

Navigating the Future: Generative AI Market Maturity and Strategic Readiness for Health Care Executives

2024

AVIA has
one clear
mission

Enable healthcare
organizations to achieve
digital success with
greater **speed**, **discipline**,
and **impact**.

AVIA is the partner of choice for health care organizations on a digital transformation journey.



Deep digital expertise



Network best practices & benchmarks



Long-term partnerships



Part 1: What Healthcare Executives Need to Know



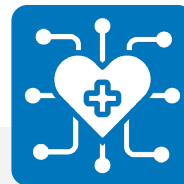
Executive Summary



AI development
proving more
readiness than ever
before



Standard AI
language is critical
to organizational
alignment and
capability/use case
development



Healthcare is ripe to
embrace AI with
many areas to
consider; Start with
a few ...

History of Artificial Intelligence | 1950- 1970s



1950 - British mathematician and logician Alan Turing proposed a test that has taken his name: the Turing Test. In the Turing test, people would interact with an agent and to try to decide from its responses whether it was human or a computer.

```
Welcome to  
##### LL      IIII ##### AAAA  
EE  LL  II      ZZ  AA  AA  
##### LL  II  ZZ  AAAA  
EE  LL  II  ZZ  AA  AA  
##### LLLLLL IIII ##### AA  AA  
  
Eliza is a mock Rogerian psychotherapist.  
The original program was described by Joseph Weizenbaum in 1966.  
This implementation by Robert Landsteiner 2005.  
  
ELIZA: Is something troubling you ?  
YOU: Men are all alike.  
ELIZA: What is the connection, do you suppose ?  
YOU: They're always bugging us about something or other.  
ELIZA: Can you think of a specific example ?
```

1960s - Using the symbolic AI approach (rules-based systems), scientists tried to replicate human intelligence by programming rules for decision-making into machines such as SHRDLU and ELIZA



1950

1960

1970



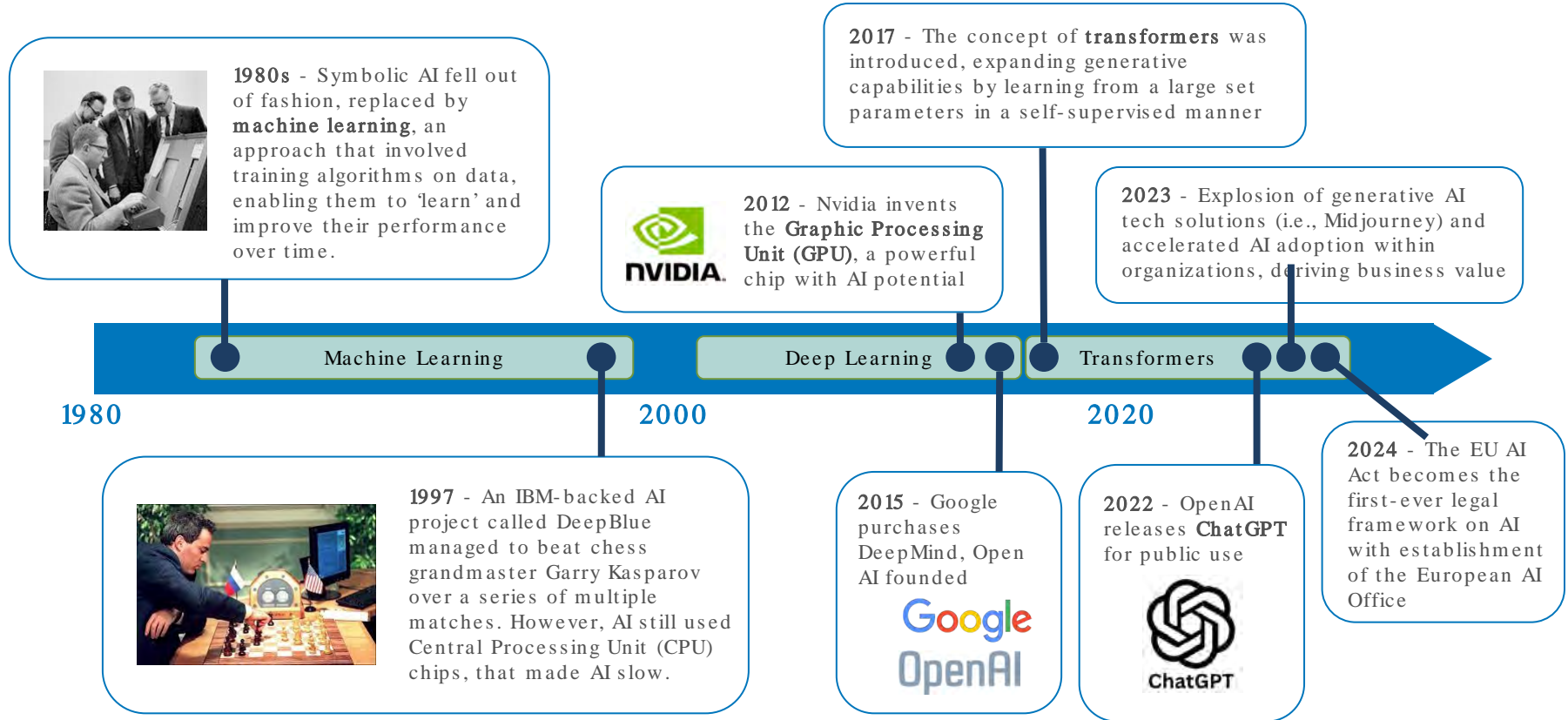
1956 - The term, "Artificial Intelligence" was born at a conference held at Dartmouth College in 1956 by leading researchers in the new field of computing



1970s - The world entered an AI winter, triggered by the pulling of government financial support for AI research in the US and UK. AI's time in the shadows would last for around a decade.

