



Using data to drive better outcomes

Prof. Dr. Mathias Goyen, Chief Medical Officer Europe,
and André da Silveira, Senior Product Marketing Manager
– Enterprise Imaging and Cardiovascular IT EMEA,
GE Healthcare

Abstract

There are many challenges facing the complex world of healthcare, including the need to **reduce clinician burnout** to ensure staff retention and quality of care, **improve efficiency** to reduce costs, waste, duplication and the length of the care pathway, and **increase patient satisfaction**. Data is the driver for the future. Healthcare providers need easy access to data that can be aggregated, consolidated and turned into insights that support clinical, operational and financial decisions. Modern technology has an important role to play in this scenario, connecting existing systems with open platforms, and specialists with patients, while employing artificial intelligence (AI) to analyse the data and generate actionable insights.

This paper discusses the challenges facing today's healthcare providers and how these can be overcome, as well as some of the ways that GE Healthcare

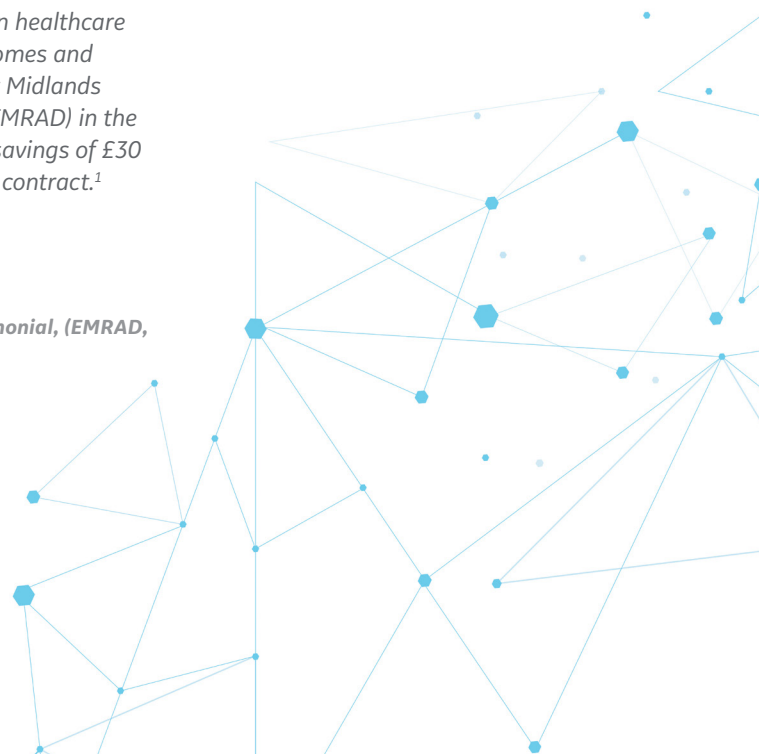
Digital can help connect people, data and existing systems for radiology, cardiology and other specialties within the care delivery network. It describes a world of collaboration without constraints, where data and images can be accessed anywhere and at any time, through a secure IT ecosystem that complies with regulations and promotes uninterrupted clinical workflow and interoperability. This is illustrated by real life success stories from customers who have embraced the latest technological advances in healthcare and achieved great outcomes and savings, such as the East Midlands Radiology Consortium (EMRAD) in the UK, which predicts cost savings of £30 million over the ten-year contract.¹

References

¹ *EMRAD Customer Testimonial, (EMRAD, 01/2019)*

Contents

- 01 Tomorrow's technology, today
- 02 Tackling the challenge head on
- 03 Finding the ideal solution
- 04 Demonstrated success
- 05 Conclusion



Tomorrow's technology, today

The healthcare sector is a pressured environment, with a demand to address the issue of **clinician burnout**, **improve efficiency and increase patient satisfaction**. New technologies are having a significant influence on healthcare delivery: how it is accessed; how – and by which provider – it is delivered; and the resulting outcomes. Intuitive and personalised care ecosystems focused on patients and their families – and integrated with the medical and social care communities – show great potential to deliver the right care, in the right setting and at the right time, by combining a number of healthcare initiatives:

- the creation of holistic and longitudinal patient data that integrates fragmented information from social systems, financial resources and systems, home- and self-care monitoring, activities of daily life and traditional modalities of care;
- the use of advanced analytics and AI to generate insights for patients and their caregivers;
- development of continuum of care models – such as digital solutions, close-to-home services and traditional facilities – based on individual needs;
- device-enabled, independent care and patient buy-in;
- real-time refinement of individualised care solutions and patient engagement through AI;

