A Wealth of Benefits
Live 3D TEE presents important opportunities for cardiology and anesthesia

Contributing Value
An emergency medical service took a long-term view when standardizing its defibrillator/monitors

Simplifying Healthcare
How focusing on patients throughout the care cycle is changing Philips’ solutions
Dear Readers

This edition of medical perspective is our annual cardiology special. One focus Philips has in this area is breaking down the boundaries between different types of care. This has the potential to simplify workflows and suggest new solutions to existing problems. These ideas are explored in the article “Simplifying Healthcare” in this magazine, which outlines the philosophy that underpins our development efforts.

Breaking down boundaries is about putting people first, which is also our aim with this magazine. We like to reflect the preferences of our readers in the content and presentation of the magazine. Apart from personal feedback – which is always welcome – we survey your opinions from time to time, to ensure we can meet your need for information.

A summary of the most recent survey, conducted two editions ago, is included. We were particularly interested in your response to our initiatives since the previous survey. The supplements on trade shows are one innovation where we were interested to see that, though this is highly specialized content, 57% of you regard these as important. And the highlight for us was your interest in articles about the work Philips does in researching new products and solutions, such as “The Heart of the Matter” article in this magazine.

It was also interesting to discover that, though most of you want to keep receiving the printed magazine, many of you would value getting a copy by e-mail. As a consequence, we are going to re-evaluate how we can best provide you with the content that meets your specific information needs, in the medium that you can use best. This will mean a delay before the next edition (later in 2008), but we hope it means that medical perspective will then make even better use of your time and interest.

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The Cardiology Department of the St. Luc University Clinic, of the Catholic University of Louvain, in Brussels, Belgium, has a major scientific focus on cardiac imaging. Though cardiac tomographic imaging is becoming increasingly important, their main interest has traditionally been in echocardiography, particularly stress and contrast echo. They started looking in detail into speckle tracking as part of their evaluation of QLAB Version 6.0, for the post-processing of ultrasound images, in 2005.

Speckles are reflections from tissue that until recently were regarded as artifacts. However, it is now known the reflections “are reproducible, they are always there at the same spot, and we can track them,” explains Prof. Jean-Louis Vanoverschelde, Head of the Cardiology Department. This means they offer a quality of information similar to MR tagging. However, having this information available from ultrasound would overcome issues with the accessibility, availability and awkwardness of MR examinations.

Excellent correlation with the gold standard
To prove the validity, Prof. Vanoverschelde’s team compared torsion (twisting) of the left ventricle using both speckle tracking and MR tagging, which remains the gold standard. “Echo tracks the motion very accurately,” he declares. Both modalities give the same results for the same slice (that is, those with matching diastolic dimensions). However, the limit of ultrasound is the accuracy of finding the apex of the ventricle. Torsion reaches its maximum at the apex, and decreases toward the base, even reversing direction in the 1 or 2 cm closest to the base. If measured away from the base, the result is an underestimation. The position of the heart and probe, and the anatomy of the chest should result in consistent selection of apical slice for serial examinations, but Prof. Vanoverschelde points out that further research is necessary into absolute repeatability and its diagnostic significance.

Using MR tagging, slices in the short axis provide the information for radial strain (wall thickening) and circumferential strain. Tissue Doppler calculates values for radial strain in the short axis views, and longitudinal strain using apical windows. In an apical window, speckle tracking also provides information of the radial strain, because it is possible simultaneously to assess movement perpendicular to the axis of the window. Circumferential strain and torsion are available, with radial strain, from the short axis view. This makes it possible to build up a full picture of cardiac wall function.

Accurate and reliable quantification
The new QLAB Version 6.0 tracks speckle to calculate strain based on defined points. The echocardiographer drags markers on the diastolic image to control the points used. “You decide the position of the different spots to determine the direction of the strain to analyze,” explains Prof. Vanoverschelde. “This can be tedious, but you see whether the marker is following the speckle. You know the result is accurate.”

Today trained echocardiographers qualify an area of significant abnormal wall movement from experience. Speckle tracking could be valuable in objectifying and quantifying such strain to increase diagnostic confidence for beginners, and ease consistent documentation. However, though it is still too early to be certain, Prof. Vanoverschelde sees the most important opportunity for speckle tracking in detecting more subtle abnormalities. This could provide prognostic or
therapeutic information for preclinical disease, for example, in hypertensive patients, or where there is a family history of cardiomyopathy.

Further insight
There is plenty of work to be done. "Studying speckle should reveal much information on the mechanics of the left ventricle," says Prof. Vanoverschelde. "Torsion seems to be a sensitive indicator of changes in cardiac function. For example, torsion at the apex could reveal a for about systolic function. As longitudinal strain decreases with age, it seems the torsion increases as a compensatory mechanism. In fact, often the functional indices show no change, though the changes in strain could already make it possible to detect preclinical disease. "We have new possibilities to look at things that, first we didn't know before, and second help us understand how changes in systolic function on one hand can result in normal ejection performance on the other hand," says Prof. Vanoverschelde.

Conversely, detorsion seems to be important for diastolic function. Detorsion before the change in longitudinal strain creates the intraventricular pressure gradient during isovolumic relaxation before the mitral valve opens. How this detorsion with age is relatively unknown. What is becoming clear is that, while the overall amplitude of detorsion is relatively stable, the abnormal relaxation in diastole is due to delaying and prolonging it. "This is a new and exciting area of research".

Supporting further development
Prof. Vanoverschelde has been using Philips ultrasound for many years now because of the quality of the images. The relationship between Philips and the Catholic University of Louvain has also always been a strong and important factor in choosing Philips solutions. This is built on good collaborations in radiology and cardiology. In fact, Prof. Vanoverschelde has not experienced a collaboration of this quality or willingness with any other imaging supplier. This is behind Prof. Vanoverschelde’s work in helping develop QLAB over the last releases.

"QLAB is good software. It is robust, accurate and well thought through. And the 3D package is excellent, because of the high quality of the 3D images." But he highlights that it is an evolving tool, where any user can make such suggestions – and they often become part of future releases. With speckle tracking, this looks like being an increasingly important contribution to diagnoses of cardiac function.

Prof. Vanoverschelde’s team evaluated possible applications for speckle tracking while testing QLAB Version 6.0.

When the X-ray department of the Lorenz Böhler Accident Hospital in Vienna, Austria, considered additional investment in digital radiography, in the spring of 2006, it chose Philips. "Always being prepared and reacting quickly are our top priorities. This safeguards the lives and quality of life of the injured," stresses Prof. Harald Hertz, Medical Director. He describes the challenges facing the staff of the accident hospital: Even under intense pressure, emergency staff must work with utmost precision. The decisions made by the doctors can have far-reaching consequences, so it is essential that diagnoses are as accurate as they are fast.

High level of user-friendliness
Prof. Hertz goes on to describe how the Philips digital radiography systems speed up key processes, with automated procedures easing the staff’s workload. A large part of the time-saving is also thanks to cutting out cassette handling. "The ability to increase patient throughput, without increasing the pressure on the staff, played an important role in our decision," he says, adding that "the fully digitised workflow leaves more time to give individual care to patients."

The team working with Odile Schaden, chief radiographer, agrees. They were impressed by the user-friendly operation of the three, fully digital systems: "Even when the patient is
not very mobile, or should not move at all, the ease of set-up and the quality of the pictures are crucial for correct diagnosis and further treatment”, says Ms. Schaden describing the new work procedure. “It is possible to reposition the swing grid quickly, even during an examination, and the pre-defined organ programs can easily be changed manually.”

More certainty in diagnosis

The demands placed on the system in accident radiology are more specific than in traditional radiology. For instance, it must be possible to evaluate the soft tissue even in images taken of bones. The employees of the Lorenz Böhler hospital and Philips application experts worked together to define and implement this.

They accomplished this with Philips UNIQUE (Unified Image Quality Enhancement) software. UNIQUE removes the need to adjust images manually, because the software even our contrast levels, emphasises weak details and adjusts parameters to ensure consistent image quality, even for examinations of different areas of the body. This makes fine details visible, while keeping the natural image dynamic and without looking artificial. Dr. Martin Lexnering, senior accident surgeon, comments that in the ten-years they used computed radiography in the hospital, they were always happy with the quality of the images. “But with UNIQUE we can now also see the skin contour, fat tissue under the skin and other finer bone structures using the same raw data,” he explains. “When it comes to bone and soft tissue structures, the overall impression of the images is much better. This lets us use the full potential of the system and – with the additional information – increase the certainty of our diagnoses.”

