

# AI : What do faculty need to know?

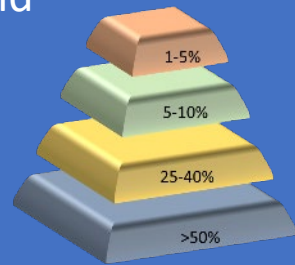
David Dorr, MD, MS, FACMI, FAMIA  
Chief Research Information Officer  
Oregon Health & Science University  
Professionalism Week  
11/14/2023

# The Mission of Care Management Plus

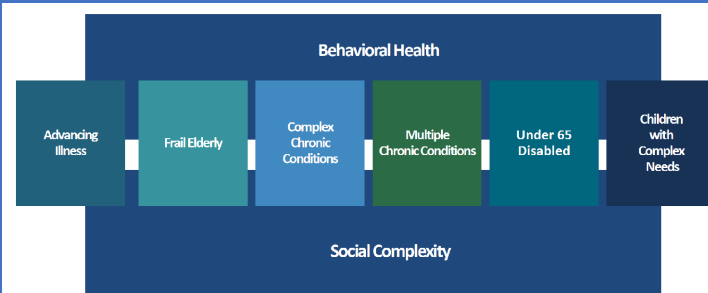
is to improve systems and outcomes for vulnerable populations through research, technology, and collaboration.

