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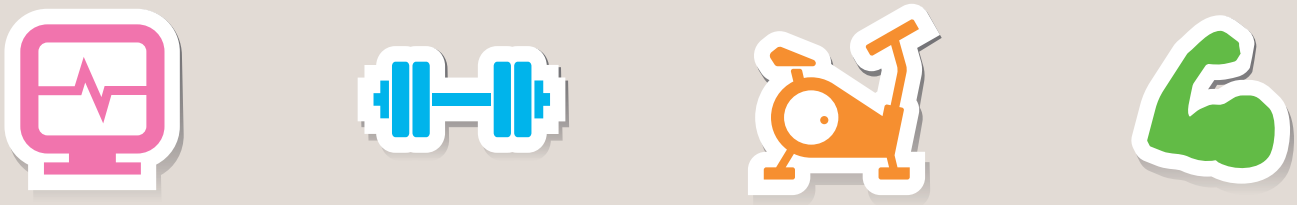
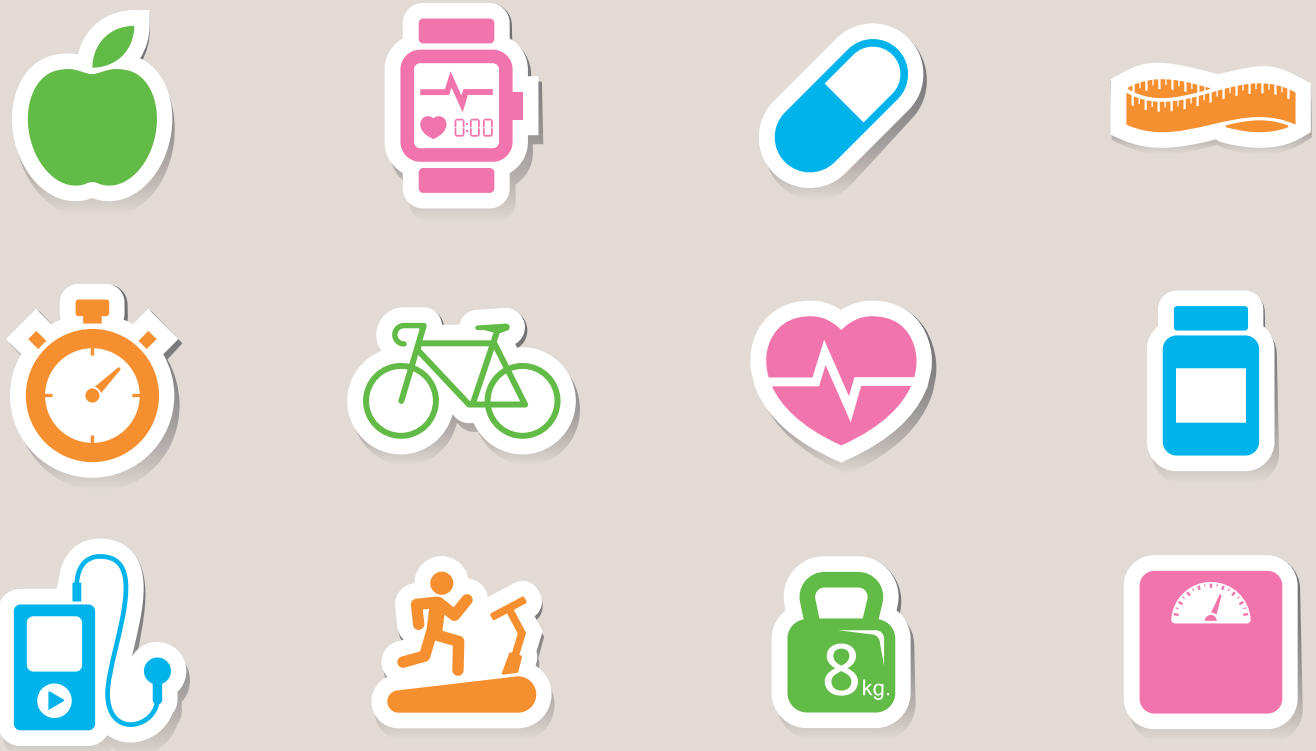


eHealth projects

Research and Innovation in the field of ICT for Health and Wellbeing: an overview



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Digital Agenda for Europe

European Commission

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EUROPEAN COMMISSION
Directorate-General for Communications Networks, Content and Technology

Sustainable and Secure Society

eHealth projects - Research and Innovation in the field of ICT for Health and Wellbeing: an overview

Introduction

Better health and wellbeing through ICT:
Our research and innovation turns the future of health into the present.

What have the best brains of Europe come up with to improve health and wellbeing with the help of Information and Communication Technology (ICT)? This report offers an overview of the most current (on-going or recently finished) European funded projects in the field of ICT for health and wellbeing ('eHealth').

The projects listed here have been divided in three types: research projects, innovation projects and projects related to interoperability - meaning the ability of systems and organizations to work together ('inter-operate').

Some of the projects overlap between these areas; they belong for example to both 'Interoperability' and 'Innovation'. Consequently they have been listed in the category which characterizes them best. The same goes for projects that overlap the subchapters of this report.

At the end of this report you will find an overview of the programs used to fund these projects in order to enable them.

For more detailed information on each project, please visit the project website mentioned herein or visit cordis.europa.eu. To be further informed on exciting results of these projects, new projects and other eHealth news, you can subscribe to the newsletter *eHealth in Focus*: bit.ly/eHealthinFocus.

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1. Research

1.1. Projects related to mental health, psychiatric and developmental disorders

Help4Mood

Computerised support for people with **depression** by monitoring their mood and physical activity at home. More info: help4mood.info

Duration: 2011-2013

ICT4DEPRESSION

This project (www.ICT4DEPRESSION.eu) wants to improve patient outcomes and increase access to anti-**depression** treatment. Therefore, the project researchers developed devices for monitoring activities and bio signals in a non-intrusive and continuous way; treatments for depression and automatic assessment of the patient using their mobile phone and web-based communication; computational methods for reasoning about the state of patients, progress of therapies, and the risk of relapse.

Duration: 2010-2013

Interstress

Equipped with biosensors this mobile system assesses and treats a condition that most citizens experience in modern society: psychological **stress**. It conducts 'e-therapy' that bridges virtual and physical reality into one seamless reality: interreality. Like this, people are able to detect and manage their stress in every circumstance thanks to continuous feedback on his parameters and provision of warnings.

In 2012 the project won the UN-based World Summit Award Mobile for the best mobile health application. More info: interstress.eu

Duration: 2010-2013

MONARCA

MONitoring, treAtment and pRediCtion of bipolAr Disorder Episodes - MONARCA (www.monarca-project.eu) develops and validates solutions for multi-parametric, long term monitoring of behavioural and physiological information relevant to **bipolar disorder**. It combines those solutions with an appropriate platform and a set of services into an innovative system for management, treatment, and self-treatment of the disease.

Duration: 2010-2013

PSYCHE

A personal, cost-effective, multi-parametric monitoring system for patients diagnosed with **bipolar disorder**. Management, treatment and prevention of depressive and manic episodes. More info: www.psyche-project.org

Duration: 2010-2013

MICHELANGELO

A wearable EEG solution and eye-tracking device to identify the stimuli that cause significant responses in the **autistic child**; signal processing algorithms enabling accurate characterization of brainwave anomalies and connectivity between different brain regions. More info: www.michelangelo-project.eu

Duration: 2011-2014

OPTIMI

"Online Predictive Tools for Intervention in Mental Illness": A diagnostic tool for pharmacological and CBT based preventative and intervening treatments. More info: www.optimiproject.eu

Duration: 2010-2012

NYMPHA-MD

NYMPHA (Next Generation Mobile Platform for Health in Mental Disorders) aims to identify new care models for patients with **mood disorders**, such as bipolar disorder or depression. They will experiment with next generation services advocated for mental health treatment based on new digital technologies, open standards and open platforms.

To achieve this, the project will adopt public/private partnership according to the Pre-Commercial Procurement (PCP) model; NYMPHA-MD (www.nympha-md-project.eu) intends to launch a European wide published PCP call for tender for the value of around €1,6M.

Project partners are the Autonomous Province of Trento as main procurer, Parc Tauli Health Foundation of Barcelona, Copenhagen Region and the scientific coordinator CREATE-NET (Italy).

Duration: 2014-2017

MASTERMIND

MASTERMIND offers e-services for better management of **depression**:

1. Guided, computerised Cognitive Behavioural Therapy (cCBT) for depression treatment;
2. Collaborative care for depression facilitated by video conference.

