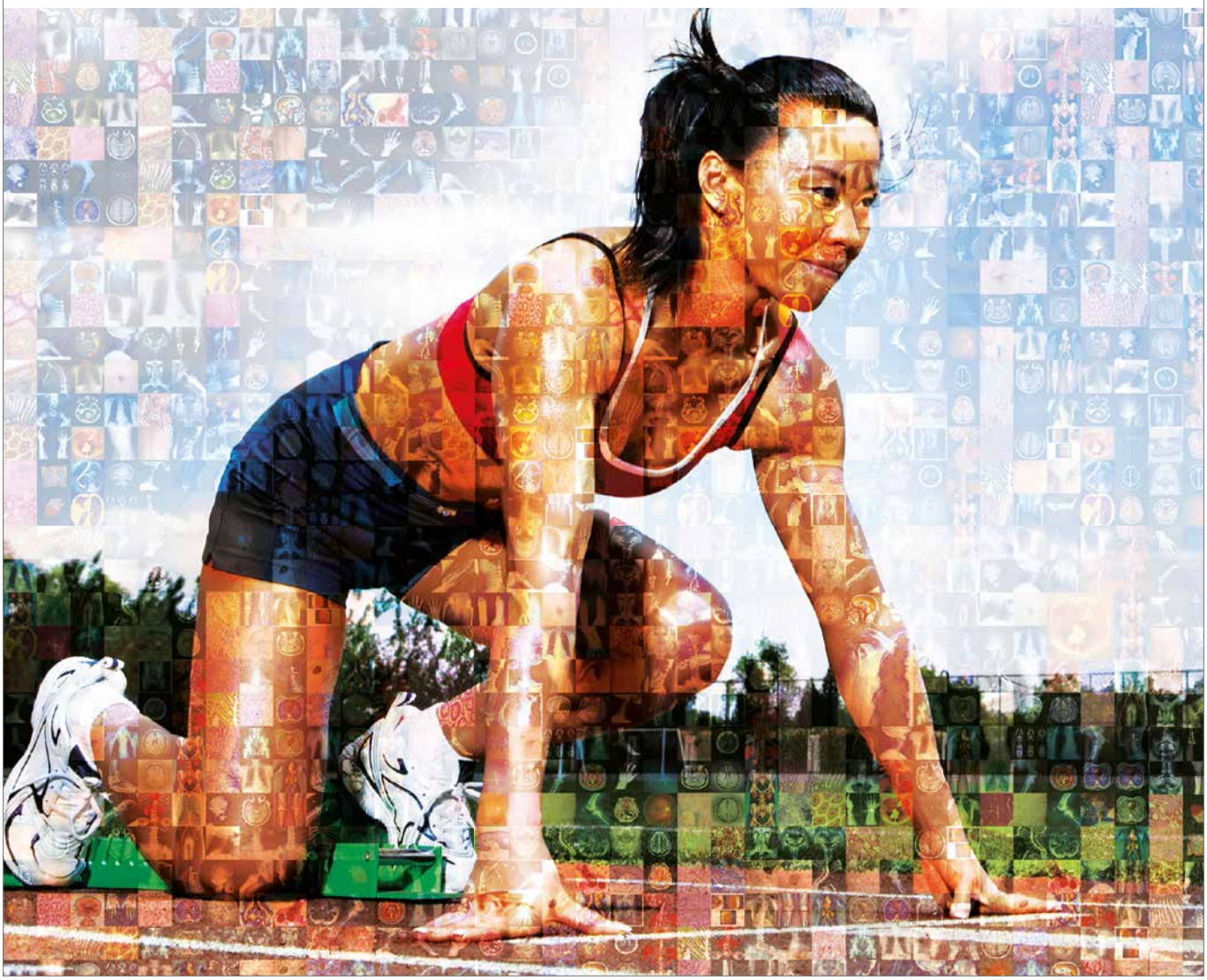
SPECIAL REPORT

January 2014

AGFA HealthCare

ENTERPRISE IMAGING



SPECIAL REPORT

January 2014

Enterprise-wide imaging

A broader view for healthcare

"No man is an island, entire unto himself," wrote English poet John Donne in 1624. Today, the same can be said of the healthcare sector. Healthcare is multidisciplinary, with collaboration reaching far beyond the traditional borders and walls that divide hospitals, departments, physicians, patients… Healthcare stakeholders recognize the economic and medical advantages of ensuring that everyone involved in a patient's care has access to all the clinical and administrative data and images, no matter their source.

In the digital age, healthcare, like so many other sectors, has become information-intensive. To seamlessly share this information, healthcare organizations need a solution that spans department, facility and even geographical boundaries. By bringing down the borders to interoperability, they can create opportunities to improve efficiency, productivity, decision-making and patient care.

Agfa HealthCare shares this vision for healthcare. As the imaging expert, we see the importance to the healthcare providers of feature-rich, easy access to integrated, patient-centric medical imaging records. In our vision, clinical images from anywhere are available anytime to anyone involved in the patient's care.

We also know that adding clinical images to the patient record can increase the quality of diagnosis and the efficiency of treatment. But image-enabling the EMR isn't just about viewing, archiving and distribution. Instead it must combine all of these components into a single workflow, connecting departments and users.

In this Special Report on Enterprise Imaging, you'll hear from healthcare organizations that have implemented our ICIS enterprise imaging solution. They'll show you how it is supporting them to achieve their own healthcare visions and to meet the requirements and demands they face today, whether from carers, patients or national authorities.

You will hear from experts about how the healthcare model continues to evolve towards a more collaborative approach, and how IT can and is supporting this, offering a broader view of imaging.
Pleasant reading!

KATARINA VAN DER HOEVEN
Marketing Communications Manager

The Agfa HealthCare editorial team would like to thank all those who contributed to this publication.

Ochsner Health Systems, New Orleans, United States

Winds of change

Chris Belmont, CIO of Ochsner Health Systems in New Orleans, explains how a combination of Hurricane Katrina and US Health Care reforms have put Agfa HealthCare's ICIS solution to the test.

INTERVIEW WITH CHRIS BELMONT, CIO of Ochsner Health Systems

In 2005, when Hurricane Katrina devastated the southern United States, Ochsner Health Systems, based in New Orleans, had already begun consolidating its hospital and clinic operations. When the hurricane left a large number of local healthcare provider's hospitals and clinics in ruins and local communities without essential healthcare facilities, Ochsner stepped in.

> "Installing Agfa HealthCare's integrated ICIS Store allowed us to consolidate medical images into one repository."
>
> **CHRIS BELMONT**
> CIO of Ochsner Health Systems

The value of consolidating all medical images into one repository

"Following Katrina, several healthcare providers decided to leave the market, so we acquired a number of hospitals and grew quite aggressively in a short space of time. At the same time, our information systems and organizational structure was not suited for a big health system – one that now numbers eight hospitals and 38 clinics – so we had to come up with a workable plan very fast," explains Chris Belmont. "Our first actions were to consolidate resources and coordinate the radiology activities across all the different entities. Luckily, we also decided to do the same thing on the information system side instead of having each hospital purchase or acquire its own PACS environment. We had already been working with Agfa HealthCare and by electing to roll radiology together we solidified our partnership. Installing Agfa HealthCare's integrated ICIS Store allowed us to consolidate medical images into one repository."

Accessibility from a single viewer

As the first organization to install the ICIS Store, Belmont admits, "The ICIS Store platform was never an issue for us. Our main concern was with getting the right viewer. When you have images that are black and white, color, motion, static, how do you make them accessible from a single viewer? To me, having multiple viewers would have been as difficult as having multiple platforms. It took us five or six tries to get a nice light viewer that is not a technology burden but Agfa HealthCare stuck with us and did a great job of getting us to where we are now with the viewer that we have."
It is a solution that has already delivered major benefits.

A reputation for continuity of care

"At Ochsner we really stress continuity of care. So, if you see an Ochsner physician at the clinic, get admitted, and then go back to the clinic, all of the records follow you. It has been one of the big positives for our community, our patients and our physicians as well. We reduce duplicate tests and information is available as needed – we don't have to call across town anymore to have it sent. It is a philosophy we have built our practice on and it is really paying off, both from a quality and a performance perspective."

Of course, it helped that Ochsner had already been working with Agfa HealthCare on rationalizing records and imaging. "We had already consolidated everything from the clinics and the hospitals – some 20 sites – so the basic foundation was there, and we didn't have to go out and select a vendor. It was more an expansion than a brand new installation."

Meeting the challenge of doing more with less

However, it's not just the winds of Hurricane Katrina that have influenced Ochsner's recent course. The increasing demands made as a result of the Affordable Care Act, as well as changes that are altering the US healthcare payment structure, increasingly require organizations to do more with less.

"Every year, little by little, we receive less reimbursement for treatment so we are having to change how we look at healthcare", says Belmont. "We need to look at how we deliver the same services at the same level of quality, but change the delivery model. And technology is going to have a huge impact in enabling us to support that."

Meaningful Use a major benefit

To that end, one of the major changes Ochsner made last year was to have physicians become more meaningful users of the electronic medical record. "Last year was kept simple", says Belmont. "Can they do an electronic

prescription? Can they view an image? 100% of our physicians were able to achieve Meaningful Use in their first year.

"Having that technology in place is now something we can build upon. Of course, just putting technology out there is not enough. We've spent a lot of time with our users, understanding it. We recognize that we have to help them migrate to it and help them understand the benefits. More importantly, we have to adapt the functionality to their work flows, so we now have a dedicated team – our Physicians' Academy – to help with that part of the program."

Taking time pays dividends

Although well on course for completion, Belmont says, "There are still parts of our systems not yet consolidated – we are about 90% of the way there – but that is more to do with us taking our time to prevent too much disruption. And there are difficult decisions to be made, such as how long to keep images that already go back nearly 10 years; decisions that have to balance quality of patient care with cost and performance. But, overall, I think it is working out pretty well.

ICIS Store with ICIS View - "An example of the perfect implementation"

"I think ICIS Store with ICIS View is an example of the perfect implementation. It's actually one of the applications we don't think about a lot because it works. It's in the background and it runs, and we feel we get the value for the costs. We don't talk about PACS anymore. We're not doing many problem resolutions. It's more about a growth and optimization strategy."

And Belmont's advice for anyone else considering a similar solution? "Aggregating images is definitely the way we go; as is putting them on a single platform. A lot of solutions say they can do that but we have found with the Agfa HealthCare solution that it really does work. It is kind of a non-event. When we elect to put a new type of image into the archive, a few people get together, they make a few decisions and then the data starts to flow. It couldn't be simpler."

Patients owning their records will be the industry game changer

Ultimately, Belmont believes that the real game changer will be when it is the patients, rather than the healthcare organizations, that own their records. "We need to make it very seamless so that the owner of the medical record – the patient – can walk into an office and say, 'here's a link. Go and pick up my images.' We are still a little stuck in the fact that the organizations own the records but we need to migrate to where patients own their records. I think that's the real game changer for this industry." ■

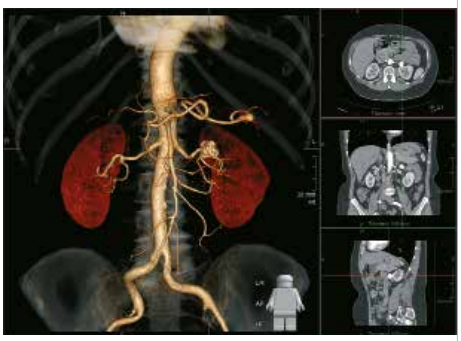
ICIS View

- Enables 'anywhere, anytime' access to images.
- Provides secure access to standard healthcare data from existing workstations anywhere on the network.
- Uses any popular internet browser and modest network connection.
- No software download or installation required.

In profile

CHARLES MORRIS Global ICIS Business Manager, Agfa HealthCare
GENADY KNIZHNIK Business Development Director, Regional Health EMEA, Agfa HealthCare
JAMES JAY Vice President Imaging IT Solutions, Agfa HealthCare

Image-enable your EHR with ICIS



Despite the promise of the electronic health record (EHR) to provide a view of patient health generated from encounters across all healthcare settings, imaging has been a critical missing component. Until now. In keeping with its "Leave no image behind" promise, Agfa HealthCare has developed the Imaging Clinical Information System, or ICIS™, to provide clinical images within the EHR. In this article, Charles Morris, James Jay and Genady Knizhnik of Agfa HealthCare reveal how ICIS empowers physicians to make more informed care decisions by embedding medical image accessibility within the EHR user interface to provide a more accurate view of the patient.

Healthcare organizations around the globe are under pressure to deliver care more cost-effectively and with higher quality. One way to achieve this is to empower physicians with easy, direct access to all of a patient's relevant medical information. While this understanding is driving a meteoric rise in EHR systems, there is still one significant roadblock to ultimate clinical productivity: most of the EHRs available on the market today do not complement the textual data with relevant clinical images.

"Physicians can deliver better, more expedient care when they have immediate access to a patient's entire medical history regardless of the care setting where the information was created," explains Charles Morris, Global ICIS Business Manager. "If they are limited to only looking at the textual data that appears in the EHR, then they aren't getting the whole picture. The addition of pre-diagnostic, diagnostic, treatment, and descriptive imaging data gives a truly integrated view of the continuity of care."

Integrate imaging silos for improved care

Giving physicians access to all the images associated with a particular patient isn't easy. "Most departments have their own solutions for capturing images, but their strategies for storing and distributing those images vary greatly," says Genady Knizhnik, Business Development Director, Regional Health EMEA. "Radiology has the systems in place to manage all of their images, data and workflow – and even to collaborate through regional PACS – but other departments do not have the same level of sophistication. Service line solutions can range from sophisticated and automated image capture and workflow to unconnected digital snapshots, for example, in dermatology or emergency surgery."

While each department's clinical image storage solution is based on procedures that work fine within their own walls, things get more complicated when they try to share those images with colleagues in other facilities or departments, or with referring physicians.

"Images are going into private departmental silos in every possible way that you can imagine," explains James Jay, Vice President Radiology IT.

"Some images are printed out and filed in a paper record. Some are stored on hard drives, CD or USB sticks. Some are entered as a line item in a spreadsheet. Now imagine you're a physician from another department and you're making a care decision. How much time do you have to hunt that image down? Even if you do have the time, there is no guarantee that you will find what you are looking for in the end. You have to choose between doing without that piece of the puzzle or, if you can't, reordering an imaging study that has already been performed."

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> **CHARLES MORRIS**
> Global ICIS Business Manager

> “Agfa HealthCare is in the enviable position to leverage the experience we have gained over the past 15 years improving image and information management for the radiology world. We have the experience, expertise and products to apply that high level and sophistication to Enterprise Imaging.”

GENADY KNIZHNIK
Business Development Director, Regional Health EMEA

Given these realities, image-enabling the EHR is a logical way to help physicians deliver higher quality care, faster. To put it in context, imagine an orthopaedic or plastic surgeon is preparing to repair a patient’s severely injured hand. If the surgeon is able to access images within the EHR to visualize the hand, using clinical photography side by side with CT and perhaps even MRI imaging, it would add so much value to the process and ultimately to the patient. Furthermore, if the primary care physician also has easy access to pre- and post-surgery images and reports through the EHR, physician/patient education and patient care experience would become richer still.

Taking the EHR to a whole new leveL

“Our ICIS solution suite addresses a whole class of missing information in the EHR,” explains Morris. “It seamlessly captures imaging data in the clinical context and then links it to the EHR. Since the images are embedded inside the primary textual interface, it is much more streamlined and efficient for the people using it. Images are presented in the context of the patient’s entire health record. Doctors do not know that ICIS is managing the imaging health record, they simply know that images show up within the EHR when they need them.”

According to Morris, creating ICIS involved looking at existing Agfa HealthCare solutions and expertise and imagining what was possible. “We wanted to create a platform solution composed of Agfa HealthCare technologies that were pre-integrated together in a particular way so that when we encounter a department that has gaps along the chain of acquiring, viewing, interpreting, storing and sharing images, we can offer them a complete workflow. And that workflow leverages technology that is in place or provides supplemental technology to produce a high-quality, intelligent imaging study that is ready for EHR integration.”

“ICIS has workflow components for capturing images from sources that do not adhere to DICOM standards, creating metadata around them and delivering them to the same vendor neutral archive as the more traditional imaging generated by departments like radiology,” explains Knizhnik. “So if we go back to our surgery example, where the emergency department is recording images with their digital camera, ICIS can store those images alongside traditional DICOM images and make both accessible to everyone through the EHR.”

ICIS is a flexible suite of clinical IT services. Depending on a health system’s needs, ICIS supports multi-disciplinary image access across a network or HIE, as well as focused specialty image consolidation and access. ICIS includes

Agfa HealthCare's widely adopted regional health portfolio that enables the creation of image sharing networks across administrative or geographical boundaries. This provides for example radiologists and clinicians with access to the patient's entire radiology history irrespective of the originating radiology department. Moreover, it enables health authorities to optimize the utilization of both radiologist and radiology equipment by allowing an "acquire anywhere – report from anywhere" workflow. ICIS has the clinical breadth to cross the three primary care settings: inpatient, ambulatory/outpatient and physicians' offices. Since each environment delivers care differently (encounter-based medicine vs. schedule-based medicine vs. office appointments), ICIS supports their unique workflow to successfully acquire images.

ICIS is for everyone

"In a way, ICIS is really the second frontier of the EHR," says Morris. "The primary health record is the single most important thing we can do for patients. And then right behind it is the imaging record. All hospitals need this technology."

ICIS offers a vendor neutral architecture and support for multiple patient ID domains. What this enables is the ability to provide a comprehensive patient health record across departments within a single facility or between multiple facilities. Hospital groups, Integrated Delivery Networks (IDN), or public and private health information exchanges (HIE) can develop and effectively share unified patient records containing both images and textual information.