- seamless integration of monitoring and care from clinical caregivers, social and community structures, and family members.²

Room for improvement

However, with continued cost pressures, as well as **clinician burnout**, the global healthcare system still has many areas in need of improvement. In particular, attention should be paid to:

- **Accessibility** – easy access to care is vital.
- **Efficiency** – efficiency has an important role to play. The cost of healthcare is not sustainable, and healthcare systems are stretched to the limits to meet increasing demands and costs. In the EU, 47 % of users say that reducing operational costs by increasing efficiency is a top priority for radiology departments.³
- **Quality** – although the quality of healthcare has improved significantly in the recent past, there is still a long way to go. Errors and discrepancies in radiological practice are uncomfortably common; a 30 % retrospective review suggests an estimated 40 million annual errors globally.⁴
- **Change** – with ongoing changes in healthcare policy and rapid advances in AI, the radiology sector has expressed concerns about the future; 50 % of radiologists surveyed in a

recent study listed being unprepared for the future as a top concern.⁵

- **Shortage of healthcare workers** – the combination of an ageing workforce about to retire, staff leaving for better paid jobs and not being replaced, along with insufficient, adequately trained young people entering the profession, is having a detrimental effect.
- **Staff welfare** – radiology professionals are dealing with greater complexity and higher volumes of work. A recent study revealed that **49 % of radiologists are showing signs of burnout**;³ radiology staff need easy-to-use solutions that relieve them of mundane tasks and searching for the information they need, allowing them to focus on patient care and driving outcomes.⁶

References

² <https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/the-era-of-exponential-improvement-in-healthcare>

³ e- EU, GE CT performance outcomes research

⁴ Berlin L. Hindsight bias. *AJR*. 2000; 175:597-601

⁵ GE Sponsored research, October 2018, SUAZIO Consulting

⁶ Peckham C. *Medscape radiology lifestyle report 2015*

Shortage of personnel

The number of radiology examinations is increasing year on year (Figure 1), and staff numbers are not keeping pace. As a result, workloads are increasing and contributing to **clinician burnout**, which has grown steadily over the past 15 years. It has been reported that doctors spend up to six hours a day looking at electronic health records without providing actual patient care.⁷ Combining AI with human clinical expertise could help,⁷ but disparate imaging tools, collaborative systems, processes and analytics are still commonplace and prevent this level of connectivity.

References

⁷ *Medical professionals don't have to fear digitalization. AI in the Healthcare Sector: A Leap Towards Personalized Medicine and Significant Relief for Doctors.* <http://newsroom.gehealthcare.com/medical-professionals-dont-have-to-fear-digitalization>

