



GE HealthCare

Ultimately human

Enterprise imaging and the
evolution of connected care



The nature of connected care

Connected care is a goal we have strived toward for decades. While we inch toward it, the goal posts continue to move as advances in technology outpace our ability to transform care models. Our data and systems remain in silos, our financial and human resources continue to be depleted, and our patients and care teams expect better, modern care experiences.

Today, disparate data, proprietary storage and archives, and cumbersome workflows tie clinicians to computers, lengthen time to diagnosis, and impede confident decision-making. Most importantly, these issues take clinicians away from face-to-face time with patients, where they want and need to be.

Moving closer to realizing the promise of connected care and better experiences means we must transform the way we think about and operationalize the care pathway. We must advance how we create, store, access, read and share patient data through EHRs. We need to reimagine how we manage our resources and care teams. We need to overcome the obstacles preventing us from seeing care models, care teams and our patients in more connected—more *ultimately human*—ways.





Ultimately human experiences

Introduction

In this eBook we explore the positive impact enterprise imaging solutions can have in response to the demand of managing mounting pressures on our health systems. In particular, we'll look at how cardiology and radiology can be better operationalized for a transformed care model.

As cardiovascular diseases account for most non-chronic disease deaths (17.9 million people annually), we consider cardiology a critical care center for the advancement of population health.¹ Radiology, as the cornerstone of diagnosis and treatment for these conditions, plays a primary role in the patient and staff experience. Assessing the transformation of the care pathway using enterprise imaging solutions requires that we also explore the needs of IT across healthcare systems and explore what lies ahead on the horizon of connected care.

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**Find more time
for your patients**

Cardiology

A transformative care model

The rapid advancement of our aging population, continued rise of healthcare costs, and decline in cardiology resources, accelerates the need to find intelligent technological solutions to the changing healthcare landscape.¹ Simultaneously, patients expect better, more connected, experiences from their physicians including faster response times and more immediate care.²

If we are to respond to these demands, cardiac care teams must be able to streamline care pathways, reduce time to diagnose and treat patients, optimize workflows, and reduce the burden of managing data and creating reports. An enterprise imaging solution can help achieve these goals by connecting ecosystems with data integrated from devices across specialties and sites.

Because an enterprise imaging solution is built around a central repository that integrates and houses data from all modalities across departments

and locations, this database is at the core of a unified cardiology ecosystem, bridging the gaps between cardiology service lines and healthcare information systems. It enables seamless data flow and streamlines workflows saving time and minimizing the frustrations of today's operations by giving care teams quick access to a patient's imaging data, notes and reports from anywhere. The time lost to waiting for scans, results and reports may determine the patient's outcome.

Centralizing data and streamlining workflows using an enterprise imaging solution moves cardiology teams closer to the promise of connected care. The ability to share structured and unstructured data across departments and care locations empowers clinicians and care teams to act with more timely, accurate information. Many providers are also finding that this may help provide a foundation for future advancements in health such as the integration of artificial intelligence into diagnosis and care models.



Powering up cardiac enterprise imaging with Artificial Intelligence

Combined with AI, medical devices, such as ultrasound systems, ECG, CT and X-ray are able to capture and process more data in a fraction of the time any human could. In the brief time cardiologists have to diagnose and treat a patient, those fractions of time can add up to life-altering moments.³

Misdiagnosis rates for conditions such as heart failure span between 16 percent and 69 percent, depending on the setting.⁴

Artificial intelligence and machine learning are now able to deliver insights aimed at improving diagnostics, care quality, and workflows.³ When paired with the data generated by the technology we're familiar with, such as ultrasound and ECG systems, artificial intelligence promises to help further improve patient care. When the combination of these data and intelligent systems are paired with an enterprise imaging solution,

measurements and interpretations are precisely and rapidly automated, not only empowering clinicians to see the full picture, but better informing time-sensitive collaboration across specialties.

AI-driven digital innovations help put together the pieces of the complicated diagnostic puzzle for patients suspected of a condition like coronary artery disease. Stacked on top of an enterprise imaging solution that rapidly reaches across specialties, departments, and sites, the timeline to the accurate diagnosis and treatment of complex conditions can be dramatically expedited.

Adding artificial intelligence to the vast amounts of big data contained within an enterprise imaging solution is how we can start seeing and understanding so much more of our patients, altering their experiences and outcomes—and empowering us to deliver ultimately human care.



Transforming outcomes: Connected cancer care

In 2023, roughly two million people will be diagnosed with cancer in the United States, and that number is expected to increase in coming years. An estimated 297,790 women and 2,800 men will be diagnosed with breast cancer, which makes it the most common cancer diagnosis.¹⁰

As is the case with many women, upon finding a lump in a routine mammogram, Sarah's primary care physician sends her for an ultrasound-guided biopsy at the diagnostic lab in her local hospital which confirms the diagnosis of breast cancer.