Integration into existing systems

“Of course, a reasonable price and low operating costs were also important factors in our decision to opt for Philips,” says Prof. Hertz. It was also important that the system integrated seamlessly into the AUVA RIS (the radiology information system of the AUVA social insurance company that runs the hospital). This was a suggestion that came from Philips that has since been implemented. This made it possible for the staff to continue using the 2900 abbreviations they already new for the in-house RIS, points out Prof. Hertz. Another benefit of the digital solution is the automatic documentation of dosages.

Process of installation

The first DigitalDiagnost installed was a double detector solution in an aftercare room. This gave the staff an opportunity to get used to the handling and operation. It was already clear at this stage that they were saving an enormous amount of time by getting the image on the preview monitor immediately after the examination, without having to carry and process cassettes.

After a few weeks, the second system was installed. This was done in the more critical area where the primary diagnoses are made. At this stage however, operating the system was routine. Through the PACs, the radiographer is online and directly connected to the accident surgeon on duty. After consulting with the doctor, he or she can take additional pictures while the patient is still lying down, if necessary. This saves the precious minutes that are so valuable in the smooth functioning of an accident hospital.

After the problem-free installation of the third system, also in the aftercare area, Ms. Schaden gave the DigitalDiagnost an excellent reference, saying: “The robust Philips equipment guarantees fast and simple handling. This is an indispensable characteristic, especially in the X-ray department of an accident hospital such as ours.”
For around 40% of calls in Germany an emergency doctor responds in parallel to the paramedical team. Mostly, these are hospital doctors on standby. Freiburg is one of the few locations with a dedicated emergency doctor station. In rotation, the hospital releases doctors from their responsibilities to work there in shifts.

In part, this is a response to the workload. The emergency doctors attend more than 6,000 calls a year. But Dr. Frank Koberne, Medical Head of the Emergency Doctor Service in the Freiburg region, points out that a dedicated service is also part of making the emergency work attractive, because it is significant work. The extra stress of emergency work done on standby means many give it up as soon as they can. This stops them building up expertise. The emergency doctors in Freiburg proves the value of their approach: the average is 12 years service.

This saves money for the health service, by reducing hospital admissions and providing better treatment. Inexperienced emergency doctors will often err on the safe side, and admit patients that might not need hospitalization. On average in the state of Baden-Württemberg, emergency doctors leave 6% of patients at home. For Freiburg this figure is 20%. Similarly, while the survival rate for cardiac arrest in the state is around 20%, the expertise of the emergency medical staff, the two-tiered defibrillation and the quality of equipment raises this rate to 50% for the Freiburg region.

Results like these have prompted Freiburg to become a competence center for emergency doctor services in southwest Germany.

The right choice of equipment

When it comes to equipment, Dr. Koberne is again keen to take a longer term view. By 2004 many of the defibrillator/monitors throughout the service were soon due for replacement. This seemed like an ideal time to standardize on a single model. Though it meant a major investment, the idea was to save money in the longer term by buying in bulk. The process for deciding on a solution involved the emergency doctors and members of each of the paramedic services. They evaluated the availability and quality of features, the ease of use, and the buying and running costs. They finally decided the Philips HeartStart MRx offered the best combination of accessible, useful functionality and value for money.

The accessibility of the features is particularly important. What most impresses Dr. Koberne is that on the MRx, the features you need “are not buried elbow-deep in menus. It is very intuitive to use. You can put it down in front of a responder, and they will know what to do with it.”

Defibrillation and extensive monitoring

The full region is made up of the town of Freiburg and the area 60 km around it. This has 500,000 inhabitants, 10,000 emergency medical calls a year, and is covered by 6 emergency doctor vans, and 20 ambulances. Each of these vehicles is equipped with an MRx. This ensures whoever gets to the patient first is ready to defibrillate. Normal practice is for the paramedics to use the defibrillator in semi-automatic mode. The emergency doctor can then choose to switch to manual operation. Many choose to continue in semi-automatic mode because they find the MRx keeps a good rhythm.

They use the MRx for monitoring in just about every call. They have 5- and 12-lead ECG, pulse oximetry (SpO2), capnometry, and non-invasive blood pressure (NBP). Motion
Patient, and they use SpO2 in almost every case. It is standard for every reanimation and every ventilated patient, but is a useful addition at the emergency site. Capnometry artifacts mean the NBP is not accurate during transport, for his interpretation of the traces.

Possible problem. Dr. Koberne finds it useful as a cross-check for his interpretation of the traces. However, the 12-lead ECG needed to be good. When you see all 12 leads in parallel, you can see changes immediately. If you only have one or two leads at a time, you might not notice anything.” The MRx excels here by providing all 12 leads simultaneously on the screen. “This is great for patients after a heart attack, when there are ECG changes during transport,” explains Dr. Koberne. “When you see all 12 leads in parallel, you can see changes immediately. If you only have one or two leads at a time, you might not notice anything.” The MRx also has software to analyse the 12-lead ECG. The analysis is often overcautious, and points out any and every possible problem. Dr. Koberne finds it useful as a cross-check for his interpretation of the traces.

Ensuring quality

The MRx also has software to analyse the 12-lead ECG. The analysis is often overcautious, and points out any and every possible problem. Dr. Koberne finds it useful as a cross-check for his interpretation of the traces.

During Sepsis Resuscitation, horizon trends track key hemodynamic parameters at a glance. A timer starts when resuscitation begins and continues through the rest of the protocol.

In addition, the system alerts Good Samaritan critical care nurses and physicians to the patient’s progress in meeting the clinical knowledge base of hospital staff.

Leading Hospital Reinforces Quality Guidelines with ProtocolWatch

Legacy Good Samaritan Hospital and Medical Center in Portland, Oregon began a quality initiative for sepsis in the fall of 2006, leading the hospital to develop its own protocols that follow the SSC guidelines. A leader in embracing evidence-based medicine, Good Samaritan Hospital recently installed ProtocolWatch in its 28-bed intensive care unit (ICU) to help reinforce this initiative, as well as increase the immediate reaction of the paramedics and doctors. "Instead of evaluating a patient’s condition and waiting for lab results, the ProtocolWatch application is able to help identify early indicators of sepsis, allowing our treatment to begin in a more timely manner,” said LuAnn Staul, clinical nurse specialist, Legacy Good Samaritan Hospital. “Accord- ing to the SSC protocols, treatment should be completed during the first six hours following sepsis identification. Since implementing ProtocolWatch, we have been able to complete interventions in less than six hours by virtue of having clear cues and a relevant timeline available, which helps remove obstacles when providing care to critically ill patients.”

Today, medical professionals require clear views to patient data and guidance in response to the information overload they often face. Clinical decision support applications like ProtocolWatch can have a powerful impact in treating patients with sepsis and potentially saving lives. Because the symptoms of sepsis are difficult to detect and often get confused with other conditions, Philips’ goal is to give physicians and nurses an extra set of eyes to screen patient data fused with other conditions. It simplifies the implementation of evidence-based care protocols.

Intuitive clinical decision support tools help clinicians treat patients more effectively throughout the care cycle.
Milford Regional Medical Center in Massachusetts, USA is committed to providing the latest facilities in a community hospital environment. When it came to upgrading their CT scanners, acquisition speeds and post processing were their top priorities. But they also wanted to expand clinical capabilities. According to Mrs. Linda Egan, Department Manager, Chief CT Technologist, and PACS Administrator, “We want to be on the cutting-edge. We’re doing what we can, within our budget, to provide the best for the community.” The answer was to include a Diamond Select refurbished system in the solution.

The medical center is a full-service, community and regional hospital, serving 20 towns in south central Massachusetts. To streamline workflows and accommodate growing patient numbers, the center needed to update their single- and four-slice CT scanners. Donna Langeveld, Lead CT Technologist, points out that scanning times were long, when patients had to hold their breath it was for extended periods, reconstruction was slow, and post processing was very complicated. “We weren’t able to get through as many patients.” Radiologists also felt the single-slice system was outdated and unable to deliver the results they needed. This contributed to a growing exam backlog, and meant running outpatient exams until 10 p.m.

Uncompromised Value

A well-balanced solution

Originally Milford Regional felt that they would only be able to afford a new 64-slice system and perhaps a new 16-slice system. But the Philips representative understood their underlying desire to maximize their CT capabilities and proposed a refurbished 40-slice instead of a 16-slice scanner. The hospital agreed with this solution, as it gave them the flexibility to add a high level of CT performance for their patients and stay within budget.

