

# Finding a cure for the health business

Together with its partners, HP is leading the way towards more efficient, consumer-driven – and more democratic – forms of health care for millions of patients around the world.

Imagine a hospital with beds that monitor patients, and drugs that warn you if you are taking the wrong pill. Imagine a card that contains a patient's entire medical history – from the time he had measles as a child to his most recent prescription. Imagine embedded chips that sound an alarm if a newborn infant is carried outside of a secured area, and locks down the hospital immediately to prevent a kidnapping. Imagine patients getting an e-mail from their doctor asking how the last visit went and whether the patient had to wait.

These are just a few visions that are rapidly becoming reality as the health care industry, like many others, turns to modern information technology as a prescription against ailments that have plagued the medical profession for centuries. And, of course, there is already a buzzword out there to describe what many doctors and hospital administrators hope will one day prove to be a cure-all for chronic cost overruns and declining service quality in the healing business: "e-health".

At the 11th World Congress on Internet in medicine, Professor Gunther Eysenbach, head of the Research Unit for Cybermedicine & e-health at Heidelberg University, went even further, stating that "E-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies." In a broader sense, Eysenbach maintains, the term characterises not only a technical development,

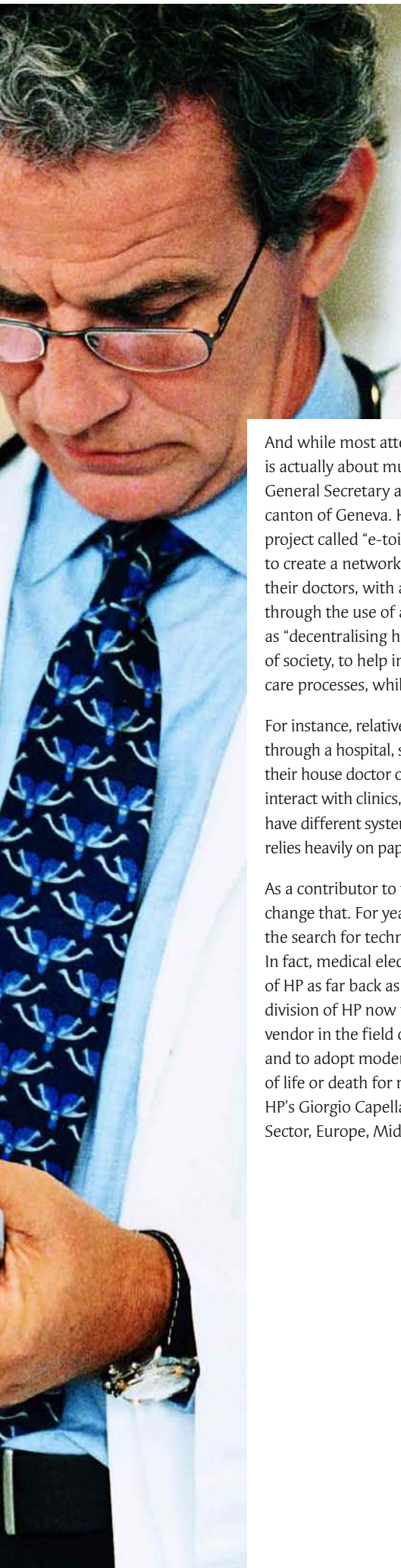
but also a state of mind, a way of thinking, an attitude, and a commitment for networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology.

In fact, Eysenbach asserts that the "e" in e-health isn't necessarily about electronics at all. Instead, he uses a raft of "e-words" to describe the benefits to be derived from increasing use of information technology in medicine; from efficiency – one of the promises of e-health is to increase efficiency in health care, thereby decreasing costs – to empowerment as the knowledge bases of medicine and personal electronic records are made increasingly accessible to consumers over the Internet. "e-health opens new avenues for patient-centered medicine and enables evidence-based patient choice", he says.

