A JOURNAL ON INNOVATION

THE FIFTH CONFERENCE HEALTH

THE FUTURE OF HEALTH AND HEALTHCARE

INTERVIEWS

+ Alexandra Carmichael
+ Ashwin Naik
+ Bart Van den Bosch
+ Bart Collet
+ Ben Heywood
+ Bruno Holthof
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+ Krister Torssell
+ Lucien Engelen
+ Marc Noppen
+ Michel Legrand
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CASES

+ Philips
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THE FIFTH CONFERENCE **HEALTH**

The Fifth Conference is an innovation platform for people who like to think. Part publisher and part conference, The Fifth Conference tackles the 'big issues', the factors that drive our future. Think ten, twenty, even fifty years ahead and try to imagine how we will live and work. What will this world look like? How will we have solved the economic, social and environmental challenges that we confront today?

To answer those questions we talk to entrepreneurs, policy makers and experts. We analyse the facts, the forecasts and the arguments. And most importantly, we collect vision. The result is published, in print, as a collectable, and online at www.thefifthconference.com.

But The Fifth Conference is also a conference. We invite our contributors—the authors of vision articles and the people we interview—to continue the debate, both online and at upcoming events. The Fifth Conference is also open for membership. We look innovators, people who like to think: entrepreneurs, policy makers, activists, scientists, students... individuals who are hungry for the deeper picture and who want to make a difference. Join us.

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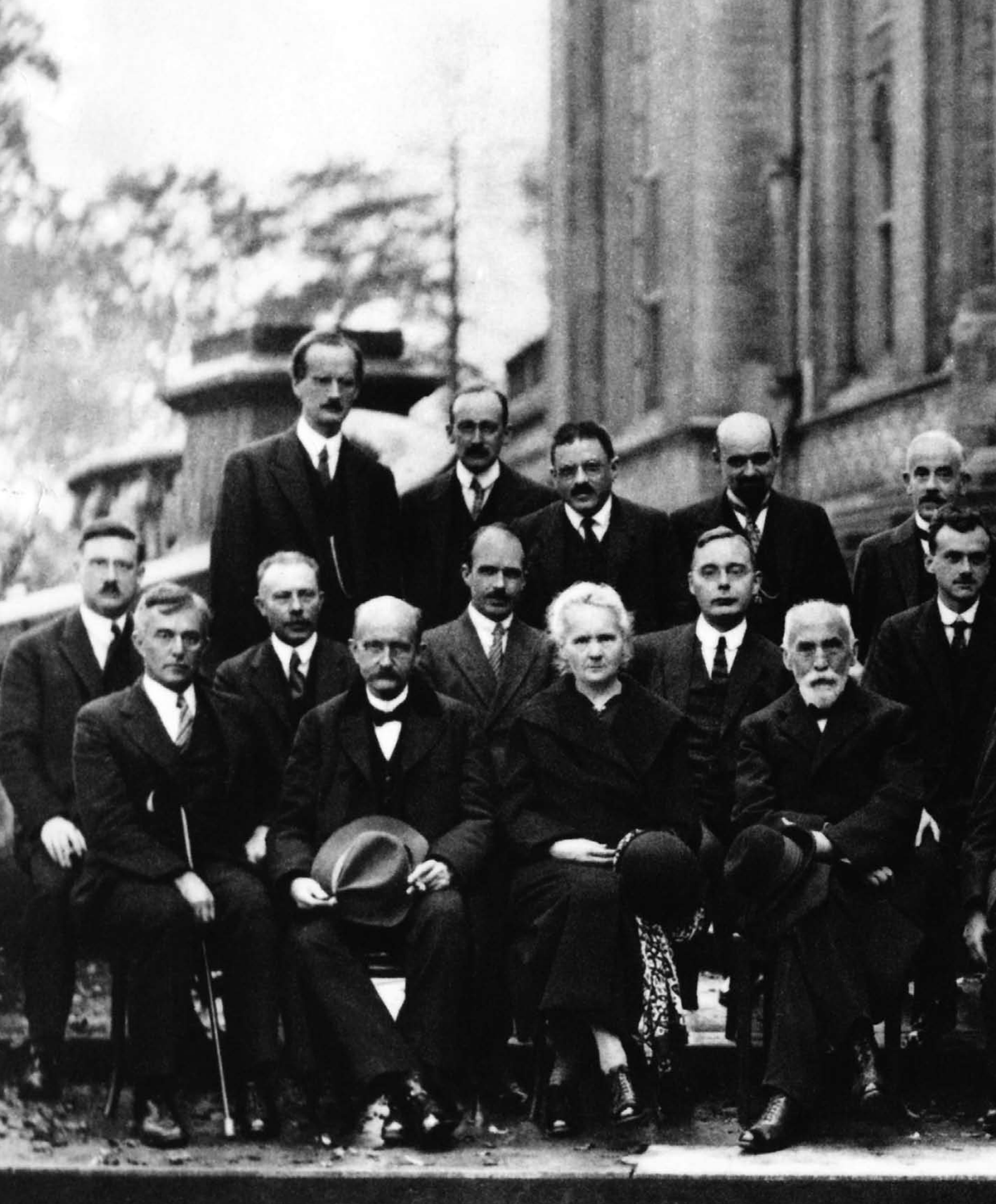

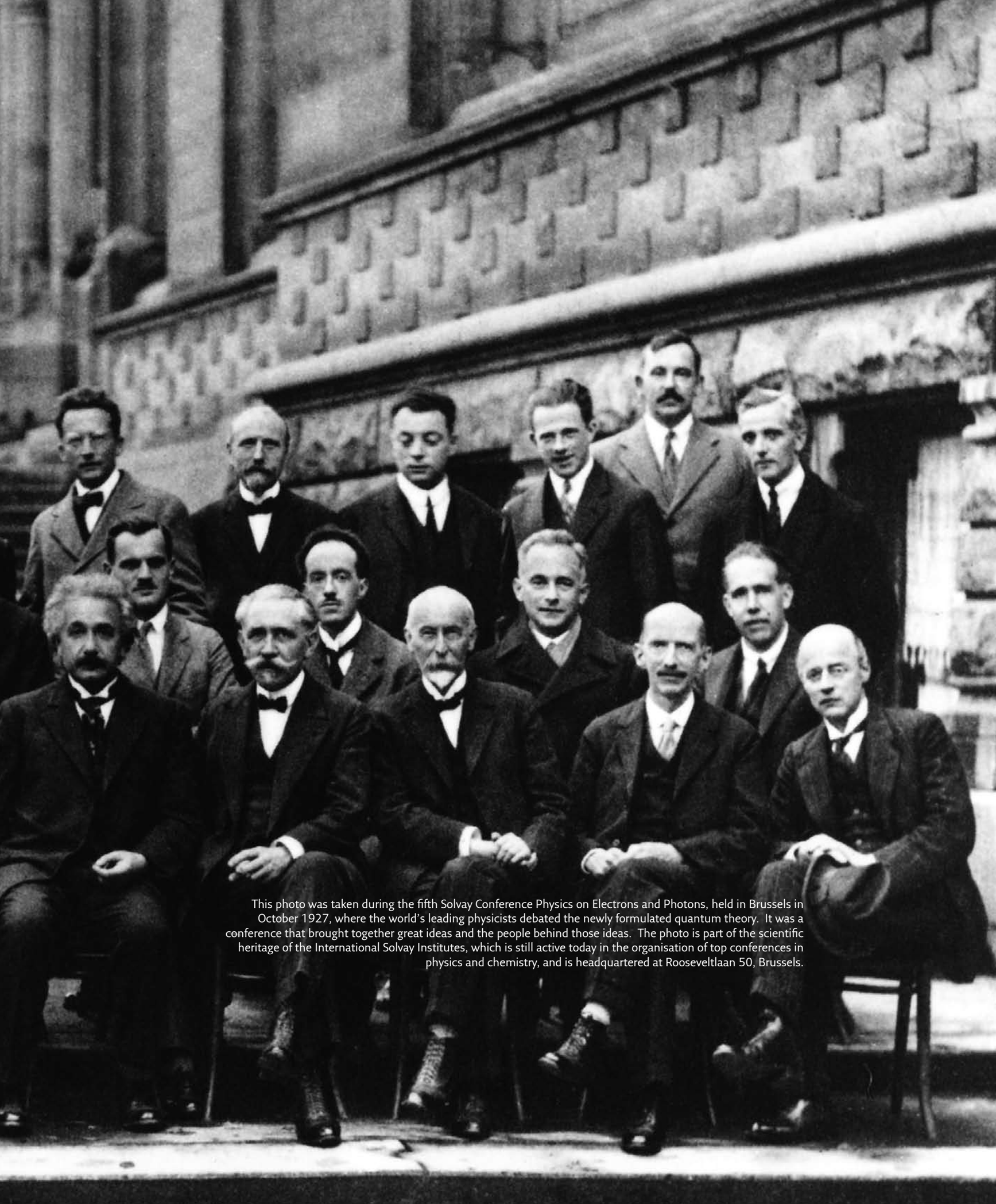

This photo was taken during the fifth Solvay Conference Physics on Electrons and Photons, held in Brussels in October 1927, where the world's leading physicists debated the newly formulated quantum theory. It was a conference that brought together great ideas and the people behind those ideas. The photo is part of the scientific heritage of the International Solvay Institutes, which is still active today in the organisation of top conferences in physics and chemistry, and is headquartered at Rooseveltlaan 50, Brussels.

Colofon

April 2011

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ISSN:
2032-2682

Word from the editor

In this edition of The Fifth Conference we explore the future of health and healthcare. The health sector, in its broadest sense, is clearly ripe for innovation. There are a number of severe challenges that need fixing, like the inequality in healthcare globally, the looming budgeting and staffing crises in the developed world and the fact that so many of us end up with incurable and painful diseases. In this edition you'll learn about the innovations (and the people behind those innovations) that will transform the way we take care of our health, both personally and institutionally. We take both a global perspective and, in the second section of the book, a Belgian perspective.

Innovation is needed in healthcare for many reasons, but most fundamentally, innovation is needed because life is too short and often too painful. Obviously that statement is fraught with philosophical and moral issues. People may disagree for any number of reasons; it is nature's way, it is God's will, three scores and ten is enough, and so on. Personally, I think this is rationalization at work – "it'll happen to all us, so we might as well learn to accept it with serenity".

No. We shouldn't accept it. A human body takes close to two decades to get to maturity, a human mind increasingly needs three decades and beyond that continues to learn and develop, until Alzheimer's strikes. When we're young we think we'll live full lives until the ripe age of 80—examples aplenty around us—but the fact is that most of us won't. In Europe the healthy life expectancy is only 67. And from the age of 50 onwards it's time to start worrying about cancer and cardiovascular disease. The fact is that just as we edge into a phase of maturity, so the first signals of our impending end appear. Economically, that strikes me as poor deal. As a society we aim to spend ever more on our youth—a knowledge economy will require a lot of lengthy education—but we only receive about three decades of productive career time in return, before ageing and chronic disease take their toll on people's lives and public budgets. And philosophically, even morally, it makes no sense at all. Human imagination and its achievements (from art to the internet) so surpasses the raw limitations of our animal form that it seems a particularly bad deal that life today is still so very short and brutal. Innovation is needed, if only because we can imagine a better future.

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1| How innovation could transform healthcare

Innovation is a wonderful phenomenon. It leads to all sorts of astonishing products and services like the internet and the tablet PC. As big an impact these innovations have on our lives, it is in healthcare that innovation is of existential importance. To be blunt, innovation in healthcare matters because most of us will have to face a miserable disease at some point in our lives; and all of us will have to face death. If we continue to innovate, then one day in the future people may not need to undergo the distress of cancer, heart disease or Alzheimer's. Perhaps we even await a future where we transcend the limitations of our physical bodies—as imagined by science fiction authors like Peter F Hamilton and predicted by futurists such as Ray Kurzweil. Today, however, we have to make do with our present healthcare system—and its challenges and limitations.

Life is short

The challenges are diverse. The most fundamental limitation is the fact that most of us continue to suffer from a number of persistently incurable diseases. Even in the European region, where life expectancy is relatively high, the healthy life expectancy is only 67 years.[1] That is just too short given the number of things that most of us would like to do in our lives.

Inequality

Perhaps most deplorable, however, is the gaping inequality in the world when it comes to health and healthcare. According to the 2010 statistics of the World Health Organisation, life expectancy in the European region averages 75 years; in the African region it is 53 years (and healthy life expectancy is only 45). In Africa the probability that a child will die under the age of 5 is 142 per 1000 live births; in Europe that number is 14 per 1000 live births. In Africa there are 2 doctors per 10,000 population; in Europe that figure is 33. Notwithstanding the wonders of the digital era, when it comes to health and healthcare much of the world lives in medieval circumstances.

Inefficiencies in the developed world

In much of the developed world we tend to celebrate the excellence of our healthcare systems. Given the progress in recent years (life expectancy in EU countries has increased by six years since 1980) and the inequality in the world there is some justification for such celebration, but more likely it has to do with our psychology (don't bite the hand that feeds you). The facts are that healthcare in the developed world can be managed better. The OECD has calculated, for example, that life expectancy could be raised by more than two years in the OECD area if all countries were to become as efficient as the best performers.[2] The OECD is specifically talking about 'efficiency' here; according to the same OECD study, simply throwing more money at healthcare is unlikely to have much impact on health outcomes in the OECD area.

1 WHO 2010 Statistics
2 Healthcare SYSTEMS: EFFICIENCY AND POLICY SETTINGS – OECD 2010

Looming crisis

Efficiency will also be important to deal with the looming budgeting and staffing crisis in most OECD countries. Healthcare costs are increasing rapidly, mainly due to the rising costs of drug development and medical technology. And in Europe the situation is exacerbated by the ageing population and increasing prevalence of chronic illness. In 2008, EU countries spent, on average, 8.3% of their GDP on health, compared to 7.3% in 1998.[3] Budgets often have been rising faster than GDP. Clearly this is an unsustainable situation for most EU countries, especially given the need to reduce budget deficits following the financial crisis. Not only is the ageing population driving demand for healthcare, it is also leading to shortages of nurses and other healthcare workers in many European countries. And this while nurses are set to play an increasingly important role in a healthcare system that will be overwhelmed by the elderly and chronically ill. What can be done to address the above outlined challenges? Fortunately, there are at least three broad innovation trends that could ensure continued progress in the state of our health.

Post-genome paradigm

Firstly, medical science appears to be standing at the cusp of what some call a post-genome paradigm shift. Recent advances in genetics and genomics are ushering in the personalization of medicine where treatments are customized to the genetic profile of each individual. It is also enabling us, as patients, to gain insight into our individual risk factors for certain types of diseases—via DNA genotyping services like 23andme—and make appropriate lifestyle changes to minimize risk. Other exciting developments are the recent inductions of *pluripotent* stem cells (transforming mature body cells into stem cells that, in theory, are able to produce any body part)[4] and the 'programming' of cell DNA by researchers at the J Craig Venter Institute. It is these types of developments and what in effect is the increasing digitization of biology that suggests that one day we may be able to program life ("wetware") much akin to the way we program software today. In a parallel to what has happened in the software development business, the biotech sector is now also seeing an increasing number of open source initiatives such as the Pink Army Cooperative (focused on breast cancer treatments using synthetic biology) and Bio Bricks (a registry of standardized DNA sequences for use in synthetic biology).

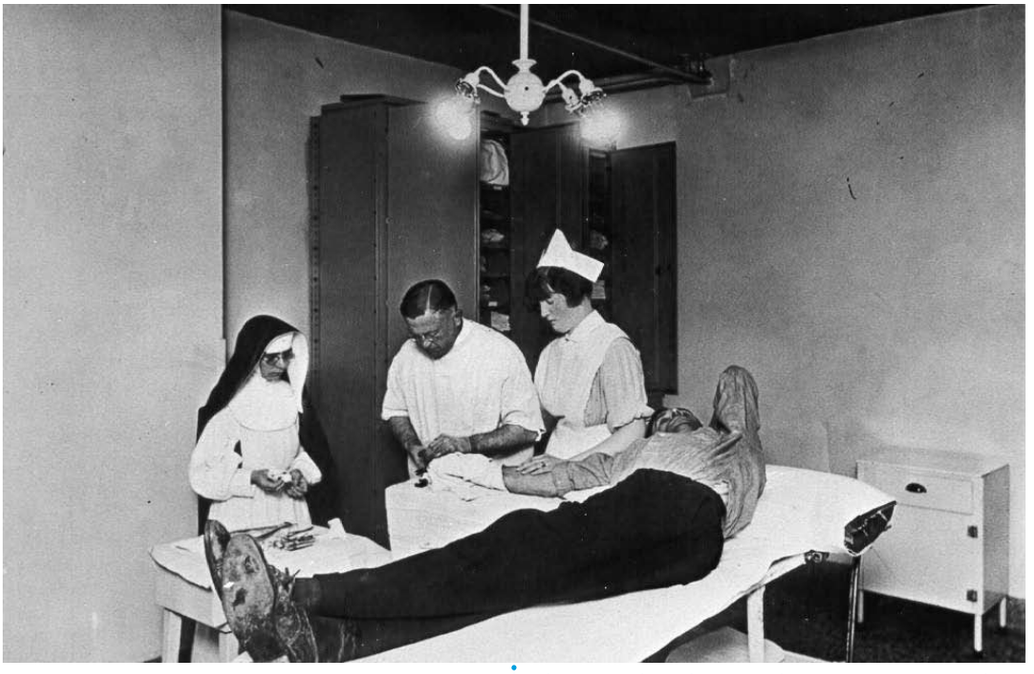
Reverse engineering healthcare

A second major trend is the economic rise of India and the way it is spurring innovation in low-cost healthcare services and medical technology. Emerging regions with a strong entrepreneurial drive have one great advantage over developed regions when it comes to innovation: they're less encumbered by legacy infrastructure and vested interests. It is probable, therefore, that much of the innovation in telemedicine, medical technology and new healthcare models will come from countries like India. Entrepreneurs are able to experiment with new models in part because there is unmet demand for healthcare services and partly because they're less likely to provoke the types of interests groups (hospital groupings, doctor associations, etc) that control healthcare in Europe. Examples abound of entrepreneurs experimenting with new business models for the delivery of healthcare. LifeSpring Hospital is an Indian network of small (20-25 bed) maternity hospitals that is able to deliver world-class maternity care at remarkably low cost. Mothers pay 4000 rupees (€65) for a normal delivery. LifeSpring's business model works because its operation is highly standardized and process-driven. This increases efficiency but also makes the model easy to replicate across India and possibly worldwide. At the total other end of the scale, Dr. Devi Shetty is trying to build huge "health cities" across India that are specialized in complex disciplines such as cardiology, oncology and organ transplant. Again, it is via process innovation, not product innovation, that healthcare is becoming more accessible to India's population. Dr. Shetty's 1000-bed cardiology hospital in Bangalore, for example, is able to price cardiac surgeries at less than $3,000 and his goal is to reduce it further. The Narayana Hrudayalaya group is also making active use of telemedicine to extend its reach. For example,

> *One day we may be able to program life much akin to the way we program software today*

3 HEALTH AT GLANCE: EUROPE 2010 - OECD 2010

4 See the Knoepfler Lab Stem Cell Blog for updates on the field http://www.ipscell.com/blog/



it has treated nearly 70,000 heart patients via its Tele-Cardiology program (using satellite technology). This level of ambition and total willingness to do things differently if it saves costs and improves accessibility is difficult to imagine in the European context. These are just two examples but there are numerous cases of innovation in telemedicine (e.g. ReMeDi remote diagnostics kits by Neurosynaptic), low-cost medical devices (e.g. Forus Health) and low-cost healthcare delivery (e.g. Aravind Eye Hospitals).

eHealth

The third key trend that is making a difference in healthcare is the use of IT and the impact of the internet more generally, especially in the developed world (and the US more specifically). Over the last two decades IT has gradually been making a bigger impact on the way healthcare is organized. In Europe the first wave of automation was focused mainly on administrative and logistical processes at hospitals, although even today there is still opportunity for greater efficiencies. As it stands, the market for hospital IT systems is still relatively immature and fragmented, mainly because the regulatory environments and financing models differ substantially from country to country. As a result, many hospitals have developed their own systems or the market is dominated by local IT providers.
In a second wave, IT entered the clinical domain via the introduction of digital imaging technology and electronic medical records. Simultaneously, national governments started developing eHealth strategies to improve coordination across the entire healthcare system. A recent study by the European Commission[5] concludes that substantial progress has been made in that regard, with most EU member states having in place policy initiatives for Electronic Health Records (a summary health record that would make basic patient health data available to any healthcare professional whenever and wherever as needed), Electronic Prescriptions (to reduce the paper trail and improve safety by, for example, relying on systems that alert doctors and pharmacists about potential contra-indications or fraud), and Telemedicine (to connect rural patients to healthcare professionals and to facilitate home-based care for patients with chronic conditions). However, the same report concludes that most member states radically underestimated the implementation challenges inherent to eHealth strategies. It has turned out to be tremendously time-consuming to reach agreement on eHealth strategies among the core stakeholders within the healthcare system. This delays implementation and creates problems during implementation if some stakeholders actively resist new methods. As a result, the actual implementation

> *This level of ambition and total willingness to do things differently if it saves costs and improves accessibility is difficult to imagine in the European context*

5 eHealth Strategies. European countries on their journey towards national eHealth infrastructures. Final European progress report. January 2011. European Commission DG Information Society and Media.

of eHealth strategies has, to date, been less successful in Europe. For example, while every EU member state has an EHR policy initiative, only 7 EU member states are routinely using EHRs. Some member states have also changed tactics, replacing top-down centralist approaches (imposing new standards and tools on healthcare providers) with a more decentralist, bottoms-up approach (creating incentives and setting standards but letting the market take the lead in implementing systems).

The power of data unleashed

IT is also gradually being used by healthcare providers in Europe to improve clinical processes and support clinical decisions. As illustrated by the Indian cases studies, this could have a tremendous impact on efficiency. Moreover, it could also significantly improve the quality and outcomes of healthcare. One of the key benefits of eHealth will be the tremendous amount of data that is gathered automatically via Electronic Records and Decision Support Tools. The countries that have made most progress implementing eHealth technologies (such as Israel and the Scandinavian countries) are now beginning to put their data to use to improve healthcare.

Health 2.0

While eHealth may be suffering somewhat from the trough of disillusionment, a new trend is emerging that is rapidly climbing the first ascent of the hype cycle: Health 2.0. In the period that healthcare providers and policy makers argued about how to manage the patient data they controlled, patients have been discovering the liberating effects of the internet and social networks. Over the last two decades patients have gained, via the internet, near unlimited access to the world's stock of medical information. A motivated ePatient (using ePatient Dave deBronkart's terminology, referring to engaged, empowered, equipped and enabled patients) can, with some effort, become a better expert on his or her disease than the attending physician. And in recent years, patients have begun forming social networks for sharing medical information. Via online platforms like CureTogether and PatientsLikeMe, people are able to compare their symptoms with each other and share advice about treatments and medical providers. Much of this information sharing is happening in a structured way enabling data mining and research. CureTogether, for example, recently reported a link between infertility and asthma (members with infertility are 40% more likely to report asthma). Patients are being empowered with highly focused, relevant information and medical science gains too because so much additional data is becoming available. All this is placing significant pressure on healthcare providers to adapt to these new realities by improving patient communication and moving to a more participatory style of healthcare provision. While many healthcare providers are still arguing about eHealth strategies and implementing heavy-duty IT systems, the institutions that 'get it', such as Radboud University Nijmegen Medical Centre in the Netherlands, are taking a closer look at consumer technologies and open internet platforms that lower the threshold for patient participation.

> *While healthcare providers and policy makers argue about how to manage the patient data they control, patients have been discovering the liberating effects of the internet and social networks.*

Opportunities

So what does all this mean for innovative entrepreneurs? Where are the opportunities? Based on this summary of the key innovation trends in healthcare, the main opportunities are in more process-driven healthcare delivery business models, as is experimented with in India; in telemedicine and low cost medical devices (especially diagnostic devices), to extend the reach and accessibility of healthcare; in data analytics tools and services, to tackle the flood of data coming from biotech on the one hand, and eHealth and Health 2.0 platforms on the other hand.

New treatments for heart diseases have improved life expectancy with five years by avoiding open heart surgeries.

Cost-efficient care for everyone

Innovation at Philips Healthcare

The exploding cost of healthcare and the shortage of people to perform the care are placing tremendous pressure on our healthcare system, both in the developed and the developing countries. Therefore, the Philips Healthcare research program is developing more cost-efficient care. With the holistic care cycle approach, Philips Research starts with the needs of the patients and their care providers and focuses on their specific medical needs throughout the whole care cycle.

It won't be a surprise to anyone that the future of healthcare is determined by the demographics of the population. Dr. J.W. Hofstraat, Vice President of Philips Research, illustrates this with a striking number: "In Japan over 20,000 people are older than 100 years. Not all of us live that long, but in general people are getting older in the industrialised countries, which means that we'll see more and more chronic conditions and more demand for healthcare. At the same time, aging means that less people are working so there's a shortage of people to do the care."

But the industrialised world is not the only one to have healthcare challenges, Hofstraat emphasises: "If you look at emerging countries like Brazil, India and China, people are also getting older there as they manage to get control over infectious diseases and as their increasing prosperity is leading to healthier diets and lifestyles." This also comes with an obvious downside: as the people are adopting the lifestyle of the industrialised countries, cardiovascular diseases are exploding in prevalence, leading to an increasing demand for care.

The exploding cost of healthcare and the shortage of people to do the care are placing tremendous pressure on healthcare systems, and according to Hofstraat medical technology is an important route to addressing those issues. That's how the inspiration for the research program for Philips Healthcare was born. "Our key concept is creating care products that are accessible to all people, both in the developed and the developing world. Developing better, more cost-efficient care means that we have to obtain higher quality of care but using fewer hands. At Philips, we make the difference with our care cycle approach where we look at the total system, starting with the needs of the patients and their care providers and focusing on their specific medical needs throughout the whole care cycle."

HOME HEALTHCARE

A first theme that Philips Healthcare is researching is home healthcare: although serious clinical situations will always require medical diagnosis and intervention in a hospital, routine medical care should be done as much as possible at the patient's home with the help of medical technology. "The key here is that the consumer should be comfortable using this technology, but Philips is in a great position since we have such a strong legacy in building consumer technology products."

> *"If we involve the patient in the daily management of his disease and provide feedback on the short and long term effects of non-compliance, we can motivate him better to adhere to the treatment regime.*

For this purpose, Philips is participating in a couple of large EU funded research projects, like MyHeart and HeartCycle. Both projects are about the follow-up of cardiovascular patients at home. The MyHeart research project consists of the development of an advanced heart-failure management system designed to provide more comprehensive information about a patient's condition and to enable earlier intervention, while in the HeartCycle project Philips is developing systems for monitoring a patient's condition at home

On-body sensors and electronics for monitoring vital body signs.

Preparation of micro-bubbles for imaging and drug release applications.

and involving them in the daily management of their disease.

"Heart diseases have a slow evolution," Hofstraat explains, "so a patient is often lulled into comfort thinking he's OK again. Hence the need to monitor things like blood pressure. But what's more interesting is that this isn't just about technology, it's about psychology too. If we involve the patient in the daily management of his disease and provide feedback on the short and long term effects of non-compliance, we can motivate him better to adhere to the treatment regime." Knowing that 11 percent of hospitalisations result from poor adherence to prescribed medication, such feedback can have a tremendous impact.

