RAND

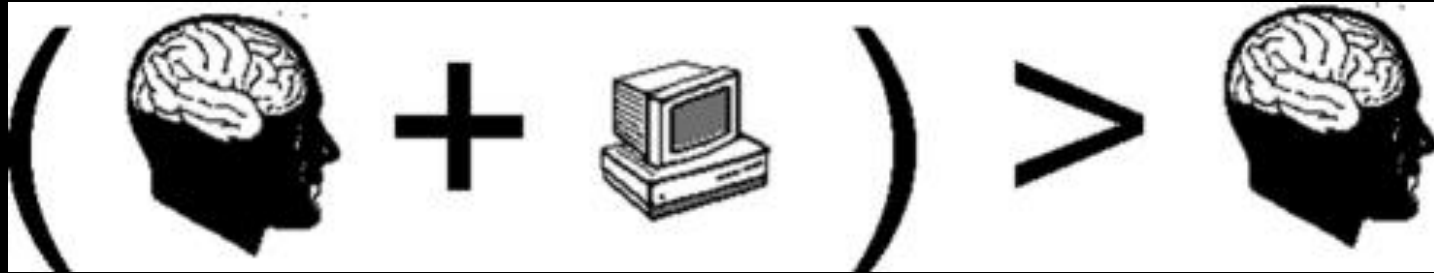# AcademyHealth's Health Workforce Interest Group
May 15, 2025

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ARTIFICIAL INTELLIGENCE'S ROLE IN RESHAPING THE FUTURE HEALTH WORKFORCE: SOLUTION OR DISRUPTION?

A "Fundamental Theorem" of informatics

CONTEXT

The COVID-19 Pandemic Changed the Healthcare Workforce

- The COVID-19 pandemic caused a dramatic unexpected shock to the healthcare sector (Cutler 2020).

- There were drastic changes in healthcare utilization almost immediately caused by the pandemic (Cantor et al. 2022a; Whaley et al. 2020).

- Between 2019 and 2020 there was a 5.2% drop in total employment in the healthcare sector (Cantor et al. 2022b).

- Previous research has established that drops in employment had still not recovered by the end of 2022 (Nguyen et al. 2023).

Actual vs Predicted Trends in Health Care and Non–Health Care Employment Levels

A Non-health care

COVID-19 PHE
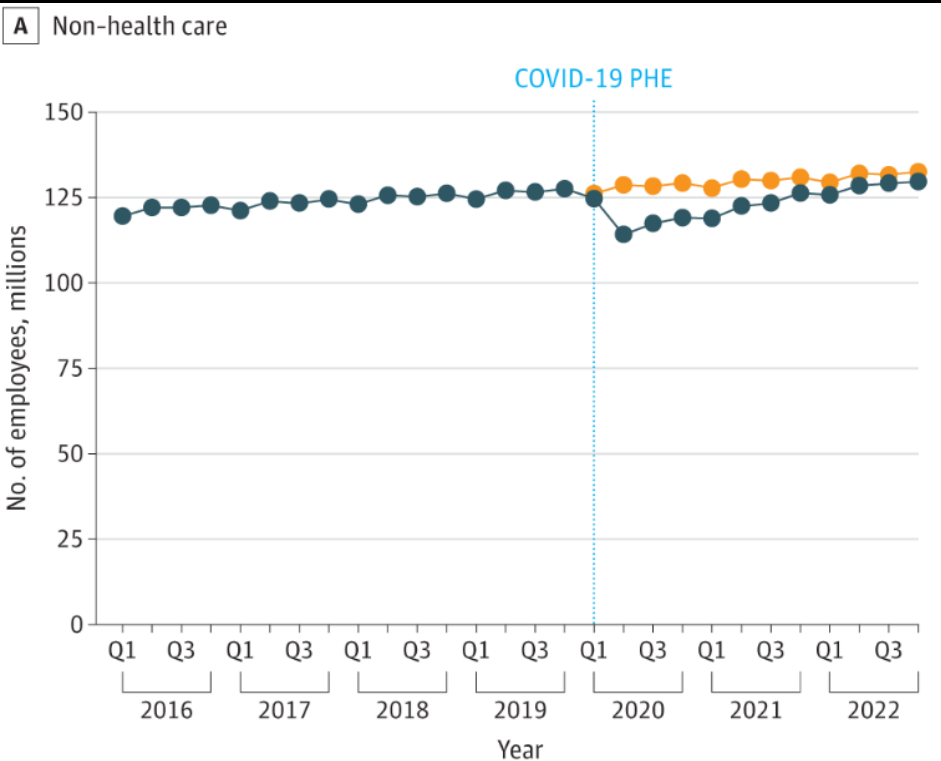
Healthcare Workforce Shortages are Important, and the Causes are Complex

- Shortages can contribute to:
  - Lack access to care
  - Inappropriate delivery of care
  - Higher treatment costs
  - Worse health outcomes

- Causes of shortages include:
  - Reduced retention of physicians
  - High rates of burnout
  - Aging physician population
  - High educational costs