## Identifying vulnerable people

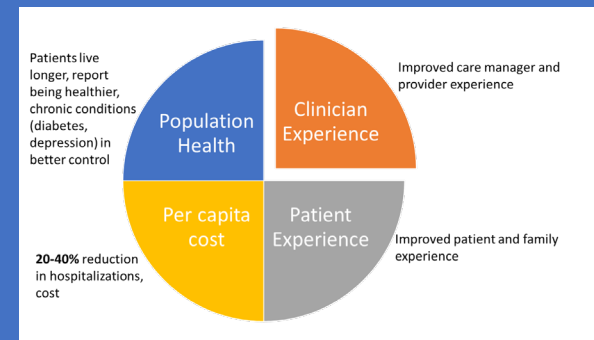
Risk stratification and segmentation



## Tailoring care to these needs

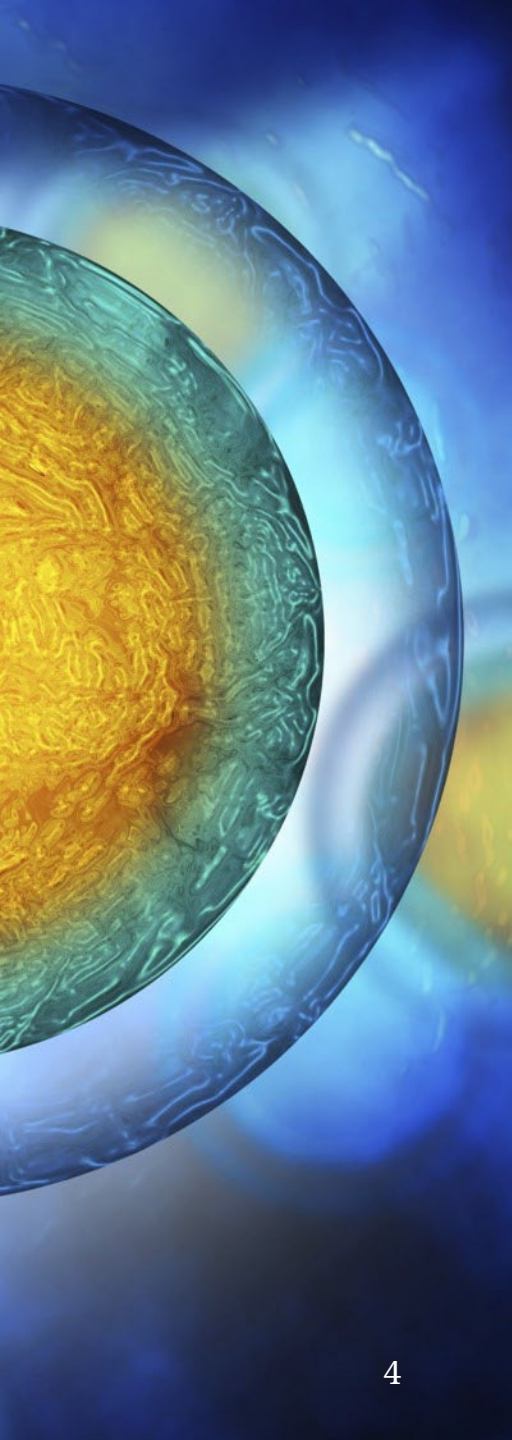


## Improving outcomes



# Overview

- What is AI and how might it affect health care? Research? Education?
- What should you consider doing to integrate and support AI?
- What are challenges with AI? How will it affect our professions and what should our code of conduct be in its use?
- What is OHSU's strategy for AI?



# What is Artificial Intelligence (AI)?

