

# AI IN IMAGING: MOVING PAST THE HYPE

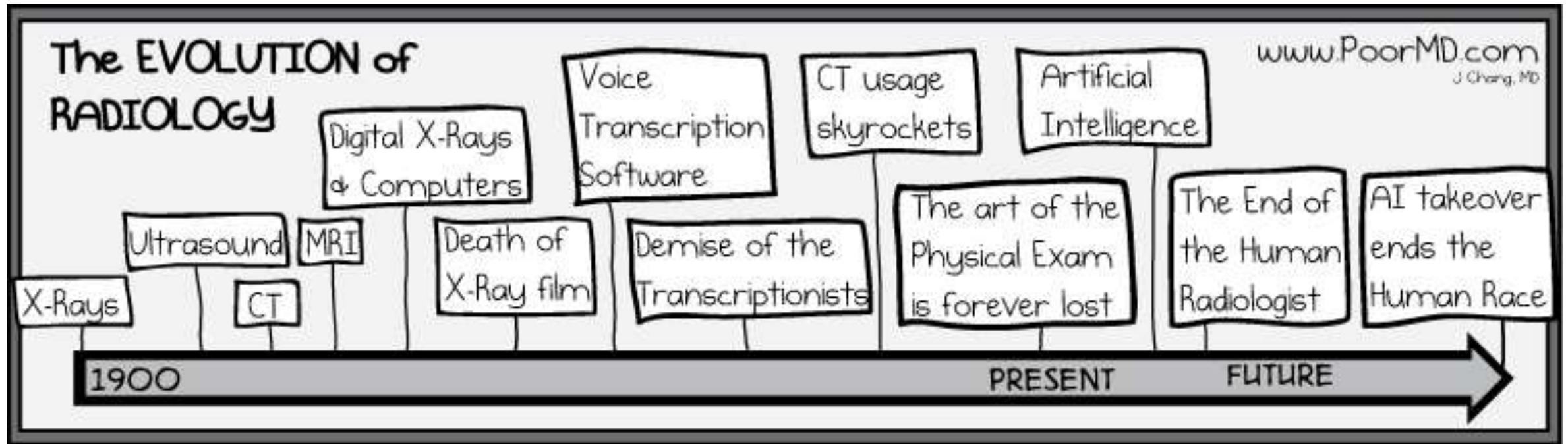
**Himss**<sup>®</sup>

**NORTH CAROLINA** *Chapter*

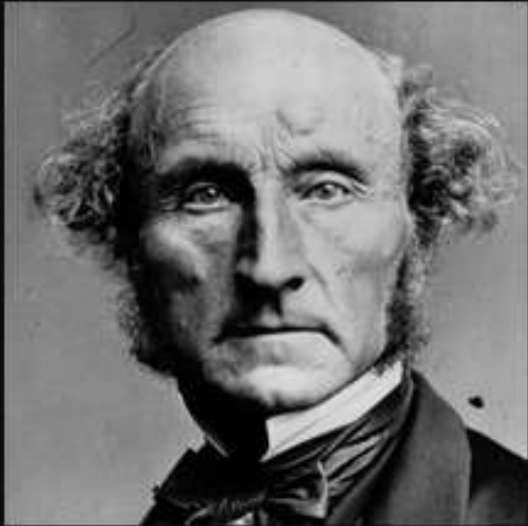
MARK DOBBS - GLOBAL IMAGING ALLIANCES  
PURE HEALTHCARE

ED RICKS - DIRECTOR OF HEALTHCARE  
SIRIUS HEALTHCARE

# AI IN ENTERPRISE IMAGING: HYPE OR NOT?



# AI IN ENTERPRISE IMAGING: HYPE OR NOT?



Every great movement must  
experience three stages:  
ridicule, discussion, adoption.

