Brigham and Women's Hospital
Founding Member, Mass General Brigham

Internal Medicine in the time of AI: Harnessing the Hype

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Disclosures

Advisor for Elsevier, Inc.

Learning Objectives

1. GenAI from 2022 to 2025: Understand the evolution in a short time
2. Evaluate the application of genAI in healthcare today
3. Explore the future potential of genAI in healthcare

Outline

Artificial Intelligence

- Analytical AI
- Generative AI

Gen AI in Healthcare and IM

- Clinician Experience
- Research and Education

Scaling Gen AI

Future of IM with Generative AI

Recap from 2024

01

Analytic AI

- Classify
- Predict
- Recognize

vs.

Generative AI

- Summarize
- Interact
- Generate new content

02

Limitations and challenges with generative AI

- Hallucination
- Bias
- Prompt sensitivity

03

Opportunities for genAI in:

- Reducing clinician administrative burden
- Improving patient experience
- Increasing staff efficiency
- Supporting research

04

Early results from ambient documentation

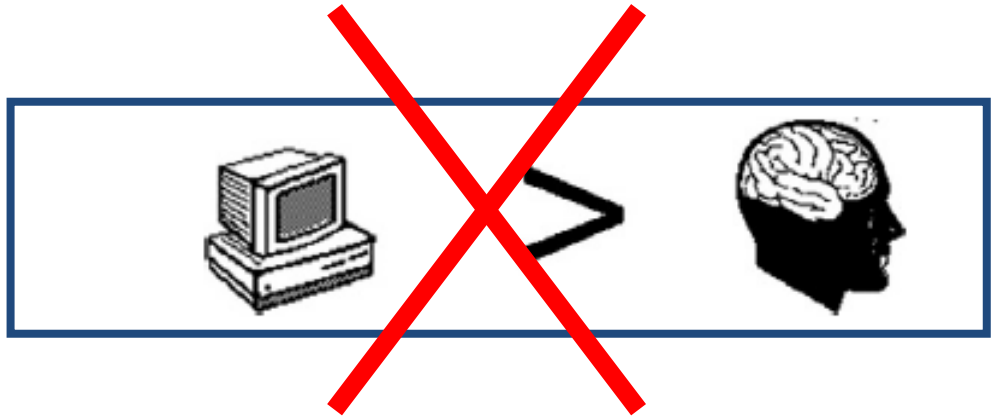
- High quality notes
- Qualitative provider satisfaction
- Qualitative time savings

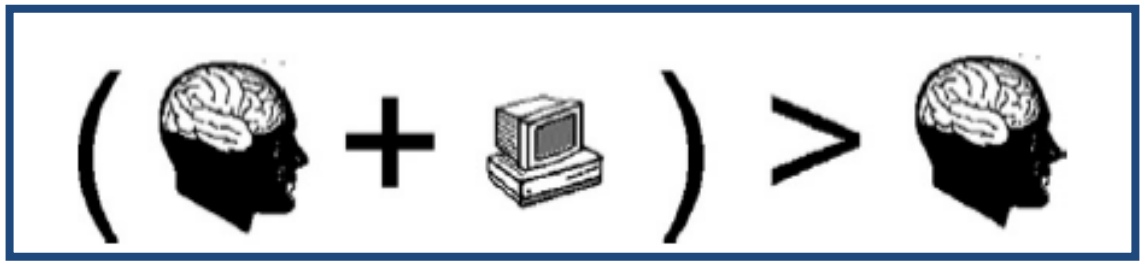
05

Responsible use of AI principles

- Fairness
- Transparency
- Responsibility
- Reliability
- Privacy
- Safety
- Benefit

Fundamental Theorem of Informatics



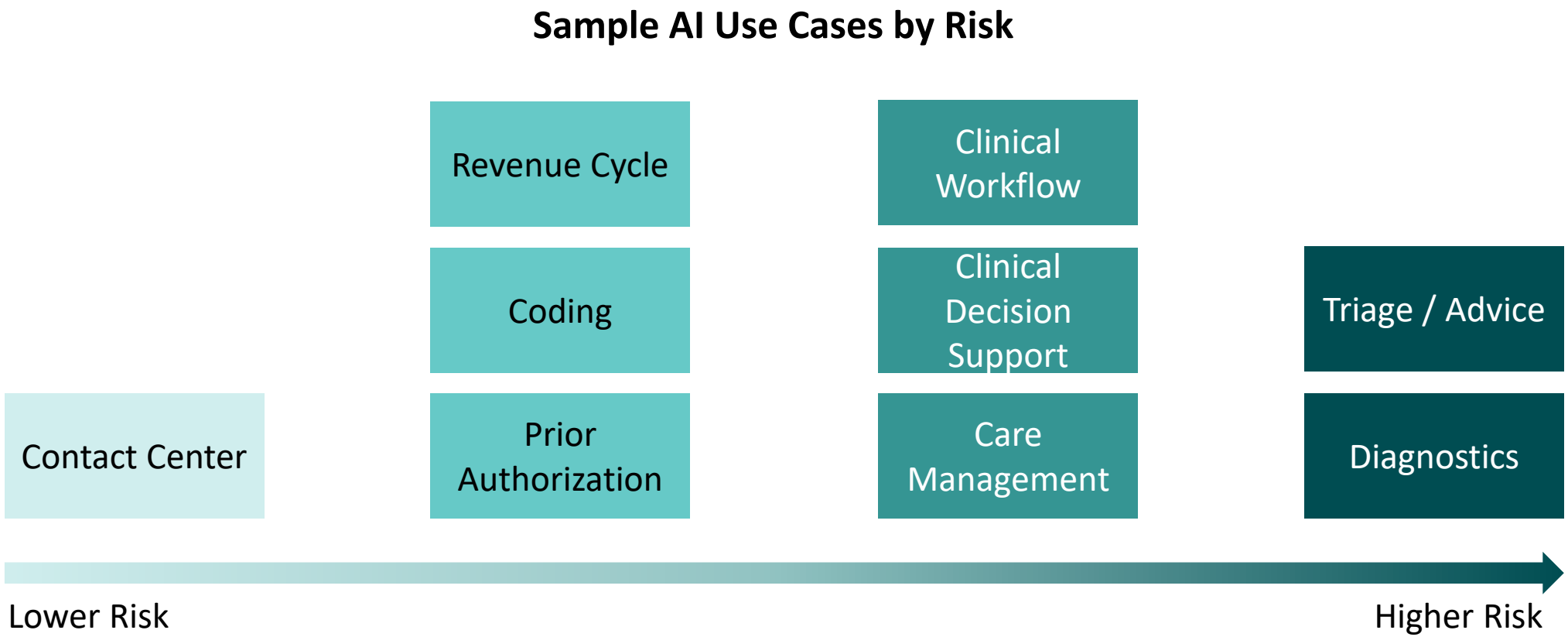


Friedman CP. A “Fundamental Theorem” of Biomedical Informatics J Am Med Inform Assoc. 2009;16:169 –170.