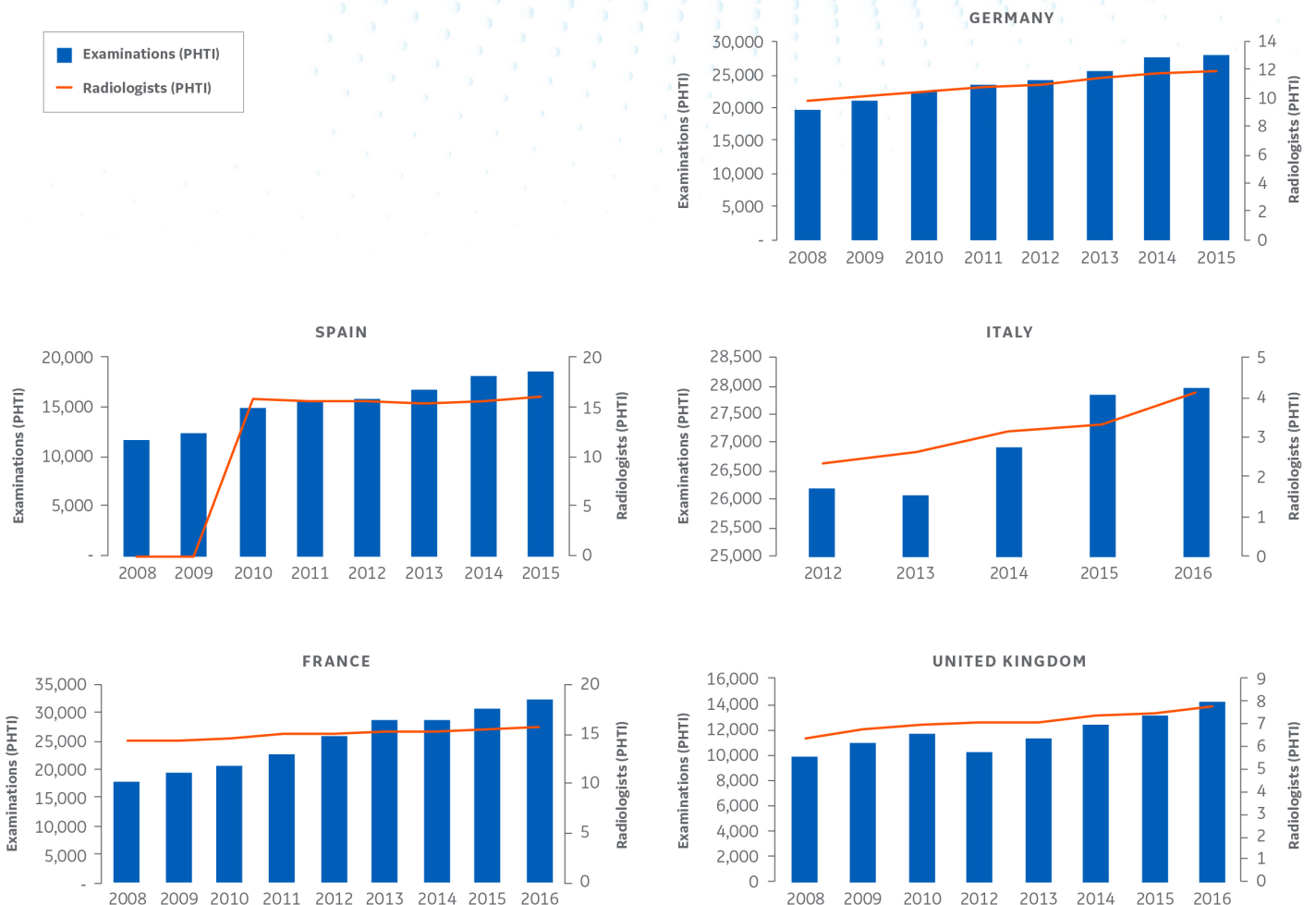


Figure 1: European trends in radiology workload.

Dealing with an explosion of data

Industry surveys and expert interviews point to three major trends that are reshaping imaging services and influencing the future of healthcare.⁸

- Data integration and analytics have become increasingly important for the healthcare delivery chain.
- Payers are facing increasing cost pressures and looking for new opportunities to control them.
- The reimbursement landscape, which drives the profitability of most diagnostics players, is gradually evolving.

Of these, the issue of data handling can to some extent be alleviated by modern technology; data is at the heart of continuous improvement.^{9 (p. 58)}

It's clear that the world is in the middle of a data explosion.^{9 (p. 102)} In 2010, the amount of healthcare data collected was said to be doubling every three and a half years; it is projected that by 2020 this will be every 73 days.¹⁰ Similarly, the International Data Corporation predicts

a healthcare data compound annual growth rate of 36 % up to 2025 – driven by analytics, imaging and real-time data for decision support – exceeding manufacturing (30 %), finance (26 %) and media (25 %).¹¹ There was a reported 48 % data growth in 2017, and it has been suggested that data acquisition could reach 2,314 exabytes by 2020 – a significant increase in the 153 exabytes recorded in 2013.¹²

The impact of this volume of data is particularly important where the potential to improve decision-making, operational processes, and the customer experience is just too big to ignore.^{9 (p. 14)}

Interoperability is a monumental challenge that needs to be confronted to open up access and allow providers to improve quality of patient care;^{13 (p. 69)} the Internet of Things will play a key role in this. Today, there are around 13 billion devices connected to the internet, and machine-to-machine connections are expected to grow to 27 billion by 2024 in multiple industries.*^{9 (p. 5)}

**data not healthcare specific*

References

- ⁸ <https://www.mckinsey.com/industries/pharmaceuticals-and-medical-products/our-insights/genetic-testing-opportunities-to-unlock-value-in-precision-medicine>
- ⁹ Marr B. *Data Strategy: How to Profit from a World of Big Data, Analytics and the Internet of Things*. 2017
- ¹⁰ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3116346>
- ¹¹ <https://healthanalytics.com/news/big-data-to-see-explosive-growth-challenging-healthcare-organizations>
- ¹² <https://med.stanford.edu/content/dam/sm/sm-news/documents/StanfordMedicineHealthTrendsWhitePaper2017.pdf>
- ¹³ Nichol PB. *The Power of Blockchain for Healthcare: How Blockchain Will Ignite The Future of Healthcare*. 2017

Tackling the challenge head on

As the volume and variety of data generated and stored have expanded, so too has the range of sophisticated but accessible systems and tools designed to help with this task.⁹ (p. 125) The challenge, amid increasing cost pressures, is to find the right technology and the right skill set to manage that data in order to deliver personalised, faster and more effective care.