"ICIS enables healthcare organizations to share imaging information across regional, facility, departmental and technical boundaries," says Jay. "This allows providers to focus on their primary mission of care delivery."

In this era of increasing regulatory pressures and efficiency focus, getting images out of departmental silos and in front of the physicians who need them just makes sense. Adding an imaging layer to the EHR with ICIS can deliver far-reaching benefits that go above and beyond expedited delivery of care and improved clinical confidence. Surgeons can use it to enhance their preparation process. Primary care physicians can leverage it to deliver more detailed, image-rich patient consultations. Physicians can access it to streamline their collaborations, especially used in emergency medical situations. Plus, having images in the EHR where authorized stakeholders can access them helps eliminate the cost- and labor-intensive process of ordering duplicate imaging procedures.

"You don't need to wait until your EHR is up and running to think about image enablement," advises Knizhnik. "If you're in the process of implementing your EHR, or even if you're just in the planning stages, it is a good time to have a conversation about ICIS. Getting Agfa HealthCare involved early in the process is beneficial because we can help you make important decisions regarding the acquisition, discovery and access of imaging and non-imaging data."

> "ICIS enables healthcare organizations to share imaging information across regional, facility, departmental and technical boundaries. This allows providers to focus on their primary mission of care delivery."
>
> **JAMES JAY**
> Vice President Imaging IT Solutions

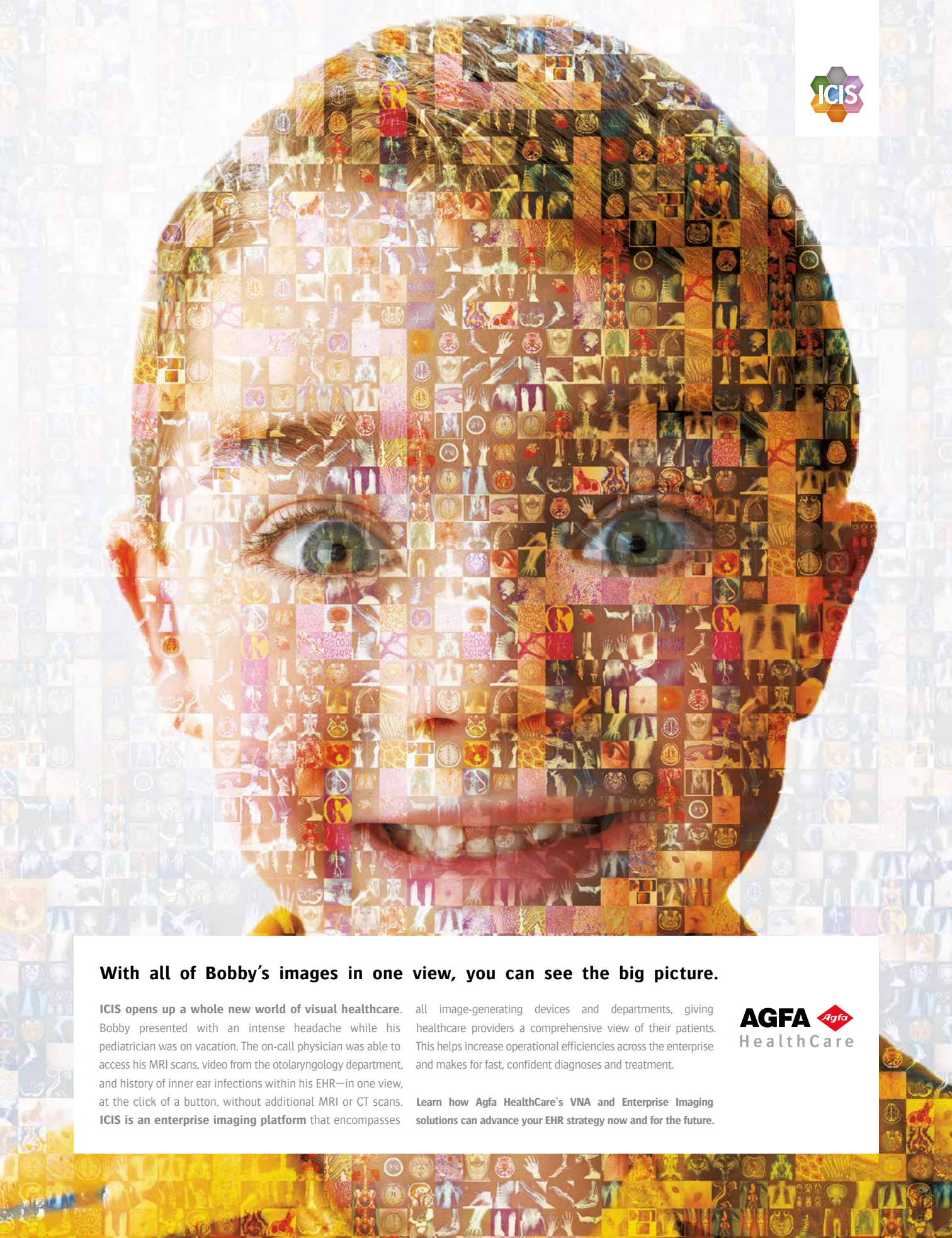
Industry-first image enablement

ICIS is a unique solution in the industry today. "Healthcare leaders are now fully appreciating the value of managing images in the EHR," says Knizhnik. "Agfa HealthCare is in the enviable position to leverage the experience we have gained over the past 15 years improving image and information management for the radiology world. We have the experience, expertise and products to apply that high level and sophistication to Enterprise Imaging."

"We don't just think about image management from the perspective of the radiologist," says Jay. "We have been stretching beyond that for some time. We designed ICIS services with input from leading clinicians and IT executives, considering deeply how imaging affects the overall quality, cost and effectiveness of care. Any number of vendors will sell you a place to store your images. That's not good enough. The true value comes in having a solution that gives physicians access to stored images from all sources in the context of the EHR. That's what makes ICIS different and so powerful."

"Someone might ask why physicians need images in the EHR now when their current methods have served them for so long", says Morris. "This is one of those you-don't-know-what-you've-been-missing-until-you-have-it scenarios. Once physicians have access to the image-enabled EHR, just try taking it away. They won't let you."

Agfa HealthCare has already enabled sharing of imaging data in a clinical context for customers in Europe, Latin America and North-America. ICIS is globally available to healthcare organizations everywhere. ■



With all of Bobby's images in one view, you can see the big picture.

ICIS opens up a whole new world of visual healthcare. Bobby presented with an intense headache while his pediatrician was on vacation. The on-call physician was able to access his MRI scans, video from the otolaryngology department, and history of inner ear infections within his EHR—in one view, at the click of a button, without additional MRI or CT scans. **ICIS is an enterprise imaging platform** that encompasses all image-generating devices and departments, giving healthcare providers a comprehensive view of their patients. This helps increase operational efficiencies across the enterprise and makes for fast, confident diagnoses and treatment.

Learn how Agfa HealthCare's VNA and Enterprise Imaging solutions can advance your EHR strategy now and for the future.

AGFA Agfa HealthCare

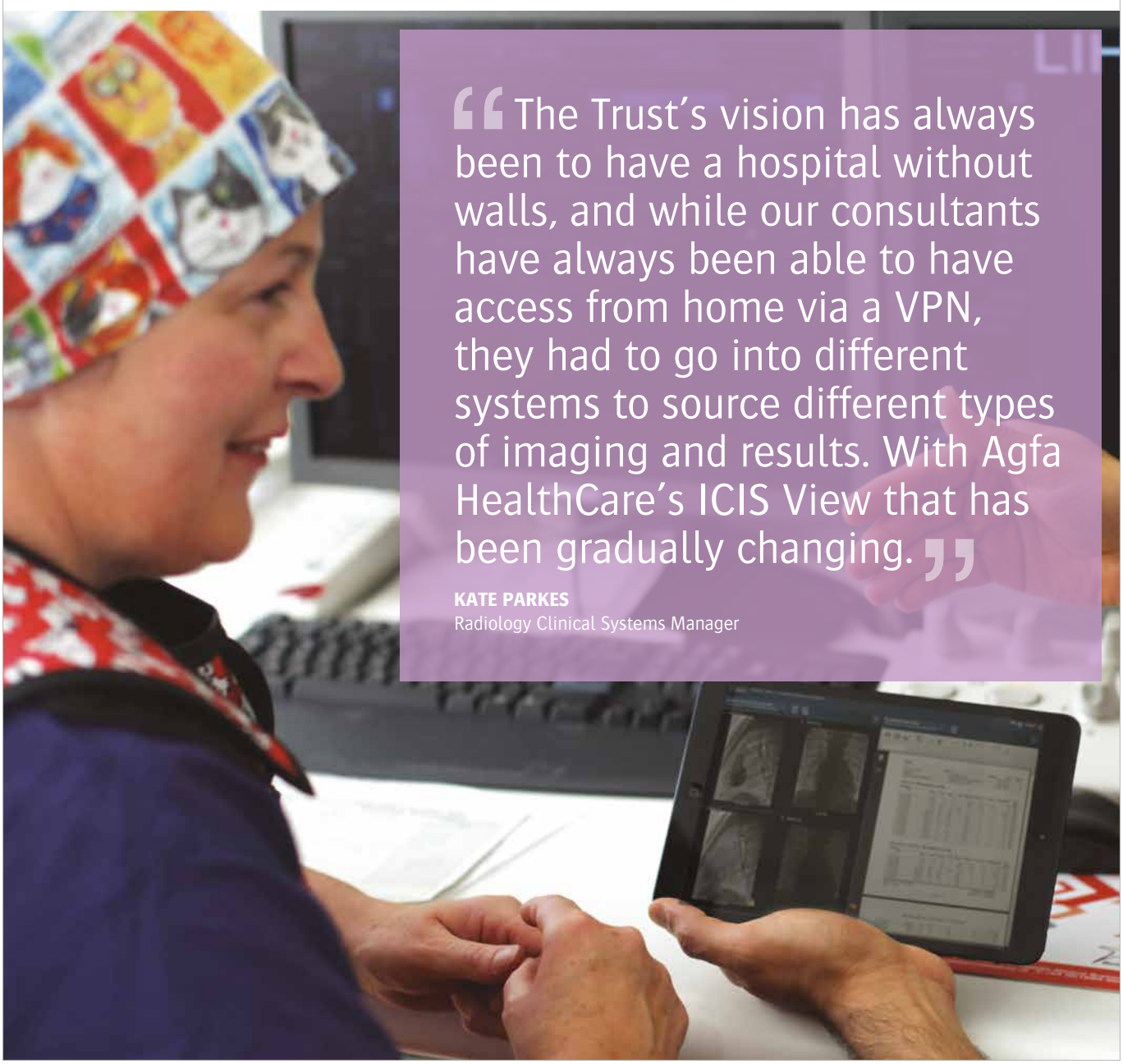
Birmingham's Children's Hospital, United Kingdom

One Vision

Kate Parkes, Radiology Clinical Systems Manager at Birmingham's Children's Hospital, explains how its installation of Agfa HealthCare's ICIS View is the latest step on its path to the ultimate goal of having every image and report on one service.

INTERVIEW WITH KATE PARKES, Radiology Clinical Systems Manager at Birmingham's Children's Hospital

"Birmingham Children's Hospital has a history as an early adopter of new IT technology," explains Kate Parkes. "As one of the first hospitals in the UK to adopt a full PACS system – as early as March 2003 we were completely digital – we are no strangers to using the latest technologies to enhance patient care and safety".



> "The Trust's vision has always been to have a hospital without walls, and while our consultants have always been able to have access from home via a VPN, they had to go into different systems to source different types of imaging and results. With Agfa HealthCare's ICIS View that has been gradually changing."
>
> **KATE PARKES**
> Radiology Clinical Systems Manager

Birmingham Children's is one of the leading pediatric specialist hospitals in the UK, providing world-class health services for children and young people from Birmingham, the West Midlands and beyond. Specialist services include liver transplant surgery, cardiac surgery, epilepsy surgery, burns, major trauma, craniofacial surgery, blood and marrow transplantation, specialized respiratory and dermatology, neurology and cystic fibrosis and consultants frequently hold outreach clinics in the surrounding area.

Developing a hospital without walls

"The Trust's vision has always been to have a hospital without walls, and while our consultants have always been able to have access from home via a VPN, they had to go into different systems to source different types of imaging and results. With Agfa HealthCare's ICIS View that has been gradually changing."

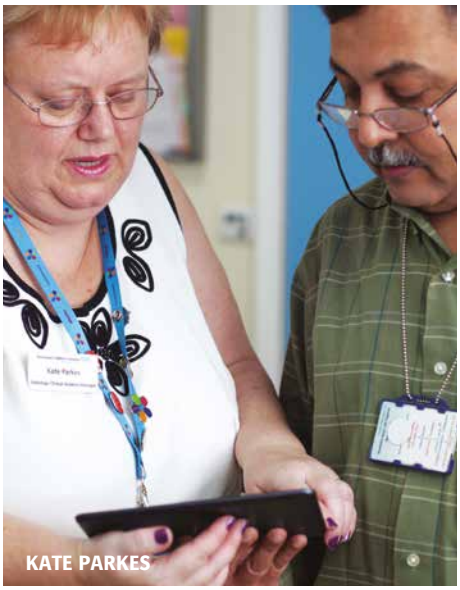
Images can be seen anywhere in the hospital

"ICIS View was being launched at around the time that we were looking to install a solution that would allow us to show our really large laparoscopic videos without impacting on the performance of the Trust's intranet as well. In addition, for studies such as endoscopy and laparoscopy, historically a lot of the information was stored on DVDs and it was often difficult to find the disc to review as there was no central store. There was a similar issue with ECG and pacemakers information; the reports were filed in the patients' records or in a folder in the cardiac unit. Now they can be seen anywhere around the hospital. "

Access to ICIS View has also had a fundamental impact on planning patient care says Kate Parkes. "It makes sure that when a child is seen by a multidisciplinary team (MDT), often with many specialties present, or when they are being discussed at the MDT meetings – which can often be as important as seeing the child – it is so much easier to flow all of the information through one service rather than having to keep switching between different systems."

ICIS View also makes interaction with the patients and their parents easier

ICIS View also makes interaction with the patients and their parents easier through its use of tablets. "We are rolling out ICIS View on Apple iPad



KATE PARKES

mobile digital devices at the moment, and although this is still quite new it is definitely proving popular with the kids," says Kate Parkes. "Children are very visual and they like looking at images on an iPad as it is familiar to them. If they can see something, then they can understand it, and children like to look at their images and see exactly what is what. They don't have the fear that adults do and they are very inquisitive generally.

Real time images save time

"Also, it is a little bit more private than having it on a computer in the middle of the ward. The iPad can be taken to the bedside and while some parents obviously don't want to see, anything that can help the child understand and be comfortable helps the parents. They can physically see changes and see improvements – or occasionally not – and it is all in real time. So, for instance, in the renal clinic or the liver clinic, they have their ultrasound and then they go back to clinic and get their results there and then. It means children don't have to come back for reports and follow up appointments and so saves time."

As with any implementation of new technology, "there is a learning curve and often when you are the first to do something, there are teething problems," admits Kate Parkes. "But, you also reap the benefits, especially if, as in our case, you have been involved in the Beta testing. We have had a say in how it looks, how it feels and how it works. And, as far as I know, we are the only site in the world that is running ClinApps*, a 3D software, on ICIS View and that has gone down really well with the clinicians here.

Our goal is all images and results from one source

"Our aim for our five-year plan is to pull all of our images into one source and then, following that, the results. We are still working with departments that haven't worked with PACS before because they have never been required to – departments such as opthalmology and the respiratory department. It has been a huge learning curve as the departments have to follow very strict workflow and in some cases, like the heart investigation unit, they have had to change their entire workflow and how they interact. But our staff is very supportive of the changes and PUG, our PACS user group, enables them to make requests for developing additional functionality. We have pretty much developed PACS as far as we can without a vendor neutral archive but, hopefully, that is on the horizon as we have a bid into Government for funding to help make that happen. I am confident that when we are ready, the solution will be there." ■

In profile

MICHAEL GREEN
President and CEO of the Americas, Agfa HealthCare

> “We have the ability to connect up the site and the technology to display all images in the context of the EHR in a completely seamless way.”

MICHAEL GREEN
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A Clear Vision for the Future of Enterprise Imaging

In this article, Michael, President and CEO of the Americas, talks about the many changes he has witnessed, the biggest challenges CEOs and CIOs are facing right now, and how Agfa HealthCare is uniquely positioned to help them meet their ever-evolving enterprise imaging priorities.

When Michael Green first joined Agfa HealthCare 16 years ago, the imaging and IT landscape looked very different than it does today. Back then, 90% of healthcare organizations were still using film to capture diagnostic images, with the early adopters implementing picture archiving and communication systems (PACS). Fast forward to today and virtually all acute care hospitals in North America have PACS in place, with the majority of hospitals in Latin America only a few years behind. As these PACS implementations matured, radiologists remained key decision makers, but the management responsibility migrated to the IT department.

Imaging extends beyond radiology

"Hospitals with PACS generate huge volumes of images that need to be securely managed and stored," explains Green. "The IT department has to take privacy and disaster recovery into consideration. When new systems are put into the hospital, they are tasked with migrating these massive image repositories. All of this can be very expensive and time consuming."

Adding to this complexity is the fact that radiology is no longer the only department in the hospital generating images. Nearly every clinical discipline that a patient interacts with today has some form of imaging associated with it, from cardiology and women's health, to dermatology, pathology and beyond. And clinicians across the healthcare enterprise want access to this steady stream of images. This reality is driving Chief Executive Officers (CEOs) and Chief Information Officers (CIOs) across North America to look at building the infrastructure to support information and image sharing across the enterprise.