CLINICAL DECISION SUPPORT

When care is not only given in hospitals but is increasingly being delivered in day centers and at home, you should take this into account in the care cycle. "Hence we need to look at solutions for that too. Moreover, we have to keep patients as short as possible in the hospital, and we have some ideas on how technology can help there, e.g. by making the diagnosis as early as possible, by doing less invasive treatments and more customised treatments tailored to the specific characteristics of the patient and the illness. This is what we call clinical decision support."

So Philips is working on solutions to help the doctor and patient make the right decisions across the entire care cycle. "There is a huge amount of information out there about earlier cases, the trick is to filter and assess that information and tailor it for each case, all in the context of very case-specific information the doctor is dealing with at that moment," Hofstraat explains, and he adds that this is not about pushing doctors into prescribed paths but about giving as focused and relevant information as possible: "It's like an auto navigation system where you're given several options, like the fastest or the shortest way, and it adapts as new situations emerge. The interesting thing about clinical decision support is that it also can involve the patient: patients could have specific preferences about the various possible treatments."

AVOIDING INVASIVE TREATMENTS

A third important theme in the care cycle is what Hofstraat calls 'image guided intervention & therapy': "If we want that the patient stays in the hospital as short as possible and with less complications and side effects, the key is avoiding invasive treatments. We can do this by imaging technology or by the use of very small devices that can do complex operations using only a small opening in the patient's body." As an example of this approach, treatments for heart diseases have improved life expectancy with five years by avoiding open heart surgeries, which create a huge trauma for the patient.

Of course Philips doesn't cover all these topics, so a multidisciplinary approach is increasingly important and the company is working on partnerships with pharmaceutical companies. Technology can help getting medications to the right place because the problem with a lot of medication is that the body recognises this as foreign material and reacts to it. "Using imaging technology, we can locate the problem area and target the medication to this specific place, but we can also help with the delivery system, e.g. by packaging these drugs in polymer capsules that deliver the drug where needed." A nice example where all these ideas comes together is ultrasound-mediated drug delivery. Philips is researching drug-loaded microbubbles that are injected into the bloodstream of the patient, tracked via ultrasound imaging, and then ruptured by a focused ultrasound pulse to release the drug payload when they reach the desired spot. Hofstraat believes that these three R&D tracks of the care cycle approach (home healthcare, clinical decision support and image guided intervention & therapy) will impact healthcare practice in three to ten years, of course depending on acceptance by the user and the financing system.

BIO

+ Philips is a diversified Health and Well-being company, focused on improving people's lives through timely innovations. As a world leader in healthcare, lifestyle and lighting, Philips integrates technologies and design into people-centric solutions, based on fundamental customer insights and the brand promise of "sense and simplicity". Headquartered in the Netherlands, Philips employs more than 119,000 employees in more than 60 countries worldwide. With sales of EUR 25.4 billion in 2010, the company is a market leader in cardiac care, acute care and home healthcare, energy efficient lighting solutions and new lighting applications, as well as lifestyle products for personal well-being and pleasure with strong leadership positions in flat TV, male shaving and grooming, portable entertainment and oral healthcare.

+ www.philips.com

A Patient Empowerment Activist

Dave deBronkart is trying to transform the way healthcare is done

In 2007 Dave deBronkart was diagnosed with late stage kidney cancer. After a miraculous recovery, he decided to turn his expertise to helping empower patients in an effort to transform the healthcare field. Now an advocate, activist and proud e-patient, deBronkart shares his ideas for taking advantage of the information explosion to create a new, improved way for patients and the medical field to interact.

WHAT MAKES AN "E-PATIENT"

After my diagnosis, I was given 24 weeks to live. That tends to focus the mind. When I beat the disease, I faced life with a whole new view. A year later, my physician enrolled me in an e-patient study group.

E-patient means "empowered, engaged, equipped, enabled" it means people taking charge of their own medical care and not depending on the system. The founders of this idea saw that with the internet patients would have access to things formerly only available to physicians. Now patients could have better information, connections with other cases, and so on.

When it was first developed, the "e" was popular for everything online. Today, being online does not make you an e-patient. Many people are online and remain very much not empowered.

The main "e" today is being an engaged patient instead of a passive recipient. You can be an engaged patient with or without the internet. If patients are highly activate partners in healthcare, that just brings an enormous new resource to the transaction, and it's a resource that has been highly missing.

PATIENT EMPOWERMENT MEANS PATIENT ENGAGEMENT

There are lots of definitions of patient empowerment. For many people, "patient empowerment" is shorthand for "watch out, medical errors happen all the time and you or your family may get harmed. So be aware."

However, I'm a child of the '60s. I watched the civil rights movement and the women's liberation movement. I watched as people became empowered. To me empowerment means people being able to say what they want. Empowerment means people speaking up for themselves instead of feeling "no, I can't say that."

Many people get into patient empowerment after medical disasters. I came at it after being the recipient of a miracle cure. My diagnosis, treatment and hospital care were all superb. But as I studied healthcare, I began realizing there were massive inefficiencies in this field. Even where healthcare is efficient, it's not accomplishing what it could. There's this mythology built up around the medical field, and that has to change.

HOW PATIENTS ARE CHANGING HEALTHCARE

Like the medicines that ended up saving my life, there are treatments that are not well understood by the medical community but are understood by the patient community. It raises the question: how could it possibly be that scientifically accurate information is more readily available among patients than among many doctors?

Twenty years ago this would not

be true. At best, through dumb luck you might bump into somebody at a diner with valuable information that's not available from most doctors. But today it's very common.

For example, when interleukin, the medicine that saved my life, was first approved, it worked on seven percent of patients and four percent died. But by the time I underwent treatment four years ago, it was up to 20 percent of patients working, and they haven't lost a patient in nine years. Things have drastically improved.

But your average oncologist doesn't see a kidney cancer patient that often, they don't know this.

Doctors are under increasing pressure to see more and more patients; there's an explosion in the number of diagnoses possible. There's also an explosion in journal articles. The doctors are simply overwhelmed.

In contrast to that, my kidney cancer patient community has one area of focus: we can go deep and wide. We can examine these topics in a detailed way that most physicians simply don't have the ability to do by themselves.

This is a cultural problem, and there's some pretty aggressive pushback from doctors superstitiously disbelieving how overwhelmed their profession has become. They have this belief that of course their support systems are keeping them up to date on everything they need to know. But it can't. It's not their fault; it's a product of the information explosion.

The time it takes to go through the journal process — from getting the information to it landing on a doctor's desk — is two to five years. If you have an estimated survival time of 24 weeks and there may be life-saving information out there that's still working its way through that pipeline, this is a problem.

THE PROBLEMS WITH THE ESTABLISHED MEDICAL INFORMATION "PIPELINE"

It's true that valuable information can exist outside the medical pipeline. It's true that people, without medical training, can hunt and find that information. It also explains why this whole thing has blindsided the establishment. They simply were not aware this was happening.

More enlightened doctors, especially those coming out of medical school now, get that this change has occurred. They're beyond simply using e-mail; they'd rather IM with their patients.

> *"There are a certain percentage of people in the medical field — at least in America, but doubtlessly around the world as well — who are simply assholes*

But the assumption in the establishment is that it will upgrade itself. They cannot do this because they have out of date information and the old methods simply can't keep up. If you're in a medical crisis in this environment, it's like stepping into traffic based on information that's years old.

Think about this: your mother, your uncle, your kid is in a medical crisis. You want to save them and this is about as fundamental a need as it gets. So there is economic value in higher quality information, and it's not coming from most hospitals.

ADAPTING PATIENTS — AND DOCTORS — TO THE NEW REALITY

A major goal is to get people adapted to the new reality. In some cases it clears up immediately. In others it requires transforming the culture, getting over people's beliefs.

It turns out there are a certain percentage of people in the medical field — at least in America, but doubtlessly around the world as well — who are simply assholes. They have a god complex, they don't want to change, and some of them get belligerent.

For example, my sister had a severe case of stomach pain. In her particular doctor's office, it was the receptionist who was empowered to filter out who she thought should see the doctor. She told my sister that there was just a stomach flu going around. Finally she forced her way back in there where she saw a physician's assistant who put her on an ambulance and rushed her to the emergency room. She had a major gallbladder problem; it was infected and hemorrhaging. She was hospitalized for two days.

In this case, her primary care physician was no longer taking her phone calls, and she would have died if she had followed their advice. But she knew to speak up for herself. That has nothing to do with better access to information on the internet; that's patient empowerment of a different sort, and it's just as vital.

There's awakening people to this new reality — that they have information at their fingertips that simply wasn't there two decades ago — but just as importantly, there's a need to change the culture so they're the ones empowered.

BIO

Dave deBronkart, known online as "e-Patient Dave," is the leading spokesperson for the e-Patient movement-Empowered, Engaged, Equipped, Enabled. A high tech executive and online community leader for many years, he was diagnosed in 2007 with Stage IV kidney cancer, with median survival 24 weeks. He used the internet every way possible to partner with his care team; today he is well. His first book on healthcare is "Laugh, Sing and Eat Like a Pig."

Financing innovation in healthcare

Patrick Van Beneden, Executive VP of Gimv's Life Sciences division, explains Gimv's investment strategy and shares his vision on the life sciences sector.

For an investor like Gimv, the core business of medicine is new drugs and devices to treat disease. Diseases like cancer and Alzheimer's continue to cause untold misery to millions of people around the world. And many existing drugs have side effects. Demand for more effective and safer drugs will stay. Innovation is required to develop those drugs, and innovation is what Gimv finances. We take a closer look at Gimv's investment strategy and its vision on the life sciences sector with Patrick Van Beneden.

HOW DO YOU SEE THE LIFE SCIENCES SECTOR EVOLVING IN THE COMING YEARS?

Drug development today is more and more a biotech story. The pharmaceutical sector has a number of key challenges, one of which is the 'patent cliff'. When a patent for a drug lapses then the revenue from that product typically collapses as the market is taken over by generic manufacturers. Patents obviously expire all the time but in 2010 and 2011 we're seeing a significant bulge in the number of expiring patents. This is at a time when most companies have relatively thin pipelines. The net result is declining revenues. In response, pharmaceutical companies have been reorganizing their businesses and reducing costs. We're seeing increasing amounts of M&A activity as the sector consolidates. And apparently over 60,000 jobs were lost in the sector in 2009.

While pharmaceutical companies are focused on building scale and efficiencies, innovation is increasingly left to the biotechnology companies. Indeed, an increasing percentage of new products are developed by biotech companies. The pharmaceutical sector acquires this innovation via complex corporate deals involving upfront cash payments, milestones, royalties and sometimes via outright acquisition of the biotech company. These corporate deals are clearly becoming more numerous and bigger. For example, Johnson & Johnson is currently on track to acquire Crucell, one of Europe's largest biotech companies, in a €1.75 billion deal. Johnson & Johnson decided to extend its portfolio with vaccines.

We are going to see a lot more of these types of deals, not only because of the narrow pipelines that pharmaceutical companies have, but also because the product life cycle is becoming shorter. The costs and time it takes to develop a drug keeps on escalating. Over the last thirty years, the average drug development time has doubled from about 7 years to 14 years now; and, according to a pharma representative, the average cost is several multiples of what it was. That's why the partnership between biotech companies and large pharmaceutical companies makes a lot of sense. If a biotech company had to invest in the commercialization of the products it develops then it would take far too long to be viable. Instead it can partner with a pharmaceutical company that has the scale and commercial power to let a product go to peak sales very quickly. More and more biotech companies are responsible for the "R", while pharmaceutical companies focus on development, marketing and sales of new products as widely and rapidly as possible.

BESIDES BIOTECH WHAT OTHER AREAS IN HEALTHCARE INTEREST YOU AS AN INVESTOR?

The other areas that interest us are medical devices, agro and diagnostics. Traditionally, the medtech sector has been mainly a US business. Smaller companies were able to introduce products faster on the market over there and typically got acquired by the major US players. European companies were hampered because they would have to undergo product approval processes first here and then again in the US, adding delay and costs. But this is changing. We're now seeing more independent European companies emerge and US companies now come to Europe first because they feel the regulatory process is more straight-forward here now. Gimv has made a number of investments in the European medtech sector in recent years. For example, one of our portfolio companies is specialized in the development of transcatheter aortic valves that can be implanted via the femoral vein or an incision between two ribs. This type of technology illustrates a key trend in medtech: using devices to replace what used to be invasive techniques involving surgery. Such technology will typically save a lot of time and money, but will also reduce complications.

> *"There are five Flemish companies in the top 30 European biotechs in terms of market capitalization*

In life sciences we also see opportunities in the agro sector. Compared to the 'red' biotech sector (focused on the development of medicines), green biotech is more complex because of the smaller number of potential acquirers. However, if you look at the population growth curve and compare it to the food production curve then it becomes clear that we are heading toward a food crisis. Not only is the total demand for agricultural products growing due to population growth, but rising living standards are also driving demand for a wider variety of products. The

problem is that with current capacity we will not be able to meet the increasing demand for food. Unless agricultural productivity improves dramatically we will be facing a serious food crisis by 2050. Our only option is to innovate. Fortunately we are very well positioned in Flanders to play a key role in that regard. Globally we are a top 3 region for agro R&D. VIB is one of the world's best and largest research institutes in the sector, employing more than 250 leading plant biotechnologists. And we have growing clusters of agro biotech companies in Ghent and Leuven.

WHAT ARE THE KEY DEBATES OR CHALLENGES IN THE SECTOR TODAY?

An increasingly important issue that could impact on the future of biotech companies is the debate around affordability and reimbursement. The price of developing drugs and medical devices has been increasing steadily, which combined with the ageing population is placing severe strain on government healthcare budgets. Hence, the discussion about the reimbursement and affordability of some drugs is ethically very difficult: if you can extend lifetime, how much is that worth? In the past, if you launched a new effective drug you were almost always guaranteed solid revenues. Today that isn't always the case as questions emerge about who should pay the increasing healthcare costs.

TELL US ABOUT GIMV'S INVESTMENT STRATEGY

Gimv serves as a partner for its portfolio companies. In the past we were completely focused on starting new companies. In that regard we played a key role in the early stage funding of some of the more successful biotech companies in the Benelux, including CropDesign (acquired by BASF), Ablynx, Devgen and also Movetis. Obviously we will continue doing these types of deals, but today we are involved in all phases of a company's life cycle, from seed funding, to later stage, to IPO.

Gimv is an evergreen fund. In comparison with our Anglo-Saxon competitors, Gimv is not limited in time horizons. This is important now for biotech companies as it takes much more time and investments to get to a liquidity event. For instance, we have been with CropDesign for 9 years and Devgen for 10 years. And we typically have strong positions in our portfolio companies—sometimes we are the largest shareholder in our participations.

Also, we have been active in the sector for almost 30 years, which is pretty unique in the European context. To date, Gimv has invested approximately €370 million in Life Sciences. We have been involved in 16 IPOs, of which 8 on NASDAQ and 8 on EURONEXT.

WHAT IS YOUR PERSPECTIVE OF THE BELGIAN MARKET?

We have a European investment strategy but it also is important to say that we are particularly well-positioned in the Benelux.

Flanders has done particularly well in life sciences so far. The government has adopted a very pragmatic and proactive approach to supporting the industry and it has worked. There are five Flemish companies in the top 30 European biotechs in terms of market capitalization. The sector is clearly becoming more mature. We have a number of large companies; products are coming to market; and we have a growing ecosystem: talent, universities and investors. The sector also became more international. We have been successful in involving international investors in every company we have invested in and most of our companies have international management teams. We're optimistic about the Flemish biotech sector; we've got a great track record and the pipeline is looking good.

BIO

+ Gimv is Belgium's leading private equity and venture capital provider and has 1.8 billion euro under management.

+ Patrick Van Beneden is responsible for the Life Sciences business unit at Gimv. Patrick is a board member at several listed and unlisted participations, including ActoGeniX, Astex, DeVGen, Endosense and Biotech Fonds Vlaanderen. Previously, he was board member at Innogenetics, Crucell, Avalon, Torreypines Therapeutics, Hypnion (acquired by Eli Lilly), Acertys, Ablynx and CropDesign (acquired by BASF). Other former investments include PGS, Connetics, Exelixis, Gene Logic, Pamgene, Plexxikon, JenaValve, Neuro3D and Isotis.

+ www.gimv.com

How CureTogether enables patients to drive medical innovation

CureTogether is giving new meaning to patient empowerment. Co-founder Alexandra Carmichael explains

The 25,000 members of Health 2.0 company, CureTogether, have contributed nearly three million data points across 576 medical conditions. In the process, this community is not only helping itself via mutual support and information provision, it is also ushering in a new paradigm of patient empowerment and creating new models for clinical research. Co-founder Alexandra Carmichael explains the workings and impact of CureTogether.

Tell us a little about yourself?

Well on the professional front I have a degree in molecular genetics and molecular biology and I spent 7 years as co-founder of a life sciences software company (Redasoft). On the personal front I've lived in and around chronic pain my entire life, first being around my mom – a chronic migraine sufferer of 30 years – and then with my own challenges: I live with vulvodynia (chronic vulva pain), migraines, depression, and a chronic multiple tic disorder.

How did you come up with the idea for CureTogether?

My vulvodynia, which I finally solved 5 years ago, was an extremely embarrassing condition. I had no one to talk to or compare notes with about it, and doctor after doctor could find nothing wrong. Striking out against my fear and loneliness I dove into PubMed to try and solve the problem myself. When I finally did find the solution I wanted to share everything I'd learnt with other women going through the same thing. As a scientist, I found the disease forums good for general support, but I wanted quantitative evidence-based answers.

Based on this need we put up CureTogether as an experiment, looking at three conditions: vulvodynia, migraines and endometriosis (which a friend of mine had). I published my symptoms, treatments I'd tried, and what had worked best. Soon we had a deluge of requests from people wanting to add their own conditions to the site, so we opened it up and it grew from there.

What is the central idea behind CureTogether?

Firstly we aim to quantify the collective patient experience. While other patient support sites focus on information from experts, we focus on quantitative data from patient-contributed conditions. With the largest available online real-world comparative effectiveness database we want this deep knowledge from individual patient experiences shared such that patients' global voices are elevated in a way they've never been before.

> "A fundamental change is on the way

CureTogether is also about breaking the isolation – helping people connect with others that they share multiple conditions with – something incredibly difficult to do on most health sites that focus on single conditions.

A final central idea to the site is looking at the unique co-morbidity data it generates – something that's breaking through the paucity of research into this area. The idea here is to enable patients to help each other, help research into their conditions and in this way help themselves.

What are some of the key achievements to date?

Firstly we've achieved significant global reach, with 25,000 members in 112 countries. These members have contributed almost three million data points across 576 conditions. However, the real impact of CureTogether can be seen in the individual patient stories – where lives have been changed.

Using the data shared by these people our research has been able to replicate a dozen published disease correlations. In addition to this, we've also released infographics for eight conditions – scatterplots of treatment effectiveness vs. popularity of use. What we've

discovered here is that the most popular treatments are not always the most effective.

Looking ahead, what are the key opportunities and challenges for CureTogether?
A future impact we hope to have is in empowered trials. We've already received recognition from the clinical trial community and we're currently in discussions with a cross-disciplinary team looking at re-purposing existing drugs for new indications. Both pharmaceutical companies and research organizations want to recruit our members to do clinical trials differently. We're talking about a brand new space here – leveraging online communities for new research paradigms.

What does patient empowerment mean to you?
It means patients being able to draw on multiple sources of information to make robust medical decisions; including fellow patients, doctors, and online sources.

How do you see this movement around patient empowerment evolve in the coming 3-5 years?
I see more patients coming together to drive medical innovation, and doctors acting as guides or partners to work with patients on their health journeys.
Do you see an opportunity to collaborate with hospitals and the formal health-care system? In what way?
Of course! Hospitals are still essential for things like surgeries and emergency services, and doctors can be very helpful and knowledgeable. But increasingly they will need to work **with** patients, and incorporate patient knowledge into their systems in order to survive.

What will be the impact on the health-care system? Will there be a fundamental change in the way we organize health? Should there be?
Yes, a fundamental change is on the way - it may be a kind of creative destruction, or it may be a smooth addition to the medical system. It will depend on how willing the existing system is to adapt to the new health economy.

BIO
Alexandra Carmichael is co-founder of CureTogether, a Health 2.0 company that brings patients with hundreds of conditions together in overlapping data communities. Alexandra has spent 15 years bridging gaps between life science research, internet technologies, design, and business. She previously co-founded bioinformatics software company Redasoft with Daniel Reda. Redasoft's Visual Cloning technology was acquired by Hitachi Software. Alexandra also helped to design the first social web application for bioinformatics. She is also currently Director of The Quantified Self, which helps people find self-knowledge through numbers, and can be found on Twitter @accarmichael.

A patient-driven approach to generating healthcare data

A social network for chronically ill people is generating a wealth of healthcare data

While much of the debate about improving the United States' healthcare system — one of the world's largest — has centered around companies and government figures, the social networking website Patients Like Me has tried to approach the complex and often vexing issue by putting more information in the hands of individual patients, and inviting them to share. Co-founder Ben Heywood, currently the President and Director of Patients Like Me, believes a reassessment of privacy and better use of data is necessary to take healthcare into the 21st century.

A FAMILY TRAGEDY LED TO THE FOUNDING OF PATIENTS LIKE ME

Unfortunately my brother got diagnosed with Lou Gehrig's disease back in 1999, so my family got really involved in ALS research. So my brother, Jeff Kohl and I decided to start Patients Like Me out of the experience of caring for our brother, researching ALS and talking to other patients about what they were going through. We found that there was a real dearth of information, for everyone, about what happened to "patients like me;" outcomes, symptoms, treatments that patients were taking. We saw there was really no good

way of finding and sharing that information. Seeing that need, we started a registry on ALS in 2004, launched the first site in 2006 and have been growing ever since.

ONE OF THE CORE BELIEFS OF PATIENTS LIKE ME IS THAT "INFORMATION CAN CHANGE THE COURSE OF A DISEASE."

It's all about getting the right treatment for the right patient. In the healthcare industry as a whole, there just isn't data that allows one to do that; it's just not part of the system. Part of what the communities we create on our site do is help share that information. Our data sets have quickly become some of the largest in the world. We had a researcher on fibro myalgia talk to our community about eight months after our launch and he said "you have the richest data set on fibro myalgia anywhere in the world."

HOW DATA CAN HELP SOLVE THE HEALTHCARE SYSTEM'S PROBLEMS

These data sets allow you to begin modeling a disease, so you can really understand what happens to an individual patient. That way, when something new comes on the market — a new drug, a new product, a biomarker, etc. — you can rapidly understand whether or not it works, and for which patients.

One of the big problems with healthcare is that we don't measure in the right ways. If you think about what you do in business or in your everyday life, one of the first steps is measurement. To measure is to know. When healthcare does measure lots of stuff, it doesn't measure what's ultimately most important: the patient's quality of life. In the realm that we deal most in — chronic conditions — there's no measurement over time.

The data our patients provide becomes an incredible source for measuring value, then you can spend healthcare dollars where they're most valuable instead of just spending healthcare dollars, which is what happens now.

PATIENTS CAN BROWSE AND USE THE DATA TO BETTER UNDERSTAND THEIR OWN — OR OTHERS' — CONDITIONS, AND THE DATA CAN PROVE USEFUL TO OTHER PARTS OF THE HEALTHCARE SYSTEM AS WELL

Sometimes being able to see other patients' experiences acts almost like a kind of intervention; 20 percent of people in our mood disorders community, for example, actually report needing less care because of being a member of Patients Like Me. That lowers healthcare costs.

Primarily we're also partnering with pharmaceutical companies who really want to understand — from a clinical standpoint and a market standpoint — how patients are experiencing their disease and how they perceive and utilize their products and services. This allows the company to improve their products; it's a way of partnering companies and patients together around the data that's being shared in the community.

People are used to being very private about their healthcare situation, and there are laws that back that up, making access to healthcare information stricter than almost any other sort of record. But there are issues with that mentality.

Every day, millions and millions of dollars are spent, trying treatments, whether they're old and true methods or newer, more experimental ones. But often we don't learn from all that trial-and-error, because this data isn't collected. Even when it is collected, this important information is usually kept siloed in hospitals or universities. The reality is, there's tremendous value in sharing that information.

> "Our data sets have quickly become some of the largest in the world.

All of these privacy protections that have been put in place are actually, as a society, reducing our ability to further research disease states, reduce healthcare costs, and have real conversations about the tradeoffs of treatments for different diseases.

The beauty behind our openness philosophy is that people learn that when they start sharing what happens to "patients like me" they can learn about their own healthcare and help the whole society.

SOCIAL NETWORKING IMPROVES PATIENTS' WELLBEING

Some of these diseases are very isolating, and with that isolation comes depression, which only worsens the condition. Having a social connection is healing in and of itself. Knowing that sharing this information is helping yourself and others is another way it improves a patient's quality of life.

Also, we hear all the time from patients in our multiple sclerosis community, for example, that "the rest of the people in my life just don't understand what I'm going through." Just having other people who do understand the condition can really be an outlet for some of the frustration of dealing with these serious illnesses.

STRIKING A BALANCE BETWEEN SELLING AND USING DATA WHILE PROTECTING PATIENTS

Obviously, we're on the forefront of this field, so finding a balance is very tricky and we work hard to maintain it. We let patients know, as best we can, the risks of sharing information so they can decide what they do or don't want to share. In keeping with our philosophy, the patient is ultimately in control of how much they share.

In our partnerships, we explicitly say that this data cannot be re-identified. They cannot use our website or other data sets to re-identify our patients. That way they're just using the data to improve their business, and they are contractually obligated to not do some of the things they could do quite easily if they re-identified the data and attached it to individual patients.

EXPANDING THE COMMUNITY

Our goal, long term, is to open Patients Like Me up to as many diseases as possible; currently, we have 19 conditions and 80,000 patients. While that's a good start, we really want to open this community up to a wider audience. Our goal is a million patients in the next couple of years and give every last one of those patients tools to better manage and understand their illness.

BIO
Ben Heywood is co-founder and President of Patients Like Me

Preparing for the healthcare crisis

HR Specialist Mercer is mining its global database to help governments and companies prepare for the coming crisis in healthcare funding

A healthcare crisis looms in many developed nations as their populations age and costs escalate. According to global HR specialist Mercer, countries and companies can do much to counter the threat but will have to look for alternative financing and risk management approaches. We speak with Mercer's Belgium Office Leader Koenraad Van Kerckhoven about preventing a healthcare disaster both globally and locally.

A LOOMING HEALTHCARE CRISIS

At Mercer we spend a great deal of time analysing demographic and economic data. As a global HR, insurance and actuarial specialist, Mercer provides advice on risk insurance, pensions and healthcare plans for multinational clients. To do this well we must be able to accurately assess the risks involved and that is why we conduct such extensive data analysis and research. One conclusion of our research is that healthcare systems around the world are currently under tremendous pressure and in need of a solution.

REVEALING STUDY ON HEALTHCARE AROUND THE WORLD

In conjunction with the World Economic Forum and the Organisation for Economic Co-operation and Development (OECD), Mercer headed up a steering committee to research a variety of issues related to global healthcare.

The report, based on two years of research, was called 'Transforming Pensions and Healthcare in a Rapidly Ageing World: Opportunities and Collaborative Strategies'. The study found that healthcare systems today require collaborative intervention at earlier stages in the lifespan and not only near or at retirement age. The effort was a clear call to global leaders for strategic thinking regarding their pension and healthcare agendas.

The methodology brought together thought leaders, professors, and industry representatives from all over the world. In this study, we used demographics to reveal certain healthcare issues, plus reviewed different healthcare systems all over the world.