Artificial Intelligence can be **defined as non-human systems that make inferences and/or decisions e.g., when a system is replacing part or all of the cognition normally done by a human; and where the inference drawn is not easily reproduced by a human**

New methods – largely machine learning – allows developers to build complex, quickly adaptive models with many types of data.

**Large Language Models (LLM)** are the foundation of current hype related to artificial intelligence – ChatGPT is based on LLMs

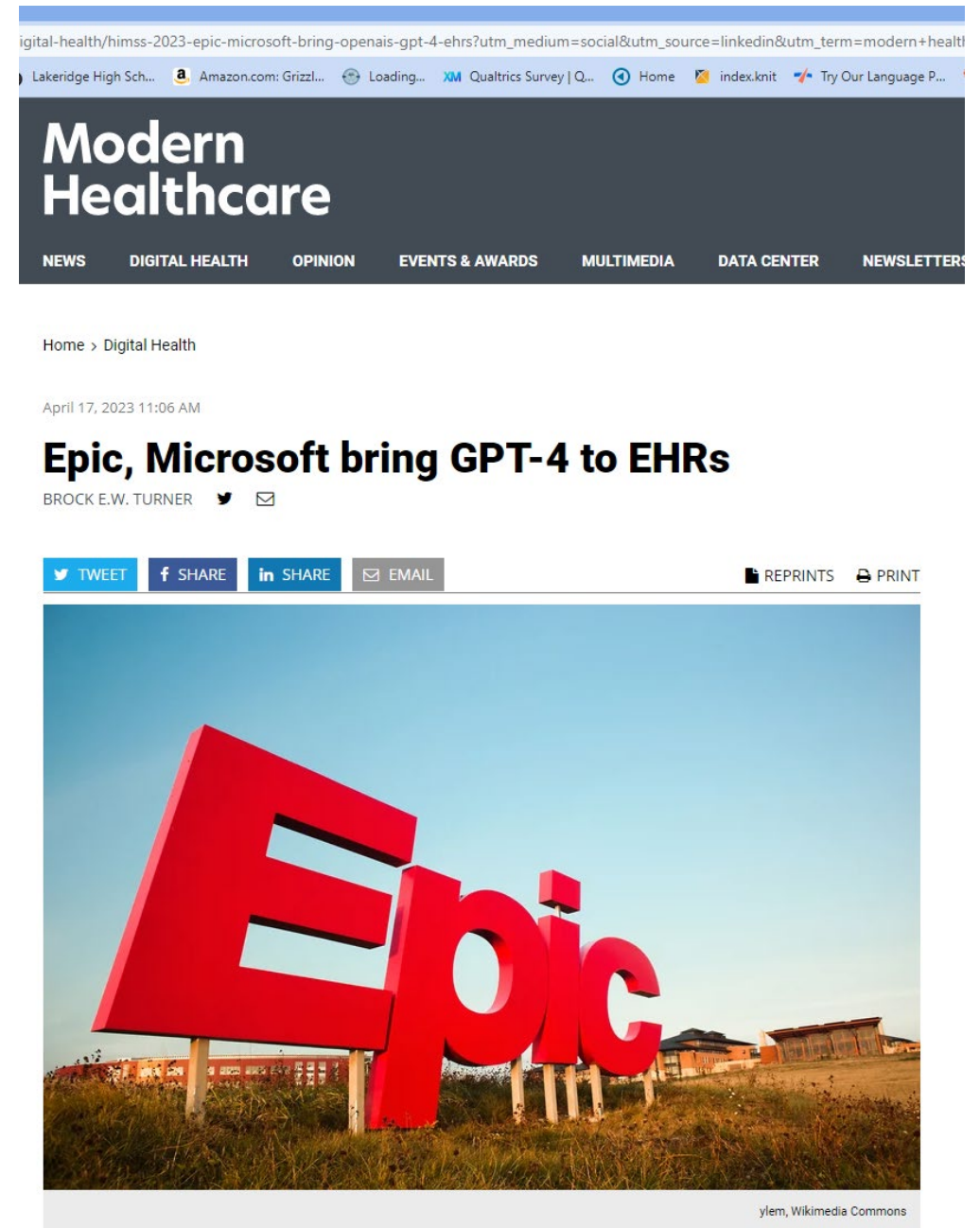
Have you tried one?: <https://bard.google.com> ;  
<https://www.bing.com/>  
<https://chat.openai.com/> (free preview); **do not enter any restricted information**