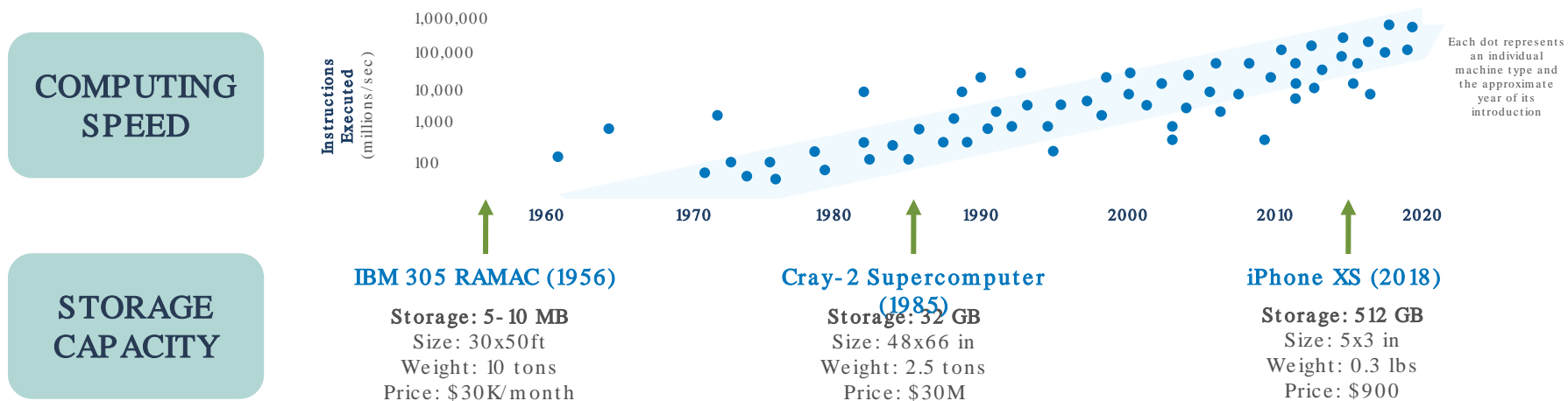
Source: Cybernews

History of Artificial Intelligence | 1980s - Now



Additional Advancements that Supported AI Growth

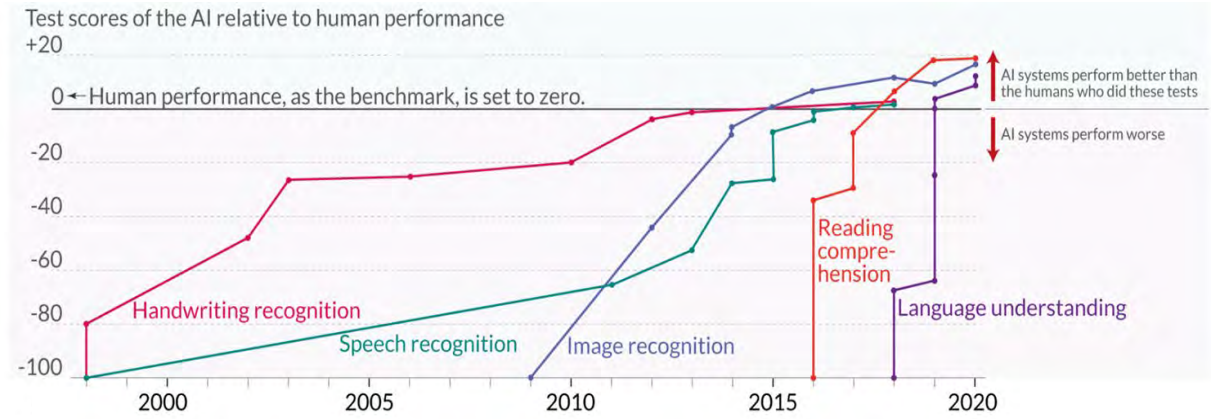
Increased computing speed and storage capacity propelled AI development, enabling complex algorithms and transformative applications



Faster computing and improved information storage allowed for practical, real-time solutions to find relationships in the data that were previously unknowable using mathematical expressions and algorithms

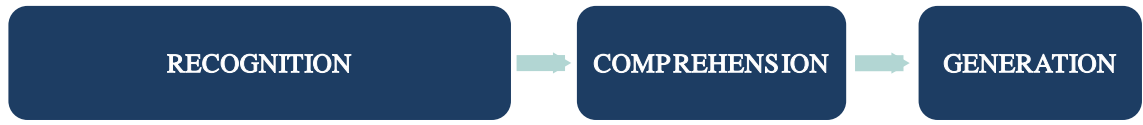
From Promise to Performance

Technological advancements have enabled AI to outperform humans in cognitive tests



Generative AI vs. Standard Tests

	GPT-3.5	GPT-4
Bar Exam	10th percentile	90th percentile
SAT Reading & Writing	87th percentile	93rd percentile
SAT Math	70th percentile	89th percentile
Stanford Complex Clinical Care Exam	4 points higher than med students	4.2 points higher than med students

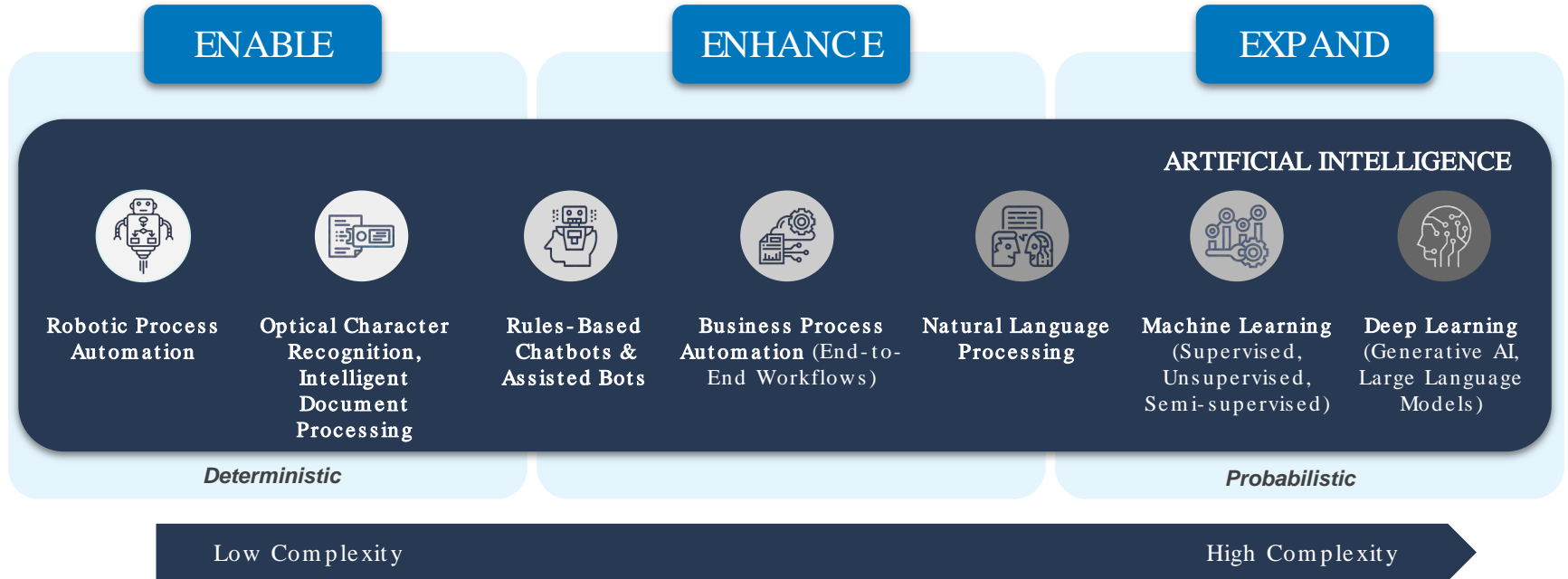


Generative AI is just starting to display its capabilities, with already impressive results

Source: Kiela et al. (2021) - Dynabench: Rethinking Benchmarking in NLP

Defining AI & Generative AI

Intelligent Automation encompasses a set of technologies that create a 'digital workforce' to further optimize business, clinical, and operational objectives