Looking at developed countries, we can anticipate what is likely to happen, especially in Europe with their state-funded healthcare systems. Everyone is aware of the aging population and the rise of associated costs. At its heart, there is a dual problem; there is a funding decrease with lowered birth rates and less people to fund social security and there are the rising costs associated with the ageing population. The most recent financial and economic crisis has taught us that sovereign states are not an unlimited funding resource.

SHIFT IN FUNDING AND THINKING

Given the looming healthcare financing crisis, countries and industries have to look for alternative financing of social security benefits. Under these circumstances, a shift of funding from state to employers and individuals is a likely alternative. In fact, we already see the switch from public to private funding in a number of countries such as the Netherlands.

States need a more integrated solution and we believe we can play a meaningful role in providing solutions. Mercer is looking at this entire situation with great interest as we see it as an opportunity for our company to truly utilize our core competencies. Given our global reach and expertise, we are in a privileged position providing us unique insight into the healthcare financing challenge.

TO BELGIUM

In Belgium, Mercer is a leading adviser on HR-related issues such as retirement plans, and health and benefits insurance. In addition to advice on the insurance of employee-related risks, we also provide companies with recommendations on how to contain those risks and methods to help them develop and maintain a healthy and motivated workforce.

Risk management in healthcare obviously implies the need for better health management. In that regard we are constantly developing methods for keeping the

Mercer's Belgium Office Leader Koenraad Van Kerckhoven

working population healthy and reducing risks. Age is one such risk factor, as an older workforce often is associated with increased absenteeism due to illness and stress-related factors. Mercer provides companies with methods to deal with the challenges of an ageing workforce.

ASKING THE RIGHT QUESTIONS

Recently we held a number of workshops for a client dealing with demographic challenges. The questions I put to the group were; "Are you as an organization aware of the upcoming challenges - issues such as an aging European population and the increased need for care? Will you be able to cope with these challenges? Have you considered these new circumstances: an older workforce with alternative needs, flexibility in the labour force, part-time work, continuous education, salary scalability, etc?"

"We provide forecasts and models that show companies how their workforce will evolve in five to ten years time and what the effect will be on productivity

The challenges are certainly clear but as of yet there are no concrete solutions; this will come with time. Our priority at present is to make employers aware of the issues. We need to encourage companies to start looking at these issues very seriously. That's the first vital step. In this regard we provide forecasts and models that show companies how their workforce will evolve in five to ten years time and what the effect will be on productivity and eventually on profit and loss. It is the employer's responsibility, helped by the government, to create a sustainable working environment.

Mercer can help employers create this structure by laying the foundation with data, research and information. Indeed, we expect that the Belgian government will start looking to industry and individuals to share the burden of healthcare costs. The recent financial crisis has only made the issue more pressing and urgent.

However, we do think this is an opportunity for positive change through innovation. As the pressure on our healthcare systems increases, all stakeholders will need to work together to develop alternative financing systems and to adapt our work environment to the new realities. Given our global expertise, at Mercer we are in a unique position to play a key role in this process of transformation. We are optimistic.

BIO

+ Mercer is a leading provider of consulting, outsourcing and investment services, with a global network of more than 20,000 employees, based in over 40 countries. Our consultants help clients design and manage health, retirement and other benefits and optimize human capital. We work with our clients to develop solutions that address their global and country-specific challenges. Mercer advises clients in the public and private sector.

+ www.mercer.be

TED, the iPad and the quest for participatory healthcare

Lucien Engelen and his team at the Radboud Reshape & Innovation Center are using proven methods and technologies to help change the way healthcare is done

How do you encourage a large university hospital to make the transition to participatory healthcare? "Develop a Swiss army knife". Lucien Engelen and his team at the Radboud Reshape & Innovation Center are addressing the problem in a multi-pronged but highly pragmatic manner. Firstly, they're getting healthcare workers to talk about the issues. Not by handing out flyers, but by organizing fun Pecha Kucha sessions and what could be Europe's largest TEDx event yet, focused exclusively on the future of healthcare. Secondly, they're facilitating real change in the hospital's work processes. Not by launching a major 'change' project but by experimenting with consumer technology—such as the iPad and Skype—that lowers the threshold for patient participation.

Can you tell us a little about the Radboud REshape & Innovation Center?

The Radboud REshape Center was set up by the end of 2010 when the Executive Board of the Radboud University Nijmegen Medical Centre as part of the adopted strategy that we need to transition toward participatory healthcare. This was a pretty fundamental decision, as a result of intense discussions I had with the board, for the hospital because it touches on the core of what we are,. It acknowledges that there probably is nothing as paternalistic as a hospital and that a total mental shift will be required if we are to succeed. At base it means that we need to start informing patients in such a way that they are able to make decisions—together with the physician—about their treatment.

Are people ready for that responsibility?

Not everybody but you have to look at this from a long-term perspective. Innovations typically take about 7 years before they lead to real societal change, al least in healthcare. It is true that the generation requiring care now does not need or want computers, but the generation coming in was brought up with computers. Even today's diabetes generation is young enough to have been brought up with computers. It's difficult to say how exactly this will evolve but attitudes and expectations are definitely changing. For example, my son looked at me as if I was crazy when I tossed away a phone book delivered by mail, when I told him what we used to use it for. They think differently, not only about communication but also about work processes and power relationships.

I'm convinced that the patient-doctor relationship and the role of the doctor in particular, are changing significantly. The doctor's role will evolve to a more consultative and coaching role. In the 10 minutes they have with a patient they will have to focus on the right questions, helping patients make sense of the information and come to decisions. The problem is that patients only process about 20% of what is said during a consultation. That's why technology can really make a difference to improve communication. Although I do want to make clear that Health 2.0 is not primarily about technology; it is about attitudes, roles and work processes.

> "Health 2.0 is not simply about technology. In fact, you can apply Health 2.0 without technology. Ultimately it is about co-decision.

Tell us about some of the innovation projects initiated by REshape

I like to think of our Reshape-programme as a Swiss army knife; it's multipronged initiative. We do research, we organize events and conferences, give lectures and workshops and we initiate innovative projects. There is no silver bullet to transforming healthcare. We have to work at different levels. For example, the conference call system I'm using now to talk to you is an open platform (Skype). We've made it available for multidisciplinary consults but we specifically went for an open system so that patients and their relatives can join in too. The idea is to place the patient in a much more central position. So we've adapted this "consumer technology" to help patients to enter our newly developed video-conferencing system FaceTalk. Once they are in, our secure system takes over. So we use standard technology to lower thresholds and broaden the use.

We're handing iPads to patients to show short films about what they can expect in their treatment. And for young adult cancer patients we've created a community to address specific challenges around identity, sexuality, careers, etc—concerns that are very specific to the 18-35 age group. With regard to the technology it is important to avoid creating islands. That's why we use proven consumer technologies and simply add extra elements or combine techniques to simply create a new service for the care environment. Obviously you can build huge proprietary systems but there is no point in that.

To spread the message and stimulate debate on Health 2.0 we're using events—again using proven concepts. Pecha Kucha (a popular event format where presenters show 20 slides, in 20 seconds each) is a great technique to liven up presentations and to ban keynotes with 120 slides or

more. We started by bringing in external people to present material but now we're seeing some of the doctors take up the challenge to present their experiences. It is a great way to stimulate dialogue, to look at your message, not only content wise but into design as well. And in April we have our first major conference, TEDxMaastricht. This is going to be one of the largest TEDx conferences in Europe to date—900 seats—and it will be dedicated entirely to the future of healthcare. Live streams in HD will be broadcasted to simulcast locations like Darwin Australia, Stockholm Sweden and many other places taking the amount of real-time visitors up to 10.000.

What is the higher goal of your organization? Is there really anything wrong with healthcare today?

Absolutely, there is something very wrong with healthcare. At present it is mainly one-directional traffic. Doctors say that they talk to patients; perhaps so, but there isn't real negotiation with the patient. For a doctor, the patient too often is simply a disease that generates data on which they base their medical decisions. There is no real co-decision. Our mission is to inspire our colleagues to take a different approach to healthcare. And we're doing that in a piecemeal fashion; via small steps and proven methods we gradually want to change the way healthcare is done, but sometimes we have to use way's never explored until now. In a way, we're trying to seduce our colleagues to work differently. We want to offer tools and services that really appeal to people. It is the little things that count here. That's why we're using the iPad as an enabler—people want to use it. FaceTalk is another example. Technology can't be a barrier; it needs to be an enabler, something that will seduce people into behaving differently. But again, Health 2.0 is not simply about technology. In fact, you can apply Health 2.0 without technology. Ultimately it is about co-decision.

Healthcare professions tend to think that they know what the patient needs. That is not (always) the case. We see this time and time again. The whole sector is evolving with only one group in mind—the people who need care now, but it should also be preparing for the next generation coming in.

Why now? If Health 2.0 isn't about technology, why is it making inroads now?

I think it has to do with the internet and the wider cultural shift that it is driving. This isn't only about healthcare—you can see similar trends everywhere. It is about information access, or rather, the democratization of information. And it is about the increasing power of social networks.

For physicians this can be difficult to adapt to, especially because patients differ in their approach to seeking out and using information. Some are proactive researchers who confront their doctor with mountains of data and information. But there are others who are silently 'testing' their doctor's expertise. It is so difficult to integrate this into the education of doctors. But technology is opening up opportunities here.

It is really important that we prepare ourselves now, so that we can be ready in a few years to cope with the impending changes, not only in patient expectations but also the problem of staff shortages, increasing healthcare costs and exponential healthcare demands.

Are you optimistic about change in the healthcare sector?

I'm an optimist at core, but also a realist. It will take years. The danger is that we keep talking about change but nothing really happens. In the healthcare sector we're not very good at making changes, at making decisions—we talk too much. But that is no excuse because it is an ethical decision. It is unethical to delay; we need to get cracking on this. That's why with our innovation center we concentrate on short 30-day projects to rapidly test things in a real world setting. And yes, we fail sometimes as well, but we will know within 30 days and hence can quickly cut our losses. This is in contrast to most e-health projects that fail because they are far too large and complex. And they tend to have very few generic elements in them. All our projects rely on generic components—on proven consumer technology—so that ultimately we can involve the patients in these projects, also from home. It is so important that these services are light, easy and accessible.

Obviously I don't want to argue that we should kill all the large e-health projects but I do feel that there should be more programmes for supporting small projects, because I think it will ultimately be the small projects that will make the difference.

BIO

Lucien Engelen is Director of Radboud REshape & Innovation Center at Radboud University Nijmegen Medical Centre. He is Advisory to the executive board, Head of the Regional Emergency Healthcare Network, Health 2.0 Ambassador, speaker and founder & Curator of TEDxMaastricht.

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Building practical high-tech hospitals

As architects who understand the complex needs of hospitals, VK has a multi-disciplinary approach for healthcare facilities

VK offers state-of-the-art architectural & engineering services to its healthcare customers. Real estate developers, architects, industrial clients and public authorities can rely on VK for its widely recognised engineering services for their buildings, industry and infrastructure needs.

According to marketing manager Serge Cappon, the healthcare market currently represents around 40 percent of VK's turnover, and among the 200 employees in Belgium, the company has around 70 healthcare specialists on the payroll. VK has designed some top healthcare projects, such as the 45,000 sqm expansion of the Hospital of Our Lady in Aalst, the Revalidation Centre for the University Hospital in Liège and various projects at the General Hospital Saint-John in Bruges. Besides these references, two greenfield hospitals with more than 700 beds are on the drawing boards: the General Hospital Saint-Martin in Mechelen and the Sacred Heart Hospital in Roeselare.

COMPLEX NEEDS

'Healthcare buildings are among the most complex buildings to design,' says architect Stéphane Vermeulen, director healthcare at VK. 'Many architects feel a calling for and are attracted by this market, but few of them realise the extremely complex context of these buildings. Because we have been designing healthcare facilities for decades, we understand the specific needs of healthcare organisations. As we know hospitals inside out, all we need is half a word to understand what a client needs when he talks about an operating room or medical-technical platform.'

VK is a multi-disciplinary architecture & engineering (A&E) firm, integrating all disciplines within the construction process, offering a wide variety of services to its healthcare customers: masterplanning, programming, architecture, building services, structural engineering, medical gasses, energy engineering, landscaping and interior design. According to Stéphane, this "Integrated design" principle is really important in this sector because, as an architect, you have to integrate for example all future medical equipment in your design: 'After all, hospitals choose their state-of-the-art medical equipment years after the building has been designed, so you have to be sure all rooms are designed to be capable to house this future equipment. This implies you have to think on a strategic level, together with the client and all stakeholders. The building also has to be flexible enough to make future extensions possible. So hiring a star architect who is more concerned about the building envelope may eventually burden the running cost of your hospital.'

Designing a hospital implies speaking to all stakeholders: you have to talk to doctors, nurses, the logistics personnel and the management. As a result the design scheme is broken down into operational clusters, where for example, you try to limit the walking distances. Stéphane explains: 'The shorter the total walking distance for the staff, the more efficient the hospital is running and the more time there is for quality of care. For architects, this requires a special way of thinking: they like to think that they can indulge in a lot of architectural features for a hospital, but they tend to forget that the building cost of a hospital only represents one percent of the cost of the whole life cycle of the hospital. So your operational cost is very much affected by issues as, amongst others, these walking distances. The staff's efficiency and the patients' comfort should be the first concern, and only when these conditions are fulfilled, our designers take care of the building envelope, the energy efficiency and other issues that have an impact on the operational and maintenance cost.'

As to the fit out and the finishing of a building, VK can present a very special reference: The Burns Unit of the Military Hospital in Brussels. The client, the Ministry of Defense, has the ambition to promote this unit as a European reference center. Evidently, the imposed standards were high, especially in a high care room where heavily burned patients are treated, sometimes for months. The room temperature equals body temperature and it has 80 percent humidity, driving the pressure on the used materials to the limit. Stéphane explains how VK tackles this: 'In such extreme conditions, you have to use special materials. To prove that the materials we chose would be able to withstand these atmospheric conditions, we made a simulation using computational fluid dynamics. Simulating energy losses, air flows and the impact of humidity only stresses on the physical aspects. But you also have to bear in mind some psychological factors, such as the colour of the room. Patients with burns have to be reassured with cool, blue colours. Red or orange colours are not done, because they remind the patients about the fire that caused their burns. A

> *'Healthcare buildings are among the most complex buildings to design.*

Revalidation Center Esneux

Sint-Jan Hospital Brugge

Military Hospital Brussels, Burns Unit

Sint-Jan Hospital Brugge

Entrance Hall OLV Hospital Aalst

BIO

+ **VK offers architectural & engineering services to healthcare customers, as well as engineering services in the buildings, industry and infrastructure market.**
+ **www.vkgroup.be**

patient will heal faster if he feels good in his hospital room. Due to abundant daylight, a good air quality and temperature, the surrounding landscape,... we design the ideal setting. Besides that we focus on ergonomics and comfort, enlarged autonomy, self- reliance and we optimize the ease of use for the patient. That's what we call a "Healing environment".'

GOING ABROAD

A few months ago, VK has deployed its business plan for the coming 5 years. The Belgian group has striking international ambitions as it has grown towards domestic market leadership in some of its core markets. 'Therefore, we have searched for countries where there is a need for our know-how of general hospitals, mental care facilities and senior care facilities,' Stéphane says, and Serge chimes in: 'We've done some research on emerging economies and are already involved in partnerships or have established own offices in Russia, Kazachstan and Vietnam. We feel we can fill in the gap there, as the big multinational firms also seek partners and local governments are looking for worldwide expertise.'

VK has started some joint ventures with local firms. Stéphane emphasises that local partners are quite essential: 'We have tried going abroad without a local partner first, but that didn't go too well. There are a lot of barriers: you don't know the language, the laws and regulations, the habits or the commercial attitudes. In 2009, we founded an office in Astana, Kazachstan. When the economic crisis struck, things were difficult but we now have 30 employees over there and two big projects under contract.' Other international offices have been started up in Saint-Petersburg and Hanoi.

TOUGH SOCIAL DECISIONS

With this experience abroad, Stéphane has seen some striking differences in business climate in the healthcare sector. 'In the eastern part of the world, decisions are made and projects are realised much faster: a project that we need ten years for in Belgium, can be accomplished in two or three years over there. In Belgium, our financing system is too cumbersome and the regulations are too complex. Moreover, Serge adds: 'In Western Europe and especially in Belgium, we have ended up in some kind of "superdemocracy": everyone has their say in whether and how a hospital can be built, including the neighbour. This way our economy will stagnate. So our society has to make some tough choices: we can't pamper everyone from the cradle to one's death bed. If we want to remain a top region in healthcare, we need a more efficient business climate, also for hospitals.'

Scalable health coaching

Digital health coaching has the potential to change the lives of millions. Claudia Put, founder and director of BrandNewDay, explains.

We all know that healthy living is important, not only to our own longevity but also to the sustainability of our healthcare systems. But simply knowing that isn't enough. In fact, most people tend toward an unhealthy lifestyle because unhealthy living is easy and appears fun—the pain comes later. That's why health coaching works; we need a little encouragement and support to change our behaviour. The problem is that coaching is expensive—you need coaches. Also, it takes some courage to join a group and expose your vices to strangers or colleagues. Enter digital health coaching. Health psychologist Claudia Put and her team have developed a digital coaching platform that feels like the real thing but can be scaled up to reach thousands. Claudia has an exciting vision: in years to come we will all learn to manage our health better—the tools are ready.

DIGITAL HEALTH COACHING

The concept is digital health coaching. It is a form of health coaching that relies on the digital environment. Why I say digital is because it isn't limited to the computer only; for example, we're also using mobile channels. Our main goal is to change behaviour, health related behaviour. That can encompass areas like smoking, alcohol consumption, exercise but also compliance with medication. The main benefits of our model are twofold On the one hand the threshold to participation is very low—it is easier to participate in an online program than it is to join a live coaching program. And on the other hand, and possibly most importantly, the model is highly scalable. We're not claiming to be better than live coaching. In fact, most research shows that digital coaching is equally effective to live coaching. The main difference is scalability: we can make this service available to thousands of people without having to invest in progressively more healthcare professionals.

Prevention is our main focus. The main reason that people live unhealthy lives is because there is no immediate incentive to eradicate unhealthy behaviour. Most people with an unhealthy lifestyle experience more benefits than pain. The pain comes later, when you get older. That's why an unhealthy lifestyle is normal; we have a normal tendency to be unhealthy. Our goal is to counter that tendency and let people experience the joy of health, to feel more energetic and upbeat about life. We work with individuals, but our clients are companies and government agencies who make our services available to their staff. The benefits for the employer are a healthier and more productive staff—that's been proven in research studies. And health insurance companies obviously benefit too.

The basic process of our programmes follows. It begins with an assessment of your current behaviour after which a tailored coaching programme is worked out for you. This involves an action plan with regular feedback loops and a benchmarking tool. Benchmarking—call it a form of social comparison, anonymous obviously—is really important to motivate people. Also important to note is that the ongoing interaction happens via small triggers. This type of coaching is not based on constant education and the provision of lots of information; small triggers are usually enough to affect behaviour. Obviously there also are various detection points and alerts in case the person's condition becomes serious. The degree of customisation is pretty advanced. I've been told by several people that they sometimes forget that they're interacting with a machine.

ROOTS IN HEALTH PSYCHOLOGY

I'm a researcher and clinical psychologist by training. During my psychology training I realised pretty quickly that I didn't want to work as a clinical psychologist. So when I was offered an opportunity to go to the U.S. to do research work, I accepted. I spent four years in the U.S. and that's where I first became involved in the field of Health Psychology. This discipline of psychology looks at how health can be improved via behaviour change; not only via purely preventative behaviour such as stop smoking but also by helping medical patients manage their health better. For example, cardio patients have an important responsibility in their treatment with regard to taking medication properly and living healthier lifestyles.

LIMBURG STOPS SMOKING

On my return to Belgium I was offered a position at the University Hospital Leuven combining clinical and research work. After I graduated there with a doctorate in the medical sciences, I realised I wanted to focus my efforts more on lifestyle promotion. In 2003 I set up the company and started doing health coaching focused on smoking and stress. That worked well—for the people in the groups, because they were motivated. The problem is that most people aren't in the group because the threshold to participation is so high. In a work environment, people are hesitant to expose themselves to colleagues in that way. They also have to free up time to fit with the coaching schedule. Language issues sometimes exist too. It all adds up to a pretty significant barrier. That's why we started experimenting with online approaches. Our first project—an

online stop smoking campaign for the province of Limburg (limburg-stoptmetroken.be) was very successful. We reached a very large group and still managed to offer people highly personalised advice based on their input. People felt really engaged—and we noticed it in our results. We had control over our databases and could clearly see who improved and who didn't—and thus we could react appropriately, optimizing the programme as we went. We also were lucky that we could partner with organisations like Stichting Kanker to share the financial risk. They were looking for a partner to develop these types of programmes and scoured the entire European market for a suitable supplier. That they chose us was a tremendous endorsement that we were on the right track.

BUILDING THE PLATFORM

The stop smoking programme was a tremendous success, not only because we attracted so many subscribers but also because it is so sustainable. We were able to stay with people for the long term and noticed that people were changing their health behaviour more generally. Hence we expanded the scope of the programme to cover 8 health domains in the area of occupational health. The result is a digital health coaching platform we called *'i change'*. The investment has been huge but we managed to launch the platform last April (2010) and currently have six companies making use of it, with more coming soon. And they're happy. It just works. Companies sign on and subsequently make it available to everyone in the company. It is a very democratic approach; we don't charge on a per-user basis. We also coach our clients to make sure that they get as many people as possible involved. It is important that a certain buzz around the service is created for it to take off. But that it does; at our clients we average a 30% participation rate—that is tremendously high—and they stay on the platform for months. At this stage we've just come above water and are hugely excited. We're with 9 people now and at the cusp of a major growth trajectory.

A UNIQUE MODEL

I never understood that. In Europe we do appear to be unique. It is unfathomable, because it seems so obvious. I could be because the investment required is pretty significant. Also, it requires intense collaboration between psychologists and IT professionals—and that is not easy. They're two very different profiles. They don't think in the same way. For example, web developers tend to have experience making websites that are very marketing oriented, or they're very rational and logical in their approach, being used to business applications. Health coaching is different.

In the U.S. they are ahead in this. We're watching the key players there very closely and in fact are collaborating with some of them. I've invited them to our conference (Healthy Company,31/3/11) and I attend theirs.

THIS WILL BE BIG

I'm absolutely convinced that digital health coaching is going to become huge. Information technology is making it possible to do effective health coaching at a tremendous scale. People are gradually going to get accustomed to using these tools—and that will have an impact on our health.

In Belgium we tend to be slow in adopting new technologies and methods. We're somewhat conservative. But also here we're going to start using digital coaching tools at scale. We're showing that when given the chance, people do make use of them.

It is important to customise the tools to local culture and language. For the Netherlands we're adapting our platform pretty significantly. It's the little details that matter. For example, in the Netherlands it makes sense to encourage people to use a bicycle for home to work travel, but that doesn't hold everywhere—the geography or infrastructure often isn't setup for that.

CHALLENGES

I'm a psychologist. I had no experience as an entrepreneur and had to learn as I went. Possibly that was a good thing because I was naïve. I invested like crazy in our platform. Perhaps if I was an entrepreneur I would have been more careful. But then the product wouldn't exist today. Also, we realise today that we started our company in what is probably the most difficult and conservative market: Belgium. But we're succeeding and are now keen to internationalise as fast as possible. We're talking to investors to fund that growth. So the next phase will be about managing that growth, while simultaneously keeping on renewing and innovating.

HEALTHCARE TRENDS

I'm seeing increasing interest in health promotion everywhere because the costs of healthcare are spiralling out of control. Also culturally I think there is a shift toward people taking more responsibility for their health. You can see that in the way that people are taking responsibility for their lifestyles—fewer smokers, more physical exercise, improved diets—but also in the way insurers are beginning to look at this, for example, by rewarding healthy lifestyles.

BIO

Claudia Put is founder and Managing Director of BrandNewDay (www.brandnewday.eu), a Belgian company that has developed a digital health coaching platform specifically for companies. BrandNewDay also organises an annual conference (www.healthy-company.be) on sound workplace health policies. Claudia is a Health Psychologist and Dr. in the Medical Sciences.

Open source telemedicine

A student organization at MIT is building a free, open source telemedicine platform

mHealth or mobile health services are a potential way to improve access to healthcare in developing regions. Sana, a student organization based at MIT, has developed a free, open source telemedicine system that connects community healthcare workers to medical professionals. The platform is currently being implemented and tested in several regions of the world, including India, Brazil and the Philippines. We spoke to the operations lead of Sana Mobile, Chris Moses.

TELL US A LITTLE ABOUT YOURSELF

I graduated from MIT last year with a Bachelors in Brain and Cognitive Sciences. I currently work at MIT OpenCourseWare (ocw.mit.edu) publishing MIT courses online to make the materials freely available. I volunteer my time as operations lead for the telemedicine research group, Sana, at MIT.

WHAT IS SANA MOBILE AND HOW DOES IT WORK?

Sana is a highly multidisciplinary volunteer-driven organization hosted at MIT comprised of students and working professionals in the fields of medicine, public health, engineering, and business. We have developed and implemented a free, open source, cell phone based telemedicine system that empowers frontline community health workers and general practitioners to provide expert care to patients with the support of remote specialists and doctors. Sana is a smartphone application written for the Android operating system that allows health workers to collect medical data (photo, video, audio, free text, and rich data such as x-ray, ultrasound, and ECG), and send this data using the cellular network to an electronic medical record system. A doctor in an urban hospital who participates in the Sana referral network logs into the online medical record system using his or her browser, reviews the case, and enters the diagnosis and treatment recommendation, which are then sent back to the health worker's cell phone so that the care can be delivered.

WILL IT MAKE A DIFFERENCE?

Sana can minimize and potentially eliminate the time to diagnosis and close the loop of patient presentation with an illness to delivery of care. Minimizing this cycle reduces the high rate of loss to follow-up that is common in remote areas where the patient must travel long distances and sacrifice daily income to seek care. By providing either preventive care or care early on in the stage of illness, total cost of treatment is lowered, and health outcomes improve. Sana's software has been specifically designed to meet these needs, and overcome the constraints of poor cellular connectivity during data transfer.

IS IT BEING IMPLEMENTED IN THE FIELD?