The operational workflow market has been growing mainly in the most mature imaging IT markets of North America and Western Europe, and only sporadically elsewhere, chiefly driven by hospital consolidation and a shortage of radiologists. Changing models of care also creates the opportunity for future growth; the emergence of multidisciplinary care models is adding complexity to diagnostic processes and increasing the pressure on radiology resources that are already stretched. Many operational and workflow tools currently on offer have made limited inroads to support multidisciplinary care; the majority available today have focused most prominently on managing radiologist time. However, as broader enterprise imaging solutions start to bring more non-imaging data

and information from the wider clinical record into the diagnostic reading environment, demand for radiology consults will likely increase. As a result, workflow tools will increasingly need to manage radiologist time from both a reading and a broader collaborative approach.¹⁴

Data is the driver for the future.¹ Once the ideal data has been identified, the next step is to establish how it can be turned into useful insights and applications by considering collection, storage, analysis and processing, as well as data access and communication.⁹ (p. 101, 120) This requires a robust data strategy to simplify rigid and complex paper-based data systems that involve multiple steps on multiple systems. The advent of cloud computing has massively increased storage capability and computing power, and large volumes of fast-moving data from different sources can now be analysed, even in real time.⁹ (p. 101-102) Data handling solutions must meet the needs of multiple stakeholders – patients, users, clinicians, providers and payers – and, in a highly regulated industry, connect with diverse and fragmented healthcare data systems.¹⁵

References

- ¹ *EMRAD Customer Testimonial, (EMRAD, 01/2019)*
- ⁹ *Marr B. Data Strategy: How to Profit from a World of Big Data, Analytics and the Internet of Things. 2017*
- ¹⁴ *Imaging IT: Operational & Workflow Tools – World – 2019 report (Signify Research)*
- ¹⁵ <https://www.mckinsey.com/industries/pharmaceuticals-and-medical-products/our-insights/designing-a-healthy-future-for-medical-devices>

Setting the ground rules

A big part of good data governance relies on building a data culture in your organisation.^{9 (p. 164)} Data analysis skills are crucial but are in short supply. Similarly, it can be hard to relate data to healthcare needs and communicate the key insights it gives to people with no technical background.^{9 (p. 137-138)}

In the healthcare sector, trust is everything, and collecting and storing personal data brings serious legal and regulatory obligations.^{9 (p. 151)} The EU GDPR regulations insist that any personal data collected must be relevant, and limited to the minimum necessary for the purposes for which the data are processed.^{9 (p. 154)} Patients need to trust that their medical information is protected, that the treatment is appropriate to their symptoms, and that the care they receive is tailored to their needs.^{13 (p. 52)}

To achieve these aims, healthcare systems need:

- configurable tools;
- full integration with electronic medical records (EMRs) and imaging modalities;
- complete patient views across care pathways;
- data management and analytics;
- better operational and financial outcomes.

The power of AI

Artificial intelligence (AI) has been shown to have a lasting impact on the way healthcare systems work together to improve patient care, particularly from an imaging perspective. Done well, AI should be invisible. Thanks to powerful algorithmic learning, it has made it easier than ever to pore through large numbers of scans to spot diagnostic patterns and improve workflows. Both clinical and operational benefits can enhance the patient experience before, during and after every procedure – though patients may never realise that AI had a hand in doing so! AI can also provide a level of expertise, for example, on a pre-assessment level, to help a team to prioritise their focus and highlight where a second look may be needed. And, if poorly resourced hospitals lack the technology, telemedicine can make AI available on a broad scale.¹⁶

AI offers many advantages to patients, including shorter waiting times for hospital beds, faster transfers to other units or hospitals and more comfortable diagnostic measures.⁷ Non-pixel AI – the workflows and operations that support care delivery, from the patient to practice – also has huge potential to provide more value to both organisations and patients. For instance, using a set of parameters to determine the probability of whether patients will arrive at their scheduled time or fail to turn up can help to manage workflows.¹⁶ AI will continue to have a growing role in healthcare and, in time, it will just become a normal part of the care continuum.

