

# HEADLINER

## How AI is revolutionizing Healthcare - Leading to Precision Care



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GE HealthCare

# How AI is Revolutionizing Healthcare ... Leading to Precision Health

Roland Rott, President & CEO Ultrasound, GE HealthCare

Intelligent Health, Basel, 13<sup>th</sup> September 2023



# Key Challenges in Healthcare Today



## Hey ChatGPT

# What are the biggest challenges in healthcare today where AI can make a meaningful difference and improve outcomes?

As of my last knowledge update in September 2021, there are several significant challenges in healthcare where AI has the potential to make a meaningful difference and improve outcomes. Keep in mind that the status of these challenges and AI's impact on them may have evolved since then.

Some key challenges include:

- ➔ **1. Diagnosis and Disease Prediction:** AI can assist medical professionals in diagnosing complex diseases by analyzing large amounts of medical data such as images, genetic information, and patient records. It can also help predict disease risks and outcomes based on individual patient data.
  - ➔ **2. Medical Imaging:** Interpreting medical images like X-rays, MRIs, and CT scans can be time-consuming and prone to human error. AI-powered image analysis can help radiologists detect abnormalities more accurately and quickly, leading to earlier diagnosis and treatment.
  - ➔ **3. Drug Discovery and Development:** Developing new drugs is a lengthy and expensive process. AI can analyze vast datasets to identify potential drug candidates, predict their effectiveness, and accelerate the drug discovery process.
  - ➔ **4. Personalized Treatment:** AI can analyze a patient's medical history, genetic information, and other data to recommend personalized treatment plans. This can lead to more effective and tailored interventions, reducing adverse effects and improving patient outcomes.
  - ➔ **5. Remote Monitoring and Telemedicine:** AI-powered devices and applications can remotely monitor patients' health conditions, allowing doctors to intervene early if issues arise. Telemedicine platforms can provide medical consultations and advice to patients who have limited access to healthcare facilities.
  - ➔ **6. Healthcare Operations and Efficiency:** AI can optimize hospital operations by predicting patient admissions, streamlining resource allocation, and improving staff scheduling. This can lead to reduced wait times, better resource utilization, and cost savings.
  - ➔ **7. Electronic Health Records (EHRs):** EHRs contain a wealth of patient data, but accessing and analyzing this information can be challenging. AI can help organize and extract insights from EHRs, leading to improved clinical decision-making and better patient management.
  - ➔ **8. Chronic Disease Management:** AI-powered tools can help monitor and manage chronic conditions by providing patients with real-time feedback and support. This can lead to better adherence to treatment plans and improved quality of life.
  - ➔ **9. Natural Language Processing (NLP) in Healthcare:** NLP techniques can be used to extract information from medical literature, patient records, and clinical notes. This can aid in evidence-based decision-making and keep medical professionals updated with the latest research.
  - ➔ **10. Ethical and Regulatory Considerations:** As AI becomes more integrated into healthcare, ethical issues surrounding patient privacy, data security, and bias in algorithms need to be carefully addressed to ensure patient trust and safety.
  - ➔ **11. Data Integration and Interoperability:** Healthcare data is often fragmented across different systems and institutions. AI can help standardize and integrate these data sources, enabling comprehensive patient profiles and more informed decision-making.
- It's important to note that while AI has great potential to address these challenges, successful implementation requires collaboration between AI experts, healthcare professionals, regulators, and patients to ensure that solutions are accurate, safe, and ethically sound. Since the field of AI and healthcare is rapidly evolving, I recommend checking the latest sources for updates on the progress and impact of AI in healthcare.

# Today's Key Challenges in Healthcare

3.8<sub>B</sub>

People globally lack **access** to basic healthcare<sup>1</sup>

> 20%

Healthcare spend **wasted** across OECD countries<sup>2</sup>

> 50%

Prevalence of **burnout** among healthcare professionals<sup>3</sup>

3<sub>RD</sub>

**Medical errors** estimated to be the 3rd leading cause of death<sup>4</sup>

## Is the current way of healthcare provision sustainable?

1 – World Bank & World Health Organization

2 – Berwick and Hackbarth, JAMA, OECD

3 – Physician Burnout.. Agency for Healthcare Research and Quality, Rockville, MD

4 – Makary and Daniel, BMJ



# Global Shortage of Healthcare Professionals

7M

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Today

18M

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2030

*World Economic Form. April 7, 2022.*



A radiologist, in a 12-hour shift, is looking at ...

500 images

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15 years ago

50.000 images

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Today



*Goyen M. Center for Data Innovation. November 24, 2020.*





6000

Medical Journals

900.000

Articles per year

Goyen M. Center for Data Innovation. November 24, 2020.





Every ...

