial will last more than one year, two main adjustments must be considered , related to the inflation for cost and time preference for cost and effect (discounting). According to the US Public Service Panel on Cost-Effectiveness in Health and Medicine, suggest 3% is the most appropriate , discount rate for economic evaluation. However , any past studies have used 5% rate , that makes it also acceptable.
Sensitivity analysis	one-way and two-way for all assumptions made.
Data collection	A trained nurse will collect both clinical and economical data monthly, using Case Report Forms (CRFs)

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