

Medical Solutions

The Magazine for Healthcare Leadership

November 2011

SIEMENS

A photograph of Lord Norman Foster, an elderly man with a balding head, wearing a dark turtleneck sweater and light-colored trousers. He is standing in a modern architectural space, possibly a hospital lobby, with a staircase to his left and a large window with a grid pattern in the background. The lighting is dramatic, with strong shadows on the wall behind him.

Built to Last, Designed to Heal

Lord Norman Foster Has a Vision For Today's Hospitals

Will Jimmy be able to afford good medical care when he is my age?



The world needs better and more affordable healthcare. That's why we've developed better technologies and more efficient IT solutions.

With life expectancy on the increase, healthcare is becoming more expensive. We offer innovative solutions to improve the quality of care and streamline hospital processes before, during and after treatment. From imaging and lab systems that help provide more accurate diagnosis to managing hospitals more efficiently, we can save money that can be put to better use – saving lives.

[siemens.com/answers](https://www.siemens.com/answers)

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Advancing Human Health

Health is the most important factor for each one of us to live a happy and fulfilling life. Without our health, we lose the freedom to fulfill our potential – and our dreams. Thus, human health needs to be protected and sustained just like natural resources such as clean water, fresh air, and the biodiversity our planet provides – both by society and its individuals.

At Siemens, we play a unique role, supporting healthcare professionals to do their job the best they can by providing medical technologies that help deliver a better quality of healthcare and enable ever-improving degrees of individual care through advanced imaging, diagnostics, therapy, and healthcare IT solutions. We thereby help ensure the next generation of breakthroughs becomes a reality. Our commitment to advancing human health, however, goes beyond merely delivering the latest diagnostic and treatment technology to our customers. We support their success through close collaboration and mutual partnerships. Healthcare providers benefit from such business alliances in many ways. To build and maintain a complete hospital together with Siemens not only improves its performance by combining the latest

technology with ongoing application support; planning a healthcare facility with a single long-term contract for supply, installation, testing, training, and commissioning also saves time and money. Results of such a partnership are minimum equipment downtimes, extended service hours, and enhanced clinical and patient outcomes.

Read in this issue how Siemens as a general contractor helped create a state-of-the-art molecular imaging facility in Abu Dhabi (page 12) and how, through a managed equipment service contract, we supplied the equipment for two brand-new hospitals in the Spanish region of Murcia (page 18).

Another innovation beyond medicine is our Green⁺ Check, where we support healthcare providers in their efforts to deliver high-quality, efficient, and environmentally-friendly care. St. Georg Medical Center in Leipzig and University Medical Center Hamburg-Eppendorf, Germany, were the first facilities to have their efforts evaluated with this check (page 24). Just as our health is connected with prevention and medical treatment, it is also dependent on a healthy environment. The Green⁺ Check takes this into account by looking not only at clinical



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

processes, but also at patient communication or building infrastructure. And, when it comes to the immediate patient environment, studies¹ suggest that hospital buildings themselves have substantial effects on patients' well-being. Learn more in our interview with British star architect Lord Norman Foster on page 28. Foster shares with us a common goal: to support healthcare professionals across the globe in their personal mission to help more people enjoy a longer life, a better quality of life, and a happier life. With this in mind, I wish you a happy reading.

Sincerely,

¹ Bryan Lawson: Healing architecture. Arts & Health, Vol. 2, Iss. 2, 2010, p. 95 – 108.



Cover Story



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To build and maintain a complete hospital together with Siemens not only improves its performance by combining the latest technology with ongoing application support; planning a healthcare facility with a single long-term contract for supply, installation, testing, training, and commissioning also saves time and money. Results of such a partnership are minimum equipment downtimes, extended service hours, and enhanced clinical and patient outcomes.

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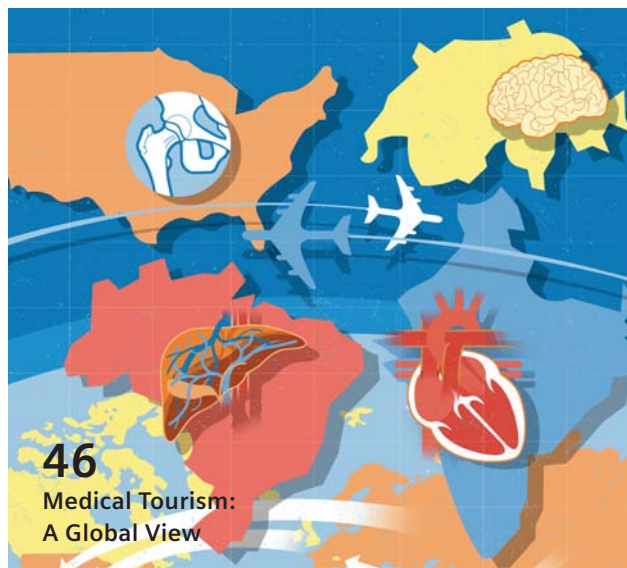
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Siemens Healthcare announces its "International CT Image Contest 2011."

Can You Beat This?

After Siemens' first computed tomography (CT) image contest in 2010, institutions and clinics from around the globe are taking the opportunity to submit their best clinical images for 2011. Such images, taken with the lowest possible radiation dose on Siemens CTs, will then be reviewed by a jury of internationally renowned professors. The aim of the contest is to show that the highest diagnostic image quality can be achieved at minimum radiation dose levels and help to make the public aware of the responsibility that manufacturers and radiologists have with regards to diagnostic radiation through best practice sharing. Siemens users who use a CT from the SOMATOM® Definition family, a SOMATOM Emotion, SOMATOM Sensation, or SOMATOM Spirit will be able to present clinical images – which have been reprocessed with *syngo*® CT Workplace, *syngo* MultiModality Workplace, or *syngo.via* – in seven categories: Cardiology, Angiography, Dual Energy, Pediatrics, Trauma, Neurology, and areas of their clinical routine, which includes thorax, abdomen, and pelvis.

In 2010, the International CT Image Contest from Siemens was an extraordinary success having received approximately 300 clinical images from more than 30 countries. There was even a fan community on Facebook with more than 1,600 active members who frequently discussed the submitted images. In addition, all Internet users could vote for their favorite picture in a public vote. The Internet page devoted to the contest received 17,000 hits within six months.

Entries can be submitted until September 18th, 2011. Siemens will announce the winners at the next conference of the Radiological Society of North America (RSNA 2011) in Chicago.

www.siemens.com/image-contest
www.facebook.com/imagecontest

Book Your Application Courses Now!

As a system or application user, it is vitally important to keep pace with advances in technology and to extend skills in the use of technical medical equipment. Siemens designed a comprehensive selection of applications courses to provide professional skills and hands-on experience that customers need for the effective use of modern medical systems and user programs. Covering the complete spectrum from beginners to the expert level, Siemens' courses are taught by experienced specialists.

In a newly published training booklet, customers will find a complete listing of courses for the second half of 2011. From angiography to ultrasound, the courses give users system, application, and technology training that combine theoretical principles with practical exercises in a one-day to five-day course format.

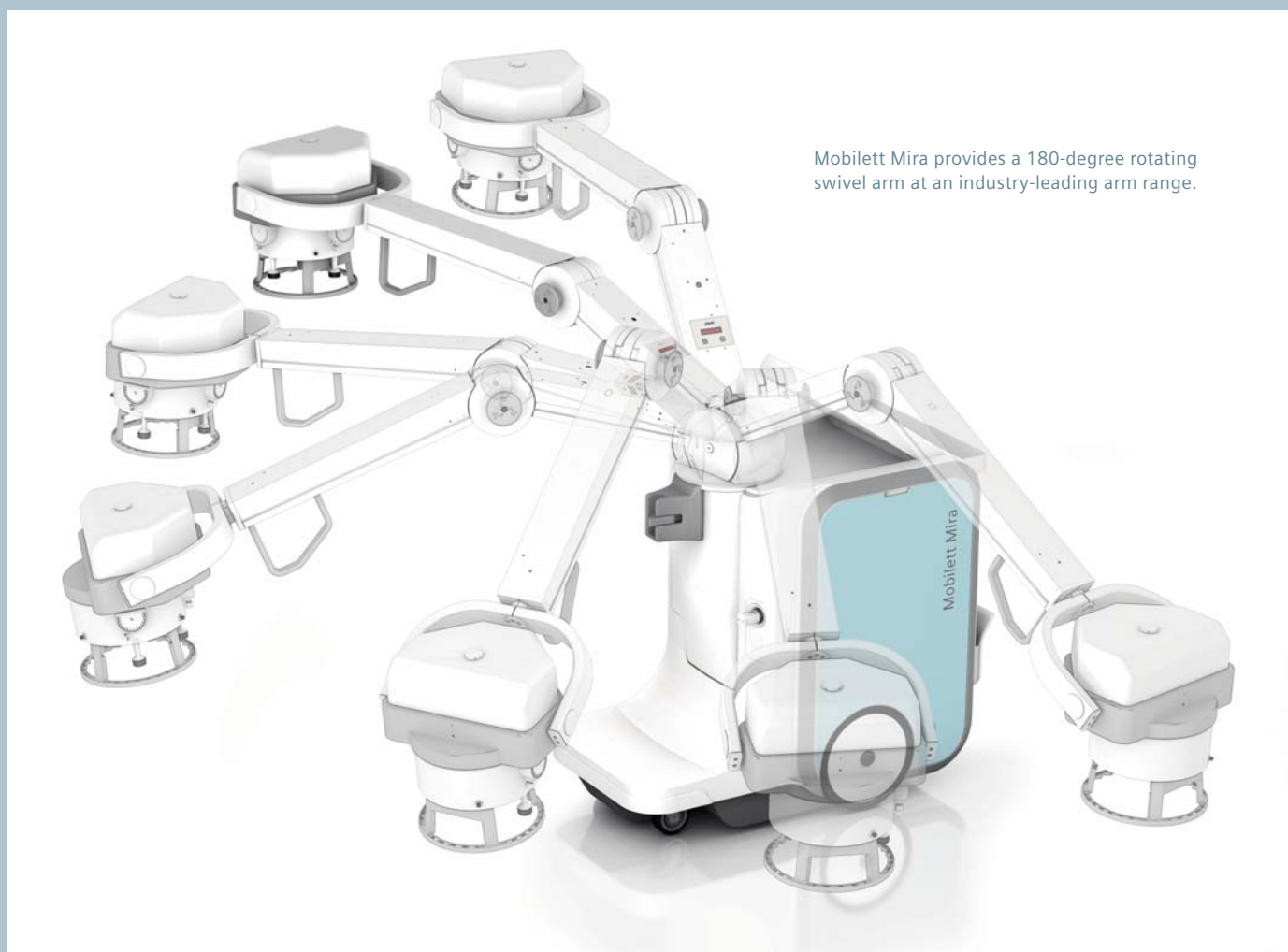
The global training concept offers participants learning opportunities on the latest systems at state-of-the-art training centers in Germany, the U.S., and China. Participants can attend hands-on courses with colleagues covering the maintenance and operation of medical systems and applications, without the distractions of their daily clinical routine. Clinical workshops, on-site trainings, fellowship programs, or e-Learning courseware optimally supplement the instructor-led courses.

All classes are available for online booking via the link below. This Website also provides the opportunity to order the training booklet.



www.siemens.com/healthcare-training-center

Reaching New Heights in Mobile X-ray Imaging



Mobilett Mira provides a 180-degree rotating swivel arm at an industry-leading arm range.

The new Mobilett Mira¹ from Siemens opens doors to new perspectives of mobility and imaging freedom for mobile X-ray systems. With its wireless detector and the 180-degree rotating swivel arm (90 degrees in two directions) at an industry-leading arm range, the system offers new heights of flexibility that lets clinicians examine their patients from every necessary angle – even patients with limited mobility. The system features an integrated cable design for easy handling and cleanability. Clinicians can feel confident with their diagnosis since the system boasts an image resolution of more than seven million pixels. Motion blurring is prevented with the high output power of up to 35 kilowatts (kW) or 450 milliamperes (mA), resulting in sharp, clear images. Patients can experience lower radiation

dose due to the highly sensitive caesium iodide scintillator material (CsI) and the high-end WLAN detector. Mobilett Mira has recently undergone its first clinical use test and the feedback was very positive. Physicians especially enjoyed the image quality, which was compared to the image quality of high-end stationary lung X-ray systems. Clinicians can also count on Siemens as a reliable, proactive partner in terms of Mobilett Mira's uptime. Siemens Remote Services (SRS) helps ensure uninterrupted system availability with regular anti-virus software updates and remote system diagnosis. Wireless freedom, outstanding flexibility, and investment security offered by Siemens all make this system uniquely new – reaching further than ever before in mobile X-ray imaging.

¹ This product does not yet have a certificate of conformity. This product is not commercially available in the U.S.

www.siemens.com/mira



The Dimension EXL 200 Integrated Chemistry System gives smaller laboratories access to fast, sensitive immunoassay testing on a trusted and proven integrated platform.

Advanced technology for smaller-sized clinical laboratories

Siemens Healthcare Diagnostics recently added the Dimension® EXL™ 200 Integrated Chemistry System to the Dimension family of analyzers. For the smaller-sized clinical laboratory, this new system features the revolutionary LOCI® advanced chemiluminescence technology, allowing smaller laboratories access to fast, sensitive immunoassay testing on a trusted and proven integrated platform. The test menu includes over 90 percent of the critical methods typically ordered by physicians, and includes a cardiac STAT menu with high-sensitivity Troponin I results in 10 minutes.

“It’s exciting to offer our low-volume customers the same advanced technology

on an integrated platform, historically available only to higher-volume laboratories,” said Dave Hickey, CEO, Chemistry/Immunoassay, Automation and Diagnostics IT Business Unit, Siemens Healthcare Diagnostics. The Dimension EXL 200 system will also connect to the Siemens VersaCell™ System, a compact automation system offering advanced sample management and sorting capabilities. The VersaCell System allows smaller customers to maximize the number of tests run on one workcell and improves the efficiency of their operations. Based on the success of more than 900 global placements of the Dimension EXL with LM system used, Siemens is confi-

dent the new Dimension EXL 200 system will meet customers’ needs. Currently, both Dimension EXL systems allow customers to run a broad menu of tests. Available panels include: cardiac, thyroid disorder, therapeutic drug monitoring, drugs-of-abuse testing, protein testing, fertility, and routine and specialty chemistry testing.

[www.siemens.com/
dimension-exl200](http://www.siemens.com/dimension-exl200)

“Turn your city pink!”

We at Siemens want to raise breast cancer awareness with our new global campaign “Turn your city pink! Raise awareness for breast cancer.” Why? Breast cancer is one of the world’s most threatening diseases and early diagnosis is key for its effective treatment. Siemens wants to help spread the awareness for breast cancer with the new international campaign, which started in October 2011 and runs for one year. The campaign aims to get people all over the world engaged and encourages them to be creative and turn their city pink. Pink is the international color of breast cancer awareness. Participants can upload pictures or videos of their actions to the campaign Website and share them with friends, creating even more awareness. Siemens will reward every entry with a donation to charity and the most popular entry wins a pink City iPad¹ every month.

The new campaign is a step toward informing the public about the disease and the importance of early detection. In October 2010, Siemens completed the “Pink Ribbon around the World” campaign, where participants helped to raise breast cancer awareness in a one-month online campaign. Additionally, the German market research institute Gesellschaft für Konsumforschung (GfK) conducted an international survey to determine the needs of women and medical practitioners.

The study pointed out that many women think of breast cancer as a key topic, but do not receive screenings due to an overall lack of awareness. Numerous doctors stated that women avoid screening as they fear that something will be found or



because they do not regard it as necessary. Ultimately, the goal is to support experts and healthcare professionals everywhere to perform to their best ability and focus on detecting breast cancer as early as possible.

¹ iPad is a trademark of Apple Inc., registered in the U.S. and other countries

www.siemens.com/pink



A Fully Automated Process for Nucleic Acid Isolation

There are an estimated 400 million FFPE-preserved samples in tissue banks worldwide, underscoring the value of their use for analyzing DNA and genetic associations related to diseases such as cancer and autism.¹ To encourage the procedure of processing FFPE samples, a new Siemens Tissue Preparation Solution² provides a more efficient and reproducible process for the isolation of high-quality nucleic acids from FFPE tissue samples. Using magnetic particle-based isolation and proprietary iron oxide bead technology, the Siemens method enhances the quality of the extracted nucleic acids that results in more reliable and robust test results. And with the Siemens fully automated tissue extraction process, the hazards associated with handling organic solvents are minimized while the turnaround time is improved. Laboratory staff can walk away from the system and perform other tasks. By improving the speed with which labs can extract nucleic acids, they will be better equipped to manage increasingly large test volumes. The timeliness and quality of the extracted nucleic acids will help to provide physicians and their patients with more reliable information.

Toumy Guettouche, PhD, School of Medicine, Oncogenomics Core Facility, University of Miami, states: “The Siemens Tissue Preparation Solution for FFPE has the potential to significantly increase the utilization of FFPEs for downstream applications because of the ease-of-use of the instrument as well as the outstanding performance of the chemistry used. It is remarkably easy to use and the different steps of FFPE extraction have been automated elegantly which sets it apart from other FFPE extraction systems.”

¹ Source: Genetic Engineering and Biotechnology News May 15, 2008 (Vol. 28, No. 10).

² Under development. Not available for sale.

www.siemens.com/molecular



“Medical functionality is, or rather should be, holistic in its approach. Mental health is as important as, and indeed inseparable from, physical health. The one can affect the other adversely or positively.”

Lord Norman Foster, British star architect

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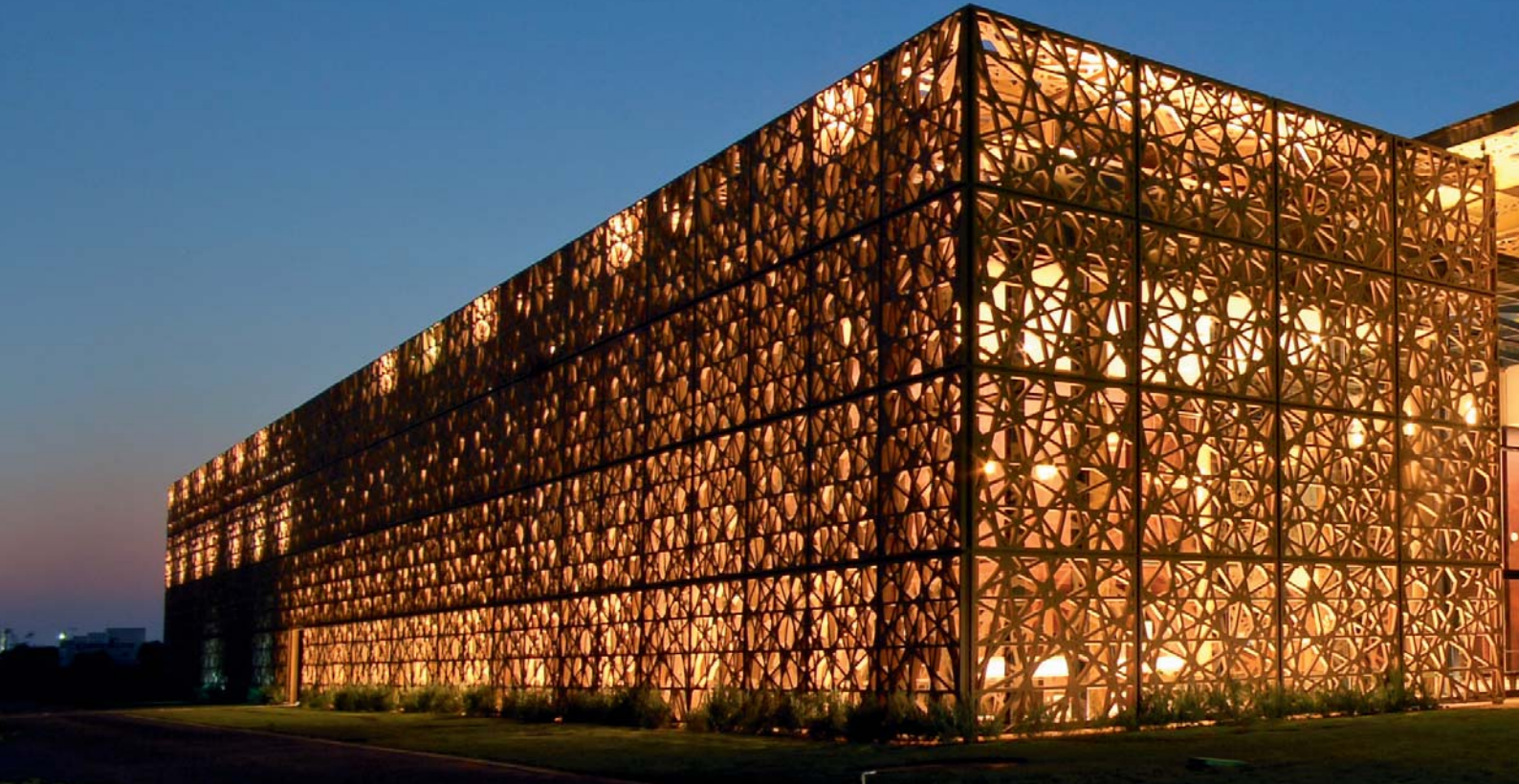
The entrance area of the Tawam Molecular Imaging Centre

Patient-Centric Molecular Imaging

Tawam Molecular Imaging Centre in Al Ain, United Arab Emirates, was designed, developed, and equipped by Siemens with advanced imaging and diagnostic equipment to help Mubadala Healthcare bring a new level of care to the Gulf region.

By Ward Pincus

Ambitious architecture, building technology, high-end imaging, and diagnostic equipment: With Siemens as a partner, TMIC sets a new benchmark for healthcare in the Gulf region.



“Siemens is the only vendor that we have given a full turnkey project to, and they have delivered.”

Bashar Al Ramahi, Senior Manager Business Development, Mubadala Healthcare, Abu Dhabi, and Project Manager for Tawam Molecular Imaging Centre

“Iconic,” “soothing” – this is how Mubadala Healthcare, the owner of the Tawam Molecular Imaging Centre (TMIC) describes this new, world-class diagnostic facility located in Al Ain in the United Arab Emirates (UAE).

TMIC elicits such descriptions because it combines advanced diagnostic imaging and workflow technology from Siemens with elegant arabesque architecture, graciously appointed waiting areas, five-star service, and friendly environment, delivering “patient-centric” care on par with what is available in leading healthcare centers around the world.

Clinical care is provided in partnership with Johns Hopkins Medicine International – creating a total offering from TMIC that helps fill a gap in the local healthcare market that impacted local disease detection and contributed to the com-

mon practice of overseas travel for the diagnosis and treatment of cancer, cardiovascular, and neurological diseases. “There is urgency in addressing this gap,” explains Bashar Al Ramahi, Senior Manager Business Development at Abu Dhabi-based Mubadala Healthcare and Project Manager for the center, which opened in October 2010. Calling positron emission tomography/computed tomography (PET-CT) technology the ‘gold standard’ for cancer detection and cardiovascular and neurological disease diagnosis, Al Ramahi says that “better detection can contribute to improved treatment” of these diseases.

TMIC also helps Abu Dhabi government-owned Mubadala Healthcare pursue its stated goals of developing a thriving local healthcare industry and reducing the need for citizens and expatriate residents



to travel overseas for world-class medical treatment.

Patient Centric Means Patient Comfort

With the arabesque latticework covering the exterior of the glass-walled building, the interior is both infused with natural light and shaded from the powerful sun in this desert oasis city. A long entranceway, with the same latticework overhead and soothing aqua-green lighting on either side, evokes anything but a medical facility.

“And that’s just what Mubadala Healthcare wanted, since those coming to the facility are ill, whether with cancer or cardiovascular or neurological disease,” Al Ramahi says. As a result, “They are already under a lot of stress, and so we are trying as much as possible to take this stress away

from patients and from their families.” As Al Ramahi puts it, TMIC conveys “a hospital as well as hospitality.” It is located adjacent to Tawam Hospital, a regionally renowned oncology center, to support the hospital’s existing work and capabilities. TMIC selected the diagnostic imaging and workflow systems from Siemens – including a Biograph® mCT (PET-CT), a MAGNETOM® Skyra 3 Tesla open-bore magnetic resonance imaging (MRI) system, and syngo® Imaging software. This equipment serves the twin goals of patient comfort and diagnostic excellence towards a shorter, more comfortable imaging experience for patients, and exceptional image quality and detail for treating clinicians. TMIC provides an edge to treatment planning and diagnosis by housing both a PET-CT and an MRI. Further con-

tributing to patient care and clinical outcomes is the region’s first particle accelerator, a Siemens Eclipse™ HP Cyclotron, which produces radioisotope biomarkers used in PET examinations. With this set of complementary technologies, says Al Ramahi, TMIC is “one of the few facilities in the region equipped with a cyclotron and one of the few facilities in the UAE equipped to do, for instance, full cardiac scanning with N-13 ammonium.” It was essential to Mubadala Healthcare’s vision for a world-class facility that TMIC was self-sufficient in biomarkers. This is important because it allows for more optimal use of the Biograph mCT, ensures that patients get imaging done whenever their treatment requires and not dependent on the availability of internationally sourced biomarkers, and gives



“When you do nuclear imaging, you don’t want patients to be too anxious and nervous,” Al Ramahi notes. Colorful lighting helps patients to be at ease during their examinations.



patients another level of safety, since generated isotopes have a minimal half-life.

Technology Blends Speed and Precision

Al Ramahi says Siemens was selected for the TMIC project for a variety of reasons, among them, “because the PET-CT scanner [Biograph mCT] is the fastest in the market ... nearly twice as fast as others¹, and because it helps to make the experience of the patients much better.” This speed, combined with calming lighting, serene image projections onto the ceilings, and various music options all help to keep patients as calm as possible.

“When you do nuclear imaging, you don’t want patients to be too anxious and nervous,” Al Ramahi notes, since anxious patients are more likely to move, thereby affecting results.

The Biograph mCT plays an important role in addressing Mubadala Healthcare and Al Ramahi’s focus on the early detec-

tion and diagnosis of cancer as well as cardiovascular and neurological diseases, because it allows physicians to view metabolic activity and the exact location of abnormal lesions within an integrated 3D image, providing fast, accurate, and effective detection and tracking of disease.

A PET-CT scan can be completed in five minutes, while Al Ramahi says that most standard scans conducted by the facility last only 20 to 25 minutes, compared to 45 minutes with other machines in other facilities in the UAE.

Because the facility is so unique, it serves patients with all kinds of needs, including children and patients undergoing treatment that requires multiple scans. Complementing the Biograph mCT is the MAGNETOM Skyra 3 Tesla MRI, which has twice the field strength of conventional MRI units, thereby producing considerably higher resolution scans in shorter timeframes. The result is again greater patient comfort through reduced

examination time and a more spacious and more comfortable examination environment, as well as excellent clinical performance due to high-quality images. With TMIC operating as a stand-alone facility with many referring physicians located elsewhere in Al Ain or the UAE, it was vital that the Information and Communications Technology (ICT) solution, also provided by Siemens, offer powerful analysis and sharing functionality. This included *syngo.via*², an advanced client-server visualization software platform designed to let clinicians more quickly and more easily process, read, and share images. This software “has so many different job functionalities – 3D image calculations, cardiac software, neurological software and analysis, while all images are archived and easily accessible,” Al Ramahi says. The solution also includes a radiology information system and a picture archiving and communications system (PACS). This means that all physicians, no matter where they are, can

have access to patient images. At TMIC, referring physicians can use a Siemens Web application to access these images.³

Siemens: A Partner and Project Consultant

Siemens' involvement in TMIC extends far beyond the equipment. From the feasibility study validating the business case to ongoing equipment service and maintenance, Siemens has provided consulting and other services across the whole lifecycle of the TMIC project. As the turnkey manager, Siemens consulted to Mubadala Healthcare on the architectural design, construction, workflow systems, technology, and, of course, equipment. It is the first such turnkey project of its kind for Siemens in the Gulf region and the first such project for Mubadala Healthcare.

"Siemens is the only vendor that we have given a full turnkey project to, and they have delivered. We are very pleased with the equipment and their services," Al Ramahi says, adding that having Siemens lead on the project made it easier for Mubadala Healthcare as the owner, in addition to helping speed completion. "We managed to finish a project that should have taken 18 to 24 months in just 14 months."

Mubadala Healthcare is looking to transform the character of care in the UAE and the wider Gulf region. With Siemens consulting across all aspects of its building design, workflow software, IT systems, and equipment solutions, TMIC has made a bold statement that healthcare in this part of the world can match the best available anywhere.

Ward Pincus, who has lived in Dubai for ten years, writes on health, energy, green technologies, banking, and finance for publications in North America, Europe, and the Middle East. He is a former correspondent for the Associated Press in the UAE.



"We managed to finish a project that should have taken 18 to 24 months in just 14 months."

Bashar Al Ramahi, Senior Manager Business Development, and Project Manager for Tawam Molecular Imaging Centre Mubadala Healthcare, Abu Dhabi,

Summary

Challenge:

- Develop a world-class molecular imaging center in Al Ain that provides patient-centric care and advanced diagnostic imaging on par with what's available at the world's top hospitals
- Bring technology, architecture, and design together to provide a patient experience that is as comfortable and relaxed as possible
- Give clinicians access to faster, more accurate, and higher-resolution imaging technologies than generally available in the Gulf region
- Provide a flexible ICT system that gives TMIC and referring physicians direct access to patient images
- Deliver a comprehensive consulting and project management package that makes project realization easy for the owner to manage

Solution:

- A beautiful, iconic building
- State-of-the-art Biograph mCT PET-CT
- MAGNETOM Skyra Open Bore MRI system
- *syngo* Imaging and *syngo.via* software
- Onsite Eclipse HP Cyclotron
- Turnkey project management – from supply of imaging equipment to consulting on building design, technology, and workflows

Result:

- Patients no longer need to travel abroad to receive advanced molecular imaging services in a comfortable, non-clinical setting
- Patients enjoy a faster, more comfortable, and more relaxed scanning experience
- Physicians can make more confident diagnoses from the high quality images that can be accessed from any location
- Optimized equipment use thanks to a reliable supply of biomarkers onsite
- As the first facility of its kind in the Gulf region, TMIC was completed four months ahead of schedule

Further Information

www.siemens.com/turnkey-solutions

¹ Based on competitive literature available at time of publication. Data on file.

² *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. The described features are *syngo.via*-based software options which are medical devices on their own right.

³ The *syngo.via* Web applications are not for diagnostic use. For mobile based applications, country specific laws may apply. Please refer to these laws before using for diagnostic reading/viewing.



Becoming a Benchmark Hospital

As part of a €132 million contract, Siemens Healthcare is supplying two new hospitals in the Spanish region of Murcia with state-of-the-art medical equipment for the next 15 years. This will enable the state-run hospitals not only to have financial and planning security during the current economic crisis, but also to be competitive and qualify as regional benchmark hospitals.