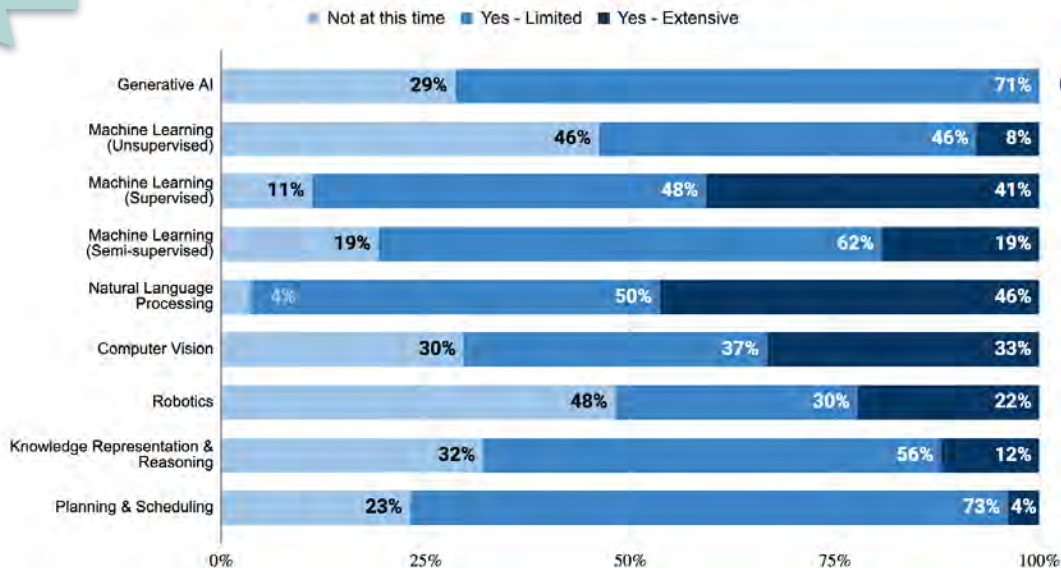
While NLP, some ML and Computer Vision have gained traction, **Generative AI, Unsupervised Machine Learning, Knowledge Representation, and Planning/Scheduling** are the least utilized AI techniques

As of Q1 2024, most of the Collaborative have started to explore Generative AI.

Technique Use

N=28

Types of AI Techniques used by Members



With regulatory clarity from the FDA, **Radiology and Cardiology** are two of the most mature clinical areas where AI is demonstrating scale across the system

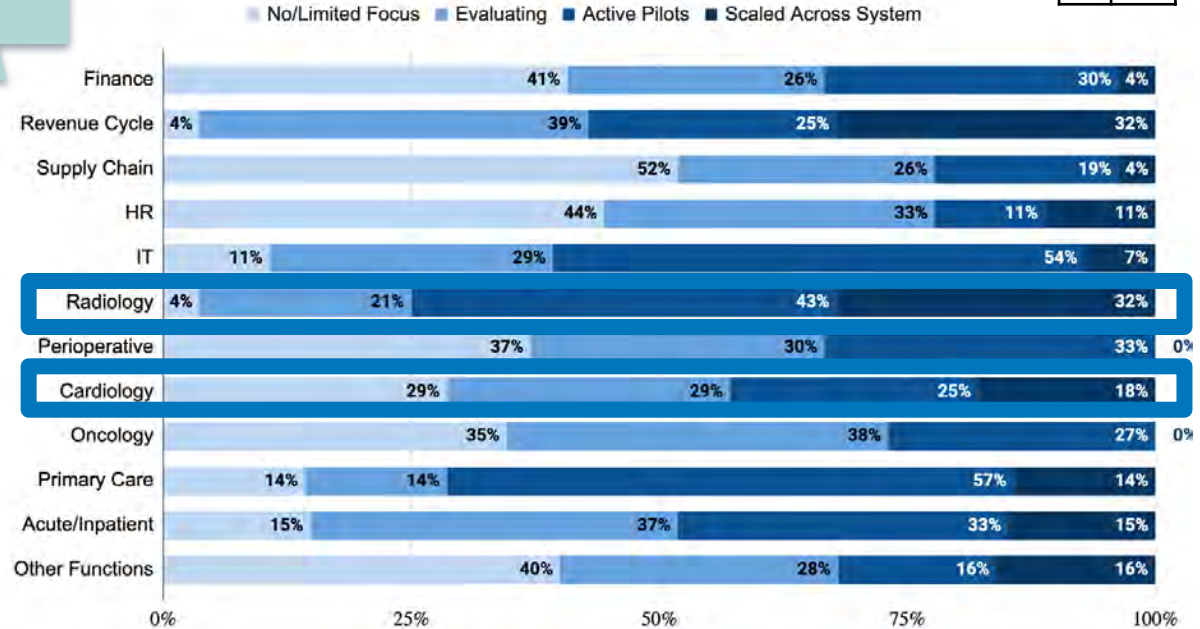
Revenue Cycle and IT provide examples of administrative use cases due to workflow and risk attributes.

Functional Area Use

Primary Care appears to have higher degree of maturity due to NLP technology, while Acute Care is a resultant of predictive analytics.

Functional Areas where Members are using AI

N=28

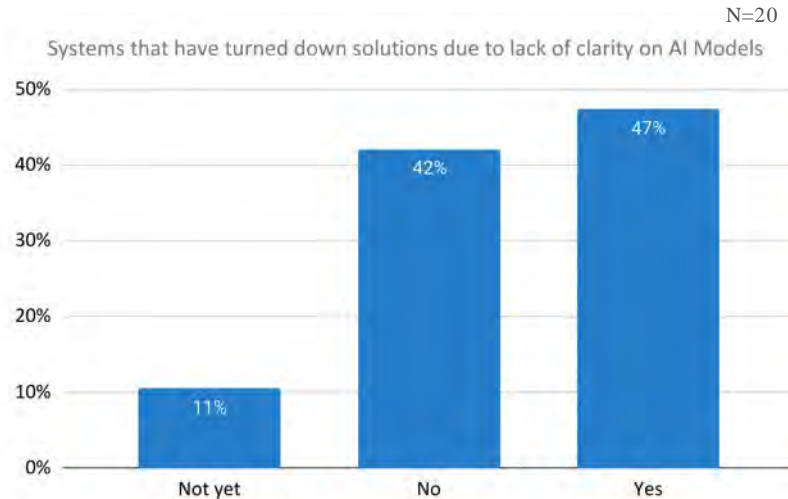


Organizational Survey

Half

of organizations have **turned down a solution partner** due to lack of clarity on AI model/solution design

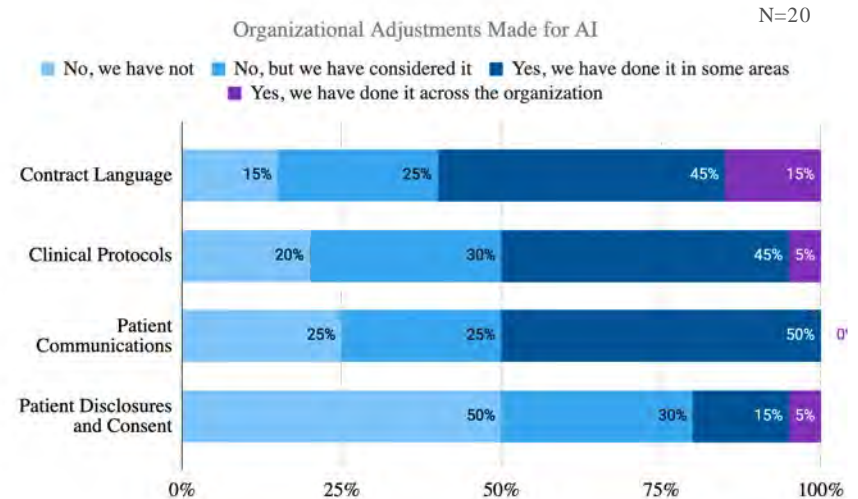
There is a gap in the market with solution opaqueness and model ambiguity, leading to missed opportunity.