~ John Stuart Mill

AZ QUOTES



# YOUR IMAGING DATA IS AN ASSET



**MIT Sloan**  
Management Review

**What's Your Data Worth?**

Many businesses don't yet know the answer to that question. But going forward, companies will need to develop greater expertise at valuing their data assets.

SPRING 2017  
ISSUE



**The Economist**

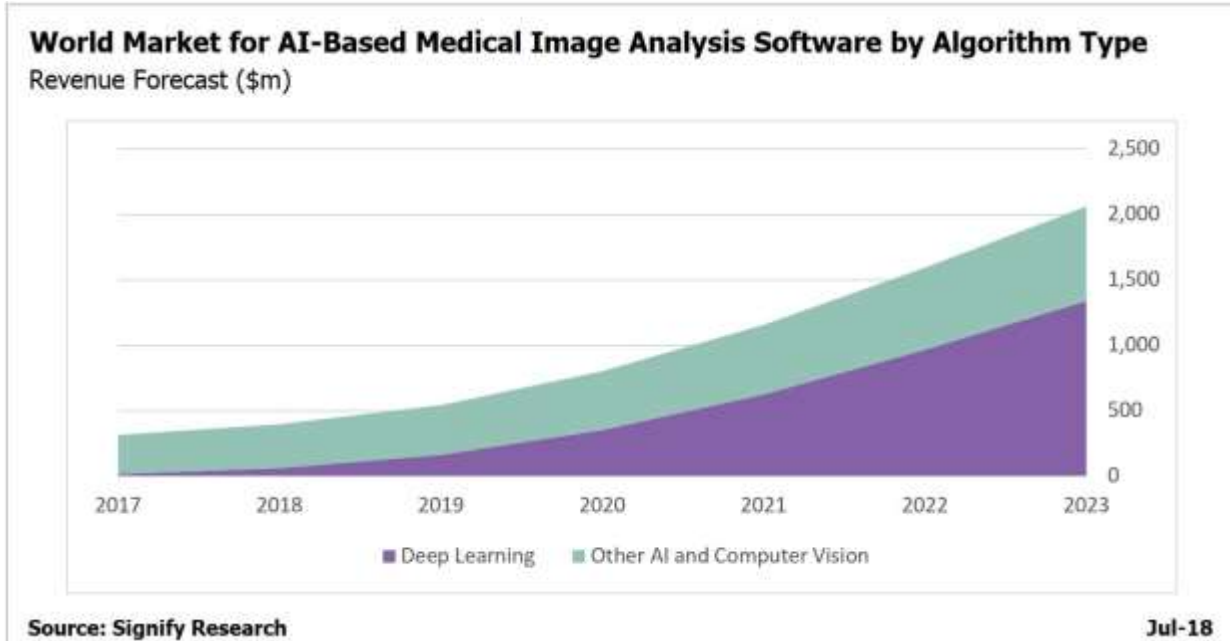
Theresa May v Brussels  
Ten years on: banking after the crisis  
South Korea's unfinished revolution  
Biology, but without the cells