By Manuel Meyer



In the Murcia region, 1.5 million residents will be served. Santa Lucía University Hospital in Cartagena is one of ten hospitals to fulfill this need.

There is hardly any other area in Spain where people are as satisfied with their healthcare system as in the southern region of Murcia. In the government's most recent healthcare survey, taken in 2010, two out of three residents of the Mediterranean coastal region not only rated the public health system as good, they also gave healthcare staff the top marks among all public servant groups. Since the spectacular response of doctors, paramedics, and hospital staff to the powerful earthquake that struck the region in mid-May of this year, injuring hundreds, this group of professionals

has built a better reputation with the public than any other. The residents of Murcia have a number of reasons to be satisfied with their healthcare system: While the average wait time for an appointment with a specialist in Spain is 53 days, Murcians wait an average of just 29 days to be seen by a specialist. They also wait only 51 days on average for surgical interventions, while residents of other regions in Spain have to remain patients for about ten days longer. Nonetheless, the healthcare survey also showed that half of Murcians still con-

sider the wait times for appointments with specialists or non-emergency operations at public hospitals to be too long. The overwhelming majority of respondents also indicated that it should take significantly less time to receive test results. That is an opinion that might change soon; at least, that is what Manuel Ángel Moreno Valero, General Director at the new Santa Lucía University Hospital in Cartagena, hopes. The region of Murcia has ten government-operated hospitals to serve its 1.5 million residents. The population of the coastal region around the city of Cartagena, a

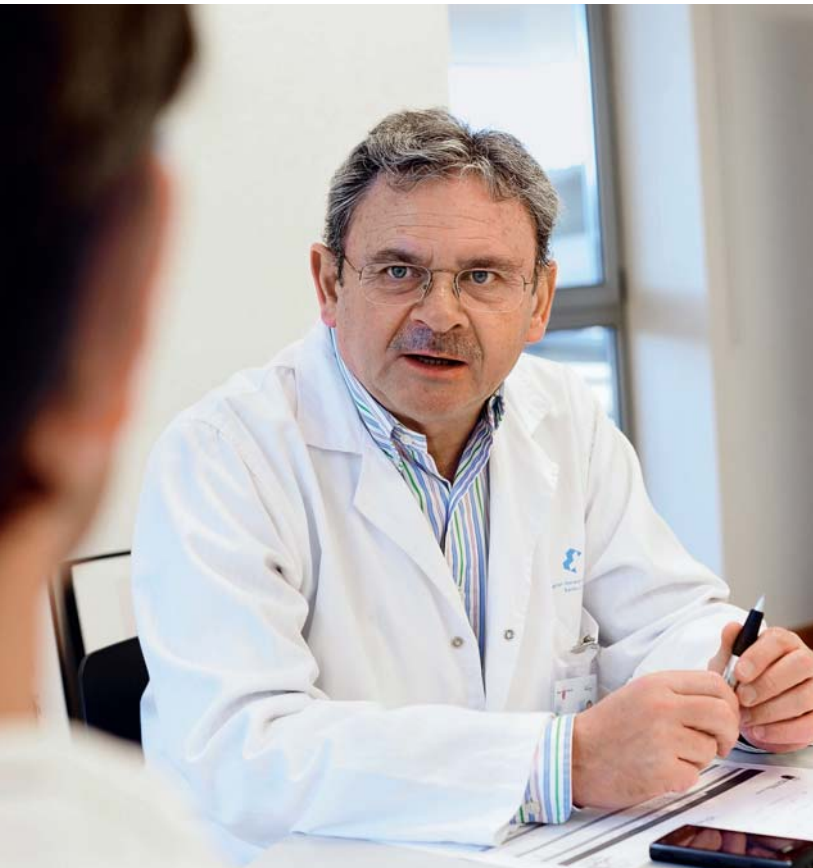
popular tourist destination, has grown disproportionately in recent years. In order to help ensure medical care to this growing population, the existing Santa María del Rosell Hospital, located in the city center, reached a mutual agreement with the nearby naval hospital to manage some patients out of the region's 300,000 residents.

Public-Private Partnership

With the opening of the university hospital in Cartagena and Los Arcos del Mar Menor University Hospital, the neighboring town of San Javier, the two major coastal areas of Murcia welcomed two new government-run hospitals at the beginning of this year, providing nearly 1,000 beds. "This means our healthcare needs are adequately covered for the next 25 years," explains María Ángeles Palacios Sánchez, Minister of Health for the Region of Murcia.

The increased number of beds, emergency rooms, and operating rooms will help to solve wait lists: "The situation will definitely improve now that the two new hospitals are open," says Moreno. He adds that having more beds and more treatment rooms is not the only reason wait times and diagnoses are expected to improve. Another major reason is that both hospitals feature the latest in medical technology from Siemens.

As part of a public-private partnership, Siemens Healthcare has equipped the two hospitals with more than 100 imaging systems, such as computed tomography (CT) scanners, ultrasound units, and mammography systems, under a contract placed by the Murcian health ministry. Siemens also set up the entire hospital information and communications system and all of the laboratory systems at both facilities. The €132 million contract includes not only the initial process of



“The contract with Siemens allows us to remain competitive, thanks to the first-rate technological innovation guarantee we have received.”

Manuel Ángel Moreno Valero, General Director,
Santa Lucía University Hospital, Cartagena, Spain



providing the hospitals with the latest medical technology, service, maintenance, and financing, but it also offers an innovation guarantee. Under the contract, for a period of 15 years, Siemens will ensure that both hospitals can always work with up-to-date medical technology. Siemens will replace the systems with the latest models in each product series at specified time intervals of five, eight, and ten years.

"In times like these, in an ongoing economic crisis that affects public budgets as well, the contract with Siemens not only offers our government-operated hospital top profitability and security in terms of financing and planning for the future, but also allows us to remain competitive, thanks to the first-rate technological innovation guarantee we have received," Moreno explains. But the advantages of working with Siemens go even further, he says: "Always being at the forefront of technology enables us to offer treatment methods and medical interventions that, in turn, shorten the postoperative process. That means that not only do we free up beds again more quickly, but we physicians are also able to treat completely different diseases right here in the region," he affirms.

A Giant Leap in Quality through Siemens Technology

In the field of interventional radiology and cardiology, the university hospital, which was officially opened by Spain's

Princess Letizia at the end of February, could even become a benchmark facility for all of Spain. Thanks to the public-private partnership with Siemens, the hospital has the only Artis zeego® multi-axis robotic technology system on the Iberian Peninsula. With the Ysio digital radiography system and magnetic resonance systems such as MAGNETOM® Espree, Avanto, and Essenza, both hospitals work across the board with advanced technology in the fields of clinical imaging, laboratory diagnostics, and information technology.

In preanalytical and clinical laboratory analysis as well, Santa Lucía University Hospital should become a benchmark hospital at the regional and even national levels in the future, thanks to its ADVIA® LabCell® and ADVIA WorkCell® Automation Solutions. The automated track system, one of the largest of its kind in Spain, is connected to ten analyzers, transporting up to 3,000 blood and urine samples each day. "This will allow us to considerably shorten the time from initially taking the sample to forwarding the test results to the treating physician," Moreno predicts. He does point out, though, that at this point, with the hospital slowly building its activities, it is not yet possible to say how the new technologies and IT systems from Siemens will enhance productivity, reduce costs, or accelerate working processes. "Aside from that, in addition to its technical equipment, a hospital can only

As part of a public-private partnership, Siemens Healthcare has equipped two new hospitals in the coastal areas of Murcia with more than 100 imaging systems and set up the entire hospital information and communications system as well as all of the laboratory systems.



“Aside from financing and price, 70 percent of our decision was based on technological quality, and in that area, Siemens simply had the best offer.”

María Ángeles Palacios Sánchez,
Minister of Health for the Region of Murcia, Spain.

Summary

Challenge:

- Equip two government-operated hospitals with state-of-the-art medical technology during an economic crisis that is causing budget fluctuations in the public healthcare sector, as in other areas
- Enhance the quality of the state-funded healthcare sector while achieving the best possible cost-benefit ratio

Solution:

- Siemens Healthcare implements its Managed Equipment Services (MES) model, assuming responsibility for providing the initial range of state-of-the-art medical technology and IT systems, financing, service, maintenance, and a 15-year innovation guarantee for the systems

Result:

- Financing and planning certainty for government healthcare sector
- Guaranteed innovation, updates, and replacements for the future
- Quality enhancement and an increased range of treatment and intervention methods through state-of-the-art medical technology
- Status elevated to regional and national benchmark hospital

be as good as its medical staff,” Moreno says, commenting that having the best medical technology available does not help very much if a facility does not also have excellent staff that uses that equipment correctly. This problem did not materialize in this case, however. On the contrary: “Precisely because we now have the most advanced medical technology in the region, our hospital has become attractive for many of the best specialists from Murcia and the rest of Spain,” Moreno says, evidently pleased that he is now able to count on some of the best specialists in their fields. Those specialists include people like José Contreras, a radiologist and the head of the new molecular imaging department. He values the ongoing support and continuing education and training he now receives at the hospital from Siemens employees. In addition to trainers who help physicians and nursing staff learn how to operate the systems, a team of six to

Managed Equipment Services

When the Spanish central government in Madrid transferred responsibility for healthcare policy to the regional governments in 2002, Murcia began to invest more in healthcare than any other of the country's autonomous regions. Over the past nine years, the region has increased its annual healthcare budget by nearly 200 percent, to its current total of €2 billion.

Nonetheless, building two new hospitals and equipping them with state-of-the-art medical equipment at the same time was still a huge financial and logistical challenge for the regional health ministry. "That was why we looked for a private investor to handle the equipment, service, and financing," explains María Ángeles Palacios Sánchez, Minister of Health for the Region of Murcia.

The arrangement marks the first time in Spain that a single technology partner is responsible for original equipment, service and maintenance, updates and replacements, and financing of medical equipment and information technology at a government-operated hospital. This is a completely new business model within the Spanish healthcare sector. Sánchez hopes it will enable the region "to improve the quality of government-provided healthcare in Murcia at the best possible cost-benefit ratio." For technology companies in the healthcare sector, these major contracts for order volumes of €100 million and more

are highly interesting, which is why they can make offers that, in turn, mean tremendous financial savings for the government agencies awarding the contracts, says Sánchez, explaining the decision in favor of the first business model of its kind in Spain.

Starting in May 2009, the health ministry conducted a seven-month series of negotiations, sitting down with various companies in direct competition, until Siemens Healthcare was finally chosen. "Aside from financing and price, 70 percent of our decision was based on technological quality, and in that area, Siemens simply had the best offer," says Sánchez.

Another market in Europe where Siemens Healthcare had previously worked with the Managed Equipment Services (MES) business model is the UK, which like Spain, has a healthcare system that is predominantly financed by the state and providers increasingly have to rely on commitments from private companies.

The Murcian Health Minister expects this business model to yield not only technological innovation, but also – and especially – financial certainty for planning purposes, even during an era when the Spanish economic crisis is expected to lead to budget fluctuations in the public healthcare sector, as in other areas.

eight Siemens experts is assigned to work with the two hospitals on an ongoing basis to service, maintain, and monitor the medical equipment.

A Long-Term Technology Partner

For Siemens Healthcare Spain, it was a tremendous challenge to equip two state-of-the-art hospitals of this size with medical equipment and IT systems at the same time and train the staff. Los Arcos del Mar Menor University Hospital in San Javier has a bed capacity of 329 and occupies about 61,000 square-meters of space. The state-run Santa Lucía Hospital in Cartagena is even larger, and, with 656 hospital beds and total usable

area of about 115,000 square-meters, is about twice the size of the other facility. In just seven months, Siemens installed 18,500 medical systems at the two hospitals, including 100 imaging systems. Regional Health Minister Sánchez is thrilled at the company's performance: "Siemens did this very well and in record time, much faster than we expected beforehand." For Siemens Healthcare Spain, the public-private partnership with the Murcian health ministry was highly important. "We are able to present ourselves on the market as a long-term technology partner, the first to tackle a project on this scale in Spain," explains José Antonio Crespo, the person responsible for the contract at Siemens. In turn,

Crespo adds, Siemens Healthcare itself has naturally gained a great deal of valuable experience in implementing projects of this size and in emerging from direct "competitive dialogue" with other providers – a new concept in Spain – as the winner.

Manuel Meyer is a correspondent for the Austria Presse Agentur in Spain and Portugal.

Further Information

www.siemens.com/healthcare-turnkey

Caring for Health and for the Future

Two leading hospitals in Leipzig and Hamburg, Germany, have successfully completed a new sustainability evaluation developed by Siemens: the Green+ Check. The results acknowledge achievements in sustainability and pinpoint the scope for further improvement.

By Philipp Grätzel von Grätz

For somebody managing a group of companies with more than 3,000 employees and an annual turnover of €220 million, Professor Karsten Güldner, PhD, is surprisingly down-to-earth. Looking out the window of his office at St. Georg Medical Center in Leipzig, the Managing Director of Klinikum St. Georg gGmbH and Director of St. Georg Medical Center talks about trees rather than figures. "I commissioned a study of an expert on forest ecosystems some years ago. And it turned out that there are quite a few very rare trees in our parkways out there," he muses.

Güldner is proud of his place of work. The hospital will celebrate its 800th anniversary next year. The pavilion ensemble in Leipzig-Eutritzsch was built nearly a century ago. "It is not always easy, but we want to and we will preserve this heritage," says Güldner.

The St. Georg Group has more to offer than the large St. Georg Medical Center

alone, which boasts more than 1,000 beds and handles 45,500 inhouse and 140,000 ambulatory patients per year. The group is also a social enterprise with numerous day-care and rehabilitation facilities and its own clinic dedicated exclusively to treating patients with drug addictions. Having spent his professional life in this environment, Güldner has developed a very broad concept of corporate responsibility, which the hospital lives up to. "As a hospital, we have medical, social, and philosophical roots," he emphasizes. "This means that we are more than a healthcare repair shop. It is our job to offer the best possible quality of care, of course. But, we also have a responsibility for the future and for our environment."

Thorough Analysis of Sustainability Efforts

When Güldner first heard about the new Siemens Green+ Check, his interest was

piqued. The Green+ Check is a thorough analysis of a hospital's sustainability. Unlike other sustainability checks, it does not focus exclusively on steps taken to protect the environment, it also takes into account the efficiency of processes and quality of medical care. "It was this broad approach that interested me," Güldner says. "As a public hospital, we tend to have a long-term perspective on everything we do. An evaluation of our work only makes sense when we look at quality of care, efficiency, and the environment all at once."

An agreement was reached in the summer of 2010, and St. Georg subsequently became the first hospital to complete the Siemens Green+ Check. Güldner: "It was certainly a lot of work for both of us. But it is always worth allowing someone from the outside to take a look at what you are doing." Güldner and his staff were confident that St. Georg would pass the check with flying colors: "We had already worked on both energy efficiency and our IT infrastructure, and we knew that these were assets we had to show off." For example, St. Georg Medical Center was among the first hospitals in Germany to negotiate energy contracting as early as the late 1990s. And with the implementation of Siemens i.s.h.med[®] hospital information system underway in all of the group's facilities, the efficiency of clinical processes was also being addressed. The result was a Green+ score of 57, which is well above the 33 point average across all areas. "It did not actually surprise us. We expected to be above average. The result acknowledges what we have achieved. And the subsequent



"As a hospital, we are more than a healthcare repair shop. We also have a responsibility for the future and for our environment."

Professor Karsten Güldner, PhD, Managing Director, Klinikum St. Georg gGmbH, Director, St. Georg Medical Center, Leipzig, Germany



Cafeteria • Shops • Passage • Büros
• Stationen • Kreißsaal



Shops • Passage

Inside the foyer
of the University
Medical Center
Hamburg-Eppendorf



Entrance of the Klinikum St. Georg Leipzig's site in Eutritzsch (left). The shuttle buses of UKE do not produce emission; they are powered by hydrogen.

analysis produced some interesting suggestions that are certainly worth thinking about." Güldner is especially happy that the check gives credit to the social responsibility demonstrated by St. Georg Group and the degree of its integration into many parts of society. "The check also revealed that we have developed a reasonably effective controlling mechanism. This is not self-evident, given the

rather complex structure of St. Georg Group."

Leipzig Outcome: Negotiations with Energy Suppliers

One palpable outcome of the check is that, in collaboration with Siemens, St. Georg Group is now planning to enter into negotiations with municipal energy suppliers in an effort to improve the energy balance even further. "We are also thinking of ways to consolidate our care processes geographically, but we definitely want to preserve the pavilion ensemble. It was, in fact, very interesting to see that, although we have to live with this pavilion infrastructure, our energy balance was actually quite good." St. Georg Medical Center in Leipzig is a very sizeable hospital. But further 300 kilometers to the northwest, University Medical Center Hamburg-Eppendorf (UKE)

is even bigger. UKE is neither a building nor an ensemble of buildings. It is an urban district in its own right. With more than 8,000 employees, it provides care for 330,000 inhouse and ambulatory patients per year. Its annual turnover has increased from €468 million in 2005 to €720 million in 2010.

Professor Jörg F. Debatin, MD, Medical Director and CEO of UKE, has overseen several years of transition. In order to keep pace with an increasingly competitive healthcare system, the city of Hamburg decided to invest in UKE. The result was a new hospital building in the middle of all the traditional structures. It opened in 2009. The new hospital considerably helped to streamline care processes at UKE. "But we wanted to keep the other buildings as well. So we decided to go beyond the actual hospital business and establish a kind of healthcare city that

Summary

Challenge:

- Evaluate a hospital's sustainability performance
- Take into account environmental aspects, efficiency of processes, and quality of care

Solution:

- Complete Siemens' Green+ Check

Result:

- Get a comprehensive overview on what a hospital has reached in terms of sustainability
- Pinpoint individual strengths and weaknesses
- Learn about measures to further improve environmental protection, process efficiency, and quality of care in order to score higher on the sustainability scale

"The Green+ Check made important suggestions about how to get ahead with our sustainability agenda."

Professor Jörg F. Debatin, MD,
Medical Director and CEO of University Medical Center
Hamburg-Eppendorf, Germany





The right medication at hand: Klinikum St. Georg in Leipzig (left). UKE's unit dose system saves up to 1.5 tons of packaging waste annually.

accommodates healthcare-related partners of all kinds," says Debatin. Sustainability has been high on the UKE agenda for several years already. "Some say that this is merely marketing, but for us it is really a lot more. As a medical service provider, we inevitably have to think about issues like durability. And so it was a straightforward question to ask how we as a hospital could contribute to a healthier environment and to a more sustainable use of ever-scarcer resources. It is clear, though, that quality of care remains our top priority."

As far as Debatin is concerned, it only makes sense to talk about sustainability in a hospital context if environmental protection, the efficiency of processes, and quality of care are treated as a triad. And, as with his colleague Güldner in Leipzig, it was the fact this triad was appreciated by Siemens that attracted him to the Green+ Check. UKE achieved an extraordinarily high Green+ of 72, reflecting the hospital's various steps to increase efficiency and improve environmental protection. For example, the hospital-wide implementation of Siemens Soarian® information system in combination with wireless access and digital ward rounds has improved the quality of care and at the same time resulted in a largely paper-free environment. UKE features two unit dose dispensing systems for the automated supply of medication to the patients, thereby increasing medication safety, clinical quality, and efficiency. At the same time, the system saves the hospital – and the environment – up

to 1.5 tons of packaging waste annually by ordering bulk-packaged medication instead of blister-packaged pills. As far as environmental issues are concerned, UKE employees are encouraged to use bikes rather than cars to come to work, and there is even a voucher system for bike repairs. UKE provides a hydrogen-powered bus service for patients, visitors, and employees to get around the vast campus. A sophisticated hospital catering service is another success story in terms of sustainability: by offering patients a choice of 20 different meals, UKE has managed to increase patient satisfaction considerably. At the same time, the amount of waste has fallen and costs have remained constant because patients are ordering fewer meals than expected.

Hamburg Outcome: Improvement in Energy Management

"We knew that we were already performing well in these areas," says Debatin. "What interested us more was to identify areas where we can further improve. And, we discovered plenty of room for improvement in the field of energy management. One issue we are now addressing is, for example, whether it was really ideal to house our data center in a tower building with maximum sun exposure." One idea that emerged from the Green+ Check was to analyze whether an old overhead bunker with thick walls could be used instead in order to reduce the energy required for cooling. Several other projects in the field of energy management are currently being

discussed at UKE as a result of the Green+ Check. One involves the introduction of a Green Building Monitor. It presents the success of the energy-saving projects, informs about current energy and media consumptions, and motivates the employees to save energy. Another idea is to equip the central energy control station with a highly efficient combined heat, cooling, and power (CHCP) plant. This way, current heat and cooling can be produced efficiently and in a resource-saving way.

"The final decisions have not yet been made. But, these are important suggestions that help us in our discussions about how to get ahead with our sustainability agenda," says Debatin. And getting ahead is what UKE is striving to do. After all, Hamburg is the European Green Capital 2011. With all its sustainability efforts, UKE is undoubtedly contributing to the green credentials of 21st century Hamburg.

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.

Further Information

www.siemens.com/greenplushospitals



The Healing Power of Architecture

British star architect Lord Norman Foster, in an interview with *Medical Solutions*, discusses the healing power of architecture, hospital design, and the artistic tightrope act between functionality and the feel-good factor for patients.

By Manuel Meyer

The times in which hospitals focused merely on medical functionality are past. It is also no longer a secret that the architecture of hospitals influences the healing process of patients in both psychological and physical respects. Colors, light, room layout: modern medicine today exploits all possibilities in order to help patients. And, as a result, hospital operators increasingly concern themselves with the creative and therapeutic impact of design and architecture.

Lord Foster, most people say that hospital buildings in general are cold and unfriendly. On the other hand, hospital staff need functional space.

What does a “perfect” hospital need to look like?

FOSTER: Almost all hospitals are cold and unfriendly, and yes, of course, hospital staff need functional space. Your question suggests that you cannot have one without the other. I reject that supposition totally. Unless a hospital meets both the material and spiritual needs, that is, helping the patient feel at ease, then it’s not truly functional.

Talking about functionality. In the past, hospital construction has focused particularly on medical functionality.

FOSTER: Medical functionality is, or rather should be, holistic in its approach.

Mental health is as important and indeed inseparable from physical health. The one can affect the other adversely or positively.

In a previous interview you said that, for you, architecture begins with people, and that it’s essentially a response to needs – both material and spiritual. Is this especially the case for hospital architecture?

FOSTER: Yes. Remember that a hospital is like any other building in that it doesn’t exist without customers. If, in a competitive world, one hospital treats the patient in a more civilized manner than another, then it’s more likely to survive in the long



A guiding principle of Foster's architectural work:
Doing more with less.

“The main challenge is to address the special needs of all the different parties who together comprise the workings of a hospital – the patients, doctors, consultants, nurses, and administrators.”

Lord Norman Foster, British architect

term. The difference isn't one of cost – it's about quality of design. The better environment isn't necessarily more expensive – it's about how wisely you spend the precious resources of time and money.

What characterizes good architecture?

FOSTER: There's a very old checklist, which goes back to Vitruvius – “commodity, firmness, and delight.” I think that still holds true, with the addition of “sustainable.”

What inspires your work in general?

FOSTER: Inspiration can come from many sources – the views, the light, the landscape, the historic context, the world of nature and even machines and aircraft – but architecture is primarily generated by people's needs. It means listening, asking the right questions and taking nothing for granted – starting with a clean sheet of paper and an open mind. Sometimes that process of questioning and challenging leads to new solutions, which I've characterized as “reinvention”.

Who are your personal guiding figures in architecture and why? Can we see them in your buildings?

FOSTER: There have been many anonymous architects, as well as known names and, of course, teachers. But if I were to

choose one, it would be Buckminster Fuller. He was a great visionary – far ahead of his time – and one of the first people to recognize the importance of conserving resources and building sustainably. His credo of “doing more with less” has been a guiding principle throughout our work. You can see Bucky in the Autonomous House project we did together. His influence is more subtle in the towers for Swiss Re in London and Hearst in New York, with their triangulated structures exposed on the exterior.

Last year, you built a groundbreaking hospital in the English town of Bath. It was the first time that you designed a hospital. What were the main challenges there and what features are important for you when designing a hospital?

FOSTER: The main challenge is to address the special needs of all the different parties who together comprise the workings of a hospital – the patients, doctors, consultants, nurses, and administrators; depending on the scale of the hospital this list might be extended to teachers, researchers, and students. Fulfilling the needs of one party should never compromise those of the others.

Would you design differently, depending on whether an object is a

general hospital, a children's clinic, or a special clinic?

FOSTER: Yes. “One size does not fit all.” There are common principles, such as opening the building to views and natural light, or the creation of a calming environment, but each type of healthcare facility has a unique set of challenges according to its size and the people that will use it. We would work very closely with specialist medical staff, patients, and users to design a building that fulfills their exact requirements yet has the flexibility to anticipate future changes and technological developments.

When designing a hospital you have to know about the workflow and the needs of hospital staff as well as those of patients. How do you collaborate with hospital administrators and staff when designing such a facility?

FOSTER: All complex projects demand the integration of what at times might seem to be conflicting demands. The designers have to be good listeners and be prepared to research in depth. The creation of teams with specialist disciplines is also central to the process, and their needs must also be addressed. In this approach, industry has much to offer.

On the other hand, Circle hospital in Bath looks like a five-star hotel and

Lord Norman Foster

Norman Foster was born in Manchester, UK, in 1935. After graduating from Manchester University School of Architecture and City Planning in 1961, he earned a Master's Degree in Architecture at Yale University, CT, U.S.. He is the founder and chairman of Foster + Partners, a world-wide enterprise with project offices in more than 20 countries. Since its inception, it has received over 500 awards and citations for excellence and has won more than 86 international and national competitions. Recent work includes the largest single building on the planet, Beijing Airport, and spectacular buildings like Millau Viaduct in France, the Swiss Re tower and the Great Court at the British Museum in London or the Hearst Headquarter tower in New York. In 1990, he was granted a Knighthood in the Queen's Birthday Honors, and in 1999 was honored with a Life Peerage, becoming Lord Foster of Thames Bank. He was awarded the Praemium Imperiale Award for Architecture in 2002. In 2009, he became the 29th laureate of the prestigious Prince of Asturias award for Arts. After redesigning the Reichstag, Germany's parliament, one of Lord Foster's most recognizable works, he received the Knight Commander's Cross of the Order of Merit of the Federal Republic of Germany in 2010. In the same year, he became the 21st Pritzker Architecture Prize Laureate.

rural landscape, the fundamental needs of patients for care, reassurance, dignity, and comfort are universal.

Do you think that the quality of building and facility design might be a crucial factor for the cure and recovery of patients?

FOSTER: Clinical studies have proved this is the case. Recovery rates from surgery, for example, have been shown to improve when the patients have improved views and better surroundings.

What do you need to consider regarding materials in the design of hospitals?

FOSTER: Materials that have not necessarily consumed huge quantities of energy in their processing or production. Materials that will age well over time and won't require expensive maintenance during their life span. Materials that are tactile to sight, sound, and touch, that give comfort and do not offend. As in all decisions, it's about getting the balance right.

You had a severe illness, cancer. How have the disease and your hospital stay influenced your view on hospital architecture?

FOSTER: Even if I hadn't had two life-threatening illnesses, I would have still given these answers from my experience as an architect. However, speaking as a patient "on the receiving end," I can assure you that my views are backed and validated through personal experience. On this question, I can only add that the best facilities in the world are only as good as the individuals who operate them. In an ideal world, we need both to be of the highest standard.

Manuel Meyer is a correspondent for the Austria Press Agency in Spain and Portugal.

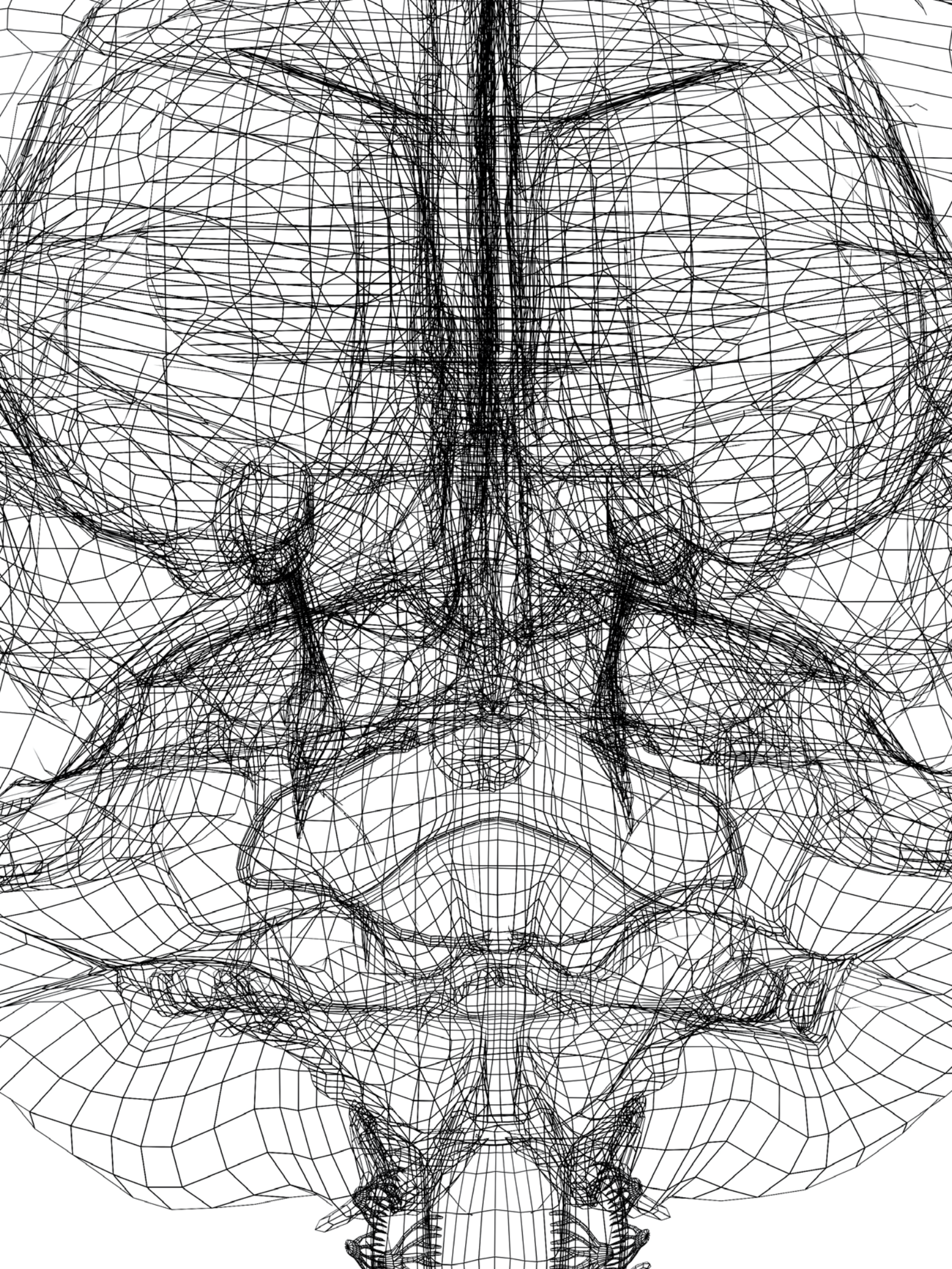
it's definitively not the cheapest hospital building in the world. What would you do differently designing hospitals in poorer countries with a lower budget?