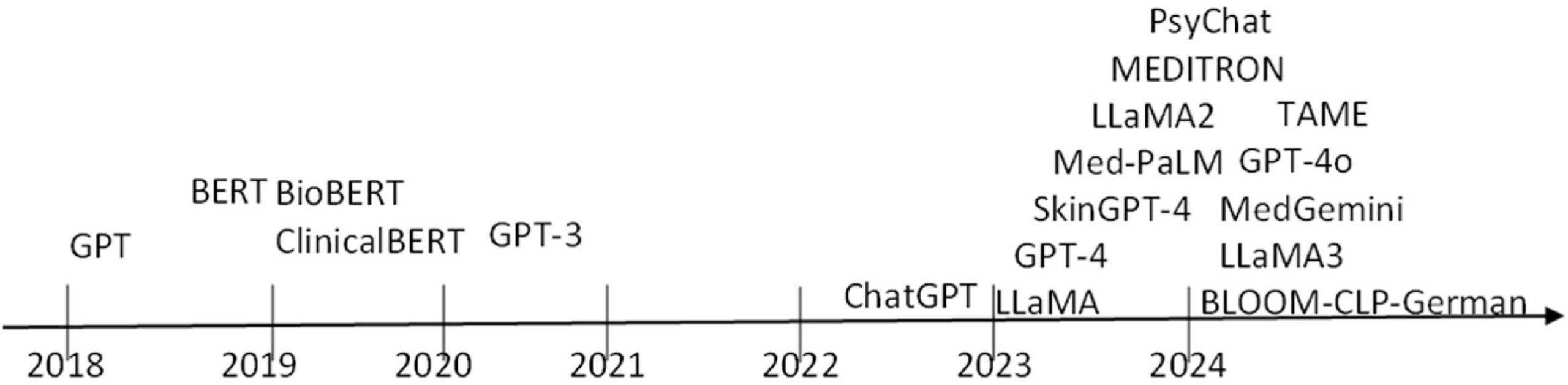
Generative Artificial Intelligence 2022-2025

The Opportunity for AI in Healthcare

We are scratching the surface of applying AI to address the Quintuple Aim and challenges in healthcare