Association of American Medical Colleges Projection of Shortage
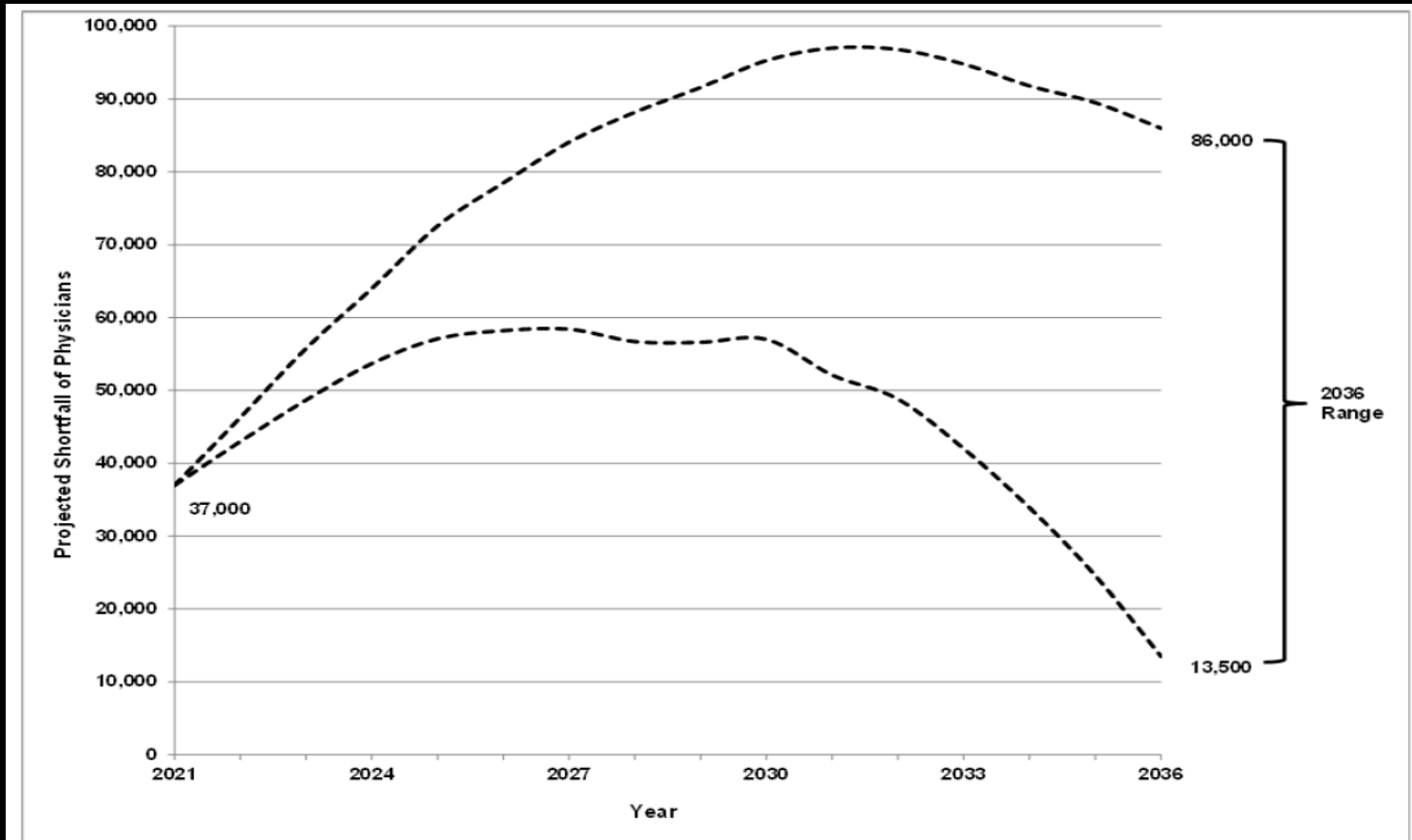
The National Physician Shortage: Disconcerting HRSA and AAMC Reports

"The first [report], by the *Health Resources and Services Administration* (HRSA), projects a total shortage of 124,180, 167,030, and 187,130 physicians in 2027, 2032, and 2037, respectively. Shortages are anticipated to be most severe in nonmetro areas and in primary care disciplines. A report released by the *Association of American Medical Colleges* projects a total national shortage of between 13,500 and 86,000 physicians by 2036 and a coincident shortage of between 20,200 and 40,400 primary care physicians."
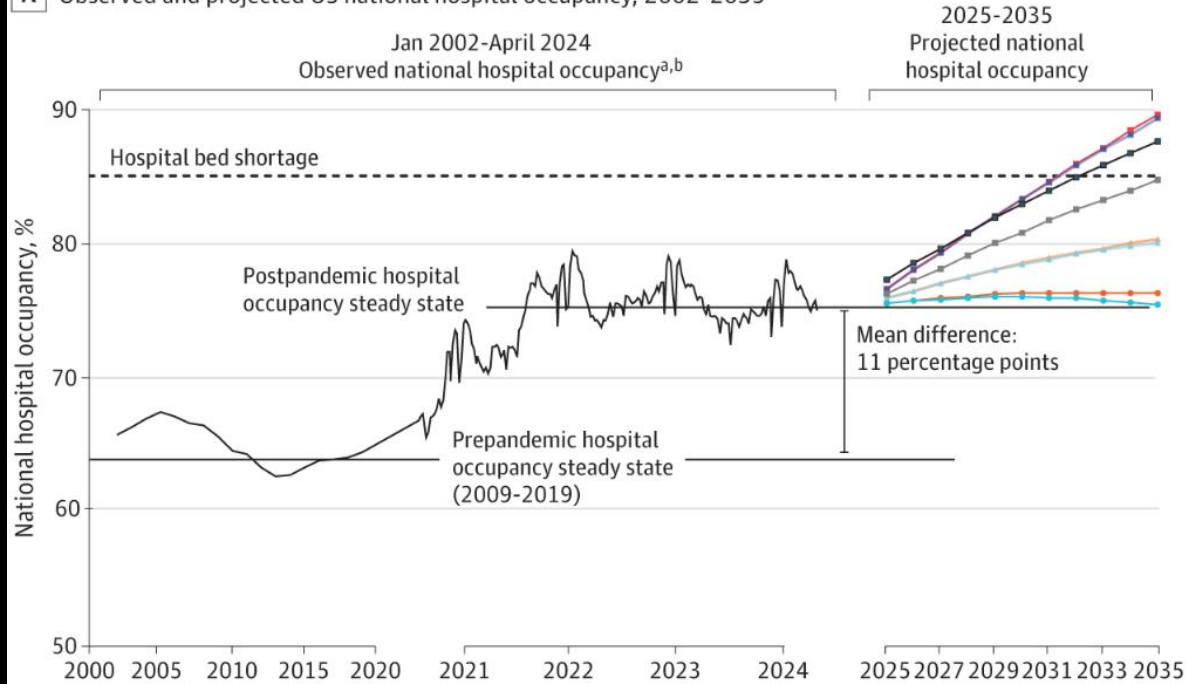
https://link.springer.com/article/10.1007/s11606-025-09575-7