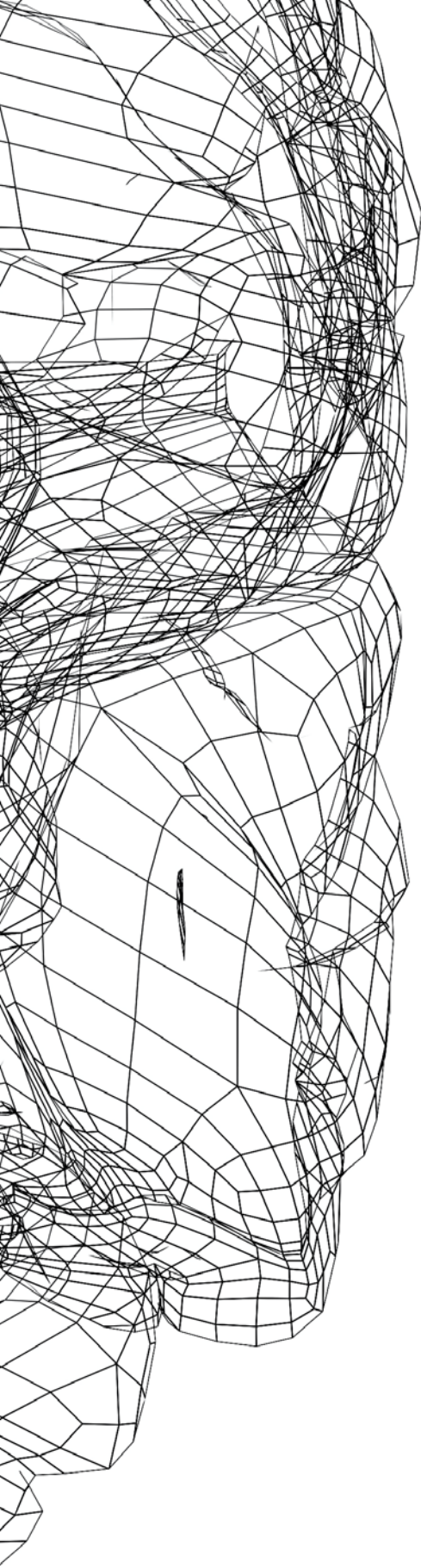
FOSTER: Try to get the basics right and to do more with less. In those areas where the environmental conditions are less demanding, using shade and natural ventilation can still modify the climate and provide comfortable conditions. With fewer resources, the priorities have to be more carefully defined. Where funds are limited, the potential for savings by repetition and standardization through a wider program of projects assumes more importance.

Is there an architectural category such as "hospital construction" at all?

Are there any differences in hospital construction and trends between different countries and cultures?

FOSTER: Yes, hospitals are important public buildings and, as such, I believe that architects have a crucial role to play in their design. However, as in all walks of life, preconceptions need to be challenged from time to time. If anything, it was an advantage that we had never designed a hospital before CircleBath – we were able to apply the expertise and authority gained through our work in civic, commercial, cultural, and residential buildings to look at the building type afresh. Thinking globally and acting locally as an approach is as valid in the healthcare sector as in any other. And while a building in a hot, urban climate may look very different to one in a colder,





The Development of Language, in Living Color

At the Basque Center on Cognition, Brain and Language in San Sebastian, Spain, research scientists are using high-end medical imaging devices from Siemens that gather data on the inner workings of the brain to explore the human mechanisms related to the learning, understanding, and production of language.

By Peter Sergio Allegretti

Things that seem the simplest can often be the most complex. Take for example the basic transmission of information. As you read this article, you are most likely able to understand each of the individual words as well as the meaning that the collection of words together are intended to convey. Yet as you do that, what is happening now in your brain and your body is an extraordinarily complex and precisely choreographed series of neurological and physical events.

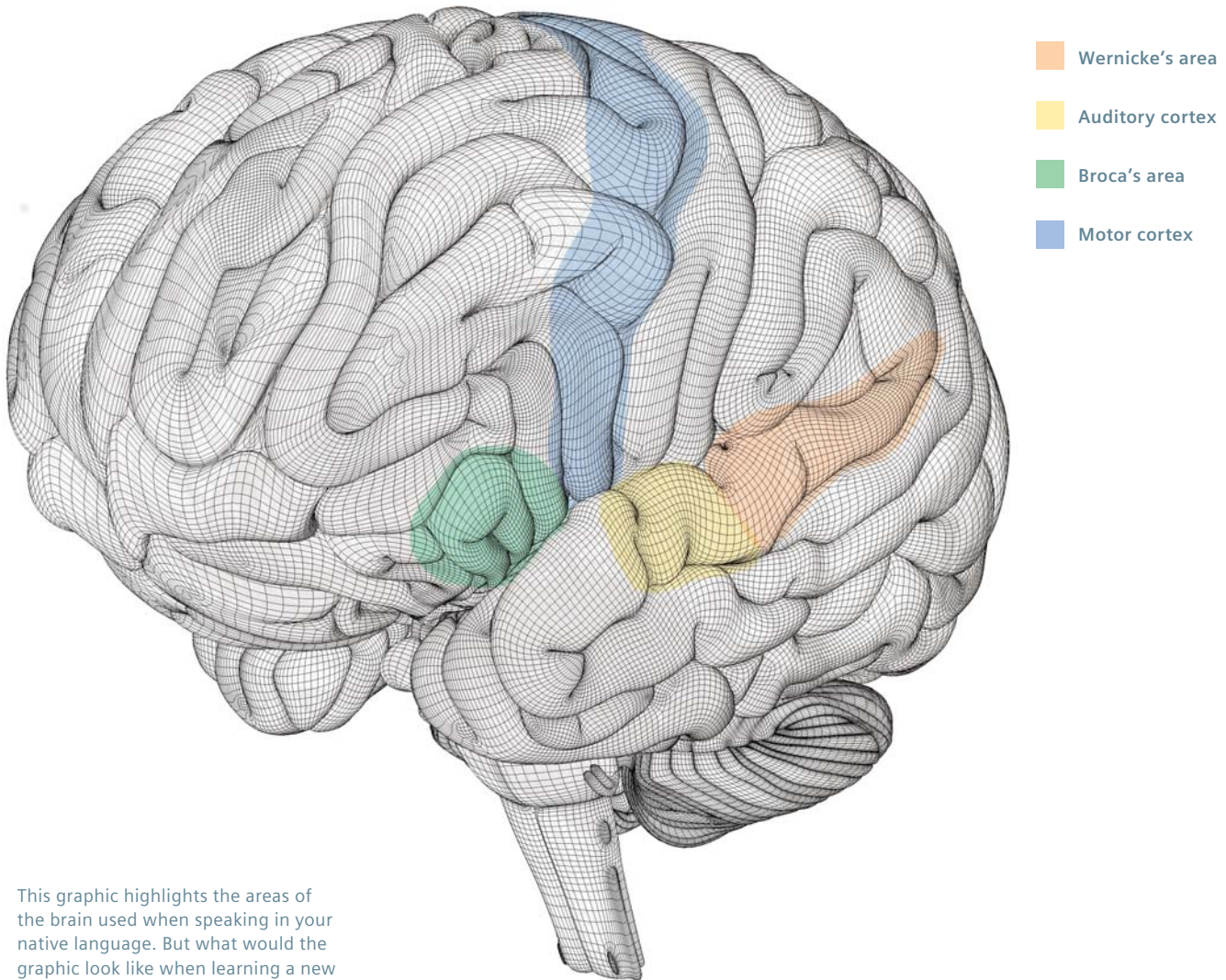
Now, imagine you were reading this in another language – perhaps a second language you had spoken since birth or one you acquired later. Would you understand it in the same way? More specifically, would your brain process the words and turn them into “understanding” in the same way?

Finding answers to these questions is a key focus of the work being carried out

at the Basque Center on Cognition, Brain and Language (BCBL) in Spain. The Center is situated in San Sebastian, an elegant coastal city and an ideal place to study the bilingual brain. San Sebastian is located at the heart of the Basque Country where inhabitants speak both Spanish and Basque, two languages that are completely unrelated, yet are used side by side in daily life.

The BCBL’s key aim is to unravel the mysteries and explore the mechanisms in the brain related to the learning, understanding, and production of language. In essence, scientists are working to understand what happens on a neuro-cognitive level when we speak, listen, and learn, and to understand how the brain takes on a second or third language.

“It’s like an enormous jigsaw,” says BCBL Scientific Director Manuel Carreiras. “We are trying to understand how it all fits



This graphic highlights the areas of the brain used when speaking in your native language. But what would the graphic look like when learning a new language?

together. The truth is, nobody really knows how language works or how we communicate." Carreiras is a man with a mission and a passion: a passion for language, for understanding and knowledge, coupled with keen curiosity. He and his staff of 60 are working to understand more pieces of the great communications jigsaw. But how can one peer inside the brain deeply enough to understand what is happening on a neurological level? What parts of the gray matter "light up" when communicating and understanding?

Here, the center gets its answers with the help of advanced medical devices that gather data on the inner workings of the brain. The BCBL employs a wide array of technology, including high-end functional magnetic resonance imaging (fMRI) equipment from Siemens as well as electroencephalogram (EEG) and magnetoencephalogram (MEG) equipment. Carreiras points out that the equipment is the lifeblood of the center, as long as one knows what to ask of it. "It's all about posing the right questions," he says. "Constructing the tests and challenges and

then refining and reframing them well are essential to getting good answers." As the members of his team show me around the testing rooms in the center, I learn that many interesting questions are being asked, such as: How do babies learn language? How do they begin to "understand?" What happens in the brain of a person who has a reading impairment? What parts of the brain dedicated to language are altered when someone suffers a stroke? How does the brain interpret speech as opposed to sign language? And, key to the center's main

mission, how differently does the brain function when two or three languages are present?

In order to get good answers, these questions have to be broken down into a series of smaller tests and questions, which will serve as the basis of study. Teams of volunteers are recruited to undergo periodic testing to allow the center to collect a body of data.

As I watch one volunteer slide into the Siemens MAGNETOM® Trio™, a Tim (total imaging matrix) system, 3 Tesla fMRI unit, I am taken around to see how video information is fed onto a small screen above the volunteer and how audio is piped into the headphones. As

a language test gets underway, I watch the results being recorded and displayed on a bank of computer screens. It is extraordinary to see images of such clarity and to watch different parts of the brain “light up” as challenges are posed to the volunteers. In this case, the woman in the MR system is given a series of words that are totally or partially contradictory together with some that are not.

Researchers want to know more about which parts of the brain are activated when things make sense and which parts are activated when it is confused.

The enormous benefit of actually being able to see this neuro-cognitive activity means researchers can make what they



“It’s all about posing the right questions.”

Manuel Carreiras, Scientific Director,
Basque Center on Cognition, Brain and Language,
San Sebastian, Spain



“With Siemens’ 3 Tesla system, we get to look deep inside the brain instead of just at the surface.”

Pedro Paz Alonso, Research Scientist, Basque Center
on Cognition, Brain and Language, San Sebastian, Spain



BCBL uses a MAGNETOM Trio on a study participant to measure her neuro-cognitive activity.

call “neuro-correlates” or matches between brain activity and behavioral activity. The benefit of using the MAGNETOM system is that it is excellent at producing 3D spatial results – images that can be seen and interpreted visually. “The MAGNETOM with 3 Tesla has great spatial resolution,” says BCBL Research Scientist Pedro Paz Alonso. “Compared to other neuroscientific imaging techniques, with this system we get to look not only into the gray matter in the brain surface, but also to white matter anatomical pathways inside the brain. Naturally, this gives us quite useful information. We also use EEG and MEG equipment that offers better temporal resolution.” Coupled together, researchers have an extraordinary amount of data available to them. The process of putting it all together can take months.

fMRI Technology: A New Way of Looking at Language

Siemens fMRI technology makes it possible for researchers to get extraordinary pictures of brain activity with excellent 3D spatial resolution. Identifying language and speech disorders is now more advanced thanks to fMRI, which means treatment plans are more efficient and suitable to patients.

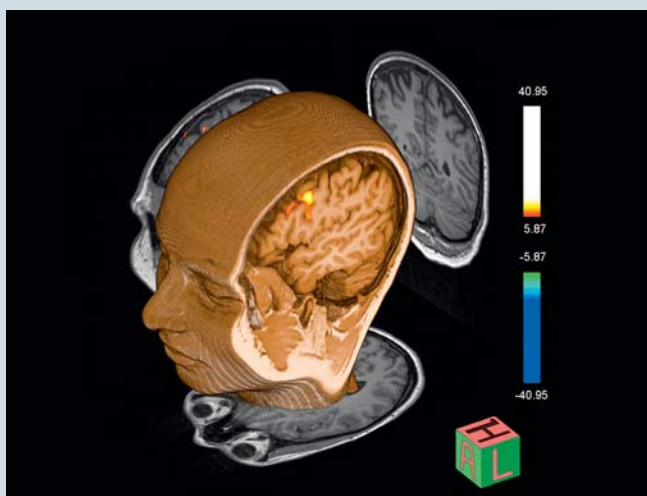
But fMRI is also being used in life-saving clinical applications. One of the most common uses is to carry out pre-surgical mapping of a brain with a tumor. Before an operation and within a matter of minutes, an fMRI scan can give doctors critical data and clear pictures about the location of the tumor and pinpoint functional areas of the brain with great accuracy, so that the surgeon can precisely remove all malignant tumoral tissue without damaging critical functional areas, such as those responsible for speech. This gives the surgeon crucial information about how best to operate. With a magnetic field of 3 Tesla, MAGNETOM® Trio™, a Tim system, has twice the power of the standard scanner, which means greater speed, accuracy, and image clarity in fMRI studies.

What is extraordinary about fMRI technology is that researchers can peer deep into the in vivo brain while it is functioning, without any invasiveness. That is what makes this “currently the most exciting technology for the functional mapping of the brain,” according to Siemens MR Neurology Global Segment Manager Ignacio Vallines. “The benefits for patients, surgeons, and researchers alike are enormous.”

Vallines also highlights the important work being done with

stroke sufferers. The ability to see the locally affected areas of the damaged brain and to track the hemispheric functioning post-stroke means that doctors can give a more accurate diagnosis and better treatment.

In all its uses, fMRI technology gives startlingly accurate images and information, which are already leading to great advances in medical practice and research, saving costs for hospitals and, most importantly, may significantly improve patient outcomes.



Siemens fMRI technology (here with the use of a MAGNETOM Trio 3 Tesla system) enables researchers to better understand human brain activities, not only for language research, but also for stroke patients.

Pure research aside, it is satisfying to come to conclusions from time to time. One of those conclusions focuses on memory storage and retrieval – how best to learn and remember things. The BCBL research team found that retrieving information is key to remembering it. In other words, the process of learning something once and then trying to retrieve it, then repeating the process again, appears to be more effective than repeated learning without retrieval. By using fMRI, the scientists have been able to get a vision of what is happening inside the brain during storage and retrieval and “see” this process of learning.

There are clinical applications for their research as well, ranging from being able to observe what is happening in the brain with serious speech disorders to understanding what happens to stroke victims when language ability is impaired. In the first case, the BCBL medical scanners and other devices are used to compare what happens in the brain of someone with normal speaking abilities and compare it to those whose speech is impaired. In stroke sufferers, they look at how some of the functions of the damaged part are taken over by other areas of the brain. BCBL Director Carreiras says this quality of research would not be possible without the modern medical imaging and measuring equipment, yet they are still a long way from reaching their ultimate goal of understanding the process of language and communication. “Although we have more pieces of the puzzle, we don’t have enough pieces to know how to fit them together.” It is a jigsaw that is far from being completed. Yet step by step, every day, they are moving a little bit closer.

Peter Allegretti has reported for NBC in Europe and the USA, and has produced news and current affairs stories from more than 30 countries for the BBC, World Monitor, and Frontline News. He is also a qualified therapist and coach with a keen interest in health issues. He is based in Barcelona.

Further Information

www.siemens.com/mr

Goals of the Basque Center on Cognition, Brain and Language (BCBL)

- To develop research and innovation in Cognitive Neuroscience with special emphasis on language processing and bilingualism
- To promote scientific research and national and international scientific relations within the area of Cognitive Neuroscience and to transfer the results of this research to the wider socio-economic community
- To promote the transfer and dissemination of knowledge about cognitive neuroscience, language, and bilingualism both within and beyond the Basque country by organizing courses, seminars, national and international conferences, and other appropriate means of general communication
- To participate in undergraduate and postgraduate education and training programs and encourage the incorporation of young researchers to this area
- To facilitate the training and ongoing development of the BCBL personnel and to promote their collaboration across different lines of research
- To forge collaborative links and common interest areas with public and private institutions, centers, and industries, with the aim of providing research, training, and technological and consultancy services to use the work developed in BCBL to the fullest economic and social advantage



The Basque Center on Cognition, Brain and Language (BCBL) in San Sebastian, Spain



A Simple, Reliable Blood Test Helps Detect Chronic Alcohol Abuse

Regina Reppin, PhD, University Clinic in Magdeburg, Germany, and Jos P. M. Wielders, PhD, Meander Medical Center in Amersfoort, Netherlands, are helping physicians diagnose chronic alcohol abuse using a specific blood test and analysis systems that deliver reliable, fast results.

By Matthias Manych

The first thing that suffers from chronic alcohol abuse is the abuser's own health. But the consequences can also be devastating to families, often destroying social relationships. The harmful health effects of excessive alcohol consumption have become a constant strain on society. In the United States, there are nearly 14 million alcoholics or people who abuse alcohol. In 1998, the financial losses due to alcohol-related illnesses, premature deaths, and crimes were estimated at 185 million U.S. dollars.¹ According to information provided by the World Health Organization (WHO), the situation is even more severe in Europe, where the

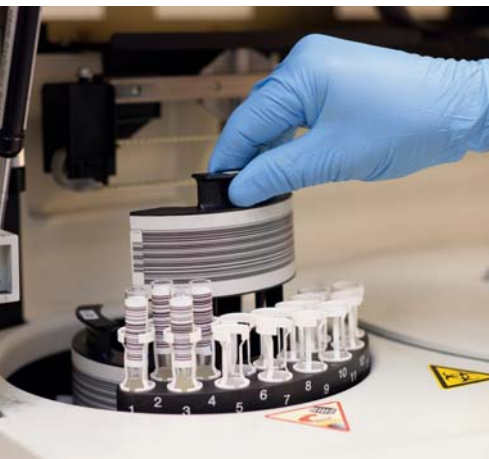
incidence of illness and premature death resulting from alcohol problems is the highest in the world.²

Regina Reppin works at the Institute for Clinical Chemistry and Pathobiochemistry at the University Clinic in Magdeburg, a city of about 230,000 in Germany. Reppin estimates that ten percent of patients in the region have a drinking problem. That estimate is echoed by Jos P. M. Wielders, PhD, who works at the Meander Medical Center in Amersfoort, the second largest city in the Dutch province of Utrecht, with a population of about 150,000. The Meander Medical Center is among the 20 most prestigious hospitals in the country,



“Three-quarters of the tests we perform are for legal issues, particularly regranting of driver’s licenses that have been suspended for alcohol abuse.”

Jos P. M. Wielders, PhD,
Department of Clinical Chemistry,
Meander Medical Center,
Amersfoort, Netherlands



Because the samples are bar-coded, different patient tubes with different plasma protein requests can be measured simultaneously.

...serving about 300,000 people in the area. Wielders puts the percentage of alcoholics in the regional population and at the hospital at the same figure: ten percent. Wielders, head of general and special chemistries at the facility’s Department of Clinical Chemistry, reports that alcohol abuse has different effects within hospitals’ various clinical departments: “When we talk about risk, for some types of trauma surgery, alcohol is reported to be involved in up to 70 percent of the cases.” Up to 25 percent of internal medicine cases are attributable to alcohol problems, along with up to 30 percent in psychiatry, Wielders says. While a general practitioner, who knows his patients well, can estimate whether his or her patient is at risk with a few standard questions, there are published questionnaires (like AUDIT) available to

ask patients about their alcohol use. The risk, however, that respondents will underestimate their alcohol problems – deliberately or unconsciously – is high. Anyone who drinks more than 60 grams of alcohol daily, equivalent to one bottle of wine or one-and-one-half liters of beer (about three 16-ounce cans or four 12-ounce cans), is at high risk. “A person with this kind of behavior, though, will vehemently deny it if someone says to him, ‘watch out, you’re on your way to becoming an alcoholic,’” says Reppin.

Clear Biomarker, Reliable Test

However, medical laboratories have to offer doctors and psychiatrists reliable test methods that confirm alcohol abuse without any doubt. The carbohydrate-deficient transferrin (CDT) is the most specific marker to detect high alcohol

consumption, and the Siemens N Latex CDT Kit is a very specific assay to measure CDT³. In the late 1980s, Swedish researchers discovered that high alcohol consumption induces characteristic changes in the common serum protein transferrin, giving rise to molecular forms that are significant indicators for alcohol abuse, commonly known as CDT.

Reppin heads a working group that focuses on proteins and molecular biology methods, and she is especially pleased at this discovery. Now, lab professionals are not dependent on indicators that either take months for alcohol abuse detection or that are influenced by non-alcohol related causes. "The rare diseases that also raise CDT levels are easier to isolate," reports clinical chemist Reppin. CDT concentrations in the blood represent the average intake of two to three weeks, and it takes about two weeks of abstinence to return to a basic level again, says Wielders. One night of excessive drinking is not enough to send CDT values into the critical range.

Based on these research findings, the nephelometric N Latex CDT testing method was developed. Wielders was involved in evaluating the N Latex CDT Kit at an early stage of development. The mechanism underlying the test is an antigen-antibody reaction. The reagent used in the test contains monoclonal antibodies and CDT-like antigens on Latex particles. "If CDT was not present in the sample, the antibody would agglutinate only with the CDT-like antigen. CDT from the sample inhibits this agglutination. Even without drinking, some CDT is always present, so results will never be zero," explains Wielders. This reaction can be measured with the BN™ II or BN ProSpec® System quickly and accurately. This method determines, with high specificity, whether a test subject has elevated levels of CDT in his or her blood, but that is not its only virtue. It is also easy to use and robust. The only immunoassay CDT method on the market, samples do not have to be pretreated to undergo N Latex CDT testing, and with the BN system all measurements and analyses are automated. After just 18 minutes, it delivers the first results. Because the

sample tubes and reagents are bar-coded, different plasma proteins can be analyzed simultaneously. A broad plasma protein test menu of more than 60 tests is available for determinations from serum, plasma, urine, and cerebrospinal fluids.

Proven in Internal Routines, Acknowledged Externally

The lab in Magdeburg performs about 2,000 CDT analyses each year, requested



“We run CDT for the university clinic’s emergency room, psychiatry, and gastroenterology departments. CDT is fully automated on the BN system and samples do not require pretreatment.”

Regina Reppin, PhD,
Institute for Clinical Chemistry and Pathobiochemistry,
University Clinic, Magdeburg, Germany

Organ Imaging Options for Damage Associated with Alcohol

Alcohol affects the entire body. The immunological and metabolic changes caused by chronic alcohol abuse can trigger both acute and chronic diseases. Hardly a single organ in the body is immune to the ill effects of alcohol abuse. From head to foot, the entire body is at risk. Alcohol adversely affects the mucous membranes, for instance, starting in the mouth and passing through the throat and esophagus before affecting the entire digestive tract. If the inflammation caused by constant, risky consumption of alcohol lasts for many years, cell damage can result in precancerous conditions and potentially in malignant tumors. In addition to lab findings and clinical examinations, imaging processes should help detect these developments early on or locate manifestations of these effects and determine their extent.

In the gastrointestinal tract, pathological changes are often detected via endoscopy. If further examination is advisable, tissue samples are taken during this process. Depending on the suspected diagnosis, but also according to the medical center's specialization, scintigraphy, magnetic resonance imaging (MRI), and computed tomography (CT) imaging methods are also used. Alcohol-related liver diseases such as fatty liver, alcoholic hepatitis, and cirrhosis are as widely known as

they are widespread. The imaging repertoire for these includes ultrasound, MRI, and CT. Ultrasound is usually applied first in detecting dilated bile ducts and to confirm diagnosis of fatty liver. Conventional ultrasound, however, cannot detect fibrotic changes until cirrhosis is already present.

Major progress in this regard is offered by Strain Imaging, a simple ultrasound application that enables a real-time assessment of the stiffness or elasticity of the tissue. Siemens' unique Virtual Touch™ Tissue Imaging and Quantification* technology, which demonstrates and measures the stiffness of tissue, helps physicians better assess the need for biopsy. Another emerging application in the field of elasticity imaging is MRI elastography.

The nervous system can be directly damaged by toxic acetaldehyde, which is a product of alcohol metabolism, with consequences including disruptions in eye movement, unsteady gait, and disorientation. The diminution of brain mass that commences in alcoholics can lead to, for example, dementia, which can be visualized using CT and MRI. The good news: If a patient abstains, the body can balance out the loss of nerve cells.

* Not available in the U.S.

by the university clinic's emergency room and by its psychiatry and gastroenterology departments. In the case of emergency room patients who are unresponsive due to factors such as delirium or a traffic accident, the speed of the N Latex CDT method pays off. In gastroenterology patients, the aim is often to use CDT to differentiate between alcohol-induced and non-alcohol-induced liver diseases. In these cases, the tests are often accompanied by imaging procedures such as sonography, which detect factors such as changes in the liver caused by cirrhosis indicating alcohol abuse. With CDT tests, alcohol abuse can be ruled out and the basic cause of the liver disease can be treated in the early stages.

Reppin is a fan of the nephelometric measurement with the BN systems and the use of monoclonal antibodies, saying, "Everything I can measure here with a monoclonal antibody, I measure without disruptive factors." The less a person needs to intervene in the test, the more precise its results are. This test's very high reliability is also not affected by variations in the samples. As the expert in Magdeburg explains, lab tests conducted in Germany undergo not only internal quality control, but also external reviews. To this end, the German INSTAND Society for Promotion of Quality Assurance in Medical Laboratories regularly conducts interlaboratory tests. In the four years since the lab in Magdeburg began work-

ing with the N Latex CDT Kit, it has passed all of the external performance tests conducted.

Within the department where Wielders works, 4,000 to 5,000 N Latex CDT tests are performed each year. Tests ordered by general practitioners who need the results in order to confront patients about their alcohol problems are the minority. Three-quarters of the tests are performed for legal issues, particularly when it comes to withdrawal and regranting of driver's licenses that have been suspended for alcohol abuse. In the Netherlands, psychiatrists commissioned by the government's Driving Test Organization are responsible for the medical judgement of the clients' driving ability. The depend-

able CDT immunoassay test is a valuable and acknowledged part of the highly regulated procedures of withdrawal and regranting. "The psychiatrists say that the CDT test is the most valuable contribution in the whole report. They hesitate very much to say someone is drinking with a normal lab test, and especially with a normal CDT result. Meanwhile, the CDT test is the cornerstone of the psychiatrists' report about chronic alcohol abuse and an essential part of the official guideline on the subject," Wielders reports with some satisfaction. After all, he has been championing the evaluation of this test, along with standardization of reliable test procedures for legal purposes for many years.

Among his other activities, Wielders is the Chairman of the CDT Committee of the Dutch Society of Clinical Chemistry and a member of the International Federation of Clinical Chemistry and Laboratory Medicine (IFCC) working group on CDT standardization. His department is named as a reference lab for the IFCC. This IFCC working group has made a major contribution to ensuring that HPLC is acknowledged as a reference method at the international level. CDT testing with the N Latex CDT Kit and the BN systems has a relative specificity of 97 percent compared to the HPLC reference method.³ For Reppin and Wielders, the CDT test has become an essential method in diagnosing chronic alcohol abuse.

Matthias Manych, a biologist, is a freelance scientific journalist, editor, and author specializing in medicine. His work appears primarily in specialized journals, but also in newspapers.

¹ National Institute on Alcohol Abuse and Alcoholism (NIAAA), Strategic Plan 2001–2005.

² <http://www.euro.who.int/en/what-we-do/health-topics/disease-prevention/alcohol-use/facts-and-figures>.

³ Delanghe, J. et al; Development and Multicenter Evaluation of the N Latex CDT Direct Immunonephelometric Assay for Serum Carbohydrate-Deficient Transferrin, *Clinical Chemistry*, 53:6 1115–1121 (2007).



Samples do not have to be pretreated to undergo N Latex CDT testing, and with the BN ProSpec System all measurements and analyses are automated.

Summary

Challenge:

- Health risks, social and economic strain caused by chronic alcohol abuse
- Forensic and clinical decisions require clear-cut test results
- Biomarkers and test methods must work dependably and robustly
- Test method must improve workflow

Solution:

- CDT: highly specific biomarker to detect chronic alcohol abuse
- N Latex CDT with monoclonal antibodies: clear reactions
- Reliable measurements via nephelometry
- BN II and BN ProSpec Systems offer automated workflows
- BN systems: fast results for a broad menu of plasma proteins
- N Latex CDT and BN systems in combination deliver accurate results with no sample prep

Result:

- CDT: the most reliable biomarker for chronic alcohol abuse³
- N Latex CDT Kit achieves nearly 97 percent relative specificity to the HPLC reference method³
- Improved workflow throughout the testing process
- Automated method with bar-code detection for various sample materials
- Robust, validated test results in 18 minutes
- High sample throughput of up to 130 tests/hour with the BN II System

Further Information

www.siemens.com/cdt



Paoli Hospital in Chester County, PA, U.S., chose to upgrade its UROSKOP Access – with all the benefits of a new system.

More Options at Lower Costs

Imagine the possibility to enhance urology image quality, improve system maneuverability, and better manage patient information – all without purchasing a new imaging system. Paoli Hospital did just that with Siemens' EndoExpand Upgrade. The 214-bed hospital located in a Philadelphia suburb in Chester County, PA, U.S., improved its endo-urologic system without a major capital expense.

For the last seven years, Paoli Hospital has used Siemens UROSKOP® Access – an endourologic system that allows clinicians to view the entire urinary tract and perform urological diagnoses and endourological procedures with unrestricted patient access from all sides of the table. However, the hospital considered if it should replace its endo-urologic system.