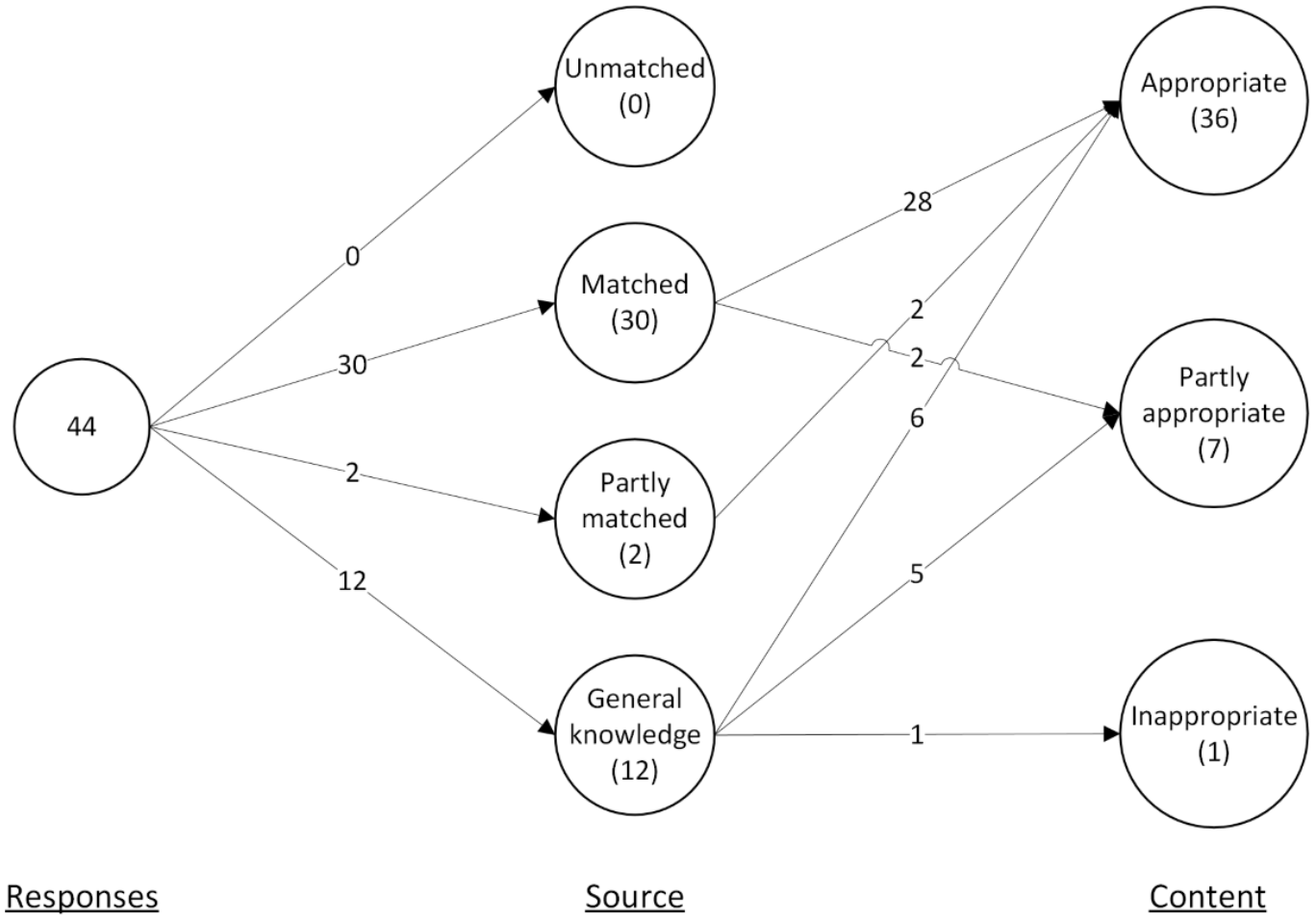


Rapid evolution of medically-trained LLMs



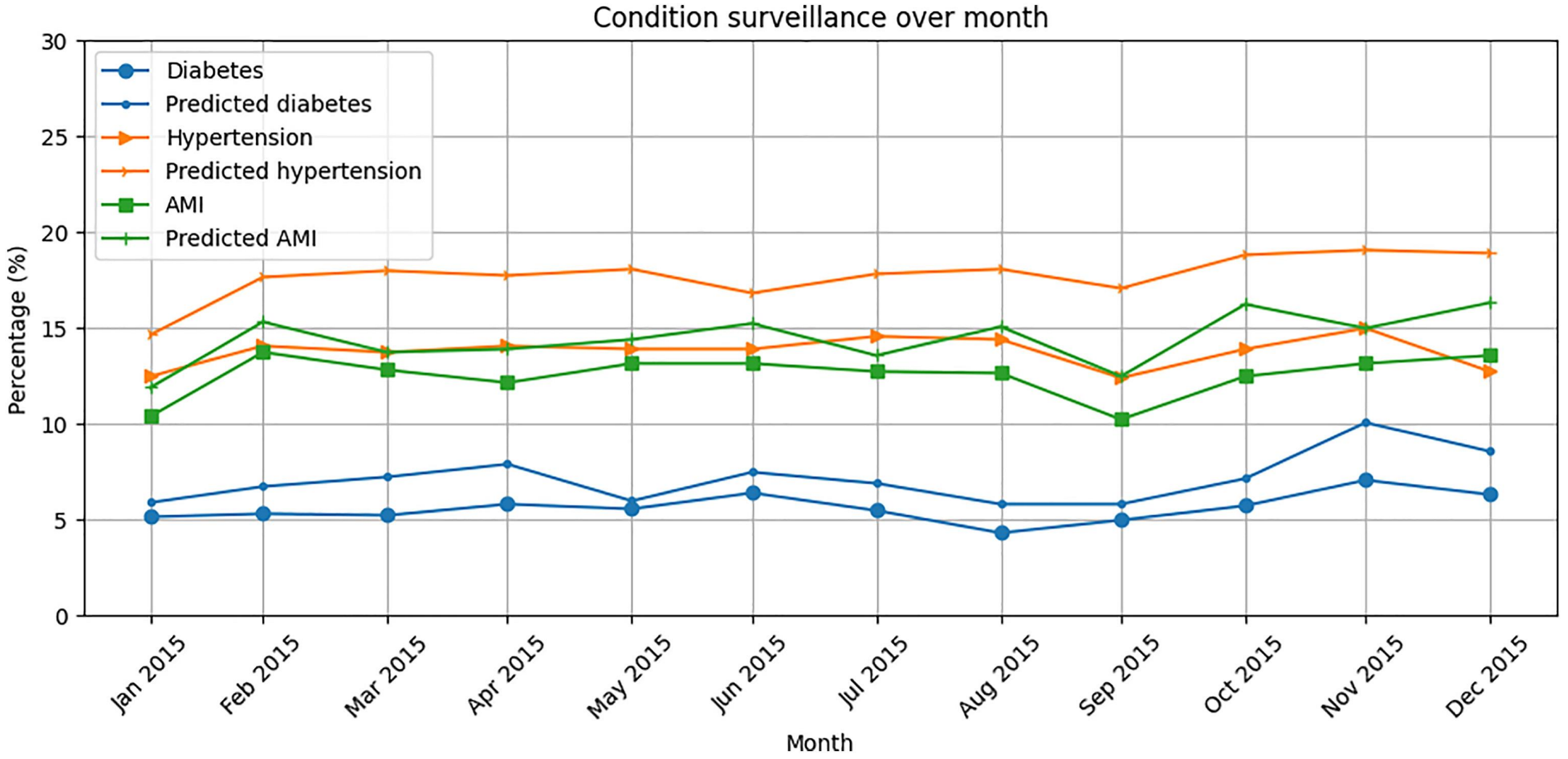
*Chihung, et al. Roles and Potential of Large Language Models in Healthcare: A Comprehensive Review. Biomedical Journal, 2025. https://www.sciencedirect.com/science/article/pii/S2319417025000423?via%3Dihub#bib23

Use of LLMs to support health literacy for type 2 diabetes



*Kelly, et al. The effectiveness of a custom AI chatbot for type 2 diabetes mellitus health literacy: development and evaluation study. *JMIR,* 2025. https://www.jmir.org/2025/1/e70131

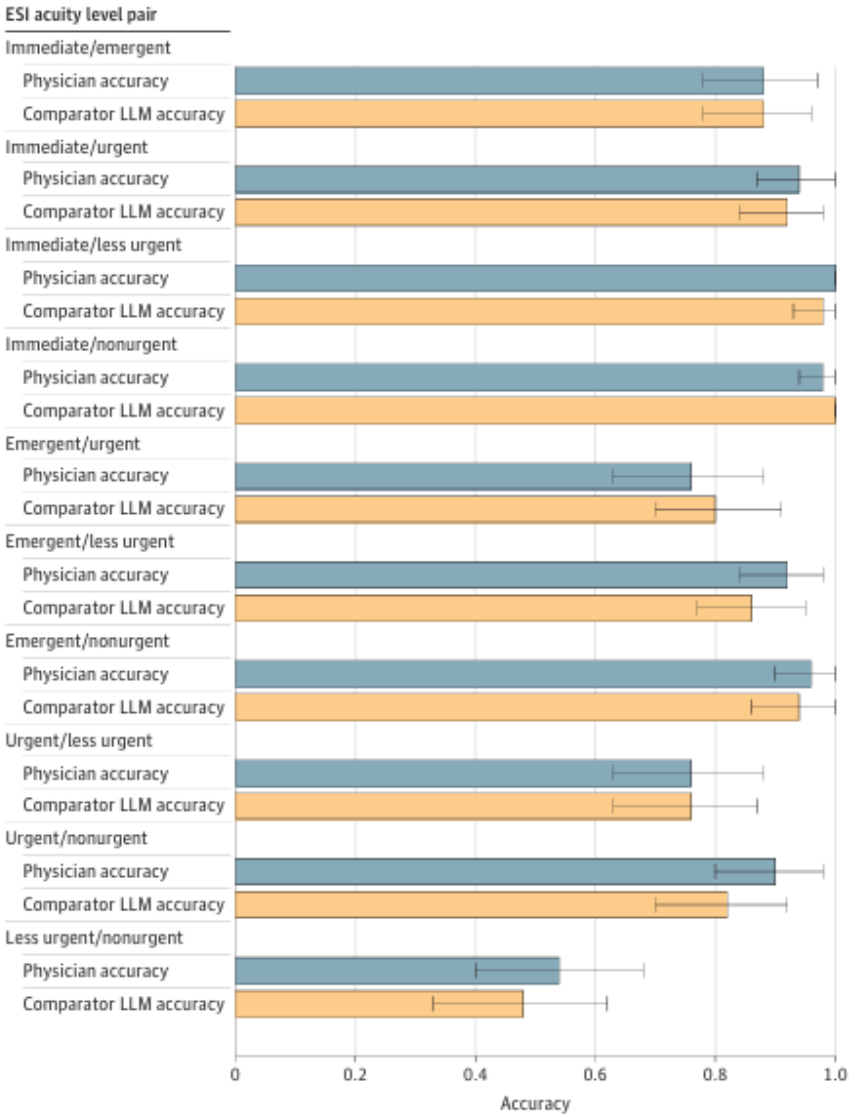
Use of LLMs to extract clinical information from medical records



*Pan, et al. Integrating large language models with human expertise for disease detection in electronic health records. *Computers in Biology and Medicine,* 2025. https://www.sciencedirect.com/science/article/pii/S0010482525005128?via%3Dihub