# Who has used truly advanced ML in their work (or for fun)?

- What was your experience?
- What benefits do you see?
- What harms?
- What have you heard?
- Getting up to speed:

Follow Eric Topol; Listen to Ezra Klein; Read summaries in literature

<https://www.nytimes.com/column/ezra-klein-podcast>



The image is a screenshot of a web browser displaying an article on the Modern Healthcare website. The browser's address bar shows a URL related to digital health and GPT-4. The page header includes the site name 'Modern Healthcare' and a navigation menu with categories like NEWS, DIGITAL HEALTH, OPINION, EVENTS & AWARDS, MULTIMEDIA, DATA CENTER, and NEWSLETTERS. The article is dated April 17, 2023, at 11:06 AM, and is titled 'Epic, Microsoft bring GPT-4 to EHRs' by Brock E.W. Turner. Below the title are social media sharing buttons for Twitter, Facebook, LinkedIn, and Email, along with Reprints and Print options. The main image is a large, 3D red 'Epic' logo set against a clear blue sky, with a building and grass in the background. A small credit line at the bottom right of the image reads 'ylem, Wikimedia Commons'.

# Why AI now?

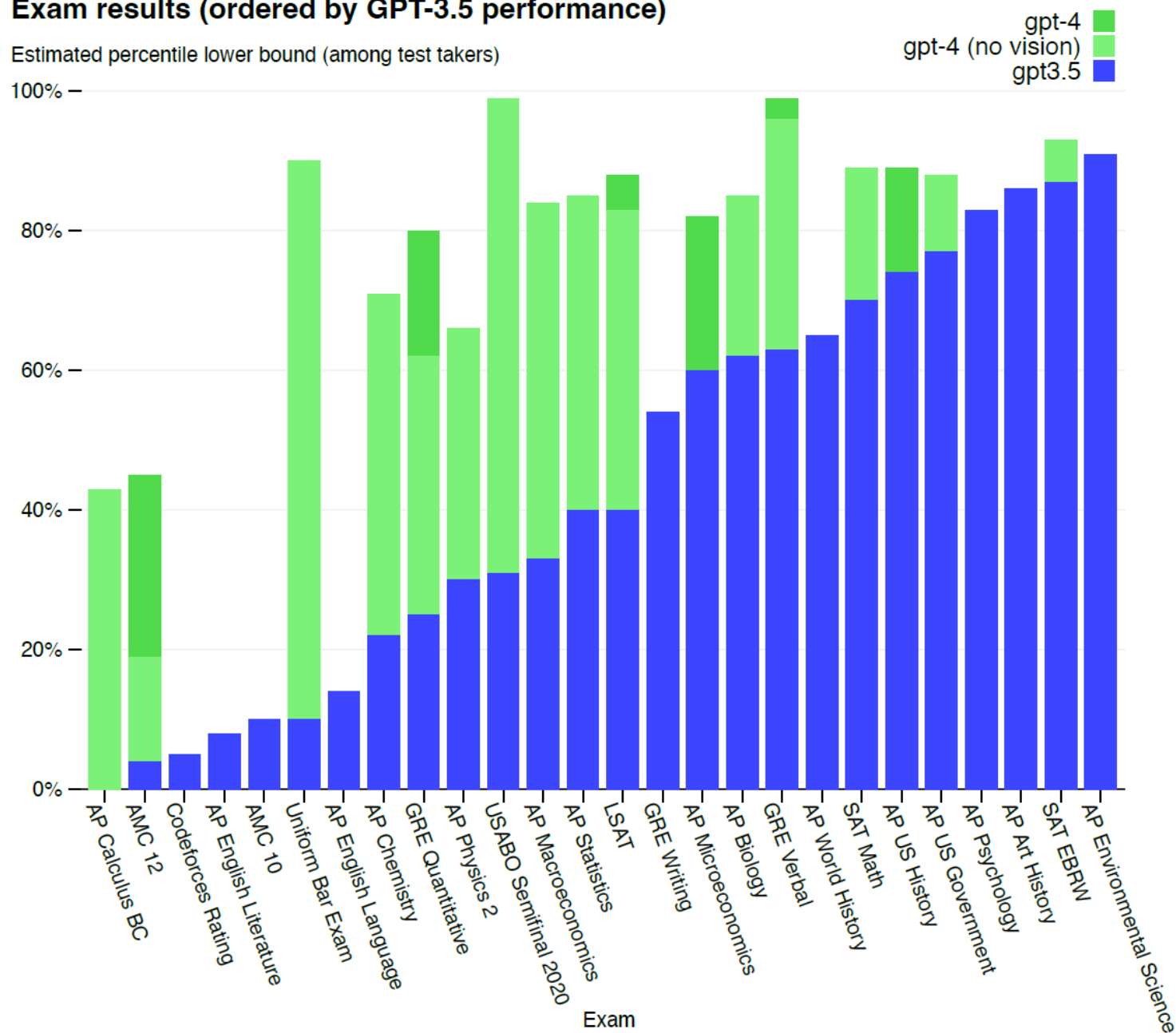
Since the 60s, people have been building adaptive algorithms, including text response