Staying on Budget

"The move to our new operating room (OR) suite would have been a good time to purchase a whole new urodiagnostic system," says Norma Holmes, BSN, Urology Coordinator at Paoli Hospital. "However, we had to be smart about how much we were spending while making sure we were diagnosing and treating our patients with the best technology available." The hospital's staff was very happy with its existing UROSKOP Access, but the

seven-year-old system was somewhat outdated. Paoli Hospital staff contacted Siemens to explore how the system could be upgraded. "Siemens understood our situation and really worked with us to identify ways to improve our existing system in order to stay on budget and to provide the best possible patient care," says Holmes.

Working hand-in-hand with Paoli's urology, surgery, and biomedical teams, Siemens focused on what changes were practical, affordable, and potentially most beneficial for the hospital's patients and staff. "Siemens shared our concerns for our patients' well-being as well as for our current and future financial well-being," says Holmes.

A Smart Move

Together with hospital staff, Siemens identified several affordable upgrades

that would enable the UROSKOP Access to function like a brand-new system and as a result, maximize the hospital's return on its investment. The changes included new monitors, new sign-on and film transfer capabilities, and new hand and foot controls. The old monitors were replaced to accommodate the latest high-definition imaging, which was available in all of Paoli's new OR suites.

In fact, UROSKOP Access has been able to virtually grow with Paoli Hospital's OR as camera technology changed over the past seven years. The suite, for example, started with a single chip camera, upgraded to a three-chip camera, and is now using high-definition endoscopic cameras.

With the upgrade, the OR staff and patients can benefit from these state-of-the-art endoscopic cameras without purchasing a brand new system.

By installing new monitors that work in tandem with the high-end endoscopic cameras, the staff noticed significant image improvement. "The imaging quality of the new monitors, displaying both the endoscopic and the X-ray images, is far superior to our previous video monitors," says Holmes. "And the warm-up time is significantly reduced, which helps our staff save time." The new monitors are also more compact and easier to move thanks to a new hand bar.

In addition, several changes were made to improve staff comfort, satisfaction, and efficiency. The new sign-on and film transfer capabilities, for example, are much more user-friendly, enabling staff to easily add additional studies to a patient's prior study. And, with the new hand controls and foot pedals, surgeons can maneuver the X-ray head more easily and quicker. "With these improvements, we've received many of the benefits of a new table system at a fraction of the cost," says Holmes.

Truly Understanding Best Interests

The entire upgrade took just one week, "which was remarkable considering this included the physical move to a new location and the system upgrades," says Holmes. With the upgrades now in place and the hospital staff and patients bene-



Norma Holmes, BSN,
Urology Coordinator at Paoli Hospital,
Chester County, PA, U.S.

fitting from the changes, Holmes thinks more than ever that the upgrade was the right choice. "Upgrading our existing UROSKOP Access with the EndoExpand upgrade was considerably more reasonable than replacing the entire system. I would recommend this option to any facility with the original UROSKOP Access and seeking to provide state-of-the-art technology without large cash expenditures," she says. "Siemens' commitment to doing what was truly in our best interest has made a lasting impression on us."

Further Information

www.siemens.com/uroskop

Summary

Challenge:

- Equip a new operating room suite for endourologic and urodiagnostic procedures
- High-end technology at lowest possible costs and with lowest possible training efforts

Solution:

- Advance the existing UROSKOP Access system with EndoExpand upgrade
- Integrate new accessories instead of purchasing an entirely new system
- Little training efforts since staff already worked with the existing system

Result:

- Profit from latest high-definition endoscopic imaging system at a fraction of the cost
- Maximize the hospital's return on investment
- Keep up the best possible patient care

A Higher Level of Patient Care

UROSKOP® Access, the high-performance system for endourology and urodiagnostics, supports a high level of patient care in urology. Siemens is the only vendor in the market that offers an image intensifier-based X-ray system with free patient access from all four sides. This helps to ease the workflow as patient repositioning is not necessary, and the anesthetist does not have to change their working position. A top-notch system for virtually all urological applications – whether diagnostic or therapeutic – UROSKOP Access enhances a hospital's clinical portfolio for:

- Radiographic examinations
- Endourological interventions
- Percutaneous interventions
- Laparoscopy
- Urodynamics
- Ultrasound examinations

Its open interface allows the attachment of endoscopic modules and ultrasound systems, so customers can easily integrate existing equipment. The two 19-inch TFT monitors and the articulating swivel arm allow for viewing endoscopy and ultrasound live images side-by-side with X-ray or fluoroscopy.

The Upgrade Package

The EndoExpand upgrade package contains the FLUOROSPOT Compact imaging system including DICOM* and CARE** licenses as well as Fluoroloop and Harmonization. It also holds a counterbalanced articulating swivel arm with two 19-inch TFT monitors, two hand-held controls, and a multifunctional footswitch. The included DVI Interface allows for connecting with high-definition endoscopic devices.



The Medical Traveler

What started in the tuberculosis clinics of the Swiss Alps has grown into a market with many players: medical tourism. But, aided by lower international airfares and the Internet, this truly global branch of healthcare is changing. *Medical Solutions* explores today's main trends and also looks at the benefits and pitfalls of medical tourism from the patient's perspective.

By Haig Simonian

Leaf through the back pages of many European airline magazines, and chances are, you will see alluring advertisements for doctors and hospitals. Most will be for cosmetic surgery and minor interventions. But, depending on the country, among the nose jobs and weight loss treatments will be pitches for far more complex procedures.

Welcome to the world of medical tourism. Jetting around the globe to find the best, or the cheapest, treatment has become big business. Firm data do not exist. The World Health Organization, the most obvious source, collates no information on cross-border treatment flows, other than for organ transplants. But the Geneva-based multinational body concedes medical tourism is becoming increasingly important.

The idea of traveling for medical care is nothing new. For decades, doctors and surgeons in London's Harley Street boosted their earnings by welcoming rich foreigners, often from the Arab world. In many cases, non-urgent care is combined with other reasons for visiting London, such as education, culture, shopping –

or just escaping the infernal summer heat.

Swiss Beginnings

Switzerland has gained a similar status, with many patients also from the Middle East. A reputation for quality and reliability, high-class private hospitals, and the possibility of combining medical treatment with other attractions prolong a medical tradition that started with the tuberculosis clinics of the Alps – arguably the first significant incidence of medical tourism.

"Switzerland has traditionally been a medical tourism market," says Ole Wiesinger, Chief Executive of the Hirslanden group, Switzerland's biggest private hospital chain, with 14 hospitals concentrated in German speaking regions. "Arab visitors have tended to gravitate towards Geneva, German speakers towards Zurich. We've been fortunate, in that domestic demand has kept us pretty busy. But we intended to step up our efforts towards the medical tourism market now."

As might be expected, complex procedures are what draw most foreign patients

to Switzerland. "The broad spectrum of orthopedics and oncology, and all complex procedures, such as heart and brain surgery is what they're after," says Wiesinger.

The Changing Picture of Medical Tourism

The U.S. has been the other big magnet. Prestige hospitals, high-tech medicine, and quality care have won institutions, such as the Mayo Clinic, international fame. Often, that status has been burnished by visits from foreign heads of state or billionaires – usually from the developing world – seeking cutting-edge treatment and technology only inadequately available at home, if at all. But the picture of medical tourism is changing. Countries that once sent patients abroad have developed their own centers of excellence and are now reaching out themselves. While many traditional locations remain busy, competition is rising.

India is the best example. In recent years, Indian specialists, many trained or experienced at top foreign universities and

hospitals, have returned home to open clinics. While catering primarily to an increasingly affluent domestic middle class, such centers are also targeting foreigners – offering quality treatment for a fraction of the price at home. Cultural concerns have been tempered by the widespread knowledge of English. Take Medanta. The self-styled “Medicity” is one of India’s biggest multi-specialty centers. Founded by Naresh Trehan, MD, an eminent cardiac surgeon, and located near New Delhi, the huge site combines doctors, scientists, and researchers to foster a multidisciplinary atmosphere in which scientific breakthroughs can be translated swiftly into everyday medical practice.

Spread across 43 acres, the site has 1,250 beds, 350 for critical care, with 45

Gilberto Galletta, International Relations Manager of Hospital Israelita Albert Einstein, one of Brazil’s biggest and most prestigious. Presenting itself as offering, “the most advanced healthcare in Latin America,” the high-rise, high-tech hospital in São Paulo offers complex treatments, including liver and bone marrow transplants. Most foreigners come for cardiology, oncology, orthopedics, and neurosurgery.

The Hospital Israelita Albert Einstein is not alone. A small, if growing, band of top Brazilian clinics is targeting foreigners. While most are based in the commercial hub of São Paulo, others are in Recife in the northeast and Porto Alegre in the south.

A significant proportion of Hospital Israelita Albert Einstein’s patients come

the U.S. Local experts promote the country as offering quality care for prices as little as one-quarter of the comparable levels in the U.S.

Jordan’s regional dominance has been challenged as the United Arab Emirates in particular has muscled into the market. As far back as 2002, Dubai launched Dubai Healthcare City (DHCC), partly to create a medical cluster not only for locals and resident expatriates, but also medical tourists from around the Gulf. Although not as successful as originally hoped – vacancy rates for clinic office space remain high – this free zone has two hospitals, more than 90 outpatient medical centers, clinics, and diagnostic laboratories, alongside more than 2,000 licensed professionals.

Abu Dhabi is also investing in healthcare infrastructure, with facilities such as the Imperial College London Diabetes Centre looking not only to serve local needs, but to attract regional patients, too. And, on the cusp of Europe and the Middle East, Turkey has been trying to develop the medical tourism business.

“We can offer the same quality and technology at very competitive prices.”

Gilberto Galletta, International Relations Manager, Hospital Israelita Albert Einstein, São Paulo, Brazil



operating theaters dealing with more than 20 specialties. Medanta also boasts a research center and medical and nursing schools. While the clientele is partly domestic, the organization also targets patients from abroad – notably those from developed countries seeking comparable quality healthcare at much lower prices. About 15 percent of Medanta’s patients are deemed to be “medical tourists.” Similar, if not always as spectacular, developments are under way in South America and the Gulf – both areas where medical tourism was once entirely out-bound.

“We can offer the same quality and technology at very competitive prices,” says

from neighboring Argentina, Uruguay, and Bolivia – patients who might once have travelled to the U.S., but are now happy with the allure of high-tech medicine closer to home, explains Galletta. Interestingly, the hospital’s roster includes patients from Angola, drawn by the common language of Portuguese, cultural similarities, and a lack of domestic alternatives, as well as U.S. citizens coming primarily on cost grounds.

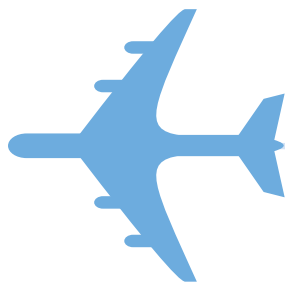
In the Arab world, Jordan has traditionally been the leading medical tourism destination. The country, which initially catered to patients from the Middle East, has widened its scope through global marketing, and is now looking as far as

Lower Airfares and the Internet

So prevalent has medical tourism become that specialist promoters, with their own Internet sites, have sprung up. The Medical Tourism Association (MTA) is a U.S.-based body propagating treatment abroad. The MTA brings together foreign hospitals and specialists with U.S. middlemen, organizes regular conferences, and produces specialist publications.

As with “mainstream” tourism, the medical variety has been helped greatly by two developments. Lower international airfares have turned flying long distances for care from a potentially major disincentive into a relatively minor cost factor. The second, and even more elemental, change has been the Internet. Not only has the web vastly accelerated globalization, it has also given patients far more liberty in selecting and creating their own healthcare solutions.

Clearly, patients’ ability to pick and choose is determined by their illness as much as their affluence. Someone who has just suffered a debilitating stroke will be headed straight for the nearest neuro-



surgical center, rather than the airport, given that such a sudden illness leaves no time to trawl the Web, let alone the ability or inclination to do so.

But for non-acute and elective cases, choice can be highly relevant. Few non-experts are likely to make decisions alone – opening the way to a new business for medical tourism intermediaries.

As yet, there is little research into why patients shun care options at home for foreign solutions. Very occasionally, the opportunity can spring from a domestic state or private sector health insurance provider. When, some years ago, UK waiting lists for non-urgent hip or knee replacement surgery reached politically unacceptable levels, local health authorities sent patients to continental Europe. Beneficiaries included one specialist center in eastern Germany, which, in its heyday, had been the orthopedic Mecca for East Germany's top athletes. After the collapse of communism, the same institution jumped on the medical tourism bandwagon.

Usually, however, the decision will be the patient's own. In a 2008 study, McKinsey, the international consulting group, examined the reasons for medical travel. The survey¹ estimated the market at the time remained relatively modest, at 60,000 to 85,000 inpatients a year – though that figure may have grown since; unfortunately, the study remains one of its kind to date.

The research analyzed patients' – and hospitals' – motives, looking at more than 20 medical travel destinations, examining primary data on the number, type, and origin of so-called "medical travellers" and interviewing health providers, patients, and intermediaries around the world.

Technology as Main Motive

Rather than saving money, seeking the best technologies was the main motive for travelling – accounting for 40 percent

of the cases covered, and with the U.S. the prime destination, even for patients from developed Western Europe. Obtaining superior care was the second reason, accounting for 32 percent. Here, not surprisingly, most patients came from developing countries, with cardiology the main speciality sought. Speed was the third reason, with patients traveling for procedures that would have involved significant waits at home. Orthopedics, general surgery, and cardiology were the main specialities in such cases.

As a motive, cost was in fourth place, accounting for just nine percent of cases. "An aortic valve replacement cost more than US\$100,000 in the United States, for instance, but about US\$38,000 at a provider in Latin America and only US\$12,000 at a provider in Asia," noted the authors. U.S. patients comprised 99 percent of the money-motivated medical travellers, with orthopedics accounting for 30 percent of all cases and general surgery for 16 percent. Medical travel on cost grounds "has the greatest potential for growth," the report concluded. These are all interesting facts for providers, but they should also be aware that medical tourists will probably also bear in mind the risks before jumping onto the next jet. Culture and language are the most obvious disincentives. Not everybody feels comfortable abroad, let alone when undertaking sensitive – and potentially life-threatening – medical procedures. Language skills may have improved, but fluency, let alone cultural sensitivities, cannot be taken for granted. Dubai, for example, does not attempt to compete on price with, say, much cheaper Asian centers like India or Thailand. Instead, it plays on quality of care and relative familiarity.

Circumstances for family and friends are further factors. Most patients may want to be accompanied by a relative. Others may take comfort – and feel their recovery will be accelerated – by regular visits

Summary

Medical tourism – the trend for patients to seek treatment abroad – is gaining popularity. While occasionally sponsored by private sector health insurers, or even governments, the main impetus has come from individuals or professional intermediaries, using cheaper fares and the rise of the Internet to create "tailor-made" treatment options. Hard data remains scant, but the evidence suggests elective procedures, notably bone and heart surgery, are most in demand. But cancer and even brain surgery are also prevalent. The evidence further suggests patients travel primarily to seek out the best technology, quality, or care, with cost playing only a subsidiary role. But spiralling prices in developed countries suggest traveling to save money will expand.

from friends. Such "soft" benefits may be entirely absent for those undertaking medical treatment far from home. Complications, let alone malpractice issues, are another consideration. Ideally, an operation will go well. But complications can arise and stays may have to be prolonged. Follow-up care is another issue. And, if something goes wrong, patients need assurances they have some redress. Many such constraints can be overcome through a health insurer with adequate experience of foreign hospitals or via an acknowledged and reputable intermediary.

Haig Simonian is Switzerland correspondent of the Financial Times.

¹ Tilman Ehrbeck, Ceani Guevara, and Paul D. Mango, Mapping the Market for Medical Travel, McKinsey Quarterly, May 2008



All About Breast Cancer

The Siemens Breast Care Day was one of the highlights of this year's European Congress of Radiology (ECR). Radiologists and medical students from around the world were given further insight into breast cancer awareness and extended their knowledge of the latest 3D-imaging modalities for breast cancer detection. *Medical Solutions* asked health journalist Wiebke Kathmann to report back.

By Wiebke Kathmann, PhD

Today, the chances of surviving breast cancer are higher than ever. This is good news for women faced with the diagnosis – a fate that strikes more than one in ten women worldwide. Today's therapies are especially effective when the cancer is detected early. "It should be detected before it is palpable," as Michael Golatta, gynecologist at the University of Heidelberg, Germany, pointed out during the panel session. "At that stage, chances are a lot higher that the cancer can be healed and less treatment is necessary. The treatment is not only more effective but also less expensive." Breast cancer awareness and early detection are therefore major factors in combating this health threat. When this is not the case, approximately one in 80 women dies from the disease. But how well informed are women in general around the globe? Where are they

seeking information and what are their needs? What are their personal experiences with mammography? A timely international survey, conducted by the renowned German market research institute Gesellschaft für Konsumforschung (GfK) on behalf of Siemens Healthcare, helped to provide answers to these questions.

Siemens' Breast Cancer Awareness Survey

The Breast Cancer Awareness Survey indicated that almost all of the women surveyed – on average 82 percent – consider breast cancer screening to be very important. It also indicated that there is some confusion about the difference between preventative programs, which are meant to raise awareness, and screening programs that cover the costs. Even

“Breast cancer should be detected before it is palpable.”

Michael Golatta, MD, Gynecologist,
University of Heidelberg, Germany

Student Perspectives

The ECR 2011 and Siemens Breast Care Day attracted many medical students from around the world. In the course of a Siemens-organized student workshop, we talked to them about their knowledge about breast cancer, screening, and discussed ways of improving awareness.

Dana Feldman from Israel, just doing a mini-internship in radiology and about to finish medical school: "With a grandmother who died of breast cancer and a mother just moving into the age-group to start the screening, I am very aware of the topic. Overall, I believe there is high breast cancer awareness in my country. Nevertheless, I see women with unbelievably advanced cancers in the thoracic clinic. They hold on and



decide to deal with it later – when the son is done with the army or some other private matter. It is not about cost, as the cost is completely covered by the government. It is more a psychological thing. It is like a veil that needs to be broken through if you do not want these women to die. Most of them belong to religious groups and attend check-ups less regularly.

So it would be wonderful to get more information into this group." Her idea to improve awareness: Combine breast care awareness with sexual education once the teenagers have gone through the bodily changes and have made friends with their bodies. Let them know it is as important as using a condom.

Mathias Nielsen from Denmark, student in the sixth semester and a radiotherapist in training: "Breast cancer awareness is high in Denmark. And there is screening for women past 50. As many of them live in the country and have trouble getting to the hospital, a screening bus goes to the smaller communities. A radiologist interprets the X-ray mammography results on-site.



In suspicious cases, the women go to the hospital to get a coronal image, plus palpation and ultrasound.

The cost is covered. I would like to add that awareness is a good thing but it also creates fear – 20-year-olds with pain in the breast come in for screening and are unnecessarily exposed to radiation. They need to be informed that a breast can hurt, that this is normal. I coach my

though the women considered themselves to be well informed, almost half did not know whether there is an official screening program in their country. In India, 74 percent of the women stated that they knew of a screening program, even though there actually is no current official program. "This says a lot about the level of awareness of breast cancer and breast cancer screening," commented Norbert Gaus, Head of the Clinical Product Division at Siemens Healthcare, Erlangen, Germany, at the opening press conference. "And it speaks to the need for more country-specific information."

The survey was conducted with 500 women each from eight countries – Austria, Brazil, China, Germany, India, Russia, Sweden, and the U.S. All women,

aged 25 to 65, answered 24 structured questions in the form of a 15-minute online interview.

Improving Knowledge

When women were asked to rate their own overall knowledge, about 40 percent rated it as good or very good. 19 percent stated they had no or deficient knowledge of the subject. This shows that there is room for improvement. The same holds true for active participation in breast cancer screening. Overall, about half of the women go once per year, with the percentages being highest in Brazil (73 percent) and lowest in Russia (31 percent). 67 percent of the Swedish women said they participate every other year. Most women were motivated to attend a

breast cancer screening after self-examination or if they belong to a risk group. Another important motivator is cancer in the past, someone they know that has been affected with cancer, or a recommendation by a doctor. Most women from the survey answered that they did not have any concerns about the screening procedure itself, which might prevent them from attending, and rated their personal experience with breast cancer screening as neutral or positive. Overall, the fear of radiation was lower than expected. As to the components of the screening exam, most women named X-ray mammography in combination with palpation breast examination and the discussion of the results with the doctor. Ultrasound and magnetic reso-

Summary

Challenge:

- Detect breast cancer before it is palpable to get the best therapy results and reduce mortality as well as costs
- Identify the status quo of breast cancer awareness and the information needs of women around the world

Solution:

- Educate and inform women and make diagnostic tools more effective
- 3D imaging can improve sensitivity beyond X-ray mammography, especially in women with dense breast parenchyma

Result:

- The Siemens Breast Cancer Awareness Study revealed a need for more country-specific information on breast cancer and screening programs
- In countries with formal screening programs, breast cancer awareness and screening participation rates are higher
- In suspect lesions, X-ray mammography could be complemented by tomosynthesis, 3D ultrasound, or MR mammography in order to improve sensitivity and reduce recall, spot compression, and biopsy rates

girlfriend in self-examination. And I am telling my mother, who just turned 50, she should go for a screening.”

Alexander Sachs from Germany, studying medicine in Vienna in the fifth year: “I think there is high awareness, and it is getting better. But I believe the information should be available earlier in life. Let me give you an example: I work in the Museum of National History of Vienna where I give guided tours for school classes. I confront them with the preparations of breast cancer and ask them why they think women had these vast forms of breast cancer 100 years ago. Out of 20, typically two or three say they did not have examinations. Then, I tell them they should go to palpation examinations every year, do self-examinations,

and participate in the screenings after age 50.” His idea to improve awareness: Use events like a breast cancer marathon to spread information. If people are confronted with it on their way to work due to a road being blocked, they hear about the initiative and can search the Internet for the name afterwards to find out more, hopefully about a certified program. Celebrities talking about their illness could also help increase awareness.



nance imaging (MRI) are also known by most women as diagnostic tools used in breast cancer screening.

Trustworthy Information

The majority of women in the survey rely on their gynecologist as the main and most trustworthy source of information. Family doctors ranked second. In Austria and Germany, more than four out of five women see their gynecologist for breast health matters; whereas in the U.S. and India, the family doctor plays a more important role. In the U.S., India, and China, family members or friends are also rated as a reliable information source. Surprisingly, modern media and the Internet play only a minor role as they are not considered trustworthy. Based on

the survey results, Siemens now plans to prepare a breast cancer awareness campaign to raise the visibility of this topic globally. This is part of Siemens' engagement to provide support for women from early detection and screening, diagnosis and therapy, to aftercare.

Breast Care Goes 3D

X-ray mammography, the method best known by women in the survey, is the accepted standard for breast imaging, especially for breast screening. It is fast, relatively inexpensive compared to other techniques, accurate, and detects masses and microcalcifications; although, 15 to 30 percent of cancers are missed due to dense breast tissue, small attenuation differences, or tumor growth patterns.

So, is it time to move on? This issue was discussed in a symposium on 3D technologies.

The shift from film-based images to digital imaging opened up the opportunity to move from 2D to 3D, namely tomosynthesis¹. Other 3D technologies holding promise for the future are automated 3D ultrasound (Automated Breast Volume Scanning) and breast MR imaging. “Even though these new technologies have much to offer, X-ray mammography will continue to be the firstline imaging tool in breast cancer screening,” predicted the symposium's chairman Professor

¹ Investigational technology not currently commercially available in the U.S., Canada and China. Limited by U.S. Federal Law to investigational use.



“With 3D ultrasound, more benign and malignant lesions can be detected.”

Matthieu Rutten, MD, Department of Radiology,
Jeroen Bosch Hospital, 's-Hertogenbosch, The Netherlands

India Needs More Pink Ribbon Campaigns

By Swati Prasad

In the course of the Breast Cancer Survey, an online study conducted for Siemens Healthcare, Gesellschaft für Konsumforschung (GfK) HealthCare polled 500 women in India. Since broadband penetration in India is only around one percent, this survey could cover only English-speaking women, based in urban India. The results indicated a growing awareness of the risks of breast cancer – an overwhelming 81 percent of the women surveyed thought breast cancer screening was very important. However, while Indian women feel they are well-informed about breast cancer, they also indicate concerns that limit their willingness to go to a breast cancer screening center; whether it be doubts about the effectiveness, fear of complications, or fear of the results. The survey clearly pointed out that Indian women need to be educated much more about breast cancer.

Breast cancer is the most common cancer among women in urban India. In rural areas, it is the second most common cancer after cervical cancer. But India is a country of stark disparities – while some women in urban areas get world-class medical treatment, their peers in villages get none.

Today, one in 22 women in India is likely to get breast cancer during her lifetime. The incidence is far lower than in some

developed countries. Gynecologists attribute this to various factors, including marriage at an early age, early and multiple childbirths, and breastfeeding of all children for a long period of time. Most Indian families (especially in rural areas) encourage breastfeeding. Government programs also reiterate its importance. However, urban women are fast moving away from this, leading to higher incidence of breast cancer in metropolitan areas.

Awareness about breast cancer is on the rise, but few women voluntarily go for a routine breast screening. Only educated, working women, primarily based in the metropolitan areas, are known to go for a routine screening – mostly when it is part of their health insurance package. India does not have a national or regional breast cancer screening program. Several government and private hospitals (such as Apollo, Fortis, All India Institute of Medical Sciences, and Carestream Health India) hold awareness programs. But again, these are limited to large cities. X-ray mammography is available in a large number of public and private hospitals in several towns and cities. However, doctors do not advocate it for mass screening, since at US\$15 to US\$38, it is not considered cost-effective.

Most Indian breast cancer patients self-detect their disease at a stage when there

is a palpable lump or even later – when malignant cells spread to other parts of the body. Sometimes, even after detecting an abnormality, women do not visit a doctor due to reasons that range from shyness to inadequate diagnostic facilities (especially in rural areas), to financial constraints or factors like indifference toward the health of women in a patriarchal society.

Even though a few large cities in India offer medical care for breast cancer patients, the treatment cost can be prohibitive. In fact, the vast majority of breast cancer patients undergo inadequate and inappropriate treatment due to a lack of high-quality infrastructure and financial constraints.

India needs regional screening centers and parallel cancer registration programs. Though breast self-examination is the most cost-effective, it needs to be performed in the right manner. Therefore, vigorous, nationwide awareness programs are the need of the hour. Pink ribbon campaigns need to penetrate every region in the country.

Swati Prasad is a freelance business journalist based in Delhi. She reports from India for several publications overseas and has worked as a correspondent and editor for the Economic Times, Business Standard, the Indian Express, and Business Today.



Not one seat left in the symposium that brought radiologists up-to-date on latest 3D imaging modalities.

Detlev Uhlenbrock, MD, a radiologist from Dortmund, Germany. "In suspect lesions, mammography might be complemented by tomosynthesis, 3D ultrasound, or MRI in the future." Especially in women with dense breast tissue, 3D ultrasound looks promising due to the low sensitivity of X-ray mammography in these patients. "Sensitivity is down to 30 to 48 percent," stated Matthieu Rutten, MD, PhD, a radiologist at Jeroen Bosch Hospital, 's-Hertogenbosch, the Netherlands. "This is worse than flipping a coin. With 3D ultrasound, more benign and malignant lesions can be detected." Similarly, tomosynthesis can improve the detection of lesions in dense breasts as well as the characterization of focal lesions. As for Professor Jörg Barkhausen, MD, from the University of Lübeck, Germany, digital breast tomosynthesis may become the imaging modality of first choice for select patients. "It allows for

early detection of invasive ductal carcinomas and depicts irregular borders more clearly. Spot compressions could be replaced by tomosynthesis." He is convinced that with tomosynthesis, physicians can get more information with less radiation.

As far as Professor Werner Kaiser, MD, a radiologist at the Institute of Diagnostic and Interventional Radiology at the Friedrich-Schiller-University of Jena, Germany, is concerned, the new standard in breast cancer screening might soon be MRI – not just in high-risk women but increasingly in those at average risk. "In spite of earlier publications concluding that MRI only increases cost and the number of biopsies and does not lower the rate of reoperations, we now agree that with MR mammography, in one out of four cases, we get additional, vitally relevant information on the cancer," said Kaiser. "The sensitivity exceeds that of

ultrasound and X-ray mammography. All studies found a high number of only MRI-detected cancers. It is the only method that describes tumor-specific signs like angiogenesis and has a high negative predictive value." Kaiser votes for MRI as an integral part of the work-up: "If your life is threatened, use your most effective weapon."