MAY 6TH - 12TH 2017

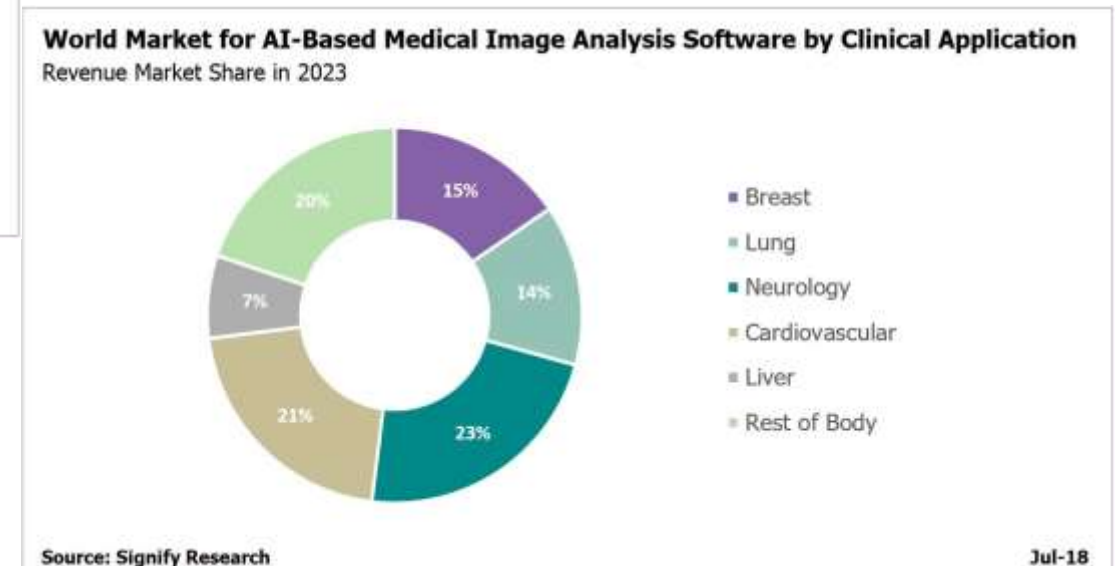
**The world's most valuable resource**

Data and the new rules of competition

# THE VALUE OF MEDICAL IMAGING DATA



**\$2B+**  
**Market**



# THE VALUE OF MEDICAL IMAGING DATA



Accenture

# WHY WE NEED AI IN HEALTHCARE

## At HIMSS19, Cerner unveils AI tool to fight physician burnout

By [Bill Siwicki](#) | February 11, 2019 | 11:40 AM



“The healthcare environment is demanding, fast-paced and can take **an emotional toll on clinicians**; Cerner has set out to make the physician experience easier with our AI technology,”

The AMA reports that **physicians spend up to six hours daily** working with electronic health records (EHRs) to adhere to government and hospital documentation requirements.

2,796 views | Feb 21, 2019, 10:06am

## How Conversational AI Can Help Cure Physician Burnout



**Ben Kerschberg** Contributor  
Enterprise & Cloud



# WHY WE NEED AI IN HEALTHCARE

**Are you ready for a radiologist shortage?**

By Laurie Lafleur, AuntMinnie.com contributing writer

It is projected that **by 2025 there will be a national shortage of radiologists in the U.S.** to the order of tens of thousands of positions.

[...] especially in Europe and, specifically, in the UK, where there is an increasing shortage of radiologists, including trainees. According to the Royal College of Radiologists, **the percentage of unfilled consultant radiology posts has been increasing and recently hit 10.3%**

[Acta Radiol Open](#). 2019 Feb; 8(2): 2058460119830222.

Published online 2019 Feb 21. doi: [10.1177/2058460119830222](https://doi.org/10.1177/2058460119830222)

PMCID: PMC6385326

PMID: [30815280](https://pubmed.ncbi.nlm.nih.gov/30815280/)

Artificial intelligence in radiology: friend or foe? Where are we now and where are we heading?

[Emre Pakdemirli](#)





# WILL ALL AI SOLUTIONS WORK FOR YOU?

# IS AI READY “OUT-OF-THE-BOX?”

## A majority of AI studies don't adequately validate methods

<https://www.healthimaging.com/topics/artificial-intelligence/majority-ai-radiology-studies-dont-validate-methods> - March, 2019

“The Korean Journal of Radiology analyzed 516 published studies and found **only six percent (31 studies) externally validated their AI.** Of those 31 studies, zero took the necessary steps to determine if their method was indeed ready for clinical use.”

# LOCAL MODEL TRAINING IS NECESSARY

## Variable generalization performance of a deep learning model to detect pneumonia in chest radiographs: A cross-sectional study

<https://doi.org/10.1371/journal.pmed.1002683>- November 6, 2018

**“Pneumonia-screening CNNs achieved better internal than external performance in 3 out of 5 natural comparisons.** When models were trained on pooled data from sites with different pneumonia prevalence, they performed better on new pooled data from these sites but not on external data. CNNs robustly identified hospital system and department within a hospital, which can have large differences in disease burden and may confound predictions.”