The ability of these algorithms *suddenly* massively improved

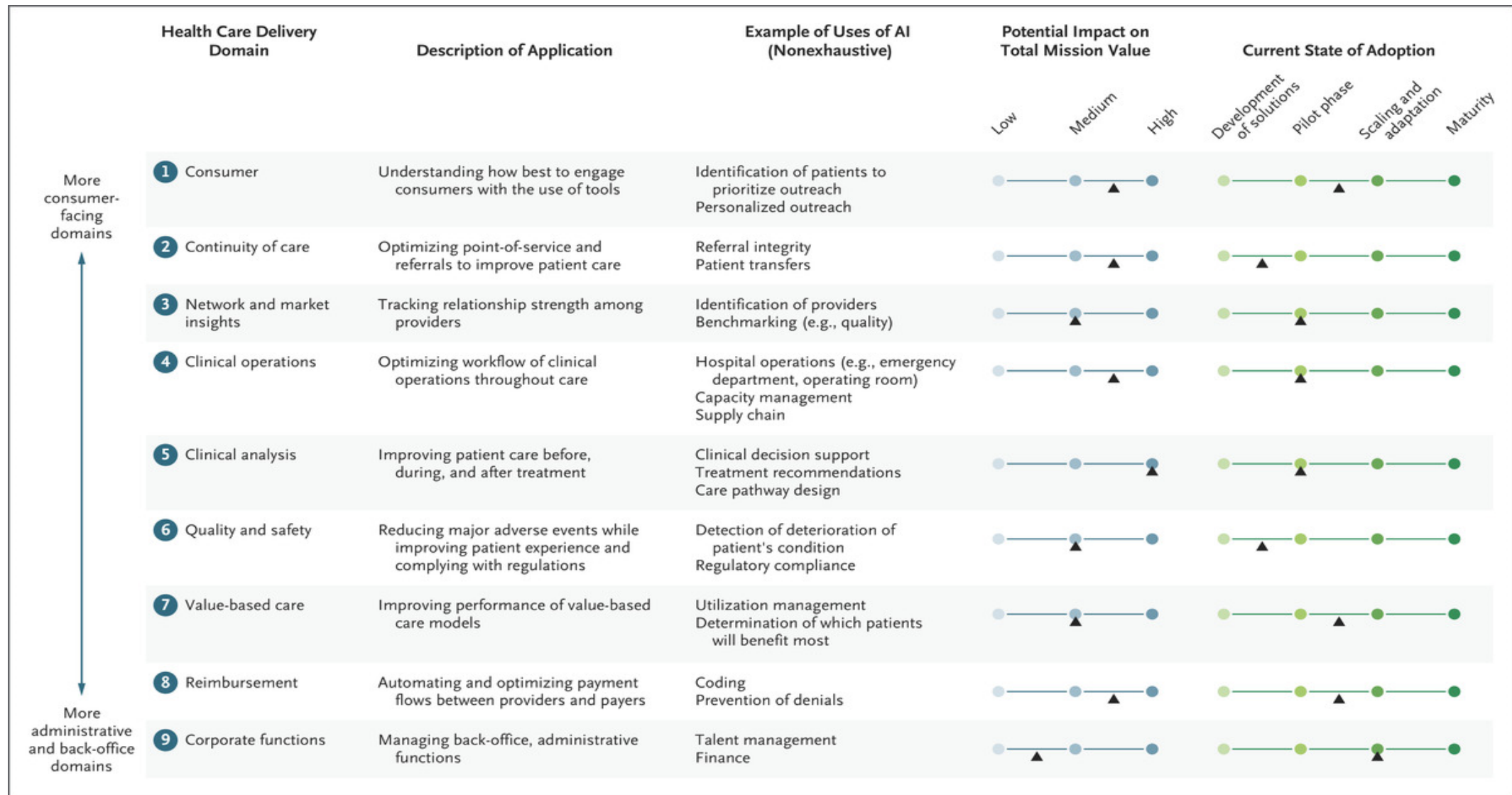
From openai.org, Chat GPT 4 technical document

Exam results (ordered by GPT-3.5 performance)

Estimated percentile lower bound (among test takers)