*Medical writer **Wiebke Kathmann** is a frequent contributor to Medical Solutions. She holds a Master's degree in biology and a PhD in theoretical medicine, and has worked as an editor for many years before becoming a freelancer in 1999. She is based in Munich, Germany.*

Further Information

[www.siemens.com/
ecr-breastcareday](http://www.siemens.com/ecr-breastcareday)

27%
Europe

49%
Americas

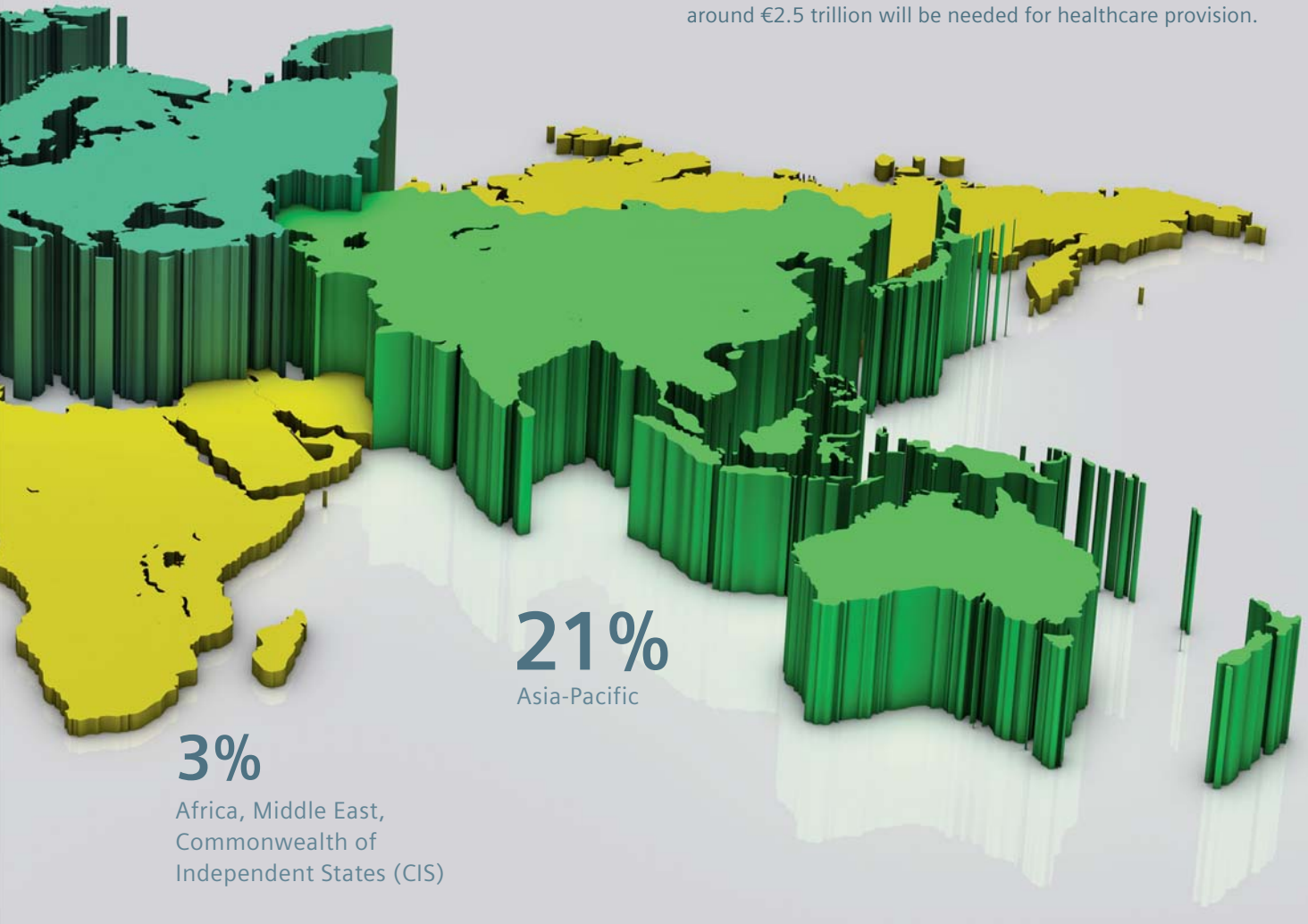
Unfreezing Capital: What Healthcare Organizations Need to Know

The world's healthcare systems are experiencing various forms of financial pressure. Billions of euros are tied up in frozen capital – inefficiently deployed capital or untapped liquidity potential. Such frozen capital is caused by buying equipment, rather than using alternative forms of financing to acquire it.

By Valeriya Masyuta

Planned Spendings on Healthcare Infrastructure

Around €15 trillion will be needed to fund developments in the global public services infrastructure to 2030. Of that, around €2.5 trillion will be needed for healthcare provision.



According to the latest study by Siemens Financial Services (SFS), healthcare organizations across the world are not making the most efficient use of available financing tools to acquire vital medical technology. SFS analyzed levels of frozen capital in various equipment categories across Germany, France, the UK, Spain, the U.S., China, Poland, Turkey, India, and Russia. The analysis took place from October 2010 to January 2011. In 2006, SFS began its study series of healthcare financing across

the globe. The 2011 study is the latest in that series following a wide publication of the findings of its predecessors. This is at a time when healthcare systems are either under severe spending pressures, as in Western Europe and the U.S., or when health systems are undergoing rapid development, for example in China. Within business environments, economists have, for many years, advocated ownership of appreciating assets, with real-estate being the classic example;

but also the “rental” or leasing of depreciating assets with decreasing value, such as vehicles and technology. Technology tends to advance in sudden leaps and in some examples can be obsolete within 12 to 18 months. Healthcare organizations that own previous-generation equipment, which they have to write-off over, for example, ten years, will find it difficult to attract patients in a health system that fosters competition – a key trend in the overall reform of global healthcare.



“The healthcare system deficit forecast for France is €10.3bn (\$14.6bn) for 2011. Supported by the Law of Social Security Financing (LFSS), the public healthcare budget targets savings of €2.4bn (\$3.4bn) for 2011.”

Thierry Fautré, Président, Siemens Financial Services, Saint-Denis, France



“In Germany, healthcare spending is currently carrying a deficit predicted to be around €9bn (\$12.8bn) in 2011. The deficit in the German statutory health insurance system is being cut through a combined initiative to raise the compulsory health insurance premia and reduce spending through lower procedure costs.”

Kai-Otto Landwehr, CEO, Siemens Finance & Leasing GmbH, Munich, Germany



“Capital spending in the UK is to fall by 17 percent between 2010/11 and 2014/15, with £1bn (€1.1bn/\$1.6bn) reallocated to social care, and over £20bn (€22.7bn/\$32.5bn) of efficiency savings to be achieved.”

David Martin, General Manager, Siemens Financial Services Ltd, Stoke Poges, UK

Financing methods that enable a health institution to upgrade to a superior technology at certain points are therefore gaining popularity. For these methods to be effective and offer good value, financiers need to understand technology development paths and also have the channels through which to remarket the older equipment at a reliable and predictable residual value.

Healthcare equipment categories, such as endoscopy, dialysis, transfusion, anesthetics, respiration, and ophthalmic, are equally susceptible to financially inefficient acquisition that results in large volumes of frozen capital. In fact, these equipment categories represent up to twice as much frozen capital as that incurred by diagnostic imaging equipment.



“There will be very significant investments in the infrastructural development in the Chinese healthcare system – for instance the state has committed RMB 850bn (€91.9bn/\$131bn) to phase 1 (2009–2012).”

Yang Gang, General Manager, Siemens Financing and Leasing Ltd., Beijing, China



“2010 saw the overall Polish health budget cut by some PLN1.5bn (€382.9bn/\$546.8bn), even though the reimbursement budget received a PLN590m (€150m/\$215m) injection. While the country’s densities of diagnostic imaging equipment are above the Eastern European norm, they are still well below those in more mature Western economies.”

Christian Foltyn, CEO, Siemens Finance Sp. z o.o., Warsaw, Poland



“In Spain, health spending as a proportion of GDP has risen dramatically precisely because national income has fallen. Budget pressures are encouraging the exploration of alternative funding formulae, such as public-private partnerships.”

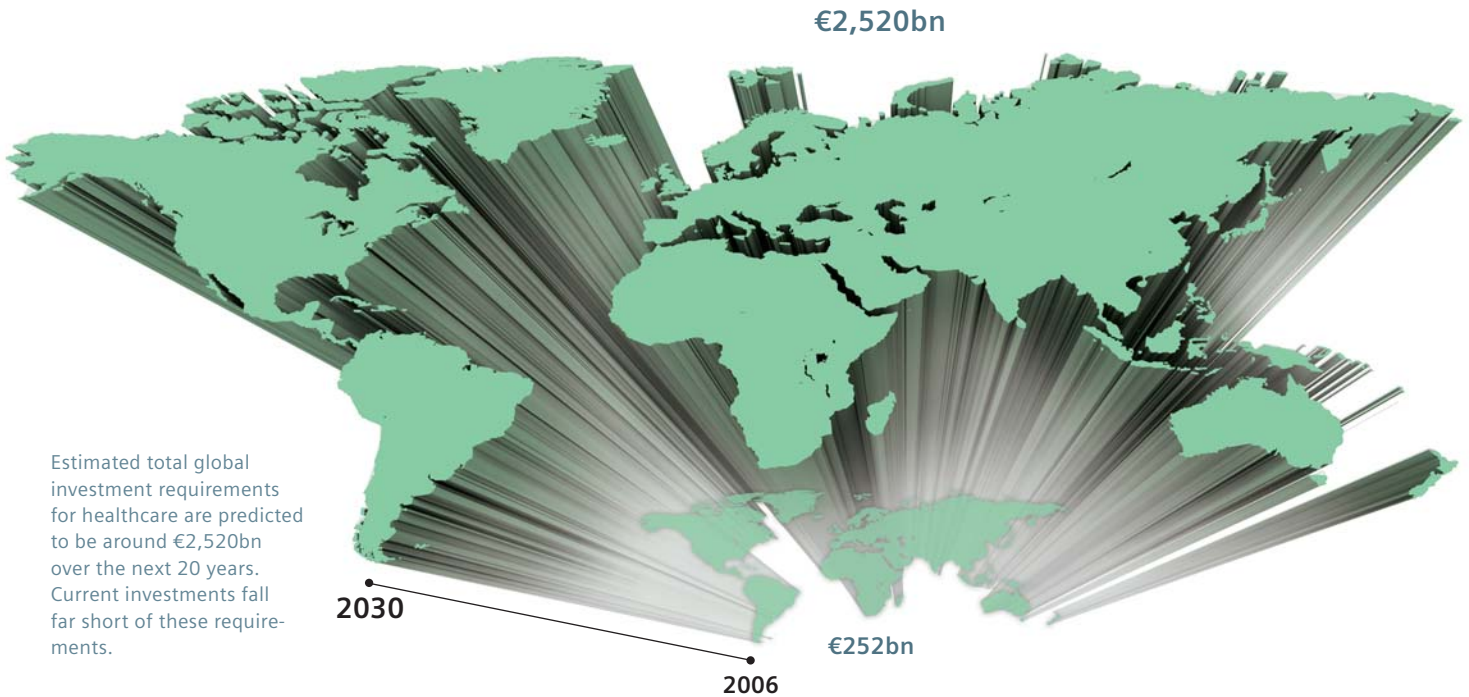
Ramón Roncero, Sales Manager Medical Sector, Siemens Renting S.A., Tres Cantos, Spain

However, the key area for healthcare equipment investment is diagnostic imaging; from magnetic resonance imaging (MRI), computed tomography (CT), to X-ray and positron emission tomography (PET) technologies. Rapid and accurate diagnosis of various conditions not only enable better health outcomes, but also introduce major efficiencies and cost savings by avoiding

expensive and invasive exploratory procedures.

Yet, the acquisition of up-to-date diagnostic imaging equipment remains financially inefficient. In 2010, in the U.S. alone, there was €10.4bn (\$14.8bn) of frozen capital related to the acquisition of diagnostic imaging equipment. In Europe’s top economies, the figure is €5.2bn (\$7.4bn), rang-

Required Increase in Investments for Healthcare



ing from €2.0bn (\$2.8bn) in Germany, through €916m (\$1.3bn) in France, €732m (\$1.0m) in the UK, to €524m (\$748m) in Spain.

U.S., Europe, China – Country Profiles

Healthcare organizations are less able to have a growing proportion of their annual capital budgets tied up in equipment. In some countries, such as the UK where strong pressure was enforced by the government to stay within the budget, selected institutions were only able to meet those requirements by reducing their capital budgets and effectively putting a partial freeze on new technology and equipment acquisition. This is now spreading to other European countries and the U.S. In this kind of situation, not only is capital spending under pressure, it is actually being suppressed, leading to diagnostic and treatment inefficiency through a negative spiral

of under-investment. Therefore, the lack of appropriate technology may have a direct impact on patient care standards. In the United States, the Affordable Care Act of 2010 has created considerable pressure to reduce procedural costs as insurance companies are forced to accept people with pre-existing conditions and health insurance premiums are more heavily regulated. In order to help measure and control healthcare consumption, leasing arrangements are proving critical to understanding true cost-per-procedure. Technology upgrades in radiology are buoyant, suggesting that this area provides a particularly compelling spend-to-save business case.

Asset finance in Europe's major economies' healthcare systems lags behind the U.S., with utilization rates well below the 30 percent of equipment investments that is typical for the U.S. Financing techniques such as leasing and renting pro-

vide European healthcare systems with great potential to improve financial efficiency, transparently aligning costs with “per procedure” reimbursements or charges.

In China’s rapidly developing healthcare system, which is putting forward substantial investment, around €1.8bn (\$2.5bn) of frozen capital was associated with diagnostic imaging equipment acquisition in 2010. While China has no squeeze on access to capital, the country’s healthcare infrastructure development targets are enormous.

Healthcare professionals are determined that the rapidly expanding healthcare system will be sustainable in the long run. Therefore, as the development of a universally accessible healthcare system gains pace, equipment vendors are increasingly offering integrated financing to enable a clearer alignment of costs with health outcomes and establish a competitive position.

Access to up-to-date technology is vital to both improve patient outcomes and reduce the costs per diagnosis, treatment, or procedure. What is then the true scale of investment in necessary technological and infrastructural development that is required to create a sustainable, high-efficiency global healthcare environment over the next 20 years?

According to projections from SFS, around €15.000bn (\$21.419bn) will be needed to fund developments for the global public services infrastructure until 2030. Of that sum, around €2.500bn (\$3.570bn) will be needed for healthcare provision. These spending projections put into context how much public services, in particular healthcare, are under pressure to use the most effective methods to finance such developments.

Great Potential to Improve Financial Efficiency

Critical to acquiring healthcare technology and equipment is having better access to flexible capital, improved access to treatment in the U.S., and the expansion targets in China. However, a large proportion of capital is currently still “frozen” in healthcare systems across the globe, and cannot be efficiently leveraged.

This inefficiently deployed or “frozen” capital can be replaced with an asset-financing plan that:

- simply charges a fixed equipment lease/rental and maintenance cost against revenue budgets
- reduces longer-term outlay because the financier retained title and could dispose of the technology on the secondary market
- introduces the possibility of the healthcare organization to upgrade its technology aligned with technology developments without having to write-off the full asset value

There is proof that access to the latest medical technology is crucial to improving diagnostic accuracy and treatment throughput, which in turn helps to avoid unnecessary interventions while reducing the cost of healthcare provision. Acquiring such up-to-date equipment through asset finance plans provides healthcare finance professionals with a transparent means to calculate cost-per-procedure and, armed with this knowledge, helps ensure that those costs are well understood and managed.

To free frozen capital can therefore help to make necessary investments in new medical equipment sooner. That enables faster and more accurate diagnosis, better treatments of patients, and, as a result, fewer doctor visits. All that leads to lower healthcare costs, a higher health standard, and higher labor productivity – that benefits the entire society.

Valeriya Masyuta, MA, is an editor at Siemens.

Exchange rates used in the article (rate date: 05/13/2011)

EUR to USD = 1.42
 GBP to EUR = 1.13
 GBP to USD = 0.61
 CNY to EUR = 0.10
 CNY to USD = 0.15
 PLN to EUR = 0.25
 PLN to USD = 0.36

Summary

Challenge:

- Healthcare systems are either under severe spending pressures, as in Western Europe and the U.S., or undergoing rapid development, for example in China
- Billions of euro are tied up in frozen capital – inefficiently deployed capital or untapped liquidity potential
- Healthcare systems are under pressure to use the most effective methods to finance up-to-date equipment

Solution:

Replace this inefficiently deployed or “frozen” capital with an asset-financing plan that

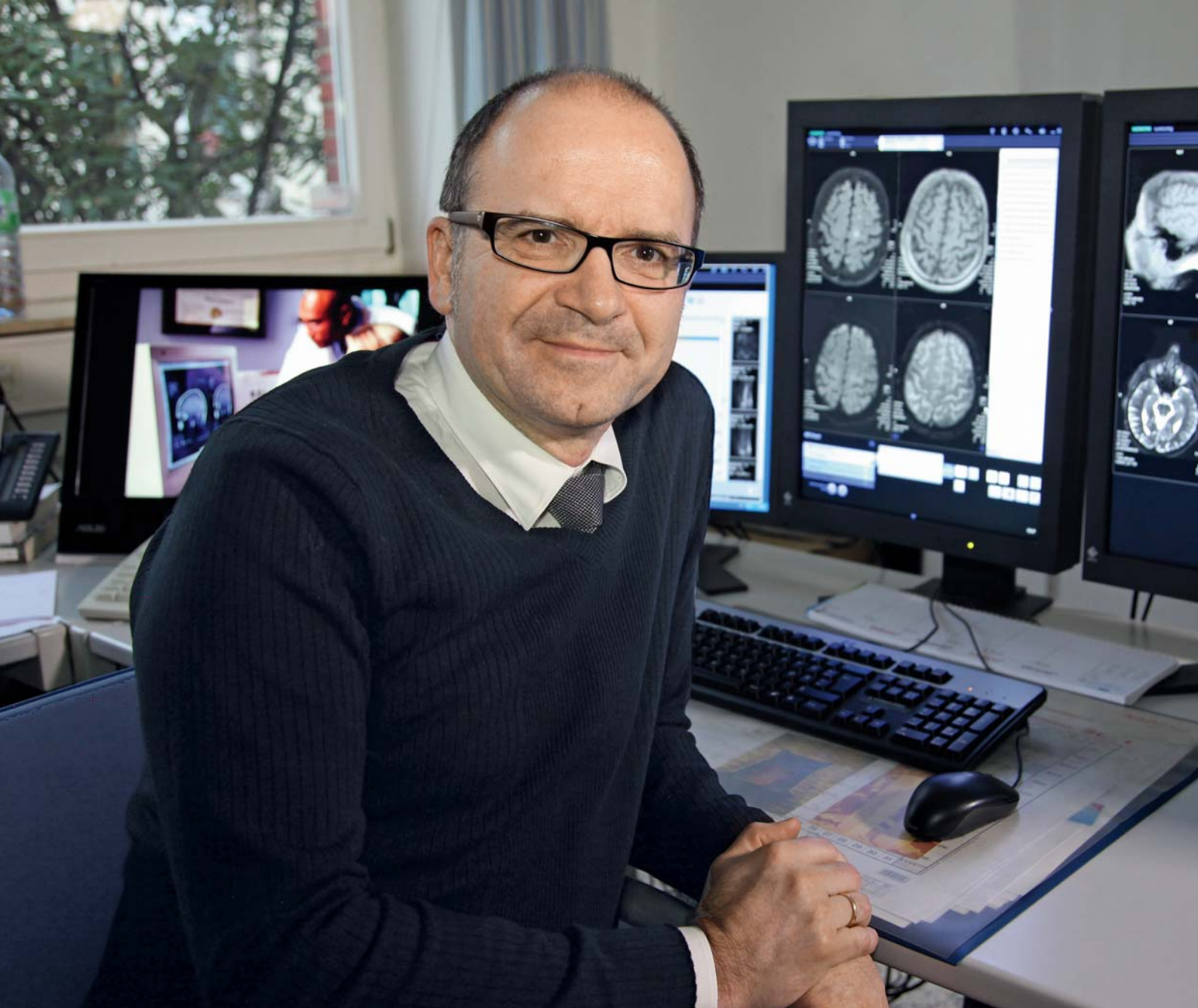
- charges a fixed equipment lease/rental and maintenance cost against revenue budgets
- reduces longer-term outlay because the financier retained title and could dispose of the technology on the secondary market
- introduces the possibility of the healthcare organization to upgrade its technology aligned with technology developments without having to write off the full asset value

Result:

- Acquiring up-to-date equipment through asset finance plans provides healthcare finance professionals with a transparent means to calculate cost-per-procedure and, armed with this knowledge, to help ensure that those costs are well understood and managed

Further Information

www.siemens.com/finance



More Options, More Freedom

Clinicians at the MR, Nuclear Medicine, and PET/CT Center in Bremen Mitte, Germany, focus on saving time and improving quality with Siemens' integrated solutions, *syngo.via* and *syngo.plaza*, and can view their images on mobile devices.

By Andreas Pietsch



“The most important thing is to lighten the radiologist’s load if you want to increase the efficiency of the practice.”

Markus Lentschig, MD, MR, Nuclear Medicine and PET/CT Center Bremen Mitte, Bremen, Germany

Espreo, MAGNETOM Avanto, MAGNETOM Verio) and a 6-slice Biograph® TruePoint™ PET-CT. They will also receive a new MAGNETOM Skyra MRI scanner and a Biograph mMR soon.

The practice sees approximately 20,000 patients every year – an enormous volume for radiology technicians and radiologists, which increases the need for time-saving support. Every minute spent finding and preparing images is a minute taken away from making a diagnosis and keeping the radiologists from doing their real work.

A New Level of Imaging IT

Always intrigued by the latest technologies, Lentschig implemented *syngo*®.via¹, the advanced imaging software, as a Siemens development partner in early 2009. Since then, he has contributed his ideas to further optimize the system. The solution processes images from different modalities, such as magnetic resonance imaging (MRI), computed tomography (CT), and positron emission tomography-computed tomography (PET-CT). Additionally, it connects to radiology information systems (RIS) and picture archiving and communication systems (PACS) from leading vendors, including Siemens’ newest PACS solution, *syngo*.plaza. This close interaction led Lentschig to install *syngo*.plaza, a year-and-a-half later, which combines 2D, 3D, and 4D images on one workplace and offers a new dimension for reviewing images.

What benefits does Lentschig experience using *syngo*.via and *syngo*.plaza together in his clinical workflow? His answer is short and sweet: “Efficiency and quality.”

Every radiology office needs a stable PACS that can provide images quickly, which gives the radiologist timely diagnostic tools and intelligent support in order to cut down on time-consuming routine tasks. Additionally, the office also needs highly efficient diagnostic software.

“The combination of *syngo*.plaza and *syngo*.via offers both – and with a largely identical user interface,” says Lentschig. As someone who uses both programs, Lentschig prefers to perform diagnoses with *syngo*.via. Other radiologists work with *syngo*.plaza and rely on the diagnostic software for special cases. With either clinical workflow, the systems are flexible, offering pre-set customizable tabs and integration with RIS.

A head examination, for example, shows how the integrated solutions provide efficiency and quality. The exam procedure varies depending on whether the patient is complaining of pain or receiving follow-up care for a tumor or a stroke. Images that are brought up in *syngo*.via are preprocessed, removing any details that are irrelevant for the current diagnosis. The radiologist does not need to process confusing or irrelevant images in order to take indication-specific measurements and study the images. The principle behind this workflow involves highlighting the important information and eliminating things that are secondary. This saves time and frees the radiologist from tedious routine work.

Additionally, the screen layout for *syngo*.via and *syngo*.plaza can be customized according to the doctor’s personal preferences and the examination requirements. For most of the examinations,

The constant influx of images and data from patient exams challenges clinicians to streamline their workflow in order to finish their daily workload. “As a result, the most important thing is to lighten the radiologist’s load if you want to increase the efficiency of the practice,” says Markus Lentschig, MD.

Lentschig runs the MR, Nuclear Medicine, and PET/CT Center in Bremen Mitte on the Bremen Mitte Clinic campus in Germany with two other radiologists. Lentschig and his colleagues cover the entire examination spectrum in a radiology practice. The site is home to three magnetic resonance imaging (MRI) systems (MAGNETOM®



syngo.via WebReport allows the referring doctor to view the patient's images on the screen before the CD is sent over from the radiology practice, which improves coordination between the medical offices and increases loyalty with the referring doctor.

Lentschig has created predefined layouts that his colleagues in the practice can adopt or reconfigure according to their preferences. For head exams, the stroke layout opens automatically since strokes are the most common reason for an exam of the head. If another kind of head exam is required, the radiologist changes to the corresponding predefined layout. If needed, both solutions offer functionalities to display all of the previous and new examination results side by side. "A decade-and-a-half ago, a stomach exam gave us 150 images. Today, a normal exam produces 2,000, sometimes even twice that many. There's no way I can look at them each individually," says Lentschig, pointing out a constantly growing dilemma for radiologists. For

the greatest possible diagnostic quality, you need as many images as possible – but the flood of images is overwhelming for radiologists. Intelligent selection and sorting mechanisms that help focus on the most important frames can only be beneficial.

One key feature that helps is offered by both *syngo.via* and *syngo.plaza*: the Findings Navigator. During each workflow step, findings can be added automatically or manually to a list so that they can be called up again with a simple mouse click. "When I show my findings to a colleague, I don't need to scroll through the entire series," says Lentschig, praising the user-friendly feature that makes it easier to efficiently share the images internally, especially when obtaining a

second opinion. "The time that my colleagues and I used to spend searching can now be spent on diagnosis."

This is aided by another application that is also available in both imaging IT solutions: the 3D reference point. With this function, the radiologist can quickly navigate to the same coordinates of a patient in different series and views of series.

Integration of PACS and Advanced Imaging Software

Historically, advanced imaging software and PACS were two separate systems, often located in two different locations. This means the clinician often had to walk to two separate workstations in order to make his or her diagnosis. *syngo.via* and *syngo.plaza* come very close to creating

“The time that my colleagues and I used to spend searching can now be spent on the diagnosis.”

Markus Lentschig, MD,
MR, Nuclear Medicine, and PET/CT Center
Bremen Mitte, Bremen, Germany

a uniform user interface with identical functions, as Lentschig confirms: “Anyone who is familiar with *syngo.via* can use *syngo.plaza*, too.”

“The combination of *syngo.via* and *syngo.plaza* makes this system one-of-a-kind,” says Lentschig, emphasizing the value of his diagnostic software and PACS solution. “Every integration improvement puts the existing solution further and further ahead of the competition.” New technical abilities inspire further desires and possibilities. A current example of this can be seen with the web applications and availability on mobile devices, which many radiologists have embraced with open arms.

Mobile Imaging

In addition to *syngo.via* and *syngo.plaza*, Lentschig has the option to view diagnostic reports and images via a secure Internet connection on a remote computer or a mobile device. This allows the referring doctor to view the patient’s images on the screen before the CD is sent over from the radiology practice, which improves coordination between the medical offices and increases loyalty with the referring doctor. The simplified communication also supports exchanges between radiologists when they need to get a second opinion.

syngo.via WebViewer² offers physicians the ability to access, view, and read images in interactive 2D and 3D with a

Web browser, when in combination with a diagnostic-grade screen. General images for non-diagnostic purposes can also be viewed using the corresponding application designed for Apple® mobile devices. Connection is possible anywhere³ within the reach of the hospital network through a secure VPN. With *syngo.via* WebReport⁴, physicians have secure and immediate access to reports and images – anywhere³. The application can be launched with a Web browser or, if using an Apple mobile device, by using a corresponding application for non-diagnostic purposes. Thanks to the thin-client architecture, minimal administration is needed – savings costs while also protecting an investment that is aligned with patients’ needs.

“It gives me more personal freedom because I can communicate with the practice from home or even look at the images on my iPad while I’m on the road,” says Lentschig. “Especially when it comes to iPad use, Siemens demonstrates that this company is driving technical progress with its innovations, while simultaneously keeping up with current trends.”

Andreas Pietsch is a freelance business writer based in Coburg, Germany, specializing in clinical IT, healthcare, and logistics.

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 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 are not intended to be used for diagnosis.

³ Prerequisites include: wireless connection to clinical network, meeting recommended minimum hardware requirements, and adherence to local data security regulations.

⁴ The application is not for diagnostic use. Please refer to your sales representative whether the product is available for your country.

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 are not intended to be used for diagnosis.

iPhone/iPad/iPod are trademarks of Apple Inc., registered in the U.S. and other countries.

Summary

Challenge:

- Streamline workflow for clinicians to reduce their daily workload
- Pinpoint relevant data in the overflow of images available to clinicians
- Freedom to work from other locations

Solution:

- Integrate diagnostic software and picture archiving communications system (PACS)
- Intelligent selection mechanisms that help focus on the most important frames
- View diagnostic reports and images via a secure Internet connection on a remote computer or a mobile device

Result:

- *syngo.via* and *syngo.plaza* together help create efficiency and improve quality
- *syngo.via* WebViewer and *syngo.via* WebReport offer clinicians remote access

Further Information

www.siemens.com/syngo.via
www.siemens.com/syngo.plaza
www.siemens.com/syngo.via-weboptions

An Asset for Staff and Patients

The new technology platform FAST CARE has been available for the Single Source CT system SOMATOM Definition AS since spring 2011. The FAST functionalities simplify and accelerate CT workflows, as demonstrated by the first months of clinical operation at institutes in the UK and the U.S. The results have yielded increased satisfaction from staff as well as patients.

By Ingrid Horn, PhD

Hospitals are currently fighting a fierce battle against staff shortages and the pressure to perform. This applies particularly to computed tomography (CT), which relies on technical specialists. The technology platform FAST CARE, available since spring 2011, unites the optimization of radiation dose with its new CARE functionalities while increasing the simplicity and reliability of CT operations for staff with FAST.

The Major Software Benefits

For the team headed by Olivia Egan, CT Superintendent Radiographer at the Chelsea and Westminster Hospital (CWH) in London, UK, the software includes two major benefits: FAST helps make technicians more efficient, while simple compatibility with the various CARE functions leads to high levels of safety when reducing radiation dose.

The CWH has 460 beds and includes medical, surgical, womens & childrens, and HIV care amongst others, in addition to providing a bariatric service and an emergency department. Despite almost 350 CT examinations that are performed weekly in the imaging department, using two scanners which are operated by teams of rotating staff, the FAST Adjust function has proven particularly beneficial. Here, scan parameters like scan time, pitch, and tube current can be set accu-

rately with the click of a button. According to Olivia Egan, FAST Adjust enables technicians to efficiently prepare the system for scan processes.

Joe Larson, Imaging Manager at the Tacoma General and Mary Bridge Children's Hospitals in Washington, U.S., has reached a similar conclusion. After working with the software for several months, he feels that FAST CARE has helped to improve his technicians efficiency to levels that may have taken longer.

In Tacoma, the technology platform was used with a scanner in the emergency and trauma departments, which is important since CT examinations are becoming more routine procedure for trauma patients. In acute emergency situations, physicians and CT technologists and radiologists are under enormous pressure to deliver a quick and reliable diagnose. Yet, spinal scans have proven extremely time-consuming until now. Technologists normally have to mark each vertebra individually and determine its precise position manually to generate an effective image, a process which can easily take 30 minutes or more. In contrast, the FAST Spine program automatically marks the vertebrae within a predetermined scan area of the spine and independently calculates the position of vertebrae and discs for anatomically correct imaging. The time saved positively impacts the

entire examination. As the images appear in real-time, the surgeon accompanying the technologist can decide whether to operate much more quickly than without FAST Spine.

Accelerating the diagnostic process, FAST Spine eases the time pressure placed on technologists scanning trauma patients, resulting in a less stressful collaboration with the attending physician. After just three weeks, no one was willing to work without FAST Spine. Additionally, according to Larson, consistently good image quality is delivered. As a result, fewer repetitions are required, patient radiation exposure is reduced, and the diagnostic process is accelerated. This also increases economic viability, since hospitals are often unable to obtain reimbursement for repeat imaging – a benefit that is passed down to the patient. Who would want to pay extra for poor imaging?