AHA Anticipates Shortages in Workforce but not MDs

1 | Expect a shortage of about 100,000 critical health care workers by 2028.

2 | Shortage of nurse assistants (NAs) may be severe.

3 | Gaps may differ widely by state on registered nurse availability.

4 | Modest surplus of physicians expected nationally.

5 | Compensation variation could lead some workers to move

https://www.aha.org/aha-center-health-innovation-market-scan/2024-09-10-5-health-care-workforce-shortage-takeaways-2028

Hospital Beds Shortage is Imminent

A — Observed and projected US national hospital occupancy, 2002-2035

Source: Leuchter et al. (2025)

Allied Health Shortages

NCHWA projects shortages in 2037 for many key allied health occupations, including:

- 36,820 dispensing opticians
- 6,480 respiratory therapists
- 9,140 physical therapists
- 17,030 pharmacists
- 4,430 podiatrists
- 8,190 chiropractors

Behavioral Health Shortages

NCHWA projects shortages in 2037 for many key behavioral health occupations, including:

- 113,930 addiction counselors

- 87,840 mental health counselors

- 79,160 psychologists

- 50,440 psychiatrists

- 34,170 marriage and family therapists

- 39,710 school counselors

The Healthcare Workforce Was Uniquely Impacted by the COVID-19 Pandemic

- There was an increase in exit rates by healthcare workers that was offset by new hiring into 2021 (Shen et al. 2024).
- Recent graduating residents and fellows in New York were less likely to enter into rural communities and were less likely to report a good job market outlook (Ramesh et al. 2025).
- Emotional exhaustion increased for most healthcare workers during the COVID-19 pandemic (Sexton et al. 2022) with higher levels of stress and burnout in both clinical and non-clinical staff (Prasad et al. 2021).
- Threats of violence against local public health officials (Ward et al. 2022), and concerns of threats of violence against healthcare workers (Larkin 2021).

The COVID-19 Pandemic led to evolving and ongoing change in how care is delivered

- The dramatic drop in in-office care was partially offset by telemedicine (Whaley et al. 2020).

- But the dramatic rise in telemedicine was not experienced the same across all geographies, payers or conditions (Cantor et al. 2021; Nakamoto et al. 2024; Walker et al. 2025).

- There were and are large differences in state telehealth policies and how providers respond to such policies in the offering of telehealth (Agniel et al. 2023; Leung et al. 2024).

- Federal telemedicine policy is still being decided with Medicare waivers set to expire at the end of March 2025 (Mehrotra and Perkins 2025).

NEW AND EMERGING TECHNOLOGIES

The Effect of Telemedicine is Still Being Studied

- Mehrotra and Uscher-Pines (2022) in *New England Journal of Medicine* lists several outstanding questions:
  - What is the impact of telemedicine on spending?
  - What is the impact of telemedicine on patient outcomes?
  - What is the impact of telemedicine on health equity?
- Difficult to evaluate each of these important questions given different studies contain different samples by:
  - Payer
  - Condition
  - Geography
  - Provider

In the last two weeks, did this business use Artificial Intelligence (AI) in producing goods or services?
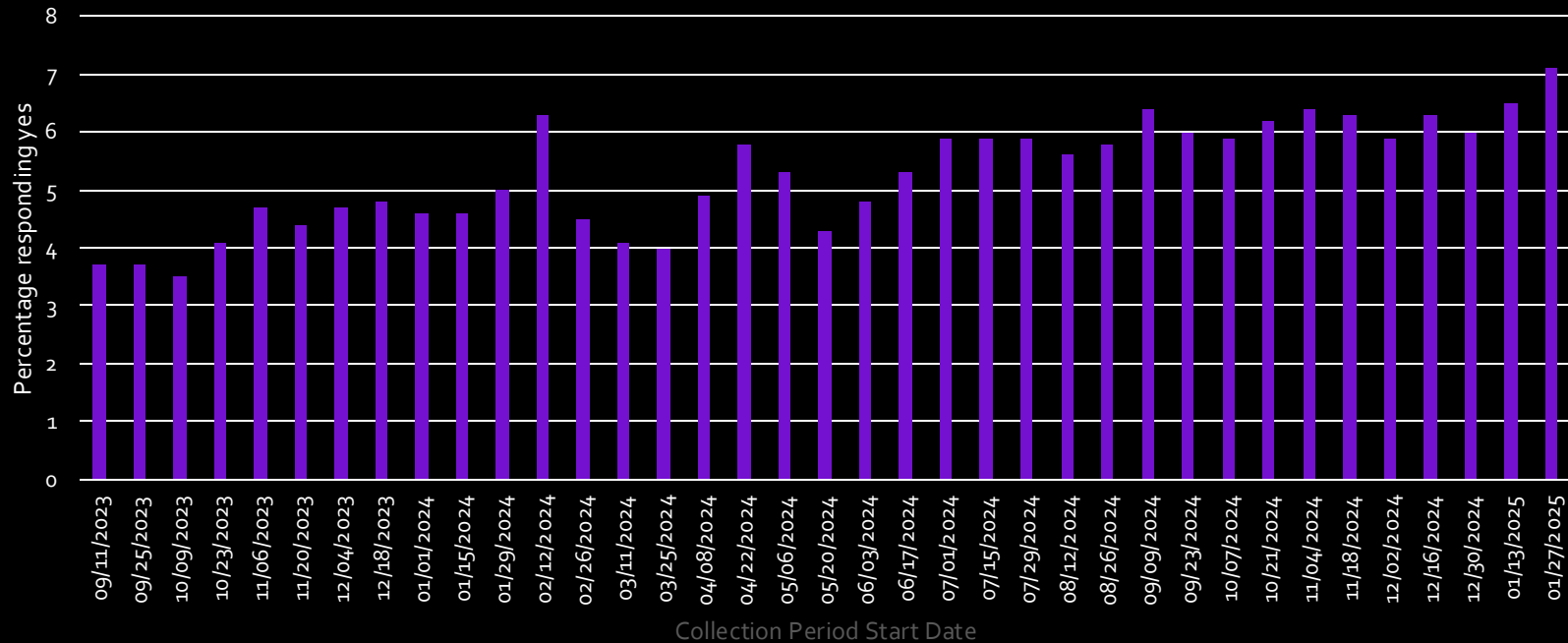
Source: Author's analysis of the Business Trends and Outlook Survey.