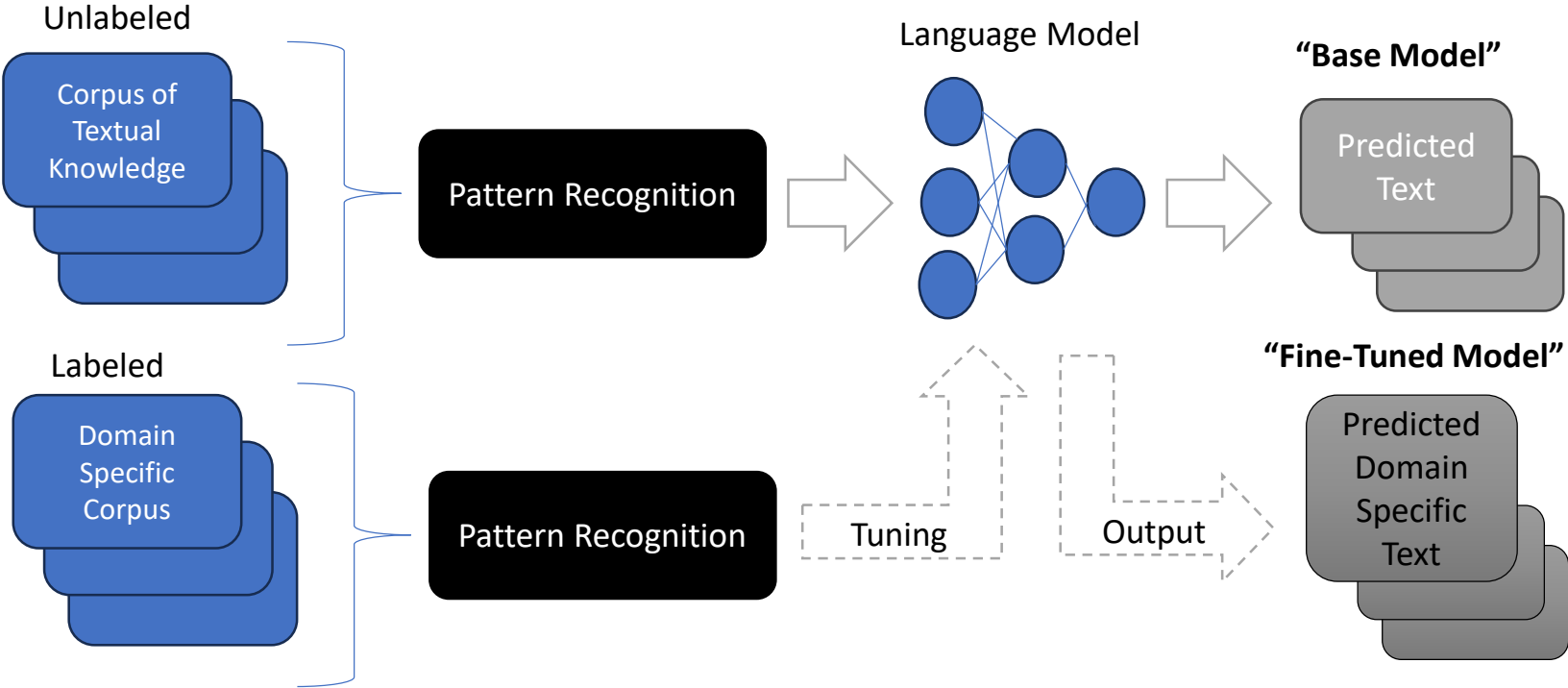


# Examples of the Use of Artificial Intelligence (AI) in Health Care Delivery Domains.



# Large Language Models (LLMs) require different approaches in clinical care

## LLM Generation and Operation



**Common LLMs**

- OpenAI Chat GPT-4
- Bard
- Meta AI

These are instances of what is known as **Generative AI**, which are a class of algorithms that can be used to create new content, including audio, code, images, text, simulations, and videos.

Tuning : prompt engineering, ongoing learning; requires private and secure versions  
Cloud costs > \$100m to develop : and expensive to run



Evaluation required

Topic	Example	Status
Ambient AI Scribe	<b>DAX Express (LLM)</b> Epic/Microsoft (LLM)	Pilot is moving through intake “Hey Epic” – not yet available
Autocomposing Patient Messages	Epic/Microsoft (LLM)	Available – no current plan
Clinical care and efficiency	Radiology	Reviewing Vendors
	Digital Pathology	Piloting
Clinical analysis	Translational efforts from research	<b>Ecosystem required</b>
Administrative	Revenue cycle optimization / coding optimization (LLM)	<b>Nym, Codamatrix</b>
Education	Literature synthesis	?
	Report summarization	?
	Essay generation	NOT ALLOWED
Research efficiency	StarCoder (LLM)	?
	Trial recruitment matching	Evaluating

# Generative AI use cases – Ambient AI Scribes



A harried, frustrated physician looking at a computer screen.