3,5 years

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2010

73 days

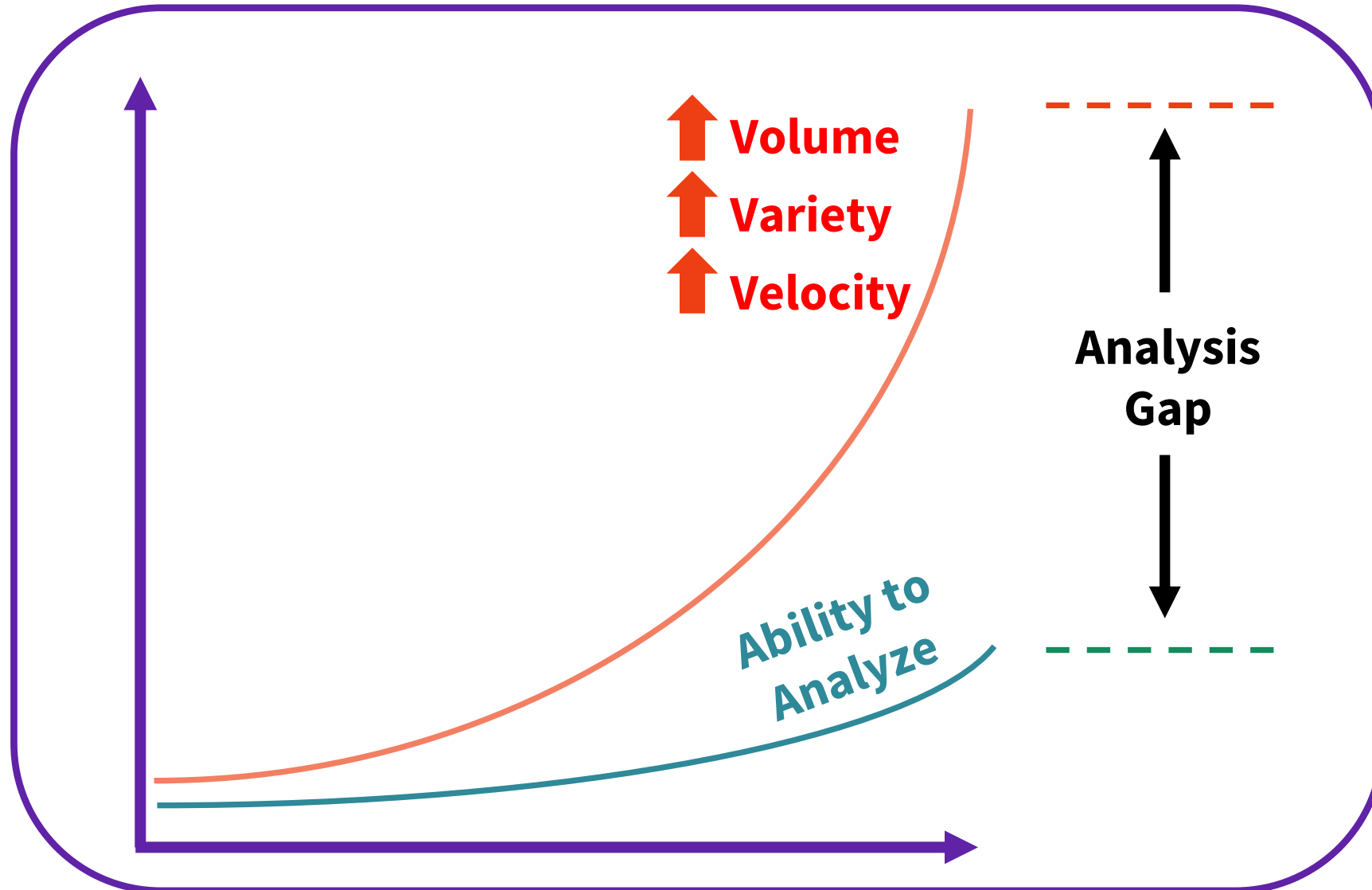
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Today<sup>1</sup>