More info: mastermind-project.eu

Duration: 2014-2017

1.2. Projects related to epilepsy

ARMOR

The ARMOR project (www.armor-project.eu) tackles the most common brain disorder, **epilepsy**, which affects 1-2% of the population, especially children and adolescents. What can ICT do for such a common, serious and still incurable disease?

The project uses sophisticated technologies to provide healthcare specialists with a framework, so they can monitor and analyse epilepsy-relevant multi-parametric data. The specificity of each patient and the need for constant adjustment of the treatments will be addressed through a personal health system (PHS), which allows for flexible monitoring and efficient diagnosis management.

The project combines clinical and basic neuroscience research with advanced data analysis, medical management tools and telecommunication to develop novel applications for the management of epilepsy.

It will deliver a non-intrusive personal health system (PHS) for monitoring and early diagnosis of people with epilepsy and will support healthcare professionals by providing an accurate analysis.

Duration: 2011-2014

EPILEPSIAE

This project has done a lot of research to make prediction of epileptic seizures possible and is trying to bring a small transportable warning device for **epilepsy** patients on the market. Blog post "Giving hope to millions of epileptic people" by Professor António Dourado, project coordinator.

Duration: 2008-2011

1.3. Projects related to neurological disorders like Parkinson's and Alzheimer's disease

CuPiD

ICT-enabled solution for the rehabilitation of patients with **Parkinson's disease**. The system is based on wearable sensors, real-time biofeedback, virtual reality, restitution interfaces and a telemedicine infrastructure for remote monitoring and supervision by a clinician. More info: www.cupid-project.eu

Duration: 2011-2014

NeuroTREMOR

NeuroTREMOR (www.car.upm-csic.es/bioingenieria/neurotremor) aims at technically, functionally and clinically validating a novel system for understanding **tremors**, giving support to diagnosis, and remotely managing tremors.

Duration: 2012-2015

REMPARK

Goal is to develop a Personal Health System for the management of **Parkinson's disease** (PFD) patients at two levels: wearable monitoring system able to identify in real time the motor status of the PFD patients; intelligent analysis of data provided by the first level, supported with the disease management system. The tool will be tested on 60 patients in real life. More info: www.rempark.eu

Duration: 2011-2015

SENSE-PARK

An empowering information system for use at home by **Parkinson** patients. The system informs the users about motor and non-motor functioning in daily life activities and provides them with tools to monitor patterns in their condition. More info: www.sense-park.eu

Duration: 2011-2014

VERVE

The VERVE project (www.verveconsortium.eu) aims to improve the quality of life for disadvantaged groups including older people and those with **neurological disorders**. The project includes virtual reality environments (tailored to the individual), 3D web graphics, and serious games.

VERVE's efforts will focus on three situations, each targeting a different group of participants: fear of falling and Parkinson's disease; apathy related to cognitive decline and behavioural disturbances, in particular due to Alzheimer's Disease; and other emotional disturbances linked to anxiety. Although focusing on these areas initially, it is expected that the results of the research will be applicable to a much wider range of potentially disadvantaged individuals.

The international project is coordinated by Trinity College Dublin and includes collaborative partners in healthcare and academia in France, UK, Italy, Spain and Germany.

Duration: 2011-2014

Dem@Care

Development of a complete system providing personal health services to people with **dementia**, as well as medical professionals and caregivers by using a multitude of sensors (context-awareness, lifestyle monitoring, health parameters…). More info: www.demcare.eu

Duration: 2011-2015

VPH-DARE-at-IT

A clinical decision support platform for early differential diagnosis of **dementias** and their evolution. This is being based on models of the ageing brain and taking into account biochemical, metabolic and biomechanical brain substrate, as well as for genetic, clinical, demographic and lifestyle determinants.

The VPH-DARE-at-IT project (www.eibir.org) covers part of the "Virtual Physiological Human" (VPH), which deals with biomedical modelling and simulation of the human body.

Duration: 2013-2017

PredictND

The research project PredictND will take an important step towards better prediction, diagnostics and management of **memory disorders** such as Alzheimer's. This project aims to predict these disorders even before the symptoms start. The PredictND project is a VPH-project, so it will use biomedical computer models to simulate the human brain.

On top of that, clinicians experience an overload of information: They need to combine information from multiple tests and biomarkers for finding the correct reason and name for the disease. PredictND will provide tools that help clinicians to form a holistic view of the patient by combining information from several sources, such as clinical tests, imaging and blood samples, and by comparing these measurements to previously diagnosed cases available in hospital databases.

More info: "EU grants €3 Million to better predict and diagnose memory disorders"

Duration: 2014-2018

NoTremor

NoTremor aims to create new tools to predict how **Parkinson's disease** (PD) develops. It will develop patient specific virtual, physiological and computational neuromuscular models of the coupled brain and neuromuscular systems. These will be subsequently used to improve the quality of analysis, prediction and progression of PD.

In particular, it aspires to establish the neglected link between brain modelling and neuromuscular systems. This will result in a holistic representation of the physiology for PD patients. More info: notremor.eu

Duration: 2014-2016

1.4. Projects related to stroke and brain injury

CONTRAST

Contrast (www.contrast-project.eu) deals with rehabilitation after **stroke**. The project is developing easy-to-use auto-adaptive human-machine interfaces (HCI) which can be used in the clinic and at the patients' home. Training modules for cognitive enhancement will be tailored to the individual patient and remote data processing and support systems will allow for continuous monitoring of health parameters to evaluate individual progress and for shared patient-expert decision making.

The project experts will also develop, test, and upgrade brain-neural-computer interface (BNCI) based neurofeedback tools, based on findings that increase power in specific EEG frequency bands which can improve long-term cognitive performance.

Duration: 2011-2014

CogWatch

A system for continuous cognitive rehabilitation at home for patients with Apraxia and Action Disorganisation Syndrom after **stroke**, by exploiting intelligent tools and objects, portable and wearable devices and ambient systems. More info: www.cogwatch.eu

Duration: 2011-2014

INTERACTION

An unobtrusive and modular system for monitoring daily life activities and for training of upper and lower extremity motor function after **stroke**. More info: www.interaction4stroke.eu

Duration: 2011-2014

SCRIPT

Support for rehabilitation at home (after a **stroke**) with a system involving robotic devices. More info: scriptproject.eu

Duration: 2011-2014

StrokeBack

Remote rehabilitation after **stroke** via telemedicine. More info: www.strokeback.eu

Duration: 2011-2014

TBIcare

Traumatic brain injury (TBI) is the most common cause of permanent disability in people under the age of 40. Recent statistics show a steep increase in the incidence of TBIs, with an increase of 21% over the last years – threefold greater than the rate of increase in population. Yearly cost from TBI in Europe exceeds 100 billion euros.

The TBIcare project (mainly based in Finland, but also in the UK) aims to improve TBI diagnostics and treatment decisions for every individual patient with a software solution. Part of this tool are:

1) a methodology for finding efficient combinations of multi-modal biomarkers used in statistical models to objectively diagnose and assess a TBI patient,

2) a simulation model for objectively predicting outcome of the planned treatment of a TBI patient.

TBIcare covers part of the "Virtual Physiological Human" (VPH), which deals with biomedical modelling and simulation of the human body. More info: www.tbicare.eu

Duration: 2011-2014

1.5. Projects related to the lungs and/or kidneys

AirPROM

Creation of a validated **airway model** to predict disease progression and response to treatment. Also provided is a platform to translate these patient-specific tools, so as to pave the way to improved, personalised management of airway diseases.

The AirPROM project covers part of the "Virtual Physiological Human" (VPH), which deals with biomedical modelling and simulation of the human body. More info: www.europeanlung.org

Duration: 2011-2016

CHRONIOUS

An open, ubiquitous and adaptive chronic disease management platform for **COPD** (Chronic Obstructive Pulmonary Disease) and **renal** insufficiency. More info: www.chronious.eu

Duration: 2008-2012

NEPHRON+

NEPHRON+ (www.nephronplus.eu) will provide a major leap forward in **renal care**: The project experts are developing a wearable artificial kidney for on-body blood purification - a next generation, integrated solution for personalized, remote controlled treatment and management of patients with chronic renal failure. Continuous dialysis outside the hospital offering better blood clearance, while patients can stay mobile and active in social and economic life.