References

- ⁷ *Medical professionals don't have to fear digitalization. AI in the Healthcare Sector: A Leap Towards Personalized Medicine and Significant Relief for Doctors.* <http://newsroom.gehealthcare.com/medical-professionals-dont-have-to-fear-digitalization>
- ⁹ *Marr B. Data Strategy: How to Profit from a World of Big Data, Analytics and the Internet of Things. 2017*
- ¹³ *Nichol PB. The Power of Blockchain for Healthcare: How Blockchain Will Ignite The Future of Healthcare. 2017*
- ¹⁶ *Expanding Imaging AI to Resource-Strapped Areas. GE Healthcare Global*

03

Finding the ideal solution

Caregivers around the world are turning to GE Healthcare Digital to tackle these challenges with resounding success. They help to:

- bring doctors back to what they love to do, focusing on treating people in the best way possible;
- lower the cost of care and **improve the patient experience**, while complying with government regulations and reimbursement pressures;
- provide interoperability and **improve both clinical and IT productivity, and operational efficiency**, while simultaneously boosting staff satisfaction;
- increase productivity and improve patient care by allowing image access within the clinical workflow;
- reduce the total cost of ownership, consolidate departmental archives and increase the adoption of Vendor Neutral Archives (VNAs) across the organisation, through interoperability with ancillary and departmental systems.

Edison Datalogue

Edison Datalogue provides EMRs with holistic patient imaging and multi-media patient records, helping to

improve clinician productivity and patient outcomes. With Edison Datalogue, there is virtually no limit to what providers can do with the data, whether it is as a source for AI, business intelligence or to deliver clinical information and insights. It enables a variety of workflows, such as collaboration and mobile image transfer, and is also the basis for multi-specialty data management, supporting multiple data formats that require DICOM and/or non-DICOM data. This vendor neutral ecosystem is central to integration and interoperability.

Edison Datalogue comprises:¹⁷

- Centricity Enterprise Archive (EA) – a multi-ology, multisite repository enabling consolidation of IT infrastructure for archiving and managing DICOM and non-DICOM clinical content.
- IHE XDS registry – stores the catalogue of patient clinical information and supports user queries.
- Centricity Universal Viewer Zero Footprint (ZFP) – integrates with the registry and provides web access to patient clinical records for care providers.
- Media Manager mobile application – supports the acquisition, documentation

and storage of visible light images in the Edison Datalogue, making it part of the patient record. It offers automated patient identification and guided documentation steps to publish on the XDS registry.

- Enterprise master patient index (EMPI) – creates a patient identifier for each individual and allows both PIX and PDQ queries to link identifiers across multiple clinical information systems.
- Clinical gateway – allows the different clinical information systems, such as HIS, RIS, and CVIT, to insert and update medical content in the content repository (EA) and the EMPI.
- Audit Trail Repository – receives audit messages from other components of Edison Datalogue, establishing security measures that ensure patient information confidentiality, data integrity, and user accountability.
- Device interface engine – connects non-standard devices and systems to store data in the content repository (EA) using either IHE XDS or XDS-I.

References

¹⁷ Hanover J, Piai S. 2016 White paper: *The Role of XDS-Compliant Vendor Neutral Archive in Promoting Integrated Care*. IDC Health Insights #US40627815



GE Healthcare solutions, featuring Intel® technology, deliver the performance, reliability and security that bring providers, patients and intelligent insight together at the point of care, to help achieve faster time to diagnosis and enable better outcomes.

Edison Datalogue Connect

Edison Datalogue Connect is designed to offer streamlined, intuitive clinical collaboration between clinicians and patients, seamless device connectivity and embedded analytics tools, all with comprehensive end user controls and data management. This single, scalable solution extends 3D visualisation and imaging workflows beyond the radiology department. It provides

a flexible, secure set of tools with a choice of data centre or cloud-based deployment, to simplify IT maintenance and drive down capital expenses.

Quick, easy and flexible access to data from any vendor system – and from anywhere – greatly improves the workflow and reduces the time taken to complete different stages of an imaging exam,

increasing productivity and efficiency. There is no longer a need to switch between different systems or, in the case of a hospital network, to wait for data to arrive from another site. Having access to the right data, at the right time, from any location in the network, improves patient safety and decreases the length of the care pathway, as well as reducing the need for repeat studies in different hospitals.

Ultimately, this contributes to:



better patient engagement and involvement



lower operating costs and increased operational efficiencies



faster and more definitive diagnoses to support enhanced patient outcomes



stronger collaboration across hospitals and the care community



more effective care teams



growing clinician referral networks

Edison Datalogue Connect



Better for your **clinicians**

A solution such as Edison Datalogue Connect can not only help **improve patient satisfaction**, but also allows clinicians to spend more time with patients, potentially **reducing the probability of staff burnout**. They can collaborate more easily as part of

multidisciplinary teams, helping them to confidently and consistently make the right clinical decisions and bring about better patient outcomes. In turn, this reduces the associated pressure of requesting second opinions and the stress of making decisions in isolation.