... medical data doubles

*Goyen M. Center for Data Innovation. November 24, 2020.*

# We are Witnessing an Information Explosion



# How AI Can Help ...

## Examples

# Access to Healthcare – Ultrasound Examples



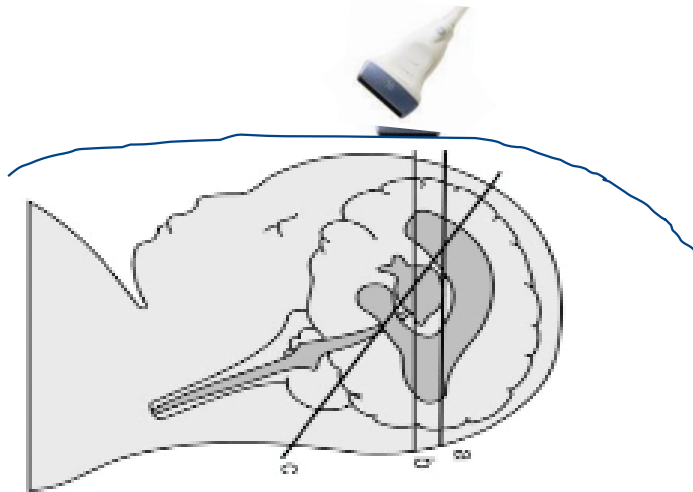
Handheld Ultrasound







# Efficiency & Accuracy



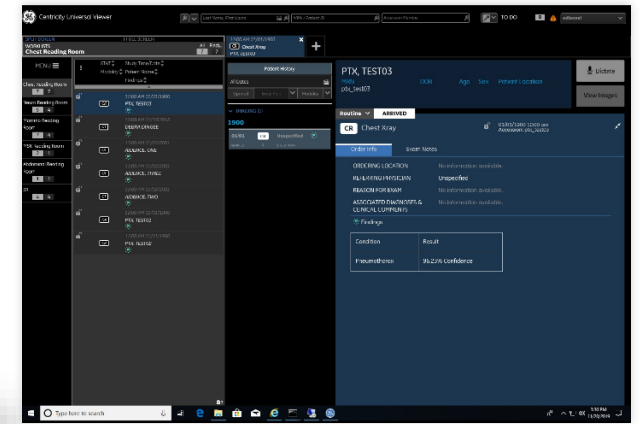
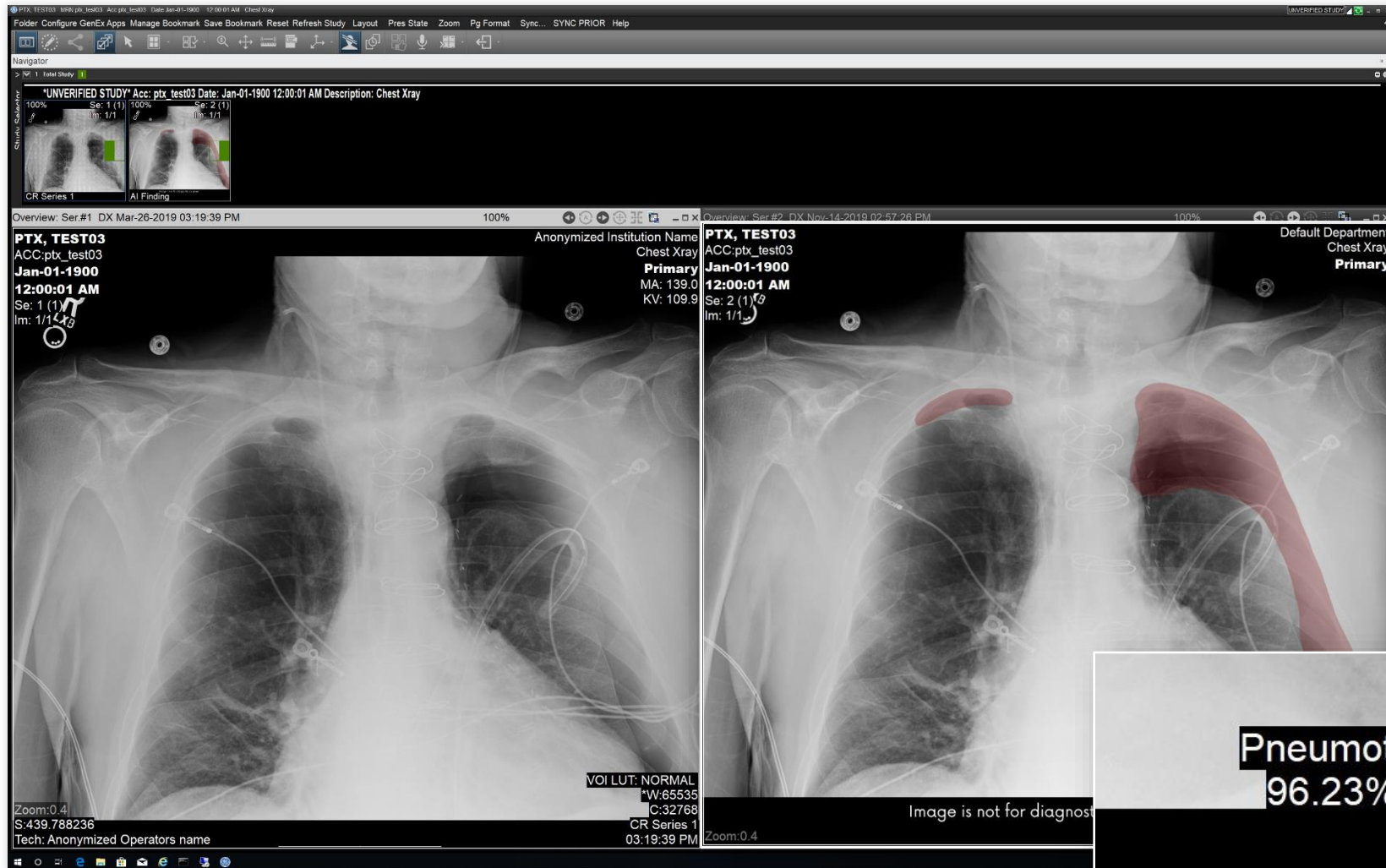
From 1-2 minutes to 10 seconds  
with the help of AI

The screenshot shows the GE Voluson E10 ultrasound interface. At the top left, patient information includes 'g', 'E69766-18-09-07-1 GA=20w5d', and 'Voluson E10'. At the top right, technical parameters are listed: 'TIs 0.2', 'Tib 0.2', 'MI 0.9', '09/07/2018', '12:54:14 PM', 'RM6C', '73Hz/ 9.8cm', '42°/0.9', 'Routine 2 Trim./OB', 'HI M 7.70 - 4.30', 'Gn 0', 'C7/M7', 'P4/E2', and 'SRI II 3'. The main display area shows three ultrasound images: a top-left axial view, a top-right axial view, and a bottom-left sagittal view. A central crosshair is labeled 'A', 'B', and 'C'. On the right side, there is a QR code and text: 'Make sure the Transthalamic plane (TT) is visible in the A-plane area, adjust if needed. Then press **Start Alignment**' and 'Scan the QR code below with your mobile device to access the ISUOG Guidelines.' At the bottom right, a yellow triangle icon is labeled 'V = 0.684 lit' and 'Vol.Angle'. A green progress bar at the bottom center indicates 'Calculating...'. The bottom of the screen features a control panel with buttons labeled 'P1', 'P2', 'P3', 'P4', 'P5', 'P6', 'img', and '3D', along with a 'Ticely' logo and other system icons.