Duration: 2010-2014

Synergy-COPD

The Synergy-COPD project (www.synergy-copd.eu) aims to study the underlying mechanisms of Chronic Obstructive Pulmonary Disease (**COPD**) and seeks to produce a complete computer model of the mechanisms of COPD.

Synergy-COPD covers part of the "Virtual Physiological Human" (VPH), which deals with biomedical modelling and simulation of the human body.

Duration: 2011-2014

WELCOME

To help **COPD** patients with comorbidities and to reduce the burden on our health systems, the FP7 WELCOME project aims to create innovative solutions such as an integrated care management tool and a monitoring vest.

Great attention will be paid to the small-scale validation of the project and its impact on healthcare in five countries (Greece, UK, Ireland, Germany and the Netherlands). www.welcome-project.eu

Duration: 2013-2017

1.6. Projects related to cardiovascular disorders

ARTreat

ARTreat (www.artreat.org) targets at providing a patient-specific computational model of the **cardiovascular system** applied in a real-case simulator training and in two decision support tools to assist

clinical cardiologists into providing personalized treatment selection and real-time, on- the-fly advice during invasive interventions. With the help of 20 European partners, the project experts created a 3D image reconstruction of the arteries and modelling of blood flow and plaque. Interview with the project coordinator: ec.europa.eu/digital-agenda

ARTreat covers part of the "Virtual Physiological Human" (VPH), which deals with biomedical modelling and simulation of the human body.

Duration: 2008-2013

Bravehealth

Patient centric approach for an integrated, adaptive, context aware remote diagnosis and management of **cardiovascular diseases**. More info: fastuk.org/research

Duration 2010-2014

euHeart

euHeart (www.euheart.eu) uses clinical data from various sources, such as medical imaging, measurements of blood flow, blood pressure and electrocardiography. Computer models integrate behaviour of the heart and aorta at molecular, cellular, tissue and organ level. These models also 'know' how **cardiovascular diseases** disturb the correct functioning of the heart at these levels.

The euHeart project covers part of the "Virtual Physiological Human" (VPH), which deals with biomedical modelling and simulation of the human body. It uses computer models of the diseased heart to select and personalise the most effective treatment for heart failure and heart rhythm disorders, but also coronary artery, and diseases of the aorta and valves. Doctors can use the simulation tools to predict the outcome of different types of therapy.

Duration: 2008-2012

HeartCycle

Telemonitoring system for **heart patients**, rehabilitation. More info: www.heartcycle.eu

Duration: 2008-2013

iCARDEA

An intelligent platform for personalized remote monitoring of **cardiac patients** with electronic implant devices. More info: www.srdc.com.tr/projects/icardea

Duration: 2010-2013

RT3S

RT3S (www.rt3s.eu) deals with **vascular surgery**. The project will develop a patient-specific, probabilistic model for peripheral stent fatigue-fracture, integrated in a real-time, computer-aided surgery planning application. RT3S will provide advice on fracture-risk and help to both trainee vascular surgeons and engineers in medical device companies.

Duration: 2011-2013

SCATh

SCATh (www.scath.net) improves patient safety during **vascular surgery** by contributing to less invasive surgical procedures. Article: "Researchers make cardiovascular system more visible and surgery safer"

Duration: 2010-2013

SensorART

Innovative telemedicine services supporting patients with **chronic heart failure** and healthcare professionals, allowing patients to be treated at home without renouncing to accessing high medical expertise. More info: www.sensorart.eu

Duration: 2010-2014

THROMBUS

Rupture risk of **intracranial aneurysms** (IA) has been studied at length. However, very little is known about the healing mechanism, namely the formation of a clot inside the cavity after insertion of a stent. The multiscale interaction between biological and hemodynamic processes is the central ingredient of this proposal.

The expected results: 1. A reliable validated numerical model of the intraaneurysmal thrombosis mechanisms based on biological experiments, 2. providing a virtual tool for clinicians to help in choosing the optimal stents based on relevant criteria issued from image processing and numerical simulation, 3. providing stent manufacturers with strategies for optimal stent design, 4. providing clinicians and scientists with an interactive end-user tool coupled to a medical collaborative tool, allowing efficient exchange of information.

THROMBUS (www.thrombus-vph.eu) covers part of the "Virtual Physiological Human" (VPH), which deals with biomedical modelling and simulation of the human body.

Duration: 2011-2014

CARDIOPROOF

CARDIOPROOF is a project to determine the applicability and effectiveness of predictive modelling and simulation tools for **cardiology**. It supports and is part of the "Virtual Physiological Human" (VPH) community. More info: www.cardioproof.eu

Duration: 2013-2016

VP2HF

Heart failure (HF) is one of the major health issues in Europe affecting 6 million patients and growing substantially. Existing therapies are ineffective in up to 50% of the treated patients and involve significant morbidity and substantial cost.

The primary aim of VP2HF is to bring together image and data processing tools with statistical and integrated biophysical models mainly developed in previous VPH projects, into a single clinical workflow to improve therapy selection and treatment optimisation in HF. The tools will be tested and validated in 200 patients (including 50 historical datasets) across 3 clinical sites in Europe. *Website under construction.*

Duration: 2013-2016

1.7. Projects related to diabetes

AP@home

The main goal of AP@home (www.apathome.eu) is to improve treatment of patients with **diabetes** at home. The researchers will build and evaluate an artificial pancreas (AP).

Duration: 2010-2014

Commodity12

COMMODITY12 (www.commodity12.eu) will build a platform for continuous monitoring of **diabetes**. The project will focus on the interaction between diabetes and cardiovascular diseases.

Duration: 2011-2015

EMPOWER

EMPOWER (www.empower-fp7.eu) supports the self-management of **diabetes** patients through a modular and standards-based Patient Empowerment Framework. It helps sufferers of diabetes with observing daily patterns of living and with managing personalised action plans.

Duration: 2012-2015

METABO

"Controlling Chronic Diseases related to Metabolic Disorders" - METABO focuses on the improvement of **diabetes** disease management by providing patients and medical doctors with a technological platform to help them handle and analyse all information related to diabetes treatment, integrating it with patients´ lifestyle data. More info: www.metabo-eu.org

Duration: 2008-2012

MISSION-T2D

A patient-specific model for the simulation and prediction of metabolic and inflammatory processes in the onset and progress of the **Type 2 Diabetes** (T2D); A diagnostic tool to estimate the risk of developing T2D and to predict its progression in response to possible therapies. More info: www.iac.rm.cnr.it

Duration: 2013-2016

MOSAIC

Development of mathematical models and algorithms that can enhance the current tools and standards for the diagnosis of **T2DM, IGT, IFG** and **GDM**; That can improve the characterization of patients suffering from those metabolic disorders and that can help evaluating the risk of developing T2DM and GDM and their related complications. More info: www.mosaicproject.eu

Duration: 2013-2016

REACTION

The REACTION project (www.reaction-project.eu) have developed an integrated approach to improve long term management of **diabetes**. Continuous blood glucose monitoring, clinical monitoring and intervention strategies, monitoring and predicting related disease indicators, complement on education on life style and, ultimately, automated closed-loop delivery of insulin will be automated.

Duration: 2010-2014

1.8. Projects related to cancer

CHIC

Computational Horizons In Cancer (CHIC): Developing Meta- and Hyper-Multiscale Models and Repositories for **In Silico Oncology**.

The CHIC project (chic-vph.eu) covers part of the "Virtual Physiological Human" (VPH), which deals with biomedical modelling and simulation of the human body.

Duration: 2013-2017

DR THERAPAT

DR THERAPAT's aim is to create the Digital Radiation Therapy Patient platform. This **platform** will integrate available knowledge on tumour imaging, image analysis and interpretation, radiobiological models and radiation therapy planning into a coherent, reusable, multi-scale digital representation. More info: drtherapat.eu

Duration: 2013-2016

FUSIMO

Removing a tumour without a scalpel or x-rays? This is possible thanks to a certain type of ultrasound: Strong, concentrated ultrasonic waves are directed at the patient's body in such a way that they heat and kill individual cancer cells. Goal was to develop a multi-level model for moving **abdominal organs** for use with "focused ultrasound (FUS) therapy" and Magnetic resonance-guided focused ultrasound surgery. More info: www.fusimo.eu

Duration: 2011-2013

TRANS-FUSIMO

The follow-up of FUSIMO: The new Trans-Fusimo project will use the ultrasound technique for treating cancer in moving organs, especially the **liver**.