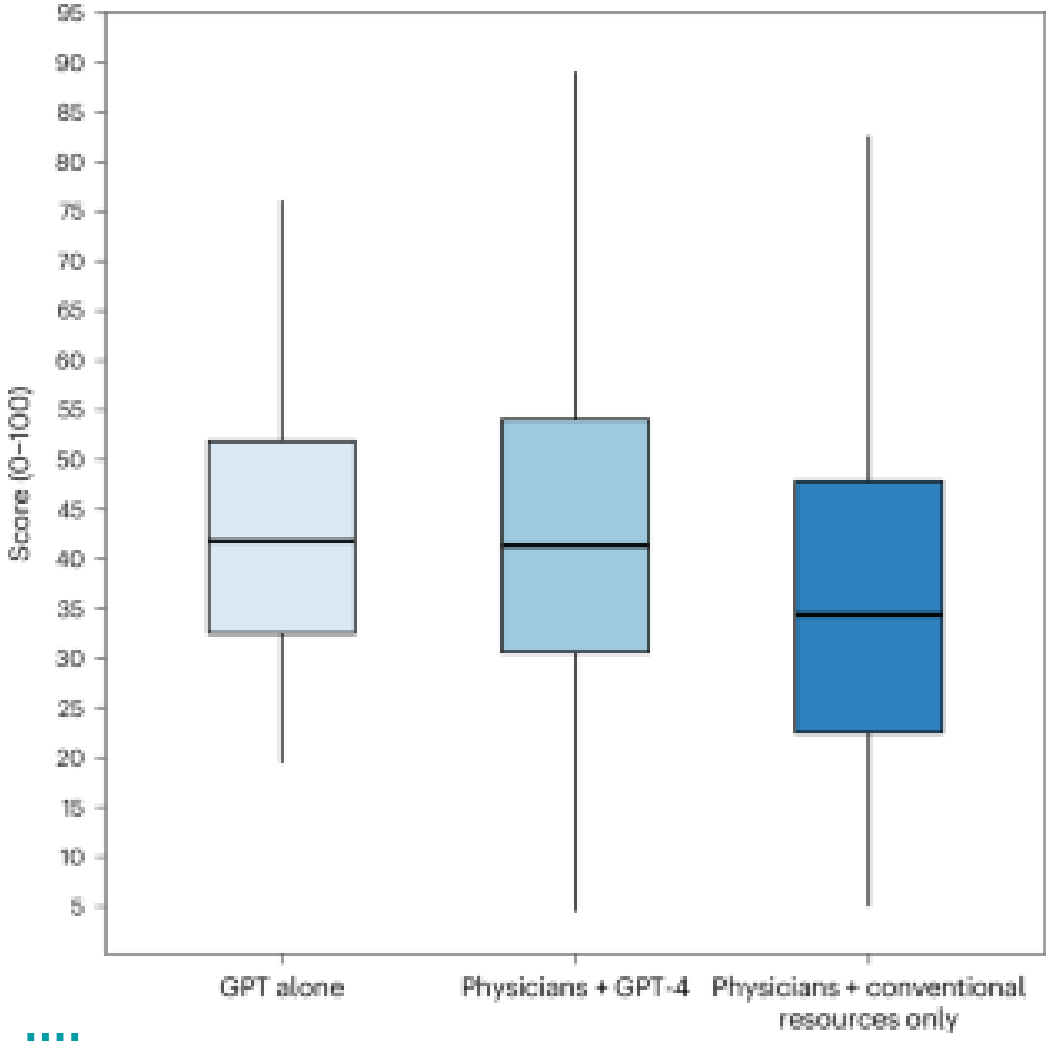
LLMs to augment physician triage of acuity of patients

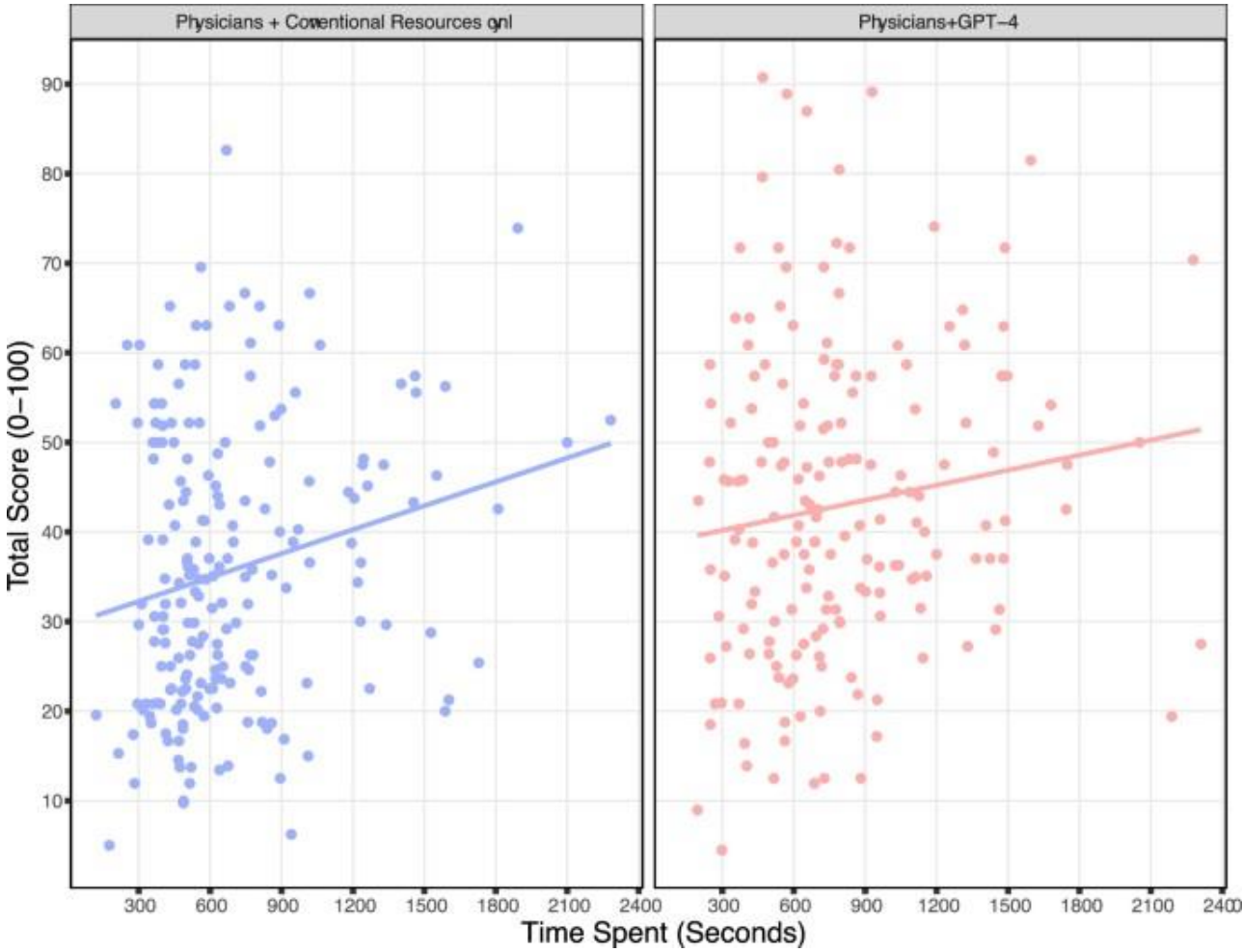
Figure 3. Comparison of Comparator Large Language Model (LLM) and Physician Performance



*Williams, et al. Use of a large language model to assess clinical acuity of adults in the emergency department. *JAMA Network Open,* 2024.