During the next six months, do you think this business will be using Artificial Intelligence (AI) in producing goods or services?

Percent Responding Yes

Collection Period Start Date
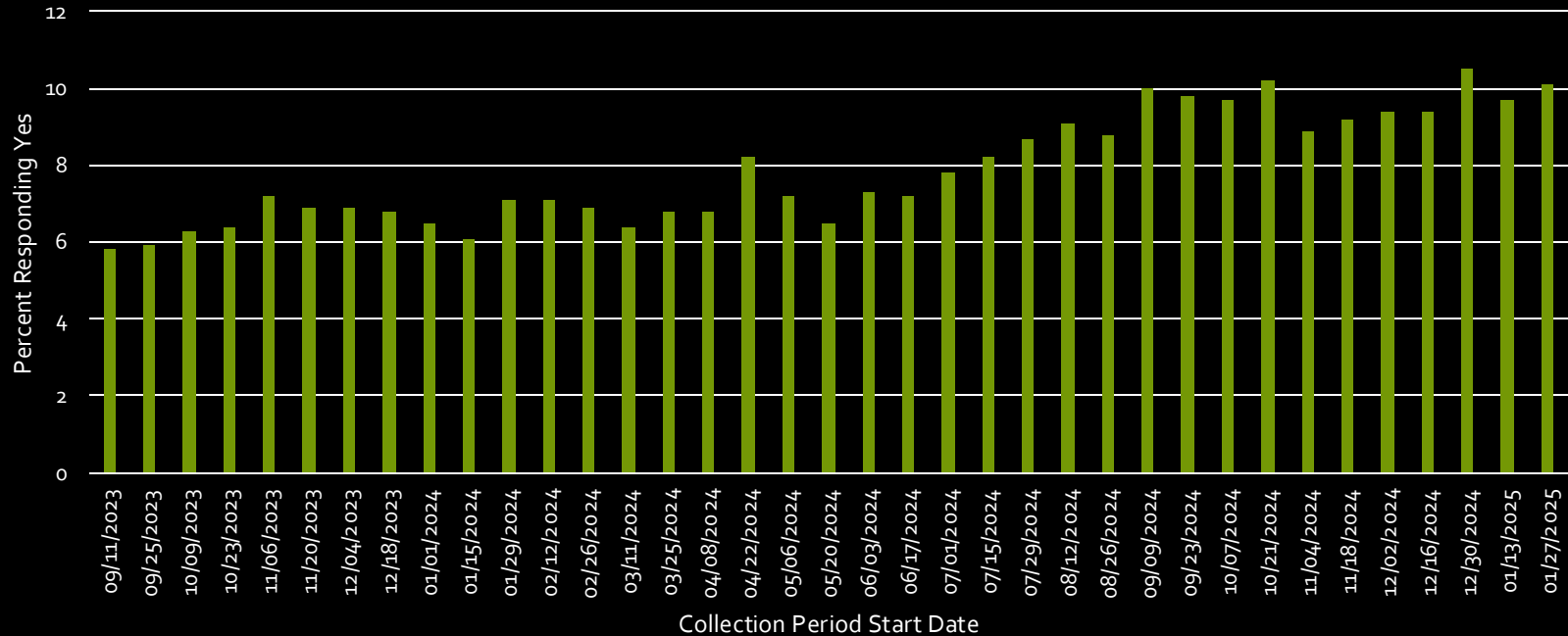
Source: Author's analysis of the Business Trends and Outlook Survey.

Large Language Models

- Large Language Models are defined as "learns the probabilities of occurrence of sequences of words from a corpus of text, whose probabilities are learned using textual corpora with trillions of words such that the resulting model has billions of parameters (Shah et al. 2023)."
- 40 percent of U.S. individuals aged 18 to 64 now report a routine use of LLMs (Bick et al. 2024).
- Approximately 78 percent of a sample of survey respondents stated that they were willing to use ChatGPT for self-diagnosis in February 2023 (Shahsavar et al. 2023).
- Adults under age 65 and those in households earning less than $50,000 are particularly likely to use LLMs about physical and mental health (Elon University 2025).

