“We Need to Reconsider Medicine.”
Professor Junbo Ge on Trends in Cardiology
Cardiovascular care is in motion. On the one hand, healthcare systems hold increasing economical challenges. On the other hand, you want to safeguard your position as a leading cardiovascular care provider, both today and in the years to come. How to solve this issue?

With a partnership that lasts. At Siemens, we accompany you. We provide solutions that are sustainable and affordable, again and again. This is the long-run. And to navigate it, we provide you with technology that can support your ability to make sounder decisions, perform safer procedures, operate with better efficiency, and invest resources wisely. In short, we help you establish a sound basis for the future – so you are perfectly prepared for the long-run.

Are you ready for the long-run?
Sustainable Cardiovascular Care
Dear Reader,

Clinical care of cardiac diseases is costly and prolonged. The direct costs divert family and societal resources to medical care. In addition, cardiac diseases, such as coronary heart disease or valve disease, mostly affect individuals in mid-life, reducing their lifelong quality of life, disrupting the future of the families dependent on them, and undermining national economic development by depriving valuable sought-after human resources in their most productive years. Societies, therefore, must consider spending on improved cardiac care not only as a present expense, but also as a long-term investment in their future.

Patients who survive an acute episode of cardiac disease are likely to suffer from associated chronic diseases for the remainder of their lives – chronic diseases that not only reduce quality of life, but also create substantial costs. Healthcare providers are, therefore, facing a growing number of cardiac patients, including chronic, multi-morbidity cases, and an increasing demand for high-quality care. Taking these social, economic, and political challenges into account, Siemens Healthcare has focused for many years on integrated solutions that enable its customers to raise clinical standards in cardiac care while reducing its cost through workflow improvement.

Transcatheter aortic valve implantation is one example. Here, a comprehensive solution – in this case a hybrid room in Japan – that combines a cardiac catheterization laboratory and an operating theatre supports healthcare providers to raise clinical standards and treat patients who previously could not have been treated because of co-morbidities (p. 34). Similarly, the treatment of cardiac arrhythmias at IKEM in the Czech Republic is benefiting from integrated technology, where the latest advancements enable easier and more precise navigation, improved workflows, and less dose (p. 18). In Brazil, our cardiovascular imaging solutions, thanks to their outstanding resolution, enable clinical trials for bioresorbable stents that are difficult to visualize (p. 22). Further, workflows in the UK are improved by the Cardiac Dot Engine for magnetic resonance imaging (p. 26) and in India by the joint deployment of our imaging equipment and imaging IT solutions (p. 38).

The prevalence of cardiac diseases is closely linked to demographic development. Professor Junbo Ge, President of the Asian-Pacific Society of Interventional Cardiology, noted in his recent interview with Medical Solutions (p. 42) that lifestyle-related risk factors are on the rise in China, especially in the growing wealthy middle class. As the above examples illustrate, China is not the only country facing this challenge. Modern, minimally invasive cardiac treatment methods, which were first employed in more economically developed countries with a focus on the patient, sustainable care, and costs, are now being deployed around the globe.

I hope you find these articles informative.

Hermann Requardt,
Member of the Managing Board of Siemens AG
and CEO of the Healthcare Sector

Global Cardiovascular Care
Cover Story

10 Trends in Cardiology
Cardiovascular care is in motion. On the one hand, healthcare systems face increasing economic challenges. On the other hand, hospitals want to safeguard their positions as leading cardiovascular care providers, both today and in the years to come. This issue of Medical Solutions features success stories in the treatment of coronary artery disease, arrhythmias, and congenital heart disease, as well as latest advancements in cardiac MR and IT-supported workflows. Our interview with Professor Junbo Ge, President of the Asian-Pacific Society of Interventional Cardiology and Chief Physician, Department of Cardiology, Zhongshan Hospital, Fudan University, Shanghai, China, focuses on recent developments in cardiac care in his native country.
Features

48 Improved diagnostic performance can be cost-efficient, patient friendly, and economically accessible for imaging centers, as proven by the SOMATOM Perspective in Osny, France.

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56 The devastating earthquake in Haiti in 2010 moved a Boston, MA, USA, urologist and surgeon so deeply that he began seeking ways to help the survivors and ended up volunteering for Project HOPE.

62 Workflow, patient comfort, and financial aspects were addressed when Radiology Associates in the gulf coast city of Corpus Christi, TX, USA, installed the Biograph mCT.

66 Siemens Remote Service monitors equipment at the rapidly growing Siloam Hospitals Group in Indonesia – a helpful solution for serving the often remote healthcare facilities in this country.

72 Computerized physician order entry capability using the Soarian Clinicals health information system helps WakeMed Health & Hospitals in North Carolina, USA, improve quality of care and reduce medication errors.

76 The emergency department at Fernando Fonseca Hospital is one of the busiest in Portugal. The unit sees up to 800 patients each day. The hospital is using Siemens Healthcare IT solutions to tackle the growing challenges.

80 Requests for vitamin D testing are increasing. The core laboratory at the MetroHealth Medical Center in Cleveland, Ohio, USA, found a way to deal with them without compromising accuracy or efficiency.

86 The versatility of the Luminos Agile fluoroscopy system gives Leopoldina Hospital in Schweinfurt, Germany, the flexibility it needs.
New Partnerships for Healthcare Excellence

Siemens Healthcare has entered into a number of partnerships to advance its offerings in molecular imaging, laboratory diagnostics, and radiation oncology.

In the field of molecular imaging, PETNET Solutions Inc., a wholly owned subsidiary of Siemens Medical Solutions USA, Inc., Siemens’ network of positron emission tomography (PET) drug manufacturing establishments, has entered into a U.S.-wide commercial agreement with Eli Lilly and Company. It grants Siemens PETNET Solutions the right to manufacture and distribute Lilly’s molecular imaging agent in the United States. PETNET Solutions began supplying the new agent to imaging centers in limited U.S. markets.

In the field of radiation oncology, Varian Medical Systems and Siemens Healthcare signed a strategic global partnership to provide advanced diagnostic and therapeutic solutions and services for treating cancer with image-guided radiotherapy and radiosurgery. The collaboration covers the mutual marketing and representation of products for imaging and treatment in the global radiation oncology business.

The collaboration further comprises the development of software interfaces between Siemens imaging and Varian treatment systems. The two companies will also investigate opportunities for joint development of new products for image-guided radiotherapy and radiosurgery.

Thirdly, Siemens Healthcare Diagnostics agreed on new companion diagnostics partnerships with pharmaceutical companies Viiv Healthcare and Tocagen – marking a major step for Siemens into this important and fast-growing segment of the in-vitro diagnostics (IVD) market. Both partnerships intend to leverage the clinical trial and commercialization options within Siemens’ CLIA (Clinical Laboratory Improvements Amendments) accredited laboratory, as well as Siemens’ established IVD clinical and regulatory expertise.

Clarification
regarding Patient-Centric Molecular Imaging, Medical Solutions November 2011, page 13

In our article ”Patient-Centric Molecular Imaging” in Medical Solutions’ edition of November 2011, it was stated that “[...] Tawam Molecular Imaging Centre [...] was designed [...] by Siemens [...]”.

This statement referred to the set-up and technical equipment of Tawam Molecular Imaging Centre, not to its design in the sense of its architecture. The architectural design was created by Titus Pernthaler, Architekten Pernthaler ZT GmbH, Fohnsdorf and Graz/Austria (website: www.pernthaler.com).

We apologize for any misunderstanding.
The Whole Picture With One Sweep

The new syngo® DynaCT 360 software speeds up rotational angiography for Artis® zeego, the interventional imaging system from Siemens utilizing robotic technology. Thanks to the syngo DynaCT 360 application, an angiography system for the first time can rotate 360 degrees in six seconds to provide computed tomography (CT)-like slice images with a field of view of 35 by 25 square centimeters.

Up until now, the C-arm has taken 16 seconds to achieve such extensive soft tissue coverage, which is necessary for abdominal interventions. An exposure time reduced by more than one half brings a number of advantages: It is now unnecessary for patients to hold their breath for so long during the exposure, and the images are subject to fewer motion artifacts. Furthermore, the physician generally needs to administer less contrast agent. The syngo DynaCT 360 software is a further development of syngo DynaCT, a Siemens-developed technology that creates CT-like slice images from the approximately 400 images made during a rotational angiography and displays them on screen in the angiography suite while the intervention is still in progress. Particularly in the case of unexpected complications during the intervention and also for immediate follow-up, this enables physicians to arrive at a precise diagnosis without the need to transfer the patient to the CT suite.

Dedicated Software for Breast Ultrasound

syngo®.Ultrasound Breast Analysis software offers image analysis and reporting with comprehensive tools that help improve and accelerate diagnoses, including a magnifier, interactive zoom, free rotation, and automatic scrolling. Positional reference markers and a combined breast pictogram provide clinicians with precise lesion information, including location from the nipple, depth, and distance from the skin. The software produces streamlined reports that support the ACR BI-RADS® U.S. Lexicon Classification Form¹. This standardized reporting makes it easier to communicate with referring physicians. In addition, the system provides a diagnostic standard that allows images to be compared with past findings.

The software can be installed on a wide variety of hardware, such as a personal computer, a local PACS, or vendor-neutral archives and is available through multiple licensing structures, including fixed and floating licenses.

¹ BI-RADS (Breast Imaging-Reporting and Data System), a quality assurance tool, is published and trademarked by the American College of Radiology (ACR).
Siemens’ Partnership Becomes MBA Case Study

Siemens’ partnership with Hospital Clinic in Barcelona, Spain, is a unique strategic venture of healthcare innovation between a corporation and healthcare institute. The partnership, was selected by IESE, a leading global business school, to become a case study used in IESE’s MBA and executive educational programs. IESE students analyzed the case study and discussed the different aspects of the collaboration, its objective, and the fit into the overall strategy of each organization. They looked into the success for the Hospital Clinic: its organizational redesign and collaboration between different departments: laboratory, radiology, and clinical institutes. For Siemens, the success factors included realization of strategic goals – innovating to improve the quality of patient care while reducing healthcare costs, and bringing Siemens laboratory, imaging, and IT solutions together to help deliver clinical results faster and more efficiently.

The case study will allow IESE and other business schools to teach how innovation can successfully be carried out in collaboration: industry – hospital; private – public; engineers – physicians. The partnership with Siemens allows IESE and its Centre for Research in Health Innovation Management to generate knowledge and insights for new generations of healthcare professionals.

By Professor Magdalene Rosenmöller, IESE Business School

Greater Efficiency in Urinalysis

Since urinalysis samples come from a variety of collection sites day and night, laboratories need a simple solution to manage high volumes while delivering consistent, reliable results. The CLINITEK Novus™ Automated Urine Chemistry Analyzer1 enables just that. It has recently received CE Mark approval and is also available in Japan and many other countries. The instrument combines a dry-pad urine chemistry technology with an easy-to-use cassette test format. Offering a full spectrum of tests and a throughput of up to 240 samples per hour, the analyzer streamlines workflow, simplifies routine analysis and STAT testing, and delivers consistent, high-quality results even during peak periods. A digital imaging measurement system is utilized, and new ergonomic features such as the tiltable, color-touch screen and intuitive user interface, customized menu options, and automatic entry of cassette lot number and expiration date enhance ease of use.

1 Not available for sale in the U.S. Future availability in the U.S. cannot be guaranteed. Not all product offerings are available in all countries.

www.siemens.com/novus

A world leader in reliable urine chemistry testing, the CLINITEK® analyzers provide broad clinical insight into patient health.
At the Cutting-Edge of Hemostasis

As part of its on-going educational commitment, the Hemostasis Online Campus has been launched to keep clinicians around the world up-to-date on emerging trends. Clinicians can view webinars that focus on improving bleeding-risk management, the clinical use of D-dimer, the effects of preanalytical factors on coagulation testing, and other coagulation-testing-related topics. Hemostasis professionals can access a calendar of events, congresses, and in-depth technical material; such as, a white paper on the influence of new anticoagulants on coagulation tests. The paper discusses various anticoagulants and compares their influence on coagulation assays, visualized through figures and tables.

www.siemens.com/hemostasis-online-campus

Preventing Organ Rejections

The Mycophenolic Acid assay from Siemens Healthcare Diagnostics is now available for use on the company’s portfolio of Dimension® Integrated Chemistry Systems. With this addition, the company becomes the first laboratory diagnostics solutions provider to offer the consolidation of four fully automated immunosuppressant drug (ISD) assays on a single integrated chemistry system. The four ISD tests cover mycophenolic acid, cyclosporine, tacrolimus, and sirolimus – the most commonly prescribed immunosuppressants used by physicians to prevent organ rejection. These drugs have a narrow window of clinical effectiveness and have to be monitored thoroughly in order to ensure effective prevention of organ rejection while minimizing harmful side effects.

Now, tests for these drugs can be run simultaneously with routine chemistry tests on the Dimension systems, enabling more efficiency and more comprehensive care for transplant patients.

www.siemens.com/isd
Trends in Cardiology

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Pediatric Hospital Delivers Hope

Armed with an ACUSON Cypress cardiovascular system, doctors from the Fundación Cardioinfantil clinic in Bogota take their diagnostic and clinical expertise into the most remote, impoverished areas of Colombia to offer help to families who would otherwise have no access to advanced medical care for their ailing children.

By Chris Kraul
Cardiology

The prognosis was grim for 11-year-old Nubia Quirino, the sickly daughter of an impoverished indigenous couple in Leticia, a steamy Amazon River port town in remote southeastern Colombia. She was born with a host of complex heart problems, including just one atrioventricular valve instead of two. The death sentence she was living under was visible in her cyanosis, or blue-grayish complexion, her swollen toes and fingers, and her gasps for breath after the slightest exertion.

Local doctors had told Nubia’s parents, Herminio and Zoila, that there was nothing they could do for the child and that she would be lucky to live to her quinceanera, the traditional 15th birthday celebration that is every Colombian girl’s rite of passage. “She has gotten weaker and weaker, so we were resigned to losing her,” says Herminio Quirino, a member of the Ticuna native community on the outskirts of Leticia, which is accessible only by boat or airplane.

Diagnosis Offers Possible Reprieve

But the dark-eyed wisp of a girl with an impish smile may have gotten a reprieve when she was examined in March by a visiting team of doctors from Colombia’s leading pediatric hospital, Fundación Cardioinfantil of Bogota. The medical “brigade,” led by cardiologist Miguel Ronderos, MD, held a two-day clinic at Leticia’s San Rafael Hospital where, free of charge, they examined 305 children suspected by their parents of having heart problems. The doctors’ goal was to examine all comers, and, if necessary, take those who needed treatment back to Bogota.

Ronderos examined Nubia with the Siemens ACUSON Cypress™ cardiovascular system, a compact and lightweight diagnostic unit that he has taken on dozens of similar pro bono “flying clinics” across the length and breadth of Colombia. Durable, weighing just 18 pounds, and taking up only as much space as a bulked-up attaché case, the unit renders highly defined images of exceptional quality.

After scanning Nubia with the system, Ronderos got sharp images that revealed the girl’s serious cardiopathy. He immediately scheduled her visit to Bogota and probable surgery at Fundación Cardioinfantil later that month. Her medical, travel, and housing costs would be paid by the hospital’s charitable foundation, which budgets US$1.5 million a year to help poor children like Nubia.

“I just hope we’re in time, because she is in a lot of danger and could suffer a heart attack at any moment,” says Ronderos, who trained at the University of Alabama-Birmingham School of Medicine in the USA. “There is no guarantee she will make it, but there is a good chance.”

Dedicated doctors like Ronderos, supported by Siemens’ advanced diagnostic tools had once again brought hope to a family where previously none existed. The girl’s upcoming trip to Bogota for

Cardiovascular Disease in Colombia

How many people with cardiovascular disease are there?
Of the 44 million people in Colombia, an estimated 4.8 million or 12 percent of the population over 15 years of age have heart problems, mainly high blood pressure.

What is the most common cardiovascular disease in Colombia?
High blood pressure (hypertension) and disease caused by smoking. The average age that people begin smoking in Colombia is 13 years old. If diabetics are included, that adds another 2.5 million people, for a total of 7.3 million Colombians with cardiac diseases, or 16.6 percent of the population.

Source: Ministry of Health
surgery came as a “total surprise, a gift from God,” her father says. “We thought there were no options.”

By coming to Fundación Cardioinfantil for treatment, Nubia will receive another benefit that could be just as consequential to her long-term health. Any follow-up diagnosis, and possibly surgery, will be performed using Siemens’ state-of-the-art low dose angiography systems. The hospital has four Artis® C-arm systems that can dramatically cut the radiation exposure of patients like Nubia, compared with what she would have received a few years ago. Decreased exposure is important because extended radiation used in angiography is known to increase the incidence of cancer, as well as other side effects.

How is reduced radiation exposure accomplished? Siemens’ proprietary CARE (Combined Applications to Reduce Exposure) software, which is bundled into the Artis imaging systems, provides a broad range of dose-saving applications, including pulsed imaging, enhanced monitoring, and real-time reporting of the radiation being generated. The flexibility of use allows doctors to tailor treatment to a patient’s specific age, weight, and diagnosis.

Over the last five years, Siemens software has also made 3D imaging possible, enabling physicians to better see the structure of vessels and organs. As one doctor puts it: “If you see better, you spend less time diagnosing the condition and placing coils, stents, and heart valves. That decreases the patient’s and medical staff’s exposure to radiation.”

Low-dose treatment is important for Nubia, because, as Ronderos points out, if the first surgery is a success, she will need several more.

**Angiography’s Expanding Applications**

Improved safety is doubly critical because of the expanding range of diagnoses and treatments for which angiography is now being used, going far beyond its original cardiovascular application to include neurological and peripheral organ diagnoses and surgeries.

The upshot is that Siemens’ advances in imaging technology now enable doctors to reduce the number of times a typical heart patient has to undergo angiography. A decade ago, patients like Nubia might have had to undergo three different procedures during their stay at Fundación Cardioinfantil: one to diagnose, a second to treat the disease, and a third to confirm success. But the likelihood now is that a single procedure will suffice.

As one of a dozen Siemens “reference sites” at leading hospitals in Latin America and the Caribbean, Fundación Cardioinfantil has become a key proving ground for Siemens’ low-dose angiography initiative in the region and an incubator for more intensive relationships between Siemens product managers and the medical professionals who use the company’s equipment.

“One of the hottest trends in medicine is the use of technology to lower costs,” says Sánchez. “Siemens is helping to drive that movement in Latin America.”
Giving underprivileged children life-saving medical care free of charge has been part of Fundacion Cardioinfantil's mission ever since its founding.
Ronderos has taken the Siemens ACUSON Cypress cardiovascular system, a compact and lightweight diagnostic ultrasound tool, on dozens of pro bono "flying clinics" across the length and breadth of Colombia.

Helping the Unfortunate
Giving underprivileged children life-saving options has been part of Fundación Cardioinfantil’s mission ever since its founding by two brothers, Reinaldo and Camilo Cabrera, who returned to Bogota in the early 1970s after their cardiology training at Houston’s Texas Medical Center, U.S. The brothers devised a financing plan in which fees paid by wealthier heart patients, plus donations, would underwrite treatment for less fortunate ones. In the beginning, their clinic offered treatment only to youths from Bogota, or to those who could travel there. But since 1986, mobile medical “brigades” have gone to out-of-the-way or impoverished Colombian cities, where they conduct examinations at cooperating hospitals. The March visit to Leticia’s San Rafael Hospital by Ronderos and pediatricians Carolina Casas, MD, Linibeth Cruz, MD, and Sara Aguilera, MD, is one of ten such trips planned this year. Last year, the team examined 3,165 children during the trips, and 270 of them were taken to Bogota for further treatment, free of charge. Of those, 189 underwent heart surgery. “Without it, most would have died soon or over the next few years,” says Fabio Hencker, Fundación Cardioinfantil’s long-time community relations director.

A former foreign correspondent for the Los Angeles Times, Chris Kraul is a freelance writer based in Bogota, Colombia.
Deep Insight Into Rhythm Control

Fewer and fewer people are dying from a heart attack (myocardial infarction); more and more people are suffering from cardiac arrhythmias. Such conditions are diagnosed and treated by means of electrophysiology. One of the leading centers in this highly specialized field is the Institute for Clinical and Experimental Medicine in Prague, Czech Republic. The innovative methodologies and equipment in its Department of Cardiology must always meet one condition – they must benefit patients.

By Matthias Manych

The large, modern Institute for Clinical and Experimental Medicine (IKEM) Medical Center meets all of the visitors’ expectations: comprehensive service, a friendly no-nonsense demeanor, a great deal of daylight. Artwork, too. The sculpture that attracts attention at the intersection of several corridors is a true eye-catcher: Two large-dimensioned metal bowls of shiny chrome open up to reveal a giant heart. We are entering the Cardiology Department to meet Professor Josef Kautzner, MD, PhD, the Director of Cardiology. With a jocular wink, he points out that the sculpture must depict a hypertrophic heart, considering the relatively small coronary vessels. Kautzner has been head of cardiology for the last 11 years, and his department accounts for 84 of the total of 312 beds at IKEM. The focus of his work, both as clinician and researcher, is on the therapy of cardiac arrhythmias through catheter ablations, implantation of devices for cardiac stimulation and defibrillation, and imaging techniques.

“The Golden Era of Electrophysiology”

The cardiologist has worked in the field of electrophysiology for the last 20 years, and today is one of the leading international experts within the field. Naturally, during this time a great deal has changed; however, certain aspects are particularly relevant for daily clinical routine, as Kautzner explains: “Today, we are in a position to treat acute situations such as..."
myocardial infarction much better. The chances that a patient will survive such a serious incident, live longer, and reach the state of heart insufficiency are on the increase. At the same time, treatments of hypertension and lipidemia have greatly improved, so that conditions like ischemic heart disease are on the decline. But with increasing age, people often develop atrial fibrillation, the most frequent form of arrhythmia. The reason is that atrial fibrillation can be triggered by various heart diseases that become more prevalent with age, such as heart insufficiency, hardening and narrowing of the coronary arteries, or thickening of the heart muscle of the left ventricle. This change is clearly reflected in the number and type of interventions. Whereas just ten years ago, some 1,300 interventions to open or widen constricted or blocked coronary arteries were carried out every year at IKEM, today only 950 of these angioplasty interventions are required. In the case of catheter ablations for curative treatment of arrhythmias, the trend is in the opposite direction. While ten years ago, 360 rather simple ablation procedures were carried out each year, Kautzner and his team now perform around 850 ablations a year. In more than 60 percent of the cases, these are complex procedures, such as treatment of atrial fibrillation. Currently, between one and two percent of the Czech population are affected by atrial fibrillations. This and the increasing incidence of other cardiac arrhythmia disorders have a considerable influence on the development of electrophysiology. For instance, life-saving implants, including implantable cardioverter defibrillators (ICD), were developed. Patients at IKEM have already benefited from these units for the prevention of life-threatening arrhythmias.
for the past 28 years. Additionally, many techniques for catheter ablations are available today that offer a broad therapy spectrum for arrhythmias. Accordingly, Kautzner concludes: “We are currently in the golden era of electrophysiology.”

The Essentials: Multimodality and Integration

Two floors below Kautzner’s office, the heart of the department is beating. Here we find the noninvasive and interventional laboratories. And here, the extent to which Kautzner and his team stay abreast with the ever-increasing complexity of electrophysiology becomes clear. In order to be able to provide every patient with the optimal treatment and to further improve the control and safety of the interventions, two strategies are consistently pursued: Multimodality and integration of imaging and systems. Data acquired from computed tomography, magnetic resonance imaging, and ultrasound can be compared with one another. The more complex the electrophysiology procedures become, the higher the requirements concerning workflow and radiation safety. While some arrhythmias can be treated in less than an hour, other catheter ablations require as many as six hours. While multimodality and integration do not significantly reduce the time required, they do permit more efficient and concentrated work and meet one of Kautzner’s mottos: more control, less risk.

An instrument that has assumed great importance in the day-to-day work at IKEM is intracardiac echocardiography (ICE). This ultrasound imaging has significantly improved the workflow, since during the ablation, the electrophysiologist sees the anatomical conditions “online” and can immediately detect possible complications like thrombus formation and increase the safety of transseptal punctures.