# Augment Diagnosis – Help Prevent Errors



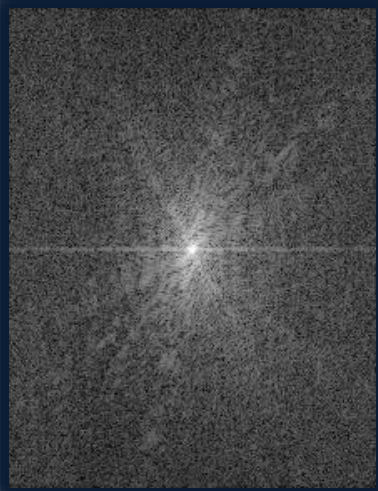
**Pneumothorax found**  
**96.23% confidence**  
**W:255**  
**C:128**  
**AI Finding**



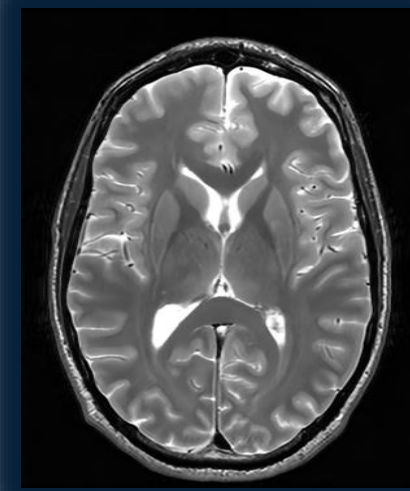
# Getting to Best Possible Images ...

Deep-Learning network trained to reconstruct images that are:

- achieving higher SNR by eliminating noise leveraging raw data.
- sharper from Intelligent True Resolution
- without sacrificing scan time