Using LLMs to augment physician clinical management reasoning





*Goh et al. GPT-4 assistance for improvement of physician performance on patient care tasks: a randomized controlled trial. *NatureMedicine*, 2025. https://www.nature.com/articles/s41591-024-03456-y

Guiding principles for the responsible use of AI*

- Meet an identified business or clinical need
- Responsible use of AI framework
- MVP pilots
- Demonstrate ROI ($ or soft)

Characteristics of Responsible Use of AI	Sub-areas
Fairness	Patient-centered, Equitable
Transparent and Explainable	Documentation of data and development Performance metrics / confidence intervals Patient education
Responsible and Accountable	Responsibility across model lifecycle AI governance structure ROI
Robust and Reliable	Model performance across shifts in data Performance monitoring and thresholds
Privacy	De-identified data used for model training Access to output Role of Informed consent and IRB
Safety and Security	User interaction Education Feedback loops / AE reporting Cybersecurity
Benefit	Patient outcomes and satisfaction Clinician and staff wellness Financial ROI

*Saenz AD; Mass General Brigham AI Governance Committee; et al. Establishing responsible use of AI guidelines: a comprehensive case study for healthcare institutions. NPJ Digit Med. 2024 Nov 30;7(1):348.

Considerations for application selection and implementation

Data security and privacy

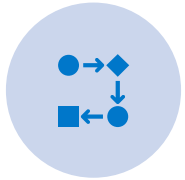
Reliability and transparency

Accountability

Equity

Informed consent

Safety



Workflow

Benefit, ROI

Vendor Roadmap

Clinical trial informed approach to implementing AI
(after model statistical evaluation and responsible use of AI assessment)

Phase I: Safety

Evaluate safety

Design workflows

Engaged stakeholders

Phase II: Efficacy

Refine workflows

Assess impact:

- Quality (incl equity)
- Efficiency
- Financial

Phase III: Effectiveness

Scale

Compare to standards

Design best practice workflows / implementation guides

Monitor safety, workflow, impact

Phase IV: Monitor

Monitor safety, workflow, impact

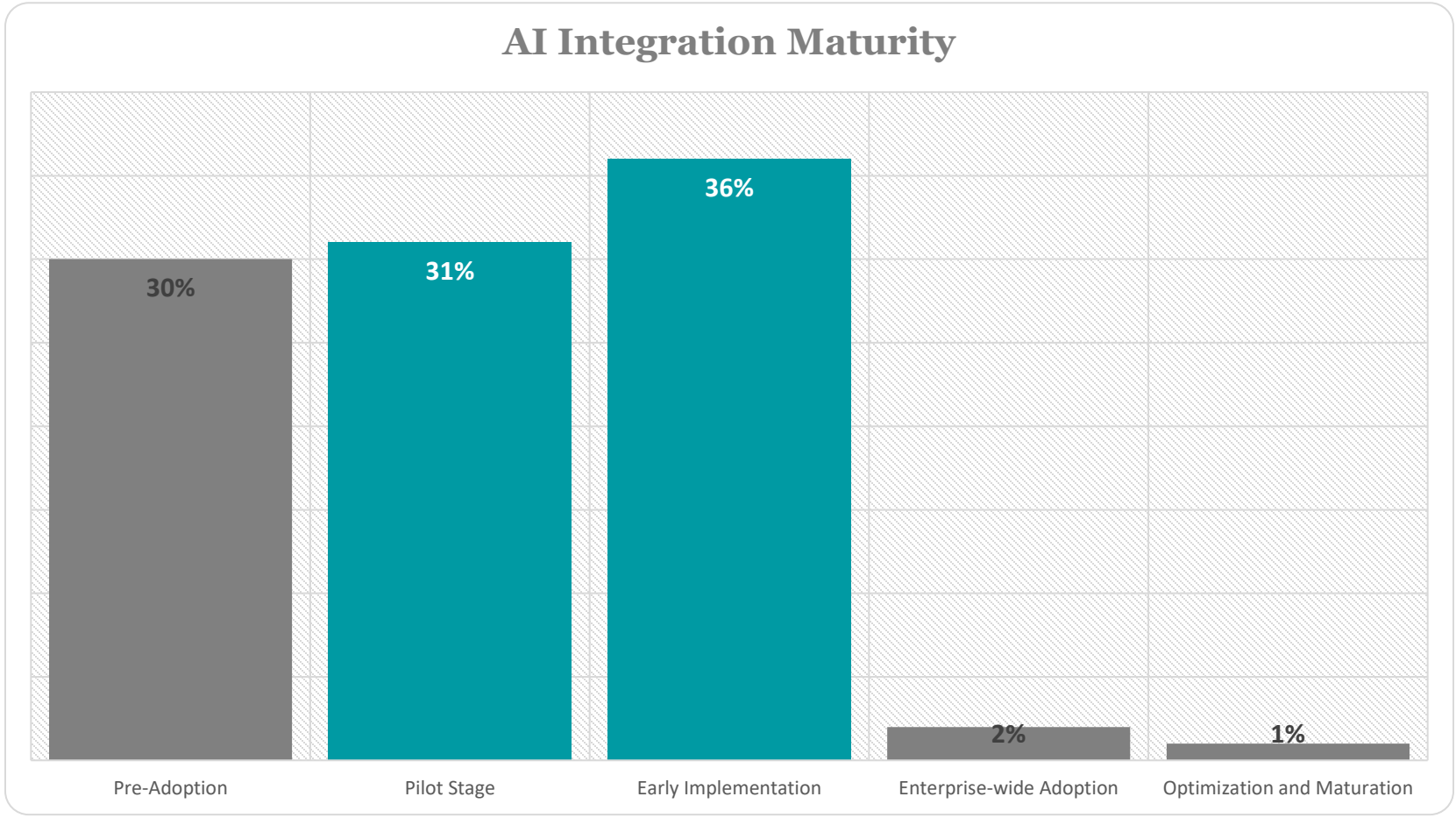
Disseminate / share outcomes, best practices