Most

Organizations have made **some adjustments** to accommodate AI

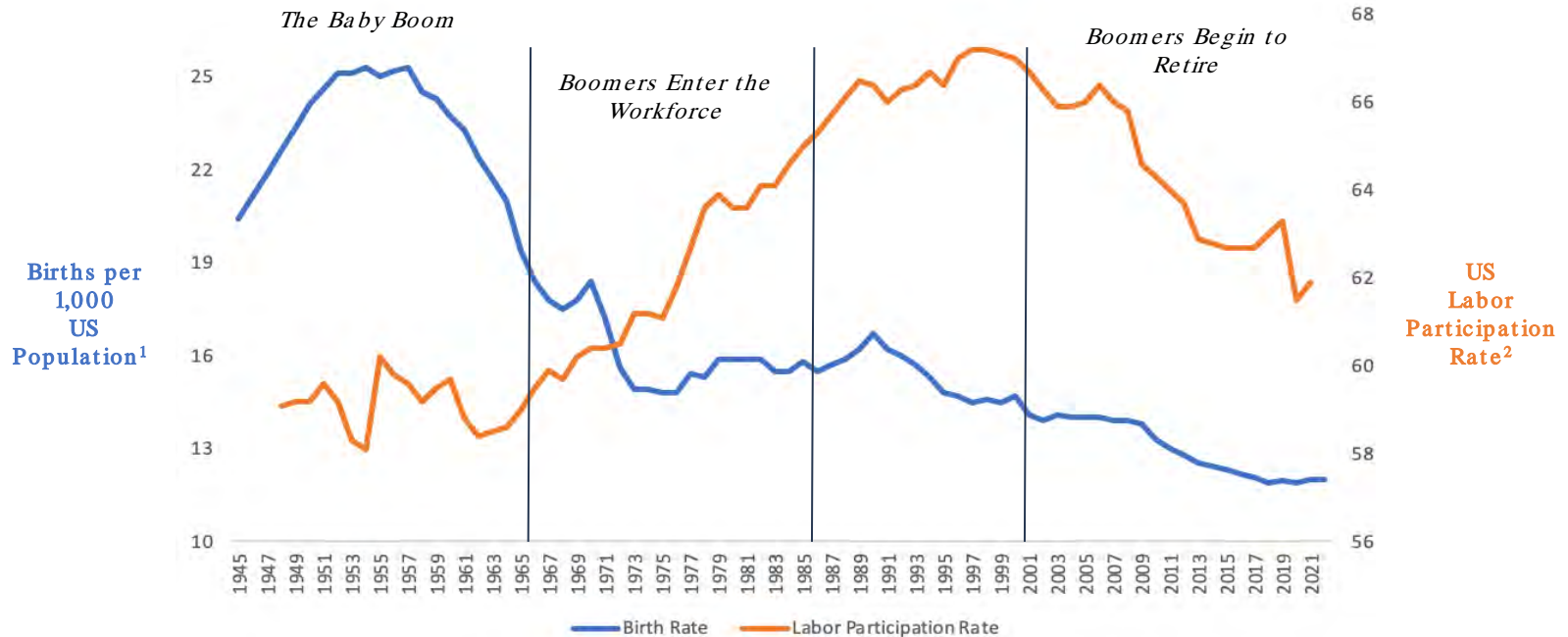
Organizations appear to be starting to act from a key risk perspective, but only in limited ways across operational and patient facing aspects.



The Case for AI in Healthcare

The Capacity Cliff | More Patients, Fewer Workers

Providers will soon have to treat more patients with fewer workers



Sources:

[1] Live Births and Birth Rates, by Year

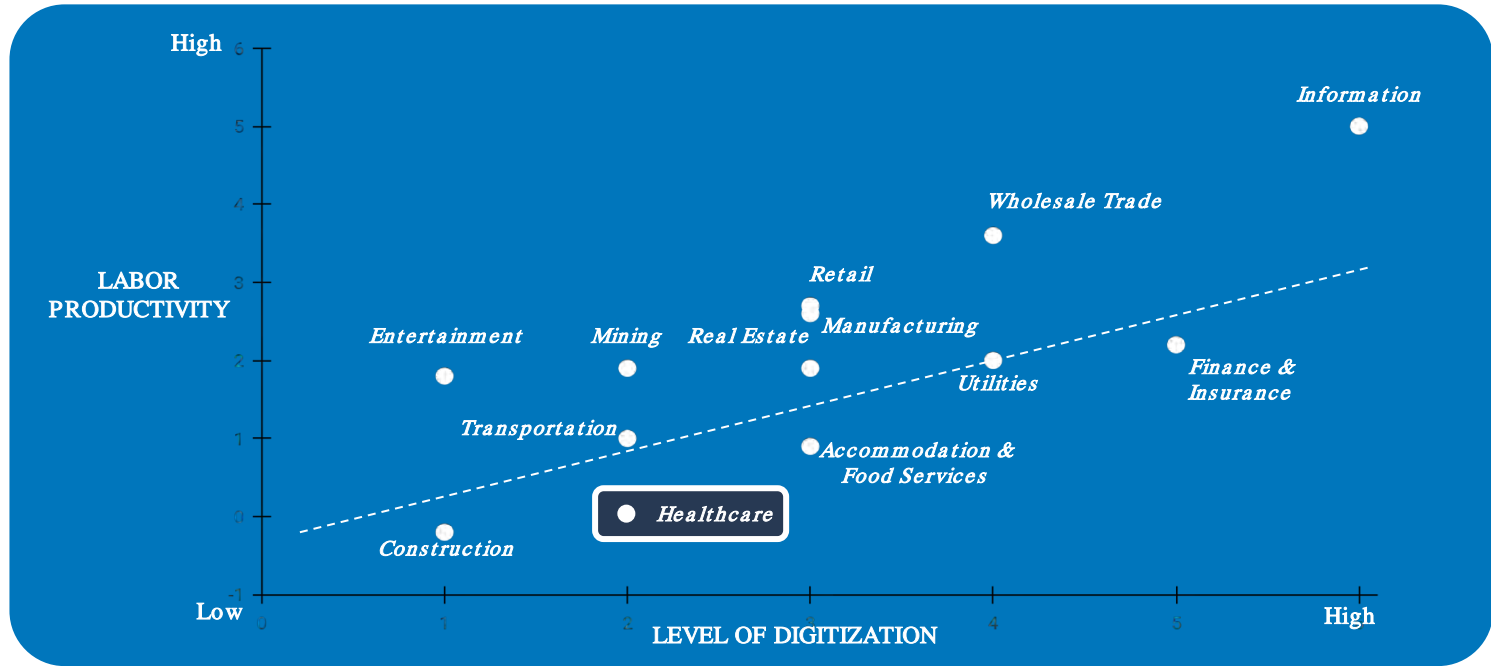
[2] FRED Economic Data

[3] U.S. Census Bureau

[4] AMN Healthcare Survey: 85% of Healthcare Facilities Face Shortages of Allied Healthcare Professionals