A good example of the integration of state-of-the-art technologies is the Artis zee® angiography system from Siemens that was recently installed in Prague. In addition to the high image quality and recording techniques such as three-dimensional rotational angiography, the C-arm system integrates the very latest navigation technology. In the configuration in use in Prague, this is the MediGuide™ system from St. Jude Medical, which is incorporated in the C-arm. While the physicians maneuver the catheter to the planned position in the heart, they can now control the navigation almost radiation-free in real-time: With MediGuide technology, the current position of the catheter is projected onto a fluoroscopic cine loop previously created using Artis zee. This increases safety and dramatically reduces radiation exposure. The system can also work together with the electroanatomic mapping system and improve its accuracy. Now, it is possible to perform complex catheter ablations of up to six hours duration that require just a few minutes of radiation exposure. IKEM is only the fourth center worldwide to have such a navigation system.

The work of the electrophysiologists in the catheter laboratory with its density and wealth of information is now also provided with advanced visual support. Instead of having to monitor three or four display screens during an ablation, the electrophysiologists now have all the information clearly combined on the new large-format screen. Like the new screen-based Cockpit workplace in the control room, it is part of the Artis zee system. Also here, the less is more principle applies. Now, just a single computer mouse, one keyboard, and one display screen are sufficient to make all the information related to measurement results or various images from the intervention room databases available at the physician’s fingertips.

Based upon Kautzner’s experience, by using multimodality imaging, every current cardiological state of the patient can be diagnosed with great safety and the therapy optimized. At the same time,

“I appreciate the fact that I can help many people through the use of new technologies.”

Professor Josef Kautzner, MD, PhD, Director of Cardiology, Institute for Clinical and Experimental Medicine (IKEM), Prague, Czech Republic

Cardiovascular Disease in the Czech Republic

How many people with a cardiovascular disease are there?
The Czech Republic is a country with higher rates of cardiovascular mortality, and cardiovascular disease is the main cause of death, accounting for 50.2 percent of total mortality in 2010.

What is the most common cardiovascular disease?
The most common forms of cardiovascular disease are those of atherosclerotic origin such as ischemic heart disease and stroke.

radiation exposure can be minimized, which is extremely important, particularly in the case of children. The cardiology department at IKEM is also a training center for the European Heart Rhythm Association. Kautzner explains to visiting colleagues that, with such an intervention, precise and controlled navigation is of particular importance. And here it is not primarily a question of X-ray imaging, but rather the use of multimodality imaging, mapping systems, and image integration with a minimum of radiation exposure.

The state-of-the-art technologies offer possibilities today that were not foreseeable a few years ago. But the head of cardiology explains why he is not interested in every new type of technology: “Effectiveness is the deciding factor. We analyze the potential benefits and try to focus on what in this respect has the greatest effect. In this way, the technologies can have cost-saving effects. Sometimes they are also revolutionary, for example remote navigation.”

**A Look at the Future**

In the control room, to the right of the Cockpit, Kautzner is already using remote navigation to gaze into the future. He points to a kind of ball that is part of the electromechanical system (Sensei X, Hansen Medical). It can be moved in every desired spatial direction and guides the catheter inside the patient’s heart. After some initial skepticism, the cardiologist now knows that this concept works. He believes remote navigation will standardize the interventions and hence will make them safer even for operators with less experience.

The electrophysiologist assumes that as the technology develops, mapping will be one of the most important aspects. Asked what he would wish for in the immediate future, Kautzner’s first response is: “I can envisage so many changes, it could be anything,” only then to confess: “In any event it will be fascinating. I really appreciate the fact that I can be part of this period and am able to help many people through the use of these technologies. One of the most wonderful things in the world is to receive a postcard from a patient on the other side of the globe and to realize that one has completely changed his or her life.”

**Summary**

**Challenge:**
- Increase of complex cardiac arrhythmias
- Catheter interventions under radiological control lasting several hours
- Use of different imaging techniques prior to, during, and following the intervention
- Facilitate smooth and simultaneous operation of widely differing technologies and systems
- Reduction of radiation exposure
- Cost-effectiveness and patient benefits

**Solution:**
- Multimodality imaging
- Angiography systems with a high level of integration potential
- Mapping systems and integration of various image data
- “Online” control with intracardiac ultrasound
- Integrated Cockpit workplace in the control room
- Remote navigation system
- Medical positioning system

**Result:**
- Diagnosis and treatment of arrhythmia with a high level of certainty
- Improved control, reduced risk in complex ablations
- Minimized radiation exposure for patients and staff
- Improved workflow, increased efficiency
- Cost-reduction potential through the high effectiveness and reliability of the techniques

Matthias Manych, a graduate biologist, is a freelance scientific journalist, editor, and author specializing in medicine. He mainly writes for professional journals and newspapers.

Further Information

www.siemens.com/ep
A Keen Eye for Elusive Stents

At a leading cardiology clinic in Brazil, the Artis zee system from Siemens helps Brazilian physicians to view a new class of bioresorbable stents with precision.

By Reinaldo José Lopes
A team of physicians at the Dante Pazzanese Cardiology Institute, one of the main centers for the study and treatment of heart disease in São Paulo, Brazil, is leading the effort to test the safety and efficacy of a new kind of coronary stent, or scaffold, as it is being called. The devices are made with polymeric compounds and are both highly biocompatible and bioresorbable, being ultimately broken down and absorbed by the body over the course of approximately 18 months. Those properties could potentially benefit patients and lessen the adverse effects of carrying a stent in the coronary arteries. But the new scaffolds are also not opaque to X-rays, except at two tiny points, about one millimeter wide each, located at their tips. That means they offer an added challenge to doctors while they are being placed and adjusted in a patient’s vessels. Alexandre Abizaid, MD, and his colleagues at the Dante Pazzanese Institute are using the Artis zee® cardiovascular imaging system by Siemens to overcome that hurdle, so that they can image the bioresorbable stents and the surrounding arteries with precision. “As an interventionist, you need high-quality equipment and outstanding image resolution in order to optimize the performance of your implant, and that goes not only for these innovative scaffolds, but for metallic stents as well,” says Abizaid.

Implanting a bioresorbable stent requires absolute precision. Cardiologists in São Paulo and Siemens’ imaging systems make a perfect match to achieve this.

“It’s great to have the immediate accurate feedback, with real-time X-ray imaging of the area you’re treating.” The team at Dante Pazzanese had already been using Artis zee for a number of other procedures before the bioresorbable scaffold’s clinical trials, which began about a year ago. The equipment was a natural choice as an aid to the tests.

Pioneering Stent Procedures
The Brazilian institute is, of course, no stranger to clinical trials with stents. In fact, according to Abizaid, Dante Pazzanese was among the world’s first institutions that implanted metallic or “bare metal” coronary stents in 1986.
Cardiovascular Disease in Brazil

How many people with a cardiovascular disease are there?
There is no official number for the sum of all cardiovascular diseases in Brazil. The latest telephone survey for hypertension, for example, indicates that 22.7 percent of adult Brazilians have high blood pressure. According to the Ministry of Health, nearly 30 percent of annual deaths in Brazil are caused by cardiovascular diseases.

What is the most common cardiovascular disease?
Apart from hypertension, the leading cause of death in Brazil is cerebrovascular disease (around 10 percent of annual deaths), followed by acute myocardial infarction (around 7 percent of annual deaths).

What proportion of health expenditure goes toward cardiovascular diseases?
One of the most recent estimates (2008) in the journal *Arquivos Brasileiros de Cardiologia* (Brazilian Archives of Cardiology) puts the figure at 31 billion Reais, or 16 billion US-Dollars.

“...You need equipment that allows you to visualize pretty well the stent itself.”

Alexandre Abizaid, MD, Dante Pazzanese Institute, São Paulo, Brazil

More than a decade later, the institute was also a pioneer in the use of pharmacological stents. They have a number of advantages over the bare metallic stents, as Abizaid explains. “When you cut the skin of the back of your hand and it heals, it often doesn’t show a scar at all,” he says. “But sometimes there’s tissue hypertrophy at the site of the injury, with a thick, ugly scar.”

The situation is similar when one considers coronary, bare metallic stents. In most cases, cicatrisation takes place smoothly. But in around 30 percent of non-pharmacological implants, there is the phenomenon known as intimal hyperplasia, a dangerous thickening inside the blood vessel. After six to nine months, the intimal hyperplasia tends to lead to so-called restenosis — the flow of blood in the artery that had been reopened by the stent becomes constricted again.

Pharmacological stents were developed to overcome this kind of problem by avoiding excessive hyperplasia. The drugs that coat their surface inhibit cell proliferation. They have been pretty successful over the years, reducing the rate of restenosis from 30 to 5 percent. Still, there are potential problems with this approach, according to Abizaid.

“The most important one is that, when using a pharmacological stent, you also need to implement what we call dual antiplatelet therapy, with aspirin and clopidogrel, to protect the patient against stent-generated thrombosis,” he says. “That’s because, although the drugs on the stent are a great way to stop restenosis, the delay of the cicatrisation process itself means that the metal from the stent remains exposed for a larger period. And that metal, in contact with blood flow, may unleash thrombosis. You have to be on the lookout for this kind of complication because it is an important trade-off between risk of restenosis and risk of thrombosis,” he explains.

Bioresorbable Scaffolds: Multiple Advantages

This is where the bioresorbable scaffolds or stents come in. It is hoped that, because they eventually disappear from the blood vessel, patients will not need to rely on the dual antiplatelet therapy for a prolonged period of time. “On the other hand, of course, I think it is unlikely that we will be able to get rid of aspirin and clopidogrel altogether during the first six to twelve months after the implantation of the stent,” says Abizaid. Another potential advantage involves restenosis itself. Current pharmacological stents of the metallic variety may lead to the so-called late catch-up phenomenon: In the first six to twelve months after implantation, the stent may inhibit restenosis, only for it to appear after two years or so. Abizaid believes bioresorbable scaffolds are unlikely to have the same effect.

Finally, in the most serious cases, one ought to take into account the effect of multiple metallic stents in long-term patients, the physician argues. “It’s not uncommon for us to treat patients who are relatively young with diabetes, when you have problems in several vessels,” says Abizaid. “If you metalize all those vessels, forming what we call a ‘full metal jacket’, you’re going to have a major problem if that patient happens to need surgery in the future. Where do you think the surgeon will be able to insert the saphenous vein during coronary bypass surgery if the whole arterial network already has a metallic framework? Avoiding that would be another important advantage,” he says.

Finally, there is a potential imaging advantage. “You could use tomography in patients with bioresorbable stents...”
that would be hard to do in someone with a conventional stent, because the metal induces a number of artifacts which compromise the tomography, and you can't see inside the vessel properly," says Abizaid. "So follow-up with these patients could be less invasive."

**Precision Is Crucial**

It is clear, then, that precision imaging is indispensable if physicians are to take full advantage of bioresorbable scaffolds. "Most, though not all, bioresorbable stents are not radio-opaque," Abizaid explains. "That is why, for example, companies have placed two small platinum marks at the proximal and distal borders of the implant. Or you could use a polymeric material that is also radio-opaque. We're working with both approaches here and elsewhere in Brazil. You need equipment that allows you to visualize pretty well the stent itself – its expansion, its position." This is where the outstanding image quality of Artis zee comes in.

While preparing a patient to receive the new scaffolds, one of the first steps is to use the Artis zee system to pinpoint the exact location of the plaques inside the coronary vessel, through so-called online QCA (quantitative coronary angiography). That helps the physicians determine the exact size of the device that is going to be used right away.

"Precision regarding size is crucial for the bioresorbable stents because they are far less tolerant to post-dilation with a balloon," says Abizaid. "Metal is much more amenable to it – you can start with a smaller stent and use a bigger balloon and the stent goes along with it. There's no risk of rupture. On the other hand, if you do the same with a polymeric stent, odds are you are going to fracture it." He adds that modern equipment like Artis zee allows physicians to have this precision by producing a near-perfect definition of the vessel's borders, its diameter, and the size of the lesion. "I need to be sure that I'm neither overestimating nor underestimating the size of the implant I need," says Abizaid. "If I underestimate it, the stent keeps 'dancing' inside the vessel and I'm in danger of causing a clot. If I overestimate it, there's the danger of a fracture. I could even rupture the vessel. The equipment we have allows us to cover the range we need to avoid both dangers," he explains.

**Artis zee Before, During, and After Implantation**

Another important factor is to know exactly how much residual lesion is left inside the vessel. "Of course the ideal would be zero lesions. We would definitely want to cover the lesion shoulder to shoulder, so to speak, so that there are no remains of plaques in the borders," he says. If 30 or 40 percent of the original plaque still remains, the team would have to use a balloon again, with more pressure and a bigger diameter to have a better result. "And we need to know exactly where the stent boundaries are," says Abizaid. "That's why viewing those little millimeter-wide dots is so important." Flaws during the procedure can also induce desiccation of the vase or even restenosis.

According to Abizaid, the whole process of implantation is over after 30 to 40 minutes. "Everything is pretty much automatic," he says. "You do the angiographic injection, a technician does the measurements, you pre-dilate with the balloon and then post-dilate to optimize the placement of the stent."

The Artis zee equipment may also be an important tool during late follow-up. "It is going to depend on the symptoms and on the complimentary exam," says Abizaid. "If the patient comes back after six or nine months with angina pectoris and pain, and if a nuclear medicine exam shows ischemia, we will have to do a catheterization."

Again, the equipment is crucial to give the physicians the exact position of the stent's landmarks, so that they may evaluate whether the stent itself is the problem or whether the patient's disease has progressed. "That way, we can decide if we need to use another stent or if it's a case for surgery," explains Abizaid. "We wouldn’t be too cavalier to do catheterizations in our patients, only if that proves absolutely necessary."

The team at Dante Pazzanese will continue the Brazilian trial of the bioresorbable stents along with two other major institutions in the country, the Albert Einstein Israelite Hospital, also in São Paulo, and the Hospital do Triângulo Mineiro, in Minas Gerais State. The three hospitals have already treated around 40 patients and, according to Abizaid, early results look encouraging.

Reinaldo José Lopes is the science and health editor at Folha de S.Paulo, Brazil's leading daily newspaper.
Getting to the Heart of Cardiovascular Magnetic Resonance

At Royal Bournemouth Hospital in the UK, the Cardiac Dot Engine software for improving cardiovascular magnetic resonance procedures has won over both radiologists and cardiologists – and they, in turn, are now enlightening visiting colleagues from around the world about this timesaving new technology.

By Bill Hinchberger
There is a joke about Bournemouth: It is the biggest place in the United Kingdom that nobody has ever heard of. But anyone who really cares about cardiovascular magnetic resonance (CMR) has probably heard of the Royal Bournemouth Hospital, the main medical center in the coastal retirement-resort region that is home to 400,000 people.

The Royal Bournemouth Hospital regularly attracts physicians curious about the Cardiac Dot™ Engine, the new Siemens software on its 1.5 Tesla MAGNETOM® Aera system that is revolutionizing the way CMR procedures are carried out. “They usually want to know if they should buy it,” says Matthew Benbow, Superintendent Radiographer of the computed tomography (CT) and magnetic resonance imaging (MRI) Department. Adds his colleague Russell Bull, a Consultant Radiologist, “I say it is worth it if you use it.” Benbow and Bull have become the “go-to guys” for medical professionals who want to know about the Cardiac Dot Engine – mainly because they helped develop it.

Dot stands for “Day optimizing throughput” and, if you stop to think about it, the title describes exactly what the software does. MRI sounds fairly straightforward: Immobilize the part of the body you want to view and look at static cross-sections of the area you want to examine. But, of course, the heart cannot be immobilized. Neither is it positioned squarely in the chest, as examiners might prefer. As the CMR examination is conventionally performed, the MRI technologist (also known as a radiographer) must manually plot a series of coordinates to ensure useful results. Only a handful of these professionals have sufficient training and experience to do it right, and even then they often need to have a radiologist at their side. This labor-intensive and ultimately idiosyncratic approach means that the CMR tests take much longer than a conventional MRI. Since the MRI scanner most often is split between different kinds of examinations, cardiac patients often face long waiting lists. The only other option is cardiac diagnostic imaging using radiation, which has the disadvantage of possible side effects for the patient.

At the Royal Bournemouth Hospital, all 18 radiographers have been trained to perform the CMR examinations using the Cardiac Dot Engine. The hospital can do three tests in a two-hour slot, up from two under the old system. Patients now only need to wait two weeks for an appointment instead of the previous eight weeks. “We use CMR like a mainstream test,” notes Bull. And Benbow adds, “It should be like a production line without the patient feeling like it is.”

A Partnership with Mutual Benefits

The Cardiac Dot Engine story at Royal Bournemouth began a decade ago when the facility began its transformation from a general public hospital into a regional cardiac center. From just two cardiologists back then, the institution’s staff of specialists grew to the current nine – not to mention the usual four or five visiting physicians. In 2004, they started using MRI for cardiac patients. “But it took too long,” recalls Bull. “We had a low level of service.”

So five years ago, the Royal Bournemouth Hospital’s need to attend to more patients dovetailed with Siemens’ search for a partner institution in its effort to improve a prototype of the Cardiac Dot Engine. “We did three years of product trials to help further develop it,” says Bull. “Over that period of time, we developed a close relationship with the people in Germany. They chose to work with us because we are a general hospital. We have time pressures and we have to do things quickly.” Benbow recalls that “both Russell and I would give them feedback. And if we thought something didn’t work, they would listen to us.” The steady stream of comments flowed, and changes were made. “A lot of things needed to be tweaked,” notes Bull.

After a couple of years, Siemens had put the finishing touches on a product that could be customized and personalized according to each patient’s characteristics – making adjustments, for example, for the length of time people can hold their breath. The Cardiac Dot Engine offers step-by-step guidance for the technologists and even automatically conveys audio instructions to the patient so that the professional can focus entirely on the patient, his or her images, and their quality. The examination is almost completely automatic but still configurable by the user. The software helps to handle the complexity of CMR examinations, allowing technologists to work more quickly and efficiently.

Overcoming Resistance to Change

Yet not everyone seems happy. Naysayers claim that their painstaking, hands-on modus operandi provides superior results.
Dot in Italy

The 1,200-bed University Hospital in Brescia, Italy, acquired the Cardiac Dot Engine, says Roberto Maroldi, MD, Head of the Department of Radiology, “because we wanted the best software available.” But not everyone at the hospital was convinced from the start. “I was a bit skeptical,” says Maroldi’s colleague, Davide Farina, MD. “I thought maybe we didn’t need it because we had good radiographers.” But nobody needs to convince Farina now. “I am highly impressed,” he says. “And I would tell anyone that.”

Before the Cardiac Dot Engine, radiographers in Brescia had trouble getting the planes right. The doctor, often Farina himself, had to sit and monitor the cardiovascular magnetic resonance scanning the entire time. Now technologists are guided through the entire process in semi-automated fashion. Everything is explained. “There is little chance for error,” says Farina.

The tests take only 35 minutes on average, and the process is so smoothly guided that the technologist can conversationally prep the next patient as the current procedure runs its course. Now, after three years, the patient load has expanded from a trickle to include a more varied set of clinical cases that include arrhythmia, dilated cardiomyopathy, hypertrophic cardiomyopathy, and myocarditis. “The Cardiac Dot Engine has helped us to handle this increased load of CMR cases,” says Maroldi.

Cardiovascular Disease in the UK

How many people with a cardiovascular disease are there?
There are 2.6 million people in the UK with heart disease.1 This is 4.2 percent of the total population.

What is the most common cardiovascular disease?
Angina pectoris is most common.1

What proportion of health expenditure goes toward cardiovascular diseases?
17.1 percent, according to an often-cited study2


“They get incandescent when I say we can do it quickly and easily,” says Bull. “They say that they do very few but that they are perfect.” Others might be less emphatic in their skepticism but still shy away from change. “Some are more open-minded, but it is like the guy who has always had a Ford Mondeo,” says Benbow. “He always gets another Ford Mondeo.”

Despite the resistance, more and more visitors are heading to Bournemouth for a look. “If it did not work, they would just ignore it,” says Bull.

Benbow and Bull agree that the test results are at the same level of quality as those under the old system, so the main benefit to patients is that they are able to have an examination that may not

“Cardiac MRI should be like a production line without the patient feeling like it.”

Matthew Benbow,
Superintendent Radiographer,
CT and MRI Department,
Royal Bournemouth Hospital, UK
have been available before. In addition, time counts, not just for doctors, but also for patients. Patients might not realize it, but the quality of the test depends in large part on their levels of engagement and, conversely, boredom. A quicker test means that patients are more likely to pay attention, cooperate, and follow instructions, for example, by holding their breath at proper intervals, during the entire duration of the examination. “If people are in there for an hour-and-a-half, they get fed up,” Bull notes. There is one indisputable improvement in quality, however, as Benbow and Bull see it – and that is in follow-up tests. Under the conventional system, the technologist must manually reset the parameters once again during a follow-up. This leaves room for variations in the parameters and thus the results. With the Cardiac Dot Engine, the automated system helps ensure greater standardization. “If there is no standardization, it cannot be better,” says Bull. “Occasionally, there are automated planes that might not be perfect. But you can do multiple views. You can add redundancy. You can do more.” With a greater volume of tests, radiologists must pump out more results. But no longer are they forced to sit next to the technologist during the exam to make sure that the planes and parameters are right. “As a radiologist, I now have more cases to report,” admits Bull. “But each report is a little quicker to make, and the extra time is more than compensated for by not having to accompany the examination. Before, I would spend my time saying that this or that point had to be a little more to the left or a little more to the right.” The bottom line is that the Cardiac Dot Engine makes the CMR process more efficient and productive. And medical professionals display more confidence in the results. “This is called progress,” says Bull.

**Summary**

**Challenge:**

- Royal Bournemouth Hospital’s need to do more CMR examinations when it was transformed into a regional cardiac center
- Siemens’ need for feedback to improve a prototype of the Cardiac Dot Engine

**Solution:**

- Teamwork between Siemens and Royal Bournemouth Hospital that would allow the hospital to reap early benefits while helping to work out the kinks in early versions of the Cardiac Dot Engine

**Result:**

- Better workflow to achieve top-notch results with fewer problems in a shorter period of time
- Final development of a revolutionary new product
- Scan scheduling blocks at Royal Bournemouth Hospital reduced from 60 minutes to 40 minutes
- Showcased results as an example for other medical facilities

**Further Information**

[www.siemens.com/dot](http://www.siemens.com/dot)
A Vision Becomes Reality

Beginning with a simple video-conferencing system at Astrid Lindgren Children’s Hospital in Stockholm, a doctor’s vision revolutionized the way pediatric cardiology is practiced throughout Sweden. It is an example of how challenges in access to high-quality healthcare can be overcome, and what tomorrow’s healthcare system may look like.

By Tanja Berbalk

The midnight sun, snow-buried winters, traditional meatballs, herring, Vikings and Volvos, and IKEA – these are the things for which Sweden is known. But Sweden is much more than just those things. Many Swedish innovations are big successes around the globe: Affordable Swedish design is among the most popular in the world and the country’s domestic and international policies serve as models in Europe and beyond. Although Sweden is the third largest country in the European Union in terms of geographic size, its total population is only about 9.4 million – comparable to the metropolitan region of Chicago. A sparsely populated country like Sweden needs intelligent solutions – not only for its infrastructure, but also for its healthcare system. How can the best healthcare be brought to the most remote areas?

Bo Lundell, MD, had an idea about how this question could be answered. He is the head of the Pediatric Cardiology Department at Astrid Lindgren Children’s Hospital in Stockholm. Lundell’s department is the center of pediatric cardiology in this region, covering two million inhabitants in the Stockholm area and treating 300 inpatients and 7,000 outpatients per year. Lundell and his team have always worked in close collaboration with the other 34 pediatric cardiology teams in Sweden to discuss all kinds of heart problems such as congenital malformations, myocardial infarctions, arrhythmias, and cardiomyopathies in fetuses, children, and adolescents up to 18 years of age. In the past, discussions took place over the phone. But the children’s hospitals mainly examine their little patients using ultrasound systems – a technology that usually produces videos. "Motions cannot be described over the phone. And especially in acute cases, sending files takes too much time," Lundell points out.

As a consequence, he purchased a standard, off-the-shelf video-conferencing system and set up a communication center with monitors, cameras, microphones, and high-speed Internet to be able to go over patient files in real-time with colleagues all over Sweden.