The Philips Diamond Select program provides first-class refurbished equipment. As the name suggests, only diamonds – reliable systems with a solid service history – undergo the thorough refurbishing process. After disassembly, inspection and disinfection, all outer parts are repainted. Most importantly, all vacuum components are renewed to ensure uncompromised image quality. The system is also upgraded to the latest software level. All Diamond Select systems come with the same comprehensive Philips warranty and service as new systems.

Enjoying a new level of functionality and speed

While acknowledging that many people have historically viewed pre-owned equipment skeptically, Mrs. Egan felt the state of the technology and the value for the money meant Diamond Select deserved serious consideration. “With used or refurbished equipment, you have to ask, is it going to meet my needs in three to five years?” she says. “This Diamond Select system is state-of-the-art. When the system rolled in the door, it was just like it rolled off the factory floor. It meets our needs now, and in three to five years it will still be a highly functional CT. And if we want to upgrade the 40-slice to a 64-slice at some point, we can do that.”

Since installing both systems, Mrs. Egan notes a significant improvement in the CT workflow and a greater satisfaction among the radiologists. “We’re able to come up with new and better ways to look at things we never thought we could look at before. And we have a lot more options for manipulating the images,” she says, “creating different views, and seeing around different structures than we used to. We can do studies much easier and much faster than before.”

Patients also benefit. According to Mrs. Langeveld, examinations are quicker. “If we’re doing an abdomen or chest,” she says, “they don’t have to hold their arms up over their heads as long. And breath holds are a lot shorter, we’re down to 5 to 10 seconds tops.”
“We’re doing what we can, within our budget, to provide the best for the community.”

Mrs. Linda Egan, Department Manager, Chief CT Technologist and PACS Administrator

The staff at Milford Regional is also impressed with the background reconstruction. The Diamond Select system came with an Extended Brilliance Workspace (EBW) which Mrs. Egan describes as “a real productivity tool,” permitting the technologists to concentrate more on their patients. Physicians can use the EBW as a review station, or for reconstructions, without disturbing patient throughput.

Discussing other advantages, Mrs. Egan points to multiple studies, such as neck, chest, abdomen, and pelvic CT performed on oncology patients. Contrast boluses are reduced because of the faster systems. “And you get much clearer, faster images,” she says, “you can do many thin sections and create sagittals and coronals. The doctors can’t believe they are the same images they used to see. The pathology is a lot clearer.” There is no difference in the image quality between the new and refurbished system. “In fact,” she explains, “some radiologists ask us, ‘Which system did this image come from?”

Mrs. Langeveld notes the added flexibility she and the other technicians have in post processing. For example she says, “If the patient leaves after their scan, and the radiologist detects a lung nodule, we don’t have to rescan the patient. We can retroactively reconstruct the images, and make the images available for the radiologist to check for lung nodules.”

A future with expanded applications

One of the most exciting aspects of Milford Regional’s new multislice CT capability is the greatly expanded range of applications. High on the list is more cardio work.

“Since we are a certified stroke center within the state of Massachusetts,” says Mrs. Egan, “I’d also like to get the brain perfusion going so we can be more effective in assessing stroke patients and applying thrombolitics.” Mrs. Langeveld adds, “you can do cardiac work or brain perfusion on either system.” This would not have been the case with a 16-slice system. “So now if a case comes in we can put it on whichever system is available.”

Mrs. Egan believes having two high-end scanners is in line with Milford Regional Medical Center’s commitment to serve their community with faster more confident diagnoses, and better care. “We’re only a 126-bed hospital, but we have some pretty impressive equipment to help take care of our patients.” She quickly adds, “After all, they deserve it.”

Advice to other hospitals

Mrs. Egan is enthusiastic about the value of the Philips Diamond Select program. They have had no trouble with either scanner. “If I look at them side by side, you would never know that one was refurbished,” she says. In fact the hospital is considering another Diamond Select CT scanner for their cancer center, which is under construction. “Diamond Select is a perfect name because it really is a diamond. You get value, and it’s state-of-the-art technology. I would recommend everyone to consider it.”

What would prompt a diagnostic center to replace all its existing ultrasound systems with ten identical high-end systems? The Eindhoven Diagnostic Center (DCE) took this dramatic step in late 2005, to streamline its working methods. “We wanted to deploy our staff with the greatest possible flexibility in order to keep pace with increasing demand,” says Dr. Jules Keyzer, Chairman of the Executive Board. Dr. Keyzer goes on to explain: “So, all the systems are identical and offer the same functionality – though they should not be used in all cases.” The ultrasound technicians and other users have the same system in every examination room, enhancing their expertise with the system and delivering consistently high quality as a result.

The Eindhoven Diagnostic Center is putting ten identical Philips HD11 ultrasound systems into operation.

The High Value of Efficiency

The distinctive DCE headquarters in Eindhoven.
The correct type of examination is available at the touch of a button. This is what makes the new ultrasound systems so flexible.”

Dr. Aimée van Dobben, Doctor and Ultrasound Technician

examinations for pregnant women made finding an effective solution particularly pressing. “The sharp increase is due in part to the Dutch government’s decision to introduce the 20-week scan into the standard package,” explains Dr. Keyzer. Gynecologist Diederik Veersema stresses that the level of difficulty involved in this type of ultrasound examination has also increased: “Ultrasound technicians need to have extensive expertise. After all, we’re talking about the organs of unborn babies, and little hearts the size of buttons. In addition to this expertise, top-quality equipment is also a must.”

**Uniformity equals profit**

Dr. Keyzer admits that some examinations could be performed using lower specification systems. “Nevertheless, we opted for uniformity and high-end performance with all our equipment. We didn’t want to impact planning in any way. Only this can ensure we achieve our annual utilization across all ten systems at our three locations each year.”

As we are able to divide the examination costs by 4,000 examination instead of approximately 1,000, the price per examination remains relatively low. By offering morning, afternoon and evening consultation times, we are already looking to the future.”

Dr. van Dobben

The center also needed to factor in usability, quality and cost to select the HD11. The HD11 is a high-end, multifunctional system. “Of course, we did also consider other suppliers,” stressed Dr. Veersema, “but they were unable to offer us the same features as Philips at that price. And it goes without saying that ergonomics was also a key factor.”

(The design of the HD11XE won a prestigious International Design Forum Design (iF) product award for 2007).

**Perfect planning**

Doctor and ultrasound technician Aimée van Dobben points out that ultrasound users at the DCE cannot claim ‘their own’ room. “Every room has the same equipment, and we even take into account, for example, that the ultrasound technician always sits on the same side of the table when examining pregnant women. It therefore makes absolutely no difference who works where. This lets us plan our room schedules to perfection.”

The 40 users from various specialisms verify the multifunctional nature of the HD11. However, the emphasis is on primary care, with referrals from GPs and obstetricians. For the latter, the referral often concerns the 20-week scan, or a neck fold measurement. In recent years, Dr. Veersema has seen unprecedented growth in this type of examination, which requires considerable professional expertise: “There has been a real boom, which was just another reason for us to substantially increase the number of ultrasound technicians. We now have a team of 19 ultrasound technicians, all of whom have successfully completed the highly regarded ‘Structured Ultrasound Exam’ training,” says Dr. Veersema proudly. He continues that an ultrasound technician has a different function to a radiographer: “This is a dynamic examination where the results are determined during the examination. The ultrasound technician also assesses the result and records the details. This means that the person at the controls requires a high level of expertise and must have completed advanced professional training as a minimum.”

Empire equals profit

Two Philips application specialists took care of implementation at the various locations. They worked with the ultrasound technicians for two or three days to help familiarize them with the HD11. Then they came back later to introduce additional protocols. “Our people picked everything up very quickly,” says Dr. van Dobben. “And everyone is talking in particular about how user-friendly the systems are. This was made possible by the uniformity.” She sees the various presets for different types of examination as a benefit of the systems. “The correct type of examination is available at the touch of a button. This is what makes the new ultrasound systems so flexible,” she says.

The users are so happy using the HD11 that the DCE has no problem finding good ultrasound technicians. “They are happy to work here,” says Dr. van Dobben. “We have a large team and work is still a challenge, and this makes it a great place to work. We want to keep it that way, which is why we are already looking to the future.”
A Wealth of Benefits

Live 3D TEE presents important opportunities for cardiology and anesthesia

At the German Cardiologists Society annual congress, in April 2007, Prof. Andreas Franke, Specialist for Cardiology/Internal Intensive Care Medicine at the University Clinic in Aachen, Germany, summarized his experience testing Philips’ prototype Live 3D transesophageal echocardiography (TEE) transducer by saying: “Nice pictures are all fine and well. But what really counts is making things simpler, or opening new opportunities. And here, I am sure, there are a wealth of benefits.”