While the promise of e-health is huge, the health care industry has been something of a laggard when it comes to IT. A report published in the magazine "Health Affairs" found that less than ten percent of American hospitals had adopted computerised patient records and less than five percent had a computerised system to order medications. Given that hospitals account for 40 to 60 percent of health expenditure in the OECD (Organisation for Economic Cooperation and Development) countries, many in the industry worry that the information revolution itself may be in need of intensive care.

Applying information and communication technologies and the Internet to health care promises to help reduce costs, while bringing informed choice to patients and rapid dissemination of evidence based medicine and clinical decision support to physicians.





And while most attention is focused on hospitals, e-health is actually about much more, says Pauline de Vos, Associate General Secretary at the Department of Health for the Swiss canton of Geneva. Her government is currently financing a project called "e-toile", a 35-million Swiss franc programme to create a network providing patients in the canton, and their doctors, with access to their medical information through the use of a microchip card. She describes the goal as "decentralising health care and integrating it with the rest of society, to help increase quality and safety of the health care processes, whilst helping control costs."

For instance, relatively few patients enter the health system through a hospital, she notes. Instead, they are sent there by their house doctor or by a specialist. Small doctors' offices must interact with clinics, pharmacies and health insurers, which all have different systems. In addition, traditional health care still relies heavily on paper forms, signatures and bulky files.

As a contributor to the "e-toile" project, HP is helping to change that. For years, HP has been intimately involved in the search for technological solutions in the field of medicine. In fact, medical electronics became an independent division of HP as far back as the early 1960s (the former medical division of HP now forms the core of Agilent Corp., a leading vendor in the field of life sciences). "To promote digitisation and to adopt modern information technology is a matter of life or death for many public and private operators", says HP's Giorgio Capellani. As Marketing Manager, HP Public Sector, Europe, Middle East and Africa, he urges health

care professionals to increasingly view their patients from a business process perspective: "Hospitals must take care of their patients the way private industry takes care of its customers."

To help clinics achieve this goal, HP recently created what it calls the Digital Hospital Infrastructure (DHI). A key part of this initiative is delivered in partnership with Cisco and the Norwegian software company Cardiac, a leading developer of integration software for the medical sector. DHI is the collection of hardware, software and services to support current and future hospital application areas such as EPR (electronic patient record), e-prescription, patient tracking and many more. Together with its partners, HP is currently hard at work helping to build what is being billed as the world's first true eHospital, St. Olavs in Trondheim, Norway, which will be a showcase for many previously untried technologies and methods combining state-of-the-art computer and communications with traditional forms of patient care (see next story).

"DHI goes beyond advanced clinical systems to include additional integration between ICT (information and communication technology) and medical technologies such as patient beds, monitoring equipment, nurse call and communications systems, pagers, and medical imaging technologies", says Capellani. "It enables organisations to fully realise the hospital's potential to deliver higher quality care in increasingly efficient ways through the use of technology and process redesign."



## *St. Olavs: Building the hospital of tomorrow – today*

By including all the stakeholders in the e-health ecosystem and getting the complete process digitised, he explains, information exchange and communication can be enabled in a standardised way between health care establishments, avoiding unnecessary costs due to duplicate and often contradictory information. By combining mobile point-of-care and infrastructure for secure patient data, the Digital Hospital uses information technology to streamline processes and integrate patient and administrative information into a comprehensive, digital view of a patient's medical record.

There may also be benefits from a political and a social standpoint, as Pauline de Vos emphasises. "E-health has the potential to tear down the digital divide that currently runs between rural vs. urban populations, rich vs. poor, young vs. old, male vs. female people, not to mention between neglected or rare vs. common diseases", she says. The result might be described as the democratisation of medicine – surely a worthy vision in itself.