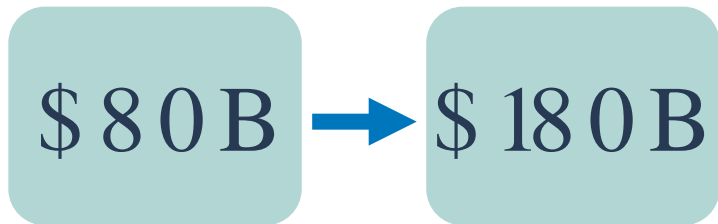
Healthcare Has a Productivity Problem

Healthcare is the only industry that added technology and lost productivity



AI Impact on Healthcare Providers | Hospitals & Provider Groups

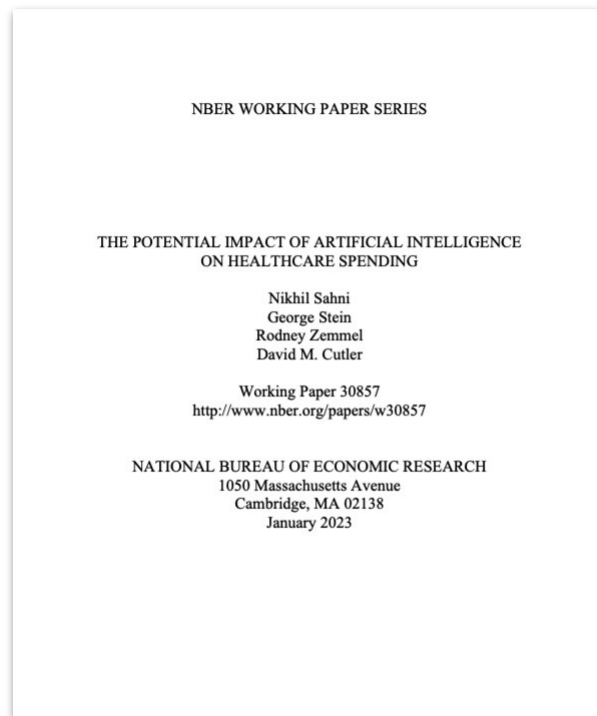
Potential net savings within next 5 years using today's technology without sacrificing quality or access:



Breakdown

Stakeholder Group	Total costs (2019), \$ billions	Net savings opportunity (2019), \$ billions	Net savings opportunity as percent of total costs
Hospitals	\$1,096	\$60-\$120	5-11%
Physician Groups	\$711	\$20-\$60	3-8%

Source: NBER (Harvard & McKinsey)



Use Case Example: Clinical Documentation

In-Person Scribes

Human scribe paired with a single provider who is physically present in the exam room to document patient encounters in real-time and produce note for provider sign off

Remote Scribes

Human scribe paired with a single provider who is virtually present in the exam room to document patient encounters in real-time and produce note for provider sign off

Tech-Enabled Scribes

A technology solution used by a provider that records and transcribes patient encounters after which a human produces the note for provider sign off

AI Solutions

A technology solution used by a provider that captures patient encounter and produces the note for provider review

ANALOG

DIGITAL

AI-Enabled

Ambient documentation solutions' comparative advantage in cost and turnaround time (TAT) **is disrupting** the industry

In-Person Scribes

Cost:
\$40K

TAT:
<24 hr

SCRIBEAMERICA

ProScribe

Remote Scribes

Cost:
\$35K

TAT:
<24 hr

SCRIBEAMERICA

AUGMEDIX

SHARPSCRIBE
BY ORCA HEALTH

SCRIBE EMR

AQuity

Tech-Enabled Scribes

Cost:
\$20K

TAT:
<4 hr

SCRIBEAMERICA

DeepScribe

3M

AUGMEDIX

NUANCE

AI Solutions

Cost:
<\$10K

TAT:
<1 min

NUANCE

Ambience

Suki

Nabla

ABRIDGE

AUGMEDIX

DeepScribe

1. Abridge, Ambience, and Nabla announced funding rounds in 2024
 2. Medical Scribes: Symptom or Cause of Impeded Evolution of a Transformative Artificial Intelligence in the Electronic Health Record
 3. 29 Health Systems in the AVIA Gen AI Collaborative

Use Cases for AI in a Healthcare Provider Setting

In order to move forward, organizations must identify the problems that AI can solve for and where to deploy

Access to Care

- Providing Rich Responses To Patient Queries
- Accelerating Clinical Trials
- Triageing Patients
- Extending the Reach of Top-Quality Medical Care

Medical Decision Making

- Improving Biopsy Procedures
- Enabling more informed treatment decisions
- Transcribing & Analyzing Doctor-Patient Conversations
- Diagnostic Assistance
- Analyzing Medical Images



Patient Care Delivery

- Improving Patient Adherence To Recommended Care
- Monitoring And Analyzing Vital Signs
- Delivering Proactive Care
- Evaluating Patients after hospital discharge
- Personalizing Treatment Plans

Population Health

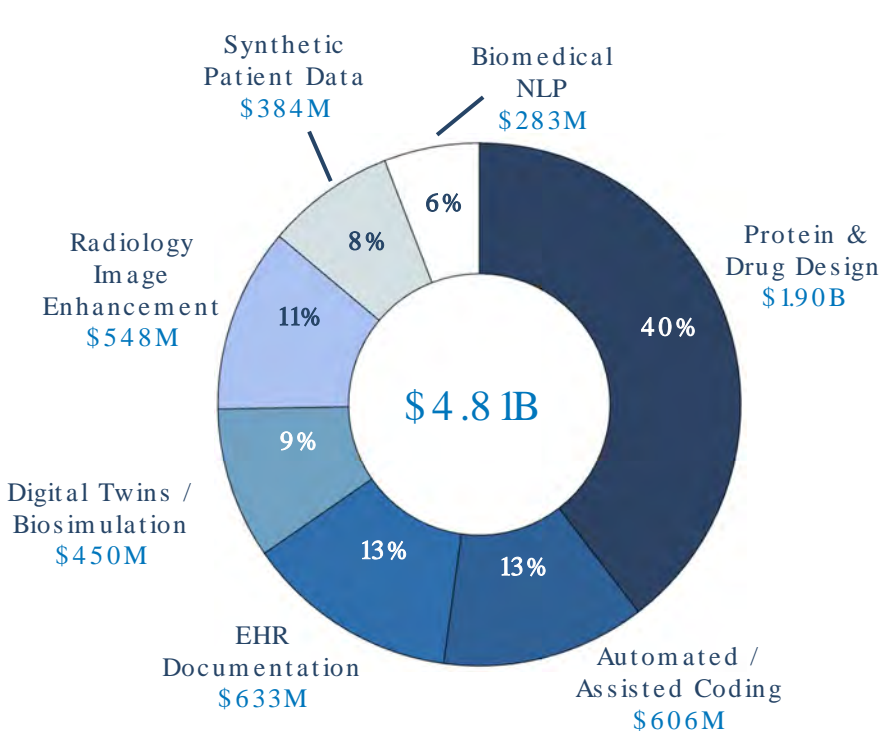
- Indexing Common Health Markers
- Identifying patients at risk of certain diseases