# LOCAL MODEL TRAINING IS NECESSARY

## Better medicine through machine learning: What's real, and what's artificial?

<https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002721>-December 31, 2018

**“Irrational extrapolation”**—the assumption that algorithms trained on an easy-to-obtain set of patients or data will lead to accurate models that act in each patient's best interest—**must be stringently avoided** until algorithms can correct for such biases and use clinical data to reason about disease severity and trajectory.



# LOCAL MODEL TRAINING IS NECESSARY

"If a given hospital, clinic, or practice has significant variation in their population's makeup or imaging protocols, then it is highly likely that this model doesn't do 'X' and perform as it is supposed to. **Don't trust any algorithms without validating them on your local data, patients, or protocols!**" -Dr. Eric Oermann from Mount Sinai Health System

<https://www.auntminnie.com/index.aspx?sec=sup&sub=aic&pag=dis&ItemID=123535-November, 2018>



# IS MY INFRASTRUCTURE READY FOR AI?

# INFRASTRUCTURE MATTERS

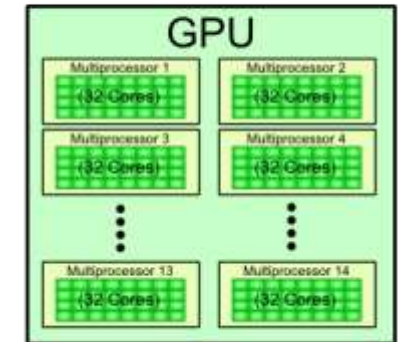
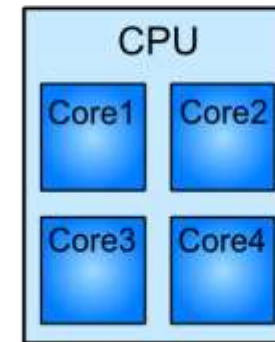
- **What is GPU starvation anyway?**
- **Why do we care?**
- **How is this related to AI in healthcare?**



# INFRASTRUCTURE MATTERS

- **Fast compute**
  - **GPUs for highly parallel workloads**
- **Fast networks**
  - **100 Gbps!**
- **Fast storage**
  - **Highly-scalable, low-latency storage optimized for parallel access**
  - **Scale-out all-flash arrays**

CPU/GPU Architecture Comparison





# INFRASTRUCTURE MATTERS

- **Bring AI from the lab to the bedside**
- **Is your IT infrastructure ready?**
- **What may have worked yesterday ~~may not~~ will not work tomorrow**
- **Retrofitting is not always a good idea**