Differing priorities drive strategies

"Meaningful Use is really driving a lot of healthcare IT strategies in the United States right now," says Green. "The first phase of the regulation centered around a textual-based EHR. In stages two and three, imaging plays a much larger role. Complying with Meaningful Use means finding a way to incorporate images into the EHR."

For smaller hospitals in the US, it can be challenging to find the funds to invest in large IT projects like building an EHR. This is fuelling a trend towards creating larger hospital groups that can share resources. In some cases, these hospital groups are also merging to benefit from the economies of scale.

In Canada, where universal healthcare has the provinces acting as single payers and providers for their entire population, this merging into groups has already happened to a large extent, in order to manage the system more efficiently and encourage collaboration.

"There is a move to have 'centers of excellence' where patients will visit one hospital for cancer treatment, another for cardiac care, another for childbirth, and so on," says Green. "In such a system, it's important for physicians at those hospitals to be able to share patient information and clinical images with one another in a streamlined way, in order to avoid duplicate imaging and deliver the most efficient, informed care."

Green continues, "In Latin America, the larger hospitals are also looking at how to build efficiencies within their enterprise imaging. Over the next two or three years, once more of the smaller hospitals have their PACS systems in place, we expect that they will turn their attention towards how to expand their imaging capabilities in order to maximize the advantages."

They are coming to realize that incorporating images into the EHR at an early stage is going to provide a much stronger return on investment than adding them later down the line.

ICIS empowers an image-enabled EHR now

Anticipating this need, Agfa HealthCare has created a solution to link the variety of images from multiple departments across the enterprise into the EHR so that when a physician pulls up a patient's record they have a complete clinical picture of the patient, with images and text all in one place. The Imaging Clinical Information System, or ICIS, has the power to provide a true enterprise-wide view of all imaging, no matter where or how it was generated.

"The great thing about ICIS is that it's vendor neutral," says Green. "So if a hospital is running unique PACS vendors in different departments, they don't have to go in and make a huge investment replacing systems. ICIS can integrate all of the images, even those that don't follow DICOM standards, in a central archive so that physicians can access them in the context of a patient's entire medical record. They see the right image appearing in the context of the right patient record, exactly when and where they need it.

"Nobody else in the market has a solution like ICIS," says Green. "Getting images from the multitude of systems in a hospital is very complex and, to be honest, not every company has the experience and capability to do it. Other

companies may be able to offer an image archive or a viewer, but we have both. We have the ability to connect up the site and the technology to display all images in the context of the EHR in a completely seamless way."

Forging value-added partnerships

With so many healthcare organizations looking at building an image-enabled EHR, Agfa HealthCare has entered into a unique partnership with the Cleveland Clinic to make the process easier. MyPractice Imaging Services is a consulting service designed to help hospitals come up with a solid strategy for their enterprise imaging.

"The Cleveland Clinic has world-recognized clinical expertise and leadership in the application of integrated technologies in medical practice," says Green. "We augment that with our advanced image management systems and technical support. The idea is that, together, we can help healthcare provider organizations maximize the value of their EHR investment."

> "We purposely designed our Managed and Cloud Services so that any size of organization can take advantage of them."
>
> **MICHAEL GREEN**

Another way that Agfa HealthCare is helping hospitals to manage their costs is in the area of IT solution management. Through a partnership with Dell™ in the U.S. they are offering a cloud-based Image Archiving and Viewing service that allows customers to pay for each image as it is stored. Similarly, Agfa HealthCare's PACS as a Service solution lets customers enjoy all the functionality of a market-leading radiology PACS without the major infrastructure investments.

"We purposely designed our Managed and Cloud Services so that any size of organization can take advantage of them," explains Green. "Smaller organizations that don't have the large IT departments are freed from investing in additional on-site technical resources. Large organizations can avoid making big hardware investments and taking

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>
> **MICHAEL GREEN**

up valuable clinical space with in-house data centers. By empowering these organizations to run in the Cloud, we are giving them business continuity, operational savings and complete peace of mind, thanks to built-in redundancy and disaster recovery.”

Unparalleled expertise in both imaging and IT

As enterprise imaging continues to change and grow, Agfa HealthCare is committed to staying one step ahead, anticipating which tools physicians need to provide comprehensive care to their patients, and which strategies CEOs and CIOs will follow to run their organizations as efficiently as possible. “Agfa HealthCare is the physician’s imaging partner. Wherever enterprise imaging has a role to play, we will be there,” says Green.

“There are other companies in this market that have IT solutions to offer, but they don’t have imaging embedded deeply in their DNA like we do,” says Green. “We’re experts in both the IT side and the imaging side of the business. We provide smooth workflow that keeps physicians focused on their patients. We have a long history of integrating our technology with any IT system and we are very experienced in presenting images to physicians in the format that they want to see them to make fast, accurate diagnoses. Whenever and however the needs of healthcare imaging and IT evolve, we are ready to get our customers where they need to go.” ■

CHIREC, Brussels, Belgium

Another brick in the digital wall for multi-site hospital

ICIS View brings images and users closer together.

INTERVIEW WITH DR. DENIS GOLDSCHMIDT, Surgeon and Representative of the Medical Professionals to the IT Department and DR. THIERRY ROGER, Head of Radiology Department at CHIREC

While the advantages of digitalizing a hospital can be multiplied across a multi-site enterprise, the challenges can be magnified as well. That's why CHIREC, with its six sites, in Brussels, Belgium, has a comprehensive strategy to become 'paperless'. "Transforming CHIREC into a fully digitalized enterprise started in 2005, and will take us some 15 years in all," comments Dr. Denis Goldschmidt. "IMPAX was a big brick in building our 'digital wall'. Now ICIS View gives us the web-based viewing we have been waiting for."

Left: **DENIS GOLDSCHMIDT, M.D.,** Surgeon and Representative of the Medical Professionals to the IT Department
Right: **THIERRY ROGER, M.D.,** Head of Radiology Department

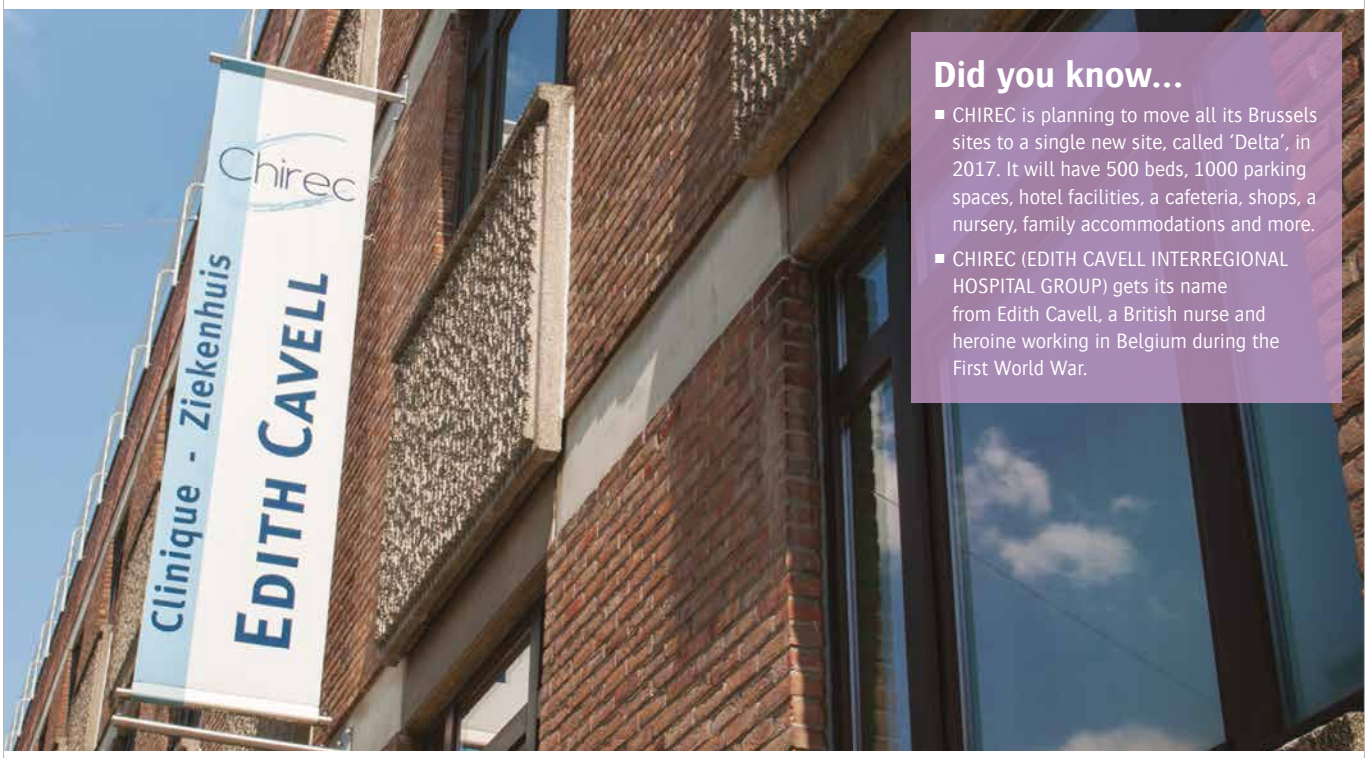
A fully digitalized hospital, to better serve patients

Dr. Goldschmidt has been heavily involved in the workgroup for CHIREC's ongoing digital transformation – a cornerstone of CHIREC's vision for the future, he explains. "This is what will allow us to provide better care for our patients, more efficiently, with fewer difficulties and fewer resources. It is a major transformation, and is changing the way we do medicine."

The workgroup knew a web-based viewer would be an important part of this transformation. With its 'anywhere, any image' access, perfect integration into CHIREC's own EHR (called bDoc), and ease of use for clinicians and radiologists alike, ICIS View fills an important gap for CHIREC.

Dr. Thierry Roger, one of the heads of the radiology department, comments, "It lets us really improve the service we provide to the hospital's clinicians. Radiologists can, for example, check images from home when they are on call, without needing to come into the hospital. And the clinicians can see the image and the report immediately, side by side, which is what they want. So there is greater satisfaction."

As Dr. Goldschmidt makes clear, though, ICIS View reaches far beyond the radiology department. "If we want to have a complete view of the patient's history, we must be able to share non-radiologic images, as well. ICIS View lets us see all our images, from any department, from any of our sites. And we have a tool that helps us as a hospital achieve our long-term goals, while also providing an attractive advantage for our doctors. That is definitely a step in the right direction!" ■



Did you know...

- CHIREC is planning to move all its Brussels sites to a single new site, called 'Delta', in 2017. It will have 500 beds, 1000 parking spaces, hotel facilities, a cafeteria, shops, a nursery, family accommodations and more.
- CHIREC (EDITH CAVELL INTERREGIONAL HOSPITAL GROUP) gets its name from Edith Cavell, a British nurse and heroine working in Belgium during the First World War.

> "If we want to have a complete view of the patient's history, we must be able to share non-radiologic images, as well. As a surgeon, for example, I take photos in the operating room, and in fact there are images coming from everywhere. ICIS View lets us see all our images, from any department, from any of our sites."
>
> **DR. DENIS GOLDSCHMIDT**
> Surgeon and Representative of the Medical Professionals to the IT department

Cleveland Clinic, Cleveland, Ohio, USA

Visualization strategy gives physicians a true picture of patients

'Leave no image behind' concept drives image-enabled EHR project at leading US hospital.

INTERVIEW WITH LOUIS LANNUM, Director of Enterprise Imaging, Cleveland Clinic

Cleveland Clinic is well on its way to achieving an image-enabled electronic health record (EHR) that provides a complete picture of a patient's medical encounter, from X-ray images to endoscopy exams. Starting from the concept of a radiology PACS, the project team developed a vision and a plan that has extended the benefits of digital image management across the enterprise, and established a new focus on 'imaging as a resource' that has taken hold in the executive suite.

> "If an enterprise truly wants a comprehensive imaging program, it is imperative to have an overarching strategic group that looks at imaging at the enterprise level, and not just at the department level."
>
> **LOUIS LANNUM**
> Director of Enterprise Imaging

For Louis Lannum, Director of Enterprise Imaging, the ICIS enterprise image management technology solution, which makes multimedia imaging data easily available across the enterprise, is changing more than just the ways in which information is accessed. "We're developing a visualization strategy that allows physicians to look at images associated with reports, and develop a true picture of what's going on with the patient," he says. "Every doctor I know is extremely visual, and now we're providing that visualization layer for them. Once physicians and practitioners and other hospital providers are able to see beyond the EHR, into a more visual world, it is going to enable better medicine, and better clinical practice."

For Cleveland Clinic, the journey to an image-enabled EHR started with a PACS upgrade. The Imaging Institute (radiology department) needed to replace a legacy PACS, along with its image distribution component. They opted for Agfa HealthCare's IMPAX solution, with ICIS as the 'storage container', along with the XERO Technology Viewer.

"We were smart enough so that when we bought a radiology solution, we also bought a strategy," says Louis. "We recognized very quickly that we could build an overarching strategy based on this infrastructure." Agfa HealthCare's Imaging CIS, or ICIS, is a new class of enterprise image management solution that offers an innovative workflow-centric platform. At Cleveland Clinic, the ICIS technology is enabling a truly global view of patient information that can be viewed at any of 35,000 workstations.

Collaboration between radiology and IT opens up greater possibilities for image and information sharing

The team at Cleveland Clinic making the purchase decision included people from the Imaging Institute, and from the Information Technology Division (ITD). "Right from the start there was a collaborative effort between ITD and radiology to take advantage of the ICIS capability. While radiology was focused on replacing its PACS, ITD took the opportunity to explore how it could broaden the scope of imaging inside the Cleveland Clinic space," says Louis.

The project has achieved all of its first-year milestones. "We have successfully completed an integration between the women's health image system and the ICIS solution, so we are now capturing all the maternal fetal ultrasounds, and we have successfully integrated the Digestive Disease Institute's ambulatory surgical endoscopy system. A month ago we began capturing ophthalmology images from the Cole Eye Institute, so although they have their own image management layer system, all the images that they capture are sent to ICIS and are displayed within the patient context inside of our EHR."

Agfa HealthCare's contribution

- Develops and supports IT solutions to maximize the clinical benefits of patient-centric imaging data, while streamlining operations.
- Provides the tools needed for enterprise-wide imaging workflows and intelligence strategies.
- Helps hospitals equip their physicians to provide better care and outcomes for patients.

Creation of Imaging Council and support from the C-suite keep strategy on track

This collaborative approach has been critical to the project's success, as has the buy-in from top-level hospital executives. "If an enterprise truly wants a comprehensive imaging program, it is imperative to have an overarching strategic group that looks at imaging at the enterprise level, and not just at the department level," says Louis.

The newly-created Imaging Council reviews all of the projects across the enterprise that have to do with imaging. The Council provides executive oversight, and ties together department and unit needs with Cleveland Clinic's overarching goal: to provide a complete longitudinal visual record for every patient.

"Our goal with the formation of the Imaging Council was to take the collaborative effort that we already had with the Imaging Institute, ITD, and Agfa HealthCare and bring it up to the executive level, and include the CIO, and the CMIO (Chief Medical Information Officer), representatives from medical areas, the chairman of radiology, administrators, and so on," says Louis. "The existence of the Imaging Council also emphasizes that imaging is a strategic initiative and a strategic resource, and here are all the departments involved in making this resource happen."

Fast image access and global patient view for physicians

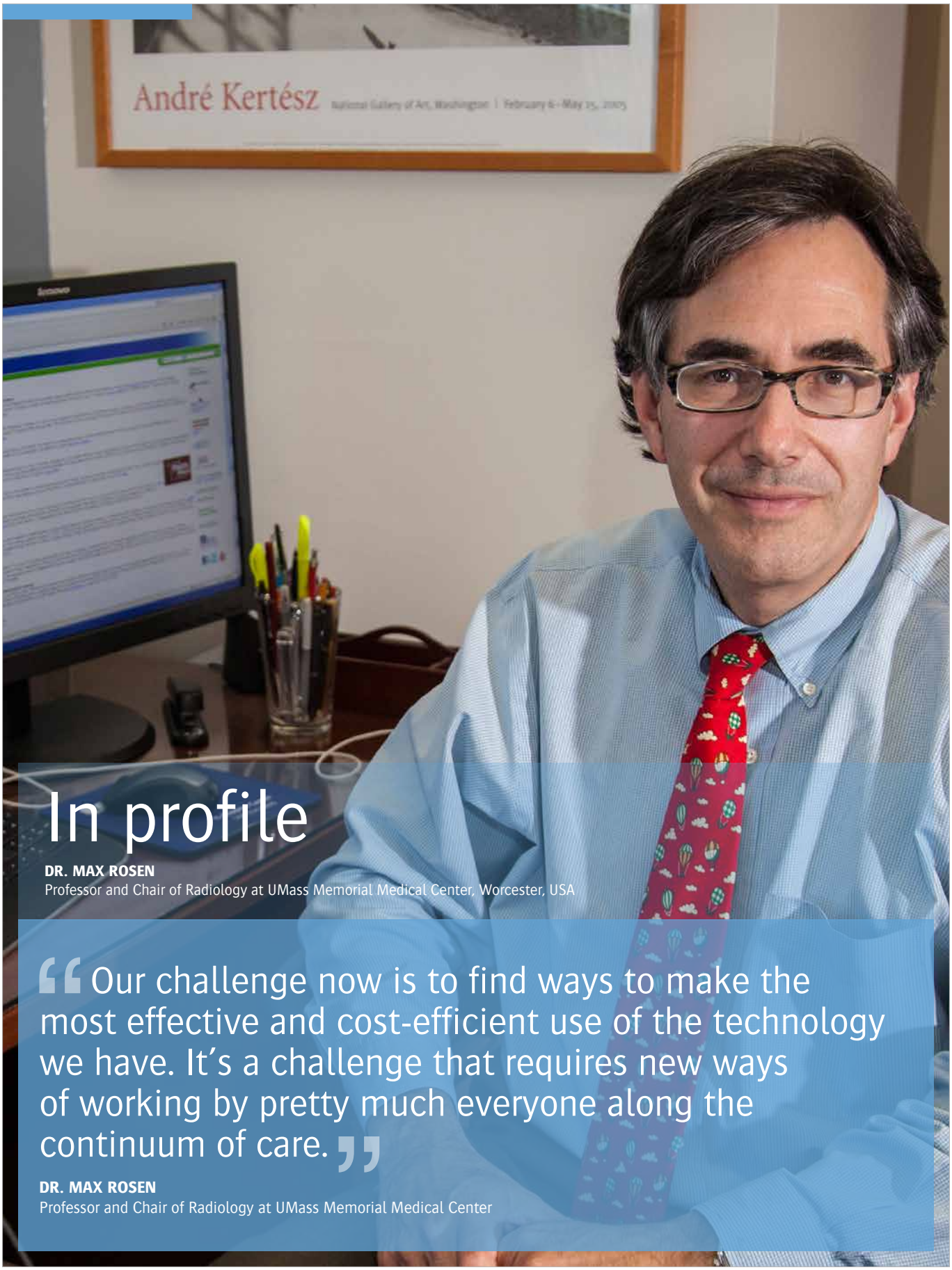
The reaction to the new access to images and information has been very positive, says Louis. "The ICIS imaging viewers are very, very fast, access to the images within the EHR is fast, there is a high level of satisfaction among our physician group. We have a global view of the patient, and the fact that the physicians have remote access to the EHR from their offices, from their homes, from outside our firewall, means that we are truly making imaging delivery mobile."