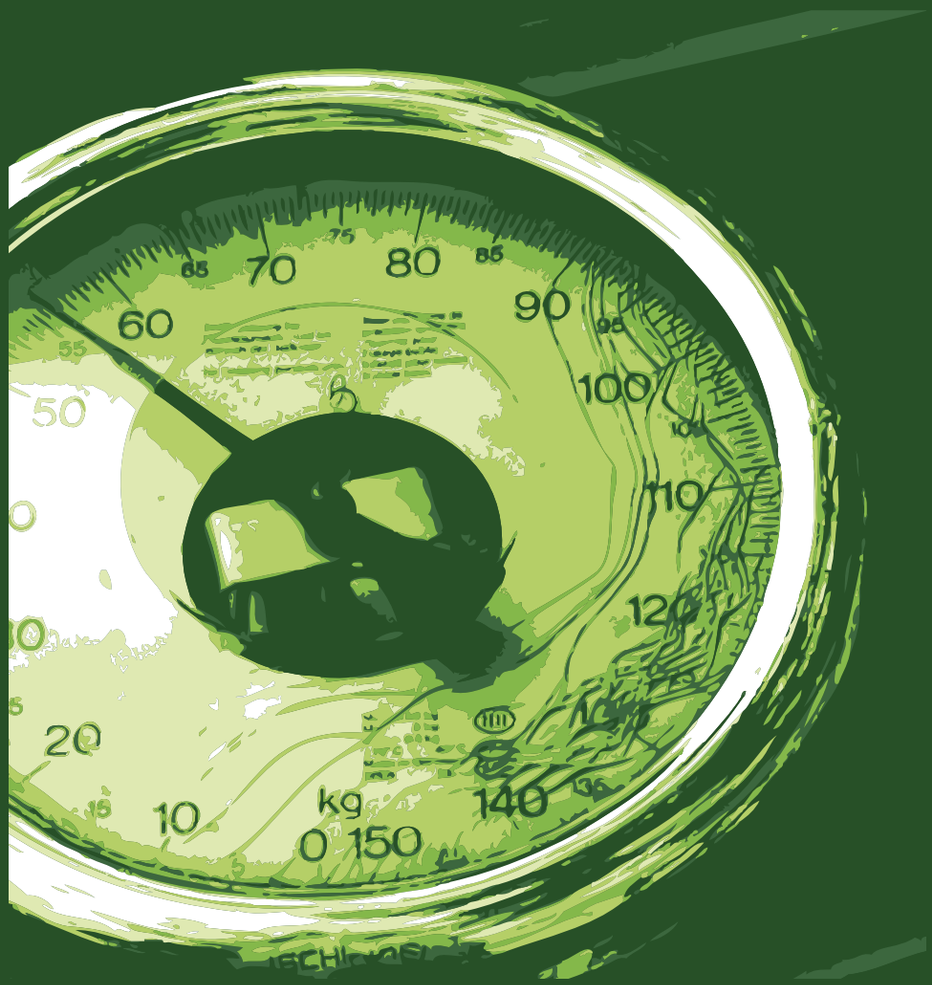
We have active projects in Brazil, two sites in India, two sites in the Philippines, and project partners implementing the system in Haiti, Kenya, and Greece. I am project manager for the Philippines, where we are customizing Sana to help community health workers operating clinics for two large microfinance institutions identify and manage patients with hypertension.

TELL US MORE ABOUT YOUR PROJECT IN THE PHILIPPINES

Cardiovascular diseases are a leading cause of mortality and morbidity in the Philippines, and our partners identified these health problems as top priorities for improving the health of their clients. We hope to identify and treat patients in the long-term who will benefit from reduced acute hypertensive episodes and minimize the risk of debilitating strokes. Our challenge is to leverage local resources to drive achievement of milestones and sustainability. To this goal, we coach our partners in the value of locally led, data-driven accomplishments, and are working closely with our own counterparts in the Philippines: a local technical consultancy who has raised grant funding to spearhead management of the cell phones and servers; hospitals and local doctors to

provide diagnosis and treatment recommendations; and we are working with the Department of Health as well as local universities to sustain continued implementation, research, and evaluation of the program. Once the project is evaluated and we make a decision whether or not to scale, we plan on integrating diabetes management tools as the next high priority disorder to tackle to improve the health of Filipinos.

> “ Our challenge is to leverage local resources to drive achievement of milestones



ARE YOU COLLABORATING WITH OTHERS?

We are constantly mentoring other research groups and organizations in the process of identifying, implementing, and evaluating mHealth projects. A completely novel offering in the mHealth space is a new course we are teaching at MIT called HST.184: Health Information Systems to Improve Quality of Care in Resource-Poor Settings.

BIO

Chris graduated from MIT with a Bachelors of Science in Brain and Cognitive Sciences. As co-founder and operations lead of the telemedicine group Sana Mobile, Chris develops relationships with key partners in academia, government, health-care delivery organizations, and grassroots organizations both in the US and abroad to customize and implement the Sana telemedicine program. Over the past two years, he has worked with partners in the Philippines to design and manage pilot studies, raise awareness of health-care disparities in conflict zones, and to improve rural health programs.

Low cost healthcare for the great Indian middle class

Dr. Ashwin Naik co-founded a low cost chain of clinics in India to serve the healthcare needs of the semi-urban middle class

While 70% of India's population lives in semi-urban and rural areas, 80% of India's healthcare facilities are located in urban/metro areas. To help bridge this gap, Dr. Ashwin Naik co-founded Vaatsalya, a chain of low-cost clinics in semi-urban and rural areas designed to bring healthcare services where it is needed most. Vaatsalya is India's first hospital network focused on Tier II (population less than 1 million) and Tier III (population less than 0.5 million) towns. Ashwin explains the model.

A DIFFERENT MODEL FOR HEALTHCARE DELIVERY IN INDIA

If you look at the distribution of population, 30% of India's population resides in urban/semi-urban areas. In that group, 10% of the population will qualify under the upper class economically and the bottom 30% will be classified as below the poverty line. We started out with a plan to cater to the middle 60% of the population and eventually reach out to the bottom 30%. Most of our customers come from the mid 60% and over the years with support from the government and other agencies we have been able to reach out to the below poverty line segment as well. We realized that this market will not be able to afford our services if we had a high priced model.

When we started the company in

2002 we did not start with a clear-cut vision but we knew that we wanted to address this particular segment of the market – tier 2 and tier 3 towns in India. From a personal point of view, we had family in these areas and knew there was demand for affordable healthcare and from a professional standpoint we knew there were doctors interested to go back and cater to these small towns but did not have the necessary support to do so.

> "We'll invest in the best equipment for critical care needs but for non-critical aspects we take a no frills approach.

We looked at all the opportunities, for example, getting involved in tertiary healthcare by positioning ourselves as consultants. As it turned out, we decided that we would focus on developing a network from the ground up. But our original network model was different from what it is today. Initially our idea was to focus on preventive healthcare and day care settings. After running the pilot project for about 9 months we realized that from an employment and scaling up point of view this model needed changing. Around the same time we got Aavishkar as our angel investor and they helped us think through some of these challenges. The model we finalized was that we will focus on tier 2 and 3 towns - any town which has a population of more than 250,000 and where there is gap in the delivery of critical healthcare. We established our first hospitals in North Karnataka (a south Indian state) in 2005 and 2006. During this time we studied the model and saw it grow. In 2007-8 we expanded to other parts of Karnataka and now we are looking to expand to 3 more Indian states.

BUSINESS MODEL

On the investment side we only invest in services which have high utilization capacity. These are services that are routinely required by the local population. We don't invest in highly specialized services like neurosurgery and cardiology. The services have to be relevant to at least 60% of the population, such as maternity, pediatrics, general surgery, and general medicine so on. We also keep our investments very focused in the sense that we'll invest in the best equipment for critical care needs but for non-critical aspects we take a no frills approach, for example, not using air conditioning.

On the operations side we focus on high utilization, keeping a lean cost structure and working closely with the local doctors. To illustrate, large metro hospitals on average invest about 5 million INR per bed. There also is a new trend where big hospital chains have clinics in smaller towns where they invest 1.5-2 million INR per bed. But our ticket size is 300,000-400,000 INR per bed. More importantly we have to see how it translates as a cost to the customer. For example if we are able to charge 5,000-6,000 rupees for a normal delivery the same service might cost 15,000-20,000 rupees in a bigger hospital.

RISKS AND CHALLENGES

The challenges we faced included market risk, employment issues and financial risk. In terms of market risk we were not sure if there was an opportunity for branded healthcare as most private healthcare in India was run locally. Regarding employment we were not certain if doctors were prepared to work with us. Traditionally in small towns doctors are not used to working with a third party; they tend to have their own clinics. Finally there was financial risk: we weren't certain if people were prepared to pay for these types of services. Those were the main risk factors we faced initially. In addition, we had to find funding. Firstly we raised money from non-resident Indian professionals who have their roots in small towns. They related to the business on an emotional level. They gave us seed money for the pilot. Subsequently we got funded by investors and right now we are close to another round of funding.

HEALTHCARE IN INDIA - EMERGING TRENDS

I think that there are inherent challenges in the way healthcare in India is structured. The traditional model of creating hospitals at every level is not possible simply because of the size of the country. So we have to depend on alternatives like telemedicine and m-health. We hope to see these technologies emerge in the next 5 to 10 years. But the larger question is who will pay for these services. Insurance providers will need to be involved because they have an interest in avoiding the cost of hospital stays.

BIO

Dr. Ashwin Naik is the co-founder and CEO of Vaatsalya - a healthcare services company with a mission to provide affordable quality healthcare services to the rural and semi-urban population. Ashwin has a medical degree from Karnatak Medical College, Hubli and a Masters from University of Houston, Texas. Before returning to India in 2002, Ashwin was part of the team that sequenced the Human and Mouse Genomes at Celera Genomics, based in Rockville, Maryland. In 2008, One World USA nominated Ashwin as one of the finalists for the One World Person of the Year 2008, for his contribution in bringing affordable healthcare services to underserved populations.

Analytics for the post-genomic era

Meet Candace Toner, CEO of rapidly growing bioinformatics company Biomatters.

In areas like science and health, something that is a theory or an idea one day can become a fact overnight. Biomatters is a company that has helped scientists turn those theories into today's facts. Their software platform Geneious was created to manage and process biotechnology data. The company started off in 2005 with no commercial funding, going from a small business with huge ideas to a 20 million dollar company by 2013. The recipe? Listening to clients, keeping it simple, and daring to be awesome. CEO Candace Toner explains what the science of medicine is going to look like in the future and where Biomatters fits in.

BEING A PART OF THE CHANGING WORLD

My biggest personal drive is to be a part of the future, forming the world, and helping scientists finding the best solutions to our current problems. Biomatters and its software are fundamentally changing the way science and research is done, and being a part of that process is amazing. We are having such a profound impact on the future, helping scientists find answers to humanity's problems. When swine flu started spreading in the USA, Geneious was used to evaluate all cases. Watching the use of our software from day one, in New York City, was just amazing. Scientists use our software in their quest for ending cancer, for feeding the world, for identifying criminals. It's such a phenomenal range of customers, and that is why I am so passionate about the company.

FROM A LITTLE TEXAS TOWN TO NEW ZEALAND

My formal education background is spread across the world – I was born in Austin, Texas, but moved to England just before high school as an Air Force brat. Then I went to Hawaii for my Honours degrees in Anthropology and Political Science. On my way back to law school in the USA, I stopped for a gap year in New Zealand. And like so many people before me, I stayed. At Massey University, I got a Master's degree in Business and Management, and my thesis was about women as entrepreneurs. I wrote about the women in charge of companies like Compaq and E-Bay; there are so many creative, determined and driven women in leading positions in technology companies.

I met Daniel Batten at the ICEHOUSE (an Auckland incubator for emerging businesses), and several years later, when I was at Telecom, Daniel got in contact with me about Biomatters. As Telecom was restructuring, I decided to take on the challenge of becoming a CEO.
When we started off, we didn't even have enough funding to last six months. We had to choose carefully what to do with the money - who to hire, what we needed in terms of equipment, and marketing. It made us very good at staying with the fundamentals.
The fact that we don't have any commercial funding – we're funded through ICE Angels (an ICEHOUSE organisation) and several New Zealand-based individuals – means that we could make our own decisions, and that we have a board of intellectual and well-connected people.

TEAMWORK

The core team at Biomatters consists of no more than around twenty people. Everyone in the team is extremely capable and motivated, whether they work with software development or marketing. I think that is one of our biggest strengths – that we are all so passionate, and that we believe so much in the impact we have.

THE IMPORTANCE OF THE CUSTOMERS

Another thing that makes us unique is the level of customer interaction. When we started up the company, I travelled to the USA to visit different universities to talk with them about exactly what scientists wanted in terms of software. That was three and a half years ago. Now over 850 universities in the USA and about 1000 in the world use our software. I believe that it was absolutely crucial that we asked them "What do you want out of a product?" and then made the software based on their answers with a little creativity from our side mixed in.
The amazing thing is that the customers have such intense interaction among themselves too, they are supporting each other through the community, and sometimes another customer will answer their questions on our user forum before our team does.

PERSONALISED MEDICINE AND THE IMPACT ON THE HEALTH INDUSTRY

The health sector is under huge change, and the concept of "personalized medicine" is growing by the day. This means that in the future, when you visit the doctor, you could have your blood taken, and the doctor can tell you what diseases you are at a high risk of getting through a fast and simple DNA analysis. Say that the chance of you getting breast cancer is high, you might have three alternatives – having your breasts removed, trying to stave off the disease by keeping extremely fit and healthy, or get a treatment that has worked for other women with similar DNA "demographics".
With today's way of medicating, it takes about 15 years to see an idea through to the developed drug product. It is such a long process for a variety of reasons, but primarily because the drug has to be safe for all demographics, whether the patient is a Caucasian 70-year-old woman or a 14-year-old Indian boy. Obviously, the process must involve extensive testing in the lab to make sure it is a safe drug for everyone. However, with personalized medicine, the process is potentially completely different. The specific medicine that has been tested safe on Caucasian woman aged 18-30 will be used only for that group, and so forth. This would shorten the process significantly; the drug might only take about five to seven years to produce, instead of 15, and therefore cost less than half as much.
With Geneious, we want to create a lot of capability in that area in the future, and create solutions to any problems that might arise.
One of our ethics is "daring to be awesome", and I think in the end that is what it all comes down to. That, and getting results.

> "We are having such a profound impact on the future, helping scientists find answers to humanity's problems

BIO
Candace Toner is CEO of Biomatters, a New Zealand-based provider of bioinformatics software for molecular biology

BIO
Krister Torssell is CEO of Ergonomidesign, a Swedish design consultancy

Helping hands – the vision of a complete healthcare eco system

A design company that wants more than good looks

Ergonomidesign is a design consultancy that has historically focused on designing devices that make life easier for people with disabilities. Their video "Helping Hands" portrays a future scenario for a healthcare system where every person will have instant access to their own biometric data, and where the process of getting diagnoses and treatments is remarkably more convenient than the conventional way. The CEO of Ergonomidesign, Krister Torssell, talks about their vision on healthcare, and the urge to modernise an ancient healthcare system.

The foundation for Ergonomidesign has always been the perspective of other humans. When the company started in 1969, we mainly focused on people with disabilities and different handicaps, and how to make life easier for them. We tried to make service conditions better and create tools that would allow disabled people to work as if they weren't. We learned a lot in this process, and moving on to Life Science was a natural step.

Our goal is to increase the life quality for humans, and to use user-driven innovation and new technology to do so. Every day at the office, people share their visions and new ideas, and we discuss possibilities and scenarios for the future.

CHANNELLING THE IDEAS INTO A VIDEO

As we were preparing for the Medica Fair 2009, we wanted to gather all those ideas and visions into one scenario that would showcase what we want to tell the world, and what possibilities actually lie in today's technology. That is how the idea of the video about the future of health, "Helping Hands", was born.

FUTURE HEALTHCARE THROUGH THE LIVES OF BERNARD AND HANNAH

In the video, we follow two people using the future integrated healthcare services. "Bernard" is diagnosed with Coronary Arterial Disease (CAD), and is dependent on a healthy lifestyle and control over his own health. He carries a tiny elliptical CAD device with a customised software application, through which he can make sure the levels in his body are under control, and therefore control his disease. Bernard can access the information at all times thanks to advanced smart surfaces with multi-touch technology (e.g. phones and tables).

"Hannah" uses a General Health service that helps her keep track of her basic biometric data, like pulse, oxygen levels, tidal breath and blood pressure. When she meets Bernard, they log into their profiles and compare their data on a smart surface. Hannah realises that she has very similar biometric data to Bernard in the initial stages of his disease. Through this early discovery, Hannah can get professional help quickly and therefore has a better starting position for treatment and keeping the disease under control.

RAPIDLY DEVELOPING TECHNOLOGY

The video is a way of showing what can be done and how we as patients would benefit from using technology as we are used to in other areas, such as managing our economy. Thereby we will hopefully accelerate the development of better devices and most importantly – turning the integration of the different systems and devices into a working eco system.

"Helping Hands" displays a future scenario, but the development in other areas suggest that we soon will have the technology we need to make it come true. We see that different types of touch screens for different devices develop fast, on everything from phones to tablets. With the new types of sensor technology, it will be possible to measure blood levels and other biometric data, or use a dinner table as an integrated smart surface. The possibility of reaching information anywhere is also quickly developing as the number of applications for technical devices grows.

What we are doing in the video is merely applying technology that is more developed in other consumer products and services to a different scenario.

THE CRUCIAL PART – MERGING FUNCTIONS INTO A WORKING ECO SYSTEM

A bigger challenge is how to merge all the different components together. It is an area where everything moves much slower. Another big question is what kind of organisation will actually build this system. The solutions will probably be different in different countries.

We have shown our vision of the future, and it is a realistic scenario. We know that many companies are already developing the different components in our future eco-system. Now it's up to the healthcare industry to develop a sustainable system that is developed with a premier focus on the patient.

WHY THE CURRENT HEALTHCARE SYSTEM NEEDS TO IMPROVE

There is so much room for improvement in today's healthcare. Many people are frustrated by the slowness of the process we have to go through to even meet with a doctor. There are so many mechanic arrangements that don't really have any value; it can take weeks or even months from the first contact with a healthcare provider to the diagnosis. With the new eco system, everything will be much more effective. The doctor will already be able to have your biometric data analysed when you get there. This way of working will not only make the process more effective, but also create time for the important human meeting. Also, all different caregivers will be integrated into one care-chain, increasing the doctor's overall control of the patient.

> *"It is surprising that things are moving so slow in an industry where there is an urgent need for improvement.*

USING TECHNOLOGY INSTEAD OF STANDING NEXT TO IT

In today's system, there is such a huge discrepancy between the healthcare system and the Internet. Anyone can search for information on the Internet, and even diagnose herself, often incorrectly. Many people do this because of the frustration of the slow healthcare system.

These problems must be solved and the industry must develop in line with the patients. It is surprising that things are moving so slow in an industry where there is an urgent need for improvement.

As a design company, we are sometimes looked upon as only caring about what looks pretty. With this concept, we wanted to show how design can develop life-changing ideas. Now, we just look forward to the ideas turning into reality.

2| Belgian perspectives on how to improve healthcare

In many ways, the health situation in Belgium is simply a reflection of the broader demographic, lifestyle, economic and medical trends in Europe. Belgians have a relatively high life expectancy and enjoy reasonably good healthcare, although like many of its neighbours, it is facing a looming budgeting and staffing crisis as the effects of the ageing population begin to weigh on the system. However, there are some peculiarities to the Belgian system that will require additional attention.

ROI could be better

Belgian healthcare is expensive. Total expenditure on healthcare as a percentage of GDP has consistently increased, from 6,3% in 1980 to 9% in 2000 and 11,1% in 2008.1 This makes Belgium the third biggest spender in the OECD on that measurement. One would hope that would also make us the third healthiest country in the OECD, but that isn't the case. Compared to other OECD countries, health-adjusted life expectancy in Belgium is ranked 15th (Japan is ranked 1st, followed by Sweden and Switzerland). As a recent OECD study suggests, spending more on healthcare does not necessarily translate into a better health status.[2]

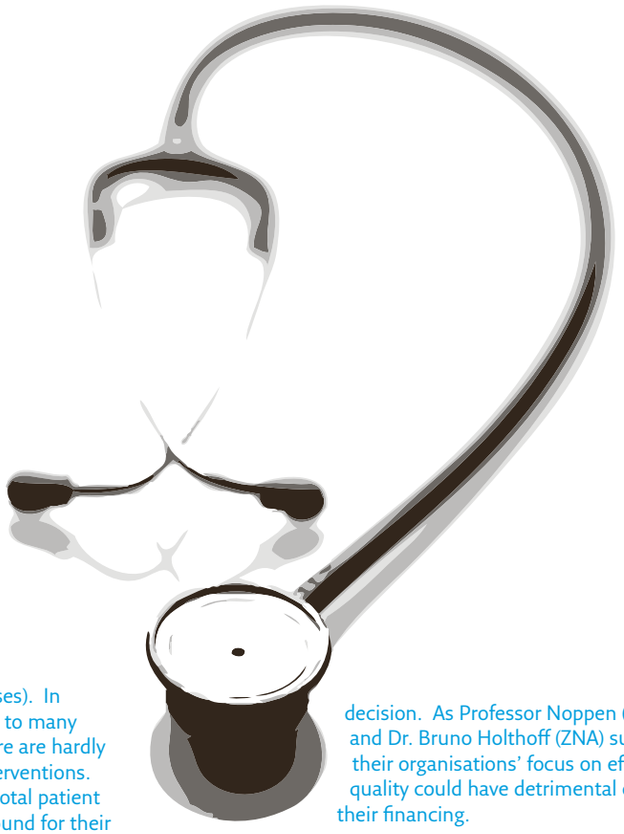
Three challenges

The Belgium healthcare system is faced with at least three major challenges. Firstly, it needs to improve efficiency dramatically - and quickly - if it wishes to avoid a budgeting crisis. Secondly, the system needs to adapt to changes in demand as a result of the ageing population and the associated rise in chronic conditions. Thirdly, the effectiveness of the system, in the broadest sense, covering curative and preventative measures, needs to improve, because it can. As various experts in this edition argue, these issues are interrelated. A more efficient, more integrated and more proactive system will be more effective. The problem is that this requires change and innovation in the way healthcare is organized; that is difficult because the current system lacks incentives for change.

Happy patients but the wrong incentives

Belgians are pretty happy with their healthcare system; in fact, public satisfaction ranks as one of the highest in the world according to statistics that the OECD published[3] in a recent paper. There are several reasons for this. Like other European countries, the Belgian system is well-equipped with good infrastructure and well-trained medical professionals (although there

1 OECD Health Data 2010
2 Joumard, I. et al. (2008), "Health Status Determinants: Lifestyle, Environment, Healthcare Resources and Efficiency", OECD Economics Department Working Papers, No. 627, OECD Publishing.doi: 10.1787/240858500130
3 As above



is an escalating shortage of nurses). In addition - and this is in contrast to many other developed countries - there are hardly any waiting lists for medical interventions. And most importantly, there is total patient freedom. Belgians can shop around for their medical care, although 'shopping' is the wrong word because healthcare is nearly free. In contrast to the British, who can also shop around for private care (if they wish to avoid the NHS) but are then expected to pay private prices, the Belgians are covered by publically funded health insurance. It is a system that has all the advantages of the free market (freedom!) but without the built-in efficiency mechanisms (price). As a result, healthcare providers are incentivized to perform a maximum number of medical services, which in turn means that Belgian doctors tend to work long hours (to cram as many consultations as possible in a day) and that hospitals compete for patients and referrals on the basis of reputation and patient experience (e.g. by minimizing waiting times).

Furthermore, as Professor Marc Noppen argues in his opinion piece, Belgian doctors have been trained as soloists that rely on 'personal engagement, accountability and responsibility.' Not only are doctors not trained to approach clinical medicine in terms of process-driven teamwork, they also have little incentive to do so, because the financing system is based primarily on the volume of direct medical interventions. The implications of all this are that the Belgian healthcare system creates happy patients and happy doctors, but lacks built-in incentives for greater efficiency and effectiveness. Government policy has been trying to push healthcare providers toward greater teamwork, standardization and efficiency but are in effect having to prescribe how things get done (e.g. by defining care paths for specific conditions, by financing the 'multidisciplinary consult', etc.). At base, the system remains one that is focused primarily on the means as opposed to the ends of healthcare. The system rewards medical interventions, primarily on a volume basis, and leaves it up to individual doctors (and patients) to decide whether these interventions are the most efficient and effective. The problem is that the incentive to deliver efficient and effective healthcare is mainly an ethical decision. As Professor Noppen (UZ Brussel) and Dr. Bruno Holthoff (ZNA) suggest, their organisations' focus on efficiency and quality could have detrimental effects on their financing.

A distorted market

Competition in a free market has its strengths. It rewards those who deliver maximum value for least cost, and thus is a tremendous incentive for innovation. Competition is all about the ends (value and costs); the means are fair game for innovation. The Belgian healthcare system enjoys a degree of competition in the sense that patients can choose their doctor and hospital. It is a distorted market, however, because patients have very little information about the effectiveness of healthcare providers (it is purely a reputation game – there is very little publically available outcomes data) and have no incentive to seek out the most efficient care.

Innovation should be the foundation

Several remedies have been suggested to improve the Belgian healthcare system. For one, a more integrated and proactive approach is required. Prevention and curative healthcare policy (currently a split responsibility between the regions and the federal government) needs to be reintegrated. Risk groups such as people with diabetes (or at risk for diabetes) need to be identified earlier on - before they get sick - and systematically followed up by a more coordinated healthcare system. This requires data sharing hence the need to get on with the eHealth program. The treatment and management of increasingly prevalent chronic conditions needs a more coordinated and process-driven approach that is reliant, as far as is possible, on remote care, home care and the patient as co-decision maker and member of the team. All this is important, but probably the most fundamental issue that needs addressing is the encouragement of innovation. This will require changes to the financing system whereby good outcomes and improved efficiency are rewarded. The financing system will also need to allow for easier collaboration among the various actors in the healthcare system and encourage provider groups - consisting, for example of a cluster of hospitals, local clinics, home care services and health insurance companies - to innovate in the way they work together and compete on the basis of (publically available) outcomes data and efficiency. Finally, it will require a lot more relevant data capture, data analysis, and most importantly a lot more transparency in the way that data is used. The Belgian healthcare system requires change, that much is certain; and although there is a fair amount of consensus about what the priorities should be in the short term, in the long term new challenges will emerge that require new remedies. The danger is that policy makers will be tempted (or pressurized) to subject the system to increasing micro-management and thereby destroy the needed flexibility in the system for innovation to happen. In the long term, only innovation will do.

VISION

Ceci n'est pas un hôpital

Marc Noppen, CEO of the University Hospital Brussels, examines the paradoxes in Belgian healthcare

WHAT DO THE SURREALISTIC PAINTER RENÉ MAGRITTE AND THE UNIVERSITY HOSPITAL UZ BRUSSELS HAVE IN COMMON? SURE, THEY BOTH WERE/ARE OF BRUSSELS' ORIGIN. FURTHERMORE, BOTH HAD/HAVE THEIR RESIDENTIAL ADDRESS AT THE BRUSSELS COMMUNE OF JETTE. BUT WHAT FEW PEOPLE KNOW: THEY BOTH WERE/ARE WORKING WITH PARADOXES.

UZ Brussels is one of the seven Belgian University Hospitals, which implies – by law – the triple assignment of care, teaching and research. In order to facilitate the latter two missions, and to make them independent or 'free' from the particularly financed care-function (I'll come back to that), University Hospitals have to meet some specific legal constraints. For instance, (at least 70% of) doctors have to be salaried, and the Hospital has to obey to the officially agreed tariffs of invoicing. In exchange, the Hospital receives an additional budget from the Ministry of Social Affairs, meant to compensate for the loss of income (agreed tariffs, opportunity cost of teaching and research,...) and the surplus of expenditure (employer contributions, social security expenditures, ...) for the hospital. Belgian and international studies have shown that the surplus expenditure needed for a University Hospital to organize and facilitate a comprehensive academic portfolio varies between 15 and 20% of the total annual budget. In Belgium, this surplus budget approximates only 7 to 8 %, implying that the rest of this necessary budget has to be found elsewhere. In Belgium, this means – for the greater part – 'indirect' financing of the academic functions of the university hospital by the 'normal' financing mechanisms of other, non-academic hospitals. That is through the social security funding channel of national insurance honoraries for doctor's intellectual and technical activities. Indeed, Belgium is one of the last countries where the principle of 'fee-for-service' financing still weighs enormously in healthcare

> *"This system has very few built-in incentives for increasing cost-efficiency or increasing quality outcome*

BIO
Marc Noppen, MD, PhD is Chief Executive Officer University Hospital UZ Brussel
Brussels, Belgium

expenditure. And this is a huge paradox to be solved by Hospital Management: how to 'liberate' doctors from their clinical care tasks, and allow them to spend time on teaching and research, whereas at the same time the hospital looses money (because when teaching or researching, they do not generate clinical income) which is insufficiently compensated by surplus academic funding.