The Prerequisites

Of course, the project was not as easy as it sounds. The biggest challenge was to equip a total of 34 children’s hospitals across Sweden with identical and compatible video-conferencing systems, just like the one at Karolinska – simultaneously. The future conferencing system had to suit their purposes to transfer high-resolution images at high frame rates and take two data streams with up to 60 images per second. Funds were needed. Lundell found a partner in the Swedish Heart and Lung Foundation. There were, however, some prerequisites. A doctor at every hospital needed to be trained to run the system and do the technical maintenance, and the system had to be used for children with heart problems only. Another prerequisite was to use the proprietary healthcare network of Sweden instead of the conventional Internet connection to meet data security regulations. Since the Swedish healthcare network was already well established, this task was solved easily. Soon after Lundell’s initial idea, the Swedish conferencing network in pediatric cardiology named "Gertrud" was born. Lundell’s eyes sparkle when he sits in his fully equipped, high-tech communication center reflecting on his and his team’s greatest achievements – which is saving children’s lives.

All For One

From a technical perspective, the video-conferencing system was only possible because the hospital had one single image storage software. The pediatric cardiology department is using syngo® Dynamics – a cardiovascular image and information system that was developed for diagnostic image review, dynamic image processing, and archiving cardiac imaging.
As soon as Lundell presses “store” on one of the Siemens ultrasound systems, the image or video file is transferred to the image database and can be accessed from any workstation or ultrasound system – anywhere within the hospital network – including the video-conferencing room.

To remain consistent, syngo Dynamics is also used in the obstetrical department for fetal examinations – critical for departments that need to work so closely together.

Taking it one step further, the institution will soon receive the syngo via WebViewer2 for Apple iPads®3 so that Lundell and his colleagues can have video conferences wherever4 they are. They can move around in the ward, perform examinations, and then answer a video phone call using the integrated iPad camera for video streaming.

Before syngo Dynamics, the department did not have a digital storage system and had to rely on video tapes, but never accessed them again because it was too complicated to retrieve them. When asked about the most important feature of syngo Dynamics, Lundell answers: “It is the ability to compare previous and newer studies of one patient directly in the system to be able to see minor changes.”

Lundell prefers to work with Siemens ultrasound systems because of their high image quality and resolution. This is particularly important in pediatric imaging, “Since defects might not be bigger than a millimeter, and precise images are the base for a successful procedure. We do fetus examinations in week 17 or 18 with the ACUSON® S2000 ultrasound system. We are able to characterize complex lesions at an early stage,” Lundell says.

No Distance Too Far
Since the video-conferencing system has been up and running in all Swedish pediatric departments, it has contributed tremendously to the collaboration between them. To Lundell, the benefits of this new way of communicating with hospitals across the country are obvious. First, the system offers new ways to share and increase expert knowledge. If anyone in the hospital network needs consulting on a complicated case, the doctor in charge can call his or her colleagues in Stockholm or elsewhere in Sweden. Additionally, the system is used for training and education across the country. Lundell also organizes periodical conferences with all 34 children’s hospitals to discuss new and significant cases from which everyone can learn. As a knowledge sharing platform, the video-conferencing system is especially valuable for smaller hospitals in remote areas. With the push of a button, they can contact other hospitals and departments in Stockholm, Goteborg, or Uppsala for difficult cases of very sick infants, particularly newborns.

Secondly, the system can be a valuable tool to get a fast diagnosis, determine treatment, and prepare the patient’s transportation. Lundell explains: “If a child needs to be transported to us, we can plan the care in advance because we have already discussed every detail via video conference. The more we know about the patient, the better we can provide care.” Just like in the summer of 2011, when a baby was born in Goteborg and appeared to be healthy after the first routine check-up. A few weeks after the baby’s birth, the parents took the baby on vacation to the small island Öland, in the south east of Sweden. All of a sudden, the baby got sick, and the parents took their newborn to the local hospital. Since the small hospital was not specialized in pediatrics, they did not have the expertise to diagnose the little patient. Thanks to the video-conferencing system, the doctors could immediately contact heart specialists in Goteborg on the other side of the country and together they managed to diagnose the heart malformation of the child. The baby was then transported to Goteborg by helicopter and operated on just three hours after the diagnosis – the baby survived.

In another case, the video-conferencing system spared sick patients and their families the burden of traveling to the next larger pediatric center. Lundell recalls a story about a family that lives in a small city in the north of Sweden...
Cardiovascular Disease in Sweden

How many people with cardiovascular disease are there?
The total number of deaths in 2010 from age 0 to 19, accounting for diseases of the circulatory system, was 19. At age 85 and older, the total rate was 19.452.1 42 percent of all deaths in all age groups account for cardiovascular disease.2 Sweden’s infant mortality rate was three per 1,000 live births in 2010 – compared to a global rate of 42.3 The total fertility rate in Sweden in 2010 was 1.98; the global rate was 2.45.4,5

What proportion of health expenditure goes toward cardiovascular diseases?
The total healthcare costs of cardiovascular disease in 2003 was € 2,841,727,504 (3,500,328,269 US-Dollars) or 12 percent of the total healthcare expenditure.6


and planned to have their baby undergo surgery in Uppsala, a city just north of Stockholm. Since their hometown hospital was connected with Uppsala via video conference, the family did not need to travel to Uppsala for pre-surgical exams and consultations with the responsible surgeons. Instead, they participated in a remote discussion with their doctors. This saved the family and the hospital time, money, and stress.

Lastly, the implementation of the video-conferencing network streamlines workflows, making the entire Swedish healthcare system more efficient. “Thanks to the system, we can make our healthcare system more worth the money,” says Lundell. He is convinced that a video-conferencing network like the one he implemented in Sweden would be possible anywhere in the world, if the prerequisites of data security, Internet bandwidth, and clinical IT are tangible. Already, several neighboring countries, such as Iceland and Norway, have shown interest in getting connected to Sweden’s system as well.

In the long run, a video-conferencing system for remote case discussions not only improves knowledge among clinicians, but also contributes to equality in treatment, regardless of where the children and their families live or what their financial situation may be.

Sweden ranks among the lowest for infant mortality in the world.5 Close collaboration through video-conferencing certainly did its part to help achieve this. By all means, Bo Lundell does his part day-in and day-out to improve the quality of life throughout Sweden.

Tanja Berbalk has a degree in sociology, marketing, and communications. She is an editor at Medical Solutions.

Further Information
www.siemens.com/syngo-Dynamics
www.siemens.com/syngo.via

Summary

Challenge:
• Connect expert centers for pediatric cardiology in Swedish metropolitan areas with hospitals in remote areas
• Discuss ultrasound videos in real-time
• Deliver fast and excellent care in acute cases
• Spare sick children the burden of unnecessary travel

Solution:
• Establish a nationwide video-conferencing system in all 34 pediatric facilities that are connected to syngo Dynamics for data reviewing and storage

Result:
• Easier way to share knowledge
• More efficient healthcare system
• Improved quality of life
• Equality in treatment, regardless how remote the patients may live

2 The application is not for diagnostic viewing/reading on mobile devices. Please refer to your sales representative whether the product is available for your country. Diagnostic reading of images with a web browser requires a medical grade monitor. For iPhone® and iPad® country specific laws may apply. Please refer to these laws before using for diagnostic reading/viewing. For Japan: Applications on iPhone/iPad/iPod® are not a medical device in Japan. Use at your own risk. They require a medical grade monitor. For iPhone® and iPad® laws before using for diagnostic reading/viewing. For Japan: Applications on iPhone/iPad/iPod® are not a medical device in Japan. Use at your own risk. They are not intended to be used for diagnosis.
3 iPad is a trademark of Apple Inc.
4 Prerequisites include: wireless connection to clinical network, meeting recommended minimum hardware requirements, and adherence to local data security regulations.
Dr. Komiya explains the placement of the prosthetic heart valve.
Heart Valve Replacement – Significant Changes Thanks to Hybrid Surgery

Today, Japan’s population is living longer than ever, but that also means a higher national incidence of elderly patients needing heart valve replacements. Siemens is collaborating with surgeons at Kurashiki Central Hospital to introduce lower-risk catheter-based procedures that eliminate the need for open-heart surgery in many of these cases.

By Clark Shimazu

Kurashiki Central Hospital is among three Japanese medical institutions whose multidisciplinary surgery teams conducted clinical trials of catheter-delivered Edwards prosthetic valves over the past year. The aim is to gain approval from the National Health Ministry for the innovative procedures. All of these institutions are equipped with Siemens hybrid rooms – a conventional operating room (OR) equipped with an angiography system to allow for both open and minimally invasive treatment in one room.

At Kurashiki Central Hospital, the room is equipped with a ceiling-mounted Artis zee angiography system from Siemens. The machine enables intra-procedural imaging in 2D and 3D and helps multi-functional teams of cardiac surgeons and cardiologists to best perform their procedures.

Doing heart valve replacements in a hybrid room is also recommended in a recent joint paper from the Society of Thoracic Surgeons (STS) and the American College of Cardiology (ACC), two of the most important cardiac surgical and cardiological societies in the world.

A Multi-disciplinary Team in a Multi-disciplinary Room

“The methods for implanting heart valves cannot be learned on one’s own because close teamwork is essential among the different specialists, including interventional cardiologists, echocardiographers, imaging specialists, and heart surgeons like myself,” says Tatsuhiro Komiya, MD, Chief of the hospital’s Cardiovascular Surgery Department. “Since the launch of our joint program with Siemens in May 2010, each specialist has not only had to learn his own specific skills but also gain some familiarity with other team members’ tasks, because we have to work in concert on the operation in a very short period of time.”

The first round of clinical trials is especially important in Japan, where many elderly people among the aging population are outliving the normal lifespan of
their heart valves. The aorta is the biggest artery in the body; therefore, its valve handles a larger flow than other heart valves. Seniors with a lot of co-morbidities, however, are not indicated to undergo open-heart surgery due to the risk that this procedure poses for them.

“For more than 30 years, we’ve relied on open-heart surgery, and that requires splitting the sternum,” Komiya explained. “Many patients with defective heart valves are more than 70 years old. Among the national population, there are annually some 10,000 cases of degenerative disease in the aortic valve, but medical institutions must turn away many prospective patients due to their advanced age and physical frailty. As a consequence, we can do only 70 open-heart surgeries a year at Kurashiki Central.”

**Catheter Delivery**

The Kurashiki heart team is focusing on two different options for catheter-delivered replacements of the heart valves, transapical and transfemoral. The aortic valve from Edwards is replaced through a transapical insertion on a valve-mounted catheter, which is introduced through a surgical puncture into the apex of the left ventricle.

Produced by Edwards LifeSciences, based in Irvine, California, USA, the prosthetic valves are based on an ingenious, yet simple design concept. They are bovine in origin and similar in size and shape to the natural valves in the human heart. These bio-valves are expandable wire-mesh stents which, when opened, hold the valve firmly in place. The Edwards valve does not require prior removal of the patient’s own valve, but instead is slid inside the defective valve, permanently pushing back its leaflets and immediately taking over the function of maintaining one-way blood flow.

Catheter delivery minimizes or eliminates the need for open-heart surgery along with the trauma of opening large parts of the thorax. The patient also spends far less time in surgery, and there is no longer a need for external blood circulation with a cardiopulmonary bypass machine. Navigation of an Edwards valve into the correct location demands orchestration of many components, including several high-tech imaging modalities, intensive planning and preparation, real-time monitoring, and multidisciplinary collaboration in ensemble.

**Taking a Balloon Ride**

Komiya points out: “The single most important step is to align the valve ring on the aortic annulus between the left ventricle and the proximal ascending aorta. The valve must be precisely positioned on this line, neither too far in nor too short of the mark.”

Echocardiograms, pre-operative computed tomography and intra-operative syngo® DynaCT images provide the heart team with a three-dimensional schema of the target region. The valve must also be perpendicular to the X-ray projection.
to capture the best real-time images of the catheter’s progression.
The Edwards Sapien valve is compressed around a balloon catheter by a crimper to a diameter narrow enough to fit inside the patient’s aortic valve. Meanwhile, the cardiac surgeon uses a scalpel to open an entry port between the two ribs directly above the apex. After completing the purse string sutures, the surgeon punctures the apical area for insertion of an introducer sheath. A temporary pacemaker lead is placed in the heart. The valve-bearing catheter is introduced through the sheath. Turning the control knob, the operator then maneuvers the flexible catheter, curving it toward and into the left ventricular outflow tract. After checking the alignment on screen, the temporary pacemaker stimulates the left ventricle with up to 200 beats per minute. The heart contracts so rapidly that the cardiac output is minimized. The balloon swells to enlarge the stent, locking the bio-valve into place. The pacemaker is stopped; the balloon is deflated. The heart again pumps.
The team watches to determine whether the Edwards valve is firm and functioning. The catheter and electrode wire are retracted. The surgeon then removes the introducer sheath to close the puncture in the heart.
“Each specialist has not only had to learn his own specific skills but also gain some familiarity with other team members’ tasks.”

Tatsuhiko Komiya, MD, Chief, Cardiovascular Surgery Department, Kurashiki Central Hospital, Kurashiki, Japan

Clark Shimazu is an environmental and technology writer based in Chiang Mai, Thailand.

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Hindus as per religious belief often tie a sacred red thread – known as moli – around trees, for wish fulfillment. Two marble sculpted trees adorn the huge lobby at Medanta – the Medicity, a sprawling 4.3-acre multispecialty hospital situated in Gurgaon, a suburb of Delhi. Referred to as the “trees of life,” their branches are laden with thousands of moli threads, each tied in hope of speedy recovery of a loved one. The sheer number of these threads lend a brilliant red tinge to the hospital lobby. The innumerable moli threads on the branches also manifest the amazing pace at which Medanta has earned a name for itself in the 30 months since it began operations. More than one thousand patients from all across India and overseas come to the outpatient departments of Medanta each day.

Started by renowned cardiovascular and cardiothoracic surgeon Naresh Trehan, MD, Medanta is known not just for cardiology, but also for its other departments like oncology, pediatrics, gynecology, urology, neurology, and ophthalmology. Medanta also focuses on clinical research, education, and training. Through this multidisciplinary approach, Medanta hopes to translate scientific advances more swiftly into new ways of diagnosing and treating patients and preventing diseases.

Medanta’s key differentiator is world-class healthcare at affordable prices. “While we were setting up this hospital, one of our key objectives was to offer the finest healthcare facility in India, at affordable rates. And we have been successful in achieving that,” says Trehan, Chairman and Managing Director of Medanta – The Medicity.

In India, affordable healthcare is the key to running a successful hospital for a host of reasons: The government hospitals, which offer cheaper treatment, are in a poor state. The penetration of health insurance in India is low and most patients pay out of pocket for their medical expenses. The purchasing power of a vast majority of patients is also low. In addition, the reach of primary healthcare facilities in rural areas is poor and people often travel from remote villages and small towns to cities for treatment. Finally, India has a rising number of diabetics, patients with coronary artery disease (CAD), and cancer, making it critical to have good hospitals that offer effective and affordable healthcare services.

Trehan has adopted a two-pronged strategy to meet Medanta’s objective: He hired the best doctors in the country and went in for the latest technology. Medanta has some of Siemens’ latest equipment, such as a SOMATOM® Definition Flash computed tomography (CT) system, an Artis® zeego endovascular surgical catheterization laboratory, a MAGNETOM®

“Real-time transport of images is a great bonus. With syngo imaging IT solutions, images can be delivered to the point of care.”

Naresh Trehan, MD, Cardiac Surgeon, Chairman and Managing Director, Medanta – the Medicity, Gurgaon, India
Verio 3 Tesla magnetic resonance system, a Biograph® mCT PET-CT system, two Symbia® gamma cameras, several digital Siemens X-ray systems, as well as ACUSON™ S2000 and ACUSON Antares™ ultrasound systems. Medanta also deploys the imaging IT trio of syngo®.via1, syngo.plaza, and syngo Dynamics. These imaging solutions help speed up the process of diagnosis, enabling faster and more effective treatment.

The Power of High-tech Imaging

Imaging is a key part of the diagnosis of a disease. According to Praveen Chandra, MD, Chairman, Division of Interventional Cardiology, in most of the cases, 30 percent of the diagnosis is based on imaging, 30 percent on pathological tests, and 40 percent on clinical examination. Speaking of how imaging technology has helped cardiologists, Trehan says that for screening and early detection of CAD, the SOMATOM Definition Flash is a God-sent tool. “It has low radiation, and we are comfortable sending patients for a CT scan,” he said.

With the use of the CT system and the imaging IT solutions, cardiologists can make more accurate and informed decisions. They can quicker find out if the patient is suffering from CAD or not. “And if the CAD is at an early stage, the cardiologist can work on early reversal of the disease,” says Trehan.

The PET·CT at Medanta offers an additional noninvasive test, enabling a quantitative assessment of the myocardial blood flow and coronary flow reserve. While the first stage is the acquisition of images through various source-type systems, the second stage is the transportation of these images. Previously, transporting images took a lot of time. “Doctors would listen to reports over the phone and often perform surgeries without seeing the images. This led to inaccuracies,” says Trehan. The most common practice was to hand over images on a CD. The syngo imaging IT solutions have addressed these challenges by making images from multiple modalities available at the point of care. “The syngo imaging IT solutions help us diagnose, prognosticate, and then plan the treatment for all kinds of diseases,” says Chandra.

Taking Images to the Point of Care

syngo.via is an advanced visualization software that enables clinicians to view, evaluate, report, and share radiological images in their own particular way. It also provides them with a broad variety of automated tools and processes to enable more efficient reading in their clinical routine. syngo.via can be used as a stand-alone device or in a client-server solution utilizing the IT infrastructure of almost any hospital for its multimodality.
dality pre-processing. Clinical workflows are tightly integrated with the hospital information system (HIS) and picture archiving and communication system (PACS) infrastructure. Medanta is using syngo.plaza – the agile PACS from Siemens that enables 2D-, 3D-, and 4D-reading in one place. With syngo.plaza, images are accessible throughout the hospital, be it the operation theater, the outpatient department, or the wards. Similarly, syngo Dynamics is a multi-modality system for diagnostic image review, dynamic image processing, and archiving. It provides physicians with the tools necessary to access multimodality images and clinical information, fully describe study findings, and archive and distribute reports. Reporting physicians are provided access to patient studies from almost any department or server across the enterprise with a single login. Streamlining the reporting process is enabled through several easy-to-use features. In cardiology, syngo Dynamics helps clinicians in getting comprehensive cardiovascular workflows and applications for evaluating images from multiple modalities. “Real-time transport of images is a great bonus,” says Trehan. “With syngo imaging IT solutions, images can be delivered to the point of care.”

Increasing the Throughput

One of a clinician’s most important jobs is to explain the disease and the line of treatment to the patients and their families. “With instant availability of images, we can discuss the disease with patients and their relatives and help them understand the problem,” says Chandra. According to him, ready access to images makes decision-making a lot faster for both the doctor and the patient. In cardiology, imaging solutions also help identify viable myocardium. “Often, patients with left ventricular [LV] dysfunction are abandoned as doctors feel they can’t be cured,” says Trehan. With imaging solutions, such patients can be treated by recognizing the myocardium that is hibernating and can be fixed. In recent years, diagnostic testing to evaluate the presence and extent of viable but dysfunctional myocardium has become an important component of the clinical assessment of patients with chronic CAD and LV dysfunction. It is well established that impaired LV function in such patients is not always an irreversible process related to previous myocardial infarction, because LV function may improve considerably after myocardial revascularization procedures.

“The syngo imaging IT solutions have led to complete integration of various specialties,” adds Chandra. Often, patients come with not just one problem, but multiple health issues. For instance, a heart patient may also be diabetic, or could have an urological problem. With integration via the syngo trio, the patient is able to receive the right treatment from all the concerned departments. All this has increased accuracy across the institution.

Cardiovascular Disease in India

How many people with a cardiovascular disease are there?
There were 38,041,090 patients with cardiovascular diseases (CVD) in India in 2005. The population of India in 2005 was 1,080,264,000. As per these numbers, 3.52 percent of the Indian population suffers from cardiovascular diseases.

What is the most common cardiovascular disease?
Coronary heart disease is the most prevalent heart disease in India, contributing more than 95 percent of the total CVD prevalence, and more than 85 percent of all CVD-related deaths in 2004.3

What proportion of health expenditure goes toward cardiovascular diseases?
This can be calculated as follows: The GDP of India is US$ 1.676 trillion, its expenditure on healthcare makes up 6.1 percent of its GDP, so it equals US$ 102.2 billion. 16 percent of this is spent on cardiovascular diseases. So total expenditure on cardiovascular diseases is US$ 6.35 billion.

Faster diagnosis and treatment leads to higher throughput, making Medanta one of the busiest hospitals in and around Delhi. There is a lot of pressure on beds at Medanta, with more than 700 patients being admitted every day, according to Chandra.

**Winning the Confidence of Patients**

The imaging IT solutions have also brought about quality control at Medanta. “I watch over 100 angiograms sitting in my cabin,” says Trehan. This way, he is able to reduce misjudgments by other clinicians. “When angiograms are being performed at the cath labs, we sit in our cabins and discuss whether an angioplasty is required or not. It’s all online and ready. It’s a huge value,” says Trehan, pointing to the workstations behind his desk, with live images from the cath labs.

Medanta has five advanced Siemens cath labs including an Artis zeego endovascular surgical cath lab. With the hybrid room, as it is known, physicians at Medanta can switch from an interventional procedure to open surgery, should need arise. With the high-tech equipment and solutions, “Patients have developed the faith that we can do the job better, that we are honest, and that they will get the right treatment at Medanta,” says Trehan.

“It’s a misnomer that higher technology and the latest equipment add to costs,” says Chandra. According to him, technology adds to value and not so much to costs. With more effective and speedier treatment, the hospital is able to draw more patients and spread costs over larger volumes. In cardiology, for instance, Medanta is 20 percent cheaper than some other hospitals in the area.

Trehan is also looking forward to mobile applications, which should be implemented soon, through the installation of the latest version of syngo Dynamics. With this version, clinicians will be able to view images such as angiograms on their iPads®, iPhones®, and laptops. “New applications on the mobile devices will help. These applications will make images and data available to us anytime, anywhere. We can keep an eye on patients any time of the day,” Trehan adds.

Medanta has a telemedicine center that provides continuous access to various primary and secondary health centers in remote locations across India. Over the next few years, Medanta plans to connect 600 villages across India and provide connectivity to 56 African cities. “The syngo imaging IT solutions help give us the competitive edge over other hospitals in the region,” says Chandra. The bigger factor, of course, is the skill set. “The experience of all the doctors put together is so many hundreds of years,” he adds.

“The syngo imaging IT solutions help give us the competitive edge over other hospitals in the region.”

Praveen Chandra, MD, Chairman, Division of Interventional Cardiology, Medanta – the Medicity, Gurgaon, India

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**Summary**

**Challenge:**
- Providing state-of-the-art, effective, and affordable healthcare
- Winning patient confidence
- Quickly taking images to the point of care
- Offering holistic healthcare under the framework of modern medicine

**Solution:**
- Using high-end imaging equipment
- Setting up hybrid rooms
- Taking images to the point of care by using syngo.via, syngo Dynamics, and syngo.plaza
- Integrating modern and traditional forms of medicine through research in order to offer holistic healthcare
- Researching new drugs through an early phase clinical research facility
- Helping out primary healthcare facilities in remote parts of the country through telemedicine

**Result:**
- Increased throughput
- Increased patient confidence
- Increased patient volume
- Costs are spread over a larger volume of patients, leading to affordable healthcare

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1 syngo.via can be used as a standalone device or together with a variety of syngo.via-based software options, which are medical devices in their own rights.
2 Prerequisites include: Internet connection to clinical network, DICOM compliance, meeting of minimum hardware requirements, and adherence to local data security regulations.
3 The iPhone and the iPad are registered trademarks of Apple Inc., registered in the U.S. and other countries.

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**Further Information**

www.siemens.com/syngoDynamics
www.siemens.com/syngo.via
www.siemens.com/syngo.plaza

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“We Need to Reconsider Medicine.”

Returning to China in 1999, after a decade of cardiovascular research at two German university hospitals, Professor Junbo Ge turned his research into practice by helping to establish modern cardiology in a vast country that is experiencing rapid social change.