Better for your **patients**

Patients feel more engaged in their care pathways and decisions, and can have access to their data in a flexible, easy and unrestricted way.

Centricity RIS-i

This integrated radiology information system is a modular, scalable and configurable radiology workflow solution that addresses the challenges of individual specialties, hospitals or entire healthcare systems, while aiming to **increase throughput and efficiency**. It enables:

- teleradiology and cross-site diagnostics;
- integrated billing for Germany and Switzerland;
- integration with third-party systems;
- context-matched, front-end integration to GE Healthcare's Centricity PACS;
- optimised scheduling;
- streamlined registration.

Actionable analytics make the process of scheduling patients and sharing workloads far easier by identifying

where resources are available. Cross Enterprise Reporting can then be used to send studies to sites with the right expertise and spare reporting capacity, without resorting to expensive media such as CDs, with related time and posting costs. This reduces the time from imaging to a report – directly impacting on waiting times and safety – and **positively influences patient satisfaction**. At the same time, it increases the possibility of insourcing, improving efficiency and reducing outsourcing costs. Overall, these features combine to considerably **enhance operational and financial efficiencies**. Clinicians can report remotely from their current location, rather than travelling to the site where the images were taken. This reduction in travelling saves time and reduces pressure on the clinicians, which may help to **prevent burnout**.

Centricity Universal Viewer

Centricity Universal Viewer is a web-based multimodality diagnostic viewer that supports efficient workflows and helps faster, clearer diagnoses. Native mammography and advanced visualisation provide a single unified reading experience, including 3D visualisation and processing for reading and comparing CT, MR, 3D X-ray, PET, PET/MR, and PET/CT data sets. Centricity Universal Viewer integrates with third-party PACS and VNAs when deployed with EA. Connectors are available for commonly-used EMRs, such as EPIC, Cerner and Allscripts, with open API connectivity to RIS, reporting, EMR and other hospital IT systems. Centricity Universal Viewer is complemented by Centricity Universal Viewer Zero Footprint (ZFP), which allows clinicians to access images from anywhere via a web browser connected to PACS or multiple VNAs in a multi-vendor environment.

Centricity Cardio Enterprise

Centricity Cardio Enterprise bridges the gaps between cardiovascular service lines and healthcare information systems – with a single point of access for patient data, waveforms, images, analysis tools and clinician reports – combined with powerful end-to-end management, analytics and workflow tools. It integrates with all major EMRs as well as GE Healthcare's suite of cardiovascular devices, such as Vivid, LOGIQ, Muse, CASE, Mac-Lab and CardioLab, plus many third-party systems. Centricity Cardio Enterprise provides intelligent image analysis tools in a single solution, including Native Cath Tools (510k pending), EchoPac, Xeleris and Advantage Workstation (AW) Server Enterprise, and TomTec Cath/Echo Tools and Medis.

Advantage Workstation (AW) Server Enterprise

The AW portfolio of clinical applications covers multiple modalities – CT, MR, PET, XA – and departments. It provides advanced 3D visualisation and diagnostic capabilities when and where you want them, and enables image sharing between relevant parties.

Imaging Insights

Imaging Insights is an analytics solution that includes MR Excellence and CT Excellence, providing a multi-vendor, multimodality practice summary of imaging equipment, radiation dose, usage and protocol metrics that enable radiology directors, imaging supervisors and clinicians to optimise the clinical, financial, and operational performance of their imaging assets and department.

DoseWatch™

DoseWatch is an enterprise-wide dose management solution that enables automatic collection and analysis of patient radiation and iodine exposure across multi-facility, multimodality and multi-vendor imaging environments. This allows protocols to be standardised and optimised, improves dose management, and reduces variability across sites, ensuring delivery of the right dose, for the right patient, and the right clinical indication, at all locations.



Demonstrated success

Numerous customers have achieved **great improvements in clinician wellbeing, the efficiency of their organisation and patient satisfaction** by implementing GE Healthcare Digital Solutions. The following examples demonstrate just a few of the many success stories.

