THE POWER OF THE IMAGE

How data ownership holds the key to successful enterprise imaging in healthcare
Introduction: a new age of data sharing in healthcare

Enterprise imaging can be a big driver for a truly integrated IT infrastructure in 21st-century healthcare delivery. But do you know who owns the data which makes the image a relevant and valuable element of the EMR?

This White Paper unravels some of the complexities which surround data ownership and management in today’s increasingly patient-centric healthcare delivery models, and explains how enterprise imaging can provide the integration factor – as long as it is based on a data management strategy in which ownership is clearly defined and prioritised.

Beyond the HISS

“Enterprise imaging has become the glue. When clinicians come to IT to solve a problem, they use radiology as a metaphor. They want to share information in the same way radiology does, and their voices are becoming louder and louder. All around them they see that radiology, the laboratory, oncology have all solved problems by sharing information and building it into their clinical pathways. They are also becoming more sensitive to the fact that they need to share this information; their colleagues are already doing it, and it is demonstrably worthwhile. Radiology is not a solution that can be applied in every instance – but it has been the trigger that shows the benefits of sharing information.”

Marco Foracchia, Medical Information Systems Manager, ASMN – Reggio Emilia, Italy
A data-sharing mind set is generally well established in today’s IT-driven hospitals. Multi-disciplinary approaches to information sharing are standard, based on apparently comprehensive data management strategies. Most institutions and healthcare regions have well-integrated EMR and HISS platforms which have generated a bedrock of consistent patient data, and this is widely understood as the foundation for collaboration. But we are only beginning to explore the potential for the wealth of information locked away in the rich layers of hospital data to be used in the constant drive to refine quality of care, while demonstrating tighter operational efficiency and improved productivity.

Radiology leads the way

Now, innovative CIOs are turning their attention to this new phase of information sharing. And their quest is revealing the gaps and missing links that, if resolved, could integrate departmental workflows even more closely with the hospital’s vast data resource, delivering benefits that have a direct impact on quality of care, multi-disciplinary collaboration, and diagnosis and treatment times.

Image-based data is, of course, just one element of this vast resource. But projects pioneered by radiology departments have opened the hospital C-suite’s eyes to the way in which a data package containing all the images, notes and reports associated with a patient can be used by a team of consultants and clinicians to collaborate on diagnosis, treatment and care.

The recent development of the Digital Imaging Adoption Model (DIAM) by HIMSS Analytics and the European Society of Radiology (ESR) as a tool to help hospitals and diagnostics centres evaluate the maturity of their IT-supported processes in medical imaging – and drive them to new levels of innovation – shows how closely aligned hospital information and imaging systems have now become.

Extending this concept across the hospital, at every level of its infrastructure, takes the established role of the EMR system into new territory, in which enterprise imaging becomes the glue which brings together the needs of every hospital department and enables the best quality of patient care throughout the treatment cycle.
Pulling the data sources together

This will have a significant impact on the way diagnostic, procedural and evidence imaging are generated, managed and accessed by an exceptionally wide range of departments:

- Accident and emergency
- Breast screening
- Cardiology
- Intensive care
- Radiology
- Ear, nose and throat
- Elderly services
- Endoscopy
- General surgery
- Maternity (Obstetrics and gynaecology)
- Microbiology
- Neonatal
- Nephrology
- Neurology
- Ophthalmology
- Orthopaedics
- Urology

A subtle shift

When it comes to driving these innovative strategies, there has been a subtle shift in the role of IT away from the traditional approach of trying to control everything within its functional remit. Hospitals in which CIOs and IT managers are integrated with the clinical environment, understand the processes which depend on shared information, and are focused on simplifying workflows while allowing patients greater access to their data, are in the vanguard of this new age of collaboration.

With the patient now established as the primary owner of their data, the need to break down the walls of traditional data silos so that it can be
WHY DATA OWNERSHIP HOLDS THE KEY TO SUCCESSFUL ENTERPRISE IMAGING IN HEALTHCARE
shared safely and securely between departments, with other specialists and institutions, and even across geographies, is helping to uncover its true value.

**Expertise through consultancy**

IT vendors like Carestream understand that developing solutions which help hospitals to realise that value requires a consultative approach, combining knowledge, experience, state-of-the-art technologies and integration capabilities in every area that they touch.