Ongoing technology evolution

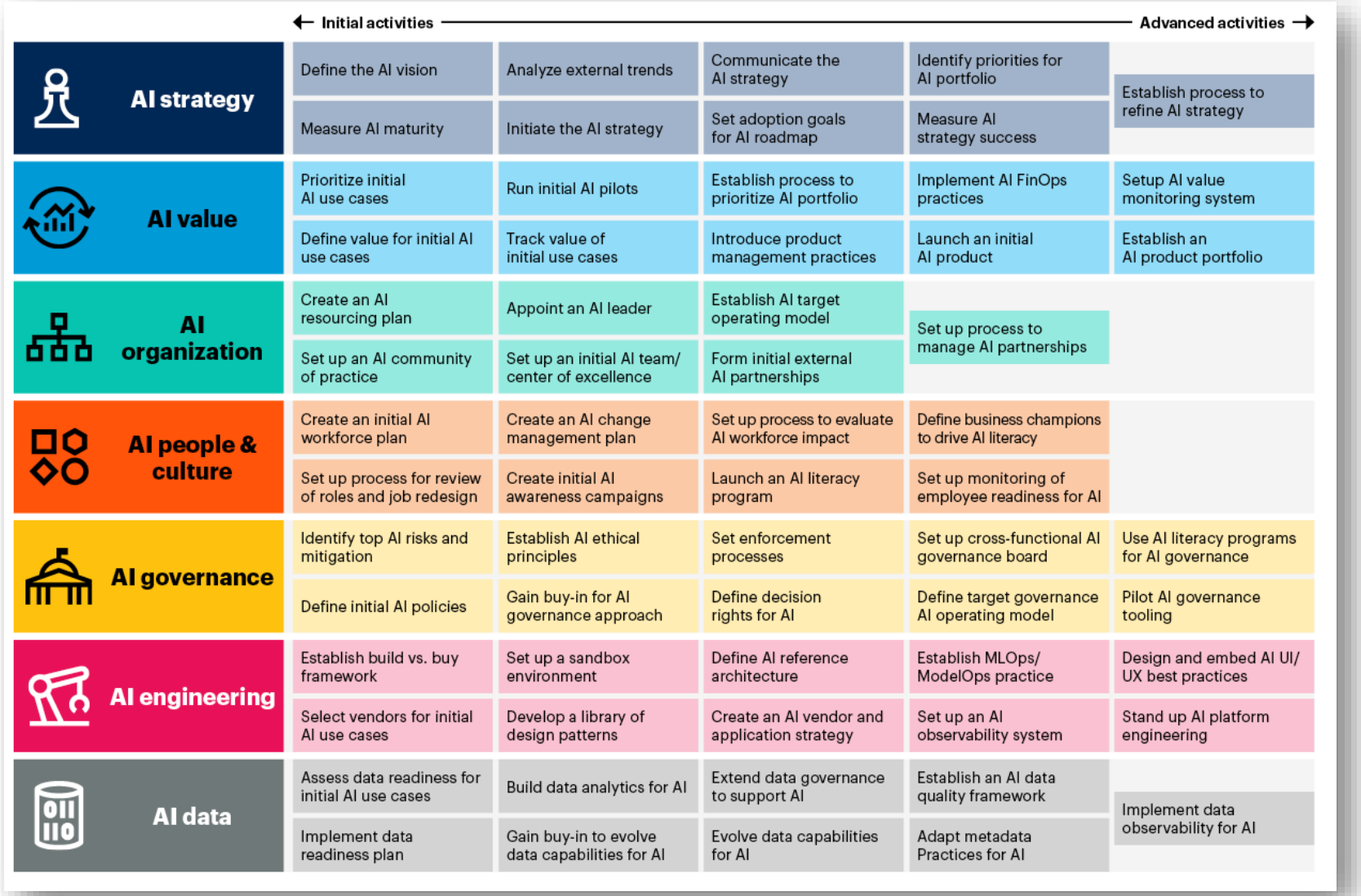
*You, et al. Clinical trials informed framework for real world clinical implementation and deployment of artificial intelligence applications. *NPJ Digital Med,* 2025.

AI level of maturity

HIMSS Survey of 100 Health Systems Leaders in Summer 2024



Gartner 2024 AI Maturity Model



	← Initial activities				Advanced activities →
AI strategy	Define the AI vision	Analyze external trends	Communicate the AI strategy	Identify priorities for AI portfolio	Establish process to refine AI strategy
	Measure AI maturity	Initiate the AI strategy	Set adoption goals for AI roadmap	Measure AI strategy success	
AI value	Prioritize initial AI use cases	Run initial AI pilots	Establish process to prioritize AI portfolio	Implement AI FinOps practices	Setup AI value monitoring system
	Define value for initial AI use cases	Track value of initial use cases	Introduce product management practices	Launch an initial AI product	Establish an AI product portfolio
AI organization	Create an AI resourcing plan	Appoint an AI leader	Establish AI target operating model	Set up process to manage AI partnerships	
	Set up an AI community of practice	Set up an initial AI team/ center of excellence	Form initial external AI partnerships		
AI people & culture	Create an initial AI workforce plan	Create an AI change management plan	Set up process to evaluate AI workforce impact	Define business champions to drive AI literacy	
	Set up process for review of roles and job redesign	Create initial AI awareness campaigns	Launch an AI literacy program	Set up monitoring of employee readiness for AI	
AI governance	Identify top AI risks and mitigation	Establish AI ethical principles	Set enforcement processes	Set up cross-functional AI governance board	Use AI literacy programs for AI governance
	Define initial AI policies	Gain buy-in for AI governance approach	Define decision rights for AI	Define target governance AI operating model	Pilot AI governance tooling
AI engineering	Establish build vs. buy framework	Set up a sandbox environment	Define AI reference architecture	Establish MLOps/ ModelOps practice	Design and embed AI UI/ UX best practices
	Select vendors for initial AI use cases	Develop a library of design patterns	Create an AI vendor and application strategy	Set up an AI observability system	Stand up AI platform engineering
AI data	Assess data readiness for initial AI use cases	Build data analytics for AI	Extend data governance to support AI	Establish an AI data quality framework	Implement data observability for AI
	Implement data readiness plan	Gain buy-in to evolve data capabilities for AI	Evolve data capabilities for AI	Adapt metadata Practices for AI	

Gen AI in Healthcare and Internal Medicine in 2025

Use Cases for AI Platforms

Clinical care delivery

- Ambient Documentation
- EHR-embedded AI tools

Enhancing employee productivity

- Organizational knowledge LLMs
- Microsoft 365 Copilot

Secure AI environments

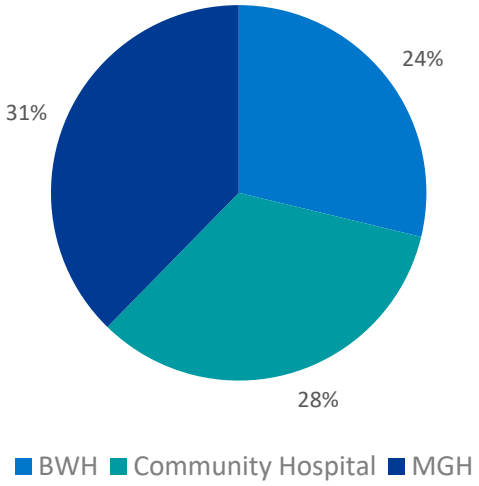
- Microsoft AI Foundry
- Secure access to public LLMs

Ambient documentation is a policy-informed approach to alleviate burnout among providers across the MGB community leveraging AI-enabled clinical note generation