Administrative

- Optimizing Medical Facilities' staffing, scheduling and resource planning
- Streamlining Administrative Tasks
- Providing internal education and co-training support to workforce for corporate service functions (HR, Finance, etc)

Healthcare Generative AI Investment Market Map

To date, Protein & Drug Design, EHR Documentation, and Automated Coding remained the top investment areas



- Protein & Drug Design**
Acceleration and de-risking of drug development, reducing time, cost, and effort / number of experiments required

- Automated / Assisted Coding**
Usage of AI / ML to streamline coding of procedures / diagnoses for billing & reimbursement purposes

- EHR Documentation**
Automated generation / enhancement of documentation using AI analytics of patient data

- Digital Twins / Biosimulation**
Usage of computer models to simulate biological processes, predict behavior of drugs / devices, and create virtual replicas of biological systems

- Radiology Image Enhancement**
Usage of AI algorithms to improve speed and quality of medical imaging, as well as reduce data requirements

- Synthetic Patient Data**
Generation of artificial data intended to imitate real patient info and mitigate challenges related to privacy, security, and access to real data

- Biomedical NLP**
Usage of linguistic models & algorithms to extract and analyze information from biomedical text data, e.g. EHRs, scientific literature, clinical trial reports

Part 2: Structure and Formation

We are seeing market formation in three distinct areas



Big Tech Companies

- Investing in AI research, data storage, platform, and computation
- Increasing collaboration with provider organizations and startups



AI Digital Solutions

- Increasing investment in funding to support solution market landscape build out
- Marketing Integration of AI technologies to health systems



AI Infrastructure (Enablers)

- Increasing growth in the cloud-based platform and computing solution spaces
- Increasing technical stack infrastructure to support “maker” organizations

The largest technology companies are leading the charge...



- Deepening partnership with **Microsoft** (Nuance)
- Generative AI use cases in **pilot/development**:
 - AI-drafted responses to in-basket messages
 - Ambient clinical notes powered by Nuance, Abridge, Ambience
 - AI-powered chatbot to explain medical bills
 - Note summaries for clinicians and researchers



- Contracted with the **FDA** to develop **AI tools to extract information from EHRs** & improve understanding of the **effects of medicines on large populations**
 - Over the next 2 years, Cerner & John Snow Labs will support the **FDA's Sentinel Initiative** by using AI technology



- **AWS** tool announced the launch of **HealthScribe**, allowing providers to build clinical applications that use **speech recognition and generative AI** to create **transcripts of patient visits, identify key details and create summaries** that can be entered into the EMR



- Built **Med-PaLM 2**, an AI tool designed to answer questions about medical information
- Announced a partnership with **Mayo Clinic** in June to explore generative AI's applications in the hospital
- Partnered with **HCA Healthcare** and **CHS**



- In 2022, acquired Nuance, a leader in conversational AI and ambient intelligence
- Incorporates **GPT-4**, the LLM technology from **OpenAI**, in its **clinical note taking** software
- Integrating **Azure OpenAI Service** into Epic



The AI Market is growing fast, are you prepared?

Clinical

DECISION SUPPORT



DIAGNOSTICS/IMAGING



RESEARCH



SURGICAL ROBOTICS



PROVIDER DOCUMENTATION

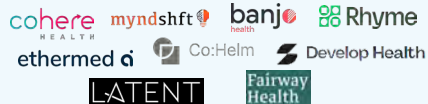


CLINICAL OPERATIONS



Administrative

PRIOR AUTHORIZATION



CARE OPERATIONS



RECRUITING



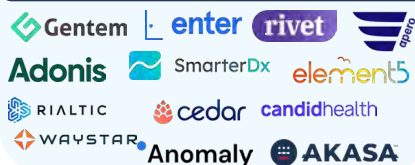
CONVERSATIONAL AI



MEDICAL CODING



REVENUE CYCLE OPERATIONS



IT & Analytics

ML PLATFORMS



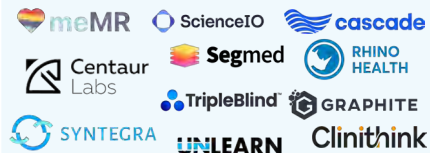
AI SUITE



POPULATION HEALTH & ANALYTICS



DATA



SECURITY & COMPLIANCE



Patient-Facing

CARE NAVIGATION



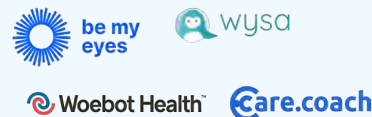
AI-ENABLED SERVICES



REMOTE PATIENT MONITORING



COMPANION AI



*Illustrative list of Digital Solutions with noted AI capabilities; Not specific to any one AI technique (ie Generative AI)
(Updated March 2024)*



Mayo Clinic has leveraged the power of AI capabilities through **image analysis and image-based risk scoring** to unlock the potential to revolutionize mammography screening while increasing early detection of breast cancer.

By effectively using Volpara's AI technology, **clinicians can most easily pinpoint high-risk patients for breast cancer** and work with them to develop **personalized prevention and screening strategies**.



Providence Health has partnered with Medpearl to **improve patient engagement and referral management** through a first of kind engagement co-pilot chatbot.

In a pilot last year involving more than 200 Providence providers, **72% said MedPearl improved their workups, 20% said it changed which specialists they referred to, and another 20% said they were able to care for the patient themselves** without the need of a specialist. MedPearl's net provider score is 61, between good and excellent.



Ochsner Health has partnered with Aidoc to **address clinician burnout while enhancing patient outcomes** through AI-enabled scan analysis.

The result is **quick and efficient identification of acute abnormalities in scanned images** using AI algorithms, enabling **quicker triaging and care coordination by the care team**. Aidoc's aiOS solution also helps facilities with implementation and integration of the solution with the existing EHR and data platforms.

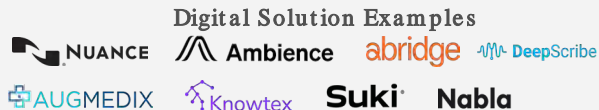
Generative AI/ AINear-Term Use Cases

There is an accelerating momentum of AI use case development across health systems in the country, with the following areas seeing early successes



Clinical Documentation

- Ambient listening, chart summary generation, provider documentation



Clinical AI

- Medical error detection, clinical decision support, diagnostics/imaging



Patient Engagement and Communications

- Bedside communications, post-discharge status checks, care navigation, remote patient monitoring, conversational chatbots



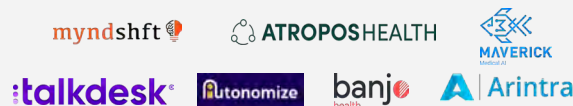
Corporate Services (HR, IT, Marketing)

- Marketing content creation, code writing, code auditing/debugging, RAG +LLM techniques for internal use (training, policy)



Healthcare Operations - Administrative/Clinical

- Internal workforce communications, prior authorization, revenue cycle operations, call center, data analytics, research



Part 3: How Leaders Should Prepare

AI Impacts Every Leader of the Organization

The questions each leader should answer for

President/CEO/Provost

“How can AI be an enabler to **achieve long term community benefit and organization sustainability?**”

CIO

“How will AI impact our **tech stack** and is our **data infrastructure** sufficient?”