Maurya Radvilas believes that the quality of patient care is another important aspect. She holds the position of Director of Imaging in Tacoma's MultiCare program. The hospital trust, one of the largest private healthcare providers in Washington with more than 450 beds, aims to use this program to consolidate and improve its care standards. Radvilas is unequivocal in her appraisal of FAST CARE. Patients benefit from the reduced

Summary

Challenge:

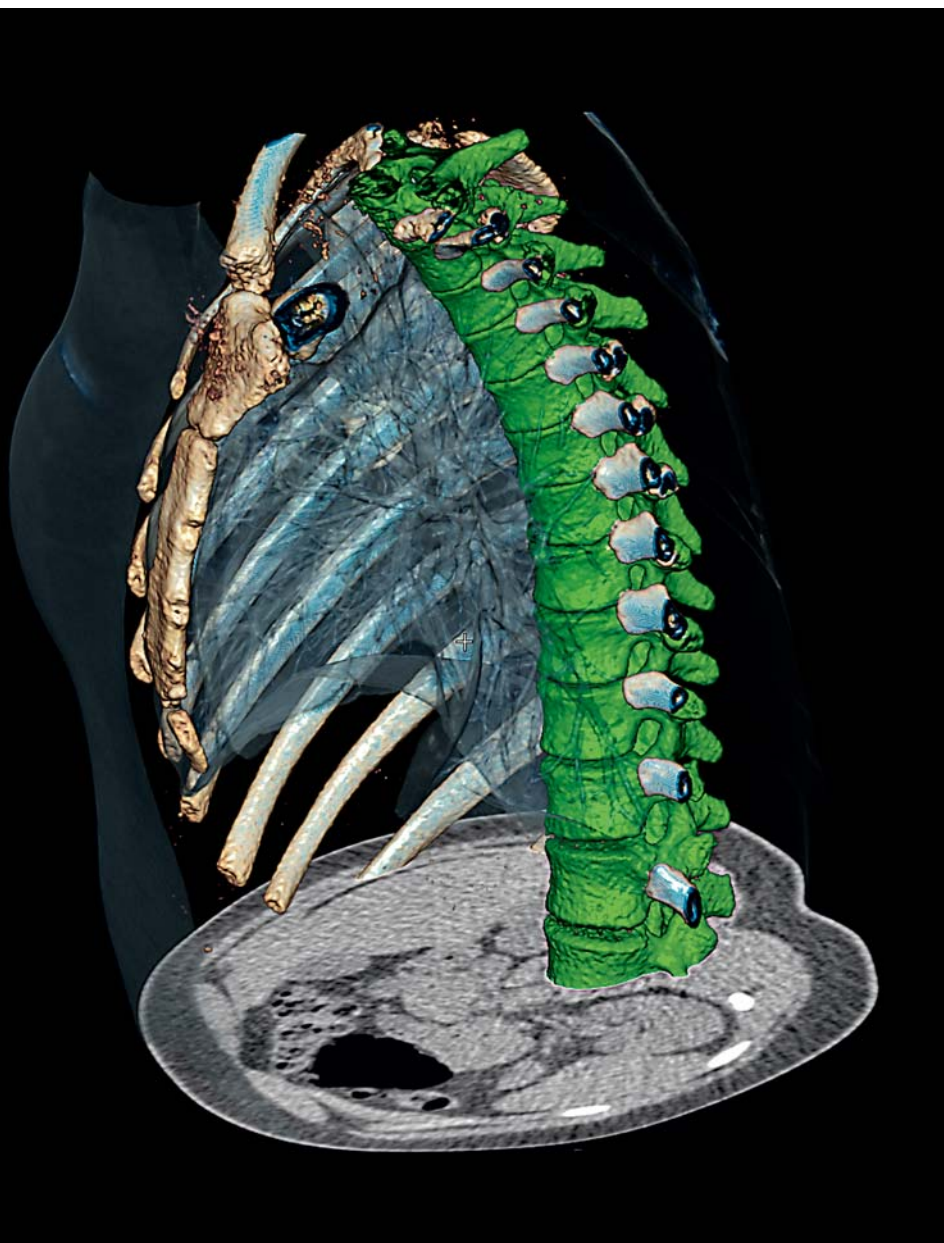
- Hospitals have to cope with shortage of staff
- Patients demand higher standards of care
- Best possible diagnosis with least possible dose

Solution:

- FAST CARE provides easy, safe CT operations
- FAST optimizes workflows for technologists
- CARE optimizes radiation dose according to organs scanned and patient needs

Result:

- The use of FAST CARE benefits patients and staff
- FAST Adjust facilitates safe parameter settings
- FAST Spine reduces time expenditure in cases of spinal column injuries
- Less stressful collaboration between physicians and technologists
- Faster, more reliable diagnosis for physicians and patients
- Competitive advantage thanks to high care standards and economic viability



Anatomically correct spine reconstructions are very time-consuming procedures, as every spinal vertebrae and disc needs to have its own reconstruction layer depending on the individual position. With FAST Spine, these manual steps can be simplified with just a single click.
Image courtesy of University of Erlangen-Nürnberg

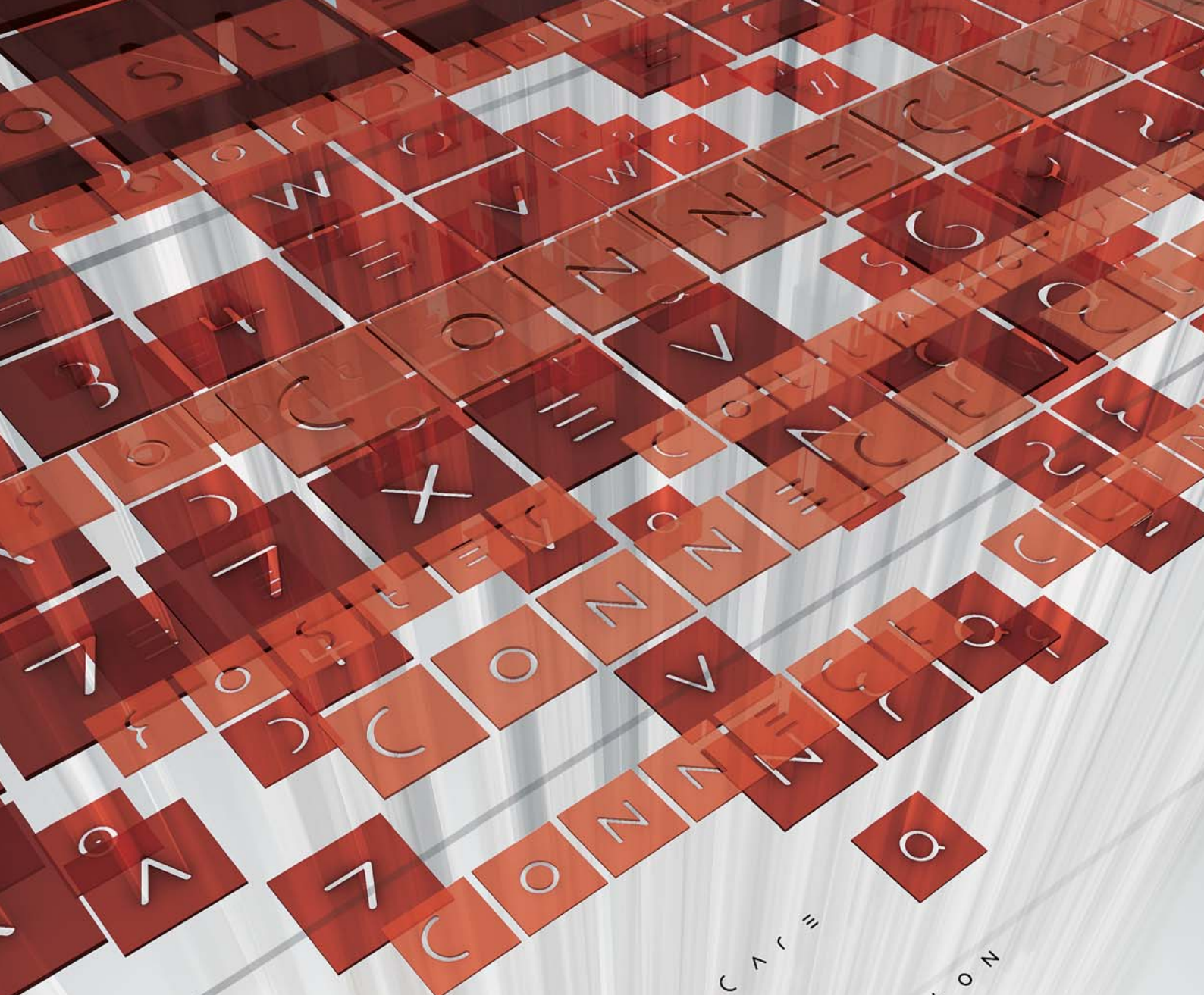
radiation dose and the relaxed working atmosphere. The less maneuvers technologists have to perform during an examination, the more time remains for the patient. If the patients are responsive, assistants can talk to them and create trust. The speed of the examinations and the trust placed in the efficiency of the staff promotes patient satisfaction.

In turn, this increases patient compliance with the treatment plan, which has a positive impact on the recovery process. The team in Tacoma has discovered that FAST CARE makes a decisive contribution to consistently high standards of care. Be it doctor or patient – the imaging department can deliver rapid results of the higher quality for all clients.

Ingrid Horn, PhD, studied biology and biochemistry. She is an expert in science communications and an experienced writer with an emphasis on biomedical topics in fields like medical engineering, neuroscience, oncology, and pediatrics.

Further Information

www.siemens.com/fastcare



COOPERATIVE CARE

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Meaningful Use, Remarkable Outcomes

Riverside Health System boosts efficiency using Siemens Soarian Clinicals. The 904-bed hospital system was among the first in the United States to meet stringent benchmarks for the meaningful use of electronic health records.

By Sameh Fahmy, MS

In his 35 years at Riverside Health System in Newport News, Virginia, U.S., Senior Vice President and Chief Information Officer John Stanley has seen the organization grow to include four acute care hospitals, a physical rehabilitation facility, and a 400-member physician group as well as several surgical centers, a behavioral health hospital, convalescent centers, and retirement communities.

In addition to this tremendous growth, Stanley also has seen the challenges that come with an aging population, the increasing prevalence of chronic diseases, and a regulatory environment that constantly seems to demand more documentation.

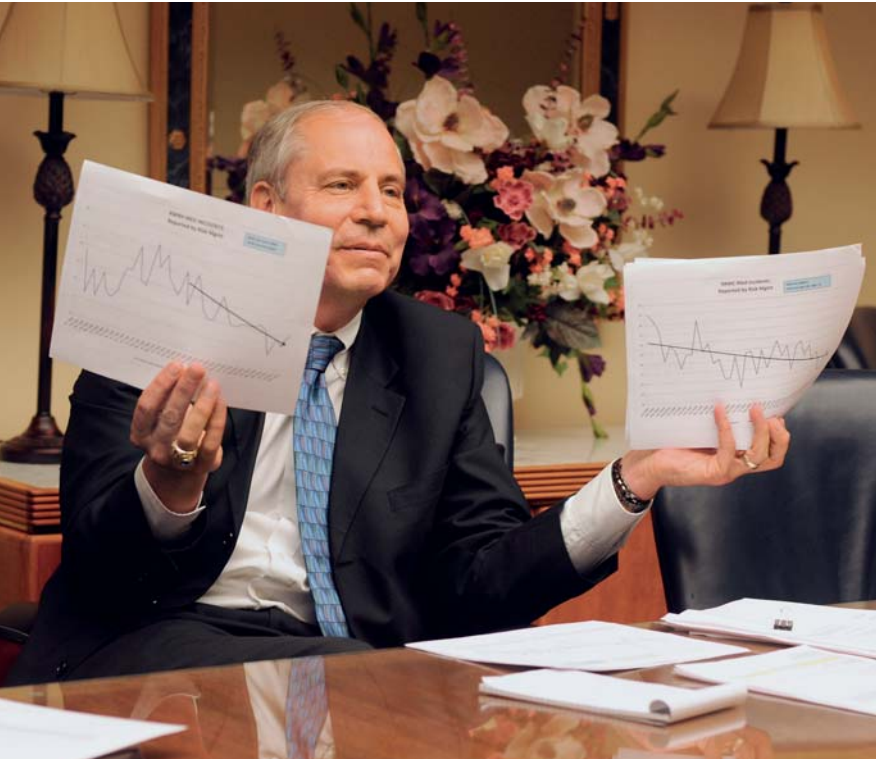
For Riverside to thrive in today's complex healthcare environment, it needed an

information technology (IT) structure that could provide seamless access to patient information while also coordinating tasks among clinicians. The technology would help the organization maximize efficiency and ensure that patients receive care that is consistent with hospital-defined best practices. To meet those needs and to attract and retain the very best clinicians, Riverside chose Siemens Soarian® Clinicals health information system for its acute care division. Stanley says that as a result of its investment, Riverside has improved the quality of care it delivers and created a safer environment for patients, with a 42 percent reduction in methicillin-resistant *Staphylococcus aureus* (MRSA) infections as just one example of the improved outcomes.

Riverside Regional Medical Center and two additional hospitals in the Riverside system were among the first in the United States to meet stringent benchmarks that qualify them for federal incentives for the meaningful use of electronic health records. "It's the right idea that we should be adopting more technology to take care of our patients, so we're doing it," Stanley says. "It's making a difference in terms of safety; it's making a difference in terms of quality of care."

"Listening" to Patients

One of the primary reasons Riverside Health System chose Soarian Clinicals was for its workflow technology. Stanley emphasizes that rather than simply capturing and collecting patient data, the



“It’s the right idea that we should be adopting more technology to take care of our patients, so we’re doing it. It’s making a difference in terms of safety; it’s making a difference in terms of quality of care.”

John Stanley,
Senior Vice President and Chief Information Officer,
Riverside Health System, Newport News, Virginia, U.S.

workflows and embedded analytics in Soarian Clinicals help Riverside optimize its processes. Clinicians benefit from a reduction in manual documentation tasks, and patients benefit from a reduction in lost orders and delays caused by inefficient task handoffs.

Clinical Systems Manager Sherry Maynard explains that as patient information is entered into Soarian Clinicals, the solution “listens” for relevant data and responds accordingly. If a patient has lab values that indicate probable diabetes, for example, Soarian suggests that the patient be given a hemoglobin A1c test. If the test is not administered within a certain amount of time, Soarian notifies the charge nurse.

Soarian Clinicals provides role-based worklists that are organized by category, such as notifications, orders approaching expiration, and medications to be charted, so that physicians, nurses, and other clinicians can efficiently move through their workday. In addition to appearing in the

Soarian user interface, notifications can be sent to clinicians via phone, pager, fax, or email. Workflows also warn of missing data, such as information on patient allergies or the need for weight information for medication dosing, and help coordinate post-discharge care earlier to avoid delays in the discharge process. Riverside has implemented 40 workflows to date, and clinicians routinely suggest new workflows and collaborate with the IT department in their development. “Our primary strategy is to create seamless integration, a seamless experience, for patients and physicians,” Stanley says. “So working toward that, it becomes clear that we need a state-of-the-art, complete electronic health record, and that’s where Soarian comes in for us.”

Reducing Hospital-Associated Infections

According to the Association for Professionals in Infection Control and Epidemiology (APIC), healthcare-associated infec-

tions (HAIs) account for an estimated 100,000 deaths at a cost of \$5-6 billion US\$ annually.¹

With the public reporting of HAIs on the rise, patients will seek those institutions with the lowest infection rates. Prior to its implementation of Soarian Clinicals and related capabilities, Riverside Regional Medical Center (RRMC) had no effective and reliable measurement tool to locate or track the impact that isolation measures had upon HAIs within the organization. Without reliable baseline data and accurate reporting, measurement of successful results from practice change would be impossible.

Today, clinicians can access and analyze information on HAIs from Soarian Clinicals documentation using the solution’s embedded analytics capability. RRMC developed a personalized data-mining tool for retrieving and analyzing infection information from selected fields in the nursing documentation stored in Soarian Clinicals. This tool, developed at RRMC,

was dubbed NIP-IT, for Nosocomial Infection Prevention through Information Technology.

The rate of MRSA infections at RRMC appeared to be on the rise before the implementation of NIP-IT. From 2008 through the end of 2010, however, Riverside achieved a 42 percent reduction in MRSA hospital-associated infections. In March 2010, there were no MRSA hospital-associated infections for the entire 570-bed facility.

Leveraging the tools and capabilities within Soarian Clinicals, RRMC revised its isolation assessment documentation to gather information on specific types of conditions and precautions, including presumptive isolation. Additionally, it enhanced the nursing admission database to target specific isolation-triggering conditions. As a result, the appropriate clinicians are notified so they can quickly identify patients in isolation, helping to reduce time to isolation and the potential for horizontal transmission of infection. In another example of measurable outcomes, the use of embedded analytics in Soarian Clinicals has allowed Riverside to track data from the Soarian Critical Care module, such as the number of days

patients are on ventilators, ventilator settings, and weaning criteria, to virtually eliminate ventilator-associated pneumonia in its intensive care unit.

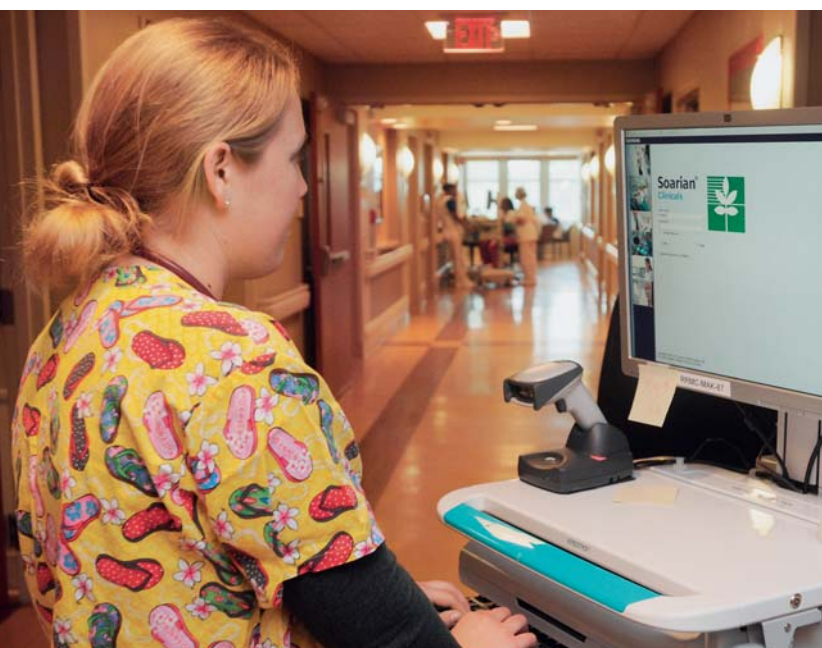
Supporting Riverside's Patient Safety Initiatives

Riverside Health System is adding more support to its patient safety initiatives by using Soarian Clinicals for medication reconciliation, computerized physician order entry (CPOE), and a closed-loop medication use process. By combining outpatient medication history from a third-party electronic prescribing net-

“Don't focus on meeting the meaningful use regulations. Do the right thing for the quality of patient care and safety that you provide.”

John Stanley, Senior Vice President and Chief Information Officer,
Riverside Health System, Newport News, Virginia, U.S.

Rather than simply capturing and collecting patient data, the workflows and embedded analytics in Soarian Clinicals help Riverside optimize its processes. Clinicians benefit from a reduction in manual documentation tasks, and patients benefit from a reduction in lost orders and delays caused by inefficient task handoffs.





By setting appropriate expectations, designating pilot hospitals and specialists for each rollout, and then applying lessons learned to the others, Sherry Maynard and John Stanley were able to demonstrate the benefits of the technologies to even the most skeptical clinicians.

“When the clinicians saw how the technology could help them take care of their patients, that was when we were able to turn the corner.”

Sherry Maynard,
Clinical Systems Manager,
Riverside Health System,
Newport News, Virginia, U.S.

work with home medication information already documented in Soarian Clinicals, the solution helps Riverside ensure that patients receive a medication regimen that does not duplicate therapies or include incorrect doses.

Another significant patient-safety effort involves the use of Soarian Clinicals for CPOE, which can help providers reduce serious medication errors when combined with decision support such as drug allergy warnings.² Riverside used a phased approach to implement CPOE at its hospitals, with hospitalists at the flagship institution, Riverside Regional Medical Center, the first to start using CPOE in November 2009. They were followed by Riverside Tappahannock Hospital and Riverside Walter Reed. In later months, specialists such as cardiologists, orthopedists, and interventional radiologists followed at all three hospitals. The most recent acute care hospital added to Riverside Health System, Riverside Shore Memorial Hospital, began its CPOE implementation in April 2011.

With Soarian, the clinical team has quick and easy access to pertinent patient data and information. The care team can view longitudinal patient data as well as images from the picture archiving and communications system (PACS). It can be securely accessed by clinicians anywhere, anytime through a secure, Web-based interface. Both Stanley and Maynard admit that some clinicians were initially reluctant to embrace workflows as well as CPOE. By setting appropriate expectations, designating pilot hospitals and specialists for each rollout and then applying lessons learned to the others, however, they were able to demonstrate the benefits of the technologies to even the most skeptical clinicians. “When they saw how the technology could help them take care of their patients, that was when we were able to turn the corner,” Maynard says.

In one instance, the use of the Soarian rules engine helped a radiology technician identify a potential risk from a computed tomography (CT) scan based on an elevated creatinine level, which suggested kidney dysfunction and a contraindication for the contrast dye used for CT. The technician sent an unsolicited letter of thanks to the IT department that noted that the software prevented her from making a critical error in patient care. “Please pass this message on to the deserving person,” she wrote. “Thank you so much!”

Quality: The Greatest Incentive

Riverside Health System saw the potential of IT to transform healthcare early and first installed Soarian Clinicals in 2002. Their leadership gave them a head start when the federal government of the United States announced a program to encourage the adoption and meaningful use of electronic health records (EHRs).

Stanley says the most challenging part of meeting the program’s benchmarks was interpreting the regulations, which are detailed in more than 800 pages and were followed by thousands of pages of comments and interpretations by various agencies. To ensure that they were meeting the letter of the law as well as

U.S. Stimulus Funds Support Electronic Health Records

In addition to providing tax cuts and increasing federal funding for education, research, and infrastructure, the American Recovery and Reinvestment Act of 2009 created an incentive program to encourage the adoption and meaningful use of electronic health records, with the goal of improving the quality and safety of patient care.

Through the Centers for Medicare and Medicaid Services EHR Incentive Program, eligible healthcare professionals and hospitals can qualify for incentive payments when they adopt certified electronic health record technology and use it to achieve specified objectives. Incentive payments for hospitals vary, but begin with a US\$2 million base payment.

To qualify for the payments, hospitals must meet 14 core objectives, including the use of computerized physician order entry (CPOE), the maintenance of an active medication and medication allergy list, and the implementation and tracking of at least one clinical decision support rule. In addition, hospitals must meet at least five of 10 additional objectives, such as the implementation of drug formulary checks and medication reconciliation.

Riverside Regional Health System in Newport News, Virginia, U.S., was among the first in the United States to successfully attest to meaningful use.

Summary

Challenge:

- Maximizing efficiency and helping clinicians manage increasing regulatory documentation requirements
- Reducing costly and difficult to treat methicillin-resistant *Staphylococcus aureus* (MRSA) infections
- Improving patient safety by reducing medication errors

Solution:

- Soarian Clinicals workflows help reduce handoffs and warn of missing or incomplete information while embedded analytics track performance measures
- Embedded analytics technology in Soarian Clinicals helped Riverside Regional Medical Center create a solution that analyzes infection information and uses answers from nursing documentation to help reduce time to isolation and the potential for horizontal transmission of infection
- Computerized physician order entry helps providers reduce errors associated with poor legibility while workflows warn of drug-drug and drug-allergy interactions

Result:

- Clinicians benefit from a reduction in manual documentation tasks; patients benefit from a reduction in lost orders and delays caused by inefficient task handoffs
- MRSA infections decreased by 42 percent following implementation of an infection control and data mining workflow at Riverside Regional Medical Center
- With the help of computerized physician order entry and the bar-code-enabled Med Administration Check™ solution, providers can reduce serious medication errors at ordering and administration

its intent, Riverside worked closely with Siemens through regular calls and frequent on-site visits that began immediately after the incentive program was announced. Stanley says his organization's longstanding partnership with Siemens and its commitment to using state-of-the-art technology to improve the quality and safety of patient care made it well positioned to meet the benchmarks. "I always felt bullish on our ability to meet the requirements because we were doing the right thing," Stanley says. "It was just a question of 'what does it actually take to pass the test.'" Two representatives from Siemens even joined Stanley and his colleagues in Riverside's corporate boardroom as he carefully filled out the online attestation form and clicked the "submit" icon.

Meeting the meaningful use benchmarks was certainly cause for celebration at Riverside, but Stanley emphasizes that the monetary benefit was not the organization's primary motivation. "Don't focus on meeting the meaningful use regulations," he advises. "Do the right thing for the quality of the patient care and safety that you provide."

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

¹ Murphy D. et al. "Dispelling the Myths: The True Cost of Healthcare Associated Infections," APIC Briefing 2007.

² Wolfstadt J. et al. "The Effect of Computerized Physician Order Entry with Clinical Decision Support on the Rates of Adverse Drug Events: A Systematic Review" *J Gen Intern Med* 23(4):451-8.



Picture Perfect

Southern California is known for its entertainment and motion picture industry. At St. Joseph Hospital, an every bit as compelling hybrid operating room and cardiovascular imaging and information management solution made their debut. With its dynamic image review of cath-lab and echocardiography imaging studies, as well as ultra-efficient processing and archiving capabilities, Siemens *syngo* Dynamics plays a lead role in St. Joseph's hit.

By Diana Smith

Founded by the Catholic order of Sisters of St. Joseph, St. Joseph Hospital in Orange County, California, U.S., opened its doors 81 years ago, right as the Golden Age of Hollywood movies began. In its eight decades of operation, the hospital has been a leader in providing innovative healthcare, particularly in the areas of cardiac and vascular conditions.

"We were the first hospital in the area to perform open heart surgery and the first hospital to do angioplasty and coronary stenting," says Renee Mazeroll, RN, MSN, Executive Director, Heart and Vascular Center and Respiratory Services, St. Joseph Hospital. Now the largest hospital in the community with 525 beds, St. Joseph's has continued its commitment to exemplary care – expanding its cardiac and vascular programs, utilizing the most advanced technology, and continually raising the bar of clinical innovation and community care.

"Currently, we have a structural heart program, congenital heart program, valve program, and we do aneurysms," reports Mazeroll. "We do everything but

transplants [the hospital partners with Southern California transplant centers]. We can even do left ventricular support if we need to," she adds. At St. Joseph Hospital, more than 7,000 procedures are performed each year.

Demographics Indicate Cardiology Focus

The focus on cutting-edge cardiology and cardiac surgery makes sense, explains Mazeroll. "Southern California is similar to Florida in that we have relatively mild weather. By 2017, it is estimated that 39 percent of our state's population will be age 65 or older. We will be treating an older population, so you have to look at disease dynamics. Atrial fibrillation is a disease of the elderly. Particularly, as you reach 65 or older, the incidence of heart disease increases."

As the population ages, the number of cardiovascular patients will grow. In response to the increased demand, St. Joseph Hospital has opened a state-of-the-art hybrid operating room (OR) and has developed a cardiovascular center

that combines cutting-edge technology with carefully-conceived and tested workflow, all designed to serve more patients, better and faster. Siemens *syngo*[®] Dynamics cardiovascular imaging and information management solution plays a big role.

Creating a Connected Environment

With the cardiology program gaining increased recognition and referrals from out of the state, a top priority for Mazeroll was to create an integrated and efficient cardiology image management and reporting environment. Her vision included providing physicians with the right tool to access multiple images and clinical information from different modalities, fully describe procedures, create a report, and then facilitate immediate distribution to the treating physician for his or her patient records and also to the referring physician in addition to electronic medical record storage. "Sending a report immediately to the referring physician is important. It really helps with



“Sending a report immediately to the referring physician really helps with connectivity.”

Renee Mazeroll, RN, MSN, Executive Director, Heart and Vascular Center and Respiratory Services, St. Joseph Hospital, Orange, California, U.S.

connectivity between the hospital and the referring physicians.” Mazeroll turned to Siemens for a solution. After lengthy, detailed work on integration and workflow, St. Joseph installed *syngo* Dynamics, which delivers real-time data transfer between Siemens Sensis XP, an interventional cardiology and electrophysiology reporting system, and *syngo*

Dynamics. Answering all the items on Mazeroll’s wish list, *syngo* Dynamics incorporates image and information management and post-processing, as well as structured reporting all in one system. All physicians and staff underwent extensive training on the system. Mazeroll reports very little dissension about train-

ing from the physicians. “Most of them asked me what time they should be there,” she says. Today, 100 percent of the physicians are in compliance with the structured reporting procedures. The *syngo* Dynamics system came with installation-ready template bundles that were developed in qualified clinical settings, but St. Joseph opted to customize their templates. “We pulled key phrases from physician dictation and customized our templates, developing them with our physicians,” says Mazeroll.

Overcoming Workflow Challenges

According to Mazeroll, workflow was the biggest challenge regarding the new system. “We didn’t know what we thought we did,” she says. “You have to take the time and map out every single step of your workflow. If you assume anything, it will cause a problem.” With the help of a Siemens-facilitated three-day workshop, staff rolled up their sleeves and performed detailed situational

The Hybrid Operating Room: Innovative Care in an Unconventional Setting

St. Joseph Hospital in Orange County, California, U.S. is one of the first facilities in the United States to implement a true hybrid operating room (OR), which allows cardiologists and surgeons to transition seamlessly from minimally invasive to open-chest surgical procedures. Staffed by a specially trained team of nurses, radiological technologists, and cardiovascular technologists, the hybrid OR incorporates groundbreaking three-dimensional technology.

Physicians and staff access exceptional 3D images, created using Siemens *syngo*[®] DynaCT software, with X-rays taken with the Artis[®] zeego robotic C-arm. With a virtually limitless positioning ratio, the state-of-the-art Artis zeego system reconstructs high-resolution images of the heart and vascular system, showing the finest anatomical details in 3D and in real time fluoroscopy. In effect, physicians follow a precise, three-dimensional anatomical roadmap.

Such pinpoint accuracy helps doctors assess and measure the most minute structural defects in the heart and blood vessels. Additionally, the extreme level of accuracy can simplify the

selection and placement of various devices physicians use to treat defects in the heart or aneurysms of major blood vessels. The result is that many patients can be treated using minimally invasive procedures instead of open surgeries that would have previously been required.

According to Renee Mazeroll, RN, MSN, Executive Director, St. Joseph Hospital Cardiac and Vascular Services, physicians report that they are able to use significantly less contrast and take fewer images because the quality and clarity is exceptional. With its revolutionary imaging system, the St. Joseph Hospital’s hybrid OR is designed to support adult or pediatric, cardiac or vascular patients – one of the few hybrid operating rooms in the United States that has such multiple capabilities. Because it is set up for all kinds of patients, the hybrid OR has a high utilization rate, optimizing efficiency and workflow. The room is used for all types of vascular and cardiac procedures, including percutaneous pulmonary artery valve insertion, plus overflow from the catheterization labs, and even STEMI (ST-segment elevation myocardial infarction) patients.