Looking at this from a helicopter viewpoint and a more global perspective, things become even trickier and more paradoxical. Global Healthcare Expenditure has followed national GDP-growth rates, and – during the last decades – even at increasing rates (OESO average 4 % marginal increase per annum). Discarding the exceptional and dramatically distorded situation of the USA, most Western countries spend around 9 % of their GDP on Healthcare. Belgium has chosen for a Healthcare system based on an extremely high service level (objectively # 1 in the world – Oeso statistics and Eurobarometer) which of course is highly appreciated by the population (objectively # 2 in the world). However, this is only possible through the heavy built-in financial incentive of fee-for-service financing for doctors (and thus hospitals – even university hospitals!). This choice has two consequences: first, this is a very expensive way of organizing healthcare (free choices of general practicioners, free choices of specialists and hospitals, very high redundancy in technical medical services in order to avoid waiting lists, etc), reaching 10.3 % of GDP and making Belgium the third most 'expensive' country in Europe and the fifth most expensive in the world. Secondly, this system has very few built-in incentives for increasing cost-efficiency or increasing quality outcome. Indeed, Belgian Healthcare performs only moderately well on average (ranking around 15th place in EU-27) despite its very high expenditure.

Facing the global economical crisis and budget constraints on national healthcare expenditure, most countries however are currently issuing plans to control expenditure and at the same time increase clinical outcome. In fact, this should not be too difficult because healthcare as a service industry is notoriously poor in terms of cost-efficiency: up to 45 % of patients do not receive evidence-based healthcare, up to 30 % of all tests, procedures and treatments are redundant, up to 50 % of total expenditure can be questioned in terms of utility and efficacy, and even up to 20 % of patients experience some form of harm after healthcare delivery (which again costs 30 cents per dollar or euro to fix!). This is because most doctors who are today's leaders and medical opinion makers have been trained as soloist domain experts, with a huge degree of 'personal engagement, accountability and responsibility' with regard to patients. Doctors are not trained to 'see' clinical medicine in terms of teamwork, organizations or processes, but rather as a highly individual effort to do the utmost to diagnose and treat the individual patient. Paradoxically, even if it has been abundantly shown that a more process-oriented, 'intelligently standardized' teamwork approach leads to better quality and safety outcomes, ànd is less expensive (and thus dramatically more cost-effective).

Against a background of considerable expenditure 'drivers', such as globalization, increasing chronic diseases and elderly populations, personalized medicine, technical developments etc, it is time to act.

UZ Brussel can by itself not change the Belgian healthcare system, but has chosen a threefold answer.

A THREEFOLD ANSWER

First, on a strategic level, the organization has to be 'redesigned' into a more flexible, dynamic system, where strategic endpoints can be adapted more easily to the rapidly changing environment. This is possible by introducing adaptivity and readiness-to-change at every level. This is communicated through public speeches by the CEO for all, early morning breakfast sessions for all with the CEO, and through numerous carriers (intranet, leaflets, etc), and **everybody** is invited to adapt or change their own fields and activities. On the management level, investments, desinvestments, strategic choices are now questionable and debatable. There are no dogmas or taboos.

Second, on an operational level, major efforts are made to increase cost-efectiveness and quality, even if this goes – at first glance - against the payment system which paradoxically mainly rewards volumes. Every large medical and supportive project is now managed through a hospital-wide, standardized project management system ('NEXUS'). Medical and supportive processes are carefully scrutinized, and redesigned using standard tools such as ISO, lean, balanced scorecards and care pathways. KPI's also have to include quality parameters. Our very performant hospital-built ICT system supports these endeavours. A critical success factor here is communication: convincing doctors that their job, indeed probably the most beautiful and rewarding in the world, is also possible when performed in another, more process-oriented way. It is not a shame to be 'part of a team'. It is good to think and practice in terms of quality outcomes and cost-efficiency. Moreover, patient reward will not decrease, on the contrary! All of this implies a huge and continuous effort. Not only towards doctors, but also – and probably even more – towards patients, hence society. This also means explaining to the public and policy makers that, for instance, making doctors wash their hands after every patient visit, is about a hundred times more cost-effective than – let's say – introducing million dollar surgical robots in every hospital. It means explaining that it is not useful having a total-body scan for 'prevention', but quitting smoking or controlling your diet ìs. And we need to prove to the public that paying huge supplements for having elective surgery done the next day is **not** a guarantee for better outcome.

Third, searching for alternative financing is now no longer taboo. This includes introduction of a professional fundraising system, valorization of innovative developments (patenting, spinnofs, contracting with private business partners, introduction of high-level temporal professoral chairs, and internationalization: for instance, UZ Brussel recently and successfully started a joint-venture fertility clinic in the state of Kuwait).

I know, all of this is not very sexy. But it's a necessary effort. Not only for individual doctors or our hospital, but for society as a whole.

Hence, the need for objective information.

Hence, this article.

We Care

Rudy Mattheus, chairman of the VOKA Health community, offers his view on the challenges facing Belgian healthcare and the potential solutions

VISION

As the European population ages and the prevalence of chronic disease rises, it is becoming increasingly clear that we can't deliver higher-quality, more affordable healthcare without aligning payment incentives and improving coordination across the many providers who care for a given patient.New capabilities and healthcare models are required, which results in challenges and opportunities for our medical community, as well as our patient-clients.

THE IMPACT OF THE AGEING POPULATION

New projections for 2010-2060, published by the European Office for Statistics, state that the number of elderly persons will rapidly increase, with the 80+ population group doubling in size by 2050. From 2015 on, deaths are projected to outnumber births in the EU27 and almost three times as many people will be 80 years or older in 2060. In Belgium (population 10 million) there are more than 1,8 million people older than 65 and 0,5 million people over 80. Eighty percent of people over 65 have a chronic disease and in the 75+ age group 85% has more than three chronic diseases.

These demographics trends will also be accompanied by a rapid growth in the number of persons with physical disabilities - about 21% of the 50+ population has severe vision/hearing/dexterity problems. Diabetes is now talked of as the epidemic of the 21st century, and parallels the worldwide explosion of heart disease.

The ageing of the European population and the associated rise in chronic conditions will lead to a growing number of older people **living alone** and in **need of care**. Simultaneously there will be astonishing but expensive advances in diagnosing and treating diseases, in a very personalized manner.

In light of these trends it is clear that the problem of care and assistance will become increasingly important both from a social and an economic perspective.

HEALTHCARE MODELS NEED TO CHANGE

These trends pose a double challenge to existing healthcare delivery models. Firstly, there is a growing mismatch between traditional services and new needs – health services for example were originally designed to deal with acute rather than chronic disease. Secondly, rising demand for healthcare services is placing tremendous pressure on healthcare budgets. In response, the healthcare model will need to change dramatically. According to the Institute for Healthcare Improvement, "many healthcare systems around the world will become unsustainable by 2015. The only way to avoid this critical situation is to implement radical changes".

NEW ECONOMIC OPPORTUNITIES

The required changes will also create new economic opportunities. There are 85 million consumers in Europe over 65 years old today and this is expected to grow to 150 Million by 2050. Their combined wealth and revenues are estimated to be over €3000 billion. Clearly there is a tremendous opportunity to help empower elderly people to stay active and live independently. There also will be significant opportunities in the use of innovative approaches to improve care and make it more efficient. For example, the telecare market is expected to exceed €5 billion by 2015 in Europe alone.

HEALTHCARE IS ALREADY EXPANDING IN SCOPE

Some significant changes are already in progress. Healthcare – traditionally focused on institutional care and on curing diseases (diagnosis, treatment) – is expanding in scope in at least two ways. The site of care is expanding its boundaries by going outside the hospital and the clinical setting and moving towards the patient's home. And care is enlarging its scope **beyond the patient domains** to also encompass the **support of people** with special needs such as the elderly and the disabled.

> *"We could best describe the healthcare model as an eco system. The intelligence is in the total care-system itself.*

BEYOND THE INSTITUTION

Healthcare is extending its "institutional" role and is becoming **personal, ubiquitous and mobile**. Informal caregivers (patient's family, friends, volunteers) are complementing the tasks of the medical professionals, but they are also under increasing pressure and need more tools. All citizens are becoming users of these new healthcare services and will be **motivated** and **empowered** to manage their own health.

Currently we are witnessing a new wave of change: healthcare is pursuing a prevention objective, by focusing on health conditions through fitness, weight management and a generally healthier lifestyle.

The social behavior and lifestyles, as well as the identity of the individual elder person, will change. Their requirements and consumer behavior will change both in quantitative and qualitative terms. A patient-client will become a **consumer**.

NEW CAPABILITIES REQUIRED: CARE COORDINATION AND OUTCOMES MEASUREMENT

The new care delivery models demand capabilities for care service coordination and an ability to track quality outcomes that were not previously required in healthcare. This should apply to all services, also home-based services. Accreditation of services needs to be approached in a much broader way and should be stakeholder driven.

The financial model needs to be reorganized; financial flows should be reallocated and become more outcome-driven. What matters are healthcare results and comfort levels; not the volume of medical interventions. The government should also investigate and rethink their financing role in building infrastructure where cost calculation should be based on life cycle costing and alternative financing should be explored.

To support the move to team-based models of care, healthcare systems must accommodate the information and workflow requirements of the many stakeholders and organizations involved directly or indirectly in patient care. Social dimensions should also be taken into account. The **coordination** of information between all actors involved is crucial.

In coordinated care the healthcare delivery system provides a continuum of evidence-based, quality driven healthcare services in a cost effective manner. Coordinated care requires a change in care culture, education, infrastructure, and in the relationships between patients, clinical staff, and caregivers. It calls for the creation of "accountable care cultures" that work together in coordinated, **collaborative** ways to drive better disease prevention, personalized treatment and positive outcomes. Technology can support this transformation by delivering vital information and tools that meet clinician and patient needs.

"Healthcare is extending its "institutional" role and is becoming personal, ubiquitous and mobile.

Healthcare will address new user groups other than the traditional patients: the elderly and people with special needs such as persons with disabilities. By taking into account the ageing of the population, this new and additional "**assisting**" role of healthcare will become increasingly important. Ambient Assisted Living refers to intelligent systems of assistance for a better, healthier and safer life in the preferred living environment and covers concepts, products and services that interlink and improve new technologies and the social environment. It aims at enhancing the quality of life (the physical, mental and social well-being) for everyone (with a focus on elderly persons) in all stages of their life.

Quality of Life will have a new, extended meaning where physical, psychological and social aspects are taken into account all together and the "**way the patient perceives his/her overall health status**" will become of paramount importance. Perception will be more dominant in the evaluation and acceptance of the services.

Hospitals – which play a significant role in the health system – should increasingly try to differentiate and complement their offerings. One-day interventions will increase and care hotels will be the place where patient recover and rehabilitate before going home.

We need to design for users; the solutions need to be **user- and demand-driven**.

Care initiatives should:

+ Respect patients' values, preferences and expressed needs
+ Coordinate and integrate care across boundaries of the system
+ Provide the validated information, communication, and education that people need and want
+ Guarantee physical comfort, emotional support, and the involvement of family and friends; the social component.

The user-as-producer transforms the relations between consumers and markets and among citizens themselves. Furthermore, it is opening up the possibility of reconfiguring the production process around the user. In many sectors there is a gradual incorporation of users into the process of production.

All the stakeholders (patients and their families, medical professionals, policy makers, health organisations, industry, institutions, insurance companies, the overall community) need to find a way to cooperate in a common effort to create solutions for a new economy and added value for the patient.

HEALTHCARE IS AN ECOSYSTEM – NOT A FACTORY

The efficiency and effectiveness of healthcare services are certainly becoming a major priority. More integration of information is needed, as well as integration of the logistical processes through the whole value chain and core trajectory. But we need to be careful in comparing healthcare management approaches with those used in industry. While some processes (e.g. some logistical processes) are reasonably universal and hence can be standardized, care processes don't always lend themselves to such standardization. Care processes are very often unpredictable and unplanned. We could best describe the healthcare model as an eco system. The intelligence is in the total care-system itself. There is chemistry to the way care functions; it a complex, adaptive system—and many aspects of care are distinctly artisanal in character. All actors in the healthcare delivery process should take that paradigm into account.

The opportunity for creating new solutions and the needed delivery models should be part of such an ecosystem, where catalyst intelligence binds the demand and delivery elements. Health technology assessment and multi-sector innovative approaches will be needed to bring value added care towards customers and to create new business opportunities. As such, it is in this context that the idea of "we care" gains multiple dimensions—we care for people with our brains, hands and heart.

Unfortunately the implementation of new approaches in healthcare is hampered by various challenges and restraints; they deal with technological issues and lack of standardization but also – and in some case preponderantly – with political, legal, financing and cultural issues.

BIO

A computer scientist by training, Rudy Mattheus has twenty years experience working in the healthcare and ICT sectors. Rudy is currently Chairman of the Voka Health community, General Manager Healthcare at ISS Belgium and sits on the board of several companies active in the healthcare sector, as well as on the board of hospitals and elderly homes. He is member of the Institute of Care Technologies at the Univ. of Antwerp and during his six years as Chair of the European Standardization Institute "Medical informatics, medical imaging and multimedia", he played a pivotal role in developing the world standards for the international medical community know as the DICOM standard.

A region of small innovators

The pharma sector in Flanders

Dirk Reyn believes that small and medium biotech and pharma companies continue to have a bright future.

Movetis is a nice example of a successful Belgian pharmaceutical startup. The idea originated in 2003, when Johnson & Johnson decided to focus on some specific R&D domains and to cease its activities in other domains, including its gastrointestinal (GI) portfolio of drugs. Dirk Reyn had been closely involved with these GI products and he strongly believed in their potential to address an unmet medical need, so he convinced Johnson & Johnson to initiate a separate spin-out business to commercialise treatments targeting gastrointestinal conditions. After one failed attempt to find the right investors, the spin-out Movetis was finally born in November 2006. The Turnhout-based startup managed to attract a Series A financing round of € 61 million, which is still one of the biggest amounts raised in its sector in Europe.

In October 2009, the first product Resolor was approved, a new treatment for chronic constipation in women. With this approval in its hands, Movetis pursued an IPO to collect the necessary funds to build a commercial structure in some selected countries and to fully develop Resolor and its other assets. After the company had some unexpected successes with the introduction of Resolor in Germany and the UK in the beginning of 2010, they increasingly started to attract the attention of some bigger pharma companies.

In August 2010, the Movetis board accepted the bid of the Irish-English biopharmaceutical company Shire, which renamed the site in Turnhout to Shire-Movetis and is making it its center of R&D and commercial excellence in the domain of gastrointestinal drugs.

> “The knowledge sector, especially biotech, is one of the sectors where our region has a long term opportunity to remain really competitive.

TOO BIG TO INNOVATE

While Dirk remains optimistic about the chances of biotech startups, he believes the future is less bright for a large group of big pharmaceutical companies: “Companies like GlaxoSmithKline, Astra Zeneca and Johnson & Johnson will have a hard time to maintain the double digit growth that they have seen in the past and continue to promise to shareholders. These companies are so big that it is impossible to generate absolute growth numbers in excess of 10 % or 2 to 3 billion USD per year. The available number of innovative big successful compounds out of their own R&D efforts is continuing to decrease, but more importantly, the government money to continue to pay for all these so called blockbuster drugs in the market is no longer available, especially now as all around the world we will be facing governmental spending freezes.’

In contrast, Dirk expects a lot of growth from the innovative small and medium biotech and specialty pharma companies. ‘These are the companies that continue to create value from an innovation and shareholders value perspective. For example, our philosophy is to develop products only for diseases that have really no good alternative treatment available and where the medical benefit is clearly identified. Still a lot of money is wasted by governments on patients as they are treated with less effective treatments or where no good treatments are available.’

FISCAL INCENTIVES

As for the Belgian and especially the Flemish region, Dirk is convinced that it offers the right ingredients for a thriving pharmaceutical sector. He recites three key elements for success: scientific knowledge, appropriate business knowledge and money. Flanders has various hubs where these three elements coincide in harmony, and the most well known is the region of Ghent with the Flanders Interuniversity Institute for Biotechnology (VIB), with a cluster of biotech companies like Ablynx, Actogenix, Pronota, Devgen and Cropdesign. It is a combination of the right scientific knowledge in the university, complemented by some dynamic business people and a strong network with the Flemish government and key capital investors. Other hubs that Dirk mentions are Leuven (e.g. Thrombogenics), Limburg (with LRM and the universities of Hasselt and Maastricht) and Mechelen (Galapagos). ‘It’s striking that in other countries, like the Netherlands, France and Scandinavia, people have good ideas but are not able to create that crystallized collaboration between academia, business and money.’

Dirk is happy overall with the support that his sector receives from the Flemish and federal government: ‘The Flemish government has supported our discovery efforts so far with 3 IWT grants and the federal government has granted our sector a favourable tax ruling, which has been important to attract capital and partnerships. In general, for companies with a commercial future, I’m more a proponent of fiscal measures than grants, because the former really give long term oxygen to your growth. The knowledge sector, especially biotech, is one of the sectors where our region has a

long term opportunity to remain really competitive, and I hope the Flemish government realizes that she should maintain the support for this sector, despite the difficult financial situation.'

ADVICE TO STARTERS

Backed by his own experience, Dirk has some advice for startups in the biotech and pharmaceutical sector: 'First of all, not only does your scientific story have to be right, but you should have a solid 10 YR business case from day one. Every potential investor has his own term in which he wants to see his return on investment, and you should fully understand these differences and see if they are aligned with the business plan. There is still a lot capital available in this economic crisis, but investors are very critical, so you have to make a strong case. Secondly, we are in a very capital intensive sector, so if you start a small company, you need to realize that it is almost impossible to find all that money without any intimate partnerships with one or more companies and you have to be prepared to what could happen to your company every time you need to raise money to the next milestone.'

The third piece of advice he gives sounds evident but is often ignored: don't forget that it's all about people. A startup in biotech or pharma is probably a company that needs to deliver and grow quite fast in its first years, and this could result in a lot of stressful moments for the majority of employees if they are not used to it. 'You can only support this growth if you also have a solid HR structure and vision from day one. At Movetis, we invested a lot of time from the beginning in HR structures, benchmarking benefit packages for the employees, a transparent evaluation system, individual and departmental objectives as part of our global company objectives, strong and frequent company communication, and so on. If you don't do pay attention this, I think it will become a challenge to keep your employees motivated when things get tough.'

BIO

Dirk Reyn started his career in 1984 as Sales Manager at Eli Lilly. In 1992 he joined Johnson & Johnson, where he was head of International Strategic Marketing for the Gastrointestinal Franchise and then Vice President New Business Development for Janssen-Cilag. At the end of 2006 he founded Movetis together with Staf Van Reet, Remi Van den Broeck and Jan Schuurkes.

IT is enabling evidence-based medicine

UZ Brussel's clinical workstation streamlines information flows and enables evidence-based medicine

To streamline the massive information and clinical processes in UZ Brussel, the university hospital has developed a Clinical Workstation. Physicians and nurses use this system for almost all their activities, and it gives them a complete picture of the patient's medical history. The Clinical Workstation even integrates clinical decision support systems, which help doctors to practice evidence-based medicine.

Since 2000, UZ Brussel is extensively using an in-house developed Clinical Workstation (CWS) to streamline the massive information and clinical processes in the university hospital. Rudi Van de Velde, CIO of the hospital, explains that this system is able to offer its users (550 physicians and 1400 nurses) a holistic view of their work: "With this clinical workstation, our users have access to all patient and hospital related information within one system using a consistent user interface, which minimises training and optimises the work experience."

Physicians use the CWS for almost all their activities, including order entry, scheduling (radiology, pathology, surgical and other activities), reporting, medication and admission. Physicians also have a complete picture of the patient's medical history at their fingertips: "We seamlessly integrate hospital applications, re-use many software components, and effectively manage change more efficiently. On a daily basis, physicians and nurses access patient records 25,000 times, schedule 4,000 appointments, capture more than 5,000 medical reports and process over 9,500 medical orders. Ninety percent of these interactions are completed in less than one second."

Compared to administrative or industrial environments, planning a workflow in a medical environment is much more complex, as it has a lot of deviations and ramifications to tailor to the clinical picture that is specific for each patient. So when ten years ago Rudi was in search of a holistic solution, there wasn't one available on the Belgian market. "Most hospital systems have traditionally been 'silo-based', expensive to maintain and inflexible. At that time, there were two options on the market: I could buy separate best-of-breed systems and try to connect them, or I could buy a monolithic system that had all the bells and whistles but was difficult to adapt to the specifics of our situation. Both options were unsatisfactory and it was clear that a new state-of-the-art system was needed, so I chose a third option against the trend: build a system in-house, not based on a client-server model but on a component-based paradigm, a multi-tier architecture providing a clean separation between business (medical) and presentation logic."

EVIDENCE-BASED MEDICINE

One of the basic components of the clinical workstation is the patient management system used to issue and manage each patient's identification and location data. Another component of this workstation suite manages the patient activities, which includes all types of orders and prescriptions. This component is the basis for Computerized Physician Order Entry (CPOE). The most important long-term benefit of CPOE results from the integration of clinical decision support systems into the order-entry process, twinned with a hospital-wide resource scheduling system and

with the result reporting in the EMR (Electronic Medical Record), so that orders can be tracked within the patient's EMR. Rudi explains: "The impact of clinical evidence on routine clinical practice using clinical protocols represents a major technical challenge and thus a promising opportunity in the field of medical informatics. At this moment, we extensively use protocols in the radiotherapy department of our hospital, integrated with the CPOE and scheduling system. We

> *Each year, the medical data available to the hospital explodes exponentially in size.*

are planning to roll out the system to other departments as well, as it helps us tremendously with keeping pace with the 9,500 daily requests."

One of the main distinguishing features of the clinical workstation is just the broad application of CPOE integrated with a sophisticated appointment planning and activity scheduling system. This protocol feature corresponds to a 'care program' scheduling facility to execute and manage the planning of an ordered sequence of clinical activities that make up such a program. It takes into account the set of temporal and physical constraints between the activities defined in the program and merges those with the agenda preferences of the patient. Incremental versions of this system have been operational at UZ Brussel for more than 10 years now.

Rudi explains the importance of this development: "The radiotherapy and oncology departments manage the complexity of cancer treatments using 300 different care programs. The goal of this development is to extend this powerful automated care program scheduling with an ICT infrastructure supporting clinical pathways (CP). The medical literature describes a lot of 'best practices' which can be incorporated in the form of a clinical pathway, which is an outline of all care that has to be done, by whom and in which timeframe. Ten years ago, we have codified these best practices in the domain of radiotherapy. When a patient is in search of a radiotherapy treatment, this system

BIO

+ UZ Brussel is the university hospital of the Free University Brussels. With over 750 beds and a staff of more than 3,200 people, it is now one of the largest hospitals in Belgium. The hospital admits more than 32,000 inpatients a year, receives over 300,000 visits in the outpatient clinic, and 155,000 in the emergency department.
+ www.uzbrussel.be

schedules a number of activities at their earliest times, taking into account the medical conditions, the availability of the patient and other specifics. Within a minute, it prints the appointments for all examinations on paper, so the patient has an overview of his own program."

MEDICAL DATA EXPLOSION

Another fundamental component of the CWS is the medical record, a deletion-less central repository that contains multimedia medical patient data (still images, video, alphanumerical data, ...) and incorporates all medical images collated from the various departments, including digitized scans, biopsies and ultrasounds. Currently, UZ Brussels sits on a data heap of 1.5 petabytes, with a yearly increase of 150 terabytes of data.
Each year, the medical data available to the hospital explodes exponentially in size. Ten years ago, a three-dimensional image of a CT scan consisted of 100 slices, 50 megabytes in total. Now an image already can be composed of 2400 slices, 20 gigabytes in total. "Currently we are evolving to dynamical three-dimensional images, and then we have 1024 times 1024 times 1024 so-called voxels, or each time 1 terabytes of data in total. If we want to present this amount of medical data to a doctor, we need intelligent systems that can filter data based on clinical relevance within the actual care context."
To face the problem of intelligence buried in medical reports, UZ Brussel has developed a terminology server with already more than 40,000 medical concepts that bring structure in the data. To put this in perspective: a typical accounting application needs around 100 concepts. This structured data can be used by medical decision support systems: "At the time of prescription, the system highlights if a drug interferes with another drug. Or it can show whether the proposed treatment is compatible with the patient's sex, age or condition. Or it can point out whether staff or equipment is available to perform this activity. Of course, the presentation of structured data should be adapted to the practitioner: a psychiatrist doesn't need as much structure as a cardiologist. The complexity of our CWS makes it an ongoing, living software project with its own clinical ecology."

Urgent need for innovation

Jan Van Emelen appeals for innovation to tackle our healthcare challenges

Jan Van Emelen has worked as a doctor in the tropics, he was the healthcare advisor in the Belgian Prime Minister's cabinet and he's currently innovation director at one of the country's main health insurance funds. As such, Van Emelen is well placed to say a thing or two about the Belgian healthcare system. In this interview, Van Emelen doesn't mince his words. As a system we're not tackling the core challenges and we're inherently resistant to innovation. Nevertheless, a new consortium of healthcare stakeholders is taking action.

ROOTS IN THE TROPICS

I'm a physician by training. After doing research at the Antwerp Institute for Tropical Medicine I spent 13 years working in tropical countries. Those were fantastic years and I do miss them. When I returned to Belgium I started work in the field of occupational health. From there I landed up

in the Cabinet of Premier Guy Verhofstadt—again a very stimulating time. Since 2003 I'm Director of Innovation and Research at the Independent Sickness Funds. As you can see, I've got a pretty diverse background: from fighting AIDS in Africa to occupational health and politics in Belgium—all of which have informed my view on the state of healthcare today.

A SOBER ANALYSIS

The independent sickness fund is the third largest in Belgium. What's unique about us is that we're politically independent. We only do insurance. We have no vested interests in hospitals or pharmacy chains. Our goal is quite simply to strive for an optimal healthcare system that keeps our members healthy. And that's the problem—we're running behind in Belgium. In our research with the Itinera Institute, for example, we've had to conclude that this country is not tackling the challenge of the ageing population. We have several interrelated challenges in healthcare today. The demographic profile of the population is changing which means that we are going to see a lot more demand for healthcare in the coming years, especially for chronic illnesses such as cancer, diabetes, depression, Alzheimer's, etc. This will place increasing pressure on healthcare budgets. And simultaneously we're experiencing an increasing shortage of people—especially nurses—to perform the actual healthcare.

INNOVATION REQUIRED

There is urgent need for innovation in the way we organize healthcare in this country but we're not doing anything, and that is mainly because we don't have all the stakeholders in the system onboard. If you want to accomplish anything in terms of innovation then it is critical that you have everyone—the doctors, the sickness funds, the government—involved. The ideas exist but they need executing.