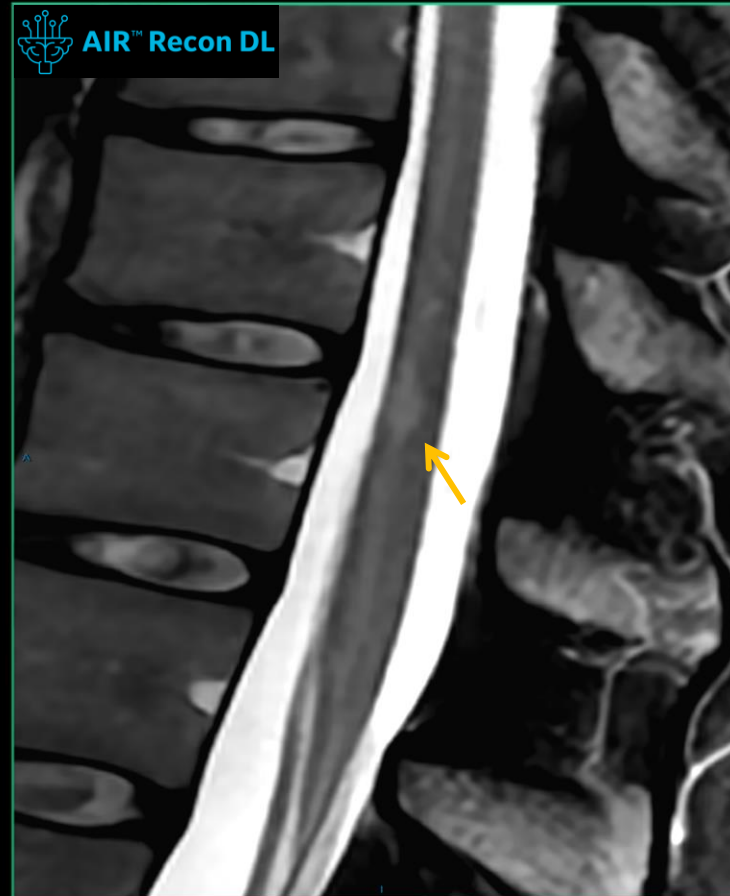
Raw data



Final image



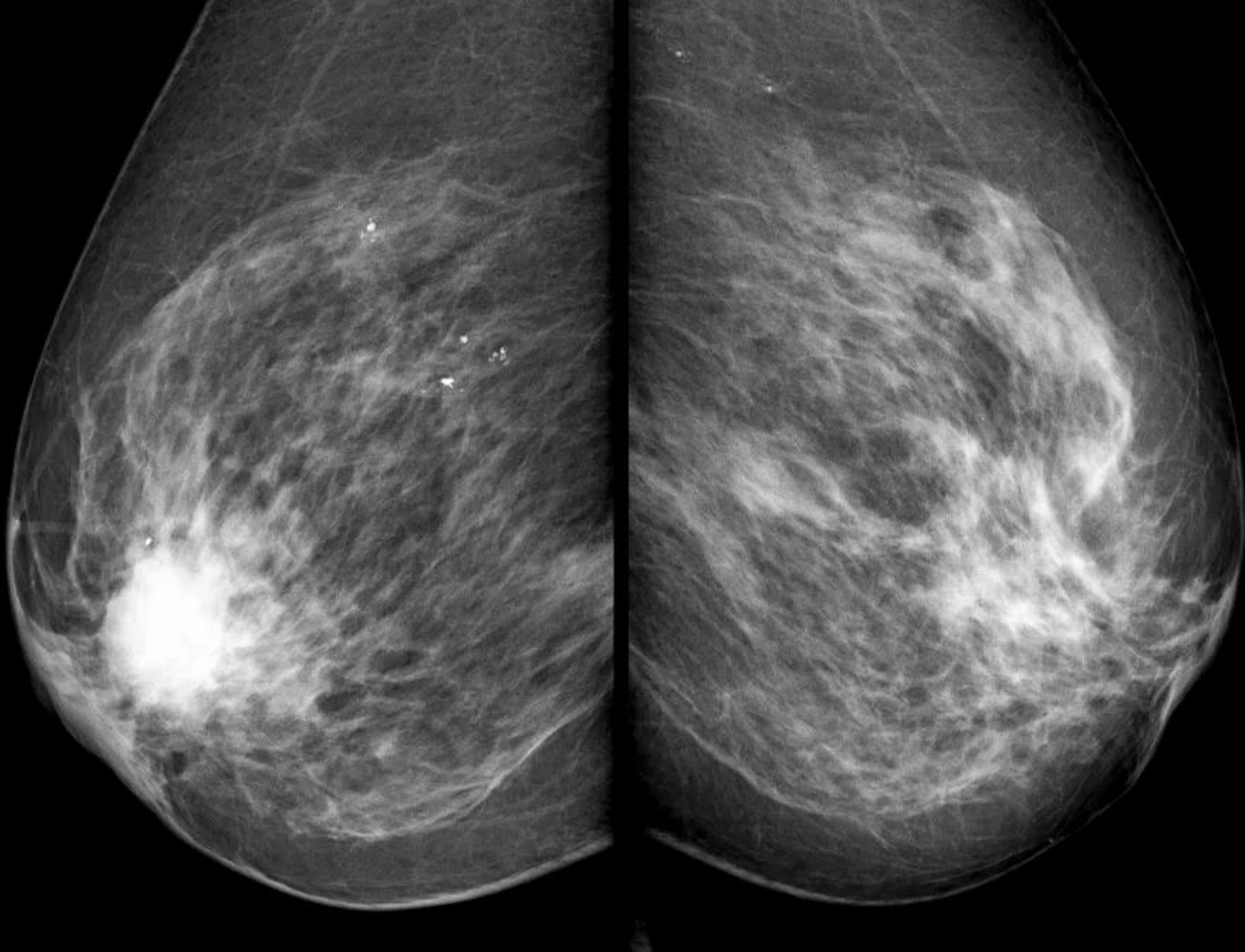
# Deep Learning-Based MR Image Reconstruction



- ✓ Noise removed
- ✓ Gibbs artifacts removed
- ✓ Higher image sharpness

Same scan time, same voxel size, same raw data

Courtesy of CCN





# Diagnostics Decision Support for Confident Diagnosis **Breast Assistant\***, powered by **Koios DS™**

## Challenge

How to reduce variability in Breast Imaging Reporting and Data System (BI-RADS®) categorization to achieve greater consistency and confidence in breast diagnosis decision-making.

## Solution

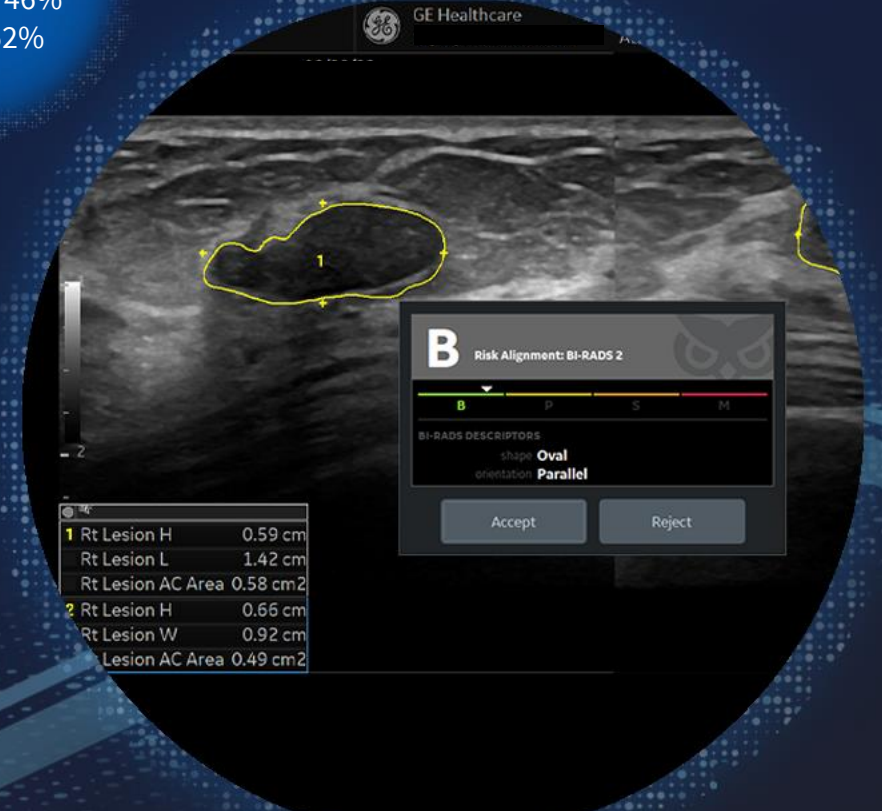
Breast Assistant, powered by Koios DS™, automatically provides an AI-based quantitative risk assessment that aligns to a BI-RADS ATLAS® category. Results are available in two seconds or less, providing decision support for the clinician, and helping to improve consistency across the department.