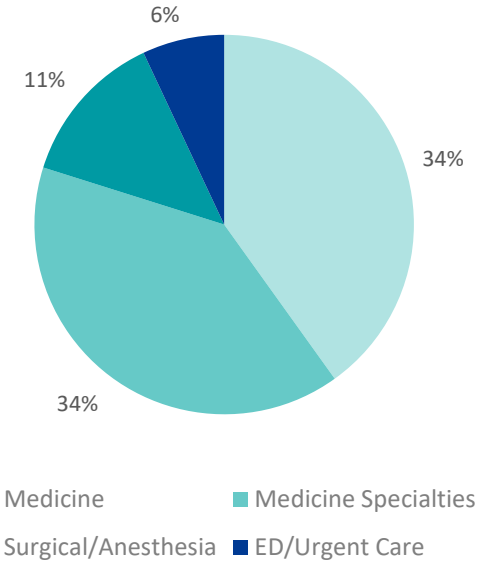
Responsible use of AI	12 Month Pilot	800+ MGB Providers Enrolled	3X Reported reduction in pajama time

Pilot Deployment

AMCs and Community Hospital Enrollment



Enrollment by Specialty



"I am in love with [ambient]. Already **I am much less likely to change careers** in the next year."
- Primary Care Provider

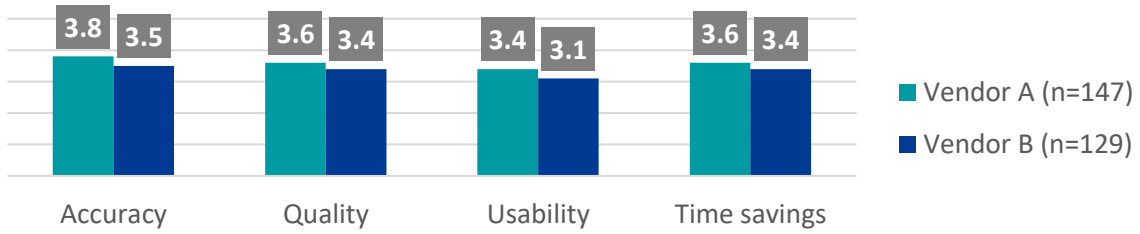
Provider Feedback

79% Report giving more attention to patients

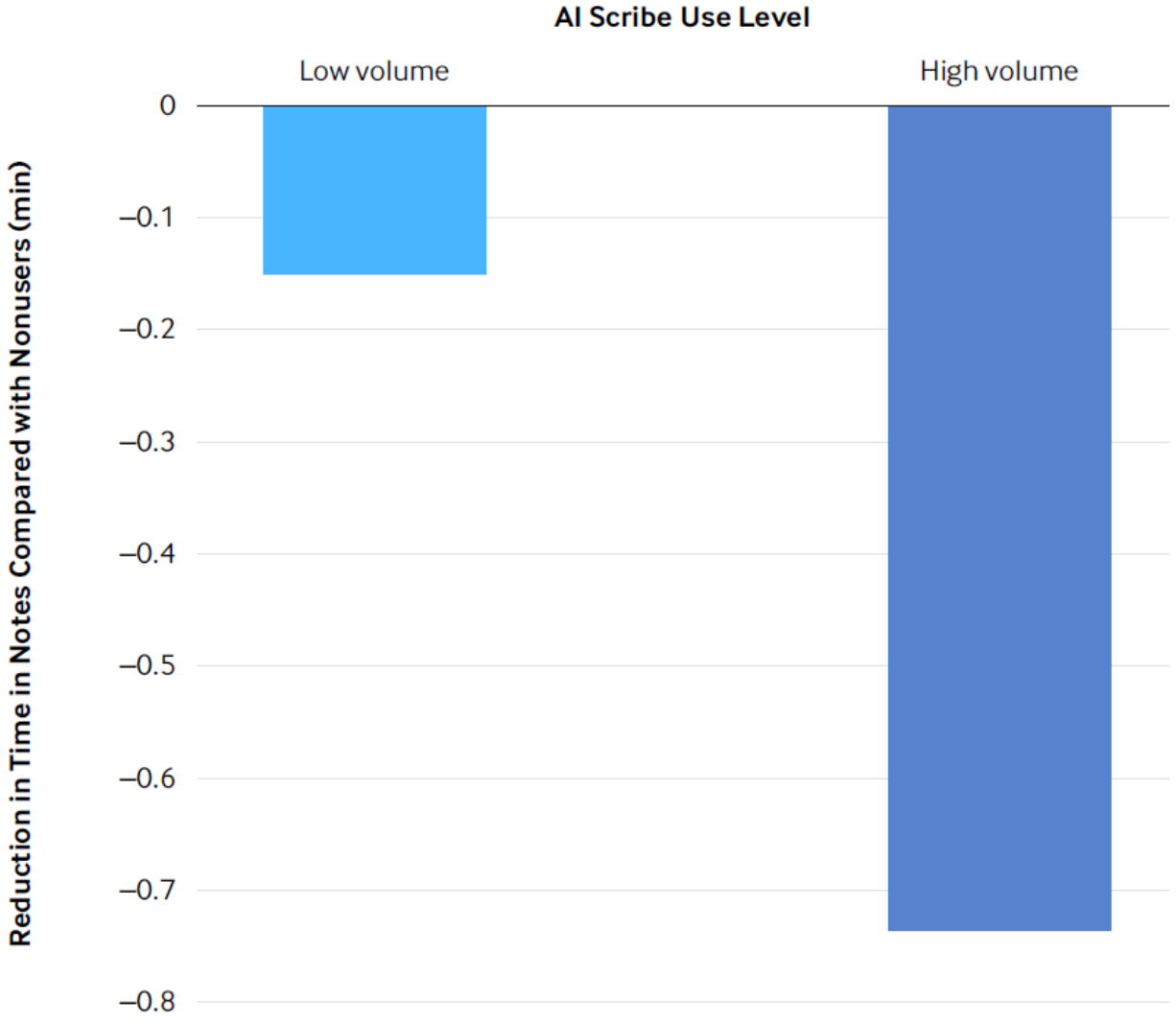
62% Likely to extend the length of clinical career

39% Reduction in burnout

Day 54 user survey: poor (1) to excellent (5)