*While e-health remains a vision in most parts of the world, residents of Trondheim, Norway, can actually check into Europe's first true digital hospital. For a glimpse of the future, read the following story: "St. Olavs: Building the hospital of tomorrow – today".*

There are times when the pace of innovation in health care is so fast that even the participants are left breathless. "Some of the stuff we were supposed to implement just simply hadn't been invented yet", Randi Enger remembers. As HP's project manager for St. Olavs Hospital in Trondheim, Norway, she and her colleagues were called upon to build what is arguably the world's most modern hospital while development of many vital systems was still going on.

Trondheim is located on the west coast of Norway halfway between Oslo and the Arctic Circle. According to myth, the town was established by the Viking King Olav Tryggvason in the year 997 at the mouth of the river Nidelva. St. Olavs, located on the Øya peninsula, is over 100 years old and serves as a kind of "health hub" for the rural population of the entire region. As a university and research hospital, it is also a major educational facility turning out some 120 brand-new physicians per year.

Due to advances in treatment and technology, the institution had been showing its age for quite some time. In 2002 it was decided that what St. Olavs needed was more than just plastic surgery: it needed a heart transplant.

When completed, hopefully by 2011, the new hospital will have 1,091 beds including a 69-bed "patient hotel" which will provide a place to stay for people who are too healthy to be a hospital in-patient but need to be close to the clinic for observation and treatment.

Since it isn't often today that a complete hospital is built from the ground up, this was recognised as a unique chance to push the envelope of modern IT and telecommunications in medicine.



"They knew very clearly what they wanted", Enger says, especially Tore Indreraak, CIO of Helsebygg, a company created by the Trondheim health region and her partner over many months of intense discussion and planning work. "He was really the brain behind the concept of the "health building" that is a critical part of the project", she maintains.

For the Trondheim project, HP teamed with network hardware manufacturer Cisco; Telenor, the largest Norwegian Telco; and Cardiac, a local software developer specialising in medical systems. "Since we were bidding to become the systems integrator and not simply to deliver hardware and software, we had to make partnerships and set up a big project organisation in order to be able to deliver", Enger says. "The customer wanted to see these companies working together on this high-risk, high-profile project because we all have proven expertise as well as a good financial platform and good R&D."

The result is one of the world's first true "eHospitals" – and a huge challenge for all involved. For instance, use of mobile phones is normally not allowed in hospitals due to the risk of interference with vital equipment. But at St. Olavs, the objective of "all over IP, IP all over" just couldn't be achieved without extensive use of wireless technology; so a highly distributed network was called for, with sensitive areas such as operating rooms completely insulated against radio signals.

As a true "eHospital", St. Olavs was planned as a model of seamless communication anytime, anywhere. Every medical employee was to be issued a so-called MDA – a Medical Data Assistance device based on HP's handheld iPAQ PDA,

used as an endpoint for lab results and requests. Every physician was to have a tablet PC with screens capable of displaying x-ray pictures and other vital data at the tap of a stylus. Patient terminals developed by Cardiac can be used to pipe both clinical data and the latest entertainment programmes right to the patient's bedside.

Emergency processes rely heavily on text messaging, as well as new organisation models. "If a nurse doesn't answer a patient call within seconds, it is automatically rerouted to the next person on the list, either by MDA or IP telephone", Enger explains. Thanks to an intelligent locating system based on smartcards, the system knows exactly where to find a specialist at a moment's notice, thus reducing reaction time and potentially saving lives of patients in critical cases.

Originally, plans called for completion of the first building phase mid-summer of 2005. However, construction problems eventually led to a delay, and the first four buildings – the women and child center, laboratories and administration facilities – weren't ready until October. "Not that we weren't happy to have some extra time", Enger notes. That gave the ITC team a chance to fix some minor bugs and gain much-needed experience. "IP telephony on this scale is very new, and nobody in the world has done this on such a scale in a hospital before", she says.

Needless to say, the systems worked. "They had to", Enger observes wryly. "After all, in an eHospital, as in any other, success is literally a matter of life and death."