Also testing Live 3D TEE was Associate Professor Jan Hultman, Director of Cardiothoracic Anesthesia and Intensive Care, Karolinska Institutet, Stockholm, Sweden. While transesophageal, real-time 3D echocardiography provides a vivid, spatial representation, resolution is an issue, and it is not suitable for peri-interventional or operational use. “Being closer to the heart, the image quality of 3D TEE is considerably better than transthoracic 3D,” says Prof. Hultman. And in cardiothoracic surgery, “it makes it much easier for the surgeons to understand what is going on,” he says. Before the operation, they can see exactly the problem they are trying to solve – for example, to see the mitral valve before it stops moving. Prof. Hultman adds, “They are thrilled about this.”

Prof. Hultman would share the value of Live 3D TEE equally between this ease of communication, and the greater accuracy of information for the echocardiographer. Prof. Franke agrees. Cardiologists have lots of practice in reconstructing 2D slices mentally. “In theory Live 3D TEE has the same information as 2D, but one can interpret it faster and better,” says Prof. Franke. Prof. Hultman adds that if 2D indicates a valve problem with around 80% specificity, turning on 3D adds the remaining 20%. “I was surprised,” Prof. Franke adds, “that it boosted my confidence so much.”

New ways of seeing the heart

The Philips Live 3D xMatrix TEE transducer is the same size as a traditional multiplanar TEE transducer. It connects to the Philips premium echo system, the iE33, and offers all the same functionality as an Omnis TEE. It is used in the same way: the logistics, the workflow and the handling remain the same. Prof. Franke “didn’t realize it would be so easy, I was much more skeptical.” He was surprised how quickly he and his colleagues overcame any doubts about Live 3D TEE, to start applying it routinely. “That shows how reliable it is,” he says.

As with transthoracic echocardiography, it takes 4 heartbeats to get a 3D full volume (FV) image with Live 3D TEE. The 3D FV images (and the 3D FV data sets with Q-Lab) are useful in quantifying left ventricular volume, and regional function. “That’s really helpful,” says Prof. Hultman. By concentrating on a volume like a thick ‘orange rind’, data is available in real-time. For cardiologists, for example, this makes it possible to get images even during atrial fibrillation. Working with the thick slices means developing a new awareness of settings such as gain, dynamic range and compression. These create the correct perception of depth in 3D – “I was amazed at how good the feeling of depth was,” confessed Prof. Hultman.

Continuing to use 2D

During the trial period in March 2007 when they had the Live 3D TEE transducer, the cardiologists in Aachen used it for all TEE examinations where they suspected a pathology. “It is a great advantage that you can use the transducer for 2D, and then just switch to 3D if you want it,” highlights Prof. Franke. “This ensures the transducer can do everything it could before, and a lot more. It is great that one has full recourse to all the proven tools and methods,” he says.

While Prof. Hultman had the Live 3D TEE transducer in May 2007, he used it for all his patients. He too highlights the benefit of having both 2D and 3D available. “This probe also has better 2D images than I have ever seen before,” adds Prof. Hultman. “That is very important.”

Monitoring interventions

For peri-interventional use in the cath lab, Live 3D TEE offers immediate spatial orientation, and easier recognition of pathologies. “We can see in real time what is happening. Personally I think that monitoring interventions is the
“Being closer to the heart, the image quality of 3D TEE is considerably better than transthoracic 3D.”

Prof. Andreas Franke, Specialist for Cardiology/Internal Intensive Care Medicine

Modeling algorithms automatically improve cardiac care

Although recent innovations in medical imaging technology have provided physicians with a wealth of data on complex anatomical structures, it is often difficult to filter out the desired information. In a bid to provide clinicians with a tool for enabling efficient diagnosis and simplifying complex therapies, Philips has been researching algorithms which make use of existing anatomical knowledge. Researchers created a new automatic heart extraction model based on volumetric images. The algorithm for heart modeling is able to accurately detect the position of the heart and adapt an embedded cardiac reference model to a patient’s images in a coarse-to-fine manner. While the algorithm has already been implemented in an application package for electrophysiological X-ray guided interventions, it also has the potential for use with computed tomography, magnetic resonance and ultrasound.

Model segmentation has been widely discussed but, owing to the individuality of each patient’s cardiac anatomy, many believed the automatic adaptation of such a heart extraction model to be impossible. However, the new model-based segmentation software automatically detects the heart and...
even the very first adaptation of the model shows a mean error of only 7 mm, reduced to less than 1 mm after iteration along the segmentation chain.

The new approach combines active shape models with deformable models. Parametric models are limited in terms of being able to approximate shapes, but are robust and fast, while deformable models ensure smoothness, offer high flexibility and can approximate any shape. With the new approach, a reference model is placed in the image and adapted according to the image structures, while deviations from the reference model are penalized. The algorithm first detects the organ’s boundaries before reconfiguring mesh and finally updating the reference model. The model uses 15,000 triangles to adapt to the shapes of seven distinct anatomical regions, that is the four chambers of the heart, the myocardium, the pulmonary artery and the aorta.

Hidden information
Once the model has been applied and adapted, clinicians can measure the location of the heart in the image, its geometry, as well as volumes and functions. All annotations included in the model are transferred to the image and the cardiac landmarks encoded in the model are available after adaptation. The goal is to reveal previously hidden information, such as ventricular mass, ejection fraction or wall thickness, which ultimately makes diagnosis quicker and improves therapy planning.

Many existing algorithms can already work out the left or right ventricle,” explains Mr. Jurgen Weese, PhD, Principal Scientist at Philips Research Europe. “But even if they can adapt the model to the heart as a whole, they are unable to provide automatic segmentation. Manual or semiautomatic segmentation requires considerable effort and is very time-consuming for the physician, which is why we have concentrated on automatic segmentation.” The whole segmentation chain runs in just 10 seconds and the new system has interactive tools for correcting data. Validation of the technology for ischemic disease has shown that in 97% of cases, no corrections were needed, making the tool suitable for routine use in a large number of cases. “Many clinicians have been intrigued by the heart modeling algorithm,” says Mr. Weese. “In one clinic, the physicians even printed the model of a patient’s heart in 3D before they started a complex intervention.”

Simplified interventions
One of the first products to come out of the research project was the EP navigator, which was launched in 2007. The EP navigator provides an automatically segmented 3D CT image of the heart for navigation in arratial ablation procedures (A-fib), guided with live fluoro data from a Philips Allura Xper cath lab system, this new tool shows the position of all catheters and the detailed atrial anatomy in real time on a single image. This information supports the electrophysiology in performing complex EP procedures with greater confidence, in a more intuitive way, helping to reduce A-fib procedure time.

Dr. Gerhard Hindricks, Director of the Department of Electrophysiology at the University of Leipzig, Germany has been working in the field of electrophysiology for more than 20 years. One of the early adopters of this technology, he was quick to realize its value. “EP navigator tells you exactly where the pulmonary veins are, exactly where the roof of the left atrium is, and in addition, shows you where the position of your catheter is in relationship to these structures. This can only be accomplished by a technology that provides an integration of images into fluoro and EP navigator is the only technology that I’m aware of that has this ability.”

Coping with data explosion
“The first tests of a new car or plane will also be computer-based. Although models is a different area, I imagine that in future, physicians will also first simulate before they operate.”

“In future, we will also research microstructures, for example the direction of fibers within a muscle.”

Jurgen Weese, PhD, Principal Scientist at Philips Research Europe and Philips is planning to integrate the new technology into its upcoming CT cardiac packages in order to further improve CT reconstruction. If motion fields are extracted from the data, reconstruction time can be shortened, the signal-to-noise ratio improved and dosage limited.

“It’s not our intention to do the diagnostics and replace the physician, rather we want to provide physicians with relevant information quickly so that they can come up with a diagnosis,” explains Mr. Weese.

Future applications
Philips Research and Philips Medical Systems have formed a multinational team based in Cleveland, Haifa, Aachen and Hamburg. Philips now holds several heart modeling patents and is researching other application areas.

EP protocols used with magnetic resonance are another potential application of the new technology: “We are looking at creating one algorithm using our experience with other modalities, for example MR and ultrasound,” says Mr. Weese. Using essentially the same algorithm, gray-value normalization could enable fully automatic, full heart segmentation in MR images. The technology could also be applied to vascular structures or the segmentation of other organs. “In the long run, we will also research microstructures, for example the direction of fibers within a muscle.”