Currently, FUS therapy is not yet approved for liver tumours: The motion of the organ caused by respiratory movement complicates pointing the concentrated ultrasonic wave on the tumour. The first step is to obtain 3D images from magnetic resonance tomography (MRT) that show the inside of the patient's abdomen and simultaneously register the respiratory movements. Based on this data, experts can perform computer simulations of ultrasound treatment on the liver. More info: www.trans-fusimo.eu

Duration: 2014-2018

GoSmart

Minimally Invasive Cancer Treatment. More info: www.gosmart-project.eu

Duration: 2013-2016

INTEGRATE

Cancer research, data sharing. More info: www.fp7-integrate.eu

Duration: 2011-2014

OraMod

This project deals with **oral cavity cancer**. To improve early prediction of reoccurrence of this disease, OraMod intends to develop and translate innovative methods, tools, virtual models and predictive markers for risk of reoccurrence from the lab into the clinic and into the usual care delivery practice.

OraMod (oramod.eu) covers part of the "Virtual Physiological Human" (VPH) aimed at personalized healthcare and disease prevention.

Duration: 2013-2016

TUMOR

Implementing an EU cancer model/data repository, and developing/providing specific tools and methods for the collection, curation, validation and customization of existing **cancer models** both in the EU and the US.

This transatlantic collaboration (sharing models and exchanging related expertise as well as jointly developing the necessary interfaces and tools) helps to optimize cancer treatment. More info: tumor-project.eu

Duration: 2010-2013

VPH-PRISM

Goal: A multidisciplinary model of the breast to improve the treatment of **breast cancer**. This model will give insight in environment-tissue interactions and will be the basis for quantitative drug efficacy assessment, surgery planning and treatment outcome prediction at both early and advanced stages of breast cancer.

The VPH-PRISM project (www.vph-prism.eu) covers part of the "Virtual Physiological Human" (VPH), which deals with biomedical modelling and simulation of the human body.

Duration: 2013-2016

ClinicIMPPACT

The main objective of this project is to bring the existing radio frequency ablation (RFA) model for **liver cancer** treatment (developed by its predecessor, the IMPPACT project, completed in February 2012) into clinical practice. More info: www.clinicimppact.eu

Duration: 2014-2017

1.9. Projects related to paediatrics

Caretoy

A baby gym with mechatronic toys for infants to **rehabilitate** after a stroke or in case of other neurological conditions, the tool includes a smart system of telemonitoring. More info: www.caretoy.eu

Duration: 2011-2014

MD Paedigree

Worldwide advanced **paediatric digital repository**. In the fight against childhood obesity and other child diseases, this medical research project uses mathematical models to improve the treatment of children. Article: "EU awards 12 million euros to supercompute a healthier future for Europe's children". Project website: bitem.hesge.ch

Duration: 2013-2017

MICHELANGELO

Wearable EEG solution and eye-tracking device to identify the stimuli that cause significant responses in the **autistic child**; signal processing algorithms enabling accurate characterization of brainwave anomalies and connectivity between different brain regions. More info: www.michelangelo-project.eu

Duration: 2011-2014

Sim-e-Child

Grid-enabled platform for large scale simulations in **paediatric cardiology**, providing a collaborative environment for constructing and validating multi-scale and personalized models of a growing heart and vessels. Article and project video: "Digital simulation of a child's heart for surgery". More info: www.sim-e-child.org

Duration: 2010-2012

1.10. Projects related to rehabilitation in general

REWIRE

REWIRE (www.rewire-project.eu) develops, integrates and field tests an innovative virtual reality based **rehabilitation platform**, which allows patients, discharged from the hospital, to continue intensive rehabilitation at home under remote monitoring by the hospital itself.

Duration: 2011-2014

1.11. Projects related to specific body parts such as the liver, skeleton, ears, breasts and reproduction organs

d-LIVER

The d-LIVER project (www.d-liver.eu) focusses on patients having **liver** problems, such as chronic or acute liver failure. It uses ICT to address the clinical need for a bio-artificial liver (BAL) and it supports the remote monitoring of the patient's condition in his home environment through a system based on biosensors. d-LIVER will enable the patients to stay more independent whilst being under constant medical supervision.

The system is expected to save up to 250.000 lives annually worldwide, for example by preventing chronic liver failure and mortality of patients on the transplant waiting list.

Duration: 2011-2015

MXL

Joint replacement surgery is much more successful with the use of ICT and computational modelling. It also decreases the costs associated with subsequent joint revision surgeries and it improves the quality of life of patients following such procedures.

Article and video: "How ICT can improve joint replacement surgery". Project website: www.m-x-l.eu

Duration: 2010-2012

MySpine

Improving the treatment of **lower back pain**. Nowadays treatment and prognosis of spinal disc degeneration are still based on trial and error decisions from the surgeon, leading to numerous post treatment complications and eventual morbidity. MySpine is working on a rational engineering approach based on advanced ICT and predictive systems that are patient-specific. Watch the MySpine video here.

The MySpine project (www.myspineproject.eu) covers part of the "Virtual Physiological Human" (VPH), which deals with biomedical modelling and simulation of the human body.

Duration: 2011-2014

NMS Physiome

Development of predictive, personalised and integrative **musculoskeletal medicine**. The aim is to compose sub-models describing processes occurring at different temporal or dimensional scales, into one hyper-model that describes all systemic interactions across scales (body, organ, tissue, cell, and molecule). More info: www.nmsphysiome.eu

Duration: 2010-2013

TLEMsafe

Improving safety and predictability of complex **musculoskeletal surgery** using a patient-specific navigation system.

Musculo-skeletal diseases and prosthetic revision operations are increasing rapidly with the aging population. Major surgical interventions are usually uncertain in outcome and have a high complication rate.

TLEMsafe aims to create a patient-specific surgical navigation system, based on innovative ICT tools, for training, pre-operative planning and execution of complex musculo-skeletal surgery. It aims to help the surgeon to safely reach the optimal functional result for the patient, and it will be a user-friendly training for surgeons. More info: www.tlemsafe.eu.

Duration: 2010-2014

PAEON

PAEON (paeon.di.uniroma1.it) deals with **infertility**. It develops patient-specific models of the menstrual cycle and external influences. It helps to predict the outcome of a treatment on patients with infertility related disorders such as Polycystic Ovarian Syndrome, hyperprolactinemia or endometriosis.

The PAEON project covers part of the "Virtual Physiological Human" (VPH), which deals with biomedical modelling and simulation of the human body.

Duration: 2013-2016

PICTURE/PICASSO

PICTURE/PICASSO, also part of the VPH, is working on an ICT tool for modelling the outcome of women **breast surgery**. More info: www.vph-picture.eu

Duration: 2013-2016

SIFEM

This project helps research on **hearing** impairment and loss as well as **ear surgery** by improving personalised 3D ear visualisation. The SIFEM project (sifem.ubitech.eu) also covers part of the VPH.

Duration: 2013-2016

EMBalance

Balance disorders (e.g. vertigo, Ménière's Disease, migraine-related dizziness etc.) affect more than a third of the EU population at some point in their lives and falls are the most common cause of accidental death in those aged 75+. However, diagnosis of balance disorders is rarely straightforward and can often take months, or even years.

EMBalance is developing a new, online Decision Support System that will aid clinical decision-making in the evaluation and management of balance disorders. General Practitioners and other doctors will be equipped with this system to help diagnose and treat dizzy patients. More info: www.embalance.eu

Duration: 2013-2016

1.12. Projects related to gastroenterology

CD-MEDICS

Coeliac disease management, monitoring and diagnosis using biosensors and an integrated chip system. The project researchers also developed a free e-learning tool about the disease. More info: www.etseq.urv.es/cdmedics

Duration: 2008-2012

VIGOR++

This project aims to create a personalised gastrointestinal tract model, which facilitates accurate detection and grading of **Crohn's disease**. The benefits are early diagnosis, improved therapy planning and a better quality of life for patient.

The technology builds on multiscale information from patients, including laboratory, MRI, colonoscopy and microscopy (histopathology) data. A novel integration of existing models is employed to predict features on the molecular to cellular scale (microscopy/colonoscopy) from descriptive properties at the organ to patient scales (MRI/laboratory).

The VIGOR++ project (www.vigorpp.eu) covers part of the "Virtual Physiological Human" (VPH), which deals with biomedical modelling and simulation of the human body.