In Israel they introduced the electronic health record in 1988! In Belgium we're still talking about it. In the 1990s they introduced electronic prescriptions. In 2010 we have a pilot project on the go. Countries like Israel are innovating at a tremendous pace. Unfortunately in Belgium we have a system that slows everything down. Due to the lengthy decision-making procedures involving numerous committees it takes at least five years before a new technology can be put to use in our hospitals. And at any stage of such decisions, a single stakeholder can stall the entire process. For example, hospital based kidney dialysis could be replaced in part by home dialysis machines. It is used in Africa and it could work in Belgium too in the right context. Here's a way to reduce healthcare costs but politically it is impossible to push through. The problem is that we have too many large hospitals, too many kidney dialysis centers. Our system has overcapacity in highly specialized care but we're not willing to experiment with alternative home-based treatments. It is political suicide to touch the hospitals. Another example: thrombosis patients need weekly controls of their blood. In the Netherlands there are 80,000 such patients and 50,000 are in a system where they do the controls themselves at home via a simple device. In Belgium that procedure isn't refunded. Why?!

OPPORTUNITIES

I'm painting a negative picture I realize, but there are opportunities for moving forward. The main opportunities for more effective and efficient treatment of chronic illness lie in telemedicine and in nanotechnology. In the pharmaceutical industry also amazing work is being done—in Belgium by the likes of Paul Stoffels and his work on AIDS. Basically these are techniques that allow for much more personalized care that is based on understanding the individual illness characteristics and sensitivity to specific drugs. Already we're seeing that cancer patients who are treated in smaller hospitals have poorer survival rates than patients treated at larger hospitals and that's because these larger institutes are far more specialized. The problem is that the financing system doesn't follow these innovations. In Belgium everybody with a common disease gets refunded equally but that doesn't fit with today's science anymore. We know that some patients are not helped by chemo while others are; but the financing system lumps them all together. A changing medical paradigm needs to be supported by a chancing financial paradigm, but that isn't happening yet.

In the Post-War period there was a tremendous boom in the building of regional hospitals for short-term acute care. Today we have a totally different context that is marked by a much higher prevalence of chronic illnesses. Today we need multidisciplinary care and a lot more cooperation among the various stakeholders in the system. Patients too need to be empowered and we need to make a lot more use of home-based care.

FOUR PRIORITIES

To address these challenges we've built a consortium involving four technology companies, two health insurance funds (the independent and the neutral health insurance funds) and two major care provider associations (the pharmacists and the doctors). It is a new initiative and strikingly, it is a private initiative. Our goal is to create structures and procedures for enabling innovation. At present we're looking at four areas:

The enrollment of patients with a chronic condition can be done much more systematically. At present we're only reacting when people get really ill—that's when the system kicks into gear. We should be identifying people on the basis of risk factors. Also, we need to capture the masses of data that is currently being generated and use that to proactively assess people at risk. At present all the data is used simply for administrative purposes or to create retroactive reports.

Patient empowerment is an urgent priority, at different levels. There is tremendous opportunity to involve patients with chronic conditions in their treatment, especially via educational and coaching tools. For example, with the right coaching it is possible for early stage diabetes patients to delay medication for years. Our communication at present is totally inadequate. We make beautiful brochures but who reads those? We're preaching to the converted. Those who read the brochures already have information. But a large analphabetic group we're not reaching at all.

Communication between healthcare providers is a catastrophe. The electronic medical records are simple translations of the paper records and they're not designed to be used by care providers. Doctors are being paid to have electronic records, not to use them. A recent survey showed that only 4% of doctors in Brussels use an electronic record system appropriately. The useful data in those systems just isn't getting through—and it isn't the doctors' fault. The software is designed wrong; it offers no intelligence for doctors. And yet, the technology is available to support doctors in their clinical decision making, systems that are based on evidence-based medicine.

Finally, we need to improve assessment, the measurement of quality and outcomes. Patient satisfaction is particularly high in Belgium, but that is mainly because we have a system where patients are free to choose their provider. We can shop around. But that says nothing about the quality of care.

OPTIMISTIC ABOUT CHANGE

These are our priorities at present. We have a consensus among a broad group of stakeholders, including the Flemish government. At a Flemish level we have made headway with preventative strategies. People are smoking less and exercising more. But there is potential for so much more. We need to expand our scope beyond disease management to risk management. That's a much more proactive approach to healthcare. Our life expectancy is 83 years, but our healthy life expectancy is only 73 years; that's quite a gap to fill. I'm reasonably optimistic. Solutions do exist. What's lacking is leadership.

BIO

Jan Van Emelen is Innovation Director at the Independent Health Insurance Funds (Union Nationale des Mutualités Libres - Landsbond van de Onafhankelijke Ziekenfondsen)

Healthy employees in a healthy company

Mensura has made health and safety in the workplace its core business and specialist area, but as General Director Roland Vanden Eede argues, the company could do so much more if the regulatory environment was more focused on real health objectives

The safety and health of employees have a direct impact on the results of a company. However, the current legislation and social security system in Belgium do not offer the right incentives for companies to improve their employees' health. Roland Vanden Eede of Mensura sees solutions in goal commitments and flexible job regulations.

A company's results depend directly on the health and vitality of its employees. Mensura helps companies with advice and solutions concerning insurance, prevention, absenteeism, safety audits, and so on. Roland Vanden Eede, general director of Mensura External Department for Prevention and Protection at work, explains the number one reason to work with Mensura: "To do their job efficiently, entrepreneurs need to focus on their core business. We assist them by handling the legal obligations a company is required to comply with respect to safety and health. These tasks are the oil in the wheelwork of entrepreneurship. Look at it this way: employees are the most expensive machines in a company. So if you sign maintenance contracts for your machines, you might do the same for your personnel, because the happiness and health of each employee has a direct impact on your company."

TOWARDS THE RIGHT INCENTIVES

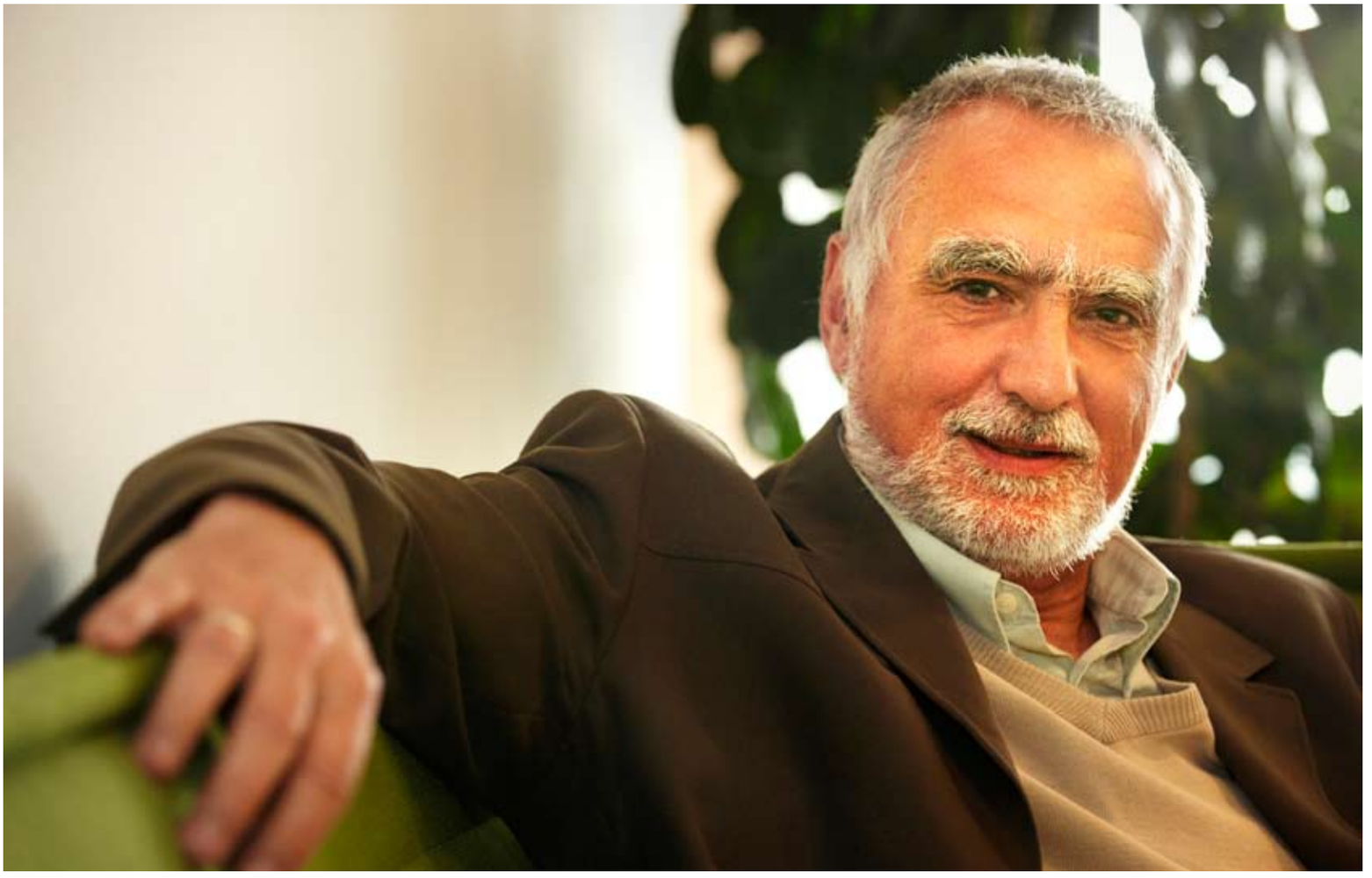
Unfortunately, the work climate in Belgium is not ideal because of the complex and counteracting legislation and bureaucracy. Vanden Eede points to the Belgian state structure: "A big problem in Belgium is that all things that have to do with the curative aspects of illness are handled at the federal level, decided by the social partners, managed by a state agency and paid for by the employer fees. At the same time, all preventive aspects are regional material. This means that an employer who invests in prevention doesn't get any return on this because he is compelled to pay a proportion of the wages for the curative part anyway, so there's no incentive whatsoever to invest in prevention." Contrast this to work accidents: this is a privatized matter, so an employer can negotiate with his insurance company and reduce its premiums if he puts some safety measures in place, which is a direct financial incentive to prevent work accidents.

ANOTHER ISSUE IN BELGIUM IS THAT THE SOCIAL PARTNERS DON'T FOCUS ON THE GOALS BUT ON THE MEANS.

Vanden Eede looks at Denmark for inspiration about the right way to manage incentives: the social partners have agreed there that in five years they want to achieve some specific goals, e.g. in the context of noise prevention. How that is achieved exactly is left to the employers, but the important thing is that all social partners support these goals. "In Belgium, the social partners always focus on the means, by agreeing on lots of healthcare actions, but that doesn't work: these actions are not our goals, our goal is to have healthy employees. To be effective, we need a goal commitment, not a means commitment."

> *Employees are the most expensive machines in a company.*

Vanden Eede is happy that the Flemish government tries to do something on that level: they set specific health goals, e.g. for vaccination grades, suicide prevention, healthy food, physical exercise, and so on. Those are all clear policy goals that Mensura can work with. But even in Flanders this doesn't happen in a structural way: "If you really want to achieve these health goals efficiently, you need another model for financing. Right now, the financing of social security happens based on the number of employees, while it really should be based on the achieved objectives. This would add another incentive to reach those



goals. Generally, I find it sad to see that companies who want to do this right are blocked in our country by the wrong incentives and sometimes even by law."

FLEXIBILITY

The World Health Organization and the European Union's directives about safety and health of workers have a really broad context, but the conditions on the terrain are entirely different, Vanden Eede says: "The job market is changing constantly and entrepreneurs need to adapt quickly and flexibly to these changes. For instance, ten years ago job mobility and job flexibility weren't issues; today they are. The problem is that in Belgium the health legislation and social security system are still based on the obsolete idea of an economy with big industrial enterprises, but the discussions that dominate the automotive and steel industries are not relevant anymore for most companies in our country. Luckily the employers' organisations Voka and UNIZO are now coming out with clear demands in this respect, while VBO, which is traditionally more linked to the industrial sectors, still has a long way to go."

To cope with the current challenges of the job market, Vanden Eede thinks that we should focus more on the real needs of people: "Today's challenges create huge stress for people, so let's focus on these issues. For example, dual earners with children need flexible work hours and home working. And many people who work nights are asking to extend their Thursday evening shift to Friday morning so that their weekend can start earlier, but the law doesn't allow this. Mensura is also limited by the law: we have so much expertise in-house, e.g. with business units focused on absenteeism, health, safety, and so on, and we have a multidisciplinary approach. We'd love to link the preventative and curative aspects, because there's so much synergy, but a lot of this is legally forbidden. To sum up, I believe that flexibility should be supported by the law instead of being outlawed."

BIO

+ Good results depend largely on healthy and energetic employees. Companies rely on Mensura to provide the expertise they need in prevention, safety and health. With advice and solutions ranging from their strict legal obligations to so much more.

+ www.mensura.be

Give us the freedom to innovate

Bruno Holthof, ex-McKinsey consultant and currently CEO of ZNA, Belgium's largest hospital network, talks about the future of the Belgian healthcare system and the obstacles to overcome.

Bruno Holthof is well-placed to have an opinion about the future of the Belgian healthcare. A medical doctor by training, Dr Holthof spent 15 years at consulting firm McKinsey&Company giving strategic advice to hospitals and pharmaceutical companies around the world. Since 2004 he is back in Belgium running the country's largest hospital network. Comprising 3 general hospitals and 6 specialized hospitals, ZNA is also a top ten European healthcare provider. In this interview, Bruno offers his vision on the future of healthcare from a Belgian perspective.

CHANGING DEMOGRAPHICS AND DISEASE PATTERNS

Let's start by talking about the coming changes in the demand for healthcare, because that will have a dramatic impact on the way we need to organize our healthcare system. The main trend in this regard is the changing demography and the associated changes in disease patterns. We keep talking about the 'graying' of the population but in fact today we're experiencing the 'whitening' of the population. What I mean is that we see a tremendous growth in the age categories 75+ and 85+. These people tend to have multiple organ malfunctioning. This means that we'll need to treat these patients using a multidisciplinary approach and expand our geriatrics divisions. Furthermore, we will see a significant increase in dementia and hence we will need to increase our capacity for managing this condition, not only in institutional settings but also via home care and day care centers. All this is going to happen—we can predict this with confidence—and Antwerp will be hit fastest in Flanders.

Another key trend is the increasing birth rate, especially among immigrant families. This has implications for our pediatrics and maternity divisions. We also expect a further reduction in the maternity stay—from 4-5 days to 2- 3 days. Once we get to 3 days we'll need to organize the entire process differently, probably by shifting to a single room model as opposed to moving the patient from a delivery room to a residential room.

ORGANIZING AROUND THE NEEDS OF THE PATIENT

The advances in technology and medicine are making it possible to reduce stays for a whole range of conditions. Hence the hotel capacity of hospitals will need to be reduced and day care expanded. Such evolutions require a constant change in infrastructure, technology and organization. Children for example, are increasingly treated in day clinics. To better organize ourselves around the needs of the child we have been expanding our pediatric day clinic. The basic idea is to make sure that the flow through the day clinic is child friendly all the way and happens as smoothly and quickly as possible. At our hospital we've organized it as an adventurous journey from Green land to Sun land. The journey starts in Green land, a play area, where the child and the parents are welcomed and registered. The first diagnostic tests are done there. Then they move one to the next 'country' where they get their

operating clothes and place their baggage in a locker. Afterwards it continues on foot or in a bed to the operating theatre. At the end of the journey the child arrives in Sun land where it is rewarded with an ice cream. At every stage we're using playful methods to explain what is going on and the child can make choices too at several points in the process. It is a nice example of care being organized around the needs of the child and the parents.

> "The future of healthcare will be more technological, more dispersed and more collaborative across the different lines of care

Patients certainly are becoming more vocal and we need to adapt to this evolution. Also with regard to dementia for example, we are developing clear charters to make sure that we treat patients and their families with respect. It is important that we do not only focus on the medical side but also on, for example patient's hair care and manicure because people with dementia tend to lose the ability to take care of themselves. It all has to do with respect.

CUSTOMIZED CARE

Customizing treatment to an individual's needs and characteristics will also become increasingly important. Medicine has become much more complex and specialized; and it is constantly evolving and becoming more technology-intensive. In oncology, for example, we know that the effectiveness of certain types of chemotherapy is related to an individual patient's genetic profile. As a result, therapy needs to be customized to the needs of the individual. Also in radiation therapy it is possible to do much more targeted and precise work, using sophisticated—and very expensive—equipment. In the coming years this trend toward more personalized care will only continue, not only on the basis of medical indicators but also on the basis of patient choice. It is true that many patients are becoming more vocal but in many cases they really have to be. For an increasing number of conditions—for example, prostate cancer, hip replacements, obesity, etc—there are several ways to treat it, hence it is essential that the patient is involved in the decision making.

QUALITY AND THE MEASUREMENT OF OUTCOMES

The measurement of healthcare outcomes is becoming hugely important. At ZNA we're making investments with the specific intent to start measuring outcome indicators. In 2011 we begin systematically measuring outcomes. Obviously you need to be very careful in the way you do this, especially in the way you correct for risk profiles. For example, an excellent maternity department could score really poorly if you just compared perinatal mortality rates in absolute terms. That's because a reputable department will likely attract the most difficult cases.

INFORMATION TECHNOLOGY IS ENABLING A MORE DECENTRALIZED BUT CONNECTED HEALTHCARE SYSTEM

Our ambition is to become a paperless hospital. We're far from there, but we are investing with that intent. We will be setup with different form factors: mobile laptops, tablet PCs, smart phones, screens in rooms and operating theatres, etc. All our hospitals are already linked with a fiber network in preparation for the coming boom in data traffic. I expect a tremendous evolution in technology in the coming years. Imaging, for example, is becoming amazingly complex and this will certainly create a huge load on our network. For example, we recently streamed a live heart operation to a cardiology conference in Boston. These technologies enable much closer cooperation among different stakeholders and lines of care. For example, the multidisciplinary consult in oncology today requires people to come together physically. We're currently exploring an advanced communication platform that will allow the caregivers to come together via video conferencing while they have access to all data and images from a common interface.

The key implication of all this technology is that we'll need fewer large hospitals. In Flanders there was a trend to build large hospitals of 1000+ beds in a single location. In the future that won't be necessary anymore. A degree of concentration is obviously still necessary to manage expensive medical equipment—patients need to come to the specialized infrastructure. But at the level of expertise you don't need that concentration anymore. In the coming years a specialist will be able to deploy his or her expertise much more widely, even beyond borders. This is why I'm a proponent of smaller hospitals that are designed around the needs of the patients. Patients prefer smaller hospitals too. The future of healthcare will be more technological, more dispersed and more collaborative across the different lines of care. Our investment program is based on that vision.

AN OBSOLETE FINANCING SYSTEM IS AN OBSTACLE TO INNOVATION

Innovation is critically important if we are to keep improving the quality and outcomes of healthcare—and keeping it affordable. The main obstacle to innovation, however, is our financing system. Our financing system is based on the retrospective payment of medical interventions and the duration of hospital stays. To illustrate, today in 2011 we still don't know how much we will be paid for a hip replacement performed in 2006. Not only does that make financial planning very difficult but this type of system also often is a disincentive for investing in new technology and methods. Take obesity as an example. We know that we can't just focus on surgery; equally important are psychological support and dieting to help patients reduce weight. But we don't get financed for all that extra care. This is absurd. The financing should be linked to weight reduction outcomes; not just surgical intervention. As a hospital we should be funded on the basis of results, which would be a tremendous incentive to innovate, to invest in new technologies and methods.

Unfortunately there is lethargy in the system. You will always have stakeholders who resist change. That's why I suspect that change will also have to come from patients. Patients are beginning to organize themselves via social networks – that's a good thing. For example, we are seeing patients beginning to put political pressure on the way palliative care is funded. At present the government will only refund residential palliative care which has led to the closing of several day-care palliative initiatives – the only ones that survive are run by volunteers. But lobbying by patient groups should make an impact.

BIO
Dr. Bruno Holthof is CEO of ZNA, Belgium's largest hospital network. Dr. Holthof has a medical degree and PhD from the Catholic University of Leuven and an MBA from Harvard University. He spent 15 years with McKinsey & Company and is CEO of ZNA since 2004. Dr. Holthof is also a board member of Barco, a leading Belgian technology company.

Choosing to be Difficult

e-trinity, a leading healthcare system integrator, relies on a unique methodology to drive change in the healthcare sector

e-trinity is purposefully changing the way healthcare is doing business. Its founder is attracted to the healthcare field because of its inherent difficulty on one hand and the potential and vital efficiency improvement of healthcare delivery on the other hand. This magnetic appeal of detecting improvement and defining solutions keeps Jeroen Van Maercke and his company e-trinity on the forefront of the healthcare evolution. Jeroen weighs in on why he's drawn to this particular challenge and his hopes for the industry.

FACING THE FUTURE

Healthcare isn't sustainable. It is a failed state about to collapse. Healthcare delivery organizations are facing a huge challenge. They face a rapidly increasing demand due to the aging demographic. Meanwhile, both the evolution of healthcare and treatment possibilities are progressing vastly. Since the emergence of social networks and healthcare communities, the patient has been claiming a more active role in his healthcare and wellbeing. This in turn places pressure on the various healthcare organizations to redefine their mission and position in society. Last but not least, the increased financial stress on healthcare budgets forces healthcare organizations to optimize their processes and collaborate with others to limit and/or share their investments.

GAINING THE NECESSARY PERSPECTIVES

I've always worked in healthcare, starting over 10 years ago with Quadrat in 1997. Industry has only one motivation – margin for profit – with a single leader responsible. It was here I climbed the corporate ladder until I worked on the global introduction and training of a software program. The years of traveling took its toll and in 2003 I opted for a job with the University Hospital Antwerp.

Instead of working **for** hospitals, I was **in** one. I soon learned that a healthcare organization is different from an industry organization. There is not a single leader in a hospital that can make decisions and be held solely responsible for them. Revenue in hospitals is generated by (often-independent) doctors utilizing and paying for the hospitals facilities. In many cases, the lack of clear responsibility resulted in conflicts of interest, power struggles on simple matters, and delayed business decisions. It was a frustrating experience that so few decisions were made and a limited amount could be accomplished.

After one year I quit and started e-trinity, a company with the clear mission to improve healthcare organizations and optimize the use of IT in healthcare. I knew from the start that healthcare would be a difficult industry to succeed in, but was convinced that e-trinity could make a difference in achieving an efficiently organized healthcare environment. e-trinity would claim the role of an independent service provider successfully bridging the gap between the business and suppliers of software solutions.

> *"We get all the actors on the same page, help them make a decision together and then finally assist in implementing that decision.*

START BEFORE THE BEGINNING, FINISH AFTER THE ENDING; A CHANGE IN MINDSET

IT is a potentially fantastic enabler for efficiency improvement and organizational change. During my career I watched hospitals choose IT as if it was a new piece of equipment with a choice for options. The real success of IT related projects, for every project, is the support of the

actors involved: management, business, IT, but foremost the users. IT is just an enabler; the people using IT need to be motivated towards change and improvement. We assist hospitals in this phase, challenging them on defining the business objectives, the content of the tender and most importantly, creating the drive and motivation of the actors before the choice is made and the project is implemented. We intervene before the hospital makes the decision. We see hospitals that use this approach have a much higher success rate in accomplishing their projects.

GARNERING SUPPORT, HORIZONTALLY AND VERTICALLY

The key is putting the business in the driver seat, as opposed to IT. IT is in support of the business, it shouldn't lead it. e-trinity understands both business and IT, so we help the business take control and support them in figuring out how IT can support and optimize their daily workflow. We guide the change in the organization. We get all the actors on the same page, help them make a decision together and then finally assist in implementing that decision. Some of the ways we do this is by keeping people informed and creating support from top to bottom and vice versa. When everyone feels like they are part of the decision, it can go a long way towards getting support for the idea. To e-trinity, success arrives from guiding the change before, during and after, from the top of the organizational structure to the very bottom.

LEAD BY EXAMPLE

What we offer isn't a product but a service – applying our business and IT knowledge to healthcare. We're able to help our customers because our organizational structure embodies the very support we aim to provide. In most traditional companies, project managers are grouped together, software developers are in another unit and the consultants can be found in a third separate group.

We consolidate knowledge and foster creativity by organizing our team around specific business topics. Instead of business units, we have competence centers with various profiles working together. We employ IT engineers with a passion for healthcare, healthcare consultants with a deep understanding of IT and project managers with strong interest in healthcare and IT. We currently have competence centers in the areas of Medical Imaging, Care (Enterprise Electronic Patient Record), Business Consulting, Laboratory, Support, and ECM (Enterprise Content Management). These centers facilitate learning around clearly focused topics.

This platform allows us to be extreme flexible. Anyone within the company is able and encouraged to share ideas, with the best concepts - no matter who or how generated - coming to fruition. Plus, we create new competence centers when the need arises, or evolve without one when the need disappears. It's a very organic and natural process.

Another advantage is that in a service company, it can be difficult to give people responsibility, which creates a lack of middle management and a high employee turnover rate due to no foreseeable career growth. With our structure, we stimulate entrepreneurship. Each of our competence centers has a leader, and is managed and judged on its own profit and loss, providing a clear opportunity for increased responsibility and rewards based upon success. Everyone is motivated to do better, find the best solutions, communicate often, and so on. By having a tiered structure, we have increased employee retention and satisfaction.

AN IDEAL FUTURE, A WORTHY ASPIRATION

Patients will take back control and become owners of their healthcare and independent healthcare providers will become an essential ingredient in future healthcare. Healthcare organizations will focus more on the patient, providing proactive communication, quality healthcare and patient satisfaction. If we have any say in the matter, these goals will be met.

BIO

+ e-trinity is a Healthcare System Integrator offering a complete set of services and solutions with a single focus on healthcare. e-trinity consists of a team of 35 enthusiastic consultants. The head office is located in Sint-Niklaas (Belgium); our customers are located all over the world.

+ www.etrinity.eu

Hospitals are becoming more cost-efficient

Towards more collaboration between hospitals

Hugo Casteleyn, general manager of AZ Sint Blasius and strategic coordinator of the Flemish Hospital Network K.U.Leuven, believes in process analysis to optimise the complex processes in a hospital.

Hugo Casteleyn combines his job as general manager of the general hospital AZ Sint Blasius in Dendermonde with a part-time job as strategic coordinator of the Flemish Hospital Network K.U.Leuven - and he is vice president of the VOKA department in East Flanders. This gives him a unique view on the processes in hospitals and medical institutions, especially on the current evolution towards more cost-effective and more collaborative hospitals.

The hospital AZ Sint Blasius in Dendermonde is a nice example of the evolution of the hospital landscape in the last decades, Hugo explains: "Once we had five hospitals in the city, but in the period from 1994 to 1997 they merged. This is part of a broader evolution: in a period of 10 to 15 years, the number of general hospitals in Flanders decreased from 150 to 50 because of mergers. But after more than ten years, even this consolidation doesn't seem to be sufficient."

According to Hugo, one of the reasons for this consolidation trend is the progressive specialisation in the field. For example, a few decades ago we had just surgeons and internists as job descriptions, while we now have surgeons and internist for various specialisations. This 'subspecialisation' is an ongoing trend, and as a result doctors need a high enough volume of patients to be able to do their job well enough. "To give an example: it wouldn't make sense for our hospital in Dendermonde to aim at a top heart surgery department, because we already have top heart surgeons in Aalst, only 12 kilometers away."