“When enterprise imaging is understood and closely integrated with the hospital strategy, it enhances the possibilities to deliver the best possible ROI,” says Massimo Angileri, Carestream Vice President, Healthcare IT EMEA. “The governance of a hospital’s equipment and resources is the main pillar for developing the best quality metrics for patients – everything comes back to investment in the enabling tools and technologies. And our wide experience of managing billions of images every day around the world gives us a powerful perspective on the role of enterprise imaging in the business of the hospital.”

Angileri says this evolution fuels Carestream’s goal to fulfil a consulting role in its customer relationships. “Technology changes every day – and we need to help IT and clinicians meet with a common understanding of the infrastructure that will provide the best value in solving their challenges and achieving their goals. Being the consultant, designing the right solution, understanding the clinical needs and departmental workflows – that is the core of our business.”

**Architectural approaches**

Carestream’s ethos is also rooted in the end-to-end design, delivery and support service which it provides from its pan-European state-of-the-art Technology & Innovation Center in Genoa. This collaborative approach allows the industry to identify key areas of commonality, fed and influenced by each new project, which become the foundation for customisation and implementation. The traditional format for system building – creating a
unique concept from scratch – and its capacity for proliferating anomalies rather than identifying shared standards, is being replaced by a more rational, innovative vision based on consultancy and constant refinement.

“An enterprise imaging system will touch many different areas of the hospital, and might be accessed by thousands of users. That in itself generates a high number of diverse requirements. They are all using different systems and workflows – and the enterprise imaging system is the focal point of integration for everything. Naturally, a hospital CIO wants to know how one vendor can address this,” says Stefano Arata, Carestream European Healthcare IT Solution Architect.

“For us, building the right enterprise imaging solution always begins by listening to the concerns of the hospital, helping them to identify what they actually need – and translating that into practical solutions.”

From these early discussions, the foundations of the system emerge in the form of an architecture definition document which includes all the components that will be integrated to build a tailored image management infrastructure. Collaboration continues throughout the sales and delivery phases of the project, ensuring that the design is actually being delivered and, crucially, incorporating changes and new requirements as they emerge during implementation. Feedback is constantly collected so that Carestream’s R&D team can build requested innovations into new system releases – and customers see how their own experiences and expertise are influencing the systems in which they are investing.

Six touch-points for driving change

The integration of patient and hospital data is changing the way in which hospitals measure quality. In many respects, this is part of the ongoing process of digitisation. Technology is setting new expectations as tools allow deeper access to data which reveals the productivity and throughput of departments, and of individual modalities and clinicians. The more transparency there is, the more that data will be integrated, and the opportuni-
The rapid growth of the mobile healthcare market is driven by greater expectations of access among patients and clinicians.

Ties for streamlining diagnosis, reducing waiting times and creating time for more patient appointments identified.

Ultimately, truly integrated data gathered from all these sources holds the key to building the best quality metrics for patients, which can then be understood and used by every discipline in the healthcare delivery chain. The opportunity for the IT function to prove its value to the hospital by implementing infrastructures, systems and tools which support this collaborative vision is a watershed moment in the evolution of healthcare technology.

How can IT and clinicians join forces to influence these strategies in the age of big data? Carestream’s 20 years of experience in developing and supporting enterprise imaging solutions has revealed six touch-points which shed light on the way technology can drive change through information sharing and collaboration.

1. Incompatible workflows

We are still some way from arriving at the point where every workflow in the hospital is integrated with core imaging and information management systems. But improving workflows is essential for shortening the diagnosis process and delivering a higher quality of care – making this an important focus for any integration project based on enterprise imaging. And it requires an accurate picture of how a process works, where the relevant data sits and who needs access to it at appropriate times. IT has an important role to play in driving standardised workflows which support efficient processes, but it needs to understand the clinical perspective rather than impose a solution for its own sake.
2. Consumerised healthcare and patient expectations

It is early days but patients are increasingly aware of their data ownership and its implications. Accessibility will become a key measure of care quality. Patients will expect to have instant access, regardless of their location, in the same way that they can use their bank card to access their account – and digitisation will be the main enabler. Paper, physical CDs and DVDs or even email exchanges will not be sufficient. One-click web access to images and other data that patients can share – with a third party for a second opinion, for example, or with their insurance company, will eventually become standard. But hospitals can only provide it if they know where the disparate data resides, deliver holistic access via a single portal.