Sarah's treatment plan includes chemotherapy and radiology, and so she must undergo further diagnostic imaging procedures including an echocardiogram and cardiac catheterization to make sure her heart is healthy enough to withstand the toll chemotherapy and radiation will take on her body. She will also require targeted CT scans to help plan targeted beam radiation.

During her treatment, Sarah will continue to require a number of imaging procedures, including regular echocardiograms, to ensure

the chemotherapy is not damaging her heart function. She'll also require regular CT scans to determine the effectiveness of the radiation treatment and changes in the disease.

When her treatment is complete, Sarah will undergo frequent breast imaging, echo studies and potentially invasive imaging to ensure her cancer is still in remission.

Sarah's journey through the healthcare system includes multiple sites, care teams, procedures, reports and systems. Her successful treatment, recovery and quality of life rely on precise, highly orchestrated communication among her broader care team. An enterprise imaging solution is the foundation of Sarah's connected care because her teams experience improvements in coordinated communications, streamlined workflows and expedited turnaround times, all of which save the critical time and resources on her journey.

A photograph of a man and a woman in a kitchen. The man, wearing a green button-down shirt, is smiling and grating a piece of yellow cheese into a white bowl. The woman, wearing a white lab coat and glasses, is looking at him. The kitchen has wooden cabinets and a window with a potted plant.

See the bigger
picture



Radiology

Bringing the patient journey into sharper focus

The demand to improve productivity and patient care amid declining reimbursements means radiology teams must find new ways to maintain timely and accurate diagnoses while striving to meet the expectations of innovative patient-centric care models.

Performance⁴ transparency, robust reporting, and streamlined workflows and communications are the first places they look to better manage increasing workload, decreasing workforce and better experiences for patients and care teams.⁵

Without the right technology to support fair and efficient workload distribution, radiology teams can be plagued with lost time and productivity, list anxiety, cherry-picking practices, reactive staffing and unbalanced work distribution. All of which impact the staff experience by destabilizing workload, workflow and decision-making. These behaviors also negatively impact the patient experience by delaying results, diagnoses and treatment.⁶

Decision Fatigue: Radiologists can lose more than

↓ **15 Minutes**

of daily productivity when they need to choose which case they're going to read next. That loss of productivity balloons to concerning levels across a large practice.⁶

In the march toward a healthcare system that supports patient-centric care models by optimizing productivity, reducing administrative burden and returning time to patients, we have a responsibility to reimagine our ecosystems in a way that promotes intelligent prioritization and dynamic assignment of workload. An enterprise imaging solution is a critical step toward accomplishing the goals of prioritizing efficiency and equity, streamlining communication and decreasing radiologist burnout.

As part of this mission, we don't have to look far into the future to see there is a shift in utilizing AI to assist radiologist's intelligence, automating redundancies and optimizing the way radiologists practice. It saves time, enhances diagnoses and potentially prevents errors caused by decision fatigue, burnout and cognitive load.⁷ The imperative for these intelligent systems has roots in enterprise imaging solutions. Marrying enterprise imaging with AI-driven predictive analytics can help to result in not only a more complete, rapid view of patient histories across specialties and care teams, but also the fair and balanced optimization of radiologists' workflow across the entire enterprise.⁸

In a study on Global Imaging Department Priorities and Outlook, more than 70 percent of radiologists who responded reported that their top departmental priorities include keeping their department up to date with state-of-the-art technology, as well as improving department workflow efficiency and productivity.⁹ Additionally, only 26 percent of respondents felt their current operational capacity was sufficient to meet their anticipated growth in procedure volumes over the next two to three years.⁴

>70%

say their top priorities include keeping up to date with technology, workflow efficiency and productivity

Only 26%

feel prepared for anticipated growth over the next 2-3 years



Transforming outcomes: Connected cardiac care

“Missing just one thing can make all the difference in a patient’s outcome.”

Upon experiencing shortness of breath, fatigue, swelling in the ankles and legs, and difficulty in breathing while lying down, our patient, Raymond, visits his primary care physician who performs an in-office ECG and sends him to the local emergency room. Once there, diagnostic tests including chest X-ray, ECG, ECHO, and blood test are done to assess his heart function, confirming a diagnosis of congestive heart failure, and he is admitted to the intensive cardiac care unit.

As an in-patient, his cardiologist and care team wait for all of his test results and conduct repeat and serial imaging to stabilize him and determine a treatment plan.