The next step is to incorporate a number of ultrasound silos and medical digital photography into ICIS. In cases where there is no department image management system, ICIS serves as a surrogate PACS. ICIS creates the metadata needed to render patient-centric imaging that's easily retrievable across the enterprise, key to the ICIS image management strategy.

For Louis and his team, this positive response has generated momentum for the project. "Before, image access was strictly radiology. Now, the minute that we display a new department's images inside our viewers, our phone starts to ring. People want to know what they can do to get their images, photographs, or reports into the EHR." ■

Did you know...

- Cleveland Clinic includes a main campus near downtown Cleveland, eight community hospitals and 18 Family Health Centers in northeast Ohio, plus other centers worldwide.
- Combined, Cleveland Clinic has 4.6 million patient visits per year.
- It is staffed by 2,800 physicians and scientists, and 11,000 nurses.
- Cleveland Clinic has pioneered many medical breakthroughs, including coronary artery bypass surgery and the first face transplant in the United States.
- Cleveland Clinic is consistently ranked among the top hospitals in America by U.S. News & World Report, and its heart and heart surgery program has been ranked No. 1 since 1995.
- In 2012, its urology and nephrology programs were also ranked No. 1 in the nation.



In profile

DR. MAX ROSEN
Professor and Chair of Radiology at UMass Memorial Medical Center, Worcester, USA

> “Our challenge now is to find ways to make the most effective and cost-efficient use of the technology we have. It’s a challenge that requires new ways of working by pretty much everyone along the continuum of care.”

DR. MAX ROSEN
Professor and Chair of Radiology at UMass Memorial Medical Center

Blurred lines

How networks, accountability and technology are drawing imaging communities closer together.

Is the world of imaging getting smaller or larger? How does evolving technology fit into an increasingly cost-conscious healthcare sector? Are private practices, community hospitals and academic centers colleagues or competitors? For Dr. Max Rosen, Professor and Chair of Radiology at UMass Memorial, these are questions that no longer have clear-cut answers, yet must absolutely be answered.

We had the opportunity to speak with Dr. Rosen, as he shared his perceptions of the future of imaging within the continuum of care. He explained how evolving technology has pushed healthcare providers to connect more closely with each other and the community, while also providing the solutions needed to support that collaboration.

Effective use of technology meets needs of increasingly cost-conscious healthcare sector

"Over the past 20-30 years, we've seen enormous growth and innovation in imaging technology. But it's been a very expensive evolution: the cost of imaging is becoming prohibitive. In parallel, the economic healthcare model has significantly changed. In the past, health insurance paid the imaging bills that were submitted, and the risk of unnecessary radiation wasn't yet a topic of concern. When a patient was sent to a tertiary facility from a community site, we would often redo imaging already performed in the community.

The situation is different today in many ways. Improvements in the technology mean that most community hospitals have the equipment to do high quality and sophisticated imaging. The result is that there isn't always a clinical need to redo images when a patient is sent to a tertiary facility.

Our challenge now is to find ways to make the most effective and cost-efficient use of the technology we have. It's a challenge that requires new ways of working by pretty much everyone along the continuum of care."

Collaboration and networks improve the continuum of care

"Hospitals are forming networks that combine academic and community practices. Consider UMass Memorial: we have our academic department based at two hospitals in Worcester; and our health care system owns four community hospitals staffed by three private practice groups; plus we have our referring physicians from the community. Instead of a competitive relationship, properly constructed networks can facilitate a smoother workflow for everyone. In an ideal world, if one site (either academic or community) had too much work on a given day, the work could be spread across affiliated radiologists in the system, ensuring faster exam turn-around time. In addition, tertiary care hospitals are now interested in lowering the cost of outpatient imaging by moving it out of the tertiary care facility into the community."

How enterprise imaging brings together imaging producers, consumers and patients

"For an integrated system to function smoothly, you need a seamless way to share images and data and to manage workflow, both within each hospital, and between affiliated sites, referring physicians and even patients. A vendor neutral archive (VNA) can group together each patient's images from multiple sites, while other software can pull and consolidate the relevant clinical information from multiple databases. The radiologist shouldn't have to hunt for images on multiple PACS systems or for relevant clinical information among multiple databases.

Dashboards should allow you to track an exam's status, every step of the way. In between the time when the exam is ordered, the report is signed and the charge is sent to the insurer and/or patient, I want to be able to track the imaging study at each step of the process. Systems like this will help us achieve the goal of improving efficiency throughout the hospital and across departments. Use of automated systems, such as critical results reporting, can also help make radiologists more efficient. Imagine, for example, that every day each of UMass Memorial's 40 radiologists spends one hour doing tasks that could be automated. That's a total of 40 work hours: the equivalent of a week's work for one radiologist."

Finding answers in a commoditized healthcare market

"Hospitals are being held more accountable for the procedures they do and the costs they charge. One way this is being achieved is through the accountable care organization, or ACO. By fixing a cost amount for a patient's care, there is no longer a financial incentive for additional imaging. Physicians must consider how additional imaging would impact the patient's overall care. Of course, one of the necessities to do this successfully is to have good data – including performance measurements – and again good data sharing! In addition, patients are more price conscious and can now shop around for the non-emergency services they need, such as an outpatient MRI for back pain. They are involving themselves directly in their health care choices, and forcing the hospitals to respond.

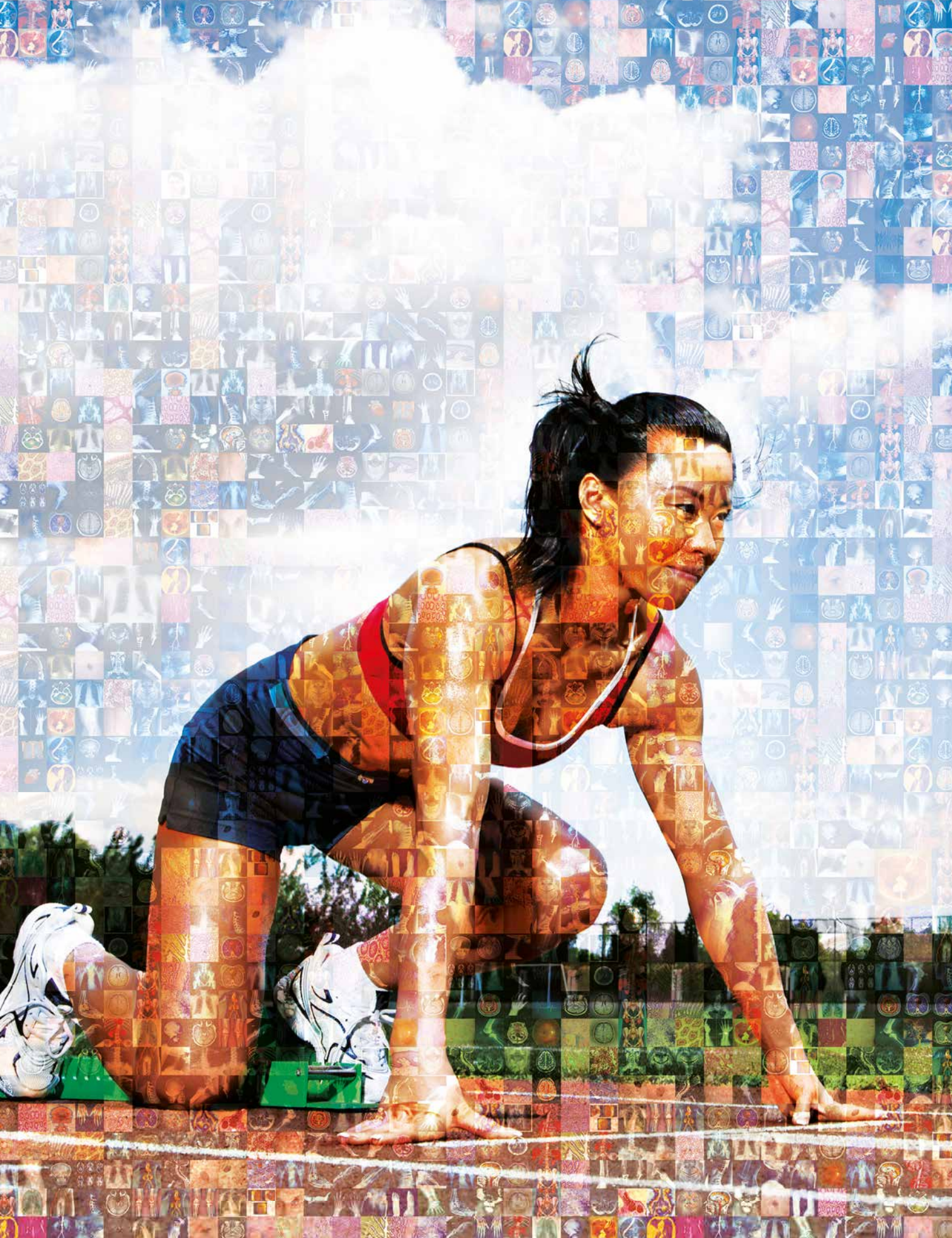
How hospitals interact and communicate with their patients is now more important than ever. I can schedule an appointment to have my car fixed on the internet; why can't I schedule an appointment with my doctor? If hospitals are providing a service, they must act as service providers. This is what patients expect today." ■

Biography

Graduating from Tufts University School of Medicine in 1986, Dr. Max Rosen completed a residency in diagnostic radiology at Boston Medical Center, followed by a fellowship in vascular and interventional radiology at Massachusetts General Hospital. He received his Master's degree in public health from Harvard School of Public Health in 1999.

At Beth Israel Deaconess Medical Center Department of Radiology, he was actively involved in preparing the department for the development of accountable care organizations (ACOs). He was also responsible for expanding the community network for the department to optimize access, volume and revenue.

Dr. Rosen's academic and research interests focus on the cost effectiveness of medical imaging and the measurement of clinical outcomes.



With all of Kim's images in one view, you can see the big picture.

ICIS opens up a whole new world of visual healthcare. When Kim presented with severe ankle swelling, her team physician was able to quickly gain access to all of the clinically-relevant images in her EHR, saving valuable time and avoiding costly duplication of scans. **ICIS is an enterprise imaging platform** that encompasses all image-generating devices and departments, giving healthcare providers a comprehensive view of their patients. This helps increase operational efficiencies across the enterprise and makes for fast, confident diagnoses and treatment.

Learn how Agfa HealthCare's VNA and Enterprise Imaging solutions can advance your EHR strategy now and for the future.

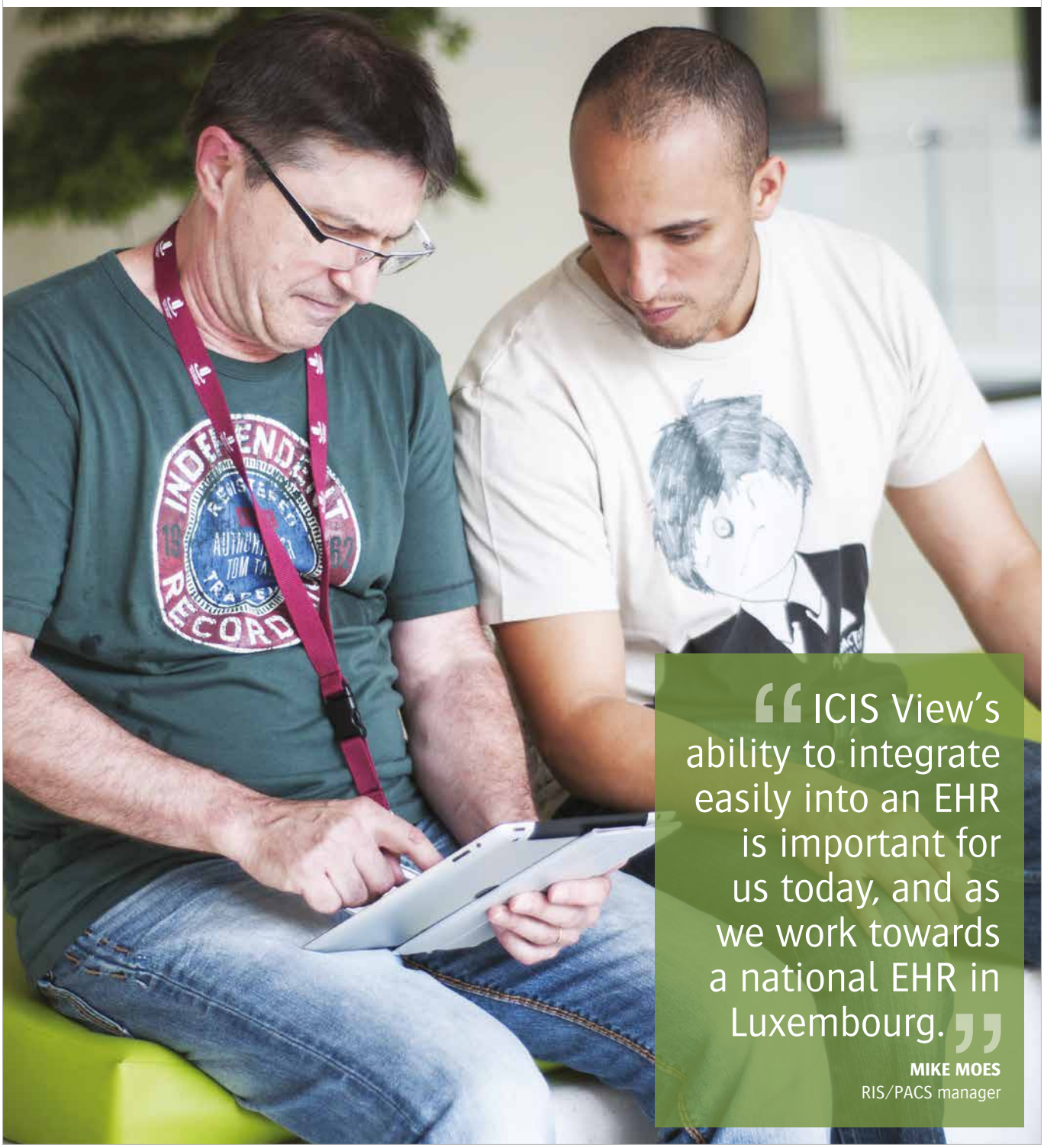
AGFA HealthCare

Centre Hospitalier Emile Mayrisch, Esch-sur-Alzette, Duchy of Luxembourg

Stepping up towards a national EHR

ICIS View helps multi-site Luxembourg hospital prepare for a connected future.

INTERVIEW WITH MIKE MOES, RIS/PACS manager, Centre Hospitalier Emile Mayrisch



> "ICIS View's ability to integrate easily into an EHR is important for us today, and as we work towards a national EHR in Luxembourg."
>
> **MIKE MOES**
> RIS/PACS manager

With a reach that covers almost half of the country, the Centre Hospitalier Emile Mayrisch (CHEM) hospital group is fully committed to complying with Luxembourg's "e-Santé" initiative. In 2012, CHEM became one of the first hospitals to implement the ICIS View zero-footprint web-accessible viewer technology. This technology, explains Mike Moes from CHEM's IT department, has helped to solve some of the hospital's current challenges, while also supporting it to prepare for the future.

Performance and functionality, from closer and simpler integration

The CHEM hospital group includes two full-service hospitals plus a smaller site with limited services. Mike Moes, RIS/PACS manager for the hospital, explains that this set-up will help CHEM adapt to the changes in healthcare organization in the country. "Each hospital is increasingly specializing, while collaboration between hospitals offers a lot of opportunity for cost control," he comments. "But this makes communication and connection even more important – including transfer and sharing of images."