Children and Large Language Models for Mental Health

- We recent conducted a nationally representative survey of 1,000 adolescents and young adults (ages 12-21) and found:
  - 13.1% use LLMs for mental health advice
  - 65.6% used them once a month or more frequently
  - 93% found that the advice is somewhat or very helpful

- Increased use for older aged adolescents.

- Black youths were **<u>less</u>** likely to report that the mental health advice as helpful.

AI USE IN HEALTH

Hospitals Adoption of AI as of 2022

Hospital AI Adoption Model (HAIAM) by Zip Zode

No Adopters   Low Adopters   Moderate Adopters   High Adopters

2022 American Hospital Association (AHA) data

"Nearly one-fifth of US hospitals (1107 or 18.70%) have adopted some form of AI by 2022."

(Bin Abdul Baten, 2024)
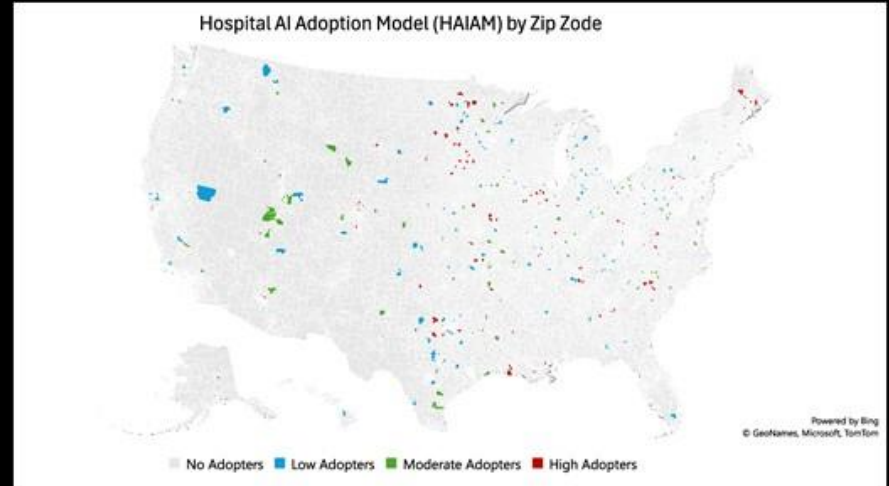
Hospital adoption of AI in 2025

Relies on AHA survey

65% of US hospitals use predictive models.

79% of those use models from their EHR developer.

"Sixty-one percent of hospitals that used models evaluated them for accuracy using data from their health system (local evaluation), but only 44 percent reported local evaluation for bias."

(Nong et al., 2025)

https://www.healthaffairs.org/doi/full/10.1377/hlthaff.2024.00842

AI IN MEDICINE

What can Large Language Models be Used for?

- Clusmann et al. (2023) describes possible uses for LLMs in medicine in *Communications Medicine*
  - Patient Care:
    - Medical knowledge, documentation and voice to text, translation and summary, patient empowerment
  - Education:
    - Prompt engineering, critical thinking, personalized education, and interactive learning
  - Research:
    - Scientific text production, access to scientific knowledge, programming, and science communications

Workforce/Administrative: Drafting Email Responses

Workforce/Administrative: Scheduling Appointments

Clinical Example 1: Radiology Screening

- **Use Cases**
  - Automated detection of abnormalities
  - Triage and prioritization of critical cases
  - Image quality enhancement and reconstruction
- **Benefits**
  - Increased **diagnostic accuracy and consistency**
  - Faster **turnaround times** for high-priority cases
  - Support in **resource-limited settings**
- **Workforce Impact**
  - **Radiologists not necessarily replaced**
  - Enables radiologists to **focus on complex cases** and **interventional roles**
  - Shifts skill demand toward **AI literacy** and oversight