Uses machine learning and a proprietary algorithm—based on more than 400,000 clinical images—to generate a color-coded confidence scale  
Accessible directly from LOGIQ™ E10 Series console;  
easy to integrate into an exam.

**SENSITIVITY  
INCREASED†**  
from 92 – 97%  
to 97 – 98%

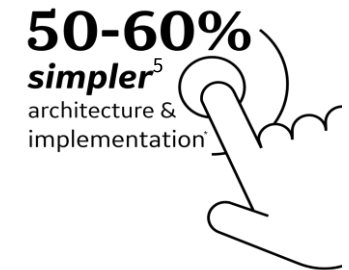
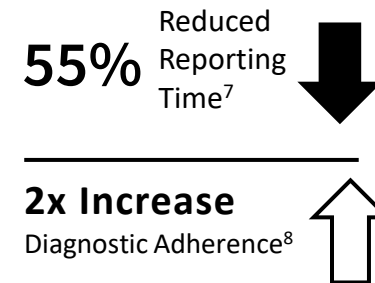
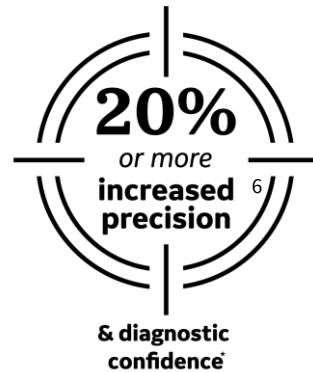
**SPECIFICITY  
INCREASED†**  
from 38 – 46%  
to 45 – 52%