Outcome	Customer	Product
<ul style="list-style-type: none"> >£100K savings during the first insourcing initiative period 30 % reduction in radiology reporting outsourcing costs in the first year using Cross Enterprise Reporting and Analytics 	East Midlands Radiology Consortium (EMRAD), UK ¹⁸	Centricity RIS-i
<ul style="list-style-type: none"> 30 % increase in productivity thanks to a single unifying system 	Antwerp University Hospital, Belgium ^{19,20}	Edison Datalogue
<ul style="list-style-type: none"> >85 % reduction in workflow turnaround times >£300K savings in postage costs over an 18-month period 	EMRAD, UK ^{1,21}	Edison Datalogue Connect
<ul style="list-style-type: none"> 40 % increase in workflow efficiency 	Helimed/University of Antwerp, Belgium ^{22,23}	Centricity Universal Viewer
<ul style="list-style-type: none"> 86 % reduction in turnaround times for Echo reports 92 % reduction in turnaround times for Cath reports 	Licking Memorial, USA ²⁴	Centricity Cardio Enterprise
<ul style="list-style-type: none"> 75 % reduction in average Cath Lab report turnaround time 	American Hospital, Turkey ²⁵	Centricity Cardio Enterprise
<ul style="list-style-type: none"> Inventory maintenance time reduced from two hours a day to a 1-click process 	Nuremberg, Germany ²⁶	Centricity Cardio Enterprise
<ul style="list-style-type: none"> 20 % decrease in reading time 	GE Healthcare internal study ²⁷	Advantage Workstation Server Enterprise
<ul style="list-style-type: none"> 25 % reduction in processing time compared to previous [AW] versions 	SELARL du Nedon Istres, France ²⁸	Advantage Workstation Server Enterprise
<ul style="list-style-type: none"> 40 % increase in MR throughput 36.5 % increase in overall throughput time to appointment reduced by four weeks 	radiomed, Germany ²⁹	Imaging Insights
<ul style="list-style-type: none"> 50 % dose reduction on chest and abdomen imaging across seven sites 	Groupe 3R, Switzerland ³⁰	DoseWatch

To learn how GE Healthcare can help you achieve similar outcomes, please contact your local GE Healthcare representative or go to [gehealthcare.co.uk](https://www.gehealthcare.co.uk)

Conclusion

Modern technology has a vital role to play in alleviating the continual pressure to **reduce clinician burnout, improve efficiency** and **increase patient satisfaction** in the healthcare sector, influencing how healthcare is accessed and delivered, and the resulting outcomes. By optimising the clinical, financial, and operational performance of its imaging and cardiology assets and departments, organisations will be able to reduce the demand on clinicians, lower costs and, ultimately, provide better patient outcomes.

As the volume and variety of data generated and stored continues to expand, healthcare providers need to embrace AI

and take advantage of solutions like GE Healthcare Digital, that allow for analytics, collaboration and faster, more informed decision-making in single- or multi-site infrastructures. AI has the potential to democratise radiology by enabling non-radiologists in underserved areas to tap into subspecialty expertise, perhaps on their mobile devices. It will help to re-establish the human connection between the doctor and the patient, making medicine human again.

Quite simply, it's not about the volume. It's about the opportunities it creates. It's not about the amount. It's about how successfully the healthcare providers use it.