By Philipp Grätzel von Grätz, MD

His research in the 1990s taught Professor Junbo Ge to ask questions. Asking questions can also be helpful when considering the future of cardiology: Which diseases will be predominant in times of demographic change and urbanization? Do patients need so many catheterizations? How can therapy be optimized? Medical Solutions discussed these issues with the current President of the Asian-Pacific Society of Interventional Cardiology not on the top of a modern skyscraper in Ge’s hometown of Shanghai but back in Germany, in medieval Forchheim.

The World Health Organization’s recent Global Atlas on Cardiovascular Disease Prevention and Control has once again identified cardiovascular diseases as the leading cause of death worldwide. And it says that this will remain the case until at least 2030. There are certain differences, though. In Europe and in the U.S., cardiovascular mortality is in fact falling. In many other countries, it is rising sharply. What is the situation in China?

Ge: We have been witnessing huge changes in the spectrum of disease over the last thirty years or so. Before China started to open up to the West in 1977, we had many infectious diseases. The open policy brought more wealth to an increasing share of the Chinese population, which is good, of course. But it also led to lifestyle changes. As a consequence, we are now confronted with lifestyle-related diseases that have already been prevalent in the West for some time. We have more obesity, more diabetes, more hypertension. And these diseases have similar consequences in China like everywhere else in the world: The occurrence of cardiovascular and cerebrovascular disease has increased dramatically, and it continues to increase substantially
Professor Junbo Ge is the current President of the Asian-Pacific Society of Interventional Cardiology and Chief Physician of the Department of Cardiology at Zhongshan Hospital, Fudan University, Shanghai, China.
Junbo Ge with the Artis zee in the Siemens showroom in Forchheim, Germany. He is proud to use the same system in his Shanghai department’s hybrid room.
every year. To illustrate what I mean: 30 years ago, when I was a fellow at medical school, I remember a patient with myocardial infarction who had all the typical electrocardiogram signs and enzymes that you would expect. This really interested me because it was so rare at that time. I even asked a co-fellow to swap shifts so I could observe the patient longer. Today, we have patients with myocardial infarction practically every day. And if I go through the wards of our department, at least 60 percent of all patients present with coronary artery disease [CAD].

What are the main cardiovascular risk factors these days?
Ge: This again is very similar all over the world. We have many people with hyperlipidemia, diabetes, and hypertension. Smoking has also become a big problem in China. In order to cope with the cardiovascular epidemic, we will have to tackle these risk factors sooner or later. Nations like, for example, the Scandinavian countries have shown how to do that. They have managed to stop the increase in coronary artery disease, mainly by reducing the risk factors.

How significant is the impact of global megatrends such as demographic change and urbanization on cardiovascular health?
Ge: These are big issues, obviously, and this again is very evident in China. Demographic change is leading to an increase in cardiovascular diseases. This is true for coronary artery disease, but also for other cardiovascular diseases like chronic heart failure and cardiac valve disease, and, of course, for cerebrovascular diseases. Take Shanghai, for example: The average life expectancy in Shanghai has now risen to 81 years. This comes with an increase in the occurrence of heart failure. I am the Principle Investigator of a big prospective epidemiologic study involving 20,000 people, very similar to the Framingham study. We did an analysis for the tenth Chinese five-year plan some years ago and found that the average occurrence of heart failure in adults is around one percent. This is quite a lot.

Cardiovascular Disease in China

How many people with a cardiovascular disease are there in China?
According to recent WHO figures, the mortality of cardiovascular diseases in China is 312 per 100,000 male and 260 per 100,000 female inhabitants. This accounts for 38 percent of the total mortality. Overall cardiovascular morbidity, excluding risk factors and hypertension, is around 13.4 percent, according to WHO 2009 figures.

What is the most common cardiovascular disease?
WHO estimates that around 38 percent of the Chinese population has elevated blood pressure. The rate of obesity and overweight is around 30 percent, as is the rate of people with elevated cholesterol. Excluding risk factors, coronary artery disease and peripheral artery disease are probably the most common cardiovascular diseases, but detailed figures are lacking. The ten-year coronary artery event rate was estimated by Chinese scientists to be 1.5 percent in men and 0.6 percent in women in 2004.

What proportion of health expenditure goes toward cardiovascular diseases?

What about urbanization?
Ge: This is interesting, too. There are massive regional differences in cardiovascular morbidity in China. This at least partly reflects urbanization, but it also reflects other lifestyle differences. The number of cases of CAD, for example, becomes lower and lower the further south we travel in China. In Qingdao, where I come from, people eat more salt, smoke more cigarettes, and drink quite a lot. CAD incidence in Qingdao is around 230 per 100,000, whereas in the far south it is only 48 per 100,000. In Xinjiang, a region in the far northwest of China, we increasingly see severe three-vessel diseases in young people. The reason is that when people who were previously very poor become wealthy, the first thing they do is change their eating habits. They eat more fat and fast food, and they drink more. What we are realizing is that the very rich are actually vigilant about their health, and so are the very poor. The problem is the wealthy middle class, which is increasing year by year. When the western and central regions of China catch up with the east, we will see an explosion in cardiovascular diseases and heart attacks. It is simple: When you go to Shanghai, there is no longer a big difference from the west in terms of wealth and lifestyle. Therefore, the number of civilization-related diseases is also fairly similar. This will happen in other parts of China as well, and it is already happening in many parts of the world.

What does this mean for healthcare spending?
Ge: Healthcare spending is already rising. I am not aware of the latest data for China. But in the People’s Congress that takes place in March every year, the most
common proposals that members of congress make to the government are related to education and medical care. The government is putting a lot of effort into improving medical care. It has defined 11 diseases that are covered by the state, including acute myocardial infarction and congenital heart disease. We would be happy to see heart failure added to the list as well. But this is a lot of money, and the government won’t be able to cover all the costs. What I consider to be at least as important, if not more important, is investing more money in health-related education. We have to tell people what a better and healthier life looks like, otherwise you become wealthy and throw all your money into hospitals afterwards. Many people are simply not aware of how to live healthily. And this is certainly not just a Chinese problem but a global one.

An increase in cardiovascular morbidity means that people need access to cardiovascular diagnostics and therapies, both medical therapies and interventional...

Ge: It does, and it is a challenge. When I was called back from Germany in 1999 there were around 4,500 cardiovascular interventions in China in total per year. Since then, this number has increased annually by around 25 percent. In 2011, we had 333,000 cardiovascular interventions, which means that China is now number two in the world behind only the U.S. There is no doubt that this number will increase further. At the moment, access to cardiovascular diagnostics and therapies is better in the metropolitan areas of the east than it is in Central China, for example. And indeed I think that companies like Siemens have a lot of responsibility here. They should not just be selling devices but they should also be training young doctors to use the technologies in the right way. The Chinese government is also active, of course. The Ministry of Health decided to build around 100 training centres all over the country. Young fellows now should be trained in one of these centres before they are given a license to perform interventions on their own in their respective local hospitals.

In western countries, there are increasing discussions on where interventional cardiology is or should be heading. Since the publication of the results of the COURAGE trial and other, similar trials, many people are arguing that there are too many diagnostic catheterizations and too many interventions. What is your opinion on this?

Ge: We are discussing these issues in China as well. We have to convince colleagues and patients of the benefits of new treatments. The COURAGE study showed no benefit of interventions in stable coronary artery disease in terms of prolonging patients’ lives. I was not too surprised about this result, because I think that normally nature is the determining factor in terms of prolonging lives. What COURAGE showed is that we can improve the quality of life of our cardiac patients substantially by performing interventions. And this is what our patients are looking for in the first place. This is similar to other diseases, by the way. If a patient comes to me and has a headache, I will give him medication to improve his quality of life. This is what I always tell my young fellows: You should not overuse the available technologies, but you can believe in these methods. We have more than enough evidence that we can improve ischemia and thus quality of life.

You have done extensive research in the field of intravascular ultrasound (IVUS) in your career. What role could imaging technologies play in making cardiology more targeted, more individualized?

Ge: First: If anything can be done noninvasively it should be done noninvasively because it is more comfortable and less painful for the patient. Second: In many ways, the existing noninvasive techniques are still not sufficiently accurate, so there is no way around invasive cardiology for the moment. There are some interesting noninvasive imaging technologies out there, for example multislice computed tomography or modern cardiac magnetic resonance imaging. I think that, with innovative software, it won’t be necessary to use invasive technologies like IVUS or interventional measurements of fractional flow reserve in order to decide on the optimal treatment for patients with, for example, ambiguous lesions. The importance of noninvasive imaging will increase. But invasive diagnostics will continue to exist for many years.

Before you returned to China in 1999, you worked at the university hospitals of Mainz and later Essen for almost a decade as a young doctor and researcher. In what ways are medicine and cardiology in Germany different from China?

Ge: It is hard for me to compare, because what I did in Germany was very different from what I do in China now. In Germany, I was an ambitious young researcher and tried to publish as much as I could. When I returned to China, I suddenly had to deal with the everyday reality of cardiology. In my department alone, we have
more than 300,000 outpatients per year. This is an enormous number. It is really hard to cope with such a high workload and it doesn’t leave much time for research. What I learned in Germany and what I really consider to be very valuable is to ask the question: Why? Asking why is not only a big driver for research, it is also helpful in clinical routine. Asking why is what I always recommend to my fellows in Shanghai. And I also tell them that they should always respect their mentor, but never trust his opinion. It can sometimes be the case that outspoken experts are wrong.

Given that cardiology in China has matured, would you still advise younger Chinese doctors to spend time in other countries?
Ge: Absolutely. It is important to get to know how things are done in other countries. My son is studying medicine, and I have strongly advised him to go to Heidelberg for a fellowship. He can learn a lot in Germany. Germans take many things very seriously. You can learn how to solve a problem and to find the cause of the problem. I remember that I saw an elderly lady at a red light once. I thought, okay, she is having difficulty walking, so I asked her whether I could help her cross the road. She said, “How do you know that there isn’t a child in the building on the other side of the road who might see an adult cross the road in spite of the red light?” Germans think differently.

As in other fields of medicine, there are many new therapeutic methods popping up in cardiology at the moment as a consequence of genetic research and stem cell research. Is this “new cardiology” already playing a role in China?
Ge: It does exist. But it is far more challenging to get these kinds of study approved in China than it is in many western countries. We have built up a stem cell centre in Shanghai, and we do a lot of research there in animal models. When it comes to clinical studies, though, we are certainly behind countries like Germany.

One thing that Germany and China have in common is a high acceptance of traditional medicine. Do you include traditional Chinese medicine (TCM) in cardiology care in your hospital?
Ge: We don’t, no. I don’t understand much about TCM, so my view may be wrong. But I still think that if you want to prove that a method is useful you have to do clinical studies. You cannot say something is good based on personal experience. If you give patients water, 30 percent will say they feel better afterwards. But this does not make water a therapy. I am not against traditional methods. But I will not actively recommend them.

How do you see the future of cardiology? Today, we still distinguish between cardiology on the one hand and cardiac surgery on the other. In many places, there is competition between both disciplines, which is certainly not in the interest of the patient.
Ge: This is indeed a problem, but it is not restricted to cardiology. Today, we cut patients into pieces. We define diseases of the brain, the stomach, the heart, and so on, without trying to bring things together. I think this is not the right way to go. In the long run, we will have to reconsider medicine. We need to teach young doctors to take a more holistic approach to patients. An important point in this discussion is reimbursement. One of the roots of the current conflict between disciplines is that money is not pooled but paid per therapy. So when I think about the future of cardiology, I think about a different approach to patients, but I would also suggest a different approach to payment.

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Philipp Grätzel von Grätz is a medical doctor turned freelance writer and book author based in Berlin, Germany. His focus is on biomedicine, medical technology, health IT, and health policy.
Accessible Innovations

“A Scanner for All

At the beginning of the year, the all-new SOMATOM Perspective computed tomography scanner was installed in an imaging center in France. The first results are an example of how improved diagnostic performance can be cost-efficient, patient friendly, and economically accessible for imaging centers elsewhere.

By Christian Rayr

By further strengthening its longstanding partnership with Siemens, the already well-equipped Sainte-Marie Imaging Center in Osny/Pontoise just outside Paris is now even better prepared to face the challenges that medical institutions in France – as in many other industrialized countries with an aging population – face today. These include handling increasing demand for treatment and imaging in large urban areas with a growing population – face today. These include handling increasing demand for treatment and imaging in large urban areas with a growing population from diverse socio-economic backgrounds, reducing waiting times for appointments, and limiting scan times in order to enable profitability and efficiency. But Sainte-Marie is also committed to maintaining high diagnostic quality while reducing the costs of buying, installing, and operating equipment – all for the comfort and health of patients.

Helping the imaging center meet these challenges are a Siemens digital mammography system, two Siemens magnetic resonance units – the 1.5 Tesla (T) MAGNETOM® Aera and 1.5 T MAGNETOM Essenza – and two Siemens computed tomography scanners – the SOMATOM® Definition AS+ and, since the end of January 2012, the SOMATOM Perspective CT. The medical team at the Sainte-Marie Imaging Center acquired the SOMATOM Perspective, which represents Siemens’ latest-generation CT technology, to improve imaging accessibility by providing quick, reliable diagnostic imaging in the vast majority of clinical situations, without compromising performance. The center handles about 300 patients per day. About three percent of them are emergency patients from the associated Sainte-Marie Clinic. Another five to 10 percent are people who are hospitalized in the clinic. The rest are outpatients. All types of examinations are performed: standard or very low-dose X-rays, echograms, mammograms, bone density scans, and scans associated with surgical procedures, such as macro- and micro-biopsies. And, since the SOMATOM Perspective has a large number of advanced options, a further benefit may be that procedures that are not an everyday occurrence in the majority of radiology centers will also be able to be performed, including interventional procedures.

Franck Lamesa, General Supervisor of the Sainte-Marie Medical Imaging Center, enthusiastically identifies the economic benefits of the new scanner, saying, “The

“The SOMATOM Perspective meets all our expectations.”

Alexandre Fuchs, MD, Co-Manager, Sainte-Marie Medical Imaging Centre, Osny, France
Accessible Innovations

SOMATOM Perspective is a small, very compact, ultra-light system that can fit into a room with a floor space of less than 20 square meters [215 square feet], without requiring any floor reinforcement or air conditioning. And it was installed in just one day." Lamesa reports that 95 percent of scans are now done using Siemens eMode software. In addition to outstanding image quality, SOMATOM Perspective’s eMode is designed with the healthcare provider’s business outlook in mind. The scanner itself is already incredibly efficient and the exclusive eMode contributes to financial efficiency with every scan. An automated software solution makes efficiency easy: eMode automatically sets the parameters for the most efficient scan. A scan analysis is made in real-time and the system automatically fine-tuned to provide a perfectly balanced scan, while reducing wear and tear on the system. Additionally, with a Siemens service contract, customers can take full advantage of eMode benefits. The system will be analyzed every 12 months to determine the customer’s eMode usage. If eMode was used in more than 80 percent of scans, the site is entitled to choose one of the valuable eMode service benefits. These include, for example, syngo® Remote Trainer, preventive maintenance outside of prime working hours, one-on-one assistance with syngo Remote Assist, or revaluation of the maintenance contract price with eMode service contract adjustments.

Sainte-Marie currently does 40 scans a day with the SOMATOM Perspective. It could do up to 60, even 80, thanks to its speed, if France were not suffering from a shortage of radiologists, much to Lamesa’s regret. But waiting times – a problem in France also related to the shortage of equipment – have already been considerably shortened. Patients get an appointment within 48 hours instead of three weeks or a month. “To date, we’ve scanned about 800 patients,” says Alexandre Fuchs, MD, Co-Manager of the Sainte-Marie Medical Imaging Center. “We’ve been able to examine cancer, pediatric, cardiac, vascular, bone and joint, and brain pathologies,” he adds. Sainte-Marie Medical Imaging Center is combining Sinogram Affirmed Iterative Reconstruction (SAFIRE¹), CARE Dose4D, UFC® and SureView for dose reduction. “With its ease of use, acquisition speed, image quality and radiation dose reduction of at least 50 percent, the SOMATOM Perspective meets all our expectations.” Thus, the system is proving to have all}

“SOMATOM Perspective routinely performs oncological, pediatric, cardiac, vascular, bone and joint, and brain CT examinations.”

Franck Lamesa, General Supervisor, Sainte-Marie Medical Imaging Center, Osny, France
Accessible Innovations

Across the globe, economic pressure on healthcare systems and their providers is eminent. Industrialized countries are challenged with an aging population and a growing demand for healthcare services. Emerging economies and their developing healthcare systems are increasingly in need of access to premium patient care. As a result, reimbursement policies across the globe are being adapted toward increasing accountability for quality and cost across the entire care continuum. Providers must demonstrate lower hospital readmissions, high-quality outcomes, and low operational costs to stay competitive. A Siemens initiative called Accessible Innovations meets these demands in the field of medical imaging.

It is no surprise that total cost of ownership (TCO) is an important factor influencing the global healthcare environment. Determining the economic value of an investment is important for all healthcare providers, regardless of their circumstances. Assessing total cost of acquisition, operating costs, and investment protection contribute significantly to profitability over time. Profitability should, however, by no means be confused with the responsibility to provide high-level imaging standards that ultimately benefit the patient. Within this context, and to serve common goals among the global healthcare landscape, Siemens is introducing a new range of imaging systems. Its Accessible Innovations initiative is equally improving the availability, quality, and efficiency of healthcare by combining state-of-the-art diagnostic capabilities with a highly sensible TCO argumentation for its customers. Quantifying the financial impact of deploying a healthcare product over its life cycle goes hand-in-hand with making healthcare more accessible for more people all over the world.

The SOMATOM® Perspective computed tomography (CT), MAGNETOM® Spectra magnetic resonance imaging, and ACUSON S1000™ ultrasound systems are proof that Siemens is taking its responsibility seriously – the responsibility to innovate and invest in cost-efficient, premium imaging standards.

Summary

Challenge:
• Meeting the healthcare needs and handling the increasing demand for treatment and imaging of a growing population with a diverse socio-economic background
• Limiting scan times and reducing waiting times for appointments
• Maintaining high diagnostic quality
• Reducing costs of buying, installing, and operating equipment

Solution:
• A CT scanner with eMode for efficient 128-slice imaging and the latest in low dosage
• A full complement of “ease-your-workday” features, plus added comfort for patients

Results:
• The small system is installed in just one day and doesn’t require floor reinforcements or air conditioning
• High patient throughput capability allows shorter waiting times
• In just six weeks, it was possible to scan 800 patients, covering a whole range of pathologies
• SOMATOM Perspective offers a radiation dose reduction by at least 50 percent along with speed and high quality, meeting all the expectations of the medical team

Further Information
www.siemens.com/somatom-perspective

Christian Rayr is a freelance journalist based in Paris, France. He writes for various medical publications and covers medical topics for the general media.

In clinical practice, the use of SAFIRE may reduce CT patient dose depending on the clinical task, patient size, anatomical location, and clinical practice. A consultation with a radiologist and a physicist should be made to determine the appropriate dose to obtain diagnostic image quality for the particular clinical task. The following test method was used to determine a 54 to 60% dose reduction when using the SAFIRE reconstruction software. Noise, CT numbers, homogeneity, low-contrast resolution and high contrast resolution were assessed in a Gammex 438 phantom. Low dose data reconstructed with SAFIRE showed the same image quality compared to full dose data based on this test. Data on file.
Taking RIS to New Heights

Lofty goals require equally lofty solutions: When The Chester County Hospital in Pennsylvania, U.S., decided to streamline its technology budget to better serve its patients, it found its solution with cloud computing – specifically, syngo Workflow Cloud Solution from Siemens.

By Robert L. Bard

The Chester County Hospital and Health System is an organization dedicated to the health and well-being of the people in West Chester, Pennsylvania, U.S., and surrounding areas. The Chester County Hospital utilizes Siemens’ Soarian® and syngo® solutions to streamline workflow and most recently added Siemens’ syngo Workflow Cloud Solution¹, a radiology information system (RIS)², combined with private cloud computing that is hosted out of the Siemens data center in Malvern, Pennsylvania.

Cloud Computing Strategy
The Chester County Hospital found cloud computing to be appealing because it provides greater flexibility to the organization.
They found that there are fewer surprises as they no longer own the servers and do not have to regularly set aside funds to address aging hardware, unexpected expenses, or even disasters. By moving to the cloud, healthcare organizations can focus their capital budget on more patient care oriented initiatives rather than infrastructure. The Chester County Hospital’s choice of *syngo* Workflow Cloud Solution has provided secure, reliable services to increase productivity and efficiency. An initial benefit is that the cloud solution has eliminated the need to purchase new servers. “We upgraded our servers about every three years,” says Michael Ward, PACS (picture archiving and communication system) Administrator for The Chester County Hospital and Health System. The cloud solution has eliminated the need to purchase database, application, *syngo* Portal Radiologist, and *syngo* Voice servers. With the elimination of these servers, space has opened up for other health system needs, and it is anticipated that utility bills will be lower because of reduced power and cooling requirements. Furthermore, support contracts and third party software are no longer needed. Perhaps the biggest expense The Chester County Hospital faced was the need for a redundancy upgrade that would cost nearly half a million U.S. dollars. That is when Paul Morris Jr., RIS Administrator of The Chester County Hospital and Health System, took advantage of the opportunity to become a beta testing site for *syngo* Workflow Cloud Solution. Morris and Ward were further challenged with providing the best possible technology services while being fiscally responsible. Without the private cloud solution, The Chester County Hospital was faced with very large, immediate costs. After serving as a beta testing site, the hospital went live institution-wide with *syngo* Workflow Cloud Solution this past December.

“The transition to cloud computing was smooth.”

Paul Morris Jr., RIS Administrator, The Chester County Hospital and Health System, West Chester, Pennsylvania, U.S.
Cloud computing provides flexible and innovative capabilities for Michael Ward (left) and Paul Morris (right).

“The benefit of having fixed costs associated with a cloud was one of the most attractive features for our Vice President of Information Technology.”

Michael Ward, PACS Administrator, The Chester County Hospital and Health System, West Chester, Pennsylvania, U.S.

The cloud solution enabled the IT department to have expenses that are predictable, and the benefits were visible immediately. “The benefit of having fixed costs associated with a cloud was one of the most attractive features for our Vice President of Information Technology [IT],” says Ward. The large expenses of a redundancy upgrade and new servers have been avoided.

Transitioning to Cloud Computing

For many in the information technology sector, cloud computing helps address large expenditures. It also presents the challenge of “letting go” of data and permitting a company from the outside to have unprecedented control. “The transition to cloud computing was smooth, especially considering that we were a beta testing site,” says Morris. Ward adds, “There was an adjustment period for the technologists to become accustomed to the new security, because they had a new login process that added an additional layer of security.”

Cloud computing can provide optimal security, which is a particularly important aspect of healthcare clouds, because of the sensitivity of the data and the federal requirements associated with the storage of such data.

Morris shared a first-hand experience with the disaster recovery benefits of RIS in the Cloud. “On Christmas morning, just two weeks after going live with RIS in the Cloud, I received a telephone call at ten o’clock from a radiologist informing me that not only was the RIS system down, but also the PACS, telephone system, and the network. There was a power surge that knocked out power to the data center shutting down every application in the hospital. It was a perfect storm.” Recovering from such a disaster would be very challenging, not to mention the fact that it was a holiday. The network, which needed to be restored prior to any application, was recovered at approximately two p.m. that day. Because of the syngo Workflow Cloud Solution, recovery of systems was complete within approximately 30 minutes, and was the first application to be restored throughout the hospital. “Without the cloud it would have taken significantly longer to come back up,” says Morris. The cloud minimized downtime with no loss of data and prevented a great deal of stress and unplanned costs.

Features and Benefits

The private cloud-based RIS from Siemens was tailored to The Chester County Hospital’s needs and provides backups, system re-indexing, system reboots, and system monitoring. The RIS is available 24 hours a day, 7 days a week via a secured and monitored infrastructure, while Siemens offers business continuity and around-the-clock IT support from experts.

The interoperability between syngo Workflow and Soarian helped to streamline processes before the move to cloud computing, and it continues to deliver important advantages. As Ward notes, “Siemens’ syngo is beneficial for the referring physician, because it permits an image launch from the radiology report,
What is Cloud Computing?