Automatic segmentation could be used in databases and integrated into a PACS system, the algorithm could help shorten the time to first image. Costs can be reduced by improving efficiency, for example with Cardiois CT, while revenues can also be increased, for example in the cath lab, since more interventions can be carried out. In terms of imaging, scan planning will be more consistent and it will be possible to use a motion map to estimate the position of the coronary artery. Modeling may also help with integrating information from various modalities, such as scans in imaging in MR combined with CT or by combining information from PET and CT.

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Cardiovascular diseases account for 35% of all deaths that occur in the Autonomous Community of the Balearic Islands. The current problem for patients is that they need to travel to a cardiologist to get the right diagnosis and start a suitable treatment. This year, patients will receive more of their care locally, and faster diagnoses in emergencies, thanks to Ib-salut’s implementation of a telemedicine system that is a first in Europe.

“Our objective is to reduce the mortality of cardiovascular illnesses,” confirms Josep Corcoll, Director-General of Planning and Financing in the Balearic Government’s Ministry of Health and Consumer Affairs. To that end, the ministry, known as Ib-salut, acquired 50 digital electrocardiographs which it is installing in the archipelago’s primary health care centers. “This is part of the Medical Care Excellence Programme spearheaded by the Autonomous Government.” The first phase, in 2007, covers four islands, with 90 primary health care centers, as well as the Balearic Islands mobile emergency care.

At the heart of the project is the Philips TracMasterVue ECG Management System, spread through the primary health care centers, and at the cardiologists’ offices in the local hospitals (seven hospitals are involved in the first phase). TracMasterVue sends high-definition electrocardiograms (ECGs), from electrocardiographs, defibrillators, telemetry or coronary unit monitors, quickly and safely to the hospital, over Ib-salut’s IT communication lines. The nearest, or best qualified, cardiologist can then analyze the ECGs carried out at different locations on the islands. This makes it possible to diagnose and monitor patients with chronic heart failure, while they are in their local health centre, and avoid unnecessary transfers to hospital.

Faster and more accurate emergency treatment
For patients with acute heart problems, TracMasterVue can also relay ECGs from defibrillators, in the same high definition, between primary health care centres, ambulances, mobile intensive care units (MICU) and the island’s emergency services and hospitals. TracMasterVue also offers comprehensive capabilities for analysing urgent ECGs in the hemodynamics room, or the cardiology or Coronary Care Unit at the hospital.

Because the ECGs can be sent before the healthcare professionals administer drugs (e.g. for thrombolysis), the cardiologists can make more detailed diagnoses, and earlier and more accurate decisions on the best treatment. This can mean an earlier angioplasty or fibrinolysis in more cases, which contributes to reducing myocardium damage. The cardiologist can also suggest the most efficacious immediate treatment for the MICU or emergency care personnel to take. They can also route the patient, while they are in transit, to the most suitable hospital. The hospital also has comprehensive information even before the patient arrives, thus allowing seamless continuation of the treatment. This saves valuable minutes, contributing to reduce damage to the myocardium.

Combined care resources
At last, but not least cardiologists can also use TracMasterVue to get the patient’s previous ECGs. This helps increase the patient’s safety and improve diagnostic quality while reducing repeat examinations, thus easing congestion in the hospital and reduce costs.

Co-ordination between health institutions across the islands, using telemedicine technology, makes it possible to offer better health coverage. Ib-salut has started a telemedicine service unlike any other in Europe, helping its patients with heart failure to receive the best of medical attention, wherever they receive their care.
Philips accelerates time to treatment for heart attack patients

Complete continuum of cardiac care shown at European Society of Cardiology congress

Every minute counts when a heart attack victim needs interventional treatment. A study published in the Journal of the American College of Cardiology found that patients with a door-to-balloon time of more than 90 minutes had a higher mortality risk than patients who received interventional treatment within 90 minutes of their arrival at the hospital. Research published in the New England Journal of Medicine has shown that the average door-to-balloon time of the majority of hospitals studied was longer than the 90-minute interval. “As soon as a heart attack occurs, the heart muscle starts to die. That’s why reducing the time between heart attack and treatment has been proven to have a big impact on a patient’s long-term recovery,” says Joris van den Hurk, Vice President of Cardiology Care at Philips Medical Systems. “Philips is uniquely positioned to help healthcare providers get patients to the cath lab fast. Our technology solutions for cardiac care cover ambulance services, primary care centers as well as the cath lab.”

In the ambulance, paramedics can connect ECG leads to a patient suffering from myocardial infarction, and then transmit the 12-Lead ECG data to clinicians in the emergency department, using the HeartStart MRx monitor/defibrillator. In the Ambient Experience cath lab, important patient information, including ECG traces, can appear on a mirror while clinicians prepare the procedure. After treatment, patients may be monitored on an MRx or IntelliVue patient monitor in the coronary care unit or quality care can continue with Philips telemetry monitoring in a step-down unit. At home, Philips Motiva helps discharged patients to remain healthy through a simple television-based interface, promoting healthy behavior, charting improvements and connecting remotely to their physicians.

Starting processes earlier
With the help of the Philips HeartStart MRx monitor/defibrillator, the door-to-balloon process can commence before the patient even arrives at the hospital. With the HeartStart MRx, a paramedic can quickly acquire and wirelessly transmit a suspected myocardial infarction patient’s ECG data to the emergency department, the cath lab or an ECG management system. The HeartStart MRx allows all 12 leads to be displayed at once and is the only tool that displays a 12-lead ECG interpretation on screen. Clinicians at the hospital can use the ECG data to begin assessing what treatment the incoming patient will need and prepare for Percutaneous Coronary Intervention in the cath lab, or thrombolytic therapy. When the 12-Lead ECG shows ST-segment elevation myocardial infarction, the patient could bypass the emergency department and go directly to the cath lab. “By allowing a hospital to begin organizing its resources before the patient arrives, the HeartStart MRx can help reduce the time to treatment significantly,” says Margrit Lelieveld, Marketing and Sales Director EMEA at Philips Medical Systems. “Starting interventional procedures sooner not only improves patient outcomes but also has a positive effect on cost management.”

Once a patient has reached the emergency department, the HeartStart MRx monitor/defibrillator also allows real-time patient data to be transferred wirelessly on the Philips IntelliVue Clinical Network. The HeartStart MRx also integrates seamlessly with the ECG management system TraceMasterVue, enabling critical patient information to be seen where needed, for example in the cath lab. In the Ambient Experience cath lab, clinicians also have easy access to important patient information, including ECG traces, before the patient arrives. Providing a comforting and calming atmosphere for patients, the Ambient Experience cath lab maximizes the interaction between patient and staff during interventional procedures. “Ambient experience is a prime example of Philips’ patient-driven approach and shows how we strive to simplify healthcare by using out-of-the-box thinking,” says Margrit Lelieveld. “Making hospitals feel less like hospitals is part of our strategy for enhancing the clinical experience throughout the cardiac care cycle.”

Timely diagnosis and treatment
At the European Society of Cardiology congress in Vienna, Philips showed how it supports cardiac surgeons in the prompt delivery of diagnosis and treatment by giving them easy access to scans from imaging equipment usually located in different parts of the hospital. Philips CT software brings high-quality CT data to the cath lab, providing clinicians with a more accurate view of the patient’s anatomy, thereby reducing the time from initial diagnosis to treatment. Furthermore, Philips Step & Shoot Cardiac application to the Brilliance CT 64-channel scanner reduces radiation exposure for patients without compromising image quality.

The new Xper Information Management cath lab workflow solution speeds up and simplifies reporting, scheduling, inventory and data management for cardiovascular professionals. It also encompasses pre- and post-cath holding and administrative and systems management. “With this new solution, we can help clinicians improve their productivity by transforming data into accurate, useful information,” says Joris van den Hurk. “From diagnosis to treatment and monitoring, Philips supports hospitals in optimizing the timely delivery of diagnosis and treatment, enhancing clinicians’ capabilities through innovative technology.”

References:
For the first time in Europe, Philips showcased the Ambient Experience catheterization (cath) lab at the European Society of Cardiology congress in September. Ambient Experience creates a personalized, comfortable environment for both patients and clinical staff and can help improve the clinical workflow. The next generation in cardiac care integrates X-ray and echocardiography: the Ambient Experience cath lab includes the Allura Xper FD20, designed to meet all vascular imaging needs, and the iE33 echo system with Live 3D TEE, which can instantly switch from 2D mode to real-time 3D imaging. Clinicians can also import CT angiography images into the cath lab. This integration of several imaging technologies will help decrease fluoroscopy time and contrast, while improving device selection and patient outcomes.

