Project Results

Care4Me
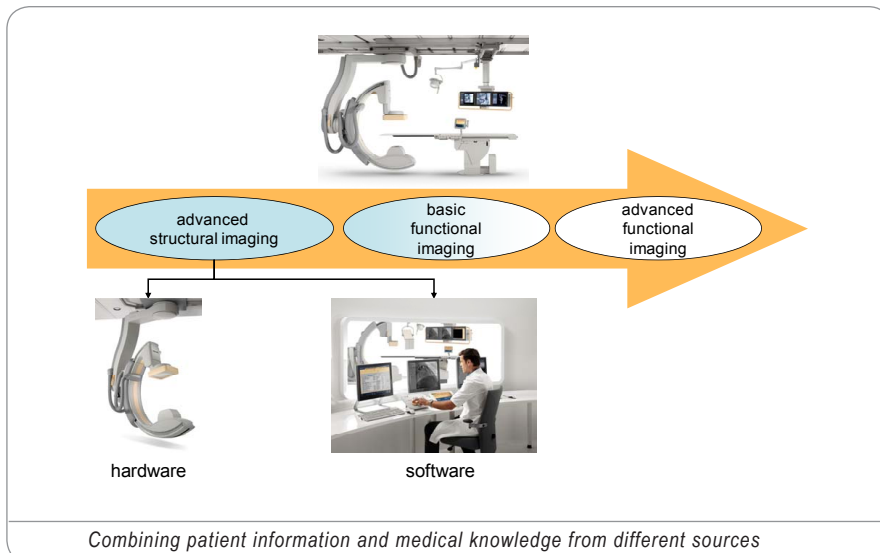## Comprehensive approach to diagnosis and treatment

The ITEA 2 project Care4Me set out to improve quality and productivity in healthcare using advanced medical imaging and decision-support methods combined with different knowledge sources, from early diagnosis to treatment and monitoring. With the ultimate goal of developing clinical prototypes for early diagnosis of cancer, cardiovascular and neurodegenerative diseases connected to hospital information systems in a new systems architecture, this project represents the first stage of a roadmap for future medical imaging systems, like X-ray and Magnetic Resonance (MR) imaging systems.

With average survival rates and age of the Western population continuing to rise, healthcare services are coming under increasing pressure as the number of chronic diseases requiring long-term treatment grows. The resulting costs and shortage of personnel present real challenges and healthcare innovation is being pushed to the limit to come up with clinical and technological solutions to collate medical data and knowledge from different sources and domains in order to address the continuum of care of all of those medical conditions.

COMBINING INFORMATION AND KNOWLEDGE

The Care4Me consortium combined strengths from different countries, involving large and small medical equipment industry, research institutes that are specialised in service oriented IT systems design, implementation and deployment as well as in medical research. Finally, the consortium included academic hospitals that have experience and expertise in deploying innovative technology to the benefit of their patients and society. By focusing on improved early diagnosis in three specific and diverse medical domains – oncology, or cancer diagnosis, cardiovascular diseases and neuro-degenerative diseases – this allowed for plenty of cross-fertilisation in the techniques that could be developed.

The combination of information and knowledge from multiple sources enables better decisions to be made. The addition of an extra measure might seem, in the short term, to make the intervention more expensive but if the right assessment can be made immediately following the intervention and whether the intervention has succeeded or not, costs are saved in the long term. In essence, the long-term health benefits of multiple modalities to

Combining patient information and medical knowledge from different sources

hardware

software

advanced structural imaging

basic functional imaging

advanced functional imaging

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■ **Partners**
Alma IT systems
Bull
CEA List
CIMNE
Compass
CVSS
Duodecim
Embedded Systems Institute ESI
Erasmus MC
HSP
INRIA
Leiden UMC (LUMC)
MediConsult
Medis
Nokia
Philips Healthcare
Philips Medisys
Pie Medical
Pohjola
Prowellness
Tecnalia
UMC Utrecht
VTT Technical Research Center of Finland

■ **Countries involved**
Finland
France
Netherlands
Spain

■ **Project start**
June 2009

■ **Project end**
September 2012

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make the right decisions now outweigh the costs of using more than a single modality. The comprehensive approach is geared to optimising the entire episode of care and not being limited to the current medical encounter.

FROM CARE TO PREVENTION

This combination of personalised treatment and early recognition means that preventive measures can be taken and this can have a real impact not only on the costs but also and importantly on the patient. Prevention was also one of the successes of the ITEA 2 Care4Me project and was evident in cardiovascular diseases in which the use of mobile devices to record data such as blood pressure, weight, exercise patterns and how people feel enabled trends to be extrapolated and feedback to be given – continue exercising in the same way, modify diet, take time out – as a kind of lifestyle coach. Pilots in Finland on such out-of-hospital activity at the interface of lifestyle and healthcare really showed how this coaching helped to significantly reduce blood pressure, which will eventually lead to preventing cardiac problems.

DEMONSTRATING THE RESULTS

The large number of image processing tools, models and algorithms developed during the course of the Care4Me project along with the generic MIS architecture with an extension to cloud computing were significant achievements as were the tools developed by the Finnish consortium partners for the prevention of disease and decision support for patients. The results for oncology, more specifically prostate cancer, and the use of High Performance Computing technology for image processing were manifested in two

demonstrators. The prostate cancer therapy demonstrator introduced automatic prostate segmentation, which reduced the time in treatment preparation per patient from half an hour to just a few minutes while the HPC demonstrator incorporated two pilots on image processing on Bull High Performance computers whereby the time needed for data processing results was reduced. Furthermore, there is clearly considerable exploitation potential for cardiology tools and products and fast exploitation of the results was achieved for a number of software packages.

REAL IMPACT

This ITEA 2 project fits within the long-term vision of a transition from structural to functional imaging in healthcare. Care4Me has managed to deliver a new generation of medical imaging analysis software that provides more accurate, functional and quantitative information from the acquired images and combine this with clinical information and knowledge obtained from other sources. Not only will patient care be improved and healthcare costs reduced but it will also have an impact on the competitive position of Europe as well as on worldwide marketing and employment opportunities.

Major project outcomes

DISSEMINATION

- ~40 publications
- ~10 presentations at conferences/fairs

EXPLOITATION

High Performance Computing technology for faster image processing
- 3 new software packages for fast exploitation, more to follow:
  • Pie Medical - QCA-3d package to construct 3D coronary tree from X-Ray Angiography
  • Medis – Qivius software package for ischemic heart disease assessment using IVUS
  • Philips Healthcare - ClarityIQ: package to determine flow dynamics from RD X-Ray Angiography, allowing for improved X-ray imaging with a lower radiation dose

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