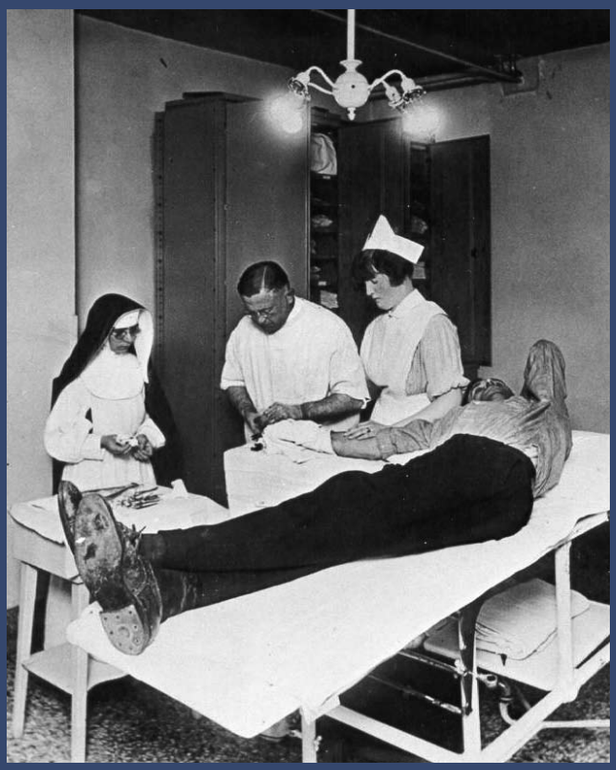
> "A lot of hospitals could benefit if they would share their process analyses with other hospitals.

But there's also an economic reason for this trend: the hospitals feel pressure from the community and the government to manage their money more efficiently. "It's not really that they explicitly ask us to do this, but we notice that hospitals are getting less money: their budget has been shrinking in the last eight years. We don't have to be sulky about this; I actually believe this is a good thing, as long as hospitals get the freedom to choose how they achieve this efficiency boost. Mergers are one way to do this."

A BIG CHALLENGE

So we will see more and more mergers of hospitals, as well as all kinds of collaboration between hospitals. An example of the latter is the Flemish Hospital Network K.U.Leuven, which consists of 19 hospitals in Flanders. Of course collaboration is always a big organisational challenge. First of all, you have to decide which departments and services you merge and which ones the hospitals keep doing on their own. Cost efficiency and the economics of scale play a role in this decision, but some services just have to be near the patients because of medical reasons. Even transport costs, how fast you need a result and how long medical samples last are factors that you have to take into account.

"Personally I think that hospitals can share a lot of services that they now do themselves. Why does each hospital have a purchasing



department, an IT department and a cleaning service? These are not part of the 'core business' of a hospital, it's duplicated work and we should wonder if these supporting services couldn't be made more efficient in a centralised model," Hugo says.

And when you have finally decided what to merge and what to keep at each hospital, the next hurdle is communication. Hugo explains: "You need common protocols, the same quality systems, you need to be able to share medical records, and so on. If doctors in different hospitals use the same computer systems or protocols, it allows them to exchange knowledge in a simple way. This is beneficial to the patients, as the doctors can then easily consult each other, ask for advice, and get a second opinion. But to streamline this, the computer systems of regional hospitals should become qualitatively better." Thanks to the Flemish Hospital Network K.U.Leuven, the clinical workstation of the hospital in Leuven is now also used in the hospitals of Diest, Brugge, Aalst, Ronse, Kortrijk and Dendermonde.

MORE THAN TECHNOLOGY

But Hugo warns that the challenge is not just technological: "Installing the same computer system and communicating by the same protocols isn't enough. You really have to share the medical praxis. We continuously bring doctors of the same discipline from different hospitals in contact with each other. Of course technology can play a supporting role in this. For instance, each doctor of the Flemish Hospital Network K.U.Leuven has access to a videoconferencing network, which we also use for our doctors in training: they are simultaneously in different campuses while their professor is at another campus showing a case.

Hugo is also a big proponent of process analysis: "Too many tasks in hospitals are managed off-the-cuff instead of by doing a thorough process analysis. The processes in a hospital are really much more complex than for example in an automotive or textile factory. At AZ Sint Blasius we have a business process management (BPM) department, which is looking at a couple of high-priority processes and trying to optimise them. Of course we share our experiences with other hospitals from the Flemish Hospital Network K.U.Leuven when we meet monthly, but this is still rather ad hoc. I think a lot of hospitals could benefit if they would share their process analyses with other hospitals, as we are all coping with the same processes."

The BPM department at AZ Sint Blasius already had quite some good results. For example, it unraveled the process behind the radiology department: a patient enters the hospital, gets a radiograph taken, visits one or more doctors to discuss the results, and so on. But the process can diverge in various circumstances. "For example, if the patient is ambulant, the protocol has to go to his general practitioner; if the patient is hospitalised, the protocol is settled in the hospital. Moreover, there are many different scanners and other machines with specific requirements, and we have investigated how fast the patient can go through the whole process."

Another process that has been analysed with a big efficiency improvement as a result is the cleaning of a room after a patient is dismissed from the hospital. "There are a lot of questions in this process: when can you start cleaning? What do the cleaners do and which tasks are the responsibility of the nurses? We have streamlined the process and started a specific team that is responsible for cleaning the rooms after the dismissal of patients. As a result, when a patient leaves now, his room is ready for another patient within an hour. This way, our hospital utilises its capacity much more efficiently and new patients don't have to wait so long anymore for their room."

BIO

Hugo Casteleyn is general manager of the general hospital AZ Sint Blasius in Dendermonde, strategic coordinator of the Flemish Hospital Network K.U.Leuven and vice president of the VOKA department in East Flanders.

IT is not the aim but a facilitator and a catalyst

Partezis translates best practices into computerised processes

ICT will be critically important to maintain the affordability of healthcare in Belgium and to cope with the increasing scarcity of resources. That's the firm opinion of Roger Lemmens, CEO of Partezis.

Partezis was founded almost 50 years ago out of the Belgian division of the Catholic social care organisation Caritas. In the context of the pillarisation of healthcare, it operated for about 45 years as a non-profit and cost-sharing member association. Today, Partezis is a fully-fledged and future-orientated IT company. While most large international IT players ignore the Belgian market given its small size and fragmentation, Partezis took on the challenge of serving the local healthcare market and is currently the leading provider of software products for care institutions. The company's mission is to support care institutions in the pursuit of their strategic goals, that is, to ensure and optimize the quality of care—and to accomplish this in a cost-efficient manner. Or stated otherwise: to deliver better care with fewer resources. CEO Roger Lemmens summarises the company's approach: "From a single integrated solution we are able to computerise every standard process in a hospital or nursing home using our own software or third-party software. At this moment more than 50 hospitals and more than 200 nursing homes are running on software that we have installed. To attune generic industrial software to the specific needs of Belgian hospitals, we build our own add-ons on top of the standard platforms and support these with an SLA (Service Level Agreement) contract. By using standardised software that we customise for our clients, we are able to offer affordable, mature and sustainable 'solutions' with a support guarantee for the next eight to ten years, which is a commitment that very few vendors in this specific market can - or want to - make."

As an innovation partner, Partezis also priorities renewal and strives for evolution towards new technologies. The company monitors the newest technology trends in the industrial world and subsequently introduces these, where relevant, in the care sector. Lemmens illustrates this with an example: "We even introduced the concept of cloud computing in our hospitals; a perfect example of how we guide our clients towards more efficient and cost-effective IT solutions."

Partezis may be an IT company, but in its mission the company makes clear that IT itself is not the point; IT is a facilitator and a catalyst. As Lemmens explains; "the company's purpose is not simply to sell software packages. We sell computerised processes based on best practices. By supporting and optimizing processes in care institutions more time becomes available for the core care tasks." Furthermore, Partezis's approach disproves the cliché that ICT by definition is a net cost. Lemmens; "If IT is optimally deployed then ROI is guaranteed. This is a key priority for us in our work in the care sector. However, this does imply that the processes to be computerised must first be standardised. Software applications only become affordable when they are able to be deployed at numerous customers in a similar way – on the basis of best practices. In addition, it is important to go beyond pure automation by also generating information and intelligence. In other words, don't simply produce data, but use data to create intelligence and apply that intelligence to optimize business processes. Or to express it in Partezis terminology: making IT healthy."

As it stands, the measurement and fine-tuning of business processes are becoming increasingly important in the care sector. Contrary to the present situation, in the future the government will increasingly rely on quality-related parameters 'to determine funding as opposed to purely quantitative or volume-based parameters.

In order to achieve the company's goals and mission, it is essential that Partezis has a contemporary business model as backbone. That was not the case, however, when Lemmens came on board in 2007. Lemmens explains; "With the ongoing depillarisation in the healthcare sector and the increasing competition in the ICT domain, the original corporate structure had become a burden, but also the internal organisational structure was in need of profound reform. A SWOT analysis with all our stakeholders at the end of 2007 resulted in a completely new and open vision."

TOO SMALL TO BE BIG ... ALONE

Over the next two years the foundations of the new vision were put in place: a new commercial legal entity with associated fiscal statute, a comprehensive internal reorganisation, an entirely new management team, a review of the personnel policies, the implementation of new processes and systems, etc. In 2010, the focus year, Partezis decided what it will be doing and what not, and with whom and for whom. And in 2011, Partezis is ready to grow based on the new priorities and focus. "One of the things we learned is that our company structure was modelled too much on the care sector while we had to reorganise our model on the ICT sector. Furthermore, we discovered that we were too small to be big ... alone. And that is why we have opened up our organization as much as possible

> *"The company's purpose is not simply to sell software packages. We sell computerised processes based on best practices...*

to sustainable partnerships with domain specialised product and implementation partners. Reform and openness are in my opinion absolutely critical in order to be able to respond to the rapid evolution in the care sector."

Lemmens sees several trends that are currently shaping the healthcare market in Belgium, and is convinced that only those suppliers who are able to evolve with the market have any chance of playing a sustainable role. Firstly there is the current consolidation trend in the healthcare sector: "As hospitals are collaborating and merging, I suspect that we'll end up with about ten groups in the Belgian market that can make decisions autonomously. This consolidation sounds bad, but the good part of the story is that this results in a much bigger scale of spending, which is very welcome because we have a lot to catch up on." Secondly the sector is facing a tremendous crisis caused by the increasingly pressing shortage of personnel—nurses and specialists in particular.

According to Lemmens, ICT will be essential to keep care in Belgium affordable and to cope with the increasing scarcity of people resources: "Awareness of ICT's benefits took some time due to complex hierarchies and older personnel, but newer generations of doctors and managers in healthcare are all the more conscious of the needs and opportunities. However, the key challenge is that most institutions don't have the budget to invest as needed in ICT. I therefore hope that the current major consolidation wave in the sector will improve economies of scale and reduce costs to tackle the lack of budget."

These challenges notwithstanding, Lemmens sees a lot of opportunities in the healthcare market. "The financial administration has already been computerised, but in the logistical processes there are still big opportunities to iron out inefficiencies and costs, e.g. in buying products, screening suppliers, managing stock, and so on. Pharmacies amount to 70 percent of the turnover of this logistical flow, and in most hospitals this has not yet been integrated. In the future we will also focus on front office solutions, supporting the doctors. For this purpose, we purchased the clinical information system of UZ Brussels, which we are bringing on the Belgian care market under the name Clinical Power Station since September 2010."

A third trend in the care sector is the evolution of a specific Belgian context towards a European context. Partezis is anticipating this development. Lemmens explains; "The solutions that we are offering today will also remain deployable when the Belgian care sector is further regulated within a European framework. Furthermore, the European integration obviously offers a huge opportunity in terms of scale expansion. And that will benefit us all."

BIO

+ **Partezis is the knowledge partner of the Belgian healthcare market in the ICT domain. From a single integrated solution the company computerises processes in more than 50 hospitals and more than 200 nursing homes.**
+ **www.partezis.be**

Smartsourcing in Healthcare

ISS is innovating with a more integrated approach to managing hospitals' non-medical processes

Healthcare systems across Europe are striving to control costs and adapt to the impact of ageing populations, while simultaneously being asked to become more patient-centric. This creates a very specific set of challenges for managing a hospital's logistical and support processes. At a time when non-core processes such as cleaning, catering, waste management, patient transport and linen need to be managed much more efficiently they have concurrently become a lot more complex to manage. For one, they have become a lot more frequent, with shorter rotation times, as hospital stays shorten. Furthermore, hospitals cannot simply adopt 'lean' management techniques that are common in industrial settings, because they are dealing with people—people who are demanding a more patient-centric approach. In response to these challenges, ISS, a leading supplier of outsourcing services to hospitals and residential care institutions, is adopting a more integrated and intelligent 'smartsourcing' approach to managing a hospital's logistical and support services. We spoke to Rudy Mattheus, General Manager at ISS Healthcare.

AN OUTSOURCING COMPANY

ISS is an outsourcing company. In Belgium, the company has five main activities. The oldest unit is the cleaning division, active in all types of cleaning services, from route based cleaning (whereby cleaning teams travel from customer site to customer site) to on-site cleaning (where teams have a permanent presence at the customer's site). The other activities include catering (mainly on-site catering, for example, at hospitals), industrial services (maintenance activities), and support services such as reception and postal room services. Finally, ISS offers integrated facility services which are basically an integrated package of the above mentioned services. In sum, ISS offers an extensive range of outsourcing service for their customers' non-core activities. In origin a Danish company, ISS today is active in more than 50 countries and employs more than 12,000 people in Belgium alone.

In the healthcare sector ISS has historically focused on two core areas: cleaning and catering. The company cleans hospitals, from the cleaning of reception areas to more specialized cleaning services such as those for operating theatres. It manages the catering operations in hospitals; catering for staff, for visitors and for patients. In recent years ISS's services have become increasingly diverse and specialized. For example, it also offers specialized cleaning services for environments that have strict or highly specific hygiene criteria such as kitchen environments or air ducts. These are very important in hospitals to reduce the risk of infection.

TOWARDS SMARTSOURCING

Given its range of outsourcing services, ISS increasingly is asked by its customers to take care of the full suite of non-core processes. For a number of hospitals in Singapore, for example, ISS takes responsibility for practically every process that is non-medical in nature, from reception and logistics to patient bathing (non-intensive care patients) and even ambulance services. For ISS this is not simply an opportunity to do more, it is an opportunity to do things differently and more intelligently. Rudy Mattheus explains; "we are gradually moving from an outsourcing model to a smartsourcing model. With outsourcing one is basically doing the same activities as in the past, typically with the same people, but on our payroll. With smartsourcing we are positioning ourselves as a partner with joint responsibility for the end result. Under this model it is not the number and timing of cleaning sessions that count. On the contrary, what gets measured and contractually defined via SLAs (service level agreements) is the cleanliness of the area in question."

ENABLING INNOVATION

Smartsourcing is 'smart' in the sense that one is exploiting synergistic opportunities by integrating several distinct processes that used to be managed in isolation from each other. By combining the know-how about a number of different processes one is able to design a more efficient and effective 'hotel service'. And by focusing on the results as opposed to the means one is allowing for a degree of innovation in the way those results are achieved. In the smartsourcing model ISS has every incentive to introduce new tools and methods to achieve its target more effectively. Everything is reevaluated with those goals in mind, from the organization of work processes to the design of the cleaning trolley.

EMPOWERING PEOPLE

Ultimately, however, the effectiveness of support services in a hospital environment depends on people. Contrary to predictable industrial environments, one cannot standardize everything in a hospital—there will always be unexpected events and most importantly, one is dealing with people, not goods. Hence, the way ISS approaches smartsourcing is by empowering its people. To illustrate, in most hospitals there are different people and departments responsible for making patient beds, cleaning patient rooms, serving meals, etc. In an integrated concept you bring these processes together under the responsibility of a single person: one person who is responsible for a specific

BIO

+ **ISS is a global provider of integrated facility services**
+ **The company employs 12,000 people in Belgium**
+ **www.iss.be**

number of rooms. The result is not only a more efficient way of working but also a more patient-centric approach. Under the non-integrated model, a patient would see several different people, with limited responsibility, passing through their room. These individuals are each responsible for their specific task and have no overall responsibility for patient comfort. A cleaner won't feel responsible if the patient's bed linen need replacing; he or she can't help if the patient is hungry. But by combining these responsibilities one is creating a closer bond between patient and support staff. The patient gains a 'single point of contact' for all non-medical services and the worker gains a sense of engagement and responsibility over 'her patient.'

END-TO-END LOGISTICAL PROCESSES

ISS has started relying on its smartsourcing concepts in Singapore and the UK where entire hospitals are run in a totally integrated manner. In the Netherlands too, a more integrated approach is being deployed in the catering operations and in Belgium ISS has already changed its approach for the cleaning services. In the coming months, the company will be rolling out the new approach in catering and logistics. All non-pharmaceutical goods streams in hospitals will be managed in an integrated and end-to-end manner, all the way to the patient rooms. At present in many hospitals, the flows of specific goods are managed independently of each other and are rarely managed on an end-to-end basis. For example, waste is typically stocked centrally at department level by the department's nursing and support staff before it is collected by the hospital's waste management service. Similarly, linen is delivered to central places and then nurses or support workers take over to supply individual rooms. By outsourcing logistical flows as a more integrated and end-to-end process, hospitals can further relieve nursing staff of non-core, non-medical activities. Rudy Mattheus; "What we are talking about here is a much broader, result-based responsibility. We want to create added value for care institutions in the sense that they can focus on their core care activities and not have to take responsibility, even financial responsibility, for non-core activities.

> *"By focusing on the results as opposed to the means one is allowing for a degree of innovation in the way those results are achieved.*

TACKLING THE BOTTLENECK

Mattheus argues that smartsourcing is a major opportunity to improve efficiency in healthcare, especially because the many processes in care institutions are becoming ever more complex and hence demand a more intelligent approach. In recent years the average length of hospital stays has become progressively shorter—and this is a trend that will likely continue. One consequence of this, however, is that the rotation frequency of most processes—such as cleaning of rooms and changing linen—keeps on increasing. Many hospitals aren't equipped to deal with that added pressure and complexity. As a result, they find that the key bottleneck their overall operation increasingly is bed availability. Hence, the faster that patient rooms can be cleaned and prepared in between patients, the more optimally the hospital can deploy its clinical staff and infrastructure.

Rudy Mattheus adds; "Already it was a real challenge for hospitals to manage their non-core processes in an efficient manner, but now, with the extra speed and rotation there is risk that such processes, if managed inappropriately, will become a huge drain on resources. Logistical processes have become a lot more complex; that is an unavoidable consequence of the broader healthcare trends. As a result, such processes need to be managed as a core business; they've become too important and complex to run as non-core activities."

THE FUTURE

In the years ahead ISS will continue integrating additional processes under its smartsourcing concept. Ultimately this will include integrated facility management whereby aspects of the physical infrastructure—the buildings—are incorporated. This could have a significant impact on the way costs are managed. By integrating the investment and maintenance costs of the building in the total hospital exploitation cost, that in turned is linked to a range of measurable deliverables and results, one is enabling hospitals to do much easier financial planning for the long term. Mattheus; "In this new world a hospital will bring in a partner to help map their financial plan for the next 30 years and work towards a stable fixed cost to cover all non-core activities. Service level agreements will describe the expected outcome and quality level at a predefined cost. We've created a new legal entity to explore this concept and are currently closing the first deals in the non-healthcare sectors. But it is definitely something that will reach the healthcare sector."

Mobile health

A necessity to keep healthcare affordable

Bart Collet believes in a world where consumer electronics make healthcare more affordable and more human

In 1995, Bart Collet became the owner and manager of Huis Vandecruys, the private home for the elderly that his mother founded. During the last sixteen years, he expanded the home from 32 to 72 patients, who he systematically calls 'customers'. Bart became an enthusiastic supporter of the use of information technology in healthcare, which he has put countless times into practice: the eager autodidact learned various open source technologies such as MySQL, PHP, Apache, Tomcat, Joomla!, Drupal and Plone, and used them to implement his own software in Huis Vandecruys. More recently, he became especially excited about the possibilities of mobile solutions for healthcare.

A sore point that Bart has seen a lot is that caregivers generally don't have a flair for technology, while software vendors tend to overload their software with many bells and whistles: 'Caregivers just need a very simple system because it allows them to focus more on working with the people.' This disconnect was one of the reasons why Bart decided to start writing his own software, and open source was a big help: 'Open source software gives me total freedom to remove all bloat. For some of my software projects, I spent 80 percent of my time removing functionality. This is obviously not possible with proprietary software, because you have to wait for the vendor to make the needed adjustments for you.' For example, Bart made easy-to-use planning software in Java running on a Tomcat server and a MySQL database. But at least on the hardware side, things seem to change: 'Recently I placed an all-in-one touchscreen PC at our elderly home, and employees who didn't want to use a keyboard in the past now use this PC because the touchscreen interface is much more natural.'

MORE TECHNOLOGY IN HEALTHCARE

Bart is clearly no technophobe and he believes that - if implemented in the right way - technology in the healthcare domain can save a lot of time and money and even lives. He gives an illustrative example from his own experience: 'A couple of years ago my son was very ill, and after some time I sat down with a professor at the Middelheim Hospital in Antwerp. Then I noticed that she had seven windows open on her computer, all from different software vendors, and she had to correlate various factors from this cluttered screen to figure out what was wrong with my son. All because different software vendors don't collaborate on integrating their data.'

But Bart had meticulously collected data about his son's illness, including his general condition, the times when his son received medication, major events in his life, and so on. 'I put all this data into a spreadsheet and generated a single graph with the different data overlaid. This is nothing revolutionary, just logical thinking, but the doctors and nurses looked at the graph as if it was something incredible. Fortunately, thanks to this visualisation the doctors could draw the right conclusions.'

MOBILE HEALTHCARE

One specific development that Bart is really enthusiastic about is 'mobile health', the use of mobile phones and other mobile devices such as iPads in healthcare. 'If you look at the current demographical trend, it's clear that we'll see more and more poignant situations like waiting lists for elderly homes if we don't change the way we organize healthcare. Also, according to a recent study by the Christian Mutuality in Belgium only 98 percent of the respondents want to go to an elderly home when they become needy. But thanks to mobile technology, people can stay longer at their own house, in their own environment they are used to, which gives them a better quality of life. Moreover, this technology is an absolute necessity to keep healthcare affordable.'

The prime target group for mobile health applications are chronically ill people. Nowadays, they have to go to the hospital very frequently, which can be overcome if they carry a device that continuously monitors some medical parameters. The use of mobile devices is a win-win situation: the patient doesn't have to go to the hospital so frequently anymore, and the doctor gets a much better picture of his patient's health. As a

consequence, the cost of hospitalization can be reduced substantially and the visits to the doctor can be limited to situations where more investigation is needed.
Another advantage of software for mobile health is that it is not expensive, as you can use regular web applications which work on all major mobile phone operating systems, as well as on PCs with Windows, Mac OS X or Linux. And the current smartphones with GPS and accelerometer are powerful enough to take over a lot of tasks from expensive medical equipment. Bart gives an example: 'Recently I saw a research proposal about fall detection. The researchers proposed to install cameras inside the person's house, and an algorithm would investigate the images and fire an alarm when the person seems to have fallen. However, this is an expensive and limited system: you have to install cameras in all places where people can fall, and it doesn't work when the person goes outside and falls there. So my proposal is: just tell these people to always wear their smartphone, and the accelerometer can detect when they fall. This may not be 100 percent accurate, but it is low-cost and also works outside.'

> "Mobile technology is an absolute necessity to keep healthcare affordable."

There's of course an important issue in this vision: if we depend on mobile networks for people's lives, they should be reliable enough. 'In 2015, mobile internet traffic will be quadrupled, and therefore I have asked mobile operators a few times what their capacity is, because it's important for mobile health that all data can be sent without problems. I didn't get any satisfactory answers, and I think it's the government's responsibility to guarantee that the infrastructure is there with enough bandwidth and coverage in all places.'

BIO
At the age of 25, Bart Collet became the owner and manager of Huis Vandecruys, a home for the elderly. Sixteen years later, Huis Vandecruys provides lodging and care for 72 customers around the clock.

Fixing the looming healthcare crisis with technology

Dirk Van Lerberghe,
CEO Corilus

Healthcare is under pressure from several directions. Corilus is connecting the stakeholders in the system to streamline processes.

Increasingly, elderly care is becoming a multidisciplinary task requiring coordination between rest and nursing homes, general practitioners, physiotherapists, nurses and pharmacies. As institutional care is extending towards home-based care, the need for efficient coordination among the various actors in the system will only increase. Corilus, a leading ICT-provider for healthcare professionals and rest homes, is aligning itself to eHealth with open standard solutions for managing processes that cross organisational boundaries.

HEALTHCARE UNDER PRESSURE

We're acutely aware of the fact that the healthcare sector is under pressure; it needs to adapt to a number of clear trends and challenges. Firstly, demand for healthcare services is gradually increasing and will continue to increase in the coming years. Partly this is due to the ageing of our population. Older people require more care and are more likely to suffer from chronic illnesses. Even among younger people, however, the prevalence of chronic illnesses such as obesity and diabetes is increasing. In parallel to these trends healthcare is becoming increasingly high tech—which requires important investments. And the regulator is adding pressure too by raising the bar on quality control and the traceability of medication. These trends all combine to drive healthcare costs upward—just at a time when governments are trying hard to reduce spending. And just to top it all off, there is an increasing shortage of healthcare workers, especially nurses. The sector is under pressure to expand, but it is restricted in doing so due to a shortage of money and people. That's why ICT is destined to play such an important role in healthcare by saving time and creating more efficiency.

TOWARD A HYBRID MODEL OF CARE

It is interesting to see how these trends play out in one of our core markets, Rest and Nursing Homes. At present elderly care is concentrated at the institutional level, at the rest homes. However, in the years and decades ahead we cannot meet rising demand simply by building more rest homes. At Corilus we believe that the system will move towards a more hybrid model where all actors in the elderly care system—GPs, rest homes, nurses, pharmacies, physiotherapists, etc—will coordinate their work around patients who remain at home. Today rest homes already have a support function to home care, but this will become more intense in the years ahead. They'll increasingly need to offer people day-care services or short-stay services. Also, we predict that rest homes will play a central role in the coordination and alignment of home care.

NEW FORMS OF COMMUNICATION AND COORDINATION REQUIRED

This evolution towards greater cooperation among the various healthcare actors does mean, however, that the system will be at risk of being overwhelmed with new administrative and organisational demands. Consider the complexity: since rest home residents can choose their own doctor, a typical rest home has relationships with up to 30 general practitioners and they're all using different software for their medical records. The rest home maintains its care records, while the doctors all maintain their medical records, but these two types of records are supposed to have overlapping data. By connecting the systems, we can increase accuracy significantly.

More and more, care is becoming a multidisciplinary task that requires the exchange of information between medical staff, speech therapists, physiotherapists, rest homes and so on. New forms of communication and coordination are clearly needed and the government's eHealth programme is set to play a critical role in that. The transition toward a hybrid system also needs to happen in the domain of ICT. We require open systems and common standards that allow for the seamless exchange of data and the steering of processes across multiple actors in the system.

At Corilus our priority remains the automation of healthcare-related processes but we realise that this has to be looked at from a system's perspective. It is absolutely critical that the various stakeholders in the system are consulted to ensure that the different user groups accept the new technologies and ways of working. Corilus is well positioned in that regard because we already have strong customer relationships with doctors, pharmacists, nurses, physiotherapists and rest homes. And in each market we have user group committees that we consult on new developments.