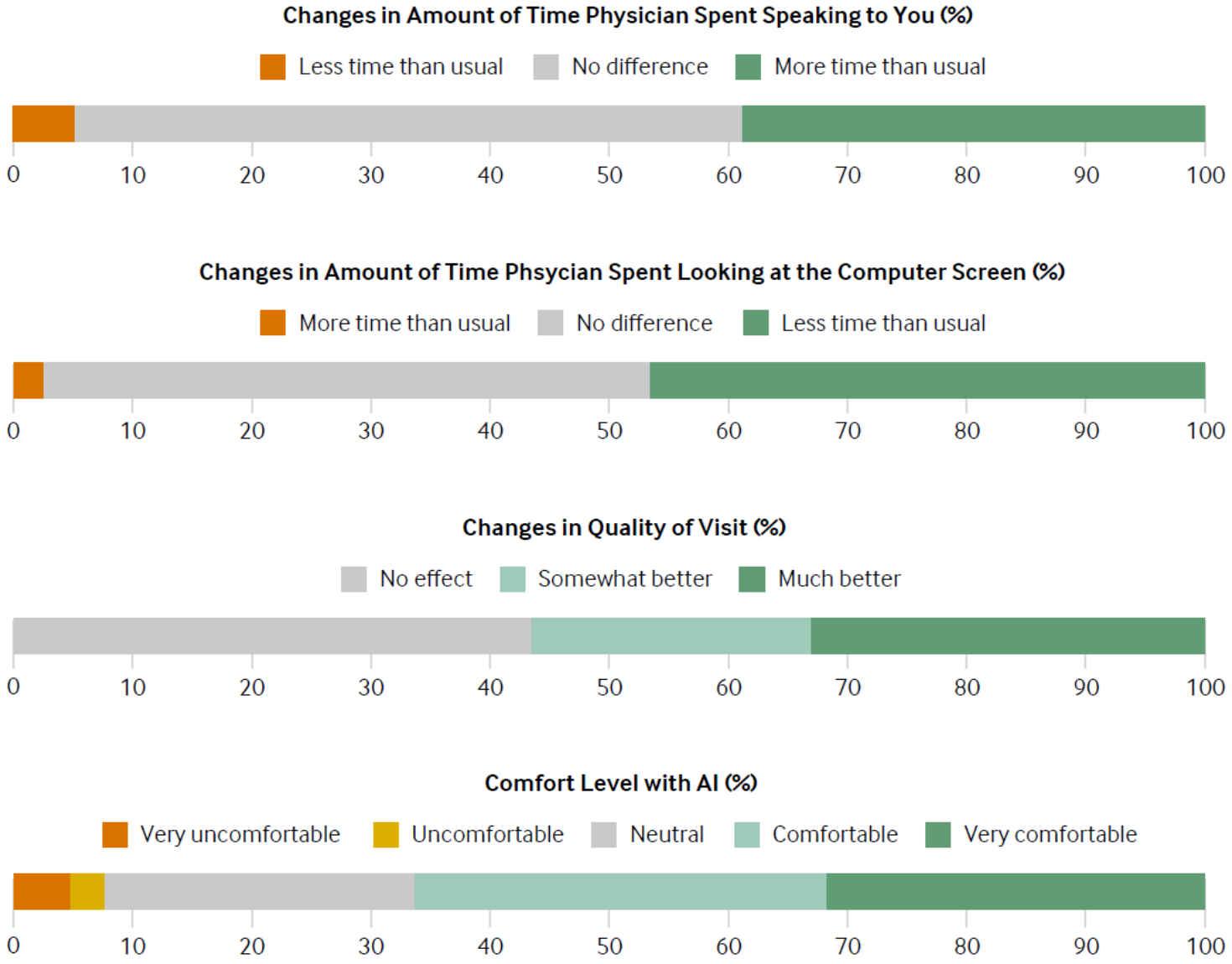


Ambient documentation use reduces time in notes in a dose-response relationship



*Tierney, et al. Ambient artificial intelligence scribes: learnings after 1 year and over 2.5 million uses. *NEJM Catalyst.* 2025.

Patient experience with ambient documentation



*Tierney, et al. Ambient artificial intelligence scribes: learnings after 1 year and over 2.5 million uses. *NEJM Catalyst.* 2025.

Society of General Internal Medicine Position Statement

Domains of Practice	For Clinicians	For Technologists	For Healthcare Organizations
Clinical decision-making	Remain attentive & receptive to AI Critically appraise value Recognize errors/omissions are a weakness Collaborate to co-design	Co-design with the clinical team Provide mechanisms to verify output High standards for success	Evaluate tools that improve quality Partner with physicians to understand acceptability Focus on preventive & chronic disease management
Optimizing health systems: access, population health, patient safety	Remain open to evaluating tools to improve quality & safety Consider how tools can help expand scope of practice	Prioritize developing tools that address the most pressing system challenges	Consider both incremental and transformative tools Ensure internal infrastructure to monitor performance
Enhancing the patient-physician relationship by reducing provider administrative burden, and designing for the patient	Explore opportunities to use AI to create more time to spend with patients	Tools should promote rapport, not just address efficiency Co-design to ensure solutions enhance experience	Evaluate tools to reduce admin burden Recognize that human and computer are better together Avoid layering genAI on top of dysfunctional workflows
Ethics & Equity	Demand transparency and evidence Justify use of AI in decision making	Address bias through representative training data, mitigation of bias in outputs, performance monitoring Fund real world trials Maintain the highest ethical standards Tools should augment healthcare workforce, not replace it	Demand diverse training data sets, transparency and equitable outcomes Ensure physician agency is maintained Critically evaluate data and evidence when making adoption decisions

Crowe, et al. Recommendations for Clinicians, Technologists, and Healthcare Organizations on the Use of Generative Artificial Intelligence in Medicine: A Position Statement from the Society of General Internal Medicine. *J Gen Intern Med, 2025.*

Future of Gen AI in Internal Medicine

Future of genAI to facilitate safe, effective, accessible care

- Colonoscopy polyp detection (Gastroenterology)[1]
- Skin cancer screening (Dermatology)[2, 3]
- Breast cancer screening (Radiology)[4]
- Cervical cancer screening (Pathology)[5]
- Lung cancer screening (Oncology)[6]
- Diabetic retinopathy[7] and cataracts[8] (Ophthalmology)

Ambient Documentation Roadmap

- Continuing to refine quality of notes
- Improve notes for inpatient, ED and specialty areas
- Tee up orders based on visit note

- Level of service summarizer
- ICD-10 and HCC code suggestions

- Reduce manual documentation in flowsheet rows for inpatient nurses

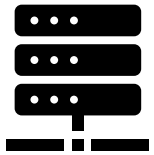
- Integration with knowledge sources such as UpToDate, Merck Manual

- Identify patients for patient clinical trials based on note and medical record
- Generate structured data for registry submissions

EHR of the future? the right information, at the right time, through the right channels

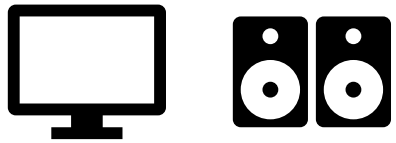
What are we, as a society and healthcare industry, ready to allow AI to do?

Entire content of an interaction is ambiently captured



Ambient visit, patient & general information (results, orders, history, EBM/science…) is stored

GenAI creates connections between the information to generate insights & decision support



Relevant information, insights, and decision support are highlighted in real time, based on the context.

Risk is introduced at 3 levels, and has to be managed with consistency

AI Maturity	Use Cases	Technology Infrastructure and Applications
• Strategy • Governance • Model evaluation & monitoring • Team organization • People & culture	• Administrative • Financial • Clinical • Agentic vs. human-in-the-loop • Business continuity	• Data infrastructure • Analytics • Application engineering • Commercialization

4 key elements to realizing the potential of AI

Education

Common definition of AI

Understanding of potential and risks, and how to mitigate them

Strategy / Goals

Organization strategy

System AI maturity / readiness

Governance

Oversight of use cases, evaluation, deployment, and monitoring

Responsible use of AI guidance

Impact Evaluation

Pragmatic approach to impact assessment

- Hard & Soft ROI
- Balancing measures

Questions

“Using technology to deliver better care and deliver care better”

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