Cloud computing is an information technology term relating to the use of the Internet to provide common business applications remotely. Cloud computing can provide services, software, or infrastructure to customers who simply access a web browser to use the software. Cloud computing does not need to be installed on individual computers, and is updated automatically. Data are stored remotely on the servers, freeing up space at the user’s facility and also negating the need to upgrade and maintain the servers. Users do not need to have knowledge of, expertise in, or control over the technology infrastructure in the “cloud” that supports them. A cloud typically consists of five characteristics: On demand self-service, broad network access, resource pooling, rapid elasticity, and measured service. The service is available to users on any computer at any time by accessing the Internet. Cloud computing helps to pool resources and provides staffing at the remote center that specializes in the customer’s specified area. Clouds that cover the healthcare industry specialize in providing immediate services with the highest privacy standards because of the sensitivity of the data associated with medical information. Furthermore, healthcare clouds focus on availability, because the delivery of care can not have downtime or slow response times. Cloud computing’s business plan focuses on regular fees for services and is frequently a desirable choice for administrators because the costs are fixed. It eliminates many of the mundane IT preventive tasks while providing the highest, specialized security. Cloud computing also eliminates many financial burdens, such as server maintenance and replacement, redundancy upgrades, and service contracts.

Summary

Challenge:

- Providing information technology infrastructure improvements
- Maintaining high-quality information technology services while being fiscally responsible
- Capital expenditures are under increasing pressure
- Providing information technology services that efficiently and effectively communicate with existing infrastructure
- Providing information technology with the best possible security, backups, and disaster recovery

Solution:

- Utilize cloud computing by partnering with Siemens
- Allow Siemens to develop a private cloud-based RIS tailored to the hospital’s needs
- Interface existing Siemens products with syngo Workflow Cloud Solution to streamline workflow

Results:

- Cutting-edge technology in RIS and fixed budget for information technology
- Elimination of large expenses for new servers and redundant software upgrades
- RIS in the Cloud provides rigid security and disaster recovery
- Specialized medical-grade cloud computing with constant technical support

so the physician can log in and view all the information for a given patient in one location.” Morris adds, “A key feature of Soarian Clinicals is its computerized physician order entry [CPOE] capability, by which orders are sent to the radiology information systems through the Siemens OPENLink™ interface engine. Status updates are communicated from the radiology information system back to Soarian to keep clinicians apprised of the status of tests. Once the images are read, results are sent back to Soarian and a notification can be sent to the referring physician’s worklist with easy access to the results. Therefore, Soarian is acting as a focal point for everything that the clinician needs when it comes to radiology and images. In essence, Soarian acts as a one-stop shop.”

syngo Workflow Cloud Solution enables end users to access syngo Workflow from any hospital computer; software does not need to be loaded locally, and upgrades are available automatically to all end users. Ward has discovered that older computers work better with syngo Workflow Cloud Solution because they only need to access a website rather than run software from the hard drive. Another unexpected benefit, he says, is that vacation coverage for Morris is easier with the cloud, because it handles many of the specialized tasks of the RIS administrator.

Robert L. Bard is a freelance medical writer certified by the American Medical Writer’s Association who also conducts clinical research at the University of Michigan’s Division of Cardiovascular Medicine.

Further Information

www.siemens.com/RIS
Dr. Rob Edelstein back in his home near Boston. The urologist is currently planning his third aid mission to Haiti.
Meaning and Mission in Haiti

The devastating earthquake in Haiti in 2010 moved a Boston urologist and surgeon so deeply that he began seeking ways to help the survivors and ended up volunteering for Project HOPE. When the initial work had been done and the need for his specialist skills became apparent, the ACUSON P10 ultrasound system turned out to be just the tool he needed.

By Louisa Kasdon
Just weeks after a 7.0 earthquake hit Haiti on January 12, 2010, Rob Edelstein, MD, a Boston-based urologist, began to teach himself Haitian Creole. “When the earthquake happened, I found myself glued to the TV,” he says. “The magnitude of the earthquake. The millions of people involved. The crippling of an already demolished infrastructure. I couldn’t get it out of my mind. I was watching every single night, and I said to my wife, Judy, ‘We really could do something here. Something more than giving money – though giving money is important, too. But I’m a urologist. I have surgical skills. Maybe I could help in a more direct way?’” Edelstein started to track all the organizations going down to help in Haiti, sending an application to every single group.

“I learned to really appreciate what we have. How much we assume about predictability and infrastructure – about clean, drinkable water, streets, and highways. How much we as patients and physicians demand and receive from our medical system,” he says. “I have a wonderful life. I love my patients, my partners, and my practice. But working in Haiti is a privilege for me as a physician. You get an acute sense of just how important your impact and service can be.”

In May of 2010, four months after the earthquake, Project HOPE called about Edelstein’s application. Project HOPE helps supply medical personnel and supplies around the world, and was helping to staff the hospital ship USS Comfort, which had arrived in the Port-au-Prince harbor to assist immediately after the earthquake. To Edelstein, it seemed like a perfect fit. He cleared 18 days from his patient schedule, packed basic supplies, and was ready for his first medical mission. Then, a last-minute snag: Project HOPE’s boat had to leave the harbor in Haiti.

A decision was made to situate Edelstein north of the quake area to Hospital Albert...
Ultrasound

Schweitzer, a private hospital built and endowed by members of the Mellon family and open to the public. The hospital had weathered the quake without too much damage to its buildings, but hundreds of thousands of people who had evacuated Port-au-Prince had gone north and were now depending on it. An already overburdened healthcare system now had to care for several hundred thousand additional people who had barely escaped the earthquake. “It was really tough. There was an incredible need for all kinds of medical services,” recalls Edelstein.

A Very Long Weekend

“If you needed any kind of surgery that weekend in Northern Haiti, you got me,” says Edelstein. He had gone to Haiti expecting to offer his help as a urologist, not as a general surgeon. But the weekend he arrived, the one and only full-time surgeon was off-duty. “That weekend, I was basically the only surgeon, really, in that area of Haiti. We performed absolutely every kind of surgery that came in the door: pediatric head injuries, appendicitis, machete wounds. We set broken bones. We operated on gynecological cases. It was a very challenging few days.” Edelstein gives enormous credit to the two Haitian general surgeons who work at this hospital. “As a regular practice, they literally handle every type of surgical problem and are on call 24 hours a day, seven days a week. The Haitian physicians and nurses are tireless, good-natured, amazing people who work miracles with very little surgical or diagnostic equipment.”

Hospital Albert Schweitzer opened in 1959, and now has 130 beds, with which it serves 345,000 people in the Artibonite valley. Most wards are large open rooms filled with patients and their families. When there is overflow, hospital hallways are the next best choice. In Haiti, patients go to their local dispensary first, and if medically necessary, the dispensary sends a patient to the hospital where they are observed for 24 hours in a triage room. The next day, a decision will be made whether or not to admit the patient to the hospital. In the hospital’s outpatient clinics, patients and their families wait patiently, sometimes for many hours, to see the doctor.

A Tropical Medicine Lesson

When the general surgeon returned after the weekend, Edelstein was able to focus on seeing patients with primarily urologic concerns – some with earthquake-related injuries, others for chronic urological conditions. Edelstein explains that the hospital organizes its clinics around the expectation of which specialists might be visiting. Orthopedic cases are scheduled when the orthopedists arrive; gynecological cases wait for the OB/GYNs to visit. Edelstein was one of very few urologists ever to cycle through Hospital Albert Schweitzer. “Urologists are always an under-repre-

The Visual Stethoscope

The ACUSON P10 system is a point-of-care handheld ultrasound imaging device utilizing advanced miniaturized technology to enable earlier, faster, and more accurate clinical assessment at the point of care. It revolutionizes assessment and examination protocols via the extension of the physical exam. The ACUSON P10 system is the ideal solution when it comes to supporting triage decisions, bedside monitoring, and traditional diagnosis by providing additional information during the clinical assessment.

- Improved patient care, improved workflow, improved outcomes
- Faster, better-informed, and more confident diagnosis
- Faster time to triage
- More secure care path decisions
- Fits into coat pocket for instant availability

Cardiology:
Visualization of basic anatomy, function, and effusion as part of an initial patient assessment, routine follow-up, or in pre-/post-procedure care in the intensive care unit or cardiac care unit.

Emergency Medicine:
Immediate assessment of free fluid, cardiac activity, and aortic aneurisms, as well as enabling ultrasound guidance for paracentesis and thoracentesis.

Obstetrics:
Quick and comprehensive overview on fetal positioning, anatomy, heart beat, fluid levels, and placenta location during labor or routine office visits.

At a Glance:
- 2D-mode imaging in fundamental and harmonic modes
- Two to four MHz phased array transducer for abdominal, renal, obstetrics, transthoracic adult/pediatric, cardiology, emergency medicine
- Intuitive personal digital assistant-style user interface
- Image depth from four to 24 centimeters
- Tissue harmonic imaging
- Application presets for cardiac, abdominal, and obstetric imaging
- Storage and retrieval of patient and study data to removable card memory
presented specialty. In all of Haiti, there are 24 urologists for a population of 9.7 million. In comparison, in the United States, our population is near 310 million, and there are between 9,000 and 10,000 urologists. Approximately ten times the number, roughly, per population.” Edelstein evaluated his urological patients early in the week, and scheduled surgeries for later in the week. He saw cases he would never see in the United States, including many children with urethral strictures, including one 12-year-old boy who was living with a suprapubic tube, “because nobody was there to fix the underlying problem,” says Edelstein. “Unfortunately, a lot of those fixes require the right equipment.” And although he is a seasoned urologist, the Haitian professionals also had a lot to teach Edelstein about practicing medicine in the tropics. “One time we were making rounds, and a post-operative patient had a fever. In the United States, we would get a chest X-ray. We would listen to their lungs. We would do blood cultures, urine cultures. I said to the Haitians who were rounding with us, ‘We’ll need to do all of the tests on this list.’ And they said, ‘Well, we can’t do any of those things. But did you order a malaria smear?’ I said, ‘Malaria?’ They said, ‘Yeah, that’s the most common cause of fevers after surgery here.’ I said, ‘Oh my gosh! Malaria didn’t even cross my mind!’

Packing His Tools
Preparing for his first trip to Haiti, Edelstein was aware that he would need to bring as much medical equipment with him as possible. “I didn’t know what the hospital would have on hand,” he says. He began calling the local reps of manufacturers of surgical instruments and equipment that supplied his practice and was pleased that several responded very quickly. One company loaned him “a beautiful set of surgical instruments” and simply asked that he try to bring it back in one piece. Edelstein crammed as much donated medical equipment as possible into a big suitcase and several plastic bins, loaded them on the plane, and lugged them through the inevitable customs bottleneck in Port-au-Prince. But once there, he discovered that his packing list had only scratched the surface, and he had to practice a more low-tech kind of surgery than he was accustomed to. “At home, we do a lot of surgery tele- scopically or cystoscopically, through small incisions or through the natural body cavities,” he says. “In Haiti, since they don’t have the equipment needed for that, they perform traditional open surgeries.” This of course makes recovery longer and more difficult. For example, in the U.S., a patient with a prostate enlargement would have

“There’s something about Haiti. When you are there, you feel the enormity of what needs to be done, and it felt right to want to go back there and help more.”

Rob Edelstein, MD, Urologist, Lexington, Massachusetts, U.S.
a modern telescopic operation and go home a day or so later. “In Haiti, a patient with the same condition would just live with a permanent catheter, or have an old-fashioned, open prostatectomy. You make an incision and actually go through the bladder and remove the obstructing part of the prostate.” What separates the two surgical approaches is not knowledge—it is equipment. One solution to the Haitian medical crisis would be better imaging, and the ACUSON P10 ultrasound system would play a critical role.

A Second Trip: Armed with the ACUSON P10

Edelstein was hooked on Haiti. He signed up to return to Albert Schweitzer Hospital the following fall, this time with IVU – International Volunteers in Urology. He resonated with the organization’s mission statement, which encouraged urologists to teach technique to local health professionals. “Their motto is ‘Teach One, Reach Many.’ I liked that,” says Edelstein. He found the medical situation improved. “There was much less chaos. When I went the first time, four months after the earthquake, beds were still filled with people who had lost limbs, were burned... The whole feel in the hospital was urgent, post-traumatic. On my second visit, I could really focus on urological surgery, which is what I wanted to do. And, which I’m much better equipped to do.”

From his first visit to Haiti, Edelstein knew the hospital had limited ultrasound capacity, the international standard of care for visualizing kidneys and bladders. “At Albert Schweitzer, there was only one machine, and it was constantly in use,” says Edelstein. “And I thought, a portable ultrasound machine would be great, because we could use it in the clinic. We could take it with us even in the operating room.” He zeroed in on a Siemens device, the handheld ACUSON P10 ultrasound system. “I called and asked, ‘Do you have one for me to take?’ And they were great. They shipped me the unit, and their only request was that I promise to report back on how it went. We made great use of it every single day.” Edelstein found the device simple and rugged. “We used it all day long in the clinic. You open the cover, and the system is ready for scanning within seconds. And you can store the images and work with them if you want. We could use it on the fly and take advantage of the swappable, rechargeable battery packs. You just keep one plugged in and use the other one.”

Given the accuracy and portability of the ACUSON P10 ultrasound system, Edelstein was able to make rapid diagnoses that would have otherwise been difficult. He was able to find kidney obstructions and locate possible kidney stones. As a result, Edelstein was able to get patients into surgery efficiently, saving them from unnecessary discomfort. Another plus: Since few Haitians are obese, ultrasound was an even more efficient diagnostic tool on the Haitian population than in the U.S. “Our images were so clear!” says Edelstein. “It took me a few days to realize just how much of a difference it makes to read images on a very lean population.”

Why Go Back?

Edelstein has already cleared his schedule — and the ACUSON P10 system — for a third block of time in Haiti next December. His experience has been so moving, so transformative, that his surgical partners are eager to go, too, as is his wife Judy, a urologist. “She needs to wait a few years until the kids are a little older,” he says. As he sits in his living room, the teenagers and the Newfoundland puppy gamboling on the calm green back lawn, a cello that he is building on the dining room table, it seems incredible that this physician considers annual visits to a hospital in Haiti as a new permanence in his life. I had to ask why. “I just felt it was an important thing to do,” he says. “It wasn’t any more complicated than that. There are a million places in the world that need people to go and volunteer and be helpful. But there’s something about Haiti. When you are there, you feel the enormity of what needs to be done, and it felt right to want to go back there and help more.”

Louisa Kasdon is a Boston-based journalist who writes frequently on health, business, science, and food. She is the author of over 500 published articles for regional, national, and international publications.

Summary

Challenge:
- Identifying specific opportunities for a U.S.-based urologist to contribute surgical skills, but also to directly use years of training as a specialist, in Haiti’s post-earthquake medical recovery
- Assembling the most useful medical and diagnostic equipment toolkit for a remote hospital with limited technological resources
- Optimizing the limited volunteer time of a foreign, medical urologist to train on-site medical professionals in Haiti and to treat patients

Solution:
- Make an optimal match between the volunteer physician’s skills, limited time in the country, and desire to work in his area of maximum skill
- Identify and inventory diagnostic and surgical tools that can be used flexibly on-site by both volunteer and full-time Haitian medical staff
- Request hospital-specific donations from medical manufacturers based on an evaluation of critically needed diagnostic equipment and medical supplies, including Siemens’ ACUSON P10 handheld ultrasound system
- Establish a clinical schedule that coincides with the timing of volunteer specialists

Results:
- Improved access for Haitian patients to skilled treatment by visiting surgical subspecialists whose training may be in scarce supply locally
- Increased sense of satisfaction among visiting doctors that their medical and surgical skills and talents are impactful and of service
- Sophisticated training for local physicians by visiting specialists
- High likelihood of return visits by physicians for follow-up on patients requiring continuing or chronic care

Further Information

www.siemens.com/acuson-p10
Mavericks on the Gulf Coast

Texas is known for its rough-and-toughness and its hospitality, and Radiology Associates in the gulf coast city of Corpus Christi is no exception. The open and welcoming facility installed the Biograph mCT in early 2011 to prepare for the future and address issues of workflow, patient comfort, and financial aspects. It is now proudly reporting on its experiences.

By Emily Lynn Smith
The Southside Imaging Center in Corpus Christi, Texas, USA, one of five Radiology Associates, LLP facilities in South Texas, feels more like the entrance to a spa retreat rather than a facility that deals with patients sometimes facing terminal illnesses. Natural light pours across the open concierge, palm trees surround the building, and smiles from the staff fill you with a comforting warmness. Patients and their family members wait and chat with one another in sandals and Hawaiian print shirts. Alfredo Garcia opens the doors for each patient who walks in and he is kept quite busy greeting those who have had to face undesirable challenges. Most patients who come to Radiology Associates face these health challenges with courage and, with the installation of the Biograph® mCT over one year ago, there is also an added sense of hope. Not only does the Biograph mCT pack the extra arsenal in combined positron emission tomography (PET) and computed tomography (CT), but at the hands of Michael Kroeger, MIS, NMAA, PET, NCT, Director of PET and Nuclear Medicine Services, the impact is felt the way an audience experiences a Texan rodeo. Kroeger grew up in Missouri on a dairy farm and after breaking his finger playing baseball, he was inspired to enter the medical field. Now, he is one of four in the United States to have completed the “inaugural Master’s of Imaging Science,” Nuclear Medicine Advanced Associate Program and passed its very first board exam with flying colors. He is extremely proud to exhibit the scanning room where the Biograph mCT sits underneath a ceiling of stars, intended to divert attention and ease the patient. The system exhibits elegance and inside, the power of its technology is impressive.

For the Patients and For the Future

For Kroeger and his team, what makes the Biograph mCT powerfully excellent is its shared service approach, utilizing the Biograph mCT as both a PET-CT scanner and a CT scanner. The system combines PET and CT to improve diagnostic confidence by offering reproducible quantification, sophisticated image resolution, and speed while still minimizing radiation dose. For Radiology Associates, the ability to image what was not previously possible opens up new doors for treatment or monitoring and can redefine clinical decision-making. It was only natural for Kroeger to decide to work with such a system.1

Practice Administrator, was on the hunt for advanced technology and was aware of how fast the PET/CT field was moving forward. One of his primary goals was to ultimately save time and streamline processes in order to accommodate the steady flow of patients – the facility in Corpus Christi sees more than 200 patients a day across all modalities. Before, and using separate systems, patients primarily dealing with some form of cancer were looking at 45- to 60-minute PET scans and separate CT scans in cramped bores. “Lying in the

“That image is a person and my role is to help that person get better by providing quality information.”

Michael Kroeger, MIS, NMAA, PET, NCT, Director of PET and Nuclear Medicine Services, Radiology Associates, LLP, Corpus Christi, Texas, U.S.
that fused image comes out, we thought, going through CT and then PET, and when patient being scanned on that one table is not where we wanted to be.”

Alignment issues were seen as well. This on older technology, resolution and 

“When comparing to outside PET/CT scans to the physicians was not as good as it 

radiologists. “The information going back 

And, it was exhausting for patients and 
sometimes became a guessing game. 

images needed to be fused together, it 

used to analyze the images and when 

clarify adds confidence to physicians interpreting those 

Kroeger. In fact, the number of physician interpreters was reduced from seven to four to enhance the art of reading mCT PET-CT scans. “I think it makes our studies and reads more consistent and I believe that our referring physicians appreciate that,” explains Keitt. Kroeger adds, “You’re really able to better develop that art and that feel after reading so many studies, to better know what this thing is you’re seeing.”

Early Bird Catches the Worm

Kroeger and Keitt are truly first-movers when it comes to installing and working daily with the combined power of this technology. They can now act as an example of how to do it. “We were doing things that people evidently hadn’t done before. It seems so logical for us to combine PET and CT into one suite,” Keitt expresses. Kroeger and Keitt had a shared vision and had their team’s support in implementing the performance of PET-CT and CT on one system and bringing it to fruition. The planning to prepare to install the system was complex, but Kroeger and Keitt explain that they received plenty of training and support from Siemens. They found that multiple people working at multiple levels of responsibility, looking at everything from the room’s layout to the shielding requirements to the scheduling, made all the difference when planning the expansion to include their new system. Keitt explains that the team along with Siemens developed a solid vision and collaborated extensively to build a road map for installation and execution. Keitt points out that the planning and installation went as well as it did because of the willingness to collaborate, or skill-building as he calls it, and the absence of friction between the PET and CT technical staff, which he believes can often be the case. "It is a source of pride for me that our technical staff didn’t have any friction. They came up with procedures to work together.” For Kroeger and Keitt, it would be simply inefficient to do it any other way.

Financially speaking, Keitt, the numbers wrangler, saw opportunities to decrease operational costs with the Biograph mCT on their team. Prior to the system’s installation, there was a duplication effect: Two suites both running two large systems, the loss of time when moving patients from one system to the next, and the amount of staff it took to maintain that particular workflow. Now the K and K duo see significantly faster turnaround times and can accommodate a higher volume of patients. “You can’t scan our PET and CT volume on one system with a PET scan that takes 45 minutes to an hour. It would even be difficult to do it with 30-minute scans. It wasn’t until the generation of mCTs and the ability to do a PET scan in less than 15 minutes that we realized there is this dual-modality process we can put in place.”

Radiology Associates intends to be at the forefront in combined PET-CT technology and the team knows that the Biograph mCT will be its PET-CT and CT workhorse for quite some time. The system is very flexible in terms of how it can be upgraded for future applications, which will only continue to take this already advanced technology higher. Kroeger believes that future technology will be built from the Biograph mCT’s platform.

Calming Nerves

“No one is coming here for fun. Patients are coming here for a medical reason, and
Molecular Imaging

Summary

Challenge:

• Save time on each individual scan and offer a seamless experience for patients that exceeds previous experiences
• More patients require more scans and that in turn, requires a highly efficient workflow
• Provide the utmost comfort for patients dealing with terminal illnesses, patients that require larger bores for scanning, and patients looking for results they can be confident about
• Images are often blurred due to motion artifacts as patients must undergo 45-minute scans
• Diagnostic confidence is decreased and physicians are sometimes forced to play a guessing game
• Separate PET/CT and diagnostic CT rooms result in duplicated cost

Solution:

• Combine the CT suite and the PET suite into one single, productive entity
• Streamline processes to save time on each individual scan and accommodate ever more patients
• Provide solid information for advanced therapy planning
• Significantly enhance imaging quality while reducing radiation dose
• Have patients leave the facility with confidence and trust in their results

Result:

• Less-than-15-minute PET·CT scans in a 78-centimeter bore
• Combined PET·CT and diagnostic CT rooms increase efficiency and eliminate duplicated costs
• Reduced reading pool, from seven to four, can interpret more images and gain experience reading high-quality images
• Patients want to have their next scan at Radiology Associates
• Radiation dose is halved
• Industry’s highest 87 mm³ volumetric resolution addresses the local needs of Corpus Christi

Although Robert Flores may be nervous about the results of his first CT scan, his scan was comfortable, quick, and easy.

ultimately, they need to feel confident that they are getting a good answer to help the treatment of their disease process,” Keitt explains honestly. Kroeger adds, “If they leave here with doubt, then we have not done them any favors. We want them to trust the results that they receive.” Take, for example, the 90-year-old cancer patient Kroeger endearingly refers to who was unable to lie down for very long without experiencing excruciating pain. She received her PET·CT scan in six minutes and thanks to TrueV and an expanded field of view on the Biograph mCT, her physicians were able to give her an accurate and confident diagnosis in a very short time and with significantly lower dose. Another patient with a nursing background who had bad experiences with her first scans at another facility came to Radiology Associates still searching for answers. The patient was in fact diagnosed with cancer, but was pleased to have a conclusive result. Kroeger notes that the difference for that patient was a positive result with so-so imaging compared to a positive result with great imaging with Biograph mCT.

Toward the end of the day, a patient comes in for a CT scan, his very first scan, of the right side of his abdomen. Robert Flores had been having pain for the past several days and when asked how he was doing, he nervously replies, “It’s been a rough couple of days.” He is escorted into the scanning suite by Kroeger, smoothly guided in, and comfortably adjusted. In a matter of minutes, crystal clear images appear on the screen. Kroeger then reflects on his personal philosophy: “That image is a person and my role is to serve, to help that person get better by providing quality information.” And while we at Medical Solutions will never know the results of his scan, one thing is certain: Flores can be confident that he has technology on his side.