CHRO

“How we incorporate AI into the organization to **alleviate workforce challenges** without employees feeling threatened?”

CFO

“How can AI help us reduce **reduce our costs / grow our revenue base** in an environment of rising expenses and shrinking reimbursement?”

COO

“How can we integrate AI into our organization to **optimize operational efficiency and streamline processes** across departments?”

CXO

“How can we leverage AI to **enhance the patient or student experience** by increasing access and healthcare literacy?”



Chief Data Officer

“How do we **ensure the quality of our data** and leverage to **deliver value to our patients, researchers, and students** and the system?”

CSO

“How can we use AI to gain a **competitive advantage in our strategies, while being ethical and responsible to our stakeholders?**”

CMO / CNO / Assoc. Provosts

“How can AI **alleviate clinician and faculty burdens** while improving outcomes and delivering care more compassionately, how and when patients or students want it?”

AI Impacts Every Leader of the Organization

Leadership Responsibilities with AI



CSO

Responsibilities:

- Strategic vision
- Resource allocation
- Ethical/regulatory oversight

Skills Required:

- AI/Data literacy
- Change management

COO

Responsibilities:

- Workflow integration
- Change management & staff engagement
- Performance measurement & continuous improvement

Skills Required:

- Workflow redesign
- Change management

CIO

Responsibilities:

- Tech stack strategy
- Tech integration & infrastructure
- Privacy & security

Skills Required:

- Technical proficiency
- Strategic planning

Chief Data Officer

Responsibilities:

- Data analytics & decision making
- Data infrastructure
- Data governance & security

Skills Required:

- Technical proficiency
- Data management
- Data analytics

CHRO

Responsibilities:

- AI talent acquisition
- Change management
- Re-skilling & upskilling

Skills Required:

- Talent management
- Change management

CMO / CNO

Responsibilities:

- Workflow integration
- Quality implications
- Education/Training
- Ethical considerations

Skills Required:

- Workflow redesign
- Change management

Counsel & Compliance

Responsibilities:

- Regulatory compliance
- Ethical & legal frameworks

CFO

Responsibilities:

- Planning & budgeting
- Benefit analysis
- Business case development

Skills Required:

- Strategic financial planning
- AI Capital/Infrastructure

CXO

Responsibilities:

- AI-enhanced patient or student engagement
- Data privacy
- Patient or student satisfaction

Skills Required:

- AI/Data literacy
- Communication

Skills Required:

- Legal & regulatory awareness
- Communication/collaboration



People

- Assess AI's impact on the workforce and clinicians
- Deploy ongoing internal training & engagement
- Address dynamic shifts of the patient-provider or student-educator relationship based on use



Process

- Ensure quality checks of AI technology outputs
- Administer ongoing testing and piloting of AI processes
- Monitor for potential misuse (eg. around data) and hallucinations



Technology

- Ensure Interoperability of AI technologies for seamless integration
- Master compliant data collection, storage, and sharing practices
- Build necessary computing infrastructure

Challenges & Risks Faced of AI Implementation in Healthcare

Understanding and addressing the challenges and risks is critical for success



Data Privacy/Security

- Healthcare & student data is **highly sensitive** & subject to **strict regulations** like HIPAA



Clinical Validation & Integration

- Deploying AI requires **rigorous testing** to ensure output **improves patient outcomes** & doesn't **introduce new risk or work**



Data Quality & Bias

- Biased or incomplete data can lead to **inaccurate outputs**, exacerbating **healthcare disparities**



Cost & Resources

- Developing & implementing AI models requires **substantial resources** (researchers, clinicians, infrastructure, high-quality data)



Ethical Considerations

- Lack of **transparency** in how AI arrives at its decisions (black-box problem)
- Ethical concerns over **accountability**, **explainability**, and **overriding decisions**



Limited Data Availability

- Acquiring large & diverse datasets is challenging due to **privacy concerns**, **rarity of conditions**, or **limited sample sizes**
- Hinders **training & performance** of AI models



Regulatory Approval

- Getting regulatory approval for AI-based medical tools is **complex & time-consuming**
- Regulators require **extensive validation** & **evidence of safety & efficacy**



Unforeseen Errors

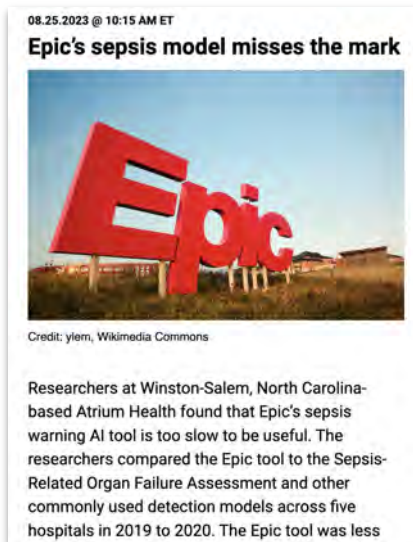
- Even well-trained AI models can **produce unexpected errors**
- In healthcare, such errors could have **serious consequences**

Acknowledgement of Risks Associated with AI

The risks with AI need to be accounted for to effectively deploy

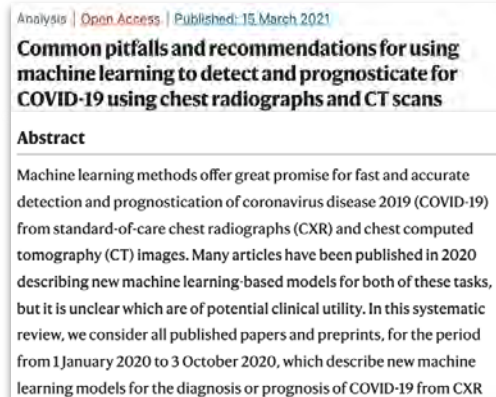


Over Memorial Day weekend, 25,000 messages were exchanged with Tessa, a 600% increase in volume, but had 25 messages containing unhealthy messages. Tessa was taken offline shortly thereafter.



Multiple studies have proven Epic's sepsis warning tool to be clinically insufficient, failing to identify 67% of people who had sepsis.