Duration: 2011-2014

1.13. Projects related to biomedical informatics

GRANATUM

The GRANATUM project (www.granatum.org) has developed a kind of "Facebook for biomedical researchers": an innovative **social collaboration platform** which connects biomedical researchers and provides access to information about cancer research and established pharmaceutical agents from 83 global data sources in an integrated, semantically interlinked manner. Sophisticated GRANATUM applications, all integrated in the GRANATUM Portal, facilitate a new collaborative and integrative approach in cancer chemoprevention research. Article: 'Biomedical Facebook': New web portal for drug discovery

Duration: 2011-2013

INBIOMEDvision

Promoting and monitoring **biomedical informatics** in Europe. More info: www.inbiomedvision.eu

Duration: 2011-2013

MSV

Interactive Visualisation of Multiscale Biomedical Data. Article: "Researchers take biomedical modelling a step further". More info: www.msv-project.eu

Duration: 2010-2012

1.14. Projects related to drugs, anesthesia & patient safety

EU-ADR

New drugs undergo extensive trials prior to authorisation. Once they are on the market, clinicians are responsible for recognising and reporting suspected side effects. However, a number of recent drug safety issues have shown that **adverse side-effects** may be detected too late, when millions of patients have already been exposed.

The EU-ADR project (www.eu-adr-project.com) exploited advanced ICT to develop new ways of using existing clinical and biomedical data sources to detect Adverse Drug Reactions (ADRs) as early as possible. The project used the anonymous electronic healthcare records of more than 30 million European citizens for their EU-ADR integrated platform. This platform has already been successfully used in other projects to assess the relationships between specific drugs classes and specific adverse events. It is at the heart of the EU-ADR Alliance, a European collaboration framework for running drug safety studies.

The Adverse Drug Response (ADR) system collects information on the use of a medicine in several European countries, as well as associated drug use and background rates of adverse drug events in the population. It then applies text mining, epidemiological and other computational techniques to assess and detect "signals".

Duration: 2008-2012

Ponte

Research into **new drugs**: The PONTE platform offers vital assistance to researchers across Europe throughout each stage of the process - from the moment a researcher generates an idea for a new drug, through to the selection of suitable volunteers for a trial. The project involved partners from seven EU member states (Italy, Belgium, Lithuania, Greece, Germany, UK and the Netherlands) and came to an end with good results. The EU invested about 2,5 million euros in it.

A demo of the tools is available for testing through registration at the project website: www.ponte-project.eu. Article. "PONTE makes research into new drugs easier and faster"

Duration: 2010-2013

preDICT

Computational technology for in silico assessment of the efficacy and safety of specific **drugs**. Part of the VPH-Community. More info: www.vph-predict.eu

Duration: 2008-2011

SAFROS

This project (www.safros.eu) focussed on patient safety in robotic surgery by defining safety metrics for surgical procedures and then developing methods that abide by safety requirements, formulated in terms of these metrics. Also training tools are included: Surgeons-to-be no longer have to practice on cadavers but can use "organ phantoms" instead. They may also practice with "virtual surgical simulators" and operating room monitoring systems. Article: "Robotic surgery made safer".

Duration: 2010-2013

TRANSFoRm

TRANSFoRm (www.transformproject.eu) aims to develop a "rapid learning healthcare system" driven by advanced computational infrastructure that can improve both patient safety and the conduct and volume of clinical research in Europe.

Duration: 2010-2015

RASimAs

A better outlook for those about to undergo surgery or have a child: The RASimAs project is working on a virtual reality simulator for doctors performing regional anesthesia. This tool supports prediction and avoidance of possible complications during regional anesthesia providing a precise anatomy of every single patient.

More info: "EU awards 3.3 million to RASimAs for simulating anesthesia outcome" and www.rasimas.eu

Duration: 2013-2016

Avicenna

Clinical trials to test new drugs, devices or treatments are not only expensive, they are also risky for the test subjects; animals or humans. Solution: Perform the tests using high-quality and reliable computer simulations. Avicenna, part of the VPH community, aims to make this possible. www.vph-institute.org

Duration: 2013-2016

1.15. Projects related to personal health, preventive healthcare, mobile health

eHealthMonitor

Development of a **platform** for individualized personal healthcare services, design of knowledge sharing methods which consider privacy protection requirements, and include all stakeholders in the decision making process. More info: www.ehealthmonitor.eu

Duration: 2011-2014

Mobiguide

The aim of the MobiGuide project (www.mobiguide-project.eu) is to develop an intelligent decision-support system for patients with chronic illnesses. The system accompanies the patients wherever they go and helps them and their care providers in **managing their illness**, whether they are at home, at work, out and about or travelling abroad on holiday or for business. The MobiGuide tool analyses bio signals from body-worn sensors and gives advice 24/7.

Duration: 2011-2015

MyHealth Avatar

Digital representation of patient **health status**. More info: www.myhealthavatar.eu

Duration: 2013-2016

p-Medicine

p-Medicine ('Personalised Medicine') is working on an **infrastructure** that will facilitate the translation from current practice to personalised medicine. More info: www.p-medicine.eu

Duration: 2011-2015

DAPHNE

With DAPHNE, researchers and businesses join forces to help people **manage their weight** and increase physical exercise using emerging technologies and information systems.

The project will use a new generation of sensors to detect how much energy a person expends - including how much time they have been sitting still, walking, standing, doing housework, etc - and can monitor their overall fitness.

More info: "€4.9 million project helps Europeans manage their weight" and www.daphne-fp7.eu

Duration: 2013-2016

BeatHealth

Better at sports while listening to music? BeatHealth wants to exploit this link between music and movement for boosting individual performance and **enhancing health and wellness**. It aims to create an intelligent portable tool and IT network for rhythmical stimulation adapted to the individual's skills.

The beneficial effects of BeatHealth will be evaluated both in patients with movement disorders (i.e., Parkinson's disease), and in healthy citizens of various ages with moderate physical activity.

More info: www.euromov.eu/beathealth

Duration: 2013-2016

PEGASO Fit for Future

Promoting **healthy lifestyles and food awareness** among teenagers through games and technology - this is the goal of the "PEGASO Fit for Future" project.

More info: "9 million euros for healthier teens" and www.pegasof4f.eu

Duration: 2013-2017

SPLENDID

This project will develop hi-tech sensors aiming to **prevent obesity**: By measuring food intake and activity these sensors can assess obesity risks. In the fight against obesity, SPLENDID also developed special programs for guiding both school children and adults. More info: splendid-program.eu

Duration: 2013-2016

PRECIOUS

To maintain a **healthy lifestyle**, PRECIOUS aims to improve motivation using a combination of motivational interview and gamification principles, as well as creating a personalised system that adapts to the users' goals and preferences. The system will measure food intake, physical activity, stress levels and sleep patterns. More info: www.thepreciousproject.eu

Duration: 2013-2016

SEMEOTICONS

The central idea of SEMEOTICONS (SEMEiotic Oriented Technology for Individual's CardiOmetabolic risk self-assessmeNt and Self-monitoring), is to exploit the **face** as a major indicator of individual's **well-being** by tracing traits of physical and expressive status.

To map and assess these face signs, SEMEOTICONS will design and construct a multi-sensory system integrated into a hardware platform having the exterior aspect of a mirror: the so-called "Wize Mirror". This will easily fit into users' home or other sites of their daily life. www.semeoticons.eu

Duration: 2013-2016

1.16. Knowledge sharing & infrastructure for EU-funded eHealth experts

A project has been set up, research has been done and then what? These projects facilitate matters. The first three are meant for the Virtual Physiological Human community dealing with in silico medicine.

RICORDO

The RICORDO project (www.ricordo.eu) focused on the study and design of a multiscale ontological framework in support of the Virtual Physiological Human community to improve the interoperability amongst its Data and Modelling resources. To this end, it built directly upon the shared experiences and published recommendations emerging from the VPH Network of Excellence and ELIXIR initiatives.

Duration: 2010-2012

VPH NoE

Coordination of the activities within the VPH initiative, development of a 'VPH ToolKit' and associated infrastructural resources, VPH community building and support, development of career structures for those involved in VPH. More info: www.vph-noe.eu

Duration: 2008-2013

VPH-Share

To be achieved: the infrastructure to (1) expose and share data and knowledge, (2) jointly develop multiscale models for the composition of new VPH workflows, (3) facilitate collaborations within the VPH community. More info: www.vph-share.eu

Duration: 2011-2015

HAIVISIO

How do we get European research and innovation project results out of the lab? HAIVISIO will help EU-funded eHealth and ICT for active and healthy ageing projects to set a common strategy for jointly disseminating their results. The project will organise events and training courses and facilitate an online community.