Ambient Documentation

- **Use Cases**
  - Passive listening during clinical encounters (e.g., Nuance DAX, Abridge)
  - Generates **structured notes** directly into the EHR
  - Learns provider preferences over time
- **Benefits**
  - **Reduces clinician time** spent on documentation
  - **Improves patient engagement**
  - May enhance **note quality and standardization**
- **Workforce Impact**
  - Eases **burnout and attrition**, especially among primary care clinicians
  - Raises new roles in **AI governance** and **clinical documentation review**
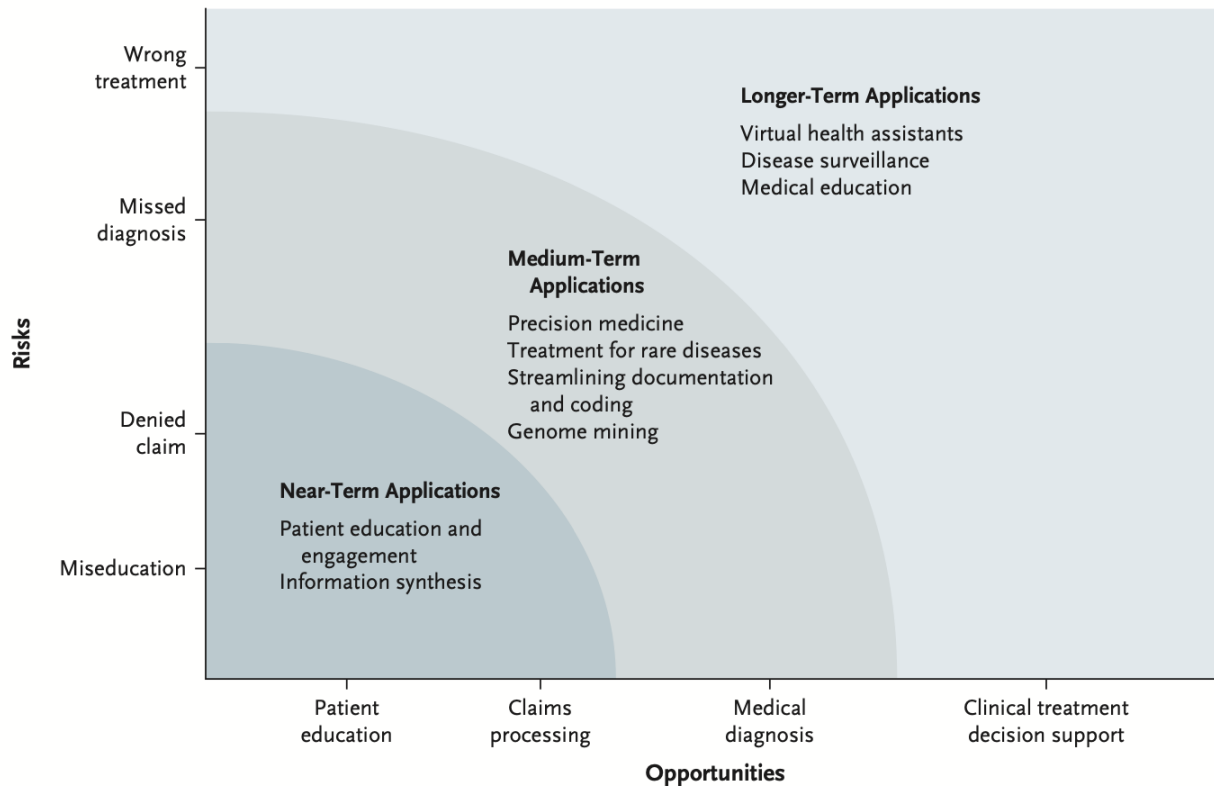
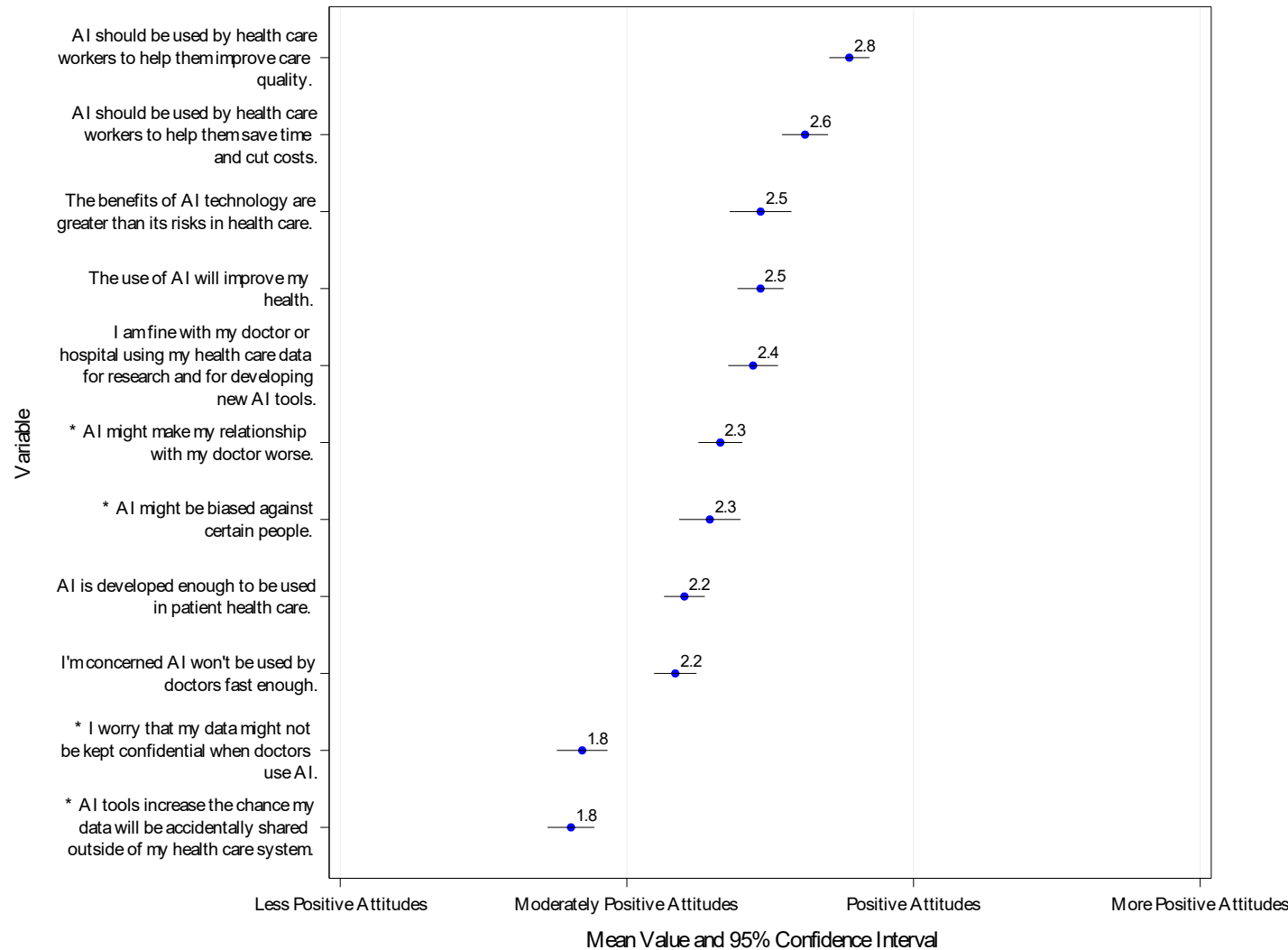**Figure 1. Application-Readiness Cadence for Large Language Models.**

Adapted from Maddox et al.[1]

Maddox TM, Embi P, Gerhart J, Goldsack J, Parikh RB, Sarich TC. Generative AI in Medicine - Evaluating Progress and Challenges. N Engl J Med. Apr 10 2025.