HOMELINK: CONNECTING REST HOMES AND PHARMACIES

Not only do ICT companies have to consult their user group, they also have to consult other ICT companies and agree on common standards. For example, in 2006 Corilus launched a project in partnership with CMS to improve communication between rest homes and pharmacies. We saw the need for a standardised

protocol to communicate between rest homes and pharmacies, so we started developing one. With our HomeLink protocol, we can manage the medication plan in the rest home, coordinate this with doctors for prescriptions, know when to order medication from the pharmacy, send an invoice to the health insurance funds, and so on. Instead of doing this on paper, the HomeLink system allows us to do all this electronically, which results in strengthened cooperation between the rest home and the pharmacy.

Thanks to the HomeLink protocol, the pharmacy has more information about the specific needs of the rest home, such as the medication plan of each patient, which means that they can start delivering medication in individual patient doses. This is much more efficient than sending boxes to the rest home where the nurses have to divide the boxes in patient doses. Together with our sister companies Aca Pharma and Arseus Medical, we are developing this further now into a total medication management solution for rest homes that integrates logistical services and advanced quality control and alert functions for dosage problems or contraindications.

SETTING THE STANDARD

The HomeLink pharmaceutical platform was developed before the eHealth platform came about, but Corilus is now adapting it to comply with the eHealth platform which takes care of encryption, authentication and mail box systems. Those are generic services offered by the eHealth platform and are not our core business. In this way, the eHealth platform is a real enabler of our services.

Beyond compliance with the eHealth platform, we also make the HomeLink protocol accessible to other ICT suppliers in the market. At present, the protocol has become pretty standard in the market and other players have started integrating it in their products. That's good for the sector and the broader healthcare system.

HomeLink is just one example to illustrate how Corilus is helping to connect the various actors in the healthcare system. Similar initiatives are in place to enable better coordination between rest homes and general practitioners. And a project in partnership with VitalCare is making home-based telemonitoring a reality. Home-based patients with diabetes or heart disease will be offered GPRS connected measuring devices that enable the remote and systematic tracking of key health indicators. In this way doctors will be automatically alerted if there is a problem and their medical records will be automatically updated, allowing for improved analysis.

The challenges in healthcare are severe, but we're convinced that ICT can—and is—enabling far reaching improvements, both in terms of efficiency and quality.

BIO

+ Corilus provides ICT solutions to a wide range of medical and paramedical professionals and institutions, including pharmacists, general practitioners, nurses and rest homes. Corilus employs more than 200 people, serving approximately 25,000 clients of which 14,000 in Belgium. The company has offices in Belgium, the Netherlands and France. Corilus is part of Arseus, an international healthcare company listed on Euronext.

+ www.corilus.be

+ www.cms-software.be

The future of hospital IT

A hospital CIO's perspective on healthcare technology trends

Professor Bart Van den Bosch, CIO at the University Hospitals Leuven, offers his view on the impact of technological developments on healthcare.

What is the impact of the internet and related technology developments on hospitals?

It is certainly changing the way we communicate. The days when hospitals simply handed out brochures as their primary means of communication are clearly numbered. The emergence of the web and social media are changing communication practices pretty fundamentally. Some leading hospitals are discovering the merits of social media. For example, the reputed Mayo Clinic in the U.S. has over 120,000 Twitter followers; they're really cultivating this type of communication. We haven't started using such social media platforms yet, but we are making progress developing and testing a new web-based communication interface for our patients. MyUZ, as we call it, will enable a totally different way of communicating with patients. At this stage we have several hundred patients on the system while we fine-tune it for official launch in 2011. Basically it is a communication platform that will deliver very personalized information to patients about what they can expect before, during and after their hospital stay. It doesn't compete with the general information out there on the web; the objective of this system is to give people very specific information that is linked directly to their medical record and treatment plant. We expect this to become a very important service.

> "The most important change in healthcare will be the closer collaboration within the healthcare system.

What do you make of patient empowerment and the emergence of personal health record platforms?

Patient empowerment is a pretty hyped concept at present but it is important. Essentially it is about involving patients more in the decisions that are made regarding his or her treatment and in the monitoring of their condition. In that sense it is also about responsibility. As healthcare providers we can offer patients more resources to make decisions and help manage their condition, but it does require patients to accept that responsibility.

In principle it should be possible to link hospital information platforms like ours to personal health record systems. For example, in our platform you can enter your blood pressure and it will create curves and alerts, but it tends to be focused on the patient's specific illness and treatment. Personal Health Records such as Google Health and Microsoft Health are focused more on general health indicators. In that sense you could say that we have complimentary platforms.

It is important to emphasize that MyUZ is not a replacement of the information that patients receive during the consultation with the physician; on the contrary, it is an alternative source of information. The problem with the consultation is that patients typically have difficulty processing all the information received during that short time. With MyUZ you get drip-fed the information which makes it much easier to process.

How is the country's e-Health strategy progressing?

The e-health platform in Belgium is on track. A number of basic services are currently live and there are several projects on the go to create additional authentic sources of medical data. These projects are implemented by several large provider networks organized around key hubs, such as the University Hospitals of Gent, Charleroi and Leuven. One of the important technical developments is the time stamping model that we developed for the eHealth Platform and was handed over to them. This was accepted as an alternative to solve the key challenges related to the use of digital signatures in a hospital setting. As it stands now, creating a digital signature is only possible via use of the electronic identity card and the entry of a PIN code. But that is almost impossible to implement in a hospital setting. You cannot ask a physician to use his eID and type in secret codes a hundred times a day. Also, the ID cards wouldn't be able to cope with such intense use—they were designed to handle about 5000 signatures per year. The solution to this problem is a trusted time stamping model. It basically allows the hospital to timestamp an entry in a medical record in such a way that the entry cannot be changed afterwards without breaking the trusted timestamp. All this can be done without sending the medical data to a third party. This is a great improvement on the previous model and is currently used by 30 hospitals.

Do you see opportunities for the remote monitoring of patients?

The remote monitoring of patients' health should become increasingly important but I suspect that only 'slow' monitoring—where patients take responsibility for

BIO
Prof. dr. Bart Van den Bosch is CIO at the University Hospitals Leuven

their own monitoring via self-report or diary methods—will gain traction in the near future. At present, the problem with automated telemonitoring—for example where a device monitors a diabetes patient's blood sugar level and automatically relays this data to the healthcare provider—isn't technical but legal. Who is responsible if something goes wrong: the healthcare provider, the patient, or the technology vendor? As of yet there is no legal framework that will encourage the use of such technology. It will take time. But I believe that self-report approaches using online tools will take off in the coming years. Ultimately this is about empowering patients; encouraging them to take responsibility for the management of their illness. Automated telemonitoring could lead to the opposite; it could give patients a false sense of security.

Could technology have a disruptive impact on the way healthcare is organized?

I don't know if there is anything really disruptive about eHealth. It is certainly going to improve the way we work but I don't know if it will fundamentally change things. For example, our clinical workstation is being rolled out at five other hospitals. That will make it easier to collaborate across sites via the sharing of a single medical record. The treatment process across different hospitals will be easier to coordinate. It'll be more efficient in the sense that we'll be able to allocate our resources—people and infrastructure—more effectively. And we'll be able to collect a huge amount of data, which is great for research and quality improvement.

Some people argue that the emergence of medical data platforms like eHealth or the patients networks like PatientsLikeMe where patients share medical data will lead to fundamental changes in the way research is done. I don't know. Legally, we can't simply start doing research using data from other hospitals. What we can do is recruit patients for clinical trials from several hospitals. That way we create scale too. But that's still within the confines of clinical trials and stringent scientific method. You have to be aware how stringent the criteria are for publishing medical research. Where the information platforms do help is in the logistics of such research, in the way that we can refer and recruit patients for trials. Ultimately, I think the most important change in healthcare will be the closer collaboration within the healthcare system. Technology enables such collaboration but it is really about people and organizations. The technology itself isn't that disruptive.

What about the impact on quality and the measurement of health outcomes?

IT will enable the easier collection of healthcare outcomes data but the defining of such parameters will remain a difficult challenge. The validity of such data is obviously important—you need to account for patient risk profiles—but the logistics of data collection is also difficult since healthcare workers are already spending too much time on reporting. Nevertheless, it is an inevitable evolution.

How do you see the hospital IT sector evolving?

The hospital IT sector is very chaotic and fragmented. There are still too many different players about. It is nothing like the ERP market for example, which has consolidated to about four or five dominant players globally. But the comparison is anyway difficult to make because ERP addresses business processes that are pretty universal and standardized across the world. Healthcare isn't like that; it is a great deal more complex. It is constantly changing—partly due to advances in medicine and partly due to regulatory changes—and the system varies from country to country, especially with regard to the financing of healthcare. Even the medical culture can differ remarkably from country to country. As a result of this complexity, hospital information systems will differ fundamentally from country to country. That is why we have developed our own systems thus far. We did assess the merits of this approach back in 1993 but it is indicative that most of the players we looked at back then don't exist anymore today.

People have been telling us for years that our approach isn't sustainable. We disagree. As I see it, the larger IT players are losing interest in the healthcare sector. Also, IT capabilities are a differentiator toward other hospitals. For example, we recently completed the JCI accreditation for patient safety and quality of care. This is an arduous audit that requires assessment of 1,300 measurable elements of care and the setting up of a system for ongoing monitoring of a range of indicators. To comply with the JCT standards we adapted our IT system. We could do so, since it was up to us. If we relied on an off-the-shelf solution we would have had to ask the vendor to make those changes—would they have agreed?

Hypothetically speaking, would you imagine starting a business in the hospital IT market?

The hospital IT market is complex, expectations are high, and budgets are low. So no, I probably wouldn't start an IT company in the sector. I understand why people are interested in the sector. Healthcare is taking an increasingly large share of GDP, but that doesn't mean it is such an attractive market for IT vendors.

From input to output

Automation can save a great deal of time and money in healthcare

According to Michel Legrand, we're still in the early years of healthcare automation.

During his internship as a physician in the eighties, Michel Legrand was struck that a lot of things that could be automated in hospitals weren't. As a dyslectic, he looked at everything as a system and he saw automation possibilities that escaped the attention of others. However, a physician working in IT was a no-go at that time, so he started his career as a researcher in the pharmaceutical industry. After some time, he began focusing on automation and in recent years he became a freelance consultant specialising in process optimisation and information management in the healthcare sector.

Both at Janssen Pharmaceutica and Hoechst AG, Michel was charged with the task of investigating how the top physicians do their job and trying to convert their behaviour to an expert system. This is the holy grail of healthcare automation: creating computers that can 'think' like a good physician and hence help physicians during their diagnosis. At the end of the eighties and the beginning of the nineties, the available computer power turned out to be too limited to make such an expert system possible, but Michel made some striking observations: 'The best physicians are very empathic and sensitive. For example, they take the patient's hand. But when I asked why they did this, they didn't even know they were doing it. So they have a lot of subconscious inputs and don't work algorithmically, which makes it a challenge to automate their behaviour. We can't yet replace the holistic approach of a good physician or nurse.'

THE EARLY YEARS OF HEALTHCARE AUTOMATION

Essentially a lot of healthcare automation looks like those expert systems replacing a physician. The whole lifecycle of a diagnosis is still a big challenge for healthcare practitioners, Michel explains: 'When a patient appears to the doctor, how fast does he have to make a decision? If there are different treatments, which one will he choose? How invasive is this treatment, what are the risks, how much will it cost, how reliable will the decision be? A physician has a lot of information to handle, and IT can make this more streamlined.'

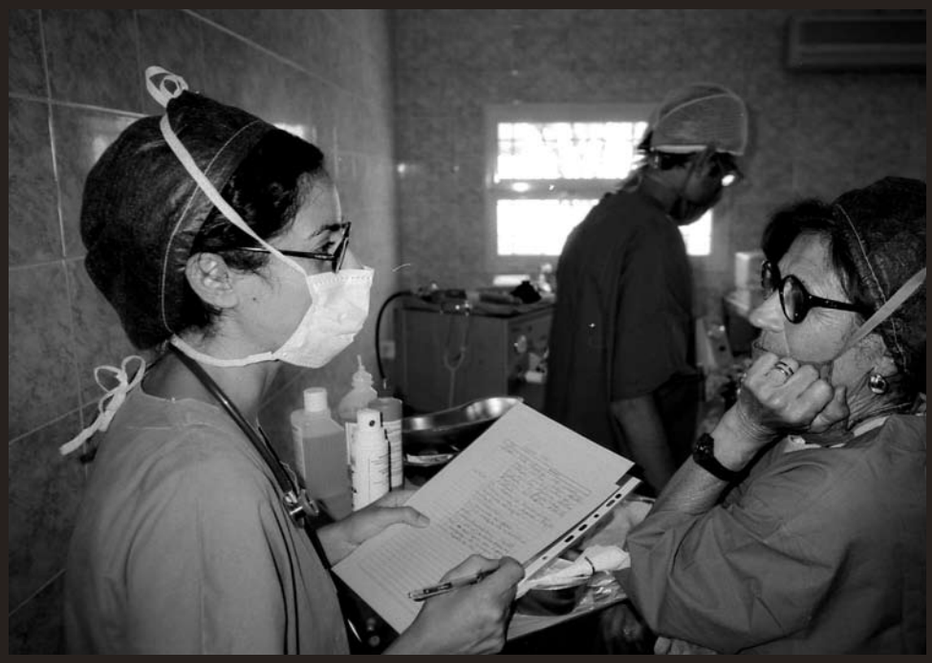
We are not there yet, though. 'It's only in recent years that technology has become useful for care workers,' Michel says. 'One example is the current smartphone with a touch screen, which can be easily disinfected in contrast to the older, button-based devices. However, we're still in the initial phase of automation in healthcare and most of the care workers still regard these devices as a burden: they have to use them for a lot of input, but the output they get back from the device is not yet that useful.'

EFFICIENCY

When done well, automation can make healthcare a lot more efficient. Recently, Michel has consulted on a project for a home nursing organisation to convert their complex paper process to a highly automated and GPRS-integrated IT process. Now the organisation has a schedule planning system with a list of all nurses with their qualifications (not every nurse is able do every task), their geographic territory, and so on, and another list with all patients with their needs and how much

time they need. A computer program then merges these two lists while satisfying all conditions.
The scheduler is also linked to a route planner, so it computes an optimal route to minimise the driving. As a result, the nurses can spend as much time as possible with the patients. This route planner has been a big success, Michel notes: 'On average, each nurse is now driving hundreds of kilometers less per day than when the organisation made the schedule manually, so they also need less overtime or sometimes they can even go to an extra patient.' Each nurse is constantly online with a PDA, and if a new patient is added during the day because of an emergency, the planning system recomputes the schedule with minimal rearrangements and signals the schedule changes to the affected nurses. The cherry on the pie is the accounting, which is automated as much as possible thanks to the information the PDAs send back to the central system.

> *'It's only in recent years that technology has become useful for care workers.*



COLLABORATION BY AUTOMATION

Automating healthcare information management also makes collaboration between different hospitals easier - even across borders. This is ultimately beneficial to a lot of patients that live in the periphery of Belgium, which is after all a small country. Michel gives an example of how there are already agreements in the province of Luxembourg: 'Diabetes patients in the north-east corner of Luxembourg are sent to Ettelbruck in the Grand Duchy of Luxembourg, while patients in the southern part of the province are sent to France. These institutions can read the Belgian SIS cards, so we can easily link the invoice from a French hospital to a Belgian citizen. Also, the French have done away with the MICU (Mobile Intensive Care Unit) in Valenciennes and the Belgian MICU drives to France. All this lowers the bar to the people in the field and gives the hospitals a better guarantee that they will be paid, so they are more inclined to cross the borders.'
But automation is also beneficial to collaboration between different actors in our own country. An instructive example that Michel gives is the electronic prescription that will be introduced soon in Belgium. The physician uses his eID card to create an electronic prescription, which is stored on a server. Then the patient goes with his own eID card to the pharmacist, who can download the electronic prescription from the server. 'With this system, the pharmacist knows for sure that the prescription is authentic, as it is signed by the physician's eID card' Michel maintains. 'Moreover, studies indicate that written prescriptions have high error rates due to handwriting legibility issues. This can lead to complications and in rare cases even to death. An electronic prescription system is much less error-prone.'
With an electronic prescription, one can go even further and add some innovative applications. Michel thinks about a personalised leaflet for each electronic prescription: 'Instead of a general leaflet with information about the doses for children and adults and all sorts of general information, an electronic prescription could come with an electronic leaflet that is adapted to the patient's situation, for example by highlighting the warnings that are applicable to the patient. The pharmacist then just has to print this leaflet and give it to the patient, who now doesn't have to decipher a complex general leaflet but has some personalised information.'

BIO
Michel Legrand holds a medical doctor degree from the University of Ghent and worked as a researcher in the pharmaceutical industry. From 2005 to 2009 he was the director consulting services of HICT, a management and IT consulting organisation in the healthcare sector. Nowadays Michel is a freelance consultant.

eHealth on track

Frank Robben sees numerous ways to optimize the quality and continuity of healthcare

Through its 9 basic services, the eHealth platform of the Belgian government already supports more than twenty value-added services, which can all be found on the eHealth portal website https://www.ehealth.fgov.be, and 15 others are in the pipeline. Currently, the value-added services are mainly services offered to healthcare providers or patients to support high quality healthcare, to optimize patient safety, to reduce administrative burden or to foster scientific research.

An example of a value-added service is the cancer register. There is also a register of all hip and knee replacements, as well as a register of all provided care with respect to heart implants. The eHealth platform also has a service where radiologists can anonymously upload radiographs to get a second opinion, the electronic declaration of birth or the electronic prescription of drugs within hospitals. Frank Robben, general manager of the eHealth platform, is already looking further ahead and promoting and exploring various new services that could attain the above mentioned objectives and optimize the quality and continuity of healthcare while still guaranteeing the patient's privacy.

EXCHANGING PATIENT DATA

To improve the exchange of patient data, all references to hospitals or other medical institutions holding information about a patient will be stored, with the informed consent of the patient, in a local or regional "hub". 'For example, this makes it possible for a medical doctor to check your medical situation in order to know whether you have

BIO
Frank Robben is general manager of the Crossroads Bank for Social Security, an institution he conceived and founded. More recently, Frank founded the eHealth platform that enables electronic service delivery in the healthcare sector.

stomach problems, which could be essential information to decide which drugs (not) to prescribe,' Frank explains. He emphasizes, though, that the system will stay completely decentralized: all electronic patient files will be kept at the hospitals.
The eHealth platform will then manage a "metahub" that stores all references to the hubs holding information about a patient. This system respects the organization of existing regional and local networks, and it prevents that certain health information about the patient can be deduced simply by knowing in which hospital he is a patient: 'For example, if someone would be able to read in the references that you're a patient in the Melsbroek hospital, which is specialized in multiple sclerosis (MS), he would immediately know that you're an MS patient. That's why the references are on the level of a hub, e.g. the hub "Leuven".' Moreover, only care workers who have a therapeutic relationship with the patient get access to the information references in a hub, e.g. to prevent that the doctor of your insurance company can access your files.

EVIDENCE-BASED MEDICINE

Amongst others, the Belgian eHealth initiative is inspired by the Finnish electronic patient files system, which is well-structured with great respect to the therapeutic freedom. They are also proponents of evidence-based medicine, using decision support systems such as scripts that automatically give a warning if for example the doctor prescribes a drug to a diabetes patient which is known to have side effects for him. Frank Robben: 'I like this use of technology: it supports the physician's actions based on evidence, but it's still up to the physician to decide.' Ultimately, such a system can prevent incorrect medication, which unfortunately still occurs too often: 'According to a recent study in the Netherlands, 50,000 hospitalizations per year are due to incorrect or incompatible medication.'

DATA WAREHOUSING

Frank expects a lot from external data warehousing based on coded or anonymised data to support medical research. It is important to note that the eHealth platform doesn't perform studies and always supports data exchanges, data coding and data access in safe and privacy-protecting conditions, under the control of an independent committee of the Privacy Commission. He gives some examples: 'If you have registered the coded results of all treatments of diabetes patients, you can infer which treatments are the best and return this feedback to the doctors. Or if according to coded data recorded through the eHealth platform, one type of hip replacement lasts only 3 years on average while another type endures 15 years and both cost roughly the same, it's evident that you should do something with this information, for example by adapting the part of the price that is reimbursed by the government to the average lifetime of the hip replacement. Since last year, there are already some external databases, managed by INAMI and/or scientific associations of healthcare providers, such as the ones for hip and knee replacements and for heart implants, and I hope that researchers will be able to deduce the first interesting results in the near future. Of course we'll guarantee the patient's anonymity with care.'
However, there are still some challenges for data warehousing. For example, there are hundreds of thousands of codes to describe diseases, but this is not done in a consistent way: 'There is a code for eczema, one for diabetes, and there is also a code for eczema with diabetes. This complicates the matter if you want to query the database for all treatments of diabetes patients. Another example: for a heart attack there is a code for when it concerns the left side, another code for when it concerns the right side, and so on. Instead, we need one code that describes a heart attack but with some specifications - like whether it's in the left or right heart chamber. If we want advanced applications like data mining to furnish meaningful results, we'll have to make the underlying data semantically interoperable, which is still a lot of work.'

“ If we want advanced applications like data mining to furnish meaningful results, we'll have to make the underlying data semantically interoperable, which is still a lot of work.

No Cash Please

Most GPs in Belgium don't yet accept electronic payment. CCV, a leading provider of electronic transactions, is trying to fix that problem

As exciting as the digital future of healthcare may seem, there is a strange anachronism in this happy tale—at least from a Belgian perspective. Already in this country, your medical and administrative data is digitally processed and exchanged among relevant stakeholders in the system, from hospitals and pharmacists to insurance companies and the government. But if you visit a healthcare professional in private practice—your GP for example—chances are you'll have to pay cash. Since this is likely to be one of few occasions in your week that you'll have to pay cash, it will probably require an extra trip to the cash dispenser—something you'd rather avoid when feeling ill or in pain. CCV, a leading supplier of electronic transactions, is trying to convince a good 80% of Belgian GPs to make the switch to electronic payment. Dimitri Beck, CEO of CCV Belgium, explains.

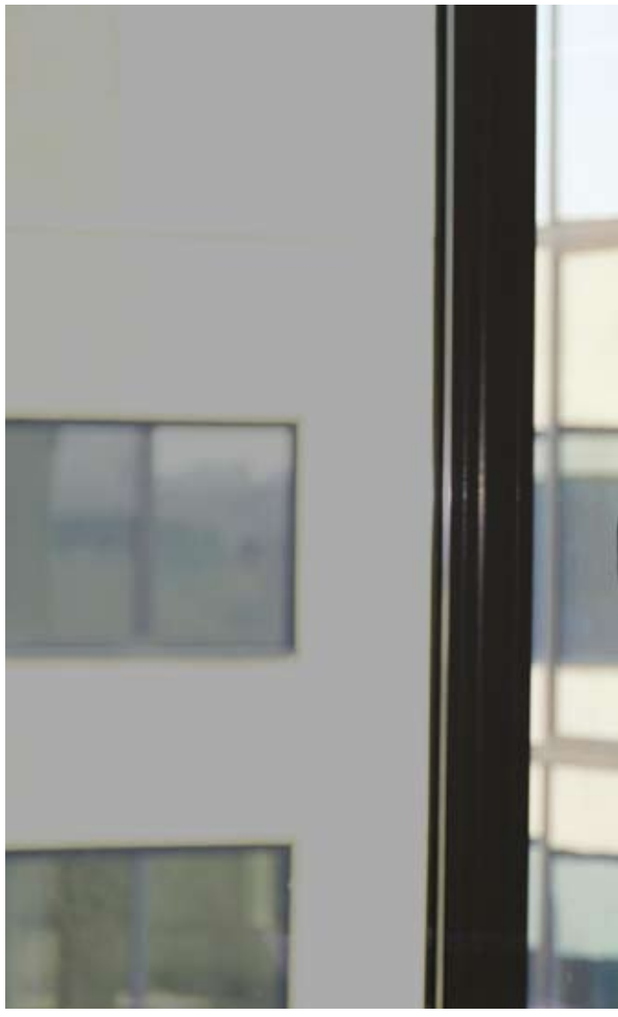
A CASH-BASED SYSTEM

At CCV we have an interest in the healthcare sector because there clearly still are many opportunities for improved financial processes. To illustrate, there are 15,000 GPs in Belgium but at approximately 80% of them you still cannot pay via an electronic payment solution. That is an astounding fact. And it isn't limited to GPs. In fact, a minority of private practitioners of any type—from specialists to physiotherapists—currently offers electronic payment facilities. Only dentists and pharmacists appear to be gradually making the shift toward electronic payment. Why are GPs sticking to a cash-based system? This is something we have been studying with interest.

> *"The switch to electronic payment systems is inevitable*

IT'S ABOUT ATTITUDES AND PERCEPTIONS

Obviously there are differences between the healthcare sector and the retail sector but we have to conclude that it is mainly about mindset. Technically there is no difference. We suspect that it is mainly because doctors do not want to be associated with commerce. In healthcare we talk about patients, not customers. We talk about a relationship, not a transaction; a practice, not a store. This is all true but these are still no reasons to stick to cash transactions. Why is the GP willing to pay for his telecom or internet, but not for a basic convenience for himself and his patient?



AN INEVITABLE TRANSITION

The switch to electronic payment systems is inevitable. It is simply one small but important component of the overall digitization of the healthcare system. You need it to close the circle. The benefits are clear for both parties and have to do with convenience, easier administration, less debtors and reduced risk. Patients don't need to make extra trips to the bank or cash machine before visiting their doctor. This is an important benefit, especially for patients with restricted mobility or sickness. Doctors, on the other hand, are able to simplify their administration and cash management. Our latest product, for example, is a payment solution that is linked to an ordinary PC in order to reduce the initial investment as much as possible. In this way the doctor can manage his accounts

direct from his current PC, read the e-ID; no need to print out reports on the terminal itself.

CUSTOMISED SOLUTIONS

At CCV we have extensive experience in card-based activities. Our history in fact lies more in non-payment activities, such as petrol cards, air miles cards, gift cards and prepaid cards. That part of the business continues to grow. For example, in the Netherlands we won the tender for the public transport card, also in Brussels for the Mobib card recharge. This is a contactless chip card that you can charge up with value and subsequently use on bus, tram and train. We're also working on a contactless vending card. These types of solutions require a lot of development and customization work but that's exactly our strength.

We feel comfortable in niche non-generic market areas that require a lot of customization work. That's why we feel there is a role for us in the healthcare sector.

EHEALTH

eHealth is certainly an area that interests us, especially since there is clear trend toward more bottom's up projects initiated by the healthcare stakeholders on the ground—as opposed to large government-controlled projects. There are so many opportunities for using technology to simplify financial processes. One could have a card for practically everything: a hospital card, several insurance cards, a pharmacist card, etc. In principle it is possible to place all those functions on a single e-ID card but I question whether people would want that. Competition and brands are important—you can't rely exclusively on a government-owned system.

BRING US IN EARLY

Our advice to the stakeholders out there is to involve us early on in the process. Whether it is a complex multi-party initiative or the setting up of a retail store, do not involve us at the last minute. On the contrary, bring us in early so that we help design an optimal payment and financial structure. At CCV we don't have a grand vision on where healthcare is going—that is not our role—but we are absolutely convinced that we have certain assets and competencies that can help make a difference to the way healthcare is organized.

BIO

+ CCV is a leading European provider of electronic transactions. The company has affiliates in Belgium, Switzerland, Germany and the Netherlands.
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Illustrations
p 22, 34, 36, 40, 42, 48, 66 by Afreux

Typography
Cover title font: Gravur-Condensed light & black
All other typography from the Fresco family

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