



# ICT AND HEALTHCARE

## A HEALTHY RESPECT FOR TECHNOLOGY

***The quality of life for European citizens is a top-level policy priority in Europe, so improvements to public healthcare — its delivery and management as well as medical interventions — have long been the focus of research programmes. EU support for ICT research is transforming health services across Europe into highly efficient, effective and more 'joined up' organisations, with an emphasis on prevention and personalised treatments.***

There was a time where if you were ill you went to the doctor to discuss your symptoms. She would listen to your chest, check your ears and throat then scrawl something illegible on a pad and send you off to the pharmacy for some pills.

Today you probably get a much more high-tech service both before, during and after the consultation. Perhaps you can book your appointment online. Maybe the doctor will use a handheld device to analyse your blood instantly. On holidays, the resort doctor may be able to access your own medical record at the click of a button.

ICT has been making step-wise changes in healthcare systems and treatments for many years, driven by cutting-edge ICT research funded through successive Framework Programmes.

Early applications of ICT in health focused on the area of telemedicine. In the early and mid-1990s research focused on using the connective power of the internet so that healthcare was not tied to a location.

## STEP-CHANGE IN E-HEALTH

The concept of telemedicine captured the public's imagination, and numerous articles talked about a future when doctors would connect with patients wherever they were located and surgery could be performed by the best surgeons via remote robotic manipulations.

The first teleoperation was reported in 2001 in which doctors in the United States removed a gall bladder from a patient in eastern France by remotely operating a surgical robot arm. But although this kind of operation is still uncommon, European research continues to drive the development of highly innovative applications of ICT and remote connectivity.

Significant funding has been made available in FP7. Through the Eur 700 million 'Ambient assisted living' (AAL) joint programme, funded with public-private sector investment, the Commission provides a strategic framework for R & D into networked technologies that can help the EU's growing elderly population remain active and independent in their own homes.

ICT allows healthcare professionals to keep a remote eye on elderly patients at home using health monitoring systems, sensor networks and alert services.

ICT is also helping to make a patient's medical data more accessible to healthcare professionals so they can provide a better level of care. To date, our medical records have always remained locked in filing cabinets, but ICT is now helping doctors to piece together the fragments of our medical history that are scattered between our local doctor, hospitals and other medical centres.





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Stemming from its vision for accessible healthcare for citizens wherever they may be in the EU, Europe's researchers have been leading the development of electronic medical records, harmonising and standardising data formats and information exchange, and breaking down the technological, institutional and ethical barriers that could limit their deployment.

Work in all these areas has been funded through successive Framework Programmes and in large-scale pilots under the eTEN initiative and more recently the 'ICT policy support programme' (ICT PSP).

ICT PSP is now funding pre-commercial technology pilots for several e-health and medical record technologies developed in previous Framework Programmes. The purpose is to show a 'proof of concept' and that such services can be deployed across borders on a large scale.

Of course, prevention is always better than a cure; by using ICT for data collection, analysis and modelling, new technologies have an important role to play in preventative medicine. A big research theme of FP5, for example, focused on intelligent systems for patients.

Projects combined remote and continuous monitoring systems, networked sources of health information and access to medical records. By spotting danger signs well in advance, these systems can help patients, especially those with chronic diseases, manage their health.

EU-funded advances in micro- and nanotechnologies are also spilling over into medical applications. FP6 and FP7 are supporting the development of revolutionary diagnostic and point-of-care systems that build on Europe's expertise in microfluidics and microengineering. The aim is to make diagnosis faster and cheaper so that illnesses can be prevented or dealt with before they really take hold.

Perhaps it will not be long before we start making trips to the doctor when we are well, rather than ill. Cutting-edge bioanalysis systems will give us a full personalised health screen (depending on our risk profile) and pick up problems long before a doctor ever needs to press a cold stethoscope to our chest. ■

## PROJECTS IN FOCUS

***The European Commission's e-Health Action Plan calls for products, systems and services that go beyond simply internet-based applications. Projects funded through the Framework Programmes and EU-sponsored pre-commercial deployment trials are ushering in an age of preventative and personalised healthcare.***

## SERIOUSLY, LET'S PLAY...

An increasing number of EU-funded projects are taking gaming technologies and approaches to achieve their serious objectives.

The European Playmancer project is developing gaming technologies and 3D engines to build so-called 'serious games', around health-related problems like bulimia and chronic pain.

People suffering from chronic pain could soon be playing games designed to ease their symptoms while their therapist monitors progress online. The therapist could interrupt the game any time to adjust the settings, or if there is an imminent health risk to the player.





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Another project, Eldergames, built a computerised play table for elderly people. Field testing shows that the system keeps elderly players mentally sharp, stimulates socialisation, and can alert caregivers to developing health problems. But it also uses clever sensor and analysis technology to detect early any cognitive decline in individuals.

## IT'S A PERSONAL PROBLEM...

The Myheart project has contributed to the fight against cardiovascular diseases by developing ICT-enabled solutions for prevention and early diagnosis. These solutions give patients 24/7 access to medical expertise in the form of continuous monitoring, diagnosis, therapy, automatic feedback and professional interaction.

The project has developed four product concepts and tested prototypes that lend well to full-scale manufacture. Start-up company WearTech in Valencia, Spain, is commercialising the smart textile technologies and garments, while another spin-off is offering motion sensing.

Just as advances in sensing devices and wireless communications are allowing doctors to monitor their patients' vital signs remotely through so-called telecare and telemedicine systems, similar technology can be used to monitor, prevent and detect mobility problems, such as falls at home. Nine out of ten hip fractures, for example, occur in people over 50 — and 80 % of them women.

The Eu-funded Sensaction-AAL project has developed wearable sensors, for elderly people susceptible to falls. Motion data can be used to help patients perform rehabilitation exercises to improve their balance and mobility, evaluate the progression of a disorder or, crucially, automatically alert emergency services, doctors or relatives in the event of a fall. It could be a life-saving technology in the event that a user has suffered a heart attack, stroke or other serious health incident.

## DEALING WITH ALL THE DATA...

Every year about 350 000 new cases of breast cancer are diagnosed in Europe, accounting for one in four of all cases of cancer in women. As the causes of breast cancer are still not well understood, the priority is to detect it early so that effective treatment can be given.

Several diagnostic techniques all reveal important information about lumps; the HAMAM project is now helping clinicians to make sense of all the data.

The project has developed a tool that will integrate all the test results into one clinical workstation. The doctor will be able to compare different images side by side while viewing the patient's history and other information. HAMAM will also connect to an extensive database of images and other clinical data to guide doctors through the diagnostic process. ■