When CHEM's existing image viewer reached its end-of-service life, the hospital needed to replace it quickly, efficiently and with minimal disruption. And the new viewer had to eliminate the problems of the previous solution: "It had a separate archive, which wasn't synchronized. It was slow, prone to errors… It couldn't work with Java, it wasn't up-to-date with the new functionalities, it didn't support new plug-in software components, and it couldn't integrate into CHEM's future. "

CHEM is strongly involved in the program to build a national archive platform, which will be a key part of the e-Santé initiative. "Adopting ICIS View was a good step for us, because it is open to being used within this evolving context," Mr. Moes highlights.

ICIS View also meets the other needs of the hospital, he comments. It doesn't require a separate cache, and works with Java. "Most of all, it simplifies the system. Technology advances let us do a lot more but they also make integration increasingly difficult. ICIS View offers plenty of additional functionality, but is simple to install, maintain, integrate and use. And it makes a big difference for our clinicians: enhancing how they work and what they can do."

Finally, with ICIS View, Mr. Moes is certain CHEM is once again in the technology forefront. "ICIS View's ability to integrate easily into an EHR is important for us today, and as we work towards a national EHR." ■

Did you know…

- In 2010, the Grand Duchy of Luxembourg established a special government agency – the Agence e-Santé – to focus on the digitalization of its healthcare system.
- An electronic health record – the DSP – is set to be launched by the end of 2013, bringing together all information relating to a patient's health, from all stakeholders.

> "Our relationship with Agfa HealthCare is important to us because it is more than a one-directional supplier-customer relationship."
>
> **MIKE MOES**

ICIS View

- Enables anywhere, anytime access to images.
- No separate cache, easily integrated in EHR.
- Provides secure access to standard healthcare data from existing workstations anywhere on the network.
- Uses any popular internet browser and simple network connection.
- No software download or installation required.

In profile

JAMES JAY
Vice President Imaging IT Solutions, Agfa HealthCare

The evolution of imaging IT in healthcare

How has imaging IT evolved in the past few years?

As imaging has grown in the last 10 years, during the conversion from film to the digitization of images, it has really spawned very strong departmental solutions. Given the transformation from film to where we are today, workflow improvements have certainly been phenomenal.

But what it has really led to is the development of extremely specific workflows designed for individual departments, both from how they read and diagnose images to the surrounding workflow. This development of departmental solutions has resulted in the creation of silos of images and imaging related data. There have been disparate attempts to try and get these images to other users but somewhat unsuccessfully.

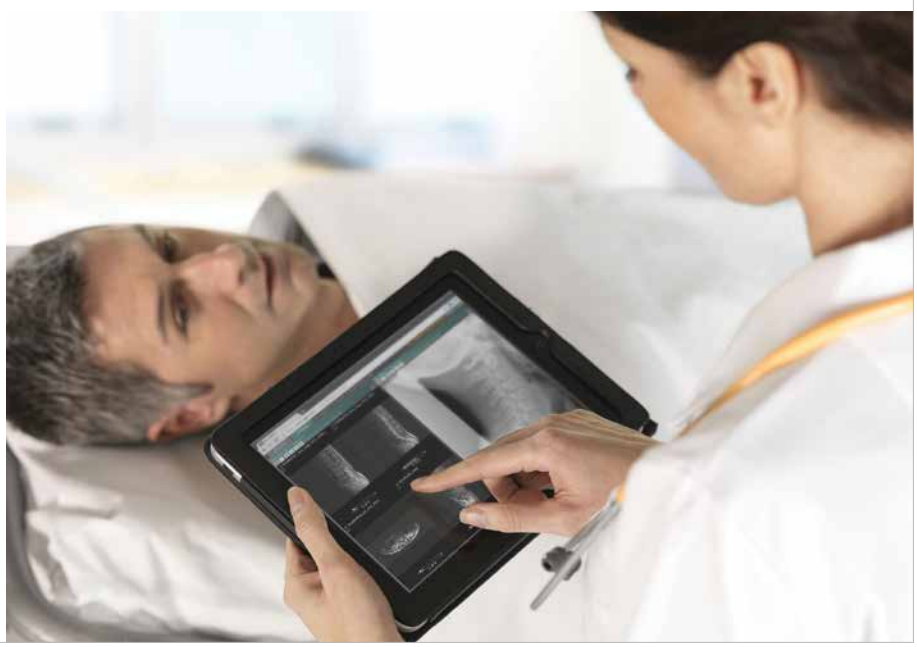
Where do you see the big changes in imaging over the next 10 years?

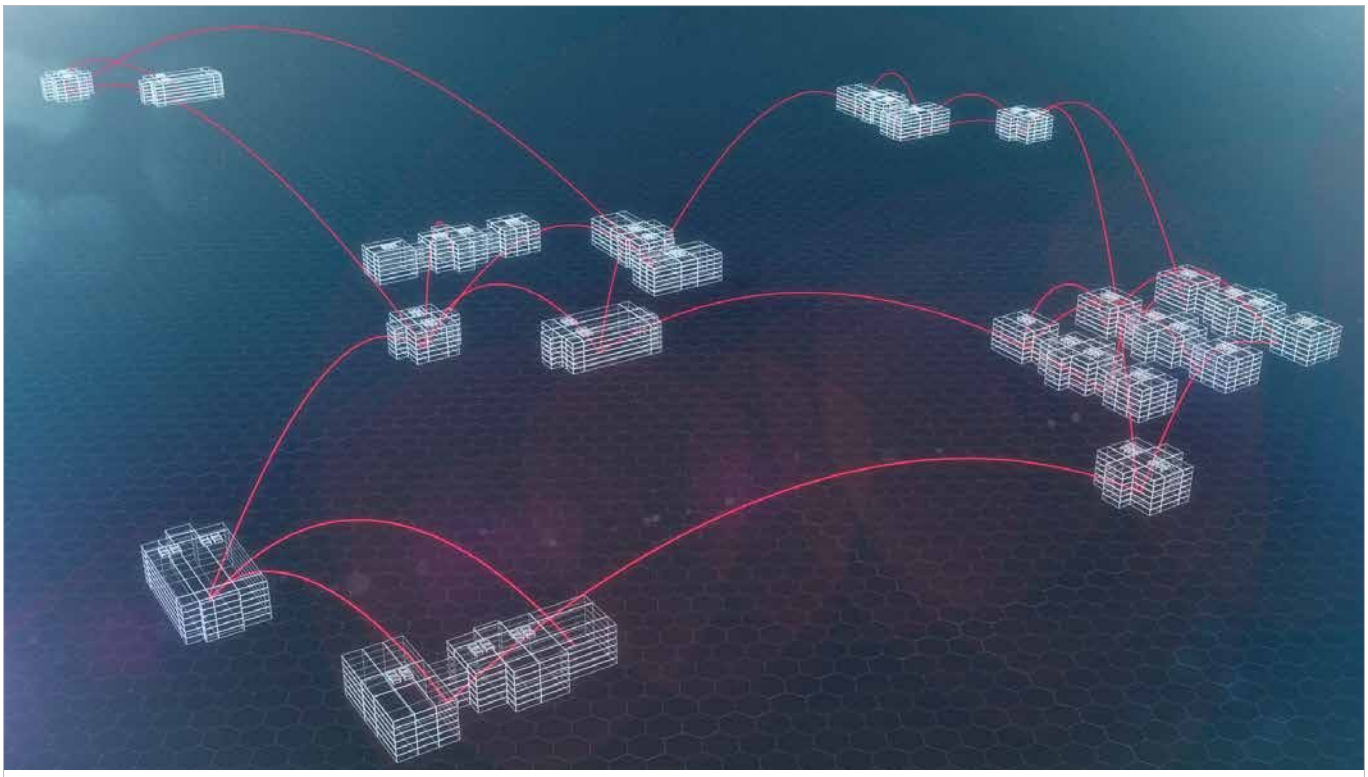
I think many of the next big changes will be driven by the expansion of the electronic medical record (EMR) / electronic health record (EHR). For decades we have been using paper charts to manage patient data and now we are seeing a transition to a stronger use of electronic tools and digitization. This enables a few things. We will have a mechanism through which information can be shared more effectively between departments, or at least the capabilities will exist and the infrastructure will be there for information to be shared. So we will see this transition towards enterprise-wide care and that is going to flow directly through to imaging.

The department-specific, best-in-breed solutions I talked about before were fine within the silos created but as we see this transition to connecting information, connecting physicians and care providers throughout a hospital or even a community, we are seeing a much broader need to bring that information together, driven via the EHR. And for imaging in particular this presents some new challenges, because there are two real kinds of players in relation to solutions that are developed. Until today, most of the focus has been on the diagnosticians of images within a department. There is a clear need to break down the walls and stress the integration across those department diagnostic users of images and connect them, but then there is also the notion of a consumer of images.

Imaging data is now more accessible and can be integrated with textual-based data or information gathered within the EHR and there is the potential that that imaging related data could be very useful in how they care for the patient. Now you've got these two pools and many more departments that could be potential users of imaging related tools and capabilities.

I think what we are going to see is a transition from departmental based imaging to what I would say is enterprise-wide imaging. It will serve both the consumer layer, integrating tightly into the EHR, and then still at the deep, departmental level, providing the right diagnostic tools for the department and connecting departments with each other and with the consumers. The focus from a provider perspective will be how to connect the enterprise across different





departments and how to connect that with the EHR. So it is much more than just putting an image in front of somebody; it is figuring out how we bring both imaging and non-imaging, discrete and raw text data, into a format that is useable by both the diagnosticians and the consumers. This is clearly where our investment focus lies at Agfa Healthcare. Our Imaging Clinical Information System (ICIS) suite of solutions meets some of these needs now, but we have many exciting innovations on tap to ensure we answer the needs of our customers going forward.

What will be different 10 years from today, or put another way, how will imaging expand beyond its traditional use?

I have been in this business for 13 years and, watching the evolution that has happened over the last few years has been fascinating, but we are just at the tip of the iceberg. We have just made that first transition from film to digital; now we'll make this transition from individual silos to an enterprise-wide system, integrating the data. But that will enable a much broader use of the technology, so I think we are going to see physician providers who before might never have looked at imaging-specific information, start to leverage imaging information. Even more, I think because of the expanded use of it, you'll see a whole new wave of imaging.

Imaging 3.0 is a term used by many, but basically there will be a wave of new algorithms, new ways that we can use images. This will include multimedia. At the present moment there are ultrasound devices that are starting to do MR, they are starting to do 4D, combining a 3D visual model with time phase studies.

These are some of the futuristic capabilities we've seen from an investment perspective, taking a model of the body and watching it progress over time, seeing the anatomical changes, changes related to disease state. So I think the role that imaging, and more importantly multimedia, plays over the next ten years and even beyond will continue to marvel both providers and patients in what it can do to help drive improved care.

As healthcare institutions are moving towards integration and cross-departmental collaboration with enterprise health records, how does imaging fit in?

I believe the key here is to focus solutions as much on the consumers of images as on the diagnosticians: it is about connecting departments and users. This presents a huge challenge because you have to figure out how to optimize within these individual departments, and optimize the connection between them while at the same time providing the right workflow.

One of the biggest fears of all users of health IT is the overload or explosion of information, that they will be expected to look at all of it because it is there. In the past you had a paper chart, you flipped through the last handful of visits, you looked at some key indicators and notes, and that was it. Now the expectation is higher because so much information is available.

The huge challenge is going to be getting the right information at the right time and driven not just by who I am but by what I am treating and what the episode is. So the development of smart systems, leveraging the latest technology and connecting users at the right points, will absolutely be one of the biggest challenges. As we enable integration across the enterprise with ICIS, we will invest to ensure we provide the right information to the right providers at the right time.

How is the market adapting to this new focus on integration, processes, productivity and added-value?

Well, it is really a tale of two worlds. I think there is a large portion of the market that isn't adapting; they are fighting to hold on to their departmental solution. This is true of both smaller

Courtesy of HealthManagement

vendors and the big players in the market. Many larger vendors have built up sub-business units throughout their enterprise and they are not willing to break down those silos and connect them together even though they might have great departmental solutions across multiple areas. So there is a definite resistance to this transition. The other side of the coin is the vendors who are designing platforms from the ground up. And this isn't easy, it takes a big investment.

The other key issue is thinking about how you can serve the broader enterprise, both from the consumer and from the deep diagnostics. The number of departments is going to expand as imaging technology expands and we move beyond just the big producer, radiology, and start to pull in other departments. Here, integration capabilities will be absolutely key, because there won't be one vendor that somehow produces everything that every customer needs. What is important is that you can offer the right breadth of solutions, both what you bring to the table and integration points for when someone has something best-in-breed but they are willing to play a role as part of an enterprise imaging system.

At Agfa HealthCare, we saw these changes coming and started the investment ahead of the curve. We took our knowledge of imaging and worked with key partners to build a new platform to enable optimization in the department and to be the integration layer for the enterprise. Our ICIS suite of applications, with the Agility engine powering it, will be the enterprise imaging solution of the future.

What role will the radiologist play in this enterprise imaging scenario?

It is interesting: the radiology department led the charge as the major producer of images, the ROI was clear and there was an explosion of imaging procedures being done. As a result they are now coming under significant pressure to further reduce costs, and the number and appropriateness of procedures are coming under question. Another big challenge concerns radiation dose and how much should be given to patients.

Even though they are the main producer of diagnostic images, radiologists are still under an incredible amount of pressure and one of the big transitions that we

are seeing is how they can become a more active player in the broader care team. Traditionally working in their dark reading rooms, radiologists need to integrate more with the broader care team, to communicate potentially with the patients but certainly with the consumers of images and to play a more active role in decision making for the treatment of that patient.

You have painted a picture with many challenges for imaging IT over the coming years. Where do you plan to focus your efforts?

We have decided to focus on a few key areas and I think we are already ahead of the curve with our investments along the enterprise imaging side of things. The first area is workflow. Enterprise imaging is all about workflow and how to connect the different departments and consumers from a workflow perspective. So we will be leveraging the latest technology. We are bringing a new engine to our solution that allows manual management of activities of the department not only at the desktop level but also at the back-end service level, and allows for introspection into other systems to bring data into the workflow presented for an individual user. This isn't coded but uses a workflow engine that can be adapted as needs change throughout the enterprise or within the department. So as activities and new things occur we can have elements built into the system very rapidly without multi-year development cycles to adapt to the market.

Another key area is the communication side of things; we really want to make sure that we are focusing on connecting users, bringing information to and from different users. So that is clearly an investment area and it will go beyond the typical chat software and move towards smart communication, getting the right information to the right people at the right time automatically.

Data is also of key importance in this transition to enterprise-wide digitization of health information. The challenge is how to build our system so that we can not only enclose data that is within our system but also allow for introspection of other systems that contain data that is not structured, that is not from a data mining perspective.

So the user makes a query to a table and the system pulls out data that is unstructured, yet is important and relevant to the user and how he is using the system. So we're looking at a lot of things and leveraging partners that have done advanced work in this area to create solutions that will go to where we want to be over the next 10 years. And this will be across the enterprise, again providing this information to the consumers and the diagnosticians.

Last but not least are our clinical tools and advanced algorithms. With our new platform we are building much more natively into the workflow of the desktop user, going beyond what is commonly used today from a 3D tools-perspective, using our own intellectual property (and what we do from an advanced imaging perspective) as well as that of our integration partners. ■

With all of Helen's images in one view, you can see the big picture.

ICIS opens up a whole new world of visual healthcare. When Helen complained of lower abdominal pain and bleeding, the local ED physician immediately accessed her EHR and saw the ultrasound performed a month ago in her PCP's office, the pathology and lower GI from the regional hospital revealing a mass, and the sequence of images during her surgery—in one view, at the click of a button. **ICIS is an enterprise imaging platform** that encompasses all image-generating devices and departments, giving healthcare providers a comprehensive view of their patients. This helps increase operational efficiencies across the enterprise and makes for fast, confident diagnoses and treatment.

Learn how Agfa HealthCare's VNA and Enterprise Imaging solutions can advance your EHR strategy now and for the future.