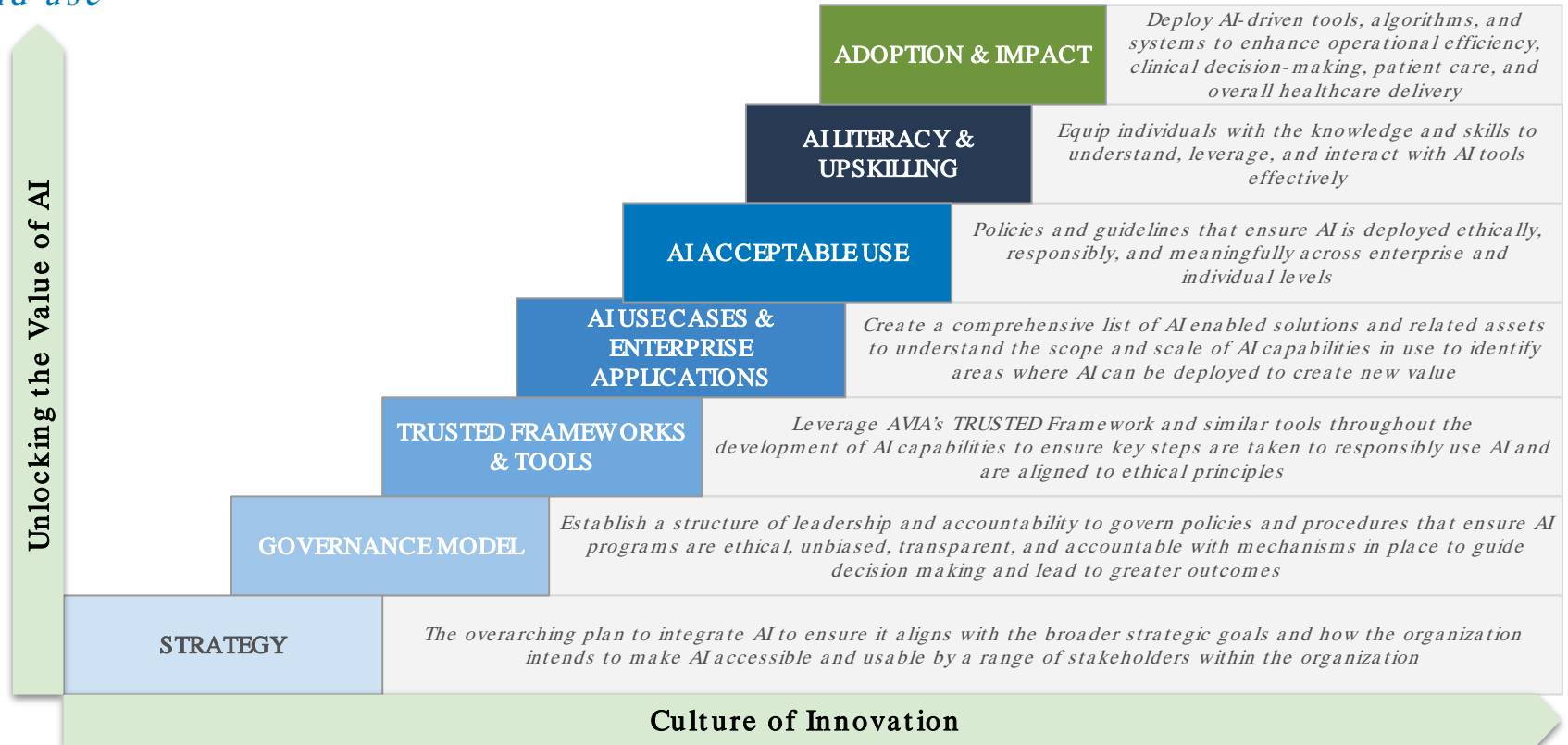
(Epic said the 2021 JAMA study does not reflect the performance of Epic's updated model, which was rolled out last fall)



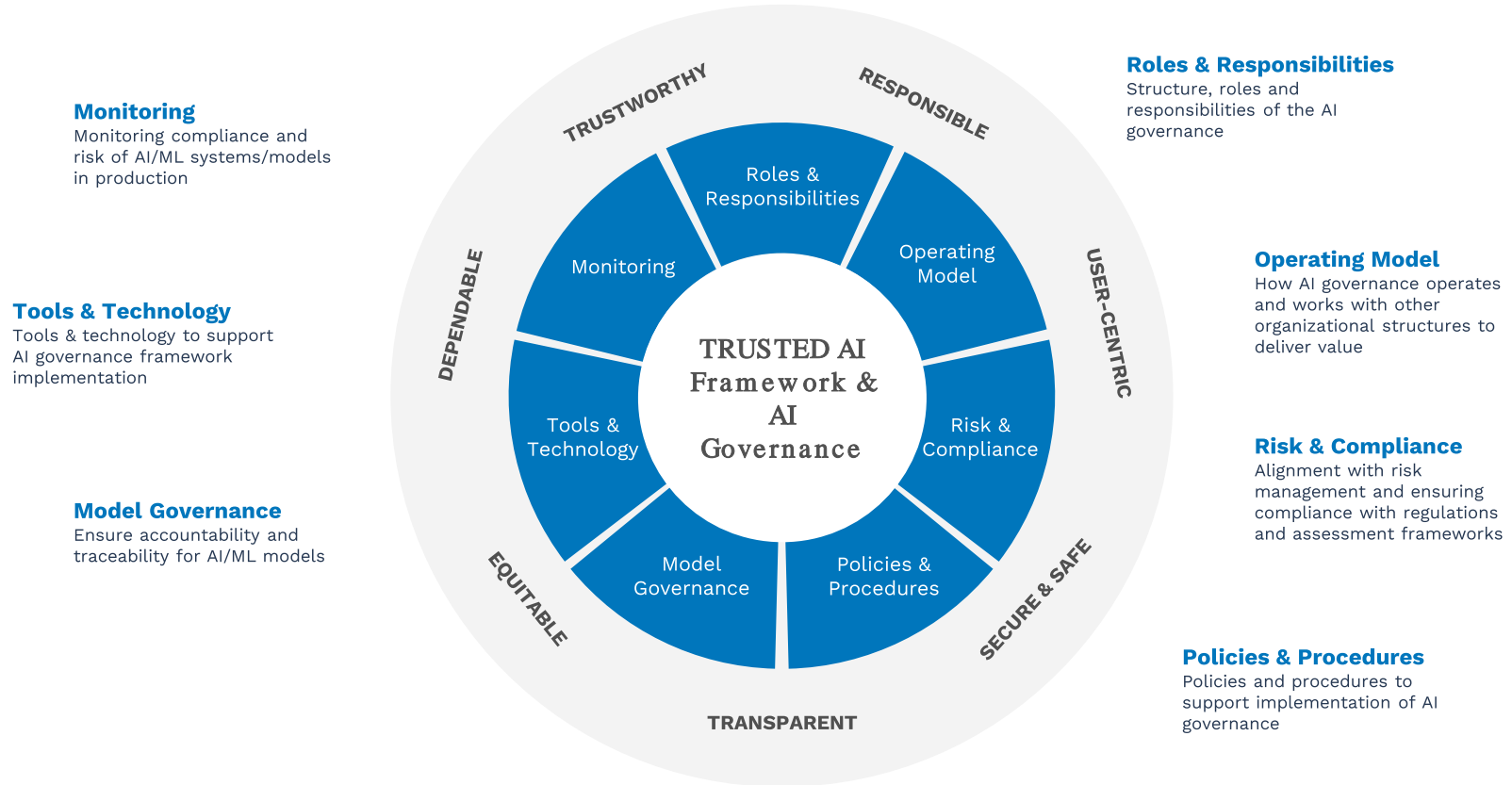
A 2021 review found that none of the models for COVID-19 detection are of potential clinical use due to methodological flaws and/or underlying biases.

Executive Summary | Enterprise Adoption

Unlocking the full value of AI requires a series of steps that will lead to greater adoption and use



Aligning AI Governance with TRUSTED AI Framework



Source: Incorporated Model from Info-Tech & AVIA TRUSTED AI Framework



Creating a Foundation for AI

Healthcare executives must organize around AI before seeing meaningful change

1. Gather appropriate Stakeholders

2. Build Literacy around AI

3. Take Inventory of Current Uses of AI

4. Align AI with Strategy

5. Determine Your AI North Star

Thank You