More info: "Bridging the gap between EU research results and service provision" and www.haivisio.eu

Duration: 2013-2015

2. Innovation: Personalised and mobile healthcare

These projects all focus on innovating and reforming our healthcare system. Keywords are: personal health systems, integrated care services, mobile health ('mHealth'), telemedicine and patient empowerment. Innovation projects are mainly funded by the ICT Policy Support Programme (ICT PSP) - Competitiveness & Innovation Programme (CIP).

2.1. Projects related to personalised health services, telemedicine and chronic disease management

Telemedicine – the interaction between doctors and patients or among health professionals through electronic media – can help citizens receive personalized care, regardless of their location. This is especially helpful for patients suffering from chronic illnesses who have to see a doctor regularly.

eHealth Innovation

This thematic network wants to develop a European roadmap for sustained eHealth innovation. The focus is on personalised health services and a supportive eHealth infrastructure. Special emphasis will be put on chronic disease management for an ageing population.

The network involves 22 partners: 20 from 10 Member States and 2 from Switzerland representing a broad range of stakeholders: national and regional authorities, industry (ICT and pharma), national solution providers, researchers and users (health professionals, patients, healthcare providers and insurers/third party payers), European and national associations. More info: www.ehealth-innovation.eu

Duration: 2011-2013

CLEAR

This project proposed the implementation of a "Tele-rehabilitation service" in four Member States of the European Union (IT, ES, NL, PL). The ambition was to convert the project, after its completion, to a European platform for Tele-rehabilitation, and to contribute to the harmonization of eHealth services in the EU.

CLEAR was a fundamental step in helping doctors treating patients who seek health treatment in a comfortable environment, including home, under supervision of a specialized team. Click here for the final results. More info: www.habiliseurope.eu

Duration: 2008-2012

CommonWell

The CommonWell project (commonwell.eu) delivered integrated telecare and telehealth services among social care providers and hospitals on open platforms. The developed services were targeted mainly for patients suffering from chronic diseases and professionals dealing with these conditions. The system collects and makes sure health parameters are monitored and health care providers receive up-to-date information about patients. The main advantage with this ICT solution is that it prevents unnecessary admissions to hospitals and patients can go on living actively and independently.

The project implemented a platform which tested 4 different services in the pilot sites:

- Telecare integration for better emergency care;
- Managed hospital admission for care providers;
- Early intervention and telehealth for CODP patients;
- Integrated support for heart failure patients.

The project ended in early 2012 and integrated services are now in real-life operation at the four pilot sites established in Spain, Germany, England and the Netherlands.

Duration: 2008-2012

MOMENTUM

A European telemedicine "Blueprint" to mainstream telemedicine into daily practice and make it sustainable. More info: www.telemedicine-momentum.eu

Duration: 2012-2014

NEXES

The NEXES project (www.nexeshealth.eu) moved the focus from hospital care to primary and home care using ICT support. To this end, the project assessed deployment of 4 innovative Integrated Care Services (ICS) for *chronic patients* (respiratory, cardiac and type II diabetes mellitus) including well standardized patient-centred interventions: home-based wellness and exercise-training; enhanced care for frail patients; home hospitalization and early discharge and remote support to primary care for diagnosis and therapy.

The pilot was carried out in three different sites – Spain, Greece and Norway – where it developed insights into local structural and operational barriers which have to be overcome for further development of Integrated Care Services.

Specific achievements of the project have been:

- Development of Integrated Care Services for chronic patients with enhanced effectiveness and reduced costs;
- Consolidation of an open source modular Health Information Sharing Platform supporting organizational interoperability among actors and clinical decision support systems;
- An innovative business case;
- Strategies for scalability of the ICT services at regional level.

Duration: 2008-2012

RenewingHealth

This project has seeked to deliver telemedicine and personal health services (PHS) to the many people suffering from Chronic Obstructive Pulmonary Diseases (COPD), diabetes and cardiovascular diseases.

The project has implemented large scale real-life pilots to validate and evaluate innovative patient-centred personal health systems and telemedicine services. The ultimate goal is to demonstrate what PHS and telemedicine services can deliver: more effective and efficient care, improving of the quality of life and enhancing patients' involvement and empowerment. More info: www.renewinghealth.eu

Duration: 2010-2013

United4Health

The United4Health project aims to exploit and further deploy innovative telemedicine services implemented and trialled under the RenewingHealth project. All included service solutions adopt a patient centred approach, and involve the telemonitoring and the treatment of chronic patients with diabetes, COPD or CVD diseases. More info: www.united4health.eu and ec.europa.eu

Duration: 2013-2015

THALEA

Through the THALEA project, five hospitals from Germany, Netherlands, Spain, Belgium and Finland will initiate a joint Pre-Commercial Procurement (PCP) focusing on getting a highly interoperable telemedicine

and telemonitoring platform (a central 'monitoring cockpit') for improving the care of acutely live-threatened patients at intensive care units.

THALEA intends to launch a European wide published PCP call for tender for the value of around €1,55M.

More info: www.thalea-pcp.eu and THALEA factsheet

Duration: 2013 - 2016

INSPIRE

An EU-network to bring together experts and procurers interested in developing and implementing innovative procurements in the eHealth, Active Aging and Independent Living areas. More info: www.nhg.fi

Duration: 2013 - 2015

CARRE

To help patients manage their **chronic heart and kidney disease**, CARRE will develop personalised alerting, planning and educational services. This will empower patients, and both professionals and patients will be able to make shared informed decisions on the disease.

The CARRE consortium consists of 6 partners from 4 countries (Greece, United Kingdom, Lithuania and Poland) and is coordinated by the Democritus University of Thrace in Alexandroupoli, Greece.

More info: www.carre-project.eu

Duration: 2013 - 2016

2.2. Projects focused on mobile health: roadmaps & new apps via procurement

MovingLife

MovingLife ("MObile eHealth for the VINdication of Global LIFEstyle change and disease management solutions") has delivered a set of roadmaps for mHealth ("mobile health"). These include technology and application research and innovation, implementation practice and policy support. The roadmaps are supposed to accelerate the establishment, acceptance and wide use of mHealth solutions at a global scale. More info: www.moving-life.eu

Duration: 2011-2013

DECIPHER PCP

DECIPHER PCP (www.decipherpcp.eu) deals with mHealth procurement. It is developing a mobile solution which enables secure cross-border access to existing patient healthcare portals. Article: "1st Decipher PCP market consultation day"

Duration: 2012-2016

UNWIRED Health

UNWIRED Health also deals with mHealth procurement for the transformation of healthcare services. In this case, the Pre-Commercial Procurement (PCP) focuses on apps offering services…

(1) to improve **vaccination** coverage and adherence

(2) to coach patients with **heart failures** enabling education, motivation, remote monitoring and other functionalities, integrating and coordinating care provided by a hospital and the primary care physician.

Both of these apps will be innovative, fully integrating the apps in the regional public health systems and can be prescribed by GPs. These services will be implemented in open platform infrastructures that will make the apps platform-agnostic, suitable to any smartphone and any participating operator.

The consortium consists of three procurers introducing the innovation into their territories in Catalonia, Scotland and Southern Denmark and three vendor independent non-profit associations that will act as catalyst to foster the development of open platforms and interoperable solutions.

Planning: UNWIRED HEALTH intends to launch a European wide published PCP call for tender for the value of around €2,136M.

Duration: 2014-2016

2.3. Projects focused on patient empowerment in general

PALANTE

PALANTE (www.palante-project.eu) focusses on patient empowerment: Maximize the potential of ICT technologies in health care by validating pilots that address mechanisms involved in patient empowerment.

Currently there are 9 ongoing pilots: in Andalusia (Spain), Lombardy (Italy), Turkey, Norway, Austria, Czech Republic, Basque Country (Spain), France, Denmark. All of these pilots address the issue of patient's secure access to their own health information.

Duration: 2012-2015

SUSTAINS

To empower patients, SUSTAINS ("Support User Access to Information and Services") comprises a basket of services based on giving citizens online access to their Electronic Health Records (EHR). The services proposed have been distilled from the experience of regions which have already pioneered such access.