PATIENT AND PHYSICIAN PERSPECTIVES ON AI IN MEDICINE

Survey of Patients

ExpertLens – Physicians and AI Developers

What are the most promising uses of AI in healthcare?

RESULTS

Image reading and ambient documentation emerged as the most promising use cases.

USE CASES

A diverse group of 38 experts rated 9 use cases on their impact on patient care and providers, scope of use, and ease of integration into routine practice.

CRITERIA

	IMPACT ON PATIENTS	IMPACT ON PROVIDERS	SCOPE OF USE	INTEGRATION
	< negative | positive >	< negative | positive >	< not wide | wide >	< challenging | easy >
	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9

Most Promising

	IMPACT ON PATIENTS	IMPACT ON PROVIDERS	SCOPE OF USE	INTEGRATION
1 Image Reading	7 POSITIVE	7 POSITIVE	8 WIDE	7 EASY
2 Ambient Documentation	7 POSITIVE	7 POSITIVE	8 WIDE	5 UNCERTAIN

Potentially Promising

	IMPACT ON PATIENTS	IMPACT ON PROVIDERS	SCOPE OF USE	INTEGRATION
3 Lab & Pathology Summaries	8 POSITIVE	6 UNCERTAIN	8 WIDE	6 UNCERTAIN
4 Automatic Prior Approval Submission & Review	6 UNCERTAIN	7 POSITIVE	8 WIDE	6 UNCERTAIN
5 Automatic Claims Review	4 UNCERTAIN	4.5 UNCERTAIN	8 WIDE	7 EASY
6 Treatment Recommender	6 UNCERTAIN	7 POSITIVE	7 WIDE	4.5 UNCERTAIN

Uncertain

	IMPACT ON PATIENTS	IMPACT ON PROVIDERS	SCOPE OF USE	INTEGRATION
7 Chatbots	6 UNCERTAIN	6 UNCERTAIN	7 WIDE	6 UNCERTAIN
8 Automatic Appointment Scheduling	6 UNCERTAIN	6 UNCERTAIN	6 UNCERTAIN	5 UNCERTAIN
9 Social Determinants of Health	5.5 UNCERTAIN	5 UNCERTAIN	5 UNCERTAIN	6 UNCERTAIN

LEGEND

1 2 3 4 5 6 7 8 9 — rating			
⌐ median			
lower quartile → 7 ← upper quartile			
Interquartile Range (IQR)			
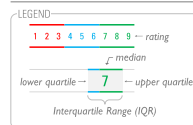
IMPACT ON PATIENTS	IMPACT ON PROVIDERS	SCOPE OF USE	INTEGRATION
1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9
< negative | positive >	< negative | positive >	< not wide | wide >	< challenging | easy >

DATA PRIVACY AND ETHICS

How do you explain AI to patients?

Participants prefer AI messages, but their satisfaction decreased when they learned the messages were AI generated (Cavalier et al., 2025)

March 11, 2025

Ethics in Patient Preferences for Artificial Intelligence–Drafted Responses to Electronic Messages

Joanna S. Cavalier, MD[1]; Benjamin A. Goldstein, PhD[2]; Vardit Ravitsky, PhD[3]; et al

≫ Author Affiliations | Article Information

JAMA Netw Open. 2025;8(3):e250449. doi:10.1001/jamanetworkopen.2025.0449

Policies vary re: informing patients

Health AI Partnership co-lead Mark Sendak: "We've heard from many of the FQHCs of the practice network [asking] for content describing AI scribes that they can put in the waiting rooms and in the clinic," he said. "When we went to our corps sites and asked, 'What are you all putting in your waiting rooms?', there was crickets." He ascribed the difference to the fact that FQHCs often have governance models that include patients, who demand more transparency.