**BENIGN BIOPSY  
RATES†**  
reduced  
34 – 55%





# Results ...

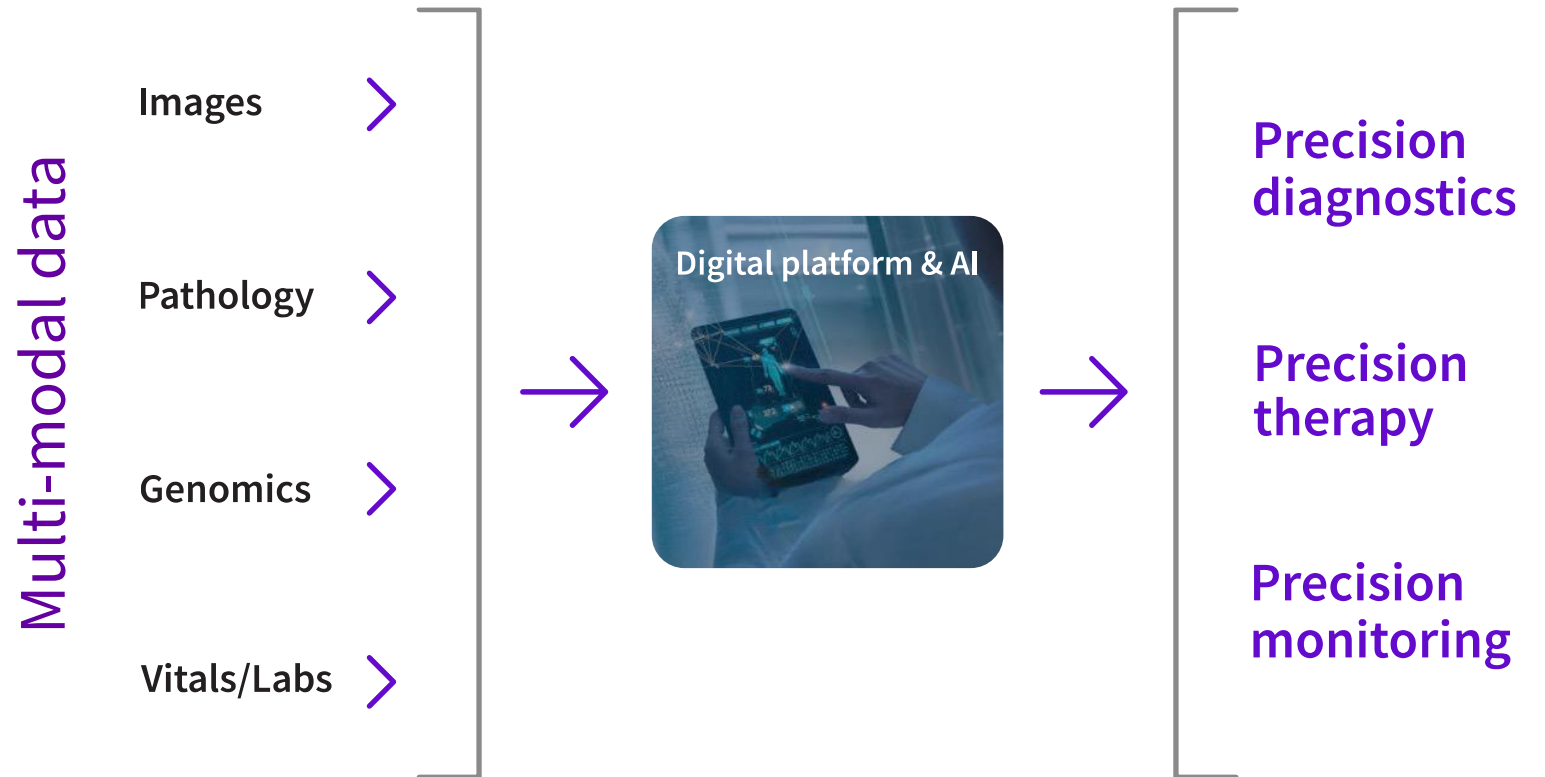


Results vary depending on customer specific considerations. Examples below from specific case studies:  
4 – Example reading time reduction with on MS disease specific reporting with use of Icobrain ms by Iconetrix  
5– Over similar Centricity PACS implementation  
6 - Example increase in detection of previously missed actionable nodules with Riverain ClearReadCT JB16335X  
7 – Kim, S.H., Sobez, L.M., Spiro, J.E. et al. Structured reporting has the potential to reduce reporting times of dual-energy x-ray absorptiometry exams. BMC Musculoskelet Disord 21, 248 (2020)  
8- Radiologist PoC clinical decision support and adherence to guidelines for incidental lung nodules, J Am Coll Radiol, 13 (2016), pp. 156-162

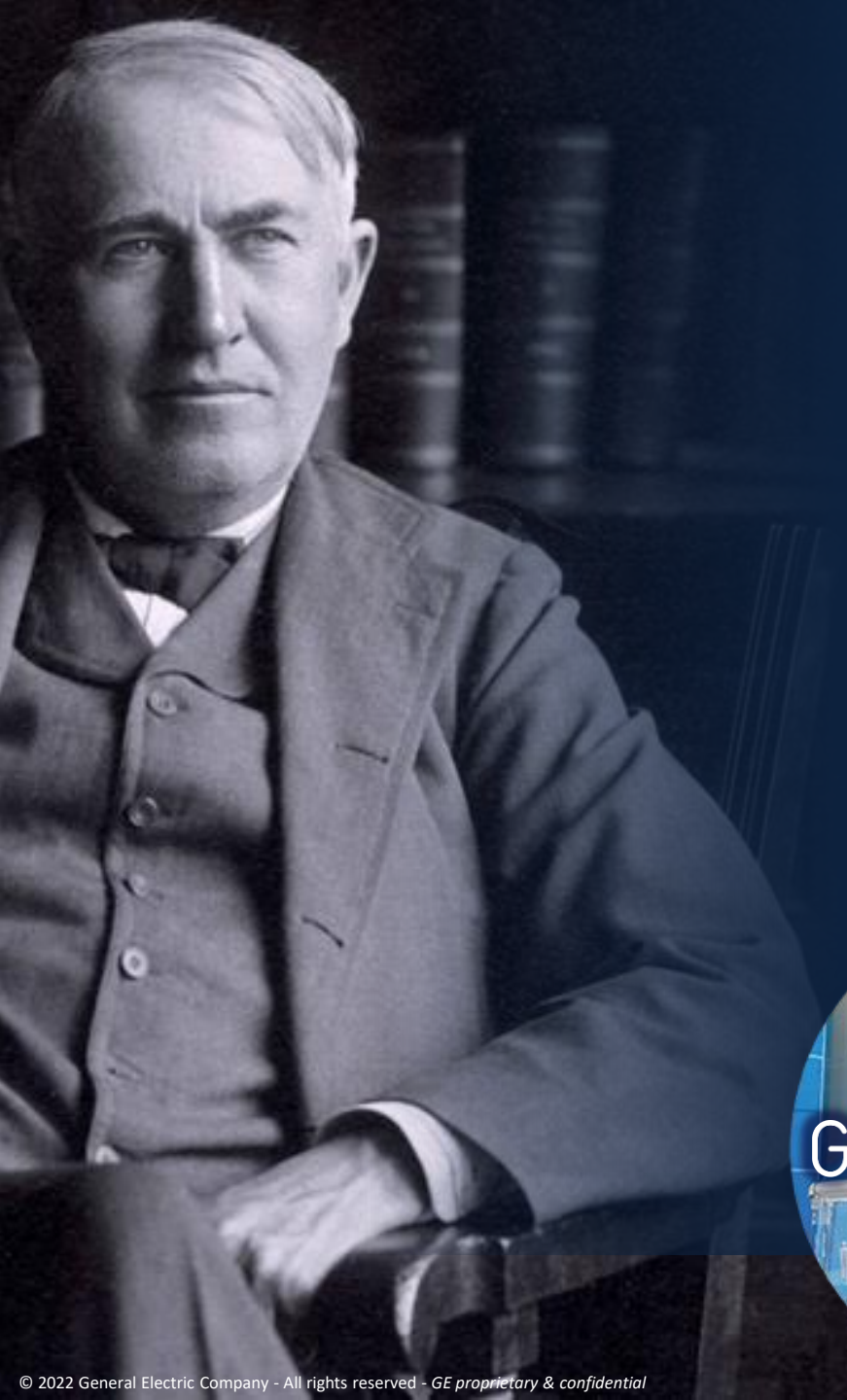
# Precision Care

leverages a patient's **unique data** via multi-modal sources to determine the **most appropriate treatment** and deliver the **best possible outcome**