The regions of the SUSTAINS Consortium share their experiences and achievements to speed up the implementation of the SUSTAINS outcomes. More info: sustainsproject.eu

Duration: 2012-2014

2.4. Projects to improve eHealth literacy of carers

CAMEI

CAMEI brings the EU-US Roadmap for eHealth into practice by addressing IT skills for healthcare workers in both the EU and the US. CAMEI coordinates research activities and policies towards the development of renewed educational material and programs, boosts new trends for acquiring new knowledge by the healthcare workforce, fosters trans-national access to research infrastructures from both EU and USA partners and establishes a network of best practices in Medical Education Informatics. More info: www.camei-project.eu

Duration: 2013-2015

ENS4Care

To deploy eHealth services, ENS4Care will share good practices by creating evidence based guidelines for nurses and social care workers. The guidelines will focus on healthy lifestyle and prevention, early intervention and clinical practice in integrated care, skills development for advanced roles and nurse ePrescribing. More info: www.ens4care.eu

Duration: 2013-2015

3. Interoperability & Standardisation

Where health and wellbeing are concerned, the European Commission would like to see Europe and its health care providers connected. These projects are on their way to make interoperability for health and wellbeing in Europe (and beyond) a reality.

3.1. Projects related to eHealth services in general & cross-border healthcare

epSOS

epSOS (www.epsos.eu) is short for European patient Smart Open Services. This large scale project provides:

- a Patient Summary: a digital summary of your medical status to make abroad care better and more efficient, especially helpful in an emergency situation.
- ePrescription: a digital drug prescription, so you can pick up your medication in a participating pharmacy abroad.

To make use of this service, please consult your doctor. More info in this video.

Duration: 2008-2014

HITCH

In order to deliver safe and efficient care, vendors, users, patients and authorities need to agree on practical solutions to validate and assert the interoperability of eHealth systems by means of appropriate testing and labelling/certification schemes.

HITCH (Healthcare Interoperability Testing and Conformance Harmonisation) involved major stakeholders to define and agree on a roadmap to establish a foundation for the Interoperability Conformance Testing of information systems in the field of healthcare. The project evaluated existing approaches and proposed an achievable Interoperability Conformance Testing foundation deployable starting in 2011. More info: www.hitch-project.eu

Duration: 2010-2011

Antilope

The Antilope project (www.antilope-project.eu) is the follow-up of HITCH. It has set up a network of core European National organisations to achieve a common approach for testing and certification of eHealth solutions and services in Europe.

Duration: 2013-2015

Trillium Bridge

What if you, while visiting the US, need urgent medical help and the doctor doesn't know your medical history? The Trillium Bridge project wants to align the use of standards between the EU and the US to share basic patient data between EU and US health professionals. Of course only when the patient has given his consent.

By helping to create a transatlantic interoperability bridge for health data, Trillium Bridge is implementing the EU-US Roadmap on eHealth. www.trilliumbridge.eu

Duration: 2013-2015

EXPAND

How to get interoperability projects such as epSOS from pilot stage to actual deployment in Europe? The EXPAND project wants to fill this gap. www.expandproject.eu

Duration: 2014-2015

3.2. Projects related to clinical research

Many interoperability projects focus on clinical research: By making Electronic Health Records (EHRs) and other clinical data interoperable, you can facilitate clinical research and hugely improve its outcome.

EURECA

The EURECA project (eurecaproject.eu) allows faster eligible patient identification and enrolment in clinical trials, providing access to the large amounts of patient data and enabling long term follow up of patients. avoid the current need for multiple data entry in the various clinical care, faster transfer of new research findings and guidelines to the clinical setting.

Duration: 2012-2015

Linked2Safety

Linked2Safety (www.linked2safety-project.eu) provides a secure medical information space for semantically interconnecting anonymous EHRs to advance clinical practice, to accelerate medical research, to improve the quality of healthcare, and to enhance patients' safety.

Duration: 2011-2014

GRANATUM

The GRANATUM project (www.granatum.org) has developed a kind of "Facebook for biomedical researchers": an innovative social collaboration platform which connects biomedical researchers and provides access to information about cancer research and established pharmaceutical agents from 83 global data sources in an integrated, semantically interlinked manner. Sophisticated GRANATUM applications, all integrated in the GRANATUM Portal, facilitate a new collaborative and integrative approach in cancer chemoprevention research. Article: 'Biomedical Facebook': New web portal for drug discovery

Duration: 2011-2013

Salus

The Salus project (www.salusproject.eu) aims to provide a standard-based interoperability framework of EHRs that will enable the execution of drug safety studies áfter the drugs have come out on the market.

Duration: 2012-2015

SemanticHealthNet

The purpose of this project is designing a semantic interoperability infrastructure of clinical and biomedical knowledge (a so called Network of excellence in semantic interoperability) and a roadmap for governments and other stakeholders. They want to help ensure that EHR systems are optimised for patient care, public health and clinical research across healthcare systems and institutions. More info: www.semantichealthnet.eu

Duration: 2011-2014

TRANSFoRm

TRANSFoRm (www.transformproject.eu) aims to develop a "rapid learning healthcare system" driven by advanced computational infrastructure that can improve both patient safety and the conduct and volume of clinical research in Europe.

Duration: 2010-2015

4. New Horizon 2020 projects

The projects originating from the call that had its deadline in 2014 are mainly focussing on making healthcare better through the use of mobile health (mHealth), innovation procurement and improving eHealth interoperability & standards.

4.1. Projects related to mHealth

HEARTEN

The HEARTEN project wants to prevent **Heart Failure** (HF). The project researchers are developing biosensors that detect and quantify novel breath and saliva HF biomarkers that can reflect the health status of the patient and also identify whether the patient adheres to the administered drugs. A new platform will send smartphone alerts to HF patients every time they find themselves in a critical situation.

www.hearten.eu

Duration: 2015-2018

Do CHANGE

According to research, 90% of people who are advised to **change their lifestyle** after a serious medical event, fail to do so. To help them, experts from the UK, Belgium, the Netherlands, Spain and a hospital in Taiwan will link inputs from medical devices, nutritional sensors, doctors and consultants, thus creating a new health ecosystem that puts the user at the centre.

Participating patients will monitor their condition and what they eat at home with the new devices that feed into the 'Do Change' system. This will inform the kind of lifestyle changes required, which in turn will help to shape a personalised programme in near real-time.

The patient will receive 'Do's' designed by the project's psychologists to encourage him or her to make the changes the cardiology team suggests they need to make for their long-term health.

www.do-change.eu

Duration: 2015-2018

PATHway

PATHway is working on a novel approach to **cardiac rehabilitation**. The PATHway experts are developing an individualized programme including an internet- enabled, sensor-based home exercise platform that manages exercise or other physical activity, smoking, diet, stress management, alcohol use etc. This enables patients to both better understand and deal with their own condition and to lead a healthier lifestyle.

The system will allow remote participation in specially designed exercise programs at any time, either individual or together with a small number of patients, from the comfort of their own living room.

Duration: 2015-2018

PAL

PAL is devoted to the development of a Personal Assistant for healthy Lifestyle (PAL) for **type 1 diabetes** patients aged 7 - 14.

The personalized assistant (PA) will assist children, health professionals and parents to advance the self-management of the diabetic child, so that an adequate level is established before adolescence. Severe episodes and complications can be prevented by performing self-management. For example, the monitoring carbohydrate intake, physical activity, and blood glucose, recognizing symptoms of hypoglycemia and hyperglycemia, and injecting insulin, can help regulate glucose levels and help minimizing the impact of the illness on the patient’s health.

Duration: 2015-2019

myAirCoach

myAirCoach aims to create a user-friendly tool for **asthmatic patients** to monitor and self-control their disease. This tool, a holistic mHealth personalised asthma monitoring system, will increase the patients' awareness of their clinical state and effectiveness of medical treatment.

This will be achieved through a multi-disciplinary approach aiming at the development of an ergonomic, compact and efficient sensor-based inhaler that will be in continuous communication with a mobile device. This sensing infrastructure will have the capability of automated monitoring of several clinical, behavioural and environmental factors in realistic conditions.

www.myaircoach.eu

Duration: 2015-2018

MyCyFAPP

The MyCyFAPP project will help **Cystic Fibrosis** patients and caregivers to manage the disease with an innovative app.

Cystic fibrosis (CF) is a genetic disease, causing severe damage to the lungs and the digestive system. The affected people suffer from insufficient activity of their pancreas, often resulting in maldigestion and malabsorption, thus leading to malnutrition and growth disturbances. In Europe, about 4% of the population carry the genetic mutation, and ca. 0.3% of the European population suffer from this severe illness, which can not be cured.