https://marketing.statnews.com/ai-prognosis-3/12/25

Data Security and Privacy

- Ransomware, as example:
  - Case-control study analyzing disruptive ransomware attacks against hospitals in California from 2014 to 2020 and found a 15% increase in emergency department (ED) visits in nearby facilities after the attack (Abouk and Powell, 2024)
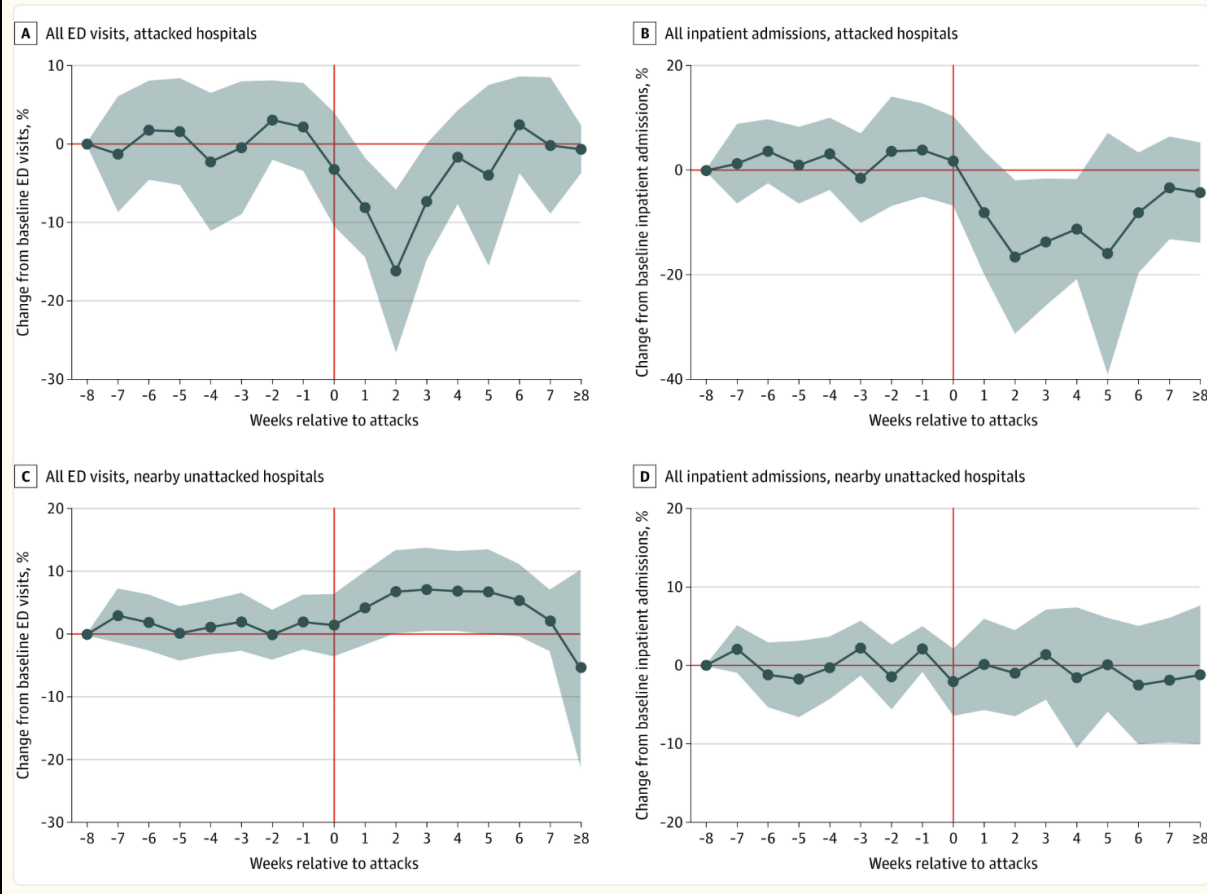
Ransomware Attacks, ED Visits and Inpatient Admissions in Targeted and Nearby Hospitals

Rahi Abouk [1,✉], David Powell [2]

Figure. Ransomware Attacks and Weekly Emergency Department (ED) Visits and Inpatient Admissions in Attacked and Nearby Unattacked Hospitals in California, 2014-2020.

Technology Can Help Clinically

- Applications range from administrative to actual care, with increasing risk
- Examples:
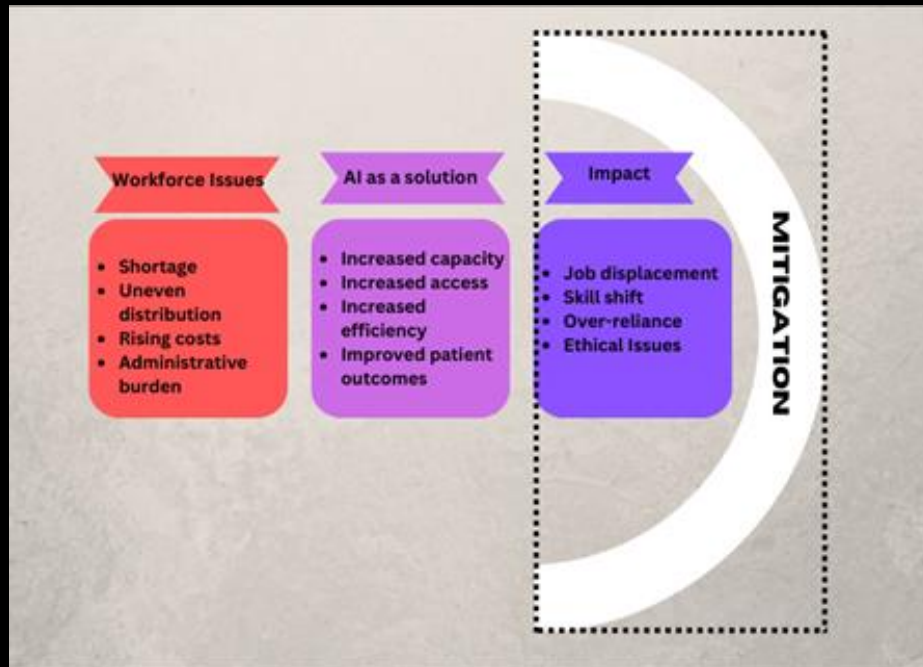 - AI documentation
  - Radiology
  - ChatBots

What are the implications of artificial intelligence on healthcare?

- Cutler et al. (2023) in *JAMA Health Forum* lists that AI will:
  - Substitute for routine office work such as billing, appointment scheduling, and facility management.
  - Complement clinician work as opposed to replace; but could replace office staff
  - Lead to development of applications that can have care delivered in cheaper settings (remote monitoring versus hospitals).
  - Enhance delivery of care by reducing biases and errors.
  - Identify novel treatments for specific subgroups.

Advantages and Disadvantages of AI

- AI can be a solution to workforce issues
- But can have negative impacts

https://gkc.himss.org/resources/impact-ai-healthcare-workforce-balancing-opportunities-and-challenges

Policy Environment

- Blumenthal

Thank you!

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