St. Joseph Hospital is among the first facilities in the U.S. to have a true hybrid OR. It is equipped with Siemens' cardiovascular IT solution *syngo* Dynamics and an Artis zeego multi-axis angiography system.

analyses to make workflow as efficient as possible. "It's like math," adds Mazeroll. "If you've ever done algebra, every step is built on the previous step. Every step has to be correct, or the end value is wrong. Even if one tiny factor is off somewhere in the middle of a formula, it will throw it off. It's the same thing with workflow. You must identify every single step along the way. When that is done, the end product is better and everything runs smoother. It has now become a practice here to have these process meetings."

Statistics reflect workflow efficiency. "Ninety percent of procedures we start on time, and our turnover time is under 30 minutes for all cases," says Mazeroll. "We have very little downtime, and are the market leaders with our imaging technology."

Additional features of *syngo* Dynamics streamline the reporting process, according to Mazeroll. Previously, data collection was a challenge. "My staff would have to pull the medical records and search for information to collect the medical data that we have to report to the American College of Cardiology [ACC] and the Society of Thoracic Surgeons [STS]. Now, the information is sent instantly, electronically, which eliminates the associated

extra workload for data handling and allows staff more time to take care of patients."

Technology Enhances Patient Care

Looking to the future, one of St. Joseph Hospital's strategic goals is to offer Perfect Care, a concept in which "each patient will receive the right care, at the right time and in the right setting." Design for Perfect Care is an initiative that unites clinical knowledge and technology to provide Perfect Care at the bedside. When fully implemented, this initiative will help staff by providing online tools such as clinical documentation, electronic medical records, and bedside medication verification. The goal at St. Joseph is to have seamless electronic medical records for all patients. That will enable caregivers to have immediate access to accurate patient information in real-time. Just like a movie set, the delivery of healthcare is a carefully orchestrated production. With solutions such as *syngo* Dynamics, St. Joseph Hospital is using technology to provide stellar care now, but also set the stage for the future.

Diana Smith, based near Austin, Texas, U.S., is a freelance writer specializing in medical topics.

Summary

Challenge:

- Delivering seamless, efficient, and accurate cardiac image management
- Improving connectivity among in-house cardiologists and referring physicians
- Optimizing clinical workflow through integration of imaging and information for faster, better, and more cost-effective healthcare
- Creating a paperless electronic record

Solution:

- Installation of Siemens *syngo* Dynamics in St. Joseph hybrid operating room and five catheterization and other procedure rooms
- Process meetings to develop the most efficient workflow, preparing for each and every step, and allowing for different scenarios
- Extensive training with physicians and staff on system operation

Result:

- Fully integrated, automatic structured reporting, report distribution, image management, and storage
- Utilization of personalized reporting templates, developed in conjunction with physicians
- High satisfaction ratings of *syngo* Dynamics among medical and technical staff
- Streamlined workflow and increased efficiency, including excellent room utilization and turnover rates and start times
- Coordinated patient care
- Construction of a solid foundation for future development, including potential upgrades

Further Information

www.siemens.com/syngo-Dynamics
www.siemens.com/Artis-zeego



Optimum Patient Care and a Stronger Position in the Healthcare Market

St. Franziskus Hospital in Münster, Germany, fully modernized its radiology department in 2010. The hospital decided in favor of one of the latest generation magnetic resonance imaging (MRI) 1.5 Tesla systems, with innovative imaging and workflow technologies. Meanwhile across the Atlantic, South Jersey Radiology Associates in the USA, a private diagnostic imaging center, chose the latest Siemens 3 Tesla MRI technology to remain competitive in its market.

By Matthias Manych

Discussing the benefits of Siemens' MRI scanners from every angle: Professor Christoph Bremer, MD, technologist Linda Willeke, and CEO Burkhard Nolte (images from left to right)



Medical Solutions met in Münster with CEO Burkhard Nolte, Professor Christoph Bremer, MD, Head of the Radiology Department, and Linda Willeke, a radiology technologist, for a talk about their recent experiences.

Mr. Nolte, what type of environment does St. Franziskus hospital operate in, and what are your areas of focus in patient care?

NOLTE: Including St. Franziskus Hospital, there are six hospitals in Münster. We are one of the largest hospitals in the area, second only to the university medical center, and we have a capacity of 562 beds.

As a major center for medical care for the area, we also have the major outpatient center FranziskusCarré on our hospital grounds. In total, both the hospital and the outpatient center cover more than 20 medical specialities. This allows us to offer patients a very broad spectrum of services in both inpatient and outpatient care. We have a very strong surgical emphasis, with high-end vascular and spinal surgery units. Plus, we have a very strong obstetrics and neonatology department. Our very broad healthcare spectrum also includes an established ENT [ear, nose, and throat] clinic, where affiliated physicians practice, and our

eye-care department, which is a center for high-end care.

And how many patients do you serve each year at St. Franziskus Hospital?

NOLTE: We serve about 30,000 patients on an inpatient basis and about 50,000 patients on an outpatient basis each year.

How important is radiology to the hospital?

NOLTE: Thanks to the hospital's broad healthcare spectrum, we enjoy very comfortable competitive conditions. It was necessary to bring radiology and nuclear medicine to a level that is appropriate for



Linda Willeke helped to develop the MRI track at St. Franziskus Hospital and is impressed how the MAGNETOM Aera system speeds up the daily routine at the hospital.

“The handling of
MAGNETOM
Aera is excellent.
With the new
system, we have
many options
now.”

Linda Willeke, Radiology Technologist,
St. Franziskus Hospital, Münster, Germany

our specific institution. For the two clinical areas, we invested ten million euros, including digitalization.

BREMER: The importance of radiology has changed radically over the past two years, ever since we started here with the new team. We are now trying to develop and offer the entire spectrum of diagnostics and minimally invasive treatments. And, we are doing so on a customized basis to fit the needs of the primary referrers. That means oncology is a major area of focus when it comes to diagnostics, but also new treatment methods. We also see the importance of radiology in our examination figures, which are rising steadily, particularly with cross-sectional imaging techniques – and here,

especially in the area of MRI. We are learning that we can put patients on the right track very quickly with this imaging modality, meaning we can reach a diagnosis quicker and more effectively.

Professor Bremer, your hospital is the Siemens International Reference Center for MAGNETOM® Aera. How did you reach that point?

BREMER: Right from the outset, I indicated to Siemens that I was interested in looking ahead, even beyond high-end clinical care, and learning what other developments are out there, which are almost ready for clinical introduction. Then, we decided to take on a leading role in clinical care and development with

MAGNETOM Aera. Then again, I also think there is a clear connection to the fact that we have a very strong team here. Ms. Willeke, who helped to develop MRI in our clinical routine from the start, is here as a great example. On the whole, we have very strong expertise in the field of MRI. I myself have worked a great deal on preclinical research projects in this area.

What benefits does the new MRI system offer, with its features Tim® 4G, the fourth generation of Total imaging matrix, and Dot™, the Day optimizing throughput engine?

BREMER: Multi-channel technology lets us scan larger regions of the body flexibly. For another thing, we can perform scans much faster with the new system, which

facturers in the past, and with the new MAGNETOM Aera system, we have many options now. You were just talking about Dot, which helps make scans even faster. That also applies to staff members who do not yet have a lot of experience with MRI. It is faster for them to learn, which also means they can perform scans on their own earlier.

BREMER: Tim 4G improves image quality, speed, and flexibility. With it, we have excellent image quality at high acquisition speeds. Dot accelerates the workflow, but also ensures a basic level of quality in terms of diagnostics, reducing variation between operators. That means that employees who only have a couple of months of MRI experience can already perform a wide range of MRI exams, something that would have been incon-

“At our facility, the length of stay is five and a half days, well below average. That’s why we need diagnostics to run quickly.”

Burkhard Nolte, CEO, St. Franziskus Hospital, Münster, Germany

has raised throughput significantly. At our facility, it is important to ensure that we can work almost on demand. We have reached the point where we can generally complete a requisition within two days, which I have never seen done before. Having such a fast unit helps a lot to accomplish this.

NOLTE: At our facility, the length of stay is five and a half days, well below average. That’s why we need diagnostics to run quickly.

In light of your experiences, what kinds of opportunities does MAGNETOM Aera offer?

WILLEKE: Handling is excellent. I have also worked with systems from other manu-

ceivable before. The Dot technology is very helpful in that regard.

WILLEKE: Patients who come repeatedly with an indication are examined in exactly the same way, which also makes the images more comparable.

What are the direct benefits for patients?

WILLEKE: One very important benefit is the unit’s wide opening, a 70 centimeter open bore design. Even obese¹ patients can easily fit into the unit now. Also when it comes to claustrophobia among patients, we are able to calm them sooner. The fact that the magnet is shorter means that the patient’s head is back outside the tunnel much sooner. And, examination

Summary

Challenge:

- Staying competitive
- Cost-effective technologies
- Shorter MRI scan times, even for complex exams
- Consistent, excellent image quality in all situations
- Workflow improvements
- Reducing fear and addressing individual patient requirements
- Reducing complexity and stress of an MRI examination
- Increasing patient comfort in MRI scanning
- Potential for more diagnostics and treatments for more patients
- Openness to future developments

Solution:

- Groundbreaking MAGNETOM Aera and MAGNETOM Skyra scanners with patient-friendly design
- Flexible multi-channel technology for large regions of the body
- Tim 4G (fourth-generation Total imaging matrix) and Dot (Day optimizing throughput)
- Large bore opening, short magnet, soothing illumination

Result:

- Reproducible and consistent image quality
- Significantly shorter scan times
- Flexible and variable strategy selections and Tim 4G coil technology
- Accelerated workflow and reduced operator variation
- Higher patient throughput, more requisitions from internal and external referrers
- Increased accessibility for obese or fearful patients and other patients whose access to MRIs was previously limited
- MRI systems that help combat challenges for institutions of various sizes and organizational structures

¹Tim Dockable Table holds up to 250 kilograms/550 pounds.



As a Siemens International Reference Center, St. Franziskus Hospital and Siemens are partners in advancing magnetic resonance imaging technology – and the patients at St. Franziskus Hospital reap the benefits.

times are considerably shorter. That has definitely become noticeably faster for patients.

BREMER: The shorter scan times are first and foremost a function of the coil tech-

respond more flexibly to other pathological findings during the scan and take additional images right away.

For which kinds of scans is the technology suitable?

WILLEKE: We initially used Dot for cardiac scans, and we are now also running it during brain and knee scans. During abdominal scans, we are already using it for the liver. But it's also moving forward; we have plans to incorporate MR angiography soon.

How many patients do you examine in your department, and what developments do you expect in the future?

BREMER: In 2010 we saw about 55,000 patients, and we expect that number to be up this year, to about 60,000. We have definitely not yet reached the maximum. When you look at trends in our MRI department, you can see that figures are continuing to rise in the long term as

“We have the ability to truly cover a variety of different scans with the MRI unit at excellent quality.”

Professor Christoph Bremer, MD, Head of the Department of Radiology, St. Franziskus Hospital, Münster, Germany

nology, depending on how many channels they can measure at the same time. We now have a 48 channels system, at 1.5 T, and we have become significantly faster. The new coil technology lets us

well. One of the reasons for that is that we have the ability to truly cover a variety of different scans with the MRI system, while achieving excellent image quality. That definitely boosts demand within the hospital, but I also think that little by little, we will also be able to convince our external referrers that we are supplying good quality. There is definitely further potential for growth.

Can you estimate the cost effectiveness of your investment?

NOLTE: We are very optimistic that we will reach our goals because we realized that our planning in terms of workflow

and patient numbers was actually rather conservative. We expect that we will reach a break-even point in the near future.

Matthias Manych, a biologist, is a freelance scientific journalist, editor, and author specializing in medicine. His work appears primarily in specialized journals, but also in newspapers.

Further Information

www.siemens.com/aera
www.siemens.com/skyra

MAGNETOM Skyra with Tim 4G and Dot

On the other side of the world, South Jersey Radiology Associates, P.A. (SJRA), located in New Jersey, U.S., is a diagnostic imaging network with a total of ten locations and over 40 specialized physicians. Within its region, which has a population of about one million, SJRA is the leading provider of radiology services. To retain this leading position, SJRA put MAGNETOM Skyra with Tim[®] 4G (fourth-generation Total imaging matrix) and Dot[™] (Day optimizing throughput) technology into operation in January 2011.

William F. Muhr, MD, is a diagnostic radiologist and magnetic resonance imaging (MRI) specialist as well as the CEO of SJRA. Muhr reports that the network faces stiff competition from both hospitals and other outpatient imaging facilities. To successfully stay afloat in this situation, SJRA has always focused on providing personalized, caring patient service and making ongoing investments in state-of-the-art technologies. "Our aim is to stay on top of the competition with the best and latest technology, to optimize our imaging results in readings to get the most accurate specialized interpretations, and to offer the customer a patient service experience which he or she will not get elsewhere," explains Muhr. MRI has been one of the group's key technologies for more than 20 years now. Muhr reports,

"We were the first facility with a 1.5 Tesla MRI system in this area in 1987. MRI is absolutely the key to our business, and we want to make sure that we are the trendsetter." Another important building block was added to this concept when the MAGNETOM Skyra 3 Tesla system was installed. The radiologists hope that the new unit will help them reach a new level in parallel imaging. Muhr already views Tim 4G and the Dot engines as indispensable. Tim 4G delivers crucial improvements in image quality, acquisition speed, and increases options for whole-body imaging.

"Certainly one of the things that is more obvious to the technologists in day-to-day scanning are the Dot engines, which really enhance our throughput, but also quality reproducibility. Dot helps the technologists and radiologists to produce excellent images," Muhr emphasizes.

Alongside a growing number of elderly patients, the network is also seeing more and more high-risk patients with breast cancer. Especially in chronic diseases, Muhr considers the reproducibility of results to be critical. With Tim 4G and Dot, it is possible to scan more patients each day, but the radiologists at South Jersey plan to continue investing the time they gain in achieving high patient satisfaction.

The 3D Revolution in Echocardiography

The Hospital Clínico San Carlos in Madrid, Spain, installed the ACUSON SC2000 ultrasound system in its echocardiography lab shortly after Siemens introduced the system to the market two years ago. While its accuracy, speed, and image clarity was impressive from the very beginning, physicians have also come to appreciate the ACUSON SC2000 system's ease of use and positive effect on workflows, as well as its potential to integrate future applications.

Gregory Morley, PhD

For more than half a century, ultrasound techniques have been used to provide diagnostic information about the heart. Today, 3D ultrasound imaging has become increasingly widespread in certain specialties, such as obstetrics and gynecology, but most echocardiographers are still heavily reliant on 2D datasets – mostly due to the limitations of the heart being a dynamic organ in constant motion. To acquire the huge amounts of data required to build up a volumetric image, echocardiography devices usually have to rely on a process where data from several consecutive heartbeats are consecutively added to provide an overall 3D image. Not only does this process

take up valuable time, it also produces artifacts and other unwanted inaccuracies due to stitching because not one heartbeat is quite like the other, especially in patients with cardiac conditions. The arrival of the ACUSON SC2000™ volume imaging ultrasound system has, however, taken volume imaging to a new level. In one heart cycle and without stitching or electrocardiography (ECG) gating, the system acquires the full volume of the heart at a 90-by-90 degree – including volumetric quantification of color Doppler, as well as the left and right ventricles. IN Focus Technology acquires and processes information at an unprecedented 2.88 Gigabytes per second,

enabling never-before-seen detail and contrast resolution throughout the entire field of view. An advancement to the legendary ACUSON Sequoia™ coherent image formation technology, IN Focus Technology enables the user to focus on the entire field of view instead of a single focal zone revealing more clinically relevant information in one single image. The ACUSON SC2000 system was launched in 2009. The echocardiography laboratory at the Hospital Clínico San Carlos, in Madrid, Spain, acquired an ACUSON SC2000 system soon after its first release. The hospital has therefore been witness to the evolution of the system, from its initial versions to the latest,



“We are always looking for a better way of getting more accurate results in order to provide improved information to make our decisions.”

Alexandra Gonçalves, MD, Echocardiography Lab,
Hospital Clínico San Carlos, Madrid, Spain



most advanced and user-friendly versions. Applications such as the eSie Measure™ workflow acceleration package have considerably improved the acquisition and analysis process, and they have enabled reliable data to be generated semi-automatically.

Ever since they had access to the latest volume imaging technologies, physicians at the hospital in Madrid have been asking themselves how they could fully exploit the high-quality 3D imaging provided by the ACUSON SC2000 system in clinical practice. As Alexandra Gonçalves, MD, of the echocardiography laboratory at Hospital Clínico San Carlos, puts it, “We are always looking for a better way of getting more accurate results in order

to provide improved information to make our decisions.”

Mitral Regurgitation: A Potential Application for 3D Technology

It is estimated that a least six million individuals in Europe and North America are thought to have some degree of mitral regurgitation¹, which represents a substantial caseload for echocardiography laboratories such as the Hospital Clínico San Carlos. Dr. Gonçalves reckons that at least 30 percent of the patients who pass through the laboratory suffer from

¹SWISS MED WKLY 2010; 140 (3-4): 36-43.
Lancet 2009 Apr 18; 373 (9672): 1382-94.

some degree of this heart disorder. One common method used by clinicians to estimate mitral regurgitation is the measurement of the vena contracta. This measurement is a 2D method in echocardiography which describes the smallest width of the blood flow jet. The more sophisticated and widely used proximal isovelocity surface area (PISA) method, based on 2D datasets, takes into account the entire cross section of the jet, but makes certain assumptions about the symmetry of flow. Says Gonçalves, “When 3D came along, we realized that 2D techniques were not providing an accurate picture of flow in mitral regurgitation – PISA is often not symmetric or spherical. With 3D techniques, the cardiologist has the opportunity to look at the flow in its real shape.” There are certain situations in which mitral regurgitation flow is even more difficult to quantify, such as after placement of a mitral clip, where there may be two independent regurgitation jets. These are areas where 2D techniques are particularly prone to error, but where 3D techniques could, in principle, provide solid data. Siemens’ new eSie PISA™ software provides semi-automatic quantification of PISA from volume color Doppler data to assess valvular disease.²

² Availability depending on individual country registration status.

Gonçalves and her colleagues are working hard to validate these 3D techniques by comparing 3D results with other techniques such as magnetic resonance imaging (MRI) and cardiac catheterization. The latter two techniques may be considered the gold standard, but they have drawbacks in clinical practice; MRI is more time-consuming, not as readily available as ultrasound, and is also not indicated for all patients, while cardiac catheterization is invasive and uses X-rays. The initial results are promising. “If we use a tool that gives us a measurement of the mitral regurgitation severity, we must be sure that we are providing a correct number when we do the report,” explains Gonçalves. “This is important because it might determine whether a patient is referred for surgery.”

Towards Greater Objectivity

According to José Luis Zamorano, MD, Head of the echocardiography laboratory at the Hospital Clínico San Carlos, “Another important factor in favor of the 3D technique is that we have a huge inter-observer variability when using the 2D techniques. They require a number of subjective judgments that in principle will not be needed with 3D techniques, and you need to send the patient to someone who is really an expert. When you have semi-automated measurement systems, the computer will provide quantitative information to the physician.” The

Summary

Challenge:

- Improve the accuracy of cardiac parameters such as mitral regurgitation, previously measured using 2D echocardiography
- Improve certainty in diagnosis and measurements in patients with abnormal cardiac geometry
- Reduce inter-observer variability in measurements
- Speed up and automate the measurement protocols

Solution:

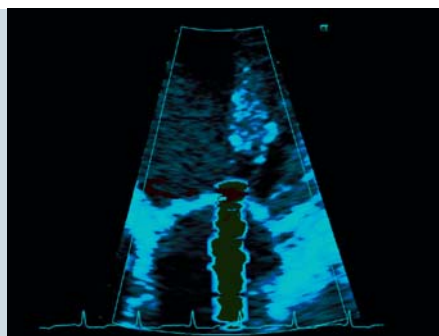
- 3D real-time imaging capabilities of the ACUSON SC2000 system to display the flow in its actual shape

Result:

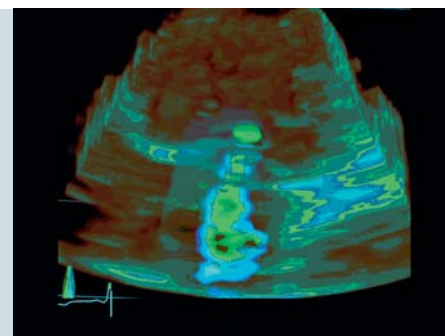
- Faster, more efficient workflows due to shorter exam times
- Accurate and standardized results
- Increased diagnostic confidence



Vena Contracta Width: Prone to error in manual measurement and poor reproducibility. Limited by color Doppler resolution and system setting.



Assumption: 2D PISA assumes a hemispheric flow convergence, which is almost never the case. Generally results in severe underestimation of EROA in most cases.



Actual: eSie PISA. Free of geometric assumptions, calculates PISA on jets in any direction.



“When you have semi-automated measurement systems, the computer will provide quantitative information to the physician.”

José Luis Zamorano, MD, Head, Echocardiography Laboratory, Hospital Clínico San Carlos, Madrid, Spain

complexity of the 2D calculations also makes them time-consuming to perform. If a system is able to perform the greater part of tedious calculations, the cardiologists should be able to spend more time on other important tasks. However, as Gonçalves is keen to point out, “We

believe that in the end, the echocardiographer always plays a crucial role. The way we do the acquisition and measurements requires training, and the person performing these tasks has to be an expert. We are, however, in a much better position if we have a system we can

trust to give us results automatically without having to make assumptions about shape.”

3D imaging of mitral regurgitation is still being validated. The echocardiographers at the Hospital Clínico San Carlos are aiming to present some preliminary results at the European Society of Cardiology this year. For the most part, they see the benefit of 3D echocardiography in determining left ventricular systolic function and in calculating ejection fraction. With the new eSie LVA™ volume LV analysis application, a 3D contour of the left ventricle is automatically drawn and ejection fraction data calculated. “[The system] can provide more accurate assumptions about left ventricular systolic function in asymmetrical ventricles, such as those with aneurysm,” explains Gonçalves.

Looking to the Future

For the time being, 2D techniques “will continue to have their place in the daily routine, because they allow higher frame rates – which means that they keep up better with the heart’s movements,” concludes Gonçalves. Cardiologists are examining the potential of 3D imaging, particularly in situations where the num-



The 2D technique requires the sonographer to make a number of subjective judgments. The one-beat-acquisition of the ACUSON SC2000 system helps to reduce inter-observer variability increasing consistency and improving outcomes.

ACUSON SC2000 Ultrasound System – Technologies

The ACUSON SC2000™ ultrasound system is the first echocardiography system on the market that offers instantaneous real-time 3D imaging of the heart. With this technology, in a single heart cycle and without stitching or ECG gating, the full heart volume can be sampled at a 90-by-90 degree angle and 16 centimeters depth at up to 40 volumes per second. Data on volumetric color flow are acquired and accurate volumes are calculated for the left and right ventricle.

New Paradigm in Image Quality

IN Focus technology, one of the latest enhancements to the ACUSON SC2000 system, delivers the same detail resolution across the entire image – from the near field to up to 16 centimeters depth – without sacrificing frame rates. An advancement to the legendary ACUSON Sequoia™ coherent image formation technology, IN Focus Technology enables the user to focus on the entire field of view instead of a single focal zone revealing more detailed information in one image. By using the power of 64 parallel receive beams, IN Focus dramatically improves image quality at all depths to ideally display the cardiac structure, motion, and blood flow information for superior and efficient diagnostic imaging.

Semi-Automated Measurements to Reduce Exam Times

The ACUSON SC2000 system exclusively features the eSie Measure workflow acceleration package. This is the first application in the industry to provide fully automated measurements for routine echo exams increasing workflow efficiency as well as the reproducibility and quality of each exam. Customizable according to user or department requirements, eSieScan™ workflow protocols dramatically reduce the need for user interaction and the number of keystrokes during the imaging process. Exam workflows are improved on both the user level and in the entire lab. In addition, these protocols increase the consistency of results and ensure that exams are complete.

Harnessing 3D Data in Clinical Practice

In order to fully exploit the potential of the real-time 3D data generated by the ACUSON SC2000 system, Siemens has integrated a number of additional technologies. These include the



The ACUSON SC2000 ultrasound system enables the acquisition of the complete heart volume in a single heart cycle and without stitching.

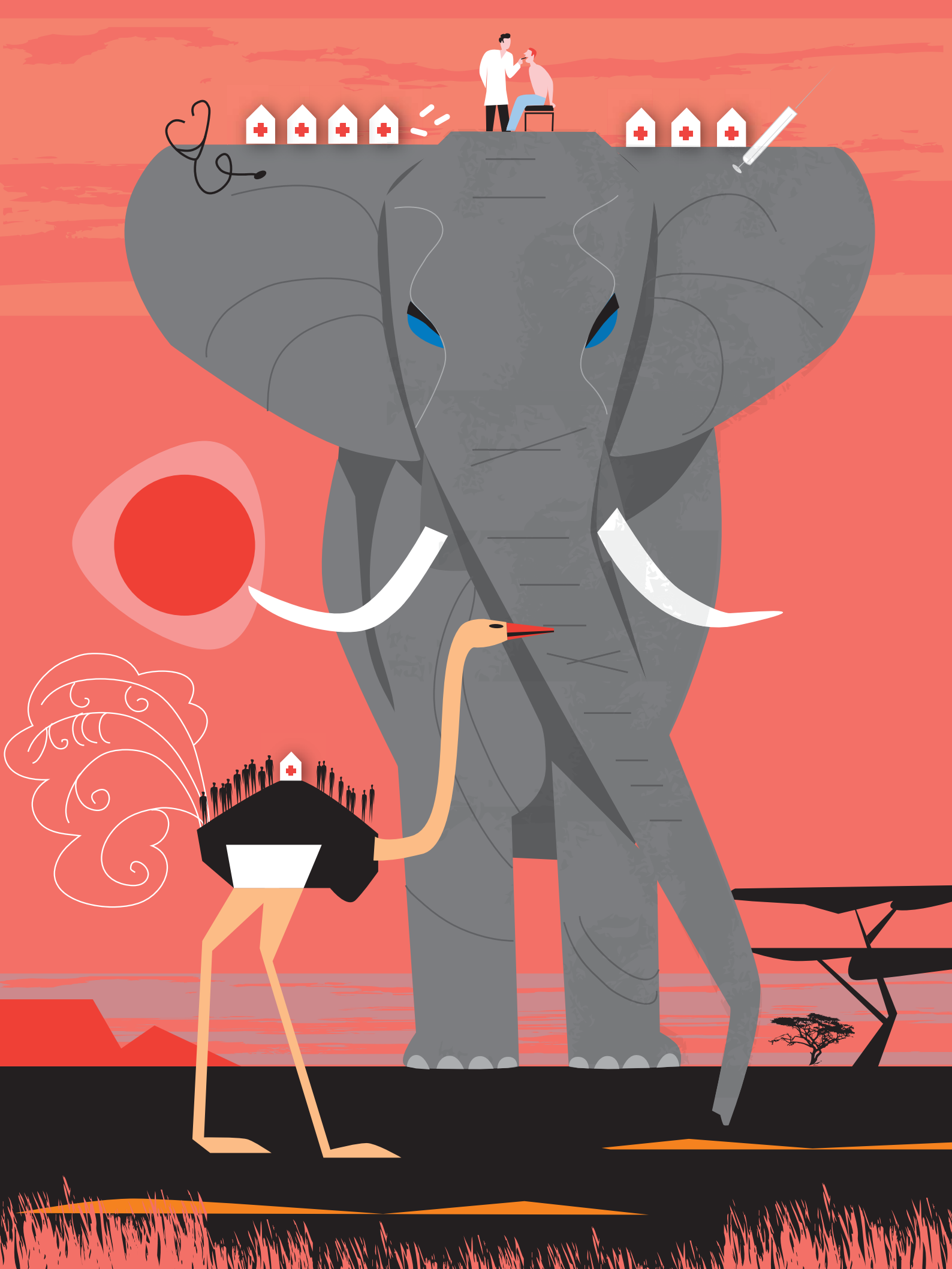
knowledge-based eSie LVA (left ventricle analysis) application, which automatically draws the contour of the left ventricle. The application then compares the data acquired with results from a database containing thousands of clinical cases, and is able to automatically calculate ejection fraction and volume data in as little as 15 seconds, reducing exam time, increasing consistency, and improving patient care. Moreover, eSie LVA supports the standard American Heart Association segmentation, allowing standardization of exam protocols between computed tomography, magnetic resonance imaging, and molecular imaging. Unlike traditional 2D PISA, which is truly applicable only for a limited number of valvular pathologies, Siemens' exclusive eSie PISA™ software can be used on almost all patients with valvular diseases to assess valvular disease. The software computes the status of PISA and effective regurgitant orifice area (EROA), and the simple workflow delivers measurement of the EROA within seconds.

bers generated from 2D datasets require laborious calculations and – even more adverse – are based on assumptions that may not be generally true. In these cases, 3D imaging is expected to result in more reliable numbers and time savings. And the ACUSON SC2000 system is testimony to the advances in technology that show us that we can have it all: The entire heart. In 3D. And in real-time.

Gregory Morley, PhD, is a medical writer and journalist based outside Madrid. In his capacity as a medical journalist, he has attended more than 30 international medical congresses throughout Europe.

Further Information

www.siemens.com/echoinaheartbeat



The South African Healthcare System: A Goal of Quality Healthcare for All

By Olive Shisana, ScD, Chief Executive Officer, Human Sciences Research Council, Cape Town, South Africa

The South African healthcare system has been evolving over the last four centuries¹. Prior to the arrival of Dutch colonialists en route to India via the Cape, the local population, i.e., the Khoisan and Africans, relied on indigenous healthcare. Even today, many continue to use this system. Jan van Riebeeck arrived in the Cape in 1652, carrying in his three ships sick, hungry, and poor Dutch sailors. The Dutch East India Company, an organization he served as an administrator, required him to establish a food station and medical care for the crew as well as other settlers. Van Riebeeck, a medical doctor turned merchant who brought white settlers to South Africa, converted his house into a hospital to care for the sick, using Dutch medically trained surgeon-merchants. This hospital was later used not only by settlers, but also by local people. This was the beginning of western medicine in South Africa, which also made great efforts to subordinate indigenous medicine.

With trade between the East and Europe via the Cape growing, diseases came. One that played a pivotal role in formalizing medical care in South Africa was the smallpox epidemic of 1713, which

brought by sailors who arrived from India with infected clothes to be washed by local people, the Khoisan. The disease spread and killed one-fourth of the European settlers and decimated the Khoisan workers. With increased demand for healthcare due to smallpox, health services were restricted to whites. Another smallpox outbreak that occurred in 1751 further decimated the local and the European population. The 1755 smallpox epidemic brought by a ship from Ceylon (now Sri Lanka) was responsible for racial segregation in healthcare, only providing care according to one's skin color.