“During interventional procedures, many patients experience significant stress,” says Keith Klein, Marketing Manager Ambient Experience at Philips Medical Systems. “Ambient Experience creates a comfortable living room feeling for the patient and it also gives patients a sense of control.” Using a wireless touch-screen tablet PC, patients can select from a variety of themes to define how the room should look, thereby creating a pleasant and relaxing environment with personalized lighting, themes and music.

**Attractive working environment**

Ambient Experience also creates a pleasant working environment for hospital staff. “Clinicians are used to coming into a room that’s sterile and hospital-like with lots of medical equipment,” says Keith Klein. “When they step into the Ambient Experience cath lab, they are often astonished to see something quite different, a nicely designed environment and a better place to work in.”

Ambient Experience uses typical elements of a hospital room in a smart, unobtrusive way: a mirror can serve as a changeable LCD to show patient demographics, clinical images or hemodynamic information, making information easily and instantly accessible to the cardiologist. “In the future, smart shelves could also track catheter inventory,” says Keith Klein. The exam room has rounded corners in order to keep it free from clutter and to facilitate cleaning. The room lighting is not only functional and easy to control, but lights directly overhead minimize reflections on the clinician’s monitor, thus reducing eye strain and enhancing the visualization of fine vessel details.

**Reducing time to treatment**

The Ambient Experience cath lab helps hospitals reduce the time between a heart attack and treatment, as some of the processes can be carried out in parallel instead of serially. In a typical hospital environment, a patient suffering a heart attack will first be transported to the hospital and only once he or she has arrived is the patient’s condition assessed, and a cath lab procedure may follow. With Ambient Experience, the 12-lead ECG of a patient can be transferred to the cath lab, and hospital staff can already prepare the procedure while the ambulance is still on its way to the hospital. When the patient arrives, the cath lab is ready and the clinicians can perform the procedure without any delay.

One Ambient Experience cath lab is already being used at Catharina Hospital in Eindhoven, The Netherlands, and two more are currently being installed in the US. “In Europe, we’re starting to see more awareness among hospitals to the fact that patients are discerning as to where their healthcare procedures are performed,” observes Keith Klein. “Ambient Experience increases patient satisfaction and helps hospitals increase the number of patients.”
In the last few years Computed Tomography (CT) has gained importance in coronary artery disease detection and CT technology is being used for important cardiac applications such as planning percutaneous coronary interventions (PCI) and preablation planning for atrial fibrillation.

At this year’s European Society of Cardiology congress (ESC), Philips presented the latest cardiac developments for the Brilliance family of CT scanners, aimed at reducing radiation dose, simplifying the CT evaluation and increasing the accuracy of interventional procedures.

With the new Step & Shoot cardiac imaging – a prospective, ECG-gated scanning mode – the Brilliance 64 CT scanner provides high-quality images of the coronary arteries and heart anatomy at low dose levels. In addition, a shorter breath hold increases patient comfort during the imaging exam. Based on technological innovations such as arrhythmia rejection and proprietary thin-slice axial reconstruction algorithms, X-rays are turned on only during the physiologic phase of interest. The technology produces cardiac CTA scans at an effective radiation dose of 2 – 5 mSv – nearly the same as annual background radiation exposure. According to a study of the Wisconsin Heart Hospital1, Step & Shoot Cardiac’s effective radiation dose is approximately 80% lower than spiral retrospective scans without ECG-based dose modulation.

“We have strived for a reduction in dose not only with Step & Shoot but also with a new analysis tool and with our CT TrueView application,” says Dr. Gerald Pötzsch, Manager Business Unit CT, Germany. “With these innovations, dose reduction goes hand in hand with better visualization. CT TrueView even enables the visualization of target segments at bifurcations.” Based on total heart segmentation, the Comprehensive Cardiac Analysis (CCA) application provides entire coronary tree visualization, ventricular functional analysis and 3-D heart chamber and valve morphology. CT TrueView uses this 3-D CT segmentation to select and visualize the best 2-D C-arm projections for planning PCI procedures, such as planning stent placement for bifurcations and chronic total occlusions.

From planning to procedure
The Philips Brilliance CT is integrated with the Philips Xeleris image management solution, importing images directly into the catheterization lab. “With CCA and CT TrueView, a cardiologist can plan the optimal projection angle during the intervention. The additional information provided by CT thus helps reduce radiation dose during the complete cardiac care cycle – from planning to procedure,” says John Steidley, Vice President of CT Global Marketing for Philips Medical Systems. “What’s more, simplifying the cardiac CT evaluation will eventually lead to faster clinical results.”

CT also helps reduce procedure times in the electrophysiology (EP) lab. An EP planning application supports assessment of the pulmonary vein, left atrial and appendage anatomy and helps to quickly identify anatomy that may complicate the EP procedure. Prior to ESC, the heart centre at the University of Leipzig, Germany, unveiled its hands free catheter ablation solution. Combining pre-interventional Philips 3D CT images with live X-ray fluoroscopy catheter position information, physicians can navigate more easily through the heart during complex procedures. Cardiologists use a mouse and a joystick to remotely control two magnets that guide catheters to and inside the patient’s heart, where they ablate abnormal tissue areas that cause atrial fibrillation. The solution is based on the Philips EP Navigator, the Stereotaxis Magnetic Navigation System Niobe and 3D location sensing technology by Biosense Webster. “We now get instant confirmation of the position of all catheters in a single image,” says cardiologist Prof. Dr. Gerhard Hindricks from the University of Leipzig. “Since we started using this system, we have seen an efficiency increase of 13-17%.”

According to Prof. Hindricks, cardiologists at the University of Leipzig can now treat cardiac rhythm disorders much more efficiently and safely than ever before.

Lower dose, better visualization

[Image]

“Since we started using this system, we have seen an efficiency increase of 13-17%.”

Prof Dr. Gerhard Hindricks, University of Leipzig

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1 Study led by Dr. Samuel Wann and Shelly Deleeuw at Wisconsin Heart Hospital from April – September 2007.
How focusing on patients throughout the care cycle is changing Philips’ solutions

Simplifying Healthcare

How focusing on patients throughout the care cycle is changing Philips’ solutions

Medical costs are skyrocketing, because Western populations are aging, the rate of chronic illness is growing, and medical science keeps pushing back the boundaries of what is possible. The Institute for Healthcare Improvement, a non-profit organization based in Cambridge, Massachusetts, forecasts that such trends mean “many healthcare systems around the world will become unsustainable by 2015.” The way forward means making radical changes. Philips is already preparing for the necessary transformation, by re-examining how healthcare is delivered—from prevention to rehabilitation. Our starting point is to improve results for the patient, and to simplify healthcare for everybody involved. Such comprehensive, forward thinking is what sets us apart from our competition.

Today, economic pressures often mean relegating patients to being a peripheral consideration to processes and prices. Payment is based on the delivery of services, for each hip replacement, for example, whether or not the operation is successful. Service-based thinking means hospitals are structured around medical specialties, rather than conditions and patients. This forces the staff to focus on making their department run more quickly and cheaply and shifting costs to others, rather than thinking about the most effective overall path for the patient. Left as it is, such focus is likely to increase as budgets get stricter and with foreseeable shortages of staff. “Both patients and caregivers struggle with a complex, fragmented healthcare system,” explains Steve Rusckowski, CEO of Philips Medical Systems. “We believe the best way to reduce this complexity is by addressing the needs of the healthcare industry from the perspective of patients and their health problems.”

Looking across boundaries

At Philips, we believe the patient’s well-being should be the primary measure in healthcare. Compensation should be based on value to the patients. They do not want to be in hospital, so value to them means avoiding an admission, leaving hospital earlier, or ultimately staying healthier longer. It is by concentrating on this value that we can expand the limits on treatment from just providing hospital-based cures to encompassing the full care cycle. This enlarges the role of caregivers to include promoting healthier lifestyles, rehabilitating patients fully, or, for chronic diseases, managing the condition in the home, such support from comprehensive, continual monitoring. This in turn takes better, multidisciplinary diagnoses and a more inclusive approach to treatments—with fewer mistakes or repeated procedures as a welcome side-effect. The result is better and cheaper cures through earlier diagnosis, fewer disabilities, faster recoveries, or at least slower progression of diseases.

Though it may mean investing in different ways, concentrating on value to the patient in this way reduces the overall cost of healthcare. The results speak for themselves: studies show that CT screening may eliminate 80% of lung cancer deaths in high-risk patients1, image-guided stenting can allow brain aneurysm patients to return to normal lives after a month instead of a year2, and using fluoroscopy to open clogged kidney arteries can save $15k per procedure3. We have been looking at ways to help clinicians make this change. This starts by intensifying innovation in our traditional solution areas, including the successful acquisition of Intermagnetics General Corporation and Witt Biomedical, to name but two. Broadening the scope of our solutions helps us improve integration, and thus simplify screening, diagnosis and treatment. We have also been expanding our portfolio, for example by acquiring Lifelines Healthwatch, who are leaders in home monitoring services and fall prevention programs for the elderly. Such solutions make it easier for our customers to extend the reach of the care they can offer.