3. The influence of the millennial clinicians

Data sets can be very large; an oncology case might consist of tens of thousands of images with scan reports, lab samples and pathology reports, consultants’ notes, prescriptions and more. Existing storage and archiving strategies have helped to create big tranches of data, accessible by a viewer which opens numerous applications. Radiology has paved the way for more focused access to rich data sets, allowing a clinician to see all the case-relevant information via a single click on their browser – and to share it with colleagues in any location. This is how enterprise imaging takes data sharing to a new level – and provides the value which millennial healthcare professionals now expect from their systems. They don’t need to see multiple terabytes of data – just the set that can help them identify a condition or make a diagnosis at the time they are dealing with a particular patient.

4. Inconsistent standards

Data sharing standards and protocols such as HL7 and DICOM are established boxes that any enterprise imaging platform would be expected to tick. But they take no account of the variation in interpretation by specialist system vendors who might be required to integrate with central systems. IT has an opportunity to push back to the market with demands for vendors to collaborate more closely on standards-based integration – helping to streamline compatibility and shorten delays in realising comprehensive data management strategies that include imaging.
5. Data and cybersecurity in an ‘open’ infrastructure

IT vendors will come under increasing pressure to decide the best place to store healthcare data – whether it’s in the hospital or, as some people think is most likely, in a cloud-hosted environment. Whatever the particular direction of travel – and this will surely be influenced by developments in European data privacy law – the institution, the region or the government will ultimately create a comprehensive data repository which will be accessible to patients and clinicians. The IT function will look to the industry for solutions which can help them balance the challenge of ensuring data security compliance with levels of accessibility that allow clinicians to deliver the highest possible standards of patient care.

6. The rise of unstructured data

What happens if images are not archived effectively? As hospitals look to harness the power of big data, their main challenge is to locate it in the silos which, despite the advances in digitisation, are very much still in place across today’s complex infrastructures. This information is already there, and multiplying. If it can be managed and analysed, its value in terms of identifying patterns in service usage, discovering demographic health-related trends and understanding how a population interacts with its healthcare services will be significant. By implementing systems and tools which enable such granular levels of analysis, IT can truly open the door to a new age of big data exploitation in healthcare.

Three image sharing tales from the front line

Hospitals, trusts and healthcare regions arrive at the gateway to enterprise imaging via different routes. But their experiences often provide examples of challenges that are relevant to many different scenarios and shed light on how to prioritise data management strategies for the best outcomes. As these three case studies show, the benefits of successful enterprise imaging touch the patient, the healthcare professionals, and the hospital in equal measure.
Value in the leftovers

ASMN Reggio Emilia is an 1,800-bed regional healthcare trust consisting of six hospitals. Its enterprise imaging strategy is built on the need to resolve the rising tide of clinician requests for ways to share data between smaller systems and the big hospital systems — what Clinical Systems IT Manager Marco Foracchia describes as the leftovers of IT management in the wake of a major EMR system implementation.

The meeting of technical and clinical needs was a revelation — not least in the domino effect as clinicians discovered the value of sharing information, and the IT team discovered hitherto uncharted data sources which needed to be brought into the fold in order to complete the digital pathways.

"In the past, the pathway was based on the patient being physically present, and the information stored at that point," says Foracchia. "With information sharing, everything can happen at different locations but the data is prop-
“I’d say that technology is only 40% of the solution, the other 60% is cultural.”

Cultural differences

Alessandro Dreosso is CIO at Centro di Medicina, a network of private and contracted healthcare facilities in the Veneto area of north-eastern Italy. He manages an IT team that takes care of 18 branches – and is steering the organisation through a major change management process, which has revealed a major challenge: the ownership of unstructured data.

“At the moment, for example, we are upgrading some departmental software – but when we started importing data from the old to the new system, we found something incredible,” he says. “Completely unstructured data coming from many different processes in the department. Each work had their own way of managing information. This was a huge challenge because we had to change the heart of the software and establish a new way of managing the data. And we are still at the beginning – there are 26 different systems running across the Centro Medicina!”

According to Dreosso, unstructured data often signifies bad processes – and those need to be addressed before a new IT system is introduced, and structured data established. “I’d say that technology is only 40% of the solution,” he says. “The other 60% is cultural.”