References

- ¹ *EMRAD Customer Testimonial, (EMRAD, 01/2019)*
- ² <https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/the-era-of-exponential-improvement-in-healthcare>
- ³ *e- EU, GE CT performance outcomes research*
- ⁴ *Berlin L. Hindsight bias. AJR. 2000; 175:597-601*
- ⁵ *GE Sponsored research, October 2018, SUAZIO Consulting*
- ⁶ *Peckham C. Medscape radiology lifestyle report 2015*
- ⁷ *Medical professionals don't have to fear digitalization. AI in the Healthcare Sector: A Leap Towards Personalized Medicine and Significant Relief for Doctors. <http://newsroom.gehealthcare.com/medical-professionals-dont-have-to-fear-digitalization>*
- ⁸ <https://www.mckinsey.com/industries/pharmaceuticals-and-medical-products/our-insights/genetic-testing-opportunities-to-unlock-value-in-precision-medicine>
- ⁹ *Marr B. Data Strategy: How to Profit from a World of Big Data, Analytics and the Internet of Things. 2017*
- ¹⁰ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3116346>
- ¹¹ <https://healthitanalytics.com/news/big-data-to-see-explosive-growth-challenging-healthcare-organizations>
- ¹² <https://med.stanford.edu/content/dam/sm/sm-news/documents/StanfordMedicineHealthTrendsWhitePaper2017.pdf>
- ¹³ *Nichol PB. The Power of Blockchain for Healthcare: How Blockchain Will Ignite The Future of Healthcare. 2017*
- ¹⁴ *Imaging IT: Operational & Workflow Tools – World – 2019 report (Signify Research)*
- ¹⁵ <https://www.mckinsey.com/industries/pharmaceuticals-and-medical-products/our-insights/designing-a-healthy-future-for-medical-devices>
- ¹⁶ *Expanding Imaging AI to Resource-Strapped Areas. GE Healthcare Global.*
- ¹⁷ *Hanover J, Piai S. 2016 White paper: The Role of XDS-Compliant Vendor Neutral Archive in Promoting Integrated Care. IDC Health Insights #US40627815*
- ¹⁸ *EMRAD Case Study: Is the shortage of radiologists impacting your service delivery? (EMRAD, 01/2019)*
- ¹⁹ <https://www.healthcare-informatics.com/news-item/new-report-examines-market-shifts-radiology-imaging>
- ²⁰ *UZA Case Study (UZA, 10/2014)*
- ²¹ *Case Study: EMRAD fit for the future of patient data exchange. (EMRAD, 07/2018)*
- ²² *Case Study: Helimed Diagnostic Imaging March 2014 (Helimed, 05/2014)*
- ²³ *Clinician Productivity increase after deploying an XDS-compliant solution as reported by Antwerp University Hospital in Belgium (UZA, 09/2014)*
- ²⁴ *Licking Memorial Case Study (Licking Memorial, 07/2017)*
- ²⁵ *CCE American Hospital Case Study (American Hospital, 07/2019)*
- ²⁶ *Nuremberg case study (Klinikum Nurnberg, 06/2018)*
- ²⁷ *GE Healthcare internal study compared reading time with VS7 versus VS5*
- ²⁸ *Customer video testimonial: Outcomes for you (SELARL du Nedon, 11/2016)*
- ²⁹ *MR Excellence radiomed Testimonial (radiomed, 01/2018)*
- ³⁰ *Results at Groupe 3R, 11/2018, Switzerland*



About Us

GE Healthcare is a leading provider of medical imaging, monitoring, biomanufacturing, and cell and gene therapy technologies. GE Healthcare enables precision health in diagnostics, therapeutics and monitoring through intelligent devices, data analytics, applications and services. With over 100 years of experience and leadership in the healthcare industry and more than 50,000 employees globally, GE Healthcare helps healthcare providers, researchers and life sciences companies in their mission to improve outcomes for patients around the world.

Follow us on [Facebook](#), [LinkedIn](#), [Twitter](#) and [The Pulse](#) for latest news, or visit our website www.gehealthcare.co.uk for more information.

Disclaimer

The results expressed in this document may not be applicable to a particular site or installation and individual results may vary. This document and its contents are provided to you for informational purposes only and do not constitute a representation, warranty or performance guarantee. GE disclaims liability for any loss, which may arise from reliance on or use of information, contained in this document. All illustrations are provided as fictional examples only. Your product features and configuration may be different than those shown. Information contained herein is proprietary to GE. No part of this publication may be reproduced for any purpose without written permission of GE.

DESCRIPTIONS OF FUTURE FUNCTIONALITY REFLECT CURRENT PRODUCT DIRECTION, ARE FOR INFORMATIONAL PURPOSES ONLY AND DO NOT CONSTITUTE A COMMITMENT TO PROVIDE SPECIFIC FUNCTIONALITY. TIMING AND AVAILABILITY REMAIN AT GE'S DISCRETION AND ARE SUBJECT TO CHANGE AND APPLICABLE REGULATORY CLEARANCE.

The solutions shown in this presentation are not considered to be medical devices in EMEA.

Edison Datalogue includes includes the following product components: Centricity Enterprise Archive, Centricity Universal Viewer ZFP client, GE XDS Registry, Clinical Gateway, Audit Trail Repository, Media Manager, ICW Master Patient Index (MPI), and Lexmark PACS Scan. See the Edison Datalogue Compatibility Matrix and product-specific documentation for requirements.

Centricity Cardio Enterprise includes the following product components: Centricity Cardio Workflow, Centricity Universal Viewer Cardiology and Analytics. See the Centricity Cardio Enterprise Compatibility Matrix and product-specific documentation for requirements.

The links provided to other Internet sites are only for the convenience of user/reader of this document. GE is not responsible for the availability or content of these external sites, nor does GE endorse, warrant or guarantee the products, services or information described or offered at these other Internet sites. Additionally, for documents available on these sites, GE does not warrant or assume any legal liability or responsibility for the accuracy, completeness, usefulness or lawfulness of any information, apparatus, product, or process disclosed.

Imagination at work