Change from the inside out

Within Philips, increasing patient focus means investing in people who are keen to learn and understand what it is like to be a patient, and the complexities that hinder doctors, nurses and hospital personnel from delivering patient-centered care. This includes understanding medical technology, clinical processes, and business concerns. But our deeper insights into how patients and clinicians experience healthcare delivery, help us identify larger market and clinical needs, and propose more suitable, more complete, and in the end simpler solutions.

An example of applying such insight is the Site PACS. This delivers full-fidelity diagnostic images to any authorized user with a web browser, inside or even outside the hospital. This meant getting rid of complicated licensing structures and the administration or modality focus, and applying sophisticated compression algorithms, to make sure even large quantities of data transfer quickly. The result is a PACS that lets any doctor access the image he or she needs easily, wherever they are, at any point in the care cycle.

Starting with oncology and cardiology, we are also bringing employees from different product areas and disciplines together in care cycle teams. These work closely with universities, doctors and professors to build on the clinical excellence of our products. Such multidisciplinary solutions

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integrate information and apply clinical expertise to “deliver solutions that address the cycle of prevention, screening, diagnosis, treatment and management of medical conditions,” explains Mr. Rusckowski.

Connecting ideas

The care cycle and patient-focus are how we express our new way of thinking about simplifying healthcare. This is important not just for us as a company, but for us as Philips employers. Such innovation and service orientation is key to our continued success: the days of achieving business goals by just selling greater numbers of products are on the way out.

Philips is one of the world’s most innovative companies18, with over 450 designers worldwide, and is among the Global 100 Most Sustainable Corporations19. Philips Medical Systems reinvests 12.2% of its turnover in research and development, which is how we pioneer such important industry firsts as non-invasive electronic fetal monitoring, rampable MR from 1.5 to 3T, and integrated catheter labs. As a global leader in healthcare and well-being, Philips has the will, the resources, and the corporate culture that enable the necessary changes to simplify how our customers deliver patient-centered care. Ambient Experience for CT is one example of a new way of thinking about simplifying healthcare delivery that is already beginning. This will be the key to our success, and the success of our customers, in the years ahead.”

Steve Rusckowski, CEO of Philips Medical Systems

Another example of providing solutions to the challenges that clinicians face is ProtocolWatch on IntelliVue patient monitors. This application screens for the signs and symptoms of severe sepsis and then guides the clinician through the Surviving Sepsis Campaign guidelines. The artificial intelligence helps with earlier detection of sepsis and issues reminders so that care recommendations are followed, collectively tackling infection rates and staff shortages. As with Ambient Experience for CT, such improved clinical and economic results can be an important competitive advantage for a hospital or clinic.

Building on excellence

We continue to improve our Medical Systems business and build on its progress. In the past three years this has focused on high-value, high-growth, emerging markets. We continue to explore further alliances and acquisitions that contribute to the care cycle, improve our solutions and, above all, create long-term value for clinicians and patients.

Creating the conditions for sustainable healthcare delivery means new ways of thinking and working throughout the care cycle, supported by innovative and affordable technological solutions. Supplying those solutions takes insight into the needs of clinicians and patients. From medical advisory boards, with selected, leading practitioners, to user communities in the Internet, such as NetForum20, we are listening for ways we can work with you to improve patient care. Mr. Rusckowski concludes, “Our vision is to contribute to the value our customers can deliver to their patients. This supports a shift in simplifying healthcare delivery that is already beginning. This will be the key to our success, and the success of our customers, in the years ahead.”


Interventional radiology at the regional hospital in Winterthur, Switzerland is working better than ever thanks to its newly converted Philips Allura Xper FD20 system. This sophisticated interventional X-ray system is helping clinicians see anatomy more clearly and perform examinations more efficiently. By converting their existing Philips Allura 15 system, the hospital saved 35 percent compared to a new purchase. The hospital now offers some of the most advanced visualization and image analysis capabilities available to its referral base which gives it a strong competitive advantage.

Leading healthcare facility

Getting the most out of its resources is second nature to the Regional Hospital Winterthur. For five years in a row, the local government has rated it one of the top three hospitals for efficiency and technology in a benchmarking survey. The hospital also received a very high satisfaction rating in a survey carried out with patients and families.

The cost of progress

The hospital began an extensive renovation a few years ago to further improve its services. As part of this, the existing interventional radiology room had to be moved to a new building. The hospital estimated that it would have to spend more than SFr. 100,000 (about €62,000) to move the existing Philips Allura 15 X-ray system and install it in a new room. Since the X-ray system was already six years old, the hospital considered purchasing a new system rather than moving the old one.

Jacques F. Steiner, hospital director says, “The mechanical components usually last 15 or 20 years, but electronics and imaging components have to be replaced more frequently. We had planned to replace this system in 2009, but the renovation changed our timetable.”

A long and beneficial partnership

Working with a partner that they trusted played an important role in this decision. The hospital management constantly

Catalyst Conversion

Newest capabilities and cost savings for interventional radiology in the Regional Hospital Winterthur

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A long and beneficial partnership

Working with a partner that they trusted played an important role in this decision. The hospital management constantly
evaluates its business partnerships to make sure that they are getting the best technology and services. Mr. Steiner says, "Philips has proven to be a very trustworthy partner for over 25 years. A substantial part of our imaging equipment is supplied by Philips and we have a very good relationship with them. We have one contact for all of our business dealings and that is very efficient for us."

Over the years, Philips has gone the extra mile in supporting the hospital. They have carried out clinical research projects with physicians at the hospital, adapted software to the hospital’s needs and always tried to find ways to improve their imaging services. That was also true when they provided advice for the new interventional X-ray room.

**Converting to the newest Philips Allura FD20**

Philips proposed an economical alternative to a new system. They offered to convert the hospital’s existing system to the same level of technology as a brand new Philips Allura Xper FD20. This system offers some of the most advanced hardware, interventional tools and workflow improvements in the industry.

In a Philips conversion, the existing system receives all new imaging and control circuitry, a flat detector, system software and flat panel displays. Substantial savings are made possible by re-using the system’s existing stand, ceiling rails and monitor-ceiling suspension. In most cases, the X-ray tube and generator can be re-used as well. All parts undergo the same stringent factory testing as new systems and are supported by Philips’ customer service organization, exactly as a new system is supported.

Mr. Steiner says, "We were able to convert our system to the same level of capabilities as a new system. But because Philips could reuse many costly components, we saved a substantial amount compared to purchasing a new system."

This was an appealing economic argument for the hospital management. However, the clinical performance was just as important. The new system had to be able to perform just like a brand new system from the factory. Mr. Steiner says, "Because of our long-standing relationship with Philips, we knew that we could depend on them. They have always provided us with the highest level of professional service and support. We trusted them to provide a state-of-the-art system that would perform reliably."

**Better image quality and greater flexibility**

The interventional radiology room is used for a broad range of diagnostic and interventional procedures. Clinicians in the radiology department are very pleased with the performance of the new system. "The image quality is better than it was before. I can see structures in the abdomen more clearly. I also get better penetration with obese patients," says Dr. E. Schoch, interventional radiologist.

Being able to view multimodality images next to each other has also improved interventions. Dr. Schoch says, "In a recent biliary drainage, I had to enter the biliary ducts percutaneously. It was very helpful to view the CT images and see different orientations. This helped me navigate better and avoid puncturing nearby structures."

**Easy to operate**

The system has simplified procedures as well. Dr. Schoch says, "We used to have a single control unit outside of the examination room. To adjust the exam protocols together with the technician was time consuming and slowed us down. Now it’s very easy to do them ourselves on the touchscreen. It’s also very easy to position the system. It turns in every possible direction, with very little effort."

**Smooth installation**

Dr. Schoch says, "The installation went very smoothly. Everything was available when we needed it and within the communicated schedule. Clinicians could use a backup system until the new one was in place. That is the advantage of Philips plug-and-play design. Each system comprises standard building blocks that can be easily exchanged as new technologies become available."