## Bridging data and technology to deliver insights



# How GE HealthCare Tackles These Opportunities



**“I find out what the world needs –  
and then I go ahead and try to  
invent it...” - Thomas Edison**

*Future of  
Precision  
Health*



*Future of  
Energy  
Transition*



*Future  
of Flight*





# GE HealthCare Today – A Leading Global Medtech and Diagnostics Innovator

**\$18B** Revenue in 2022      **160+** Countries  
**~50K** Employees worldwide      **11K+** Patents granted globally

## Business Segments

Imaging



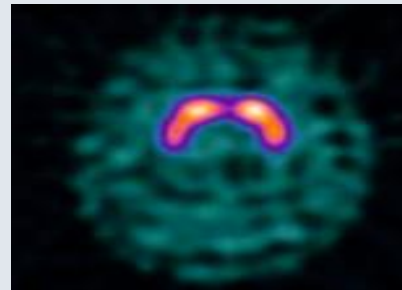
Patient Care Solutions



Ultrasound



Pharmaceutical Diagnostics



**Our Purpose – creating a world where healthcare has no limits**

# AI based medical devices

## 4. GE Healthcare and Siemens have the most authorized AI/ML medical devices

Top five companies, in the order of the number of FDA authorizations.

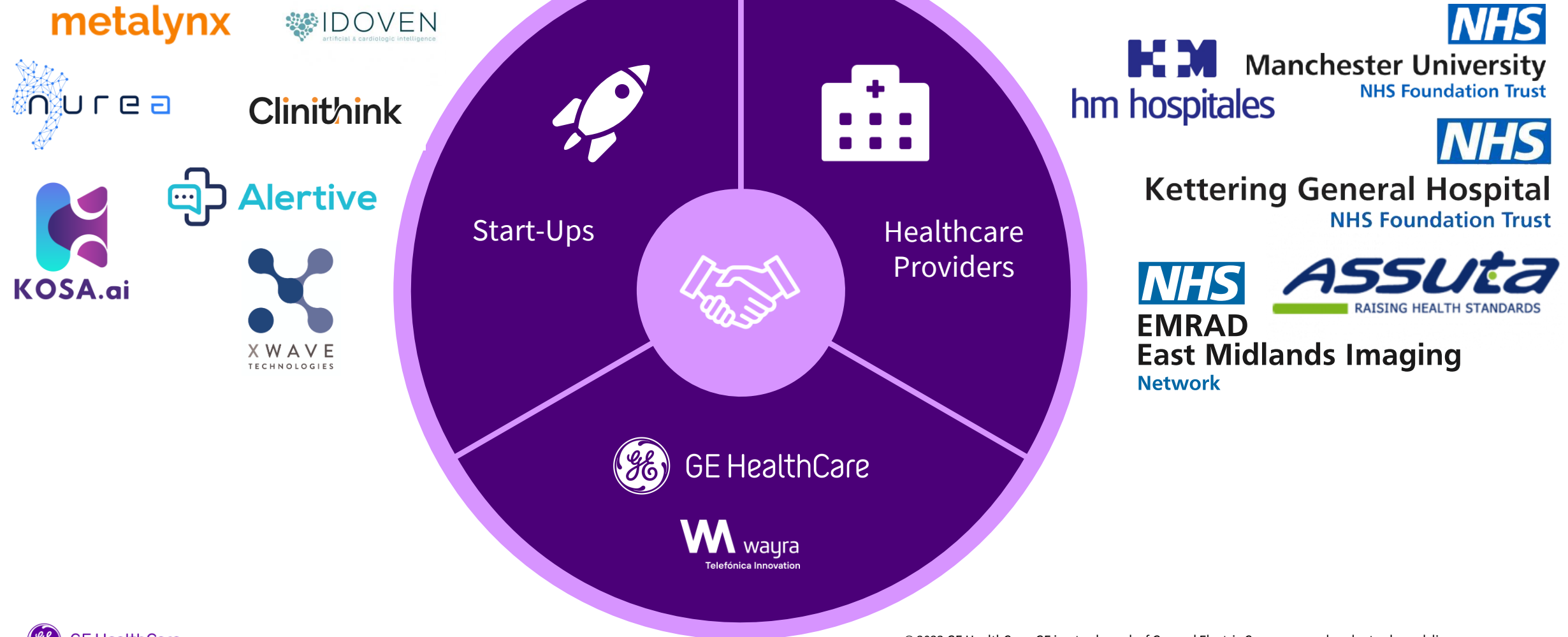


Chart: Elise Reuter • Source: [Food and Drug Administration](#) • [Get the data](#) • Created with [Datawrapper](#)

**Substantial acceleration of AI-based medical devices on the way ...**

# Edison™ Accelerator

The power of collaboration





Next 10 years  
will bring  
**BIG OPPORTUNITIES**  
including massive  
convergence of  
technologies.

Working as a  
**COLLABORATIVE  
ECOSYSTEM**  
will determine our  
vector of success.

Leveraging  
data to drive  
**BETTER OUTCOMES  
AND LOWER COSTS**  
will be core to the  
future of care.

**Creating a world where healthcare has no limits**





GE HealthCare