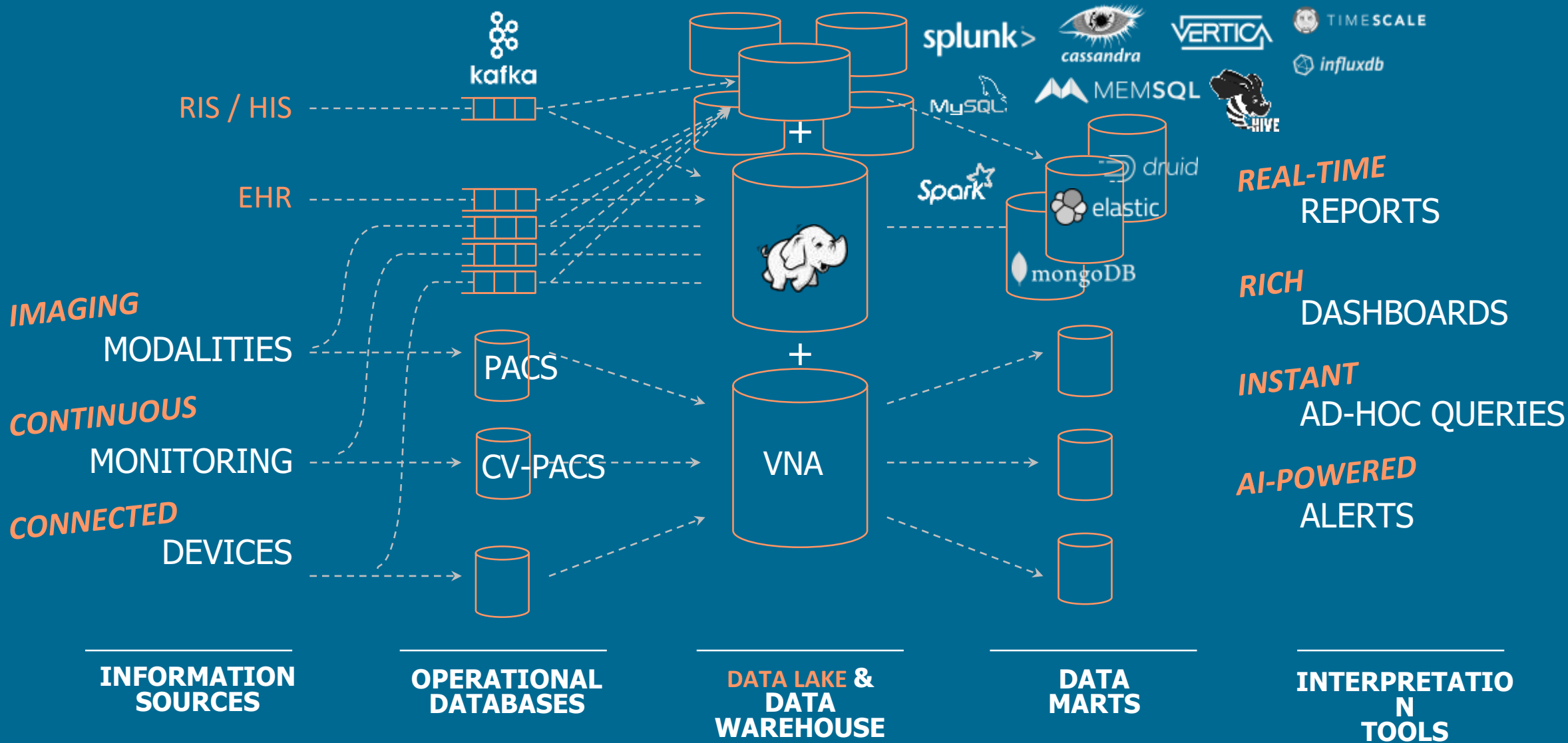
© Getty Images

# INTEGRATING AI TO EXISTING WORKFLOWS

- **Train models appropriately**
- **Clinical use requires:**
  - **High accuracy**
  - **Specificity & sensitivity depending on use**
- **Low latency**
  - **Even under heavy load**



# DATA LAKE OR A DATA ZOO?



# DATA HUB: CLINICAL & RESEARCH IMAGING

- **Most organizations have data silos**
  - **Silo for clinical data (PACS, VNA)**
  - **Silo for research**
- **Moving data between silos is slow and annoying**





# KEY TAKEAWAYS

- **AI is real and will evolve rapidly to mass adoption**
  - Data is valuable in general, more so in healthcare
  - AI will help us overcome real-world issues that humans alone cannot solve
- **Everyone should be involved in training models**
  - No one can expect to rely on shrink-wrapped models or products for AI in Imaging
- **Infrastructure Matters for AI in Imaging**
  - GPU compute, fast networks, fast storage
- **It is possible to start small**
  - Anyone can do this
  - Everyone should
  - Open source software, online courseware, simple infrastructure



 **SIRIUS**  

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**HEALTHCARE**