As his heart continues to fail, Raymond requires cardiac resynchronization therapy for uncontrollable AFIB. Eventually, an ablation will be performed and an ICD will be placed. His care pathway will require repeat chest X-rays, CTs and MRIs. While imaging would typically be performed in the same hospital, without an

enterprise imaging solution, the clinical team loses critical time searching for results on disparate systems or waiting for new scans and results, not only delaying Raymond's care, but altering his outcome.

Ultimately human, connected care

Throughout Raymond's cardiac care journey, an enterprise imaging solution could have improved a number of the interactions that determine his experience and outcome. His first ECG with his primary care physician could be accessed by ER staff, who could order further tests upon his arrival. Immediate access to imaging and reports upon his admission to ICU eliminates the need for additional imaging, expediting a more confident care plan. And access to imaging during the resynchronization procedure could save critical moments by eliminating wait times and the need for repeat imaging. An enterprise imaging solution streamlines the communication and reporting between his broader care team, improving the workflow, entire care journey and, ultimately, Raymond's experience and outcome.

A healthcare professional in a white lab coat is hugging a patient with long braids. The patient is wearing a grey and white striped sweater. They are in a clinical setting with large windows in the background. A purple text box is overlaid on the image.

**Bridge the gaps
to better care**

Information Technology

Enabling integrated enterprise solutions

Across the United States, healthcare systems are making significant investments in EHRs to act as the holistic patient record. The challenge, however, is that they are primarily structured databases and therefore have inherent gaps that create barriers to realizing the vision of connected care. Most imaging-related data exists in multiple, disparate and unstructured databases, or data silos. An overarching IT strategy inclusive of a foundational enterprise imaging solution will help close these gaps providing more complete, rapid and accessible patient data; helping to drive better patient care; and improving clinical and operational efficiency.



AI integration supports both increased productivity and accuracy as well as providing indications¹⁵ to support triage.



Intelligent workflows help teams across specialties, departments and sites work smarter, improving turnaround times on reports and findings, appropriately distributing workload, reducing burnout and ensuring service level agreements are met.



Cloud enablement¹⁶ supports workflows over wide geographic areas as well as disparate IT systems. Cloud deployments provide faster and more affordable access to upgrades as they become available by helping to reduce downtime and improve efficiencies.¹¹




IT advocates need advocates too


The challenges being faced by IT departments within care systems require that we take a larger and longer view of how we solve problems. Driving the fragmented digital transformation process forward in meaningful ways demands a partner who can solve today's challenges while helping you prepare for the opportunities we see on the horizon.


Your enterprise imaging solutions partner needs to be one who considers your relationship to be a long-term investment—a partner who, like any member of a care team, is committed to finding root causes and lifetime solutions.

The right partner on this transformation journey will be an advocate helping you build the right technology ecosystem that supports multiple care pathways and workflows using world-class solutions. Modern, scalable architecture that integrates data management, workflow and reporting functions will be table stakes for their engagement with you.

More importantly, they will provide the backbone to your operations that will:

 Dramatically reduce the solution footprint and associated costs of ownership through the consolidation of departmental imaging and workflow management

 Change the procurement model from capital expenditure to operating expense

 Help deliver increases in care pathway productivity and accuracy by employing intelligent workflow automation

The right enterprise imaging solution partner will be an enabler of integrated solutions that work together over the long term to optimize workflows across specialties, teams and sites helping to reduce the technology footprint, minimize costs, improve operational efficiency, reduce stress and maintain service levels. They will help you bridge the gaps between service lines and healthcare information systems across the continuum of care.



Transforming outcomes: Connected transplant care

Since 1954, living kidney donors have helped thousands of people facing kidney failure to live longer, healthier lives, free from the challenging routine of dialysis. Unfortunately, more than one-third of potential donors who want to donate a kidney can't because of blood type or antibody incompatibility.¹²

The National Kidney Registry (NKR) facilitates the kidney matching process by consolidating the incompatible pairs of donors and recipients from transplant centers all over the United States into a single registry database. This process allows hospitals to find donor kidneys that can be swapped between donor-recipient pairs when matches are deemed unsuitable.

Many factors determine what is considered a suitable kidney match including the kidney size and vascular structure. CT images of donor kidneys are used by the recipient's surgeons and radiologists to determine match suitability. If a donor kidney is not a viable match, the sooner that is known, the quicker a patient or donor can be resubmitted to the donor pool for matching.

In the past, donor kidney CT images were burned to a CD, then mailed from a donor hospital to a transplant center. This process could take 10 days

or longer when finally delivered to the recipient surgeons and radiologists for review. If the anatomy of the kidney was deemed unacceptable, the kidney would be declined and returned to the donor pool, increasing the wait times for critically ill patients and potentially canceling entire viable match chains involving as many as 10 patients. Patients without matches are returned to the matching pool, potentially extending their wait time by weeks, months or even years.