The integration conundrum

At Gaslini Children’s Hospital in Genoa, the largest paediatric hospital in northern Italy, an enterprise imaging solution that consolidates the radiology and cardiology departments is well established. However, as CIO Simone Lightwood reveals, specialist systems across the hospital are less easy to integrate – and this leads clinicians to find their own ways to share information.

“The main challenge for us was not integrating radiology and cardiology, but in integrating specific pathways like dental treatment or ophthalmology, which traditionally operate in closed, private silos,” says Lightwood. “Enterprise imaging is a new concept for them, and locating the data is just the first step. Then comes storage, and then the sharing.”
For Lightwood, it is a challenge that must be met by the market. “Even if you have a niche market, you must move your system to an enterprise vision,” he says. “We have to share our information in faster and easier ways – as done by the main commercial file hosting services – but also in the right way, which is compliant with the law. Standards are nice, but the market will only start building interfaces at this level if we start asking for it.”

The goal, not the technology

Estonia is now approaching the tenth anniversary of its healthcare digitisation programme – and the extent to which patient ownership of the data has been established is increasingly clear. In May 2017, for example, monthly statistics showed that in a country with a population of 1.3m, there were 1.4m patient requests via the patient portal.

“Of course, not every patient is worrying about their health but still that’s an amazing number, and we see an exponential rise as we introduce new services,” says Dr Peeter Ross, Professor and Senior Research Scientist at the eMedicine Lab of Tallinn University of Technology.

Ross suggests that any information sharing project must begin by asking why you are doing it. Identifying the desired outcomes often starts with a single stakeholder. But as with Estonia’s national PACS, solely a radiology initiative, it can become an enabler for the services and installations that ultimately define the accessibility and availability of digital healthcare.

Where next?

It is hard to escape the conclusion that when it comes to hospitals deriving maximum value from their IT investments, everything comes back to the management of the data. The data holds four keys:

- For patients to enjoy enhanced quality of care and services in the new age of data ownership.
- For clinicians to make quicker diagnoses and streamline care pathways.
- For hospitals to improve workflows so that every process delivers value and productivity to the bottom line.
• For IT departments to bring greater value to their role in building and delivering systems that enable information to be shared in increasingly diverse ways across the hospital or trust infrastructure

In order to turn those keys effectively, the imperative is for the clinical and technical sides to collaborate in locating and rationalising the entire data ‘estate’ of the institution. Understanding who currently controls it, and how they use it, is just the beginning of building a framework which will take the benefits of shared information to every aspect of hospital performance and healthcare delivery.

Working with technology providers who also understand that requirement and have the tools to store, access, mine and analyse the data will help the hospital to realise its value quickly – generating the ROI and competitive edge which are part of a healthcare landscape in which patients have more power than ever to exercise choice and preference.

Managing and structuring data in the right way will unleash the power of analysis and reporting on a new level. And enterprise imaging has the capacity to open the door to the possibilities of what can be done with the data as it is understood more closely.

The systems are often already in place. The data is already there, relatively untapped. If it is stored in machine-readable formats, we can move from the traditions of single-dimension, plain text reporting to granular analysis and reports that allow clinicians and administrators to drill down through structured, interactive reports. With integration, the scope for granular analysis and ‘live’ reporting comes even closer. This is the new era of information sharing in healthcare – ushered in by innovative hospital management vision and supported by an IT infrastructure that is developed with collaboration in mind.
What is Carestream doing?

Carestream developed an enterprise imaging platform called Clinical Collaboration Platform, built around a Unified Core, that provides a simple way to consolidate, manage and share images generated across the enterprise. With the Carestream Clinical Collaboration Platform, it is easy to quickly deploy modules that interoperate with the existing systems to unify your environment with a single solution - across specialties, workflows and locations.

The shared back-end architecture provides the backbone for fully integrating your clinical imaging, workflow and reporting infrastructure. The Unified Core accommodates all major clinical data formats and communication protocols to simplify deployment of applications and sharing of resources.

Eliminate departmental silos, streamline workflows and maximise the value of clinical images for all those who provide, manage, receive and reimburse care.

One Unified Core brings unlimited possibilities to collaborative healthcare.

More to read in: http://www.carestream.com/collaboration