Influences on Health Policy

There were many events that contributed to the development of public health in all four provinces of South Africa – Cape, Orange Free State, Transvaal, and Natal. These included the outbreak of diseases such as leprosy, bubonic plague, tuberculosis, and venereal diseases. But the biggest event that influenced the establishment of public health in South Africa was the Spanish influenza of 1911–1918, which led to the passage of the National Public Health Act in 1919. Coming after the establishment of the Union of South

Africa in 1910, the Act established the Department of Health in South Africa and allocated functions for health at national, provincial, and local government levels, leaving the latter to provide personal care services paid by individuals, instead of state resources. Various committees advocating for state responsibility for healthcare were established between 1920 and 1935, arguing that the National Public Health Act did not extend to the provision of healthcare for all. In 1941, there was an effort to establish a national health insurance (NHI) plan for South Africa, led by J. Collie, who chaired the Committee of Enquiry into the National Health Insurance, which aimed to cover all people of all races, except those in rural areas. There was resistance from various quarters, including the medical fraternity. Eventually, the Department of Health's Henry Cluver, inspired by the community-based care approaches of Sydney and Emily Kark, decided to establish a community-based care system that treated patients holistically, including a good understanding of their culture, provision of health promotion services, and curative services. As a result of the pressure, the state appointed the Gluckman Com-

“Given South Africa’s health systems’ challenges, it is essential to improve its organization and financing, which is fundamental to solving the ills it confronts.”

Olive Shisana, ScD, Chief Executive Officer, Human Sciences Research Council, Cape Town, South Africa

mission to investigate the establishment of a new public health system. Its chairman, Henry Gluckman, was probably also influenced by the British reformists, who had major challenges regarding their own health system. The recommendation of his commission, which would have seen a much more state-centralized healthcare system with integration of curative and preventive services, was excluded from the revised 1946 National Health Act. The apartheid government, which came into office in 1948, simply entrenched the racial segregation that had started in the 18th century and began segmenting the population by ethnic group and rural/urban divide, allocating resources according to different racial groups, a move that was to contribute to disparities in health outcomes by race. Africans, largely based in rural areas in what was later called Bantustans, suffered from diseases of poverty, such as diarrhea, tuberculosis, and respiratory disorders, while the whites suffered from diseases of affluence, common in industrialized countries.

With the release of Nelson Mandela and other political prisoners and the unbanning of exiles, the new democratic state was formed, culminating in the historic 1994 elections that brought the African National Congress in power. The post-apartheid government started introducing major changes in the healthcare system

in 1994, amalgamating the 14 health departments created by apartheid – ten for blacks who lived in Bantustans and four for population groups comprised of Whites, Coloreds, Indians, and Africans who lived in urban areas. The balkanization of South Africa into these racial and ethnic groups had enabled the apartheid government to establish a state-determined policy of allocation of resources (including health resources) to ensure that inequality was maintained. It is against this background that we discuss the current challenges faced by South Africa’s health system.

Healthcare Financing

The reform of South Africa’s healthcare system is challenged by the historically state-generated inequalities, inadequate financing of the public healthcare system, the existence of a two-tiered healthcare system, human resource gaps, poor quality of healthcare, and a high burden of diseases. First, let us look at healthcare financing.

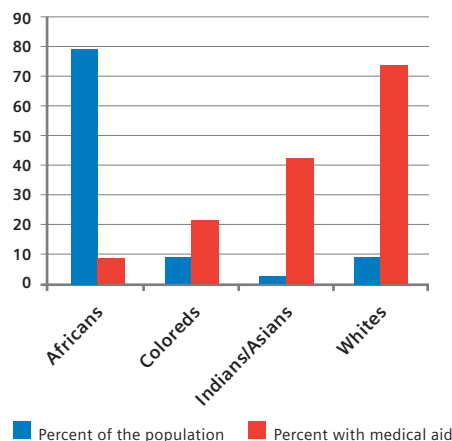
Although South Africa is located in Africa, its health spending differs from its neighboring countries. It allocates more to health than other African countries. Much of South Africa’s health spending is generated domestically, while in other parts of the African continent, donor aid plays a critical role in financing healthcare. South Africa’s spending on health is fairly comparable to industrialized countries, but it has some outcomes that are worse than those of the Organization for Economic and Cooperative Development (OECD) countries and more comparable to other African countries. This is partially due to the above mentioned inequities in resource allocation and poor living conditions inherited from the past, but it is also due largely to a heavy burden of HIV/AIDS, which is reversing the quality of life of the population.

On the face of it, the country has enough resources – R102 billion in 2010 – to spend on healthcare to serve the entire population of nearly 50 million people. In 2008, the country spent 8.3 percent of its gross domestic product (GDP) on health, of which 3.6 percent was public sector funding. The 8.3 percent spend-

ing is comparable to that spent by other OECD² countries such as Ireland, the United Kingdom, Australia, Norway, and Finland; it is slightly higher than the expenditure in Japan and significantly higher than the expenditure in Chile and Mexico.

The public sector spending on healthcare as a percentage of all healthcare expenditures in South Africa was 39.7 percent in 2008, not a significant increase from 38.5 percent in 2005. However, this is significantly lower than government spending in other OECD countries, which averaged nearly 73 percent. What is not apparent from these figures is that the 59.7 percent public spending is inadequate to provide care to the majority (68 percent) of the population who use the public health sector and do not have medical aid coverage. The balance of 40 percent comes from private sources, including medical aid and out-of-pocket expenses, and it provides services for the remaining individuals with medical aid and those who pay out of their own pockets. The distribution of medical aid coverage differs very much by race. The post-apartheid government is under pressure to allocate more resources for public healthcare and to protect the public from financial risks related to healthcare. Currently, the minority white population is the major beneficiary of access

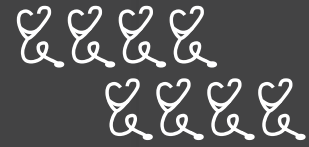
Distribution by Race and Percent with Medical Aid Coverage by Race, South Africa 2010



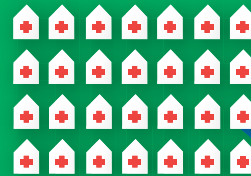


41 Number of Nurses per 10,000 Resident Population (2004)

Number of Physicians per 10,000 Resident Population (2004): 8.0



Number of Hospital Beds per 10,000 Resident Population (2005): 28.0



Population in Thousands (2006): 48.282



Total Expenditure on Health as % of GDP (2008): 8.3%

Public Expenditure on Health as % of Total Expenditure on Health (2008): 39.7%

Total Expenditure on Health per Capita (2005): US\$ 437.00



Male Life Expectancy at Birth (2006)

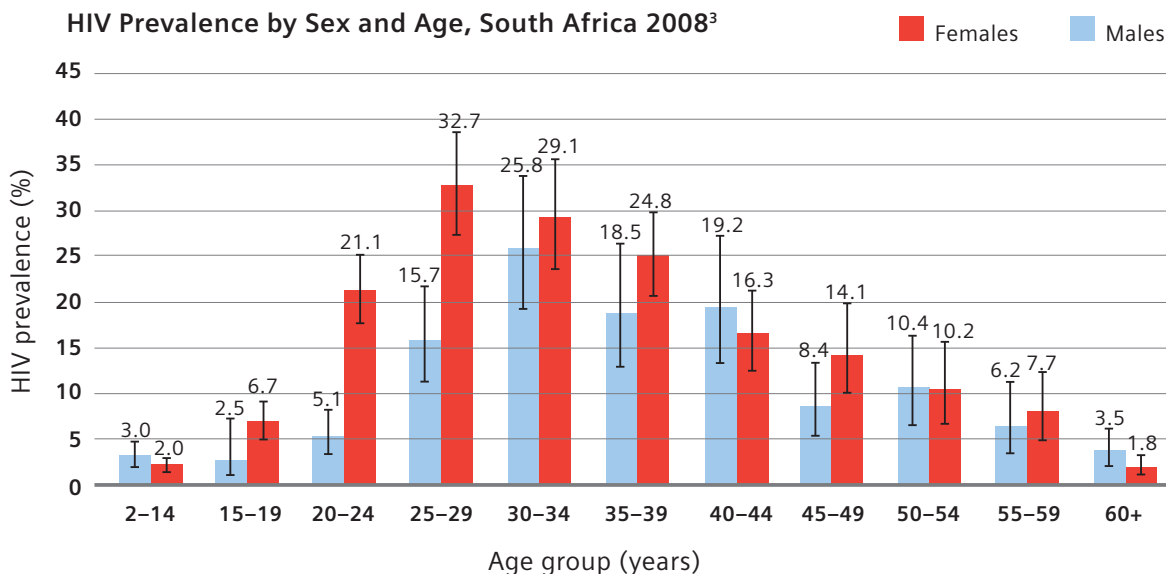
50



53

Female Life Expectancy at Birth (2006)





to private medical care, as shown on the graph on page 92.

Such inequity is at the center of debate in South Africa, causing many to demand a change in the way healthcare is financed. Many are calling for the introduction of national health insurance, which has been under discussion since 1941. At the core of the debate is the existence of a two-tiered healthcare system with a strong private sector that serves a minority of the population who use private hospital services. The private health sector provides care that is found in highly industrialized countries – not only for local South Africans, but also for patients coming from all over the world who seek modern state-of-art medicine. Funding in the public health sector, on the other hand, remains inadequate to address the generally poor health status of the black population in South Africa and the populations of its neighboring countries who seek healthcare in this country, which is better than what is available in their own. This inequity in access to financial resources and poor social living conditions contribute to poor health outcomes.

High Premature Mortality Rates

High infant mortality contributes to reduction in life expectancy at birth. Unlike other OECD countries, as well as middle-

income countries such as Brazil and Mexico, South Africa’s life expectancy is decreasing, largely due to HIV/AIDS affecting the young population (see graph above) and high rates of tuberculosis (TB). The country is home to the largest number of people living with HIV/AIDS at 5.6 million – 10.9 percent of the population – and it is also one of the 20 highest TB-burdened countries in the world. Maternal mortality is rising largely due to HIV/AIDS. Unlike the Mbeki administration, which denied AIDS was a problem, the current Zuma administration is providing anti-retroviral therapy for pregnant women at higher CD4 cell counts and has a large antiretroviral treatment program to reduce premature mortality. The high non-communicable disease burden, which fell off the radar screen for some time while the focus was on HIV/AIDS, is also contributing to high death rates. Ischemic heart disease, stroke, hypertensive heart disease, and diabetes impose a huge burden on the population. Premature mortality due to these diseases contributes to a decrease in life expectancy. The recent government’s focus on non-communicable diseases is welcome.

But for the country to provide good quality healthcare coupled with good health outcomes requires an adequate supply of well-qualified people in the workforce, starting with good managers who can

attend to better organization and planning of health service provisions, ending stock-outs of medicines, deploying staff in adequate numbers, and fostering a positive attitude among health workers towards patients. The country produces well-trained medical doctors and nurses who are often recruited and hired by OECD countries such as Canada, the United Kingdom, Australia, and also Arab States such as Saudi Arabia and the United Arab Emirates. Doctors are often recruited to work in urban areas, away from where the majority of the needy population lives. The distribution of doctors is also skewed towards high-income provinces like Gauteng and the Western Cape, where the doctor-to-population ratios approach those in industrialized countries. Training of doctors and nurses has recently begun to decline in South Africa at the time when the burden of diseases is increasing. When doctors migrate to industrialized countries, they leave a gap that is filled by foreign doctors, mostly from African countries, and philanthropic doctors from industrialized countries willing to provide healthcare in rural and underserved areas. This migration, coupled with those doctors preferring to work in the private sector and those concentrated in high-income areas, contributes to the poor quality of healthcare. When doctors are overloaded

and overworked, the patients suffer; they wait in long queues. Reduction of the shortage of healthcare providers will require not only an increase in enrollment at medical schools and the opening of more nurse training colleges, but also the introduction of task shifting, where community health workers are trained to provide primary healthcare at home and in communities – a move that the government is enthusiastically embracing.

Seeking Solutions for the Future

Given South Africa's health systems' challenges, it is essential to improve its organization and financing, which is fundamental to solving the ills it confronts. The direction taken by the African National Congress at its National General Council meeting, held in September 2010 in Durban to adopt a new national health insurance plan, is a correct path to take. The policy is envisaged to be based on the principles of the right to healthcare, social solidarity, and universal coverage. A national health insurance fund that is state funded, publicly administered, and a single payer for health services provided by both the public and private sectors will go a long way to make healthcare accessible by redistributing health workers to serve people of all races living in urban or rural areas, young or old, male or female. Such a system will use scientific evidence to select prevention, diagnostic, treatment, and care interventions to be implemented, rely on national staffing norms ratios to reduce overcrowding and work overload, and require accreditation of facilities to ensure the availability of quality healthcare. The state

WHO Health Indicators	
Infant mortality rate (per 1,000 live births) both sexes	56.0 (2006)
Neonatal mortality rate (per 1,000 live births)	17 (2004)
Under-5 mortality rate (probability of dying by age five per 1,000 live births) both sexes	69 (2006)
Maternal mortality ratio (per 100,000 live births)	400 (2005)
Deaths due to HIV/AIDS (per 100,000 population per year)	675 (2005)
Deaths due to tuberculosis among HIV-negative people (per 100,000 population)	84.0 (2006)

Source: WHO Core Health Indicators Website: http://apps.who.int/whosis/database/core/core_select_process.cfm. Last accessed July 4, 2011.

has taken a first step with the fiscal year 2011 budget to allocate funding for the implementation of national health insurance. The country is anxiously awaiting the release of the policy document that outlines the nature of the state proposal on national health insurance. There will be many detractors opposed to the implementation of the national health insurance system, behavior that is not unique to South Africa. One can only look at a recent example in the United States, where President Obama continues to be challenged by vested interest groups and political opponents. In South Africa, despite the fact that the majority of South Africans and the majority of private medical schemes holders want national health insurance to be implemented, there are a few who vehemently oppose it, just like the detractors who blocked adoption of policy on NHI in 1941 or implementation of the Gluckman Commission report. This time, the major difference is that the ANC has a policy

adopted by its members, and it holds the majority, evidenced by the latest landslide victory in the local government elections. The policy has the support of its allies, the strong Congress of South Africa Trade Union, and the South African Communist Party. Implementation of this policy will not be easy, but will require political determination such as that seen when Thailand introduced NHI. South Africa is ready. The time is now.

The opinions reflected in this article are those of the author and do not necessarily reflect those of Siemens Healthcare.

¹The history of public health in South Africa is based on an unpublished paper prepared earlier by O. Shisana, S. Zondi, A. Hadland, S. Mfecane, MA and T: South African Public Health System and Communicable Diseases, 2003.

²OECD Health Data 2010. How Does South Africa Compare with OECD Countries: <http://www.oecd.org/dataoecd/20/40/45703998.pdf>. Last accessed July 22, 2011.

³Shisana O, Rehle T, Simbayi LC, et al. South African National HIV Prevalence, HIV Incidence, Behavioural and Communications Survey, 2008. Cape Town: Human Sciences Research Council Publishers, 2009.

Olive Shisana obtained a Doctor of Science degree from Johns Hopkins School of Hygiene and Public Health (now Bloomberg School of Public Health), served as a group manager at the South African Medical Research Council, and later became the first post-apartheid Director General of Health in the Mandela Administration. She also worked for the World Health Organization as Executive Director for Family and Community Health. She previously served as Professor of Health Systems at the Medical University of Southern Africa, and Executive Director for Social Aspects of HIV/AIDS and Health at the Human Sciences Research Council. Currently, she is Chief Executive Officer of the Human Sciences Research Council, President of the International Social Sciences Council based in Paris, Chair of the Ministerial Advisory Committee on National Health Insurance, and member of the Economic Advisory Panel in South Africa.

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Guarding Your Uptime



Hanyang University Guri Hospital (HYUGH), South Korea, benefits from TubeGuard.

The X-ray tube of a computed tomography (CT) scanner is absolutely crucial to its system availability and image quality. It is subject to wear and tear. Its lifetime varies widely depending on how it is used. It is precisely here where the Siemens Guardian Program™ including TubeGuard, comes into play. This Siemens service provides certainty in avoiding downtimes for all CT systems belonging to the SOMATOM® Definition family (SOMATOM Definition, SOMATOM Definition AS, SOMATOM Definition Flash) and the

Biograph® mCT positron emission tomography – computed tomography scanner. For Siemens Healthcare's customers, the Guardian Program including TubeGuard means avoiding downtimes and unplanned workflow disruptions, as well as scheduling patients and the required staff accordingly. The advantages are obvious: establish a positive hospital reputation through a reliable uptime, meaning reliable service delivery to referring physicians. In the end, this means satisfied patients and secured

revenues, as downtimes become schedulable.

Customers around the world experienced the benefits of the Siemens service offer – including the Hanyang University Guri Hospital (HYUGH) in South Korea. "Tube replacement could be scheduled upfront, so that our active uptime could be fully used to treat patients and without causing any interruptions or delays. We had no problem with patient scheduling on the day of the exchange and the following days," says Jeong Gon Choi, CT Unit Manager of the hospital. More about Jeong Gon Choi's experiences with Siemens' TubeGuard Service can also be accessed using the link below.



Jeong Gon Choi,
CT Unit Manager
at HYUGH

[www.siemens.com/
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A Broad Approach Toward Hybrid Rooms

Hybrid rooms are already well established in the fields of cardiology and cardiac surgery, where angiographies and open-heart surgery take place on the same table. According to customer feedback, hybrid rooms can soon also be used in pulmonary medicine or spinal surgery. Lung specialist Wolfgang Hohenforst-Schmidt, MD, Senior Physician at the Hospital Coburg, Germany, is using the technology of the Artis® zee angiography system to perform *syngo*® DynaCT-guided biopsies. The major benefit of this approach is that it is a real-time procedure, acquiring three-dimensional images of the lung and performing the bronchoscopy under fluoroscopy at the same time, in the same place, and in the same position in the diaphragm. This means the precision is much higher than with classic bronchoscopic procedures. Even very small tumours of below 1.5 millimeters can now be biopsied quickly and precisely.

Christian Raftopoulos, MD, PhD, Head of the Neurosurgery Department at the University Hospital Saint-Luc in Brussels, Belgium, started using the hybrid room for spinal osteosynthesis procedures. According to him, Artis zee provides exceptional 3D image quality right in the operating room (OR), allowing for quality control during the procedure. The surgeon can thus avoid second surgeries and medical-legal issues. At the same time, he/she is faster when using 3D imaging before and during surgery because of a better 3D perception of the patient's spine. In sum, the comprehensive diagnostic and therapeutic support saves time and costs.

Speaking of costs, both pulmonary and surgery departments did not need to invest in new systems. Raftopoulos shares the existing OR with the cardiac surgery

department; so does Hohenforst-Schmidt with the hospital's cardiology department.

And, Raftopoulos thinks even further. He envisions hybrid rooms used in the minimally invasive placement of stabilizing implants, not just of the spine but also of the head, as well as in neuromodulation technologies for essential tremor, Parkinson's, or psychiatric diseases. The surgeon is confident: "The future of Artis zee can be very bright and the potential is much greater than it appears even now."

[www.siemens.com/
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Wolfgang Hohenforst-Schmidt, MD, explaining the advantages of Artis zee in pulmonary medicine.



Christian Raftopoulos (on the right) with a colleague during a catheter intervention.



Henry Woo, MD, working at the Artis zee workstation with integrated CARE features.

Taking CARE – With Low Dose Interventional Imaging

With Combined Applications to Reduce Exposure (CARE), Siemens offers a comprehensive range of technologies for radiation dose management enabling significantly reduced dose without compromising image quality. The Cerebrovascular and Stroke Center at Stony Brook University Medical Center (SBUMC) in New York, U.S., has been using CARE since early 2008 with the installation of its first Artis zee®, making dose reduction a seamless aspect in its diagnostic and interventional care. The Center now boasts two new Artis zee biplane rooms, each equipped with integrated CARE features to reduce dose for patients as well as operators.

The facility is using Low Dose acquisition to merge already acquired computed tomography (CT) with angiographic sets to easily navigate the catheter and reduce both radiation dose and contrast agents. Medical radiographer Charles Mazzaresse

is convinced of the benefits of CARE: “The Low Dose acquisition program is integrated seamlessly with an easy-to-use interface and can be accessed right from the footswitch. CARE makes the task of keeping dose low virtually effortless.” Henry Woo, MD, Director of the Cerebrovascular and Stroke Center at SBUMC, says the CARE features have been important. “With certain modalities, such as angiography, you can potentially deliver large amounts of radiation without even realizing it. Having the technology to manage radiation exposure for you – especially in emergency situations or when you are managing a complex, delicate procedure – automatically puts a lot of minds at ease.”

The new biplane rooms at SBUMC are also equipped with Low Dose *syngo*® DynaCT, an established application in interventional radiology to acquire real-time 3D CT-like, high-quality images,

that incorporates CARE for lower radiation dose. Reporting is also made easier with the use of CAREreport. Instead of having to print a report and scan it into the system, the physicians can send a direct DICOM® image as part of the study, which significantly speeds up clinical workflow.

“Siemens’ attention to radiation dose management is one of the key reasons we use Siemens equipment. The built-in dose reduction applications as well as other safety features, the ability to use tools like *syngo* DynaCT, and the more sophisticated software packages like *syngo* iPilot and *syngo* iGuide allow us to focus our attention above all on patient care,” says Woo.

[www.siemens.com/
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Siemens Customer Care: Increase Your Lab Efficiency

The most comprehensive portfolio of analyzers, assays, informatics, and automation is only the first step toward optimum laboratory productivity. Within the Siemens Healthcare Diagnostics Customer Care framework, customers can choose personalized services and support, educational resources, and workflow solutions to elevate quality within the laboratory and throughout the healthcare continuum. Siemens delivers technical expertise when needed – online, onsite, and over the phone – helping to keep labs operating at peak efficiency. Educational and training opportunities keep lab personnel up-to-date on product information and key trends in disease state management. The Personalized Education Plan (PEP)¹,

¹ Patent pending

a multimodal approach to customized online laboratory education, was developed to accomplish these goals. In addition, lab processes will become more productive and more efficient with Siemens as a partner for workflow management and consulting throughout the whole product lifecycle.

Sheryl Wilson, Senior Executive of Laboratory Services at Alegen Health, Omaha/Nebraska, U.S., appreciates the service from Siemens: “The challenges in the laboratory and in healthcare are to increase the value for the dollars that are spent. That means increasing our efficiency, lowering our error rate, making things more timely, things accurate, all of those things that add value to the services that we provide. Siemens is one



of our preferred partners built on the relationship that we've built over the years of trust, honesty, and integrity.”

www.siemens.com/diagnostics-customer-care

What Kind of Future Does Australia Want?

Population growth, obesity, and an aging population – these are critical challenges facing healthcare systems worldwide. In the “Picture the Future: Australia 2030” study, Siemens, together with more than 40 partners, investigated how the

Australian healthcare system is dealing with these challenges.

The survey results are striking. By 2030, almost 75 percent of Australians may be overweight, and the number of people over the age of 65 will double. Chronic diseases, which require long-term treatment, are expected to grow, particularly in the areas of diabetes, mental illness, joint disorders, cardiovascular disease, and cancer. These trends will drive up healthcare costs.

Australia generally provides solid healthcare to its population. The study showed, however, that the system is directed primarily at treating acute diseases. Prevention accounts for only two percent of healthcare expenditures. Yet, the developments predicted require a more holistic approach to healthcare.

In addition to treating acute diseases, prevention, early detection, and an increased use of innovative technologies must be incorporated into the system to a much greater extent. To prevent costs from exploding, the experts responsible for the study recommend educating the population early about possible health risks. This could help prevent issues from sprouting such as obesity.

Although the year 2030 may seem in distant future for some, the study makes clear that preparation must begin now.

www.picturethefuture2030.com.au/



Tube Current and Tube Voltage Modulation for Reduced Dose

Automated, real-time modulation of the tube current with CARE Dose4D is a well-known method to Siemens' computed tomography (CT) customers. With this CARE (Combined Applications to Reduce Exposure) feature, dose savings of up to 68 percent are possible when adjusting the tube current to the patient's size and shape.^{1,2} Siemens' SOMATOM® scanners now feature an additional innovative technology, CARE kV – the first automated, exam-specific tube voltage setting. While the dose reduction potential when optimizing the tube voltage is known and has been previously shown, it is in fact, rarely realized in daily clinical practice.^{3,4} The relationship between tube current, tube voltage, and image quality in CT is complex and thus, adjusting the tube voltage to each individual patient and exam is challenging and often too time-consuming. To overcome these challenges Siemens' SOMATOM scanners

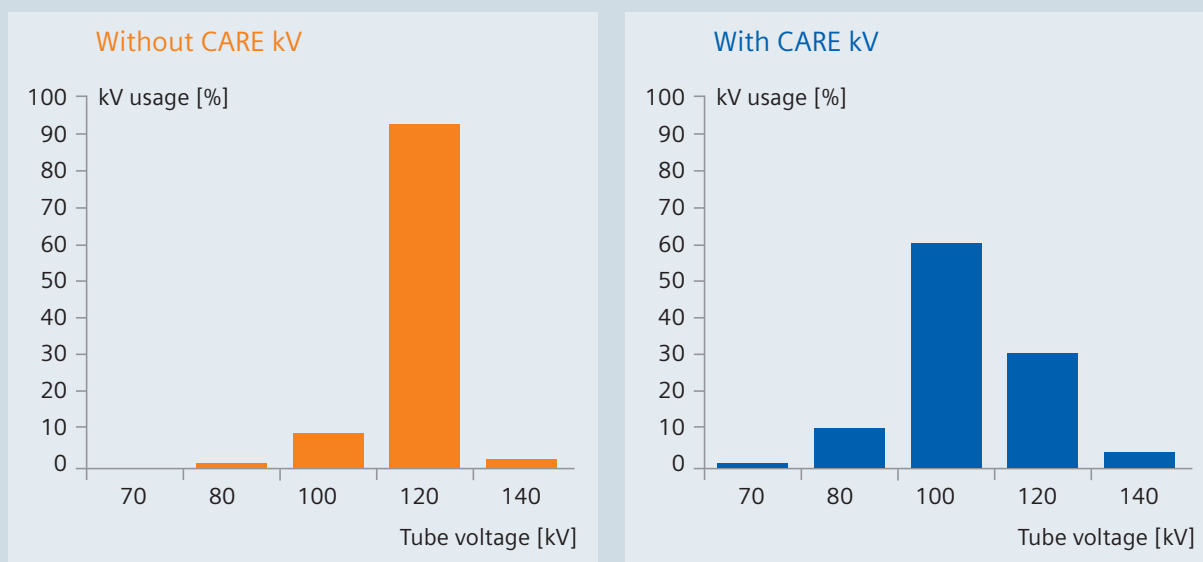
are presently the first in the medical imaging industry to provide a tool, CARE kV, to automatically adjust the tube voltage considering the individual patient and clinical indication. Simultaneously, CARE Dose4D will adjust the tube current in real-time during the examination. The combination of CARE kV and CARE Dose4D enables individualized patient care by optimizing scan parameters for each clinical need. The benefits of CARE kV are now proven: Siemens monitored CARE kV during the first months after its introduction and evaluated the results. After having scanned more than 12,000 patients, there was a clear shift toward 100 kV and 80 kV scans (see graphic below). With this tool, dose was saved in more than two-thirds of those patients surveyed, compared to the initial protocols. And, the dose reduction itself was significant. For example, abdomen scans

could be reduced to below 10 milligray (mGy) using 100 kilovolt (kV), down from 14.1 mGy with the former standard protocol set at 120 kV. This dose reduction of around 30 percent came with very minimum compromise in image quality. With CARE kV, CT users can benefit from the full potential of their system while patients benefit from significantly reduced dose. For more details, please refer to the Science section of *SOMATOM Sessions*, also available under the link below.

¹ Greess H, et al. *Rofo*. 2004 Jun;176(6):862-9.
² Greess H, et al. *Eur Radiol*. 2004 Jun;14(6):995-9.
³ Siegel MJ, et al. *Radiology*. 2004 Nov;233(2):515-22.
⁴ McCollough CH, et al. *Radiol Clin North Am*. 2009 Jan;47(1):27-40.

www.siemens.com/somatom-sessions-science

Lower dose in 67% of patients with CARE kV⁵



The evaluation of applied kV shows a clear shift toward lower kV values using CARE kV. Source: Internal data evaluation based on anonymous assessment on SRS connected scanners.

⁵ Data on file.

The Expanding Role of Clinical Diagnostics Through IT

A new generation of diagnostics IT tools is getting results into the hands of clinicians faster, improving the quality of the results, and enhancing lab operational efficiency. As a consequence, clinical diagnostics is increasing its value to the healthcare system even as resources decline. And, labs are becoming more aware that their very survival will depend on the ability to establish value for physicians, administrators, patients, and payers.

As clinicians rely on lab results for patient management, expectations of lab performance – for example, turn-around time (TAT) and quality – are rising. Clinicians and lab directors agree that achieving TAT improvement is a top priority. As clinicians are pressed to see more patients, they rely more on labs to get results to them as quickly as possible. But, while TAT is often the one performance metric for which clinicians are likely to demand improvements, lab directors and clinicians agree that the accuracy of test results is the priority. Increasingly, clinicians expect counseling from labs with the use of tests. Overloaded with information on new developments in medicine, clinicians need help navigating through numerous test choices. They look to labs to guide them through interpretation of test results with easy-to-understand reports. Clinicians' demand for more help from labs in supporting their patient management decisions is coming at a time when labs are faced with budget crunches and labor shortages. The use of diagnostics IT to improve quality and efficiency in lab operations continues to evolve and, the role of diagnostics IT to improve processes and manage lab data are coming together. Diagnostics IT is now critical to reduce human errors, streamlining



human review, guiding operations, and performing quality control. And, labs are reporting a measurable reduction in errors concurrent with improvements in TAT and increases in test volumes by deploying diagnostics IT. Day to day, clinical labs are already using diagnostics IT to optimize operations and deliver excellent service by providing timely delivery of actionable information. Diagnostics IT is also allowing labs to take an active role in supporting initiatives coming from their own institutions, payers, or government regulations. With the support of diagnostics IT, lab pro-

professionals can now go one step further in cementing the relationship with their customers – the clinicians. Siemens conducted a poll of 600 clinical laboratory professionals to learn more about their goals in the lab and how they see IT as a catalyst to achieve this new vision. To learn more about this study and the instrumental Siemens IT tools, visit the link below.

www.siemens.com/diagnostics-it

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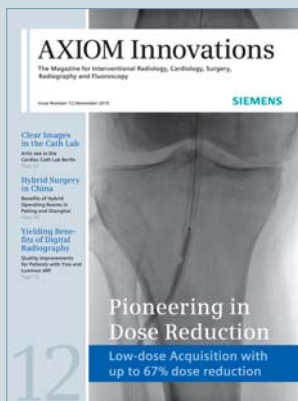
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