Emily Lynn Smith is an editor at Medical Solutions. She earned her degree in Organizational Communication with distinction from Sacramento State University, California, USA. She lived in Thailand serving as a dependent of the King and teaching English, and has been based in Germany for nearly four years.

1 The statements by Siemens’ customers described herein are based on results that were achieved in the customer’s unique setting. Since there is no “typical” hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption), there can be no guarantee that other customers will achieve the same results.

2 Based on competitive literature available at time of publication. Data on file.

Further Information

www.siemens.com/mCT
An Impossible Dream Come True

Siemens recently connected the 100,000th system to Siemens Remote Service. This service monitors equipment at the rapidly growing Siloam Hospitals Group in Indonesia—an ideal solution for serving the often remote healthcare facilities in this country of more than 200 million people spread out along a 4,800-kilometer-long archipelago.

By Clark Shimazu

Recently, Siemens service engineer Adam Troy, along with hospital staff, uncrated a Siemens MAMMOMAT® Inspiration mammography system at the Mochtar Riady Comprehensive Cancer Center in Jakarta, part of the Siloam Hospitals Group in Indonesia. After contacting Siemens’ service headquarters to schedule a test run of all systems, Troy’s team returned to the hospital eight days later to run the initial performance tests. With the flip of a switch, built-in sensors activated to check internal temperature and oil levels, and in a flash an electronic signal is created. Nearly instantaneously, the pulses reappeared as a data stream charted on a computer screen inside the global Siemens service headquarters in Erlangen, Germany. An expert peered at the timeline of events to detect if there was any indication of hardware failure; the Siemens Remote Service (SRS) continued to report that the mammography unit was operating flawlessly.

“On that first test, SRS started up without delay and reported no problems,” says Daniel Kartawiguna, Head of the 20-member Siemens Healthcare Customer Service Department for Indonesia and is based in Jakarta. “The MAMMOMAT Inspiration has been running smoothly ever since.”

At the time, his Jakarta service team did not realize the electronic blip that leaped across the Indian Ocean and the Euro-Asian land mass was achieving a milestone in Siemens corporate history: The 100,000th system was connected to the SRS infrastructure.

Fittingly, this record was set in Indonesia, which has rebounded back from the Asian financial crisis of the late 1990s to become
Siemens Remote Service

one of the region’s fastest-growing economies. Rapid economic development and urbanization are the drivers behind the modernization and expansion of healthcare facilities in this country.

“I feel so proud of this global recognition for our medical centers in Indonesia,” says Chief of Facility Management and Safety for Siloam Hospitals Sian Tjoe, MD, MM. “Our decision to install this mammography unit was based on Siemens’ excellent service support in Jakarta.”

Dr. Sian Tjoe reports that over the past five years of operations with Siemens scanners, the Jakarta Customer Care Center provided service to Siloam promptly. “The radiologists at our core hospitals in the capital are busy not only with their own patients, but also with assisting Siloam’s current expansion plan, so we really appreciate how the Siemens team caught any problems in the early stages before a breakdown. We’ve never had to worry about the condition of equipment and therefore, we can get on with our own priorities.”

SRS catches problems at an early stage, before further deterioration can cause disruptions and force long periods of downtime for equipment repairs. Prior to breaking the 100,000 mark, Kartawiguna’s team installed SRS in December 2007 with SOMATOM® computed tomography (CT) scanners at Siloam facilities in the western Jakarta district of Kebon Jeruk and at Lippo Village in Karawaci, a bedroom community west of the capital. Dr. Sian Tjoe gives high praise to the total package from Siemens, which includes scanners with reliable performance.
along with a service standard based on the early detection and prevention of problems. Compared with the hospital’s older and less-intelligent equipment, the SRS-monitored hardware has had far fewer breakdowns, meaning fewer disruptions to patient flows. At Indonesia’s over-stretched hospitals, every minute counts.

Fast Detection, Rapid Response
Summarizing the basics of SRS operations, service manager Kartawiguna explains that sensors constantly monitor the trends in internal temperatures as well as oil pressure in CT tubes and coolant levels in magnetic resonance (MR) scanners. The real-time data is dispatched over a fixed line to the service center in Germany, while also permitting access at the local service office and regional service hub. The continuous streams of entries from scanners around the world are examined for any anomalies by expert eyes. Whenever a Siemens service engineer at the Customer Care Center detects a potential problem, he or she makes a preliminary analysis and then dispatches a notification to the local service center – in this case, the Siemens service office in Jakarta. “Upon the arrival of an alert, one of our customer service engineers will conduct a detailed examination to determine the exact nature of the problem,” says Kartawiguna. “If any replacement parts are needed, these are retrieved from our supply room and handed to the customer service engineer, who is then dispatched to the client hospital. Expensive parts are sent by air freight from one of the three World Distribution Centers, but customs clearance can take some time. SRS, therefore, gives us a much-needed head start. Without remote service, the diagnostic and repair process could otherwise add up to week of downtime, especially if the breakdown happens on an isolated island.”

He notes that the usual types of problems include overheating of microchips or oil pressure variances due to leaks in a tube from normal wear and tear over time, but adds, “On one occasion, however, I noticed an odd pattern in the SRS signal from a SOMATOM Definition CT. It

Siemens Is Pioneering Remote Support
With SRS, Siemens is pioneering Remote Service by constantly enhancing the solution to fit local business needs. This gives healthcare providers more planning security regarding the availability of systems which, in turn, helps them to better focus on their core competence – patient care. Siemens has more than 20 years of experience in remote involvement:

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>First end-to-end modem connections to CT systems in UK</td>
</tr>
<tr>
<td>1996</td>
<td>De-central infrastructure in 18 countries with five independent administrated remote servers</td>
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<tr>
<td>2000</td>
<td>Development of remote service applications</td>
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<tr>
<td>2004</td>
<td>PROACTIVE, bi-directional communication</td>
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<tr>
<td>2004</td>
<td>Implementation of centrally administrated remote infrastructure within Siemens Healthcare</td>
</tr>
<tr>
<td>2005</td>
<td>Certification of SRS according to ISO 27001</td>
</tr>
<tr>
<td>2009</td>
<td>Start Remote Update Handling of systems</td>
</tr>
<tr>
<td>2009</td>
<td>syngo® Remote Application Services, e.g., syngo Remote Assist, based on the secure SRS infrastructure</td>
</tr>
<tr>
<td>2010</td>
<td>Remote application support from Siemens application specialists via interactive remote desktop</td>
</tr>
<tr>
<td>2011</td>
<td>Introduction of Internet based connectivity for mobile medical devices such as Internet-based ultrasound systems</td>
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“We can now prevent pain and mental suffering for women, along with the financial toll that comes with cancer surgery.”

Nina Supit, MD, Siloam Hospitals Group, Jakarta, Indonesia
Siemens Remote Service

recurred only now and again, but finally we tracked down the sporadic signal to a faulty fan. Our team installed a new fan before overheating could cause any further problems."

SRS also enables experts at the Customer Care Center to make online adjustments to software glitches. “So far, we haven’t used the online repair function, because there have never been any software issues among our client hospitals in Indonesia,” reports Kartawiguna.

He re-emphasizes that SRS is vital in an archipelago of 17,000 islands spread over 4,800 kilometers, or 1,000 kilometers wider than the span between Seattle and New York. “The costs of travel time and airfares can drive up maintenance costs, especially if our team members have to go back and forth several times to a far away area,” says Kartawiguna. “SRS enables our customer service engineers to be close to customers even if working at a distance, to plan ahead, and to do the repairs in a single visit.”

An Impossible Dream Born of Loss

How does SRS rate with the radiologists at Siloam Jakarta? Vera Nevyta, MD, at the Kebon Jeruk Hospital, who was hired right out of medical school as one of the first trainees on the Siemens scanners, answers: “Siemens service has been so reliable that we don’t even notice it, since breakdowns of hardware are minimal.” She adds that the quiet efficiency of SRS is consistent with the Siemens corporate culture. “When I was trained at the Siemens Training Center in Erlangen, Germany, I was completely impressed by the user-friendly advanced technology and the competence of the instructors there,” Nevyta recalls. “Our team of radiologists can concentrate on improving their imaging skills and diagnostics, since hardware problems are a minor distraction.”

One of the priorities of Siloam founder Mochtar Riady is “international quality of medical services.” Nina Supit, MD, widely recognized as a “living legend” of radiology in Indonesia, explains why Siloam seeks only top-of-the-line equipment, for example, the Siemens MAMMOMAT Inspiration unit that set the 100K mark for SRS installations worldwide. “When I began my career as a radiologist some 40 years ago, only women from wealthy families could afford the high price for a scan,” says Supit, “but even the richest people often waited until lumps were detected before coming in for a mammo-

“Our decision to install this mammography unit was based on Siemens’ excellent service support in Jakarta.”

Sian Tjoe, MD, MM, Chief of Facility Management and Safety, Siloam Hospitals Group, Jakarta, Indonesia

All Siemens CT scanners at the Siloam facilities are connected to Siemens Remote Service.
Siemens Remote Service

Summary

Challenge:
• Monitoring advanced medical equipment at long distance to detect potential problems, analyze specific causes, and dispatch customer service engineers before breakdowns occur
• Minimizing downtime for scanning equipment for hospitals with heavy patient loads in a populous developing society with limited healthcare resources
• Rapid and ecologically beneficial parts delivery from local service center or overseas air-freight shipment with customs clearance in time for the dispatch of a repair team to a client hospital

Solution:
• Coordination between the experts at the service support center in Europe with the local service engineers around the globe for fast alert of potential problems
• Expert analysis of SRS events log and data from sensors to pin down the specific causes of hardware malfunctions
• Rapid deployment of parts locally or globally following analysis of SRS alerts
• Using SRS to achieve earlier failure detection and faster repair times
• Extension of SRS service to some of the world’s most isolated islands

Result:
• A highly efficient service record that prompted the client hospital to order the mammography scanner, marking the connection of the 100,000th system to SRS
• Track record of no major disruptions to patient appointments or doctors’ workflows due to equipment downtime
• Overall system efficiency and reliability, enabling hospital administration and the in-house maintenance staff to fully concentrate on the medical group’s expansion plan
• Less CO₂ emission as fewer customer on-site visits are necessary through remote pre-clarification and support
• Opportunity to profit from other advanced services such as Remote Update Handling, Remote Application Services, Remote Software Distribution in the future
• Setting a service standard of excellence

Clark Shimazu is a science and technology writer based in Chiang Mai, Thailand.

Further Information
www.siemens.com/srs
Closing the Loop

Computerized physician order entry capability using the Soarian Clinicals health information system helps WakeMed Health & Hospitals in North Carolina, USA, improve quality of care and reduce medication errors.

By Sameh Fahmy, MS

Ben Alexander, MD, Chief Medical Information Officer (CMIO) at WakeMed Health & Hospitals in Raleigh, North Carolina, USA, recalls a time when many physicians were reluctant to use computerized physician order entry (CPOE) capability, preferring instead to scribble their orders on paper or to telephone them in. However, evidence of the improved safety that CPOE capability can provide, as well as the ease of use of the Siemens Soarian® Clinicals health information system, has convinced Alexander that CPOE capability should be an integral part of WakeMed’s efforts to maximize quality and patient safety. As a result of its technological leadership, the 870-bed private, not-for-profit healthcare system has seen a reduction in medication errors and has made it easier for physicians to adhere to best practices. “Everybody in our group felt like this was becoming the standard of care and was something that we should all be doing,” Alexander says. “They’re really embracing it.”

Immediate Impact

The implementation of CPOE capability at WakeMed was preceded by the use of Siemens Pharmacy and the Med Administration Check™ solutions, which use barcode technology at the point of care to reduce the potential for human error. Alexander says the improvement in patient safety was dramatic, with Med Administration Check preventing a significant number of medication administration errors. “That was an immediate indication that we were making an impact,” Alexander says. “So when we implemented CPOE capability and removed a large part of the potential for prescribing errors and the errors that occur during transcription, we made the process even safer.”

WakeMed began its CPOE rollout in the pediatric and pediatric intensive care units, where the use of weight-based dosing increases the likelihood of errors associated with manual calculations. Alexander notes that the sheer number of times the medication delivery process occurs at any given hospital creates many opportunities for errors and that even the most conscientious physicians sometimes make mistakes. By using CPOE capability with Soarian Clinicals, WakeMed created a closed-loop medication management process to maximize safety. Orders entered electronically flow to the pharmacy for review and validation. The dispensed drugs then go to the nurse, who scans the barcode on his or her identification badge, the patient’s unique identification bracelet, and then the drug to confirm that the right patient receives the right drug, in the right dose, at the right time, and via the right route. The medication order and administration

“Soarian is good at being able to present information in a way that doesn’t distract you from the care of the patient.”

Ben Alexander, MD,
Chief Medical Information Officer (CMIO),
WakeMed Health & Hospitals,
Raleigh, North Carolina, U.S.
changing needs. "When we went live, we told people that if you're having trouble finding something, put in a free-text order or pull out a paper order sheet and hand-write it," Alexander says. "It turns out that we probably get less than one percent of our orders as free-text orders, even though we've gone to great lengths to make it easy."

In addition to being easy to use, order sets also help clinicians improve adherence to best practices by providing access to information on interventions that help providers improve quality of care, such as the use of the antiseptic mouthwash chlorhexidine in patients with respiratory failure to reduce the risk of ventilator-associated pneumonia.

WakeMed Pediatric Intensivist and Hospitalist Bridget Donell, MD, points out that several other features of Soarian Clinicals help improve patient safety. For example, the system notifies physicians about the capabilities of Soarian Clinicals, their consultant was able to advise them on industry best practices and to anticipate and address any issues that might hinder their implementation.

Rather than building order sets that include every possible drug formulation, for example, WakeMed created order sets that display only standard doses. Alexander emphasizes that in addition to ensuring that patients receive care that is consistent with best practices, using order sets to guide physicians to the best options increases ease of use by not overwhelming the user with a tremendous number of choices. WakeMed also maximized ease of use by giving physicians flexibility in how they enter their orders. Physicians can type in non-standard orders, and Alexander’s staff monitors these free-text orders daily so that they can update order sets and create new ones that meet the hospital's changing needs. "When we went live, we told people that if you’re having trouble finding something, put in a free-text order or pull out a paper order sheet and hand-write it," Alexander says. "It turns out that we probably get less than one percent of our orders as free-text orders, even though we’ve gone to great lengths to make it easy."

In addition to being easy to use, order sets also help clinicians improve adherence to best practices by providing access to information on interventions that help providers improve quality of care, such as the use of the antiseptic mouthwash chlorhexidine in patients with respiratory failure to reduce the risk of ventilator-associated pneumonia. WakeMed Pediatric Intensivist and Hospitalist Bridget Donell, MD, points out that several other features of Soarian Clinicals help improve patient safety. For example, the system notifies physicians details are then displayed in the eMAR (electronic Medication Administration Record) component of Soarian Clinicals, which allows clinicians to view the patient’s medication history.

“In the short amount of data collection that we had, there were essentially no prescribing errors,” Alexander says. “The key benefit that we’ve received is having a safe, standardized, closed-loop medication process. And the closed-loop nature of it is important, because it ensures that the pharmacy is an integral part of the process.”

**A Seamless Rollout**

The implementation of CPOE capability in pediatrics at WakeMed began in late 2010, and Alexander and his colleagues worked closely with their Siemens implementation consultant to ensure that it would be a success. Alexander recalls that, in addition to being knowledgeable about the capabilities of Soarian Clinicals, their consultant was able to advise them on industry best practices and to anticipate and address any issues that might hinder their implementation.

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CPOE Puts St. Michael’s Among Canada’s Best

St. Michael’s Hospital, a 475-bed academic health center affiliated with the University of Toronto in Ontario, Canada, has made the continuous improvement of patient care and safety using Siemens Soarian® Clinicals as a cornerstone of its strategic plan.

The hospital marked a major milestone in that effort in February 2012, when it completed its deployment of computerized physician order entry (CPOE) capability across its acute care services. “CPOE is recognized as the key enabler for safer medication management, and leading studies note a decrease of 55 percent\(^1\) to 81 percent\(^2\) in the rate of serious medication errors following CPOE implementation,” says Chief Information Officer Anne Trafford.

The CPOE initiative at St. Michael’s began in March 2010, and the hospital now has a roughly 96 percent utilization rate for orders that can be placed using CPOE capability rather than by phone or through verbal orders to nursing staff. The roll-out of CPOE capability was accompanied by an upgrade to Siemens Pharmacy and its Med Administration Check™ component as well as the use of the eMAR (electronic Medication Administration Record) component of Soarian Clinicals. As a result, St. Michael’s has created a closed-loop medication management system for increased safety. CPOE capability has also enabled greater efficiency, with time-to-first-dose for administration of antimicrobial drugs, for example, reduced significantly.

The closed-loop medication management process has positioned St. Michael’s in the top 0.5 percent of Canadian hospitals, according to the Healthcare Information and Management Systems Society (HIMSS) Analytics Electronic Medical Records (EMR) Adoption Model\(^3\). The HIMSS model was introduced in 2005 to track EMR adoption progress at hospitals and health systems, and it scores hospitals on their use of advanced IT capabilities and their implementation of a fully electronic health record to improve process performance, quality of care, and patient safety.

St. Michael’s has used Siemens Soarian Clinicals to reach the Stage 6 designation, while 97 percent of Canadian hospitals are at Stage 3 or lower. St. Michael’s is one of only three hospitals in Canada, and the only academic health sciences center, to achieve this level.

To help achieve the final stage 7, St. Michael’s is implementing the embedded analytics component of Soarian Clinicals to leverage the system’s data mining and business intelligence capabilities to guide care planning and delivery. “We’ve done really well in getting this far, and our plan will likely see us getting to Stage 7 within a few years,” Trafford predicts.


“It’s a logical system that’s easy to pick up.”

Bridget Donell, MD, Pediatric Intensivist and Hospitalist, WakeMed Health & Hospitals, Raleigh, North Carolina, U.S.

St. Michael’s has created a closed-loop medication management process to support its patient-safety initiatives.
approximately 40 percent of WakeMed patients have at least one CPOE order, and that number continues to rise. “We’ve all become more accustomed to technology, and it’s a logical system that’s easy to pick up,” Donell says.

**Flexibility for Future Needs**

Alexander says that in addition to helping meet the hospital’s current needs, the open architecture of Soarian Clinicals allows WakeMed to adapt it to meet changes in the regulatory and business environment. Using the Soarian workflow engine, Alexander and his colleagues created a workflow that automatically orders certain consultations based on the admission assessment. If a patient meets the criteria for a nutrition consultation or physical therapy, for example, those will automatically be ordered by the system. WakeMed has a list of approximately 20 additional workflows that it is planning to implement and is also planning to use Soarian Clinicals for medication reconciliation.

Alexander says the increased acceptance of CPOE capability on the part of physicians reflects an understanding that information technology has become an integral part of everyday life, and that healthcare should be no exception.

Legislation passed in the United States in 2009 that created incentives for the meaningful use of electronic health record components, such as CPOE capability and medication reconciliation also includes penalties for non-compliance that begin in 2015 – a clear signal that the use of information technology to improve patient care will not be optional in the future. Yet despite the central role that computers play in patient care, Alexander emphasizes that physicians need their interactions with technology to be as frictionless as possible. Every second a physician spends figuring out how to use software is a second that would be better spent providing personal attention to the patient, he says. “To me, the goal of healthcare information technology should be to provide automation when it’s appropriate and to provide information in an understandable way that allows the healthcare provider to assimilate that data and make decisions based upon it in a thoughtful and effective way,” Alexander says. “Distraction is a big problem for healthcare providers, and we certainly don’t need to add to that. So I think Soarian is good at being able to present information in a way that doesn’t distract you from the care of the patient.”

**Summary**

**Challenge:**
- Reducing medication errors
- Ensuring adherence to best practices
- Streamlining workflow

**Solution:**
- Computerized physician order entry (CPOE) capability using Soarian Clinicals, which eliminates transcription errors and notifies physicians of contraindications such as allergies and drug-drug interactions, while Med Administration Check uses barcode technology to confirm that the right patient receives the right drug and dose
- Soarian Clinicals’ ability to allow healthcare providers to create order sets that include interventions consistent with guidelines and regulatory performance standards
- Workflows that automatically order certain consultations based on the admission assessment

**Result:**
- Reduction of medication errors resulting from improper transcription, incorrect dose calculations, and medication administration errors
- Patients consistently receiving care that conforms to practices and regulatory standards
- A reduction in handoffs among clinicians that improves efficiency and allows them to spend more time delivering personalized care to patients

Sameh Fahmy, MS, is an award-winning freelance medical and technology journalist based in Athens, Georgia, U.S.

Further Information
www.siemens.com/soarian-clinicals

“Soarian makes processes more transparent and minimizes duplication of work.”

Henrique Martins, CMIO,
Professor Doutor Fernando Fonseca Hospital, Amadora, Portugal

IT Solutions Open Up New Dimensions

The emergency department at Fernando Fonseca Hospital is one of the busiest in Portugal. The unit sees up to 800 patients each day. The hospital is using Siemens Healthcare IT solutions to tackle the growing challenges.

By Manuel Meyer

Micaela and her mother reached the pediatric emergency department of the state-run Professor Doutor Fernando Fonseca Hospital, in Amadora, a city of 180,000 just outside Lisbon, at about 2 p.m. The eleven-year-old girl’s hand had been caught in a slamming door at school. The little finger of her right hand is severely swollen.

Just a few minutes later, nurse Nuno Oliveira calls the girl into the treatment room. He is using the Manchester Triage System (MTS), a methodology developed in the UK for assessing patients’ urgency and assigning priority for treatment. Oliveira asks the patient about various symptoms. He wants to know whether she can move the finger, where exactly she feels the pain, and whether she has any allergies. He carefully records all the information. Soarian® Clinicals Emergency Department (ED) interfaces with the MTS module, helping clinicians to establish treatment priorities and providing an overview of patients, events, and resources in the ED. Micaela’s pulse and breathing are normal, and she is calm in spite of the pain. Since there is also no compound fracture present, the nurse assigns her “pouco urgente” (“standard”) status, one of the MTS categories available in the IT system. A green bracelet is put on the girl’s wrist, symbolizing the second to last of the system’s five urgency categories.

Faster and More Efficient

Nonetheless, Micaela does not have to wait hours to be treated. “Using the MTS interfacing with Soarian Clinicals to quickly categorize treatment priorities and to provide direct access to findings
and data to attending physicians, our work in the emergency department became faster and more efficient,” explains Professor Henrique Martins, MD, Chief Medical Information Officer (CMIO) at Fernando Fonseca Hospital. Even with her case rated ‘standard’, Micaela is able to leave the hospital after only one hour. Just a few minutes after Oliveira had entered the pain symptoms in the system and ordered an X-ray, the radiologist on duty already had all of the information and requests on hand in the IT system, which is also installed in the radiology department. The X-ray image, to which the electronic medical record has a pointer, enabled the orthopedics specialist to rule out a fracture just a short while later. When Micaela arrived in the orthopedics department, it was already clear that the only treatment needed for her squashed finger was an anti-inflammatory ointment and the placement of a splint.

From admitting a patient in the emergency department up to the point of discharge from the hospital, all information is fed into the integrated healthcare IT solutions. At the same time, the treatment is determined even before the patient leaves the emergency department, and the staff decides whether the patient should be treated as an outpatient, be transferred to the emergency clinic for short-term treatment, or be admitted to the hospital for a longer period. The workflow-management capability of Soarian Clinicals was urgently needed at the emergency department of Fernando Fonseca Hospital. While the facility has 730 beds and 1,400 employees, making it one of Portugal’s larger state-run hospitals, it is after all, also responsible for nearly seven percent of the country’s population. With as many as 800 emergency cases per day, hardly any other emergency department in Portugal is as busy as this one, which serves about 700,000 people in the local area. And, hardly any other region in the country has seen such a sharp rise in population density in recent years.