AGFA HealthCare

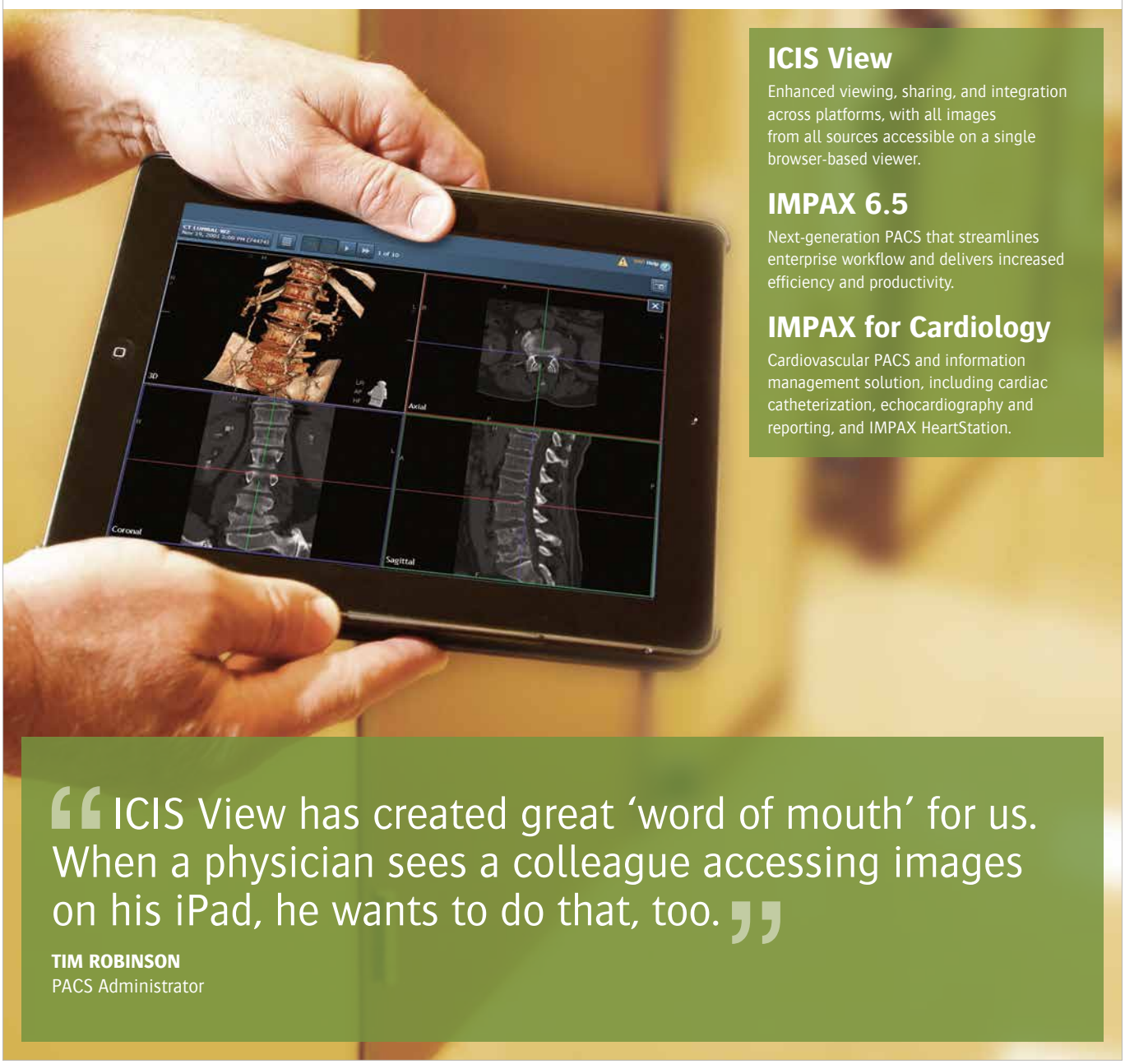
Hunt Regional Healthcare, Greenville, Texas, USA

Images on the go

With ICIS View, rural hospital offers referring physicians the support they want to enhance care quality and patient relationships.

INTERVIEW WITH TIM ROBINSON, PACS Administrator and **JOHN ERVIN,** Director of Imaging Service, Hunt Regional Healthcare

When Hunt Regional Healthcare, in Greenville, Texas upgraded its IMPAX PACS system in 2012, it was a great opportunity to add the ICIS View zero-footprint viewer. But while the hospital knew that having access to all images from all sources from a single browser-based viewer would be helpful, they did not expect the strong reaction ICIS View would receive. Now, as part of a complete IMPAX solution including cardiology, it plays a key role in the hospital's 'one-stop shop' for imaging, helping it to increase its presence in the local market and attract referring physicians.



ICIS View

Enhanced viewing, sharing, and integration across platforms, with all images from all sources accessible on a single browser-based viewer.

IMPAX 6.5

Next-generation PACS that streamlines enterprise workflow and delivers increased efficiency and productivity.

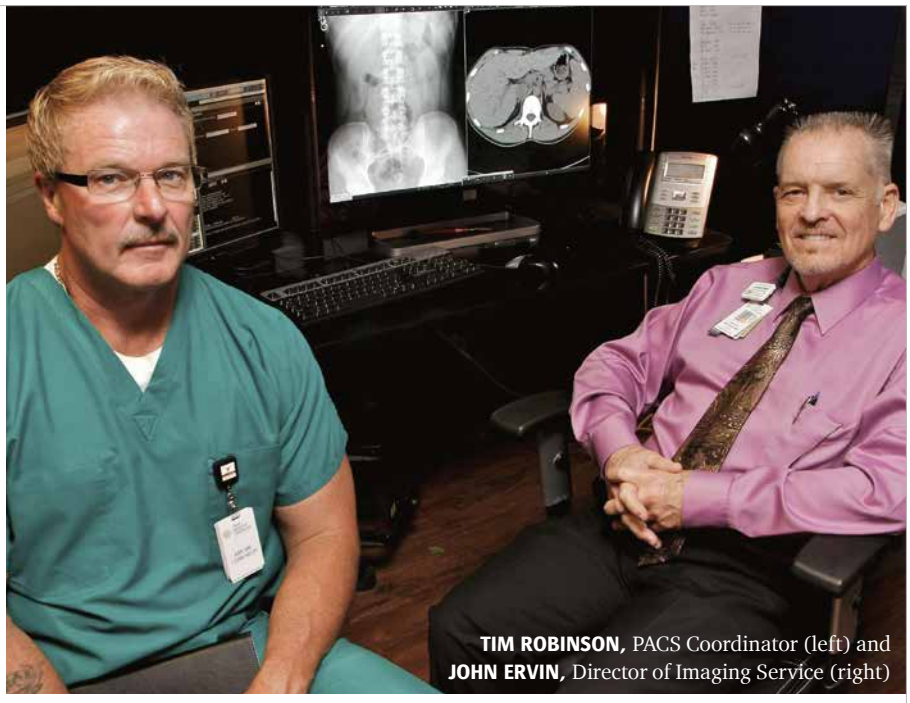
IMPAX for Cardiology

Cardiovascular PACS and information management solution, including cardiac catheterization, echocardiography and reporting, and IMPAX HeartStation.

> "ICIS View has created great 'word of mouth' for us. When a physician sees a colleague accessing images on his iPad, he wants to do that, too."
>
> **TIM ROBINSON**
> PACS Administrator

"If we want to grow, we have to offer referring physicians services that support them in enhancing the quality of care they provide, and allow them to better serve their own patients," comments John Ervin, Director of Imaging Services for Hunt. "ICIS View does that for us. The referring physicians are thrilled with the mobile access to images, available over a simple internet connection, on their laptops or even their iPads. It gives them more flexibility in where they can work, and it lets them take their images with them wherever they go. The images are available within just a few hours, so it improves their quickness of care. They can show the images to specialists or patients, anywhere."

"ICIS View has created great 'word of mouth' for us," adds Tim Robinson, PACS Administrator. "When a physician sees a colleague accessing images on his iPad, he wants to do that, too. So it's supporting our growth ambitions, as well as improving the satisfaction of our own clinicians."



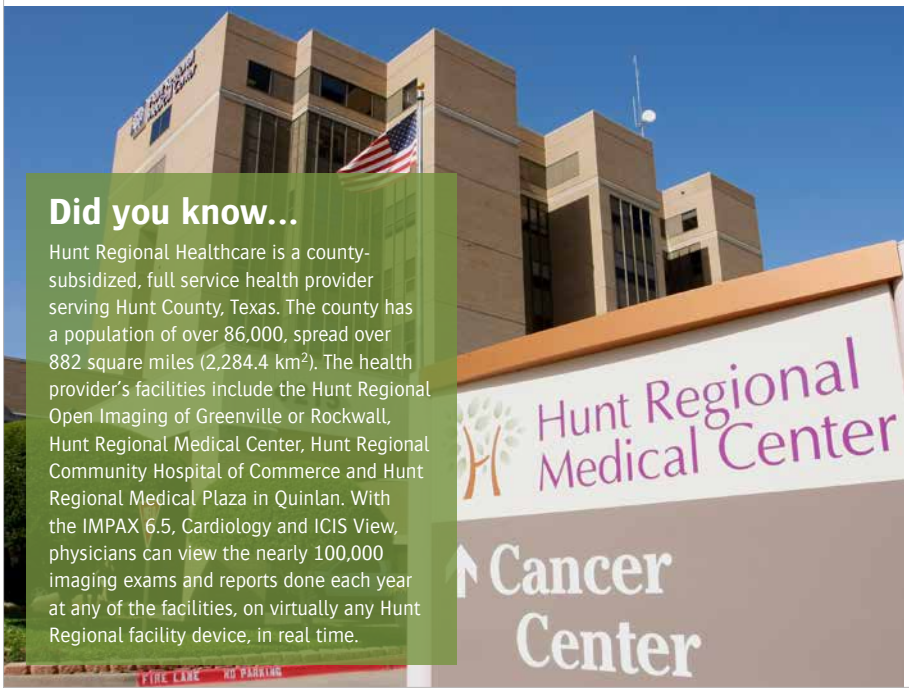
TIM ROBINSON, PACS Coordinator (left) and **JOHN ERVIN,** Director of Imaging Service (right)

'One-stop shop' for images

In 2011, the hospital group launched a competitive RFP for a radiology and cardiology PACS. "We wanted an integrated solution that would let the imaging centers see images point-to-point, while allowing us to centrally manage image and patient data," explains Mr. Robinson. The solution chosen – IMPAX 6.5, IMPAX for Cardiology and ICIS View – not only met the requirements but offers the group a serious competitive advantage. "While we used to have a range of imaging applications, now everything is on one server, routed through the IMPAX PACS. It's all accessible in one application, including radiology and cardiology, for the emergency department, clinicians, referring physicians… that's why I call it our 'one-stop shop' for images. There is only one place you have to look to find whatever image you need," says Mr. Ervin.

> "Referring physicians don't want you 'messing' with their computers. With ICIS View, they can see their images with just a simple internet connection, without adding any software."
>
> **JOHN ERVIN,** Director of Imaging Service

He adds, "We're in a rural area, where we don't always have the bandwidth to transmit large packets. With IMPAX 6.5, users can connect without a VPN; all they need is a pretty good connection. And it has multiple functions and tools that support the radiologists and physicians. At the same time, referring physicians don't want you 'messing' with their computers. ICIS View lets them see their images with just a simple internet connection, without adding any software. So the solution is helping to increase our imaging volume and propel our growth!" ■



Did you know...

Hunt Regional Healthcare is a county-subsidized, full service health provider serving Hunt County, Texas. The county has a population of over 86,000, spread over 882 square miles (2,284.4 km^2). The health provider's facilities include the Hunt Regional Open Imaging of Greenville or Rockwall, Hunt Regional Medical Center, Hunt Regional Community Hospital of Commerce and Hunt Regional Medical Plaza in Quinlan. With the IMPAX 6.5, Cardiology and ICIS View, physicians can view the nearly 100,000 imaging exams and reports done each year at any of the facilities, on virtually any Hunt Regional facility device, in real time.

In profile

HANS VANDEWYNGAERDE
Vice President Agfa HealthCare, EMEA region

"Failure to adapt will jeopardize delivery of good quality healthcare"

Health authorities worldwide are recognizing both the economic and clinical values of providing seamless access to a patient's clinical data, images and administrative data, from whatever source, in a virtual system that spans departmental, organizational and even geographic boundaries. Hans Vandewyngaerde, Agfa HealthCare's Vice President, EMEA region, discusses the company's vision and practical solutions for achieving this aim.

Major healthcare issues such as chronic disease management are driving a move to 'patient-centric' care. What are the advantages of a patient-centric approach — which implies a whole-system level?
A patient-centric approach in healthcare – and thus the IT tools to support it – is becoming more and more indispensable. As we become older, diagnostic patterns change and there is a tendency to move from acute diseases to chronic diseases. A consequence is that people have multiple diseases at the same time. Hence healthcare becomes multidisciplinary, implying that one discipline is not anymore in the center. This will make healthcare de facto patient-centric. Failure to adapt to this model will jeopardize delivery of good quality healthcare.

How should hospitals develop their systems to enable this?
The very beginning of a successful transition is a change of mind and a willingness to adapt the way healthcare

providers work. Clinicians have to work in multidisciplinary groups, even reaching outside the boundaries of the hospital. This requires proper support from the IT tools they use.

Hospitals should insist on the openness of their IT systems and compliance with communication standards. Hospitals should agree on a semantic interoperability roadmap which is both realistic and ambitious: sharing electronic documents, followed by clinical coding and structured export, then using semantic technology to reach full semantic interoperability.

Many hospitals are in the position of needing to modernize legacy systems and move away from paper records. What are the issues that should be considered and the best strategy to adopt?

Hospitals are taking one of three approaches to modernize legacy systems: a 'single supplier' route, in which they invest in an electronic patient record (EPR) system from a single vendor; a 'best of breed' route, in which they add to a suite of core systems, using technology from a range of vendors; and an 'in house' route, in which they attempt to undertake major development themselves.

The move towards a paper light (less) hospital should also include a plan to enable operational processes to take place electronically. This could include the move towards EPR solutions to enable real benefit from electronic workflows. It is not all about software, however; there needs to be a significant transformation program within organizations in line with EPR programs to manage both images and documents.

Whatever approach is taken, experience across the globe has shown that clinical engagement by those involved in using the systems is fundamental to effective implementations and the successful uptake of systems.

The rapid increase in the use of imaging in healthcare is having large implications on e.g. budgets and IT resources. How can hospitals cope with the increasing demand?

Hospitals have started to use imaging systems in a wide array of departments such as surgery, endoscopy, ophthalmology, pediatrics, pathology, dermatology, and many others.
The problem is that these departmental systems do not support healthcare standards and therefore the information is not linked. Outside radiology and cardiology, medical imaging is virtually unmanaged and data is hidden away in departmental silos. This prohibits the use of medical imaging data for clinical and business benefits.

Hospitals can overcome the above issues by creating a comprehensive electronic medical record (EMR) that includes a patient's imaging information. Agfa HealthCare's Imaging Clinical Information System (ICIS) is an enterprise imaging workflow platform that provides the longitudinal patient view, easily available to physicians within the hospital enterprise and beyond.
It does so by consolidating all the imaging data from different departmental image management systems into a single repository. ICIS ensures a high quality of imaging metadata by applying standards based imaging workflows. Furthermore, ICIS embeds the ICIS clinical image viewer inside the EMR and puts multidisciplinary imaging data in a clinical context, allowing physicians to make informed clinical decisions.

How important is it for neighboring hospitals to collaborate in providing these services and how best can they do this?

Effective sharing of patient information is rightfully perceived as critical to patient care delivery. This can be achieved by the creation of a comprehensive electronic healthcare record (EHR). One vital component that is often overlooked is to have feature-rich, easy access to integrated, patient-centric, medical imaging records. There are two models for effective sharing of imaging data: a centralized model with a single imaging repository that consolidates imaging information originating from different facilities or enterprises; and a federated model with individual enterprise imaging repositories that are linked using standard IHE Cross-Enterprise Document Sharing for Imaging. Both models are supported by Agfa HealthCare's ICIS.

> "Effective sharing of patient information is rightfully perceived as critical to patient care delivery. This can be achieved by the creation of a comprehensive electronic healthcare record."
>
> **HANS VANDEWYNGAERDE**
> Vice President Agfa HealthCare, EMEA region

Do you have any examples of where this is happening already?

The regional projects in France and the Nordics include a mechanism for sharing images and making them accessible to all, public and private, health facilities, as well as private practitioners. The image sharing infrastructure will be a basis for the development of the use of telemedicine.

In Germany, Diakonische Dienste Hannover created a 'One HIS' project aiming to unify their IT landscape and optimize the collaboration across the hospitals and clinics. The group selected Agfa HealthCare's ORBIS HIS and RIS because it could easily be adapted to the specific requirements of the hospitals in their group. In particular, the nursing documentation, management of vital data and medical documentation were especially convincing to them.
In addition, ORBIS integrates without interfaces, providing a seamless exchange of information. ■

AZ Turnhout, Belgium

Better contact, better care

ICIS View helps dual-site hospitals build closer relationships with GPs and patients, inside and outside the hospital.

INTERVIEW WITH **FILIP GOYENS,** Head of IT, **DR. HANS CUYKX,** Head of the Medical Imaging Department and **GEERT EYSERMANS,** Head of Nursing for the Medical Imaging Department, AZ Turnhout

For AZ Turnhout, the zero-footprint ICIS View is offering new ways to connect with GPs and patients – where and how they want. The advantages are obvious, comments Dr. Hans Cuykx, Head of the Medical Imaging Department. "Patients no longer have to wait for their images, workload has decreased for clerical staff, hospital clinicians can view the patient's complete digital image archive on a single viewer and GPs have immediate access to images."

GEERT EYSERMANS, Head of Nursing for the Medical Imaging Department (left) and **FILIP GOYENS,** Head of IT (right)

> "With ICIS View the images are embedded within the EHR. Clinicians can view the patient record and see the reports and images together, without switching application, even from home."
>
> **FILIP GOYENS**
> Head of IT

Did you know...

- The Leuven and Flemish Hospitals Network are implementing a hub for collecting and distributing all imaging data from 18 hospitals including AZ Turnhout.
- Reports and images will be sent to the central hub, enabling cross hospital consultation.

> "Hospital clinicians can view the patient's complete digital image archive on a single viewer and GPs have immediate access to images."

DR. HANS CUYKX
Head of the Medical Imaging Department

Enhanced viewing, sharing and integration

When Agfa HealthCare approached AZ Turnhout in 2011 to test the trial version of its new web-based image viewing solution, the hospital was very interested. The advantages of the new zero-footprint viewing technology were felt immediately. "With ICIS View the images are embedded within the EHR. Clinicians can view the patient record and see the reports and images together, without switching application, even from home," explains Filip Goyens, Head of IT. The images are displayed with all of the radiologist's annotations, mark-ups and brightness/contrast changes, so the clinician sees the image the way the radiologist intended.

ICIS View has also made sharing images outside the hospital smooth, quick and easy. "Some 25 to 30% of patients are referrals, so excellent relationships with referring GPs outside the hospital, as well as enhanced workflow and patient care inside, are priorities for us," affirms Dr. Cuykx. "With ICIS View, we can connect more closely with the GPs and create a greater sense of involvement and engagement with them," Mr. Eysermans, Head of Nursing for the Medical Imaging Department, highlights.