National Kidney Registry switched to an enterprise imaging solution built on GE's Centricity Zero Footprint viewer that gives radiologists and surgeons instant access to donor images from almost anywhere on almost any device, reducing the 10-day image review process to just minutes, giving them the ability to quickly identify matches. The switch to real-time imaging has helped NKR save thousands of lives every year by recognizing huge efficiency savings across the network that free up coordinators to spend more time on patient cases. More importantly, reducing match cancellations earlier means more patients have access to and receive more transplants every day.

The future of connected care

Enterprise imaging and the healthcare system. **What's next?**

As governments evolve regulations and budgets to meet the demands of a changing population, technology will be increasingly relied upon as an integral part of the healthcare architecture to ensure optimized resource utilization; precision monitoring, diagnoses, and treatment; and reduced healthcare delivery costs.¹³

With these conflicting demands, artificial intelligence is expected to be an elixir that will radically change how we approach healthcare. Unlike humans, however, it can only predict clinical conditions, and will never be able to accurately diagnose or prescribe care for patients. Harnessing the power of AI, however, will help to revolutionize our operational, clinical and patient experiences when it has a full view into patient journeys and data.

It is with these possibilities in mind that we see the integration of enterprise imaging across the patient journey as a necessary shift across our healthcare systems. The move to an enterprise imaging solution helps to advance the digital transformation mission. It will help fulfill the promise of better, more connected health pathways that improve patient experiences while minimizing the burden on our systems.

The shift to enterprise imaging solutions will provide endless opportunities to see more of our patients and deliver ultimately human care.

Are you ready to start seeing more of your patients and delivering ultimately human care?

Let us guide you through the next steps of your enterprise imaging evolution. [Learn more \[link to microsite\]](#)





Sources

- 1 Latest Findings on the Looming Physician Shortage, Healthgrades for Professionals, July 12, 2021, <https://www.healthgrades.com/pro/latest-findings-on-the-looming-physician-shortage>
- 2 Future of Health Survey, ZS, 2023 <https://www.zs.com/consumer-survey-on-the-future-of-connected-health>
- 3 Can AI Transform Cardiology?, GE Healthcare, February 22, https://www.gehealthcare.com/insights/article/can-ai-transform-cardiology#_edn1
- 4 Misdiagnosis of Heart Failure: A Systematic Review of the Literature, National Library of Medicine, September 27, 2021, <https://pubmed.ncbi.nlm.nih.gov/34048921/>
- 5 GE Healthcare: How to create a fair radiologist pay-for-performance program, May 2023, <https://www.gehealthcare.com/insights/article/how-to-create-a-fair-radiologist-payforperformance-program>
- 6 Leveraging new technology to predict and distribute radiologist workload, GE Healthcare, November 10, 2022, <https://www.gehealthcare.com/insights/article/leveraging-new-technology-to-predict-and-distribute-radiologist-workload>
- 7 Emerging Trends in Radiology – Artificial Intelligence, September 2021, <https://www.getyourceu.com/emerging-trends-in-radiology-artificial-intelligence/#:~:text=Artificial%20intelligence%20is%20making%20fast%20progress%20in%20the,ago%20when%20some%20predicted%20AI%20would%20replace%20radiologists>
- 8 Licking Memorial Case Study. JB42777XXb
- 9 The IMV 2019 Global Imaging Market Outlook Report, <https://imvinfo.com/product/imv-2019-global-imaging-market-outlook-report/>
- 10 Cancer Stats and Facts: Common Cancer Sites, National Cancer Institute, 2023, <https://seer.cancer.gov/statfacts/html/common.html#:~:text=How%20Many%20People%20Are%20Diagnosed,the%20most%20common%20cancer%20diagnosis>
- 11 Enterprise Imaging. Managing big data with intelligence, simply. GE Healthcare, 2023
- 12 Segev; Gentry; Warren; Reeb; Montgomery (Apr 20, 2005). “Kidney Paired Donation and Optimizing the Use of Live Donor Organs.” JAMA. Original Contribution. 293 (15): 1883–1890. doi:10.1001/jama.293.15.1883
- 13 Digital Health Approaches for Improved Population Health Outcomes: Time for a Disease Vulnerability Matrix for Individuals and Communities? Frontiers in Digital Health, September 30, 2021, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8521928/>
- 14 Functionality provided through integration with Quantum Helix Pace and Balance – Only available in US.
- 15 Indications to support triage depends on whether the AI application is regulatory cleared/approved for triage
- 16 Certain configurations are only available in US, not commercially distributed,