Up until 2009, the public hospital was run by a private management team, which kept things operating cost-effectively and even made it one of the few medical centers in Portugal to earn a profit. In March 2010, internist Martins, who specializes in clinical IT systems and hospital management, took over as CMIO, leading a ten-person team. Their task: to introduce a hospital-wide IT system by the end of 2012. The triage system module integrated with Soarian was first introduced in the pediatric emergency department, in March 2011 and has been installed in all of the hospital’s emergency departments since July 2011. This makes the facility one of the first hospitals in Portugal to use MTS Version II, which has turned out to be more suitable for pediatrics in particular.

While many triage systems used in emergency departments are based on modules that work separately from those used in the rest of the hospital, the Portuguese hospital was particularly interested in an enterprise-wide integrated IT

**Summary**

**Challenge:**
- Up to 800 emergency cases daily required faster processes
- Lack of communication between different departments slows processes and leads to duplication of work
- Lack of comprehensive view, difficulty in managing emergencies

**Solution:**
- Siemens healthcare IT solutions including a Manchester Triage System module

**Result:**
- Faster, more efficient processes
- Fewer duplicate tests
- Shorter processes lead to cost savings
- Comprehensive view, better planning ability
- Emergency management can be optimized
Emergency Department solution. It hoped that the right solution would enable operations to run smoothly from the emergency department, with the triage system, right up to the wards, making them faster but also — and even more importantly — minimizing the potential for human errors. “Siemens was actually the only vendor able to offer us a way to accomplish that,” says Martins, explaining the decision to work with Siemens.

Transparency Eliminates Duplication of Work

“Soarian makes processes more transparent and efficient and minimizes duplication of work,” Martins affirms. Earlier, he says, processes were often very “chaotic,” since some departments not only worked with different IT systems, but, in some cases, were even still using a hard copy. As a result, findings were often written up twice, once by the nurse and then again by the doctor, since no one knew about the other’s work. “Thanks to the electronic medical record, everyone who needs the information — be they in the emergency department, the operating theater, or in the wards — can always see what has already been done with a patient and what steps still need to be taken,” Martins says. This helps reduce unnecessary tests, saving time and money, and speeding up workflows.

But Siemens integrated IT solutions also help clinicians improve on the conventional triage system in a number of other ways, Martins continues. “We use the standard MTS algorithm, but with more features. That means our triage system also includes information on previous treatments and on whether a patient has diabetes, allergies, or high blood pressure.”

The Fernando Fonseca Hospital integrated healthcare IT solution has another big advantage, Martins says. It helps to make sure clinical guidelines are followed. “It is important to comply with standards of care, especially in terms of workflow,” Martins explains.

A Comprehensive View Improves Planning

The work in an emergency department is not very predictable, difficult to plan, and can often be hectic. In particular, decisions generally have to be made quickly. “Soarian lets us maintain an overview of what is going on in the emergency department,” Martins affirms. While some departments, such as radiology and surgery, often did not know how many patients and what kinds of cases they would be receiving from the emergency department, they now have a comprehensive view, which lets them plan workflows significantly better and respond to possible peak periods and staffing shortages.

In particular, Soarian has brought a whole new dimension to coordinating with the hospital’s off-site emergency department, which is located in the city center of Amadora, four kilometers (2.5 miles) away. Almost a third of all emergency cases are admitted at that unit. “Back when we used paper, we had no idea, though, how many cases and which ones were being treated there and might have to be sent to us at the hospital during the day. Now we can plan better,” Martins says. Physicians at the hospital often did not even know what examinations had already been performed at the off-site emergency department, and repeated the same tests.

In general, Martins says, archiving data also improves emergency management. He clarifies: “With the information that has been saved, we can easily determine which departments generally need more staff or where exactly our staff falls behind too often.”

Soarian Helps Save Time and Money

Soarian also helps the hospital save costs. “If a patient is in the emergency ward just one day longer than necessary or stays in the hospital for further treatment, the hospital loses money,” Martins says. He offers an example: If a doctor in a ward ordered an X-ray in the morning, the paper request often did not reach the radiology department until that afternoon, and the image was not taken until the next morning. “With Soarian, the request goes out right away, and the test requested in the morning is performed as early as midday or that afternoon,” Martins explains. The time and cost savings are considerable. And, that is certainly an interesting aspect, particularly during the current economic crisis and with governments facing empty coffers.

Manuel Meyer works for Ärzte Zeitung in Spain and Portugal.

Further Information

www.siemens.com/soarian-clinicals
More Knowledge, More Testing

Like many hospital laboratories, the core laboratory at the MetroHealth Medical Center in Cleveland, Ohio, U.S., has to cope with a sharp increase in requests for vitamin D testing without compromising accuracy or efficiency.

By Linda Brookes
Vitamin D

As hospital laboratories face mounting pressure to improve efficiency, cut costs, and boost revenues, meeting an increased demand for vitamin D testing is an ongoing challenge for senior staff like Barbara (“Barb”) Bandsuh, MT (ASCP), Supervisor of the core laboratory at the MetroHealth Medical Center in Cleveland, Ohio. Affiliated with Case Western Reserve University School of Medicine, the core laboratory serves one of the largest, most comprehensive healthcare providers in Northeast Ohio, including 16 community health centers as well as the Medical Center. With a capability of running 12 assays for infectious diseases, in addition to cardiac markers, diabetes monitoring, and bone health tests, on its ADVIA Centaur® Immunoassay System, the laboratory currently performs over 100,000 tests annually, of which around 16,500 are vitamin D measurements.

Increasing Awareness

Over the past five years, many laboratories have reported increases of 50 percent or more per year in demand for vitamin D testing. This is partly due to improved understanding by physicians and the general public of the consequences of having low levels of vitamin D, known as the “sunshine” vitamin because most of the body’s supply is formed through exposure of the skin to the sun. Up until ten years ago, it was associated mainly with bone health, and physicians usually requested tests for patients they suspected of having diseases like rickets (in children) or osteomalacia and osteoporosis (in adults). More recently, research into other roles of vitamin D has shown it to be involved in the regulation of blood pressure, immune responses, cell growth, and metabolic diseases. Vitamin D deficiency has been implicated in a wide range of chronic diseases, including some cancers, autoimmune, neurological, and cardiometabolic diseases.

Although these associations have yet to be confirmed, reports in the news media have made the public more aware of the importance of maintaining sufficient levels of vitamin D in the body. Although the definition of vitamin D insufficiency is still a matter of debate, estimates based on a widely accepted definition of optimal vitamin status (serum 25-hydroxyvitamin D (25(OH)D) of at least 30 ng/mL or 75 nmol/l) have revealed that up to 77 percent of people worldwide have so-called “insufficient” or “deficient” levels of vitamin D. Vitamin D deficiency is present in almost every segment of the population including children and young adults, but it is even more common in people with limited sun exposure, those with more melanin in the skin, the elderly, pregnant women, and breast-feeding infants. Low vitamin D status has been called an epidemic in Western populations.

Most test requests received by the MetroHealth laboratory are related to adults with suspected bone disease. In the USA, measurement of vitamin D levels is currently reimbursed by most organizations for patients with bone diseases plus a limited list of other diseases, including chronic kidney disease stage III or greater, cirrhosis, fibromyalgia, obstructive jaundice, and psoriasis, and to monitor the efficacy of replacement therapy for vitamin D deficiency. There have even been calls for vitamin D screening as part of routine health care surveillance.

Options for Laboratory Testing

With the dramatic upswing in vitamin D testing volume, laboratories may consider replacing outside services with inhouse testing if staffing and space considerations allow. This was the first decision taken by the MetroHealth core laboratory five years ago. Up to that time, vitamin D testing was done by an outside reference laboratory. In 2007, to expedite turn-around time, reduce costs, and increase revenue, testing was brought inhouse. “That’s when our numbers really went up, also because vitamin D caught on around that time,” Bandsuh noted. Decisions that had to be taken about inhouse testing included the type of instrument to use, how much work and training would be involved, and how to run controls, maintenance, proficiency testing, and calibration, as well as the quality of the test. The options for measuring serum total 25(OH)D, the best clinical indicator of vitamin D status, were immu-
Vitamin D

“We already had the ADVIA Centaur system up and running in the laboratory, so it was very easy to bring in the vitamin D assay.”

Barbara Bandsuh, MT (ASCP), Supervisor, Core Laboratory, MetroHealth Medical Center, Cleveland, Ohio, U.S.

no assays or direct detection methods such as liquid chromatography-tandem mass spectrometry (LC-MS/MS) and high-performance liquid chromatography. Mass spectrometry and chromatography equipment involves high capital outlay while operation and interpretation of the results requires a high level of specialist expertise usually limited to only a few staff in specialist centers, which restricts how often the method can be used. The recent introduction of new, automated vitamin D assays, however, allows for workflow consolidation and better, more efficient management of increasing vitamin D testing volumes, providing highly accurate test results with rapid turnaround time.

“When we brought our assays inhouse, there were not many test applications available, so we chose one that fed our instrument and did our verification procedure,” Bandsuh said. “It worked fairly well, but although we were getting a faster turnaround time, it was very manual and we could only run the batch assays two to three times per week.”

Only six out of the 55 staff employed at the laboratory were trained to run the assay. In addition, “Each run entailed only 39 specimens, so with each run we had to run a set of controls,” Bandsuh said. “We had to recalibrate the instrument and we would run a pooled sample from run to run, which we had to do after every 39 samples. And, because each run had its own calibration curve, there was a lot of variability from run to run,” she recalled. With anywhere between 300 and 350 samples a week requested, the service frequently became backlogged, so turnaround times were about two to three weeks before results got back to the physicians.

Fully Automated Testing

In December 2011, the MetroHealth core laboratory switched to using the ADVIA Centaur Vitamin D Total assay, a one-pass competitive immunoassay that uses proprietary monoclonal antibodies intended for high-throughput quantitative determination of total 25(OH)D. Key to the decision in selecting this assay was that it is traceable to LC-MS/MS.
A French Perspective

Denis Benarroche, PhD, is Laboratory Manager at Labazur Durante, a privately owned laboratory that covers test requests from physicians around the city of Nice in Southeastern France. For vitamin D testing, the company has one platform that serves all of its ten regional laboratories, and all samples are sent to the central laboratory.

In February 2011, Labazur Durante switched from a competitor stand-alone instrument to the automated Vitamin D Total assay on the ADVIA Centaur® XP Immunoassay System with track-based automation. “Our challenge was that due to the high level of demand, we wanted to automate this assay but keep the same level of quality we had with the previous system,” Benarroche said. Correlation between the ADVIA Centaur assay and the previous assay was excellent and the normal values, in practice, were almost exactly the same, Benarroche confirmed.

Other assays were already run on our three ADVIA Centaur XP systems connected to the ADVIA LabCell® automation solution. “The Centaurs altogether can run 2,000 assays per day; all are connected through the same system,” said Benarroche. “The laboratory staff has been using these instruments all along, so it took no time to learn the vitamin D assay,” he said. “In addition, it is much more practical for us to run vitamin D tests on this instrument than it was on the previous system. The same tube of the blood sample can do all the other assays and vitamin D at the same time.” Although the previous automated system gave very good quality results, in addition to being less practical to use, turnaround time was not as fast as with the ADVIA Centaur system. “On the previous machine we could only do between 60 and 80 tests per day,” Benarroche said. “We have seen a big increase in vitamin D testing volume compared with last year and the last five years working with the older system. Now we run about 100 tests per day, six days a week.” Most of the requests for vitamin D testing submitted to Labazur are for elderly people suspected of having osteoporosis, Benarroche said. The company does not receive requests for other indications or for children, and testing for adolescents is rare. “We were only able to take extra test requests when we switched to the Vitamin D Total assay on the Centaur platform,” Benarroche stressed.

“When patients go from place to place or from doctor to doctor, they want to be able to look at a vitamin D and know that it is a true reading. They should be consistent across the board,” Bandsuh stressed. “This was the first fully automated line to get FDA clearance and we already had the ADVIA Centaur system up and running in the laboratory, so it was very easy to bring in the vitamin D assay,” she recalled. “The technical staff already knew how to run the instrument, so there wasn’t a big training issue.” Staff productivity has improved, she declared. “Now everybody in the laboratory can run the assay because it is on the automated instrument that they have already been trained on.” Vitamin D is the biggest assay run on the ADVIA Centaur system from a numbers standpoint, so Bandsuh and her colleagues plan to look at the efficiency of the test in terms of billable test per full-time time equivalent (FTE) after the assay has been in use for a longer period of time.

The supervisor of the core laboratory stressed a major advantage of the assay is the lack of variability. When the laboratory switched to the ADVIA Centaur instrument, they took care that it reproduced within the linearity claimed and they also did a correlation study in which patient samples were taken from the previous assay and compared with the new one. “Some assays, depending on how they run, do trend differently,” Bandsuh explained. “You could look at your normal ranges and you might sometimes see up to a 20 percent difference just because of the nature of the instrument, but with our vitamin D testing it was straightforward; we didn’t see much
variability.” “We much prefer using the ADVIA Centaur,” she says. “With the old instrument, we had to conduct correlation samples between runs. With the Centaur, we don’t have to do that because it’s a continuous assay. So it takes less time to run and it’s real-time data. It’s no longer batch testing and it is random access.” Since converting to the Siemens assay in December 2011, the laboratory’s rate of vitamin D testing has continued to increase from 1,312 tests per month to 1,429 per month, an increase of about eight percent. “We calibrate once a week, we run controls once a day, and the controls stay very consistent. There are no variabilities and our patient samples are put on in between those controls. So the turnaround time is about six to eight hours from the time of drawing the sample.”

Action for the Future

Factors such as the projected doubling of the American population aged 65 and over, a group at particularly high risk of vitamin D deficiency, to 88.5 million in 2050, suggest vitamin D testing volumes may continue to increase. Hospitals and laboratories like Bandsuh’s will rely on accuracy and automation to meet the increased demand for vitamin D testing.

Summary

Challenge:
- Up to 77 percent of the population have insufficient or deficient levels of vitamin D.  
- Physician requests for vitamin D tests have increased by over 50 percent on average in the past five years and are continuing to increase.
- Laboratories need to meet the increasing volume of vitamin D testing, producing accurate vitamin D test results rapidly and efficiently, without increased costs, need for more staff, or substantial additional training.

Solution:
- Siemens’ ADVIA Centaur Vitamin D Total assay is a fully automated one-pass competitive immunoassay for high-throughput quantitative determination of total 25-hydroxyvitamin D.
- Assay can be run simultaneously with other assays on a single, fully automated, random access immunoassay ADVENTIA Centaur XP platform.
- Assay is traceable to liquid chromatography-tandem mass spectrometry (LC-MS/MS).
- Results obtained in as little as 18 minutes.

Result:
- Turnaround time for vitamin D testing is reduced.
- More tests can be run.
- Physicians receive results faster, allowing earlier planning for patient care.
- Revenues are increased with additional billable testing.
- Little training is required to run assay.
- No additional staffing or training needed where the ADVIA Centaur XP Immunoassay System is already in place.

Linda Brookes is a freelance medical writer and editor who commutes between London and New York, working for a variety of clients in the healthcare and pharmaceutical fields.

Professor Stephan Kanzler, MD, pointed out in an interview how Luminos Agile streamlines his department’s workflow.
Flexibility All Around

In August 2011, Leopoldina Hospital in Schweinfurt made advances in fluoroscopy: The facility was the first in Germany to use the new Luminos Agile fluoroscopy system. For Professor Stephan Kanzler, MD, the system’s major advantage is its versatility, which means the department can work with the flexibility it needs.

By Tanja Berbalk

Stephan Kanzler and his team from Leopoldina Hospital were first introduced to Luminos Agile on a guided tour through the fluoroscopy production facilities of Siemens in Forchheim, Germany. The visitors were impressed by the system that features the world’s first patient-side controlled fluoroscopy system with a dynamic flat detector and an examination table that can be adjusted to a wide range of heights. Shortly after his facility visit, Kanzler, together with Siemens, celebrated the unit’s installation at the Medical Clinic 2 in Schweinfurt as the first installation worldwide. The new system allows Kanzler and his team to perform endoscopic procedures such as endoscopic retrograde cholangiopancreatography (ERCP), percutaneous interventions, and stent placements with even greater flexibility and speed – in addition to offering their patients new levels of comfort that were not possible before. The shorter procedure times result in more time for the 5,500 inpatients and 3,000 outpatients treated by the hospital unit each year. Siemens spoke with Kanzler about his experiences, goals, and hopes.

Why did you decide in favor of a system from Siemens?
KANZLER: We did, of course, solicit other bids for comparison, and the one from Siemens appealed to us the most in terms of quality and service. Ultimately, the system offers us a full package that is perfectly tuned to our requirements. Besides that, we are proud to be the first to install this system worldwide.

What is your assessment of the current situation in fluoroscopy?
KANZLER: In practice, fluoroscopic procedures today are often replaced with methods such as magnetic resonance imaging or conventional X-ray. Still, there will always be a segment in which fluoroscopy is extremely important. We use this method primarily for ERCP and for percutaneous and endoscopic visualization of the bile ducts, but also for various stent placement procedures. The operative factor in performing these is having a good system, and also thinking about protection from radiation. Our new Luminos Agile offers the best possible conditions for our examinations.

“Luminos Agile allows us to streamline our workflow and offers clear economic benefits.”

Professor Stephan Kanzler, MD, Medical Clinic 2, Leopoldina Hospital, Schweinfurt, Germany

What improvements in your daily routine do you experience with the new system compared with your old system?
KANZLER: I see improvements both on a user level and on a patient level. Luminos Agile is more user-friendly, easier to operate, and offers greater comfort. For example, the motorized support for mov-
Fluoroscopy

ing the system has really proven its value, since you can move the system in any direction comfortably. It also monitors errors and tells us what the problem is. For example, if the table has not been raised enough, we receive notification on a small display so you can correct this and continue working. We are working with a product that is new, but very mature. My colleagues and I are all very pleased.

Have you seen benefits extended to your patients?
KANZLER: Definitely. We often see older, polymorbid patients. The fact that the table can be adjusted in all directions and raised or lowered from very low to very high positions based on the patient’s bed makes it easy to transfer these patients.

And, we are not the only ones who appreciate that – the patients do, too. Another aspect is the flat detector: In the previous model, the image intensifier above the patient table was very large. The detector in Luminos Agile has been made substantially flatter and slimmer, which is a particular advantage for patients, because the flat detector is less intimidating.

Economically speaking, what benefits have accompanied the system?
KANZLER: Luminos Agile is a practical, flexible system that enables very short changing times between patients. That not only allows us to streamline our workflow, but also offers clear economic benefits, since we can now treat more patients than before in the same amount of time. The sturdier, wider table also lets us manage new groups of patients. I’m thinking especially of our many obese patients. We were limited with our old system, and we simply could not perform examinations on these patients since they were over the system’s weight capacity. We can still move the table to an angle of up to 90 degrees even with very heavy patients. Luminos Agile is also being used by our radiologists for functional upper gastrointestinal studies.

Have you been able to improve your financial results?
KANZLER: We won’t be able to make detailed statements until about a year from now. I can already say at this point that the new system has given us more options for performing more complex interventions, such as percutaneous

Enhancing Comfort for Both Patients and Staff

The Luminos Agile fluoroscopy system is designed to improve patient experience and increase operating convenience for staff. It is the first patient-side controlled fluoroscopy system with a flexible height-adjustable table that can be lowered to 65 centimeters (26 inches) and raised to a maximum of 112 centimeters (44 inches). Immobile patients will now find it easier to get on the table, while staff will be able to perform procedures on patients during fluoroscopy more conveniently. The table also has a 275-kilogram (606 pounds) capacity and a wide 60-centimeter (24 inches) opening between the table and the detector, making it easier to examine wheelchair patients. A dynamic flat detector provides an image that is up to 116 percent larger than that of a conventional 33-centimeter (13 inches) image intensifier, enabling a wider coverage of anatomical regions so that, for example, the entire abdomen can be captured in a single image. With the Ysio® option and a wireless detector, Luminos Agile supports both fluoroscopic and radiographic applications, making the system extremely versatile.
interventions involving the bile ducts. We have much greater flexibility in our work, so we can expand our range of indications and work with more difficult cases.

How would you rate the new system’s image quality?
KANZLER: I have to note that everyone needs to figure out good image quality over time that fits one’s individual needs. Certainly, you can scan at a very high radiation dose, which always gives you good image quality. But you need to find the right balance of low radiation dose and high image quality. With help from Siemens, we have made a couple of extra adjustments so that we now have excellent image resolution at a significantly lower radiation dose. We have been able to reduce the dose by half from previous levels, and yet we still get better image quality. For detailed diagnoses in particular, we need high resolution. And, once the radiation dose has been set, Luminos Agile automatically calibrates the radiation to the patient’s anatomy. The lower radiation exposure is one of the most important aspects to us as doctors as well as to the patient. The table can be adjusted without radiation, since the CAREPOSITION application gives a virtual display of the radiation field. That helps us avoid unnecessary radiation exposure while the table is being positioned. In the long-run, this benefits the patient and us.

What do you value about working with Siemens?
KANZLER: Siemens has created a reliable working structure in which we can work in a spirit of mutual trust and confidence. Communication channels are simple and direct, and we have direct points of contact. When we have questions, we get answers quickly.

What is your overall assessment of the new system?
KANZLER: I am highly satisfied. Luminos Agile has really proven its value in practice. I would buy it again, and I am happy that our executive management was able to purchase such a good system for us to practice this kind of high-tech medicine.

“...more complex interventions.”

Professor Stephan Kanzler, MD, Medical Clinic 2, Leopoldina Hospital, Schweinfurt, Germany

Summary
Challenge:
• Finding a substitute for the hospital’s outdated fluoroscopy system
• Maintaining low as possible dose for both patients and staff
• Offering a system that broadens the clinical spectrum at Leopoldina Hospital

Solution:
• Leopoldina as the first hospital worldwide to install the new fluoroscopy system Luminos Agile
• CARE features for comprehensive dose reduction
• Adjustable table for every patient need

Result:
• Improving the hospital’s workflow with an easy-to-operate system
• Optimum image quality at the lowest possible dose
• Offering new imaging procedures for more diverse patient groups

Further Information
www.siemens.com/agile

Tanja Berbalk has a degree in sociology, marketing, and communications. She is an editor at Medical Solutions.
In spite of the 20 years that have elapsed since first transformations, reform of Poland’s healthcare system has yet to be completed. The Polish healthcare system is nominally an insurance-based system; in reality, however, a para-insurance system evolving around a governing budget system. Throughout the communistic period (1945-1989), it was a governmental budget-based system, with all hospitals state-owned and healthcare provided free of charge. The private sector share was minimal and limited to single doctors’ private practices.

First radical reforms following some transformation began in 1999, during the center-right government of Jerzy Buzek. To a considerable extent, reformation was modeled on Germany’s healthcare system, with certain elements from the British system also taken into account. Healthcare funds were created with the intention of financing healthcare in individual, regional areas. In addition, each fund was to function with significant independence. At the same time, a supervisory organization was to be set-up for the aforementioned insurance system, thus leveling disproportions between regions – ideals and actions that never took place. According to the intentions of the initiators, an insurance-based system with healthcare funds commercializing over a period of time would well serve its purpose. This never happened as politicians, wary of immense change that had already been introduced in other areas of everyday life, were put off by the threat of social conflict.

Incomplete Reform
As a result, healthcare reform came to a halt and remained incomplete despite the road map having been well chalked out. Furthermore, any claims regarding competition or possible admission of foreign capital remained valid solely on paper. It was the first time any form of cost management could have been perhaps successfully introduced, but sadly professional managers were lacking. Worse still, assuming funds had run out, the director of a hospital stopped accepting patients. Repercussions, following social pressure and this shameful event, were that the press and TV attacked the reformers’ good intentions, claiming that a free market in healthcare only brought enormous risks.

A further episode was the move by the left-wing cabinet of Leszek Miller, which took over by announcing its claim in favor of departure from the healthcare funds and replacement through a central National Health Fund – the Narodowy Fundusz Zdrowia (NFZ). The former director of a Warsaw hospital was to head the department that carried out the counteraction. Convinced that a liberal market in healthcare would fail, he held faith in an NFZ-based system, together with independent regional branches that were to be created. Practice indeed proved a central organization to be the strongest link, and since then a para-insurance-based system exists. All is concentrated on the central NFZ organization, thus making it practically a replica of the former government-run budget system. This institution sets the standards for treatment, therapy, and reimbursement – deciding what will be paid from insurance money and what not. And it is not possible to take out a “premium” insurance to cover more than basic benefits.