An individualized therapy with enzyme replacement could relieve many of the life-shortening side effects of CF. Within the MyCyFAPP project, such a therapy will be realized in terms of an innovative information and communication technology (ICT) tool, i.e. an app and a software program. This will encourage the patient’s adherence to the treatment and the best outcome of nutritional intervention, especially important for young patients.

www.mycyfapp.eu

Duration: 2015-2019

PD_manager

This project will allow people with **Parkinson's Disease** to be followed by a multidisciplinary team, with the use of easy and accessible technologies: A smart watch, an insole to measure gait and balance, an electronic pillbox and a set of applications for smartphone and/or tablet.

With these tools and the support of a powerful server and online data collection system, it will be possible to provide each patient the specific therapeutic changes necessary to ensure the best treatment and develop a rehabilitation focused home-care system that will improve quality of life and reduce the risk of complications including falls.

www.parkinson-manager.eu

Duration: 2015-2018

ELECTOR

The internet is set to make big changes to the relationship between doctor and patient. Using the latest communications technology such as the technology of the EU-funded ELECTOR project, doctors can now diagnose and treat **arthritis** patients many miles from their consulting rooms. This saves patients hours of unnecessary travel time that they for example could use for healthy living and exercise.

Once perfected, the ELECTOR telemedicine technology for arthritis patients is expected to be rolled out across the Danish healthcare service and possibly in other EU countries as well.

More info: www.elector.eu Video: http://www.bbc.com/news/health-30527565

Duration: 2015-2018

m-RESIST

With a €4 Million budget, the m-RESIST Project (Mobile Therapeutic Attention for Patients with **Treatment Resistant Schizophrenia**) aims to develop a therapeutic program that draws on the support of mobile devices and actively involves patients with treatment-resistant schizophrenia. This will make them capable of self-managing their illness, as well as support their carers.

www.mresist.eu

Duration: 2015-2018

Sound of Vision

The Sound of Vision project aims to create and convey an auditory representation of the surrounding environment to assist **blind or visually impaired** people.

This representation will be created, updated and delivered in real time without any a-priori knowledge of the environment – indoor/outdoor – and without the need for predefined sensors located in the surroundings.

The key aspect of this project is the emphasis placed on providing a high quality user experience; the system will exploit brain computer interfaces and AI algorithms for behaviour understanding, in order to avoid overwhelming the user with information.

www.isi.it

Duration: 2015-2018

WOMEN-UP

WOMEN-UP will deliver a holistic and cost effective solution for the self-management of **urinary incontinence**, with a focus on European women. A home treatment including pelvic floor muscle training will be developed, allowing for self-management of urinary incontinence via a decision support system combined with remote medical supervision.

Recent studies show that about 56 million European citizens are affected by urinary incontinence. The WOMEN-UP project has the main objective of improving the quality of life of patients affected by this disease, which represents a serious impairment to their professional and personal lives.

No website yet

Duration: 2015-2018

iManageCancer

How can you manage your own care? The iManageCancer project will find out how mobile healthcare (mHealth) and serious games help people with **chronic illnesses** and in particular **cancer**.

The iManageCancer project will provide a cancer disease self-management platform designed according to the specific needs of patients and focusing on their wellbeing. 8 partners from 5 European countries are creating intelligent, informative and fun ways to let those with chronic illnesses manage their health in a new way, all from their smart phone.

Duration: 2015-2018

NoHoW

Helping people to lose weight has been very much examined. The NoHoW project however focusses on keeping the weight off. By collecting evidence about what works and what doesn't, the NoHoW researchers will develop an innovative **weight loss maintenance** programme with, as its central part, a weight loss maintenance toolkit.

The toolkit will include mobile apps, web-based tools and inputs from other technologies, such as smart scales and activity trackers that will feed back information to participants based on personalised prediction models of what is most effective for them.

Participants in Denmark, Portugal and the United Kingdom will test the programme.

nohow.eu

Duration: 2015-2020

4.2. Projects related to innovation procurement

SAEPP

A group of European ambulance services, academic healthcare research bodies, hospitals and other healthcare organisations have formed a consortium, called the Smart Ambulance European Procurers Platform (SAEPP). Their objective: Designing and building a 21st century prototype emergency ambulance vehicle which will allow frontline clinicians to provide more high-level patient care on-scene, and thus help reduce the number of unnecessary hospital transports currently made by ambulance services across the EU.

www.smartambulanceproject.eu

Duration: January 2015-August 2015

EPP-eHealth

The aim of the EPP-eHealth project is to transform the market for eHealth solutions through dialogue and innovation procurement. The project will create a network of procuring organisations that understand the opportunities that eHealth can offer and have competence in innovation procurement and the capacity to pioneer new approaches to collaborative procurement.

As well as stimulating demand for eHealth goods and services and creating a robust framework for practical procurement (public procurement of innovation – PPI –and pre-commercial procurement – PCP) outcomes within the period of the project, it will also serve as a leading procurers group for the wider population of some 15,000 hospitals in Europe.

innovationithospitals.com

Duration: 2015-2017

PRO4VIP

PRO4VIP (www.pro4vip.eu) is a European Pre-Commercial Public Procurement (PCP) and Innovative Public Procurement (IPP) project that is part of the European Vision 2020 strategy to combat **preventable blindness**, especially due to old age.

The aims of this project are:

- The creation and consolidation of a pan-European network of procurers;
- The definition of a common innovation procurement roadmap both in the short term and in the long term;
- The definition of cross-border and joint public procurement of innovation procedure(s) that best meet(s) PRO4VIP procuring authorities' needs (that could be either a PCP or a PPI or both) and that in line with Vision 2020 would either support the early detection and treatment of functional low vision conditions or would support the provision for low vision services.

Duration: 2015-2016

4.3. Projects related to interoperability and standardisation

openMedicine

Goal of the project: to contribute towards, and enhance the safety and continuity of cross border (and also national level) healthcare through interoperable **ePrescriptions**.

The project experts want to develop concrete solutions to communicate medicines in cross border settings. Whereas the epSOS project basically solved the electronic 'communication' or message transfer problem, it encountered a serious 'delivery' problem: No common data models, standards and a lack of common vocabulary – issues to be solved by openMedicine.

Duration: 2015-2017

eStandards

eStandards will advance eHealth interoperability and global alignment of standards. The project experts will join up with stakeholders all over Europe and globally to build consensus on eHealth standards, accelerate knowledge-sharing, and promote wide adoption of standards.

The proposal's ambition is to strengthen Europe's voice and impact, while reinforcing the bridges across the Atlantic and among MS with epSOS, eSENS, Antilope, and EXPAND.

An eStandards Roadmap and associated evidence base, a white paper on the need for formal standards, and two guidelines addressing how to work with: (a) clinical content in profiles and (b) competing standards in large-scale eHealth deployments, will be pragmatic steps toward alignment and convergence.

Duration: 2015-2017

ASSESS CT

To contribute to better semantic interoperability of eHealth services in Europe, ASSES CT will investigate the fitness of the international clinical terminology 'SNOMED CT' as a potential standard for EU-wide eHealth deployments.

The project experts will investigate concrete reasons for adoption/non adoption of SNOMED CT, lessons learned, success factors, type and purpose of use, multilingualism, cultural differences, strengths and weaknesses. They will analyse the impact of SNOMED CT adoption from a socio-economic viewpoint, encompassing management, business, organisational, and governance aspects.

www.assess-ct.eu

Duration: 2015-2016

5. Funding tools

Research projects listed in this report are primarily funded under the 7th Framework Programme (FP7) 2007-2013 and innovation projects under the CIP ICT Policy Support programme, a funding tool supporting Member States and stakeholders in the implementation and uptake of ICT by citizens, governments and businesses.

Other funding sources are available through the EU Structural Funds, part of which is dedicated to the investment in ICT for public services, including eHealth.

Horizon 2020 is the next EU Framework Programme for Research and Innovation. It entered into force in 2014. It replaces the FP7 and CIP ICT programmes as a way of improving better coherence across different funding instruments. The final goal is to add value to the entire innovation cycle, from research, to product development and market deployment.

Interested to propose a project? Visit the Horizon 2020 website for finding a call: ec.europa.eu/programmes/horizon2020

6. Index

Explanation of acronyms:

VPH = Virtual Physiological Human (in silico medicine, computational modelling)
PHS = Personal Health System
PGS = Personal Guidance System
PCP = Pre-Commercial Procurement
PPI = Public Procurement of Innovation
NETW = Project related to networking
SAF = Project related to patient safety
CSA = Coordination and Support Action
ICS = Integrated Care Services
E-INCL = e-Inclusion
PH-AHA = Personalised health, active and healthy ageing
CIP = Competitiveness and Innovation Programme
FP7 = 7th Framework Programme
EHR = Electronic Health Records