The solution has also helped improve the radiology department's efficiency. "We used to burn around 120 CDs each day," says Dr. Cuykx. "Now, it's only 5-10 per day. We save 1.5 to 2 hours each day, which adds up quickly."

This efficiency extends to the patient experience: "Patient complaints are usually focused on how long they have to wait," says Mr. Eysermans. "But the waiting time for images has been reduced to the bare minimum, and our waiting rooms are empty! Patients are very pleased with how quickly it all happens."

"For the hospital's image as well, ICIS View has been a real boost. ICIS View clearly demonstrates that we are a progressive healthcare enterprise that keeps pace with modern developments," concludes Filip Goyens. ■

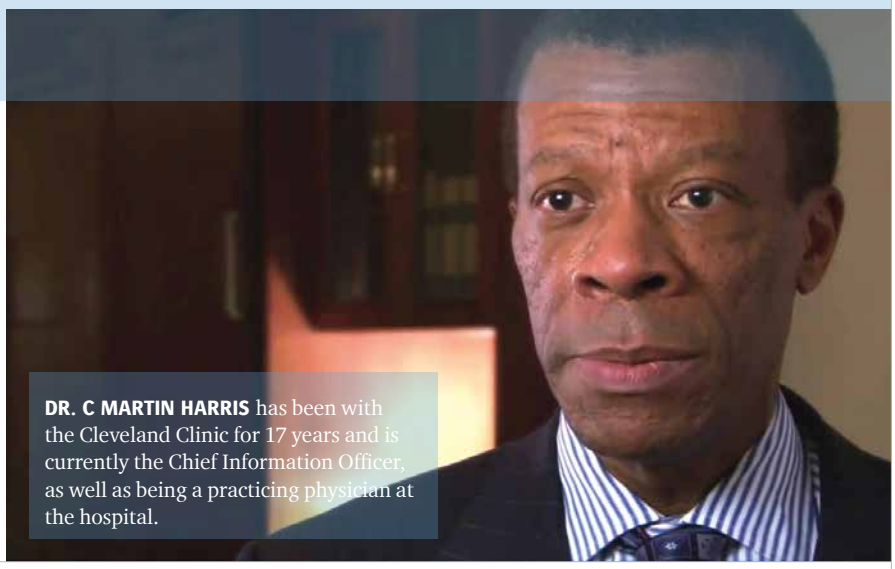
> "With ICIS View, we can connect more closely with the GPs and create a greater sense of involvement and engagement with them."

GEERT EYSERMANS
Head of Nursing for the Medical Imaging Department

In profile

DR. C. MARTIN HARRIS
Chief Information Officer and practicing physician, Cleveland Clinic, Ohio, USA

Consistently rated as one of the top hospitals in the United States, the Cleveland Clinic has a world-wide renown for the quality of its academic research and patient care. Behind the high clinical reputation of the hospital is a modern enterprise-wide IT system which, in addition to supplying all the information necessary in a typical electronic medical record (EMR) for each patient, also provides a fully integrated, comprehensive view of all types of patient imaging records. We spoke to Dr. C. Martin Harris, Chief Information Officer of the Cleveland Clinic and practicing physician at the hospital.



DR. C MARTIN HARRIS has been with the Cleveland Clinic for 17 years and is currently the Chief Information Officer, as well as being a practicing physician at the hospital.

Image integration in electronic medical records: how the Cleveland Clinic does it

Everyone has heard about the Cleveland Clinic and its high reputation but in Europe many people don't know much more than that. What and where is the Cleveland Clinic exactly?
Well in the States too, most people have heard of the Cleveland Clinic, but don't actually know too much about the details.

We are a physician group practice, that is a hospital which is owned by physicians of all specialization and who practice in the hospital. At the core of the set-up is a large 1300 bed hospital and academic medical center. This is located in the north east part of the state of Ohio, that is the part of the state bounded by Lake Erie which lies between the US and Canada.

However the Cleveland Clinic is much more than the single academic medical center, famous as that might be. In addition to the clinic itself we have a range of ten regional hospitals belonging to the Clinic and spread throughout the 120 km wide region of North East Ohio. What's more we have also a dozen or so Family Health centers scattered throughout this region, not to mention a center in Las Vegas nearly 3000 Km away, another smaller center in Southern Florida and one in Toronto, Canada.

Thus from the information management point of view, one of the main challenges we have is simply that of covering the geography, as well as the fact that when the Clinic acquired the regional hospitals, each of them had their own IT system, at various stages of deployment.

We have a commitment to our patients to always take the most appropriate and optimal clinical decisions. This in turn means that each time the patient has an appointment the clinician must have all that patient's information in front of him, up-to-date and in an easily accessible form.

So given all this, what did you do to meet the IT challenge?
Well, ten years or so ago we realized that actually we didn't have a choice – to be able to continue to meet the commitment to our patients, we just had to "e-enable" our system so that we could have one single electronic medical record (EMR) across our whole enterprise. In this way, no matter where in the system a physician is located he can access patient's data and do so in a familiar environment and recognizable document.

The key to this is to have one single truly integrated system, not just a system using interfaces to access images.

Of course the design, development and optimization of EMRs has been progressing for a long time now but a consistent oversight in this development process has always been the underestimation of the growing importance of images in the modern practice of medicine and the lack of means to fully integrate the images into the EMR. And by the way, when we talk about the increasing number of images we are not just talking about radiology, but almost all medical specialties which nowadays involve images in one form or another, right through to images of

patients' external conditions taken by digital cameras.

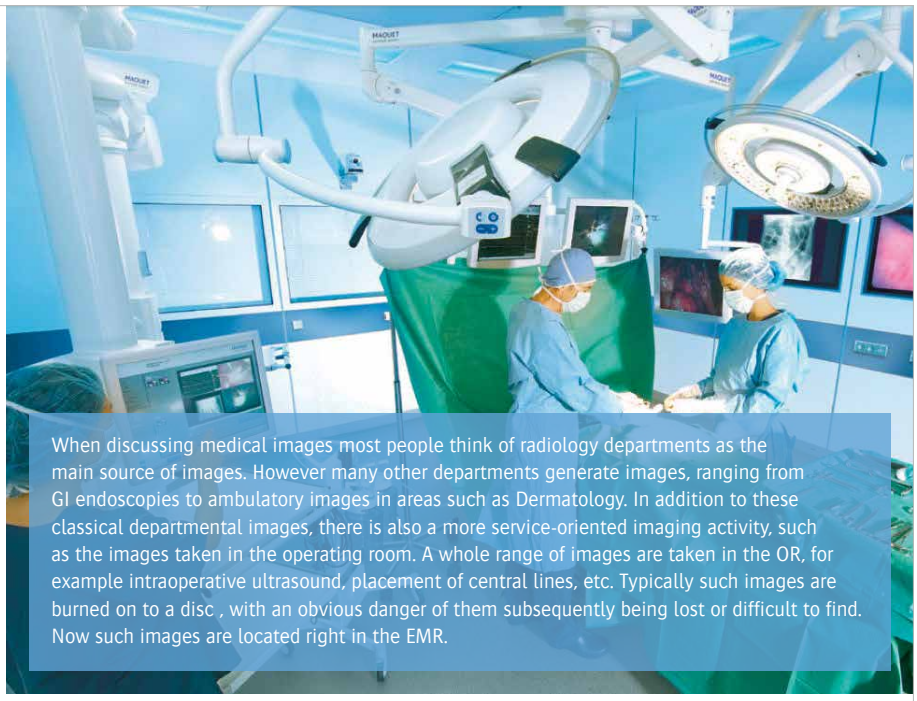
We made a key, fundamental decision to go for a truly integrated system as opposed to an image interfacing system. This has paid handsome dividends for us.

So on what technology is the new system based?
Yes let's pull back the curtain a bit. But first let's rewind to describe the system we used to have. As recently as three years ago we had several PACS systems. Radiology was the biggest one of those but other departments, e.g. cardiology also had one. Each PACS had its own associated image management system which was used to drive a storage system (vendor neutral archive (VNA)) out of which information could be retrieved using a viewer specific to the department.

This could then be connected into the EMR in a way similar to a link. The problem with this is that the accessed image can then 'take over' the EMR so that the content and text-based information in the EMR is masked by the images and no longer visible until the user gets out of the image to get back to the EMR. Not only is this really inefficient, but what's worse is that in such a situation there is a danger that, with several image interface links open, the physician could mistakenly associate an image with the wrong patient.

This was not unique to radiology — the same issues existed in the other departments who had their own systems ending up in their own viewer which again had to be linked/interfaced into the EMR.

We knew that we had to change our strategy. We went away from thinking and focusing on VNAs and storage and retrieval systems.



When discussing medical images most people think of radiology departments as the main source of images. However many other departments generate images, ranging from GI endoscopies to ambulatory images in areas such as Dermatology. In addition to these classical departmental images, there is also a more service-oriented imaging activity, such as the images taken in the operating room. A whole range of images are taken in the OR, for example intraoperative ultrasound, placement of central lines, etc. Typically such images are burned on to a disc , with an obvious danger of them subsequently being lost or difficult to find. Now such images are located right in the EMR.

We realized that what we needed was a 'Smart Library' which would have to do several things. First it had to manage in one place the context of all the images, their indexing, where they came from and where they should appear in the EMR. There would thus only be one connection back to the EMR. The new system also had to incorporate a viewer which would be multi-purpose in nature and finally, the system had of course to have VNA storage facilities. The 'Smart Library' we opted for was the Imaging Clinical Information System (ICIS).

The great thing about this set-up is that on the image acquisition side of things it doesn't get between the clinician and his preferred way of practicing his medical specialty. Thus the radiologist could pick the system best suited for his workload, the cardiologist would pick a system best suited for cardiology, and so on. Such systems are nearly always from different vendors, but with ICIS we are able to integrate these vendors into a single image distribution strategy that appears to the physician as a single user experience. Implemented across the enterprise this smart image library concept really was the appropriate approach for us.

So in practice how did you go about implementing this design?
Administratively we prioritized the order in which departments would be hooked up to the system. We started naturally enough with our radiology department who, to their credit, recognized that they had other priorities than getting into the business of mass image distribution.

However, very soon after we started with radiology we deliberately chose to get other departments rapidly involved since we did not want the new system to be perceived as a 'radiology-only' system. In short order, we got our digestive disease (DD) department involved. Our Cleveland Clinic gastroenterology unit is one of the biggest and highly rated departments in this field in the United States. With endoscopies, colonoscopies and other imaging modalities, DD is particularly image-rich.

Women's health department was then next – with fetal ultrasound this is also an image-rich department. The departments of pulmonary function and ophthalmology then followed.

> "We made a key, fundamental decision to go for a truly integrated system as opposed to an image interfacing system. This has paid handsome dividends for us."
>
> **DR. C. MARTIN HARRIS**
> Chief Information Officer and practicing physician, Cleveland Clinic

Courtesy of DI Europe

Dermatology was next – here there are a lot of images taken with relatively simple digital cameras.

From day one however we set up a council on which all departments would be represented as they got involved with the system. It's a rotating council, with members joining when their department is about to get involved and then leaving when the job of integrating the department's images is done.

Another management group we set up was what we called the physicians' advisory group who focus only on imaging from an operational point of view. This group tends to deal mainly with indexing and with questions such as how should an image actually appear inside the EMR when it is indexed.

> "We have a commitment to our patients to always take the most appropriate and optimal clinical decisions. This in turn means that each time the patient has an appointment the clinician must have all that patient's information in front of him, up-to-date and in an easily accessible form."
>
> **DR. C. MARTIN HARRIS**

In addition to these classical departmental images, there is also a more service-oriented imaging activity, where we look at images taken in various spaces throughout the hospital, for example the operating room. We're not talking here about diagnostic images taken of the patient prior to going to the OR but rather the whole range of images taken actually inside the OR, for example intraoperative ultrasound, placement of central lines, etc. In the past, these types of images were typically burnt onto a disc, with the obvious danger of the disc subsequently being lost or difficult to find.

Likewise on the ambulatory side, a priority is to be able to incorporate images typically taken by digital cameras or other personal devices. Such images should not remain on the clinician's iPhone.

So now that most departments in the clinic are incorporated into the new system, how's it panning out in practice? How efficient is it and how do you actually measure efficiency?
One measure of efficiency is that which is used in measuring turn-around time — by that I mean how quickly does information get back into the hands of the physician who ordered the tests. Here the new system is dramatically more efficient. It used to take hours for lab results to get back — now it's minutes. As for imaging, the rate-limiting factor is now basically the time it takes for the patient to physically get to and from the department taking the images. The results come back instantaneously.

Less easy to measure is the time lost by the physician in the old 'hunt and search' activities trying to locate images. Now every user knows exactly where the images he is looking for are located.

From a cost-efficiency point of view, by now we have virtually eliminated the physical delivery of paper-based medical records, and the physical delivery of films. Thus there has been a remarkable reduction in the level of staffing previously involved in such activities. This cost reduction is of course counterbalanced by the cost of the new program itself.

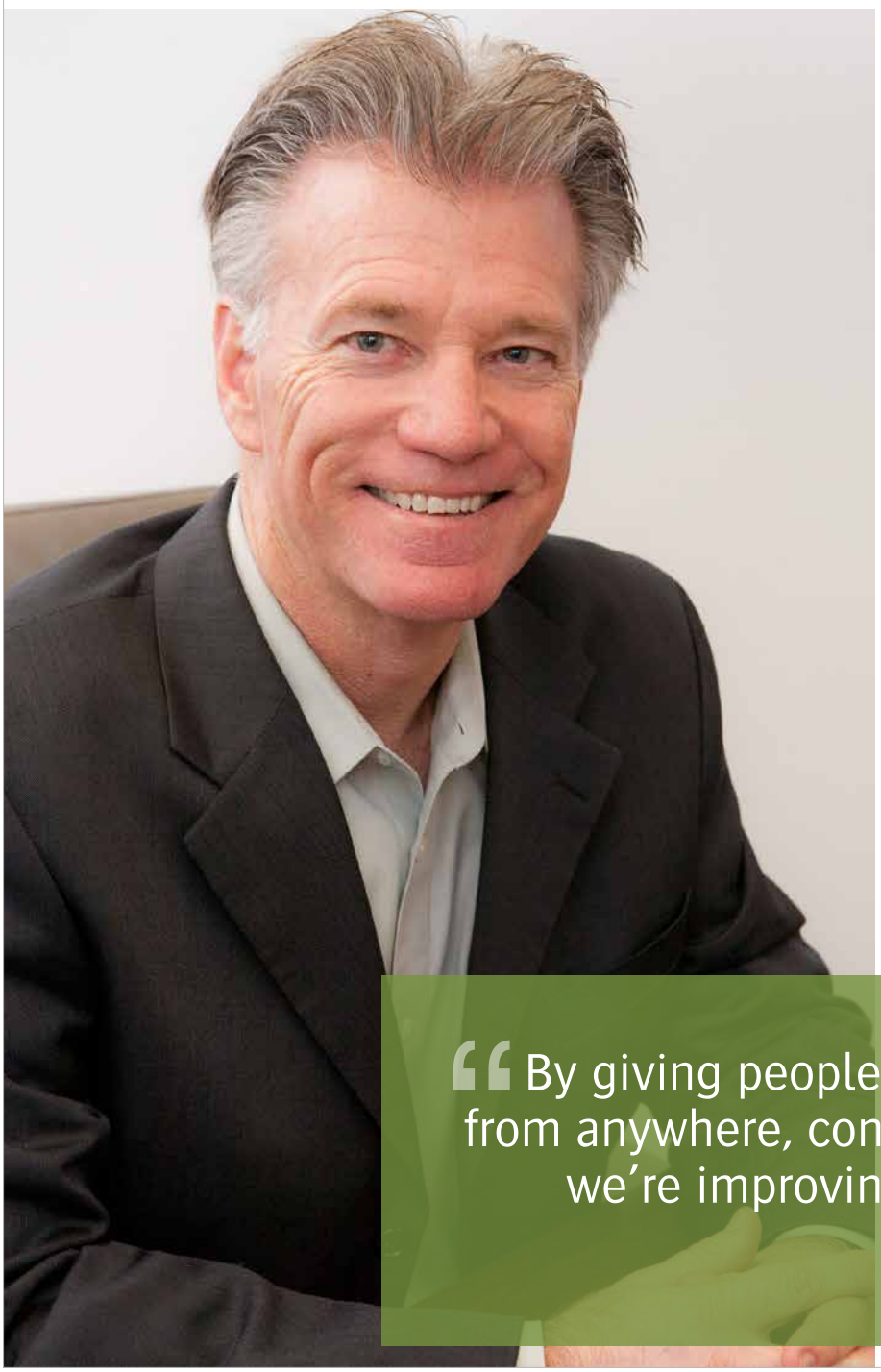
However, I see the primary advantage of the new system as future cost avoidance. On an enterprise-wide basis we anticipate that if we use the new integrated imaging approach our costs per unit storage over say the next five years will be dramatically lower than if we had stuck with the departmental approach to storage and retrieval of information. ■

UC Irvine Health, Orange County, California, USA

Unique technology in ICIS 'connects the dots' between EHR and patient images

Built-in acquisition and workflow reference tools create the links between data and users.