**Competitive advantage**

The new Philips Allura Xper FD20 gives the Regional Hospital Winterthur a strong basis to grow its business in the future. The hospital competes with many other public hospitals and private clinics for its patients. Yet it is still a relatively small community where word of mouth travels quickly. Steiner says, "Referring physicians in our region have already heard about our new interventional capabilities. We can offer them the very latest clinical techniques and that gives us a strong competitive advantage."

When asked if he would recommend Philips to another hospital, Steiner says with a smile, "No, because then my competition would have the same great equipment that we have."
Ease of Use

Furniture and lighting play an important role in a satisfying PACS implementation

When it comes to the ease of use of a PACS, the technical aspects (the software, the screen, and so on) are obvious. But the working environment is equally important. Many organizations see the furniture and lighting as added costs, rather than an extra source of value. When setting up a digital workflow in ’s-Hertogenbosch, in the Netherlands, saw ergonomics as a significant part of enabling the best diagnosis possible.

Merging the four hospitals around ’s-Hertogenbosch to form the Jeroen Bosch Hospital brought all the radiology, nuclear medicine and cardiovascular departments together into a single imaging organization. One goal of reorganizing was to create a unified, digital environment to ensure efficiency and quality. This meant using the possibilities offered by the change, and by modern computer support (RADS RIS, Easy Access PACS and SpeechMagic voice recognition software), to streamline reporting.

When setting up a digital workflow in 2003, the Jeroen Bosch Hospital in ’s-Hertogenbosch, in the Netherlands, saw ergonomics as a significant part of enabling the best diagnosis possible.

“Many departments, transfer the film workflow, one-to-one, to digital,” explains Dr. Harm Geraedts, Business Manager of the Imaging Centre. “But it is not just a case of replacing light boxes with screens. It is about realizing what working digitally makes possible.” A lot could be learnt from the hospital’s Camius site. This was one of the first sites in the world to use a Philips PACS, which meant a wealth of in-house experience on best practices, and many ideas on what could be done better. The comfort of the workspaces was one issue. “Ergonomics and workflow cannot work without each other,” explains Mr. Noot Maas, Chief Information Officer of the Imaging Centre. “Ergonomics is part of imagining how you want to work.”

Variety of input methods

Dr. Eric Tetteroo, Radiologist, Department of Radiology, was closely involved in planning the PACS implementation. For him, imagining best practices included the physical conditions for interacting with the system. “Traditionally radiologists have developed arthritic of the neck working with light boxes, now they are at risk of repetitive stress injury from working with the mouse,” he says.

He highlights the importance of having a high quality mouse, preferably one that can be used in both the right and left hand. A gaming mouse (one normally used for computer games) might also be worth considering. These have extra buttons that could be assigned to simplify access to PACS features, and a high scrolling resolution for browsing quickly through large data sets. With the ease of connecting mouses, track wheels or trackballs by USB, Dr. Tetteroo also proposes having several pointing devices, to ensure variety. He also favours using keyboard shortcutes as many alternatives as possible to eliminate repetitive motion.

Sitting comfortably

An important part of the project was to standardize workplace hardware, so any radiologist can use any reporting station. This is possible because the arrangement of the EasyAccess PACS on the screens depends on who is logged in, and not on the computer. But this means accommodating different radiologists at the same desk. Dr. Tetteroo stresses having furniture that adjusts easily. If the threshold to adjusting the desk or chair is too high, people tend to ignore the discomfort, which leads to fatigue.

Because medical computer workplaces are a recent development, such elements are overlooked in many other installations. Though radiologists often report on patient complaints resulting from badly organized PC workplaces, ironically, the radiologist’s workplace is often worse. This is particularly unfortunate in the significant number of cases where computer-based reporting has become a full-time job. Philips German partner for radiology workplaces, MediSol, has even developed an ergonomic toolkit. This recommends the height of the stool according to the doctor’s height, measures the correct distance to the screen, checks the tilt of the keyboard, and has a mirror to check for the sources of reflections.

Easy on the eyes

Where possible, the original lighting was replaced by indirect lighting that reflects off the walls behind the reporting stations. This eliminates reflections on the screen. A dimmer lets the radiologists adjust the lighting to their personal preference. Ambient light should be less bright than the screen, to ensure the features of the image can be best and most easily recognized. In the Jeroen Bosch Hospital, the low light level is simplified by having all the paperwork scanned into the RIS. Even much of the reference material is consulted on the screens from PDF documents or web-sites. There is little need for extra reading light.

Dr. Tetteroo checked and turned down the brightness of all the auxiliary screens (to 25 to 30 %). The setting out of the box was too bright, resulting in uneven lighting across the screens, which meant too many adjustments for the eye, leading to fatigue. To keep the field of view uniform, the surface of the tables are matte to reduce reflections (the ideal is a dark grey with 60% reflectivity). Similarly, where possible the wall and floor coverings minimize reflections.

Simplified organization

The staff in the Imaging Centre had full control of their budgets for the PACS project. This was decisive in maximizing the overall value of their investment according to their own priorities, and independently of the concerns of the IT, facilities management and purchasing departments. “If buying a good chair seems like the best way to ensure productivity, it is our call,” says Mr. Gerards.

Dr. Eric Tetteroo, Radiologist, Department of Radiology

Harm Geraedts, Business Manager of the Imaging Center (left) and Mr. Noot Maas, Chief Information Officer of the Imaging Center

-edwards for their contributions to this article.

Dr. Eric Tetteroo, Radiologist, Department of Radiology

Harm Geraedts, Business Manager of the Imaging Center (left) and Mr. Noot Maas, Chief Information Officer of the Imaging Center

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CliniScape mobile clinical assistant to make the best care decisions at the point of care

The Mobile Clinical Assistant (MCA) is a new category of mobile point-of-care devices that addresses the needs of nurses and physicians to provide more real-time care for a better patient experience. It integrates all the features needed to increase patient safety and reduce administrative workload. Based on Windows XP Tablet PC edition, an Intel Core Solo CPU with a 60 GB hard-disk, WLAN 802.11g/n and an easy to read 10.4 inch XGA touch-screen with digitizer the new Philips MCA combines a number of features on a single platform, including:

- a RFID reader for user-authentication and identification of patients, medication, blood containers and other clinical specimens,
- an optional built-in barcode scanner to support bar-code based identification protocols,
- Bluetooth for cordless connection of devices such as a heartbeat or blood-pressure sensor, telephone headset or dictation microphone,
- 2Mpixel camera for on-line capture of digital pictures of patient wounds,
- a RFID reader for user-authentication and identification of patients, medication, blood containers and other clinical specimens,
- a RFID reader for user-authentication and identification of patients, medication, blood containers and other clinical specimens,
- Medical grade compliance to allow its use in clinical areas where traditional laptops or tablet-PCs are not allowed.

Designed as a semi-sealed device (IP54) the CliniScape can easily be wiped clean and disinfected to reduce the spread of infection. Its durable design makes the MCA suitable to withstand knocks and drops (1m.). The lightweight device (1.6 kg) is designed to minimize fatigue while holding it flat thanks to a hand grip on the back. The long-life battery (3.5 hrs min.) can easily be swapped with a fresh one in less than 30 seconds. The device can be charged rapidly via USB to ensure constant availability.

Metal-based Digital Pocket Memo 9600 Series for dictation mobility and security

The featured technology includes a line-up of “world firsts”: the DPM 9600 introduces DSS Pro – advanced compression for improved sound quality and real-time file encryption. The industry’s largest display, unique smart buttons and intuitive menu control come in a robust metal case, featuring an asymmetrical design which has received the iF Product Design award 2007 for its outstanding ergonomics and innovative functionality. The world’s first LAN docking station (PC-free) and theBarcode Scanner Module complete the feature set.

Voice-activated recording mode and voice commands enable hands-free dictation, further increasing ease of use. The device also outperforms any other in terms of operation and stand-by time and can be charged rapidly via USB to ensure constant availability.

Correction

In the last edition, in the article “The Value of Nursing”, we referred to WiCare tools from the company WigaSoft AG. The full name of the product used is WiCare|LEP. This works with CareVue Chart using an automated database developed jointly by Philips and WigaSoft.

More information on WiCare|LEP is available from WigaSoft’s website at www.wigasoft.ch, by e-mail from info@wigasoft.ch, or by telephone at +41 (0)71 274 51 31.

For further information please go to the web-site: www.philips.com/dictation
Simplicity is technology that revolves around your workflow.

Philips Xper Information Management solution combines advanced cardiovascular physiomonitoring with integrated reporting, scheduling, inventory, and intelligent data management. Complement these efficient innovations with simplified user-centric navigation featuring role-based menus. The result is personalized, fluid cath lab workflow designed for your unique needs. © 2007 Philips Electronics North America Corporation.

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