A remaining problem following the left-wing “counter-revolution” is dual power. On the one hand the NFZ pays benefits, while on the other hand the Ministry of Health has its say – leaving open the question who should fulfill which roles. According to the 1999 reform assumptions, the Ministry of Health should be a consulting body decisive on general health policy aims – and at the same time safeguarding proper care and medical education. Disputes, however, arose between the subsequent presidents of the fund and subsequent Ministers of
Life expectancy at birth in Poland averages 75 years – 71 for men and 80 for women. Mortality rates of children under five are high. For every 1,000 births, seven children die before reaching five years of age, with the mortality of boys higher than girls. On a European scale, Poland has a relatively young society, yet the fastest aging population on this continent. In 2009, the percentage of people over age 60 was 17 percent. And, according to government calculations, Poland’s society is likely to age at the fastest rate in Europe. They foresee a 4.4-fold increase in the oldest group of Polish citizens between 2000 and 2050. No increase is expected in the child sector with reproduction rates at zero. As a result, Poland is expected to have a significant increase in old-age ailments ranging from oncological to neurological.

Meanwhile, public expenditure in Poland is steadily increasing. In 2010, Poles spent 98.85 billion PLN (28.77 billion US$) (almost seven percent of GDP) on healthcare, according to the Main Statistic Office (GUS). Of this amount, 79.85 billion PLN (23.34 billion US$) are public expenditure. NFZ expenditure is the biggest element of public expenditure. NFZ, contrary to GUS, publishes its numbers year by year. According to NFZ, the projected expenditure for health in 2012 amounts to 65 billion PLN (18.92 billion US$). In past years, those figures were far lower: 49.1 billion PLN (14.29 billion US$) in 2008, 35.6 billion PLN (10.36 billion US$) in 2004, and 29 billion PLN (8.44 billion US$) in the year 2000. The two causes for such a high rate of personal expenditure are firstly, the elevated amount of co-payment for only partially reimbursed medicines and, secondly, the fact that Poland lacks a private health insurance system. According to data from the Ministry of Health, patients pay as much as 34 percent of drug prices from their own pockets. Although every Pole has access to a basic benefit package, remaining sums must be paid by individuals.

NFZ data reveals 720 public and 1099 private hospitals in Poland. With the latter, only 48 have annual contracts in excess of 10 million PLN (2.91 million US$) for the provision of services on a larger scale. In Poland, the majority of private hospitals are narrowly specialized – day surgery in ophthalmology is one such example. And under the heading “hospital team of doctors,” this may even include a physician hiring the operating theater in a hospital to conduct a commercial operation. Approximately 70 clinical hospitals exist in Poland and the numbers are decreasing due to consolidation.

According to official data from state institutions – CWU (centralny wykaz ubezpieczonych; central list of insurance) – around two million citizens in the Polish Republic are uninsured, in other words around five percent of Poles. This data cannot be relied upon, as the CWU has no record of Poles who are insured abroad and emigration rates are high. On the other hand, registration is criticized as loss of effort – also resulting in inaccurate figures. Furthermore, data from the NFZ reveals that patient wait time is dependent upon the ability to pay. The average wait for a total knee replacement is 433 days, regardless of urgency. In the case of the hip interventions, a 365-day wait is the norm, and for highly specialized eye surgery (including cataracts), it is 351 days. In private hospitals, such operations can be carried out practically at the drop of a hat if funded with the patient’s own money.
Number of Hospital Beds per 10,000 Resident Population (2005): 52

Total Expenditure on Health per Capita (2005): US$ 495.00

Total Expenditure on Health as % of GDP (2005): 6.2

Public Expenditure on Health as % of Total Expenditure on Health (2005): 69.3

Number of Nurses per 10,000 Resident Population (2006): 52


Number of Physician per 10,000 Population (2006): 20

Male Life Expectancy at Birth (2006): 71

Female Life Expectancy at Birth (2006): 80
Health. Nominally, the latter has the upper hand, yet a Health Minister is unable to make autonomous decisions over and above those of the NFZ without permission of the Prime Minister. The current Minister of Health, Bartłomiej Arlukowicz from the centre-right Platforma Obywatelska (PO – citizens’ platform) has serious difficulties with the NFZ, and the Prime Minister is often called upon to intervene.

Many reforms have been initiated in Polish healthcare, and the same is true in the case of possible institution of family doctors. Similar to Anglo-Saxon countries, family doctors are intended to reduce excessive and unnecessary referrals to specialists, but this reform never took off. Currently, the financial situation is such that if a family doctor refers a patient for tests, he/she must then personally pay the bill. Family doctors therefore have no great interest in making referrals – especially for expensive tests. In any case, with the current system, such tests are hardly affordable, let alone the diagnosed illnesses treatable. Yet, it appears that family doctors prefer simple cases, avoiding difficult decisions – and Polish family doctors refer patients to specialists more often than necessary.

The Polish health system hence appears to have too few specialists, and often month-long waits and queues waiting to see one. The phenomenon of “packing patients off to hospital” is yet another tendency. One that apparently pays off, as, at the hospital, tests are carried out free of charge with only a prescription required from the doctor. The results of this are crystal clear – an existing overload in Polish hospitals.

In theory, the state restricts access to various services, from basic to highly specialized services. The NFZ imposes quota limits on service providers – and in any given year, a doctor or hospital is able to perform only specific services within the scope of insurance coverage. Patients thus face long queues if not in life-threatening situations.

**Healthcare Costs**

Poles pay a health premium of approximately nine percent of their income. The estimated NFZ budget for the year 2012 is 64.5 billion PLN (18.77 billion US$) – with around 7 billion PLN (2.04 billion US$) spent on the family doctor. The cost of outpatient specialist care equals this – with the state additionally paying over PLN 8 billion for medications. And the cost of hospitals further burdens the state budget by around PLN 30 billion per year. According to hearsay, patients also pay an estimated PLN 30 billion for treatment out of their own pockets. These are estimated data, but it is well known that Poles pay bribes and accept treatment in grey market areas of private clinics. This section of the market is unfortunately thriving in constantly rising figures. The existing regulations pose problems and bitter disappointment for people in the medical branch. The PO commenced elections in favor of liberalism – whereby few acts have been submitted to the Sejm (the Polish parliament) to date. Pursuant to one, namely the commercialization of hospitals, all hospitals should undergo transformation to become legal commercial companies by 2013, although how such an act is to be introduced and carried out is yet to be seen. Secondary legislation lacks and nobody knows what is likely to happen to hospitals that conduct both treatment and educational activities. If nothing changes, a decline in clinical healthcare is bound to be the outcome – and around 140 hospitals risk serious decline beginning next year.

A further act concerns voluntary, independent health insurance. The current Sejm Marshal, Ewa Kopacz (PO), put forth such an act on more than one occasion to the Sejm committee while still the Minister of Health, but the act was rejected every time due to poor preparation. It is yet to be submitted to the Sejm agenda. To date, nobody can cope with an additional insurance system. The current NFZ system is so well established and the Polish society still so lacking in means that, as research has shown, only a negligible number of Poles could possibly

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“And while perhaps aiming in the right direction, many people are suffering because of reform and deprived of access to doctors and medications.”

Janusz Michalak, President of Termedia Publishing House, Warsaw, Poland
cope with paying any form of supplemental insurance. Thus, a new phenomenon has come to light – with subscription companies such as Luxmed, Damian, and Medicover. Companies bought by investment funds that sign contracts with varying enterprises. These companies pay PLN 50-100 per month for each employee and his/her healthcare. However, such subscription companies offer healthcare at the simplest level – substituting only the duties of the average family doctor and likewise directing more complex cases to hospitals.

Poland invests very little in healthcare, approximately 10 times less than Germany. However, the problem is not directly concerned with the amount of health premiums, instead the issue is the prevailing chaos and lack of clear perspectives. Oncological clinics pose a further problem with very tardy detection rates as compared to other countries. Polish patients have far fewer chances of survival as compared to say, French or American patients. And no form of award is granted to family doctors who would take the trouble to examine patients more thoroughly. They are undoubtedly capable of detecting cancerous cells at an early stage, but there are no lucrative benefits. And naturally any level-headed insurer would prefer to cover costs in the early stages of treatment as opposed to paying for more expensive treatment at a later date – yet the state-owned NFZ pays no attention to such “details.”

Much government money in Poland has been spent to date on reimbursement for medications. Expenditure on medications continued to grow, so it came as no surprise that Kopacz introduced a reimbursement act, which generated negative reactions when it ceased access to expensive medications. Poles are now treated using chiefly generic drugs and less contemporary methods. At the same time, they have to pay considerably more for extra medications – meaning that out-of-pocket expenses will continue to increase.

**The Aging Challenge**

An additional challenge to the healthcare system is the aging of Polish society. Bearing in mind demographic forecasts, the government intends to raise the retirement age to 67, up from 65 for men and 60 for women. Such plans have been the cause of considerable social protest. So what happens next? If the existing coalition remains in power, and everything indicates this is likely to be the case, the reforms of the former Minister of Health, Ewa Kopacz, will become effective, albeit with delay. The ruling bodies are bound to be confronted with enormous uproar concerning further changes in the healthcare system – and some of the more recently implemented acts have already resulted in great confusion on behalf of the general public. On the other hand, political pressure prevails – and the will to introduce as many reforms as possible. Politicians’ intentions nevertheless have to be acknowledged – as the next three years are all that is left to implement difficult reforms. If the current government does not succeed in this or in the following year (which are the two years immediately preceding the next election) it will never do it. It has rapidly prepared healthcare reform – and in doing so behaved somewhat like a bull in a china shop. And while reform may be a step in the right direction, many people are suffering because of it; they are deprived of access to doctors and medications.

Each government in Poland is interested in carrying out certain reforms – but, in this case, the governing body is standing on very shaky ground in dealing with such a sensitive social issue. And exactly what aims the reforms will have – whether fully insurance-based or mixed – is still not clear, let alone private factors. In Poland, there is no discussion about subsequent governments imposing fragmentary solutions, and although things often go pretty much in the right direction, chaos seems to go hand in hand with everyday life. Unfortunately, patients suffer the most. Maybe in 10 years everything will be better, but we still need to survive the next 10 years ...

The opinions in this essay do not necessarily reflect those of Siemens Healthcare.

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**Janusz Michalak**, president of Termedia publishing house, graduated in Polish philology from the Adam Mickiewicz University in Poznań. He is a well-known medical journalist and healthcare expert and was for editor and manager of the Science and Health department in Wprost weekly magazine for 19 years. Michalak is the initiator of projects such as: contest Success of the Year in Healthcare – Leaders of Medicine, conference Priorities in Healthcare or Top Medical Trends Congress – one of the biggest events in the medical field. He is author of the book Z sercem na Ty (Familiar with the Heart) – an extended interview with Professor Witold Rużyłł, Editor-in-chief of Health Manager monthly magazine.
Further Reading

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Hybrid Operating Rooms: Lessons Learned

At the beginning there was a vision: Sparing patients from open surgery and saving hospital administrators the expense of a huge intensive care unit. Professor Giovanni Torsello, MD, from St. Franziskus Hospital in Münster, Germany, was the first to build a hybrid room in Germany in 2002 – and with a relatively small investment, in his case the purchase of the predecessor of today’s floor-mounted C-arm angiography system Artis zee, the approach became a big success. Ten years later, he shares his lessons learned.

One lesson was that workflow is an important issue to consider when setting up a hybrid room – especially if the room is used by a multidisciplinary team where every party needs to access material quickly and without scrubbing in and out. Torsello also recommends to connect the hybrid room to a central operating tract to avoid construction issues and to provide a gowning room. Space is another important aspect: 50 square meters (540 square feet) are the minimum, 70 square meters (753 square feet) if it is a multidisciplinary hybrid room. Besides, the operating surgeon needs to navigate the table himself, and it should be narrow and tiltable. Last but not least, experience shows that medical engineering companies should be included early on in the planning process as hybrid rooms are extremely complex working environments, with the angiography system being the center piece and all other equipment revolving around it.

Only recently, Torsello set up a second-generation hybrid room in his hospital. A third one will follow soon. The surgeon is convinced that the demand for hybrid interventions will still continue to grow and that they will one day become the standard operation procedure. To read the full story, please go to the website on the right.
CT Scans to Fit Patients’ Needs

When choosing parameters and settings for a computed tomography (CT) examination, individual patient characteristics and the clinical question need to be considered. Latest scientific papers show that SOMATOM® scanners can enable CT scans to be tailored to individual patient needs.

CARE kV is one of these new technologies. Researchers from Zurich, Switzerland, conducted a study for body CT Angiography (CTA) examinations using CARE kV on a SOMATOM Definition AS 64. CARE kV proposes a tube voltage for each examination based on the type of the examination, the topogram and the user-defined reference setting. In the study, 40 patients were examined and the reference setting for the tube voltage was set to 120 kV. In 24 cases the voltage was reduced to 100 or even 80 kV with CARE kV, leading to an overall dose reduction of 25.1 percent.1 Another study at the Medical University of South Carolina, Charleston, U.S., covered the reconstruction algorithm SAFIRE (Sinogram Affirmed Iterative Reconstruction) for coronary CTA examinations. 65 patients were examined with a SOMATOM Definition Flash. The first reconstruction used the conventional method of filtered back projection (FBP), while the second reconstruction was performed with SAFIRE. The SAFIRE images were reconstructed with data from one tube of the Dual Source system only, corresponding to a 50 percent reduction in radiation dose. Despite the lower radiation dose, the SAFIRE images resulted in an improved accuracy for stenosis visualization.2, 3

In yet another study, an interdisciplinary group of researchers in Erlangen, Germany, dealt with the dose of contrast agents for CT examinations for planning transcatheter aortic valve implantation (TAVI). This technique provides an alternative for patients who need replacement of the aortic valve but cannot be referred to open surgery because of comorbidities. With the SOMATOM Definition Flash and its high-pitch mode, the contrast agent dose was as low as 40 milliliters, which may benefit these patients as they often suffer from an impaired renal function.4 The scientific papers illustrate the capabilities of Siemens’ innovative CT technology and how they contribute to individualized patient care.

Treating Liver Cancer with Embolization

Since June 2010, the Department of Cardiovascular and Interventional Radiology of the General Hospital in Vienna, Austria, has installed an Artis zeeGO for their hybrid operating room, a multi-axis imaging system allowing for minimally invasive interventions. In addition to cardiovascular interventions, the main focus of the department is on interventional oncology or chemoembolization, which aims to cut off the tumor’s blood supply. Head radiologist Professor Johannes Lammer, MD, and his team are applying this method increasingly for liver tumors and the radiologists seek to target the tumor as precisely as possible. With the vascular system of the liver being very complex and hard to visualize, there is a considerable risk of incomplete embolization in conventional angiography. The rotating C-arm of the Artis zeGO delivers a three-dimensional view of the organ, visualizing the complete vascular system of the tumor. Lammer sees the future of interventional radiologists in the hybrid settings of multidisciplinary interventions, such as the minimally invasive procedure of the embolization of uterine myomas.

Johannes Lammer, MD, uses the hybrid angio for endovascular as well as surgical interventions.

www.siemens.com/axiom-innovations-interonco
Further Reading

According to the College of American Pathologists, up to 70 percent of medical decisions are based on laboratory test results. Growing test demand driven by an aging population has fueled increased adoption and use of laboratory automation. Siemens offers various products for lab automation, such as ADVIA® and StreamLAB® Automation Solutions, helping to maximize lab productivity through expanded capacity and enhanced automated lab management. Dave Hickey, CEO, Chemistry, Immunoassay, Automation and Diagnostics IT, Siemens Healthcare Diagnostics, in an article in the magazine American Laboratory, states that there are five areas that laboratories must consider before investing in automation to ensure a positive impact on patient care: Integrating IT to maximize automation benefits, flexibility and adaptability, sustainability, tube management, and staffing. Hickey states that automation and IT systems can no longer be regarded as separate laboratory solutions. The availability and capabilities of an IT system should be researched thoroughly as part of an automation solution. Also, laboratories must ensure they select an automation solution that can be easily reconfigured to handle future demands. Automation can also make the lab more sustainable and “greener.” For instance, through automated tube management, the number of blood tubes collected from each patient can be decreased, enabling the lab to reduce material costs, decrease water use, and produce less waste. Finally, staffing is an important aspect when automating a laboratory. Hickey states that since automation can free up staff to take on other, often more demanding roles, it can lead to greater job satisfaction among technologists.

Considerations for Lab Automation

Automation frees up technologists to take on more demanding roles, leading to greater job satisfaction.

Quantification Redefined in PET Imaging

With conventional PET, physicians have historically been faced with the issue of variability in quantitative results due to both software and hardware challenges. Now, the new Biograph® mCT gives physicians quantifiable results that are precise and reproducible over time. With the combination of intelligent software, daily calibration, and precise anatomical and functional co-registration, Biograph mCT redefines quantification in clinical fields such as neurology, oncology, and cardiology. In neurology, Biograph mCT, in combination with syngo®.PET Amyloid Plaque software, is helping to visualize beta-amyloid plaque in the living brain. In a healthy brain, beta-amyloid protein fragments are broken down and removed from the brain. In a brain affected with Alzheimer’s disease, this protein fragment forms amyloid plaque, which builds up between neurons, prevents normal cell communication and is one of the necessary pathological features of Alzheimer’s disease. The ability to visualize these plaques could lead to a better understanding of the disease and may provide new information to researchers to assist them in finding a cure in the future.

In oncology, quantification is necessary to determine the level of metabolic activity in a tumor. Metabolic activity is quantified by measuring the standardized uptake value (SUV) of a PET imaging biomarker. The uptake level of the imaging biomarker is associated with lesion aggressiveness and malignancy severity. It is monitored during treatment to check if the therapy is effective. Measuring the SUV more accurately with Biograph mCT can help make a difference in diagnostic confidence, therapy planning, and treatment monitoring.

In cardiology, Biograph mCT gives physicians access to reproducible myocardial perfusion and coronary flow reserve evaluation, making it possible to quantify absolute myocardial blood flow in daily routine. This can help, for example, when evaluating risk factors or the effectiveness of multi-vessel disease treatment.

Raising the Bar to 3 Tesla

In December 2011, thanks to the MAGNETOM® Spectra, 3 Tesla (T) magnetic resonance imaging (MRI) made its debut at the Sports Clinic and adjacent Radiology Practice Bad Nauheim, Germany (see Medical Solutions May 2012, page 22). Together with Tim® integrated coil technology, the syngo® user interface, and the Dot® workflow technology, the system became a valuable addition for staff and patients.

While 3 Tesla offers high quality examinations, the Tim technology and the Dot engines for various body regions allow improved ease-of-use. They speed up examinations and guide the user through the set-up. For example, the Cardiac Dot Engine is able to aid the user in finding all cardiac axes and optimally localize the heart. This makes a complete cardiac study possible in less than 30 minutes.

According to Bad Nauheim's Radiology Practice, all neurology applications used with 1.5T can be implemented using the MAGNETOM Spectra 3T system and are leading to significant quality improvements, detecting small blood deposits, calcifications, or Multiple Sclerosis plaques.

Regarding orthopedic imaging, the spatial resolution can be increased at comparable examination times, allowing for examinations with a resolution unseen at 1.5T. Concerning abdominal imaging, the team was able to visualize small structures such as the pancreatic duct, including smaller side ducts. After only little experience with the system, the customer can already recommend it for routine performance for all organs. The upcoming challenge will be to explain why not every medical question needs to be answered by a 3T MRI.

Get Social with Imaging IT

syngo®.via users can now share information and discuss best practices on an exclusive community platform. It contains clinical movies, white papers, general news as well as practical tips on how to get more out of syngo.via in the clinical routine. The community is free-of-charge and is limited to members only. Additionally, there is a LinkedIn discussion forum to discuss syngo.via topics with peers.

In order to access the community, syngo.via customers have two options:

They can log in by allowing the syngo.via community to use their LinkedIn profile information or register via the link below and login with the information they receive from Siemens. The advantage with using the LinkedIn option is that users will always see the latest ongoing discussion on LinkedIn on the right side of the screen.

Please note that since the syngo.via community is for customers only, existing customers will be able to join after being confirmed as syngo.via users.
Further Reading

Interventional radiology is a challenge with pediatric patients, as physicians strive to acquire diagnostic images while exposing children to the least possible radiation dose. In the Siemens expert magazine AXIOM Innovations, Bairbre Connolly, MD, and Joao Amaral, MD, of the Hospital for Sick Children (SickKids) in Toronto, Canada, share insights into the improved outcomes they have witnessed with the installation of the Artis zeego® interventional imaging system. They also outline the continuing partnership with Siemens to match the system to the unique needs of one of Canada’s largest children’s hospitals.

SickKids installed Artis zeego in a hybrid room, giving clinical teams easy and efficient patient access. Artis zeego offers advanced 2D and 3D image quality with robotic technology and a multi-axis system. Design characteristics of the Artis zee® family of imaging equipment enable ergonomic, streamlined, efficient operation, which supports dose reduction. Users optimize system parameters such as exposure time, photon energy, and others to match clinical needs while making dose as low as reasonably achievable.

Siemens engineers have been a regular presence in Toronto, learning the needs of doctors there while physicians adjust to the new technology. Equipment and software originally engineered for adults has been modified to fit the needs of children ranging from infants to 150-kilogram (330-pound) teenagers. The article describes the relationship between the doctors and Siemens engineers that leads to continued improvement of images and reduction in dose. Artis zeego was installed in October 2010, but doctors continue to push the system, the engineers, and themselves, with the goal of improving patient outcomes even further.

The Hospital for Sick Children, commonly known as SickKids, is the largest pediatric hospital in Canada.
“I’d rather have my house burn down...”

Siemens Ultrasound Germany donated two ACUSON X150™ ultrasound systems to “Doctors of the World,” which has been supporting a clinic in Kampong Cham, Cambodia since 1999. Originally, the doctors focused on surgical treatment of children who were suffering from cleft lips and palates or other facial deformities. Today, the doctors are treating everybody they can – from people with severe burns to road casualties. With the donation, the clinic can, for the first time, utilize ultrasound imaging to aid in diagnosis.

Access to Healthcare is a problem in many countries – and also in Cambodia. A Cambodian saying sums up the challenges within the country’s healthcare system: “I’d rather have my house burn down than have a family member fall ill.” For understandable reasons: A normal medical examination for an illness such as a cold can add up to ten U.S. dollars. The average income of a Cambodian is around 800 U.S. dollars per year. This, however, still excludes 35 percent of the country’s population who live below the poverty level. If an ultrasound or even an operation is needed, the entire family is often financially ruined.

Read in the Healthcare eNews how “Doctors of the World” has helped the patient Sarm Tha become healthy again.

35 percent of Cambodia’s population live below the poverty level.

The doctors are treating everybody they can.

During their stay in Cambodia, “Doctors of the World” tried to operate on as many patients as they could.

The Cambodian physicians of the clinic were trained on the ultrasound devices to be able to make sound diagnoses without the help of “Doctors of the World.”
Siemens Healthcare Publications

Our publications offer the latest information and background for every healthcare field. From the hospital director to the radiological assistant – here, you can quickly find information relevant to your needs.

**Medical Solutions**
Innovations and trends in healthcare. The magazine is designed especially for members of hospital management, administration personnel, and heads of medical departments.

**AXIOM Innovations**
Everything from the world of interventional radiology, cardiology, and surgery. This bi-annual magazine is primarily designed for physicians, physicists, researchers, and medical technical personnel.

**MAGNETOM Flash**
Everything from the world of magnetic resonance imaging. The magazine presents case reports, technology, product news, and how-to articles. It is primarily designed for physicians, physicists, and medical technical personnel.

**SOMATOM Sessions**
Everything from the world of computed tomography. With its innovations, clinical applications, and visions, this bi-annual magazine is primarily designed for physicians, physicists, researchers, and medical technical personnel.

**Imaging Life**
Everything from the world of molecular imaging innovations. This bi-annual magazine presents clinical case reports, customer experiences, and product news and is primarily designed for physicians, hospital management and researches.

For current and past issues and to order the magazines, please visit [www.siemens.com/healthcare-magazine](http://www.siemens.com/healthcare-magazine).
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