INTERVIEW WITH JIM MURRY, Chief Information Officer, UC Irvine Health and Associate Dean of IT & Informatics, School of Medicine

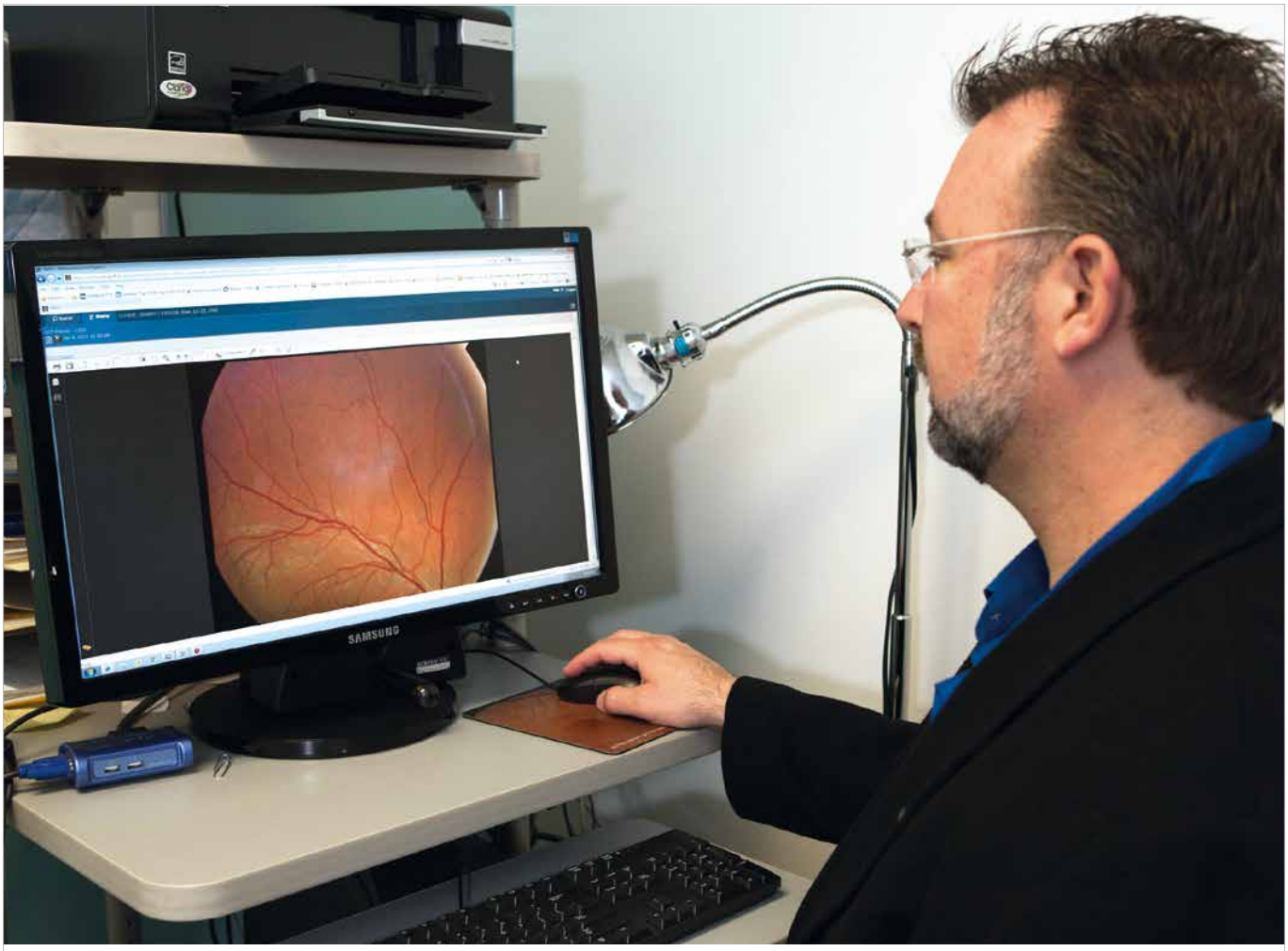


Like many healthcare enterprises, UC Irvine Health needed a way to manage the explosion in patient images and data. From ultrasounds to OR videos, from X-rays to angiograms, the facility had to find a solution to manage these millions of patient images, securely and cost-effectively, and also link them seamlessly to the electronic health record (EHR). With ICIS, an enterprise clinical IT platform from Agfa HealthCare, UC Irvine found a comprehensive solution that provides data storage and much more.

UC Irvine Medical Center is Orange County's only university medical center, not far from Los Angeles. Opened in 1976, the 422-bed medical facility offers a full scope of acute and general care services, including a regional burn center, Level I trauma center, neuropsychiatric center, Level III neonatal care unit and a National Cancer Institute (NCI) designated comprehensive cancer center. It has about 35,000 ER visits per year, and 18,000 admissions.

There were several key criteria that the UC Irvine image storage solution had to address. "It had to be able to hold any type of digital image, it had to be scalable, able to scale up and out, it needed to have a single viewer, and it needed to be very fast – users just won't

> "By giving people access to images from anywhere, connected to reports, we're improving patient care."
>
> **JIM MURRY**
> Chief Information Officer



tolerate a slow system," says Jim Murry, Chief Information Officer. "It needed to be compatible with our disaster recovery approach, and it needed to have the workflow technology built right into it."

Workflow technology in ICIS sets it above standard VNAs

For Jim Murry and his team, the workflow technology in the Imaging Clinical Information System (ICIS) is what elevates this solution above standard vendor neutral archives. "A vendor neutral archive on its own does not typically have this connecting piece – a workflow tool that allows you to 'connect the dots', to connect an image to a report," describes Jim Murry. "In the Agfa HealthCare solution there are workflows and technologies that let you get into the archive, and build a reference that allows you to feed it back into the EHR through interfaces, and connect up with the report. This allows a physician to read a report, then click on an icon to see an image, and the system will retrieve that precise image from this massive collection of images and present them with exactly the one they want to see."

In its search for a partner for its image repository, UC Irvine reviewed the marketplace, compared other vendors, and also turned to its radiology department. Since the radiologists were accustomed to working with the image management capabilities of IMPAX, they were able to share their knowledge and experience. "That helped quite a bit," says Jim Murry.

Reduced costs to manage and store data

There are numerous advantages to moving to an enterprise approach. First, there are all the costs associated with running separate image storage 'silos' across the hospital enterprise. "Now, instead of buying and managing storage for all these one-off departments, I'm supporting one enterprise-scale storage system," explains Jim Murry, "greatly reducing the investment needed in these one-off storage solutions."

The approach also brings more focus around the role of the CIO, and strengthens the connection between technology and the hospital's strategic goals. For UC Irvine, this improved

Did you know...

- The ICIS repository at UC Irvine will contain about 17 terabytes of data by the end of 2013; the IT department anticipates about 1 terabyte will be added each month.
- More than 60 UC Irvine Health physicians are listed as Physicians of Excellence in the January 2013 issue of Orange Coast magazine, selected by the Orange County Medical Association.
- The UC Irvine School of Medicine offers summer enrichment programs to about 150 high school students interested in pursuing careers in healthcare and research.

access to information will help towards the enterprise's goal to become one of the top 20 academic health systems in the United States, within five years. This ranking looks at clinical, research and education outcomes – all areas that will see benefits with the implementation of ICIS.

Enabling better clinical outcomes and research work

"By giving people access to images from anywhere, connected to reports, we're improving patient care," says Jim. "When you look at what we will be able to do with the data and the metadata, we're enabling better clinical outcomes and research work. For the first time ever, through this technology, and the right protocols, researchers will be able to access the metadata to understand and identify cohorts, and access images that they couldn't access before."

Another focus as a medical school is data security. Students, and professors, need access to images, but access must be strictly controlled. With all images in a single archive, it is easier to control and monitor access. "You can get access to the images from anywhere in the world, if you have the right security, but you can't download anything, without IT oversight and encryption," Jim comments.

So far, the ophthalmology department has gone live; cardiology is next, to be followed by ultrasound. At the same time, Jim is working with Agfa HealthCare's Managed and Cloud Services to move the solution to the cloud. "Right now, the storage is sitting in my data center. When we move it to the cloud, it becomes even more scalable, we can look at genomics, research, we can move the entire PACS into this environment. Agfa HealthCare will look after backups, disaster recovery, all of that," he says. "Agfa HealthCare brought good, experienced resources to the table, they've got a great team, they made this happen." ■

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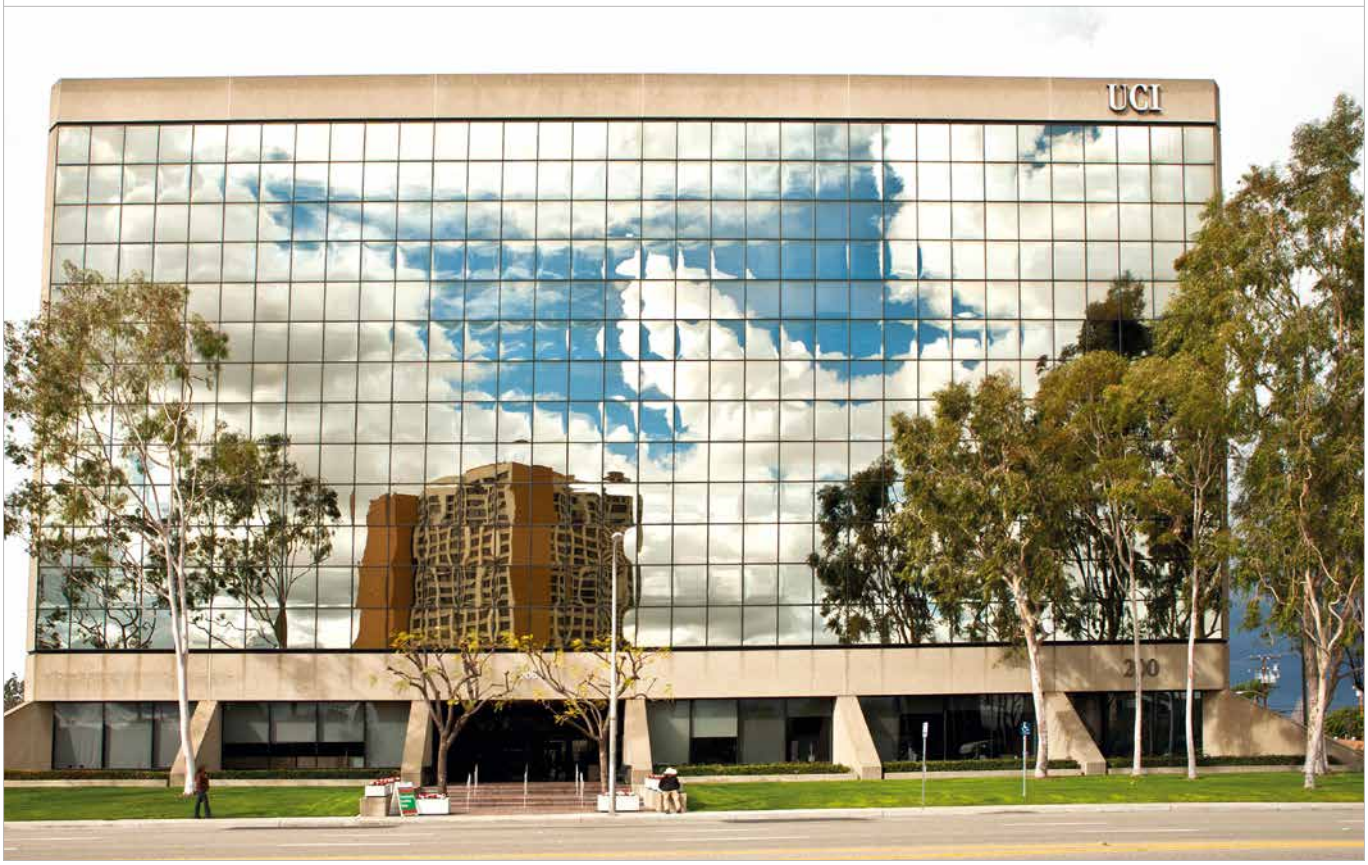
>
> **JIM MURRY**

Agfa HealthCare's contribution

- Global leaders in managing healthcare images and reports.
- Professional, expert teams contribute to projects of all sizes and scope.
- Understanding of hospital IT requirements and processes.



Facing a new healthcare reality: how IT strategy can help healthcare organizations prepare and succeed

Around the world, the healthcare industry is in a state of transformation, driven by both technological advances and by evolving economic realities. Joerg Schwarz, Agfa HealthCare Global Business Development Director, outlines an IT strategy for healthcare enterprises that can support a new healthcare delivery model, and explains why imaging is an excellent starting-off point for regional collaboration and aggregation.

In profile

JOERG SCHWARZ
Global Business Development Director, Agfa HealthCare

According to the OECD, healthcare expenditure in its member countries is outpacing the rate of inflation. "While we are now seeing costs stabilizing all over, healthcare expenditure in all industrialized countries has been steadily rising since the mid-20th century," says Joerg Schwarz, "up to a high of 17.7% of GDP in the US in 2009. Unfortunately, these higher costs do not necessarily mean better quality care."

Joerg Schwarz highlights the challenges by describing the pressures caused by chronic disease patients as an example. "Chronic conditions account for about 75% of healthcare direct costs, whether you're in a developed or a developing country, and most of that comes from only a handful of conditions, like diabetes, congestive heart failure, dementia, etc. Healthcare costs for a person with one of those conditions are double those for someone with no chronic disease. And when a patient has more than one chronic condition, expenses rise exponentially. In most countries, about 45% of citizens do have at least one chronic condition, so this is clearly an area that healthcare systems need to be prepared for."

The call for integrated care

In many countries, in fact, changes in healthcare delivery are already being implemented, he says, often involving a move towards regional consolidation and coordination. The economic model is evolving as well, moving away from 'fee-for-service' towards bundled payments for 'episodes of care'.

"In France, the regional health authorities increasingly are responsible for coordinating care in geographical areas around hospitals, while in the UK, the National Health Service (NHS) is transferring much of the control for

funding decisions in local areas to Clinical Commissioning Groups," Joerg Schwarz underscores. "We also see examples of how Integrated Practice Units, which were described by Porter and Lee in their Harvard Business Review paper, are improving patient outcomes while simultaneously improving healthcare efficiency. So in the US, healthcare players, including Medicare, are forming Accountable Care Organizations that use virtual delivery groups of hospitals and physicians to deliver all the necessary care for a patient. Germany, on the other hand, already adopted the model of bundled payments for 'care episodes', based on Diagnosis Related Group (DRG) codes. How much of a difference will this make? Well, McKinsey estimated that in the US alone, $1 trillion could be generated if the entire system switched to integrated healthcare, with providers focusing on maintaining health and wellbeing. So the incentive to move towards this model both financially and in terms of the quality of patient care is enormous."

This model requires a fundamental change in how hospitals perceive their role, as well as in how they operate. "Traditionally, hospitals would offer any type of service, and focused their attention on annual volume, not quality or cost. But that approach is no longer sustainable. To succeed in this environment of bundled payments for episodes of care, every service has to be provided at the optimum cost. Costs have to be benchmarked, and the decision of which healthcare player will provide which service will be based on those benchmarks.

The Vertically Integrated Delivery Network

"Vertical integration will allow the hospital to provide services cost-effectively using both insourced and outsourced specialists who can offer the best costs and outcomes. The hospital could increase its revenue base with additional services such as preventative services, could lower costs for low-volume services by contracting them to a higher-volume provider, and could add new services that make the patients true partners in their own care. Actions like these will increase the competitiveness of the hospital and its performance in terms of patient outcomes."

5 steps towards an IT strategy for integrated care

Achieving integrated care and supporting the new payment models requires a supporting IT strategy, and Joerg Schwarz lays out a 5-step evolution. "Imaging is a good place to start consolidating regional data," he says. "We already have an existing standard – DICOM – for capturing and consolidating data from multiple modalities into a Vendor Neutral Archive (VNA). The concept is pretty mature, and has been successfully implemented in regional and national projects in the US and Canada, for example."

"What's more, imaging is a big cost within the healthcare bundle. While imaging is a critical component for diagnosis and, often, treatment, with bundled payments there is no room for medically unnecessary or redundant exams. So it makes sense to invest in an infrastructure that provides fast, reliable and secure access to all of the patient's images, without being blocked by organizational boundaries. Real 'imaging without borders'."

The next stage is a referral workflow, he says. "Imagine that any referring physician can log into a clinical portal and start the patient's workflow, ordering images or lab tests. But the physician can also upload or share the patient's medical history. This would simplify and speed up the ordering process, and allow as much of the previous diagnostic work to be re-used as possible."

In the next step, the hospital electronic medical record (EMR) is connected to the wider care community. "Traditional EMRs were not designed for inter-organizational collaboration, but hospitals need to be able to receive and to share data with outside providers. The infrastructure to do this doesn't need to be part of the EMR itself, but it has to be able to produce and consult Continuity of Care documents."

For the next step, Joerg Schwarz comes back to the role of the patients in their own care: patient engagement. "When you put patients in control of their own healthcare, they become empowered. You can be more certain, for example, that they will correctly follow their treatment and can take on some basic care themselves (or their caregivers can). So the hospital needs to have an easy-to-use and accessible way for patients to handle things like making appointments or getting advice, themselves."

Adopting a Patient Health Management (PHM) approach is the final step Joerg Schwarz has outlined. "If you want to successfully meet the requirements of value-based payment models, you have to continuously benchmark, measure and report clinical data, and to share information. Population Health Management requires coordination between all the care players: clinicians, caregivers and the patients."

"Information systems that were designed and built for a fragmented care delivery model have to be integrated to be effective in the new environment," Joerg Schwarz concludes. "Building an IT strategy based on the five steps will help prepare organizations for the next stage in facing today's healthcare reality: creating a learning health system." ■

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> **JOERG SCHWARZ**
> Global Business Development Director, Agfa HealthCare

A 5-step evolution towards IT for integrated care

- **STEP 1** Results delivery and medical image consolidation
- **STEP 2** Referral workflows
- **STEP 3** Connecting hospital EMR with the wider care community
- **STEP 4** Patient engagement
- **STEP 5** Moving toward a 'Population Health Management' approach

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