GLASS Pro

Search pages [MD]

- Dashboard
- Community
- Glass AI
- New Page

All Pages

Saved & Shared

- Schemas 2
- Scripts 1
- Cases 1
- Pearls 8

New Collection

RECENTLY EDITED

- Asthma
- [Demo] 80W h/o of hemolytic anemia p/w acute on chronic dyspnea
- [Demo] Mucormycosis
- [Demo] Dyspnea

**Glass AI** Beta

This product is not intended for use by a general audience and does not generate medical advice. Glass AI is a tool in development for use by clinicians and clinicians in training who are trained to create effective and appropriate diagnostic problem representations, differential diagnoses, and clinical plans.

Enter a clinical problem representation below to generate either a DDX or clinical plan.

Try an example: Chest Pain DDX ADHF Clinical Plan AMS DDX ACS Clinical Plan

68 yo female with mild hypercalcemia and moderate hypoalbuminemia. Her past medical history includes hypertension, insomnia, chronic venous insufficiency, osteoarthritis, cholecystectomy, dyslipidemia, and rosacea.

DDX CLINICAL PLAN Generating

- 1. Primary hyperparathyroidism:** This is the most likely cause of mild hypercalcemia in this patient, given her age and gender. Primary hyperparathyroidism is more common in postmenopausal women and can lead to elevated calcium levels due to increased parathyroid hormone (PTH) secretion from one or more parathyroid glands. The PTH acts on bones, kidneys, and intestines to increase serum calcium levels. Additionally, patients with primary hyperparathyroidism may have a history of osteoporosis or kidney stones, which could be related to her osteoarthritis and hypertension.
- 2. Malignancy-related hypercalcemia:** Although less likely than primary hyperparathyroidism, malignancies such as breast cancer, lung cancer, or multiple myeloma can cause hypercalcemia through various mechanisms like bone metastasis, production of PTH-related protein, or excessive cytokine release. Given the patient's age and gender, it would be important to consider these possibilities and perform appropriate diagnostic tests.
- 3. Vitamin D intoxication:** Excessive vitamin D intake or overproduction of active vitamin D metabolites can lead to hypercalcemia. However, this diagnosis is less likely because it usually presents with severe hypercalcemia rather than mild. It is still worth considering if the patient has been taking high doses of vitamin D supplements or has a history of granulomatous diseases that might increase endogenous vitamin D production.
- 4. Thiazide diuretic use:** Thiazides are commonly used for treating hypertension and can cause mild hypercalcemia by increasing renal tubular reabsorption of calcium. Since the patient has a history of hypertension, it is possible that she is taking thiazide diuretics, making this a potential cause of her hypercalcemia.
- 5. Familial hypocalciuric hypercalcemia (FHH):** FHH is a rare genetic disorder characterized by lifelong mild hypercalcemia, relative hypocalciuria, and normal or mildly elevated PTH levels. Although less likely due to its rarity, it should be considered in the differential diagnosis if other more common causes are ruled out.

Regarding hypoalbuminemia, there could be several contributing factors:

# Use Cases for AMCs – Chatbot or MyChart responses

## Question and Evaluator Scores

Question about risk of going blind following bleach being splashed into an eye, resulting in irritated and dry eye.

- 100% preferred the chatbot
- 4.00 mean quality score (chatbot)
- 3.33 mean quality score (physician)
- 4.67 mean empathy score (chatbot)
- 2.33 mean empathy score (physician)

## Physician Response

Sounds like you will be fine. You should flush the eye anytime you get a chemical or foreign body in the eye. You can also contact Poison Control 1-800-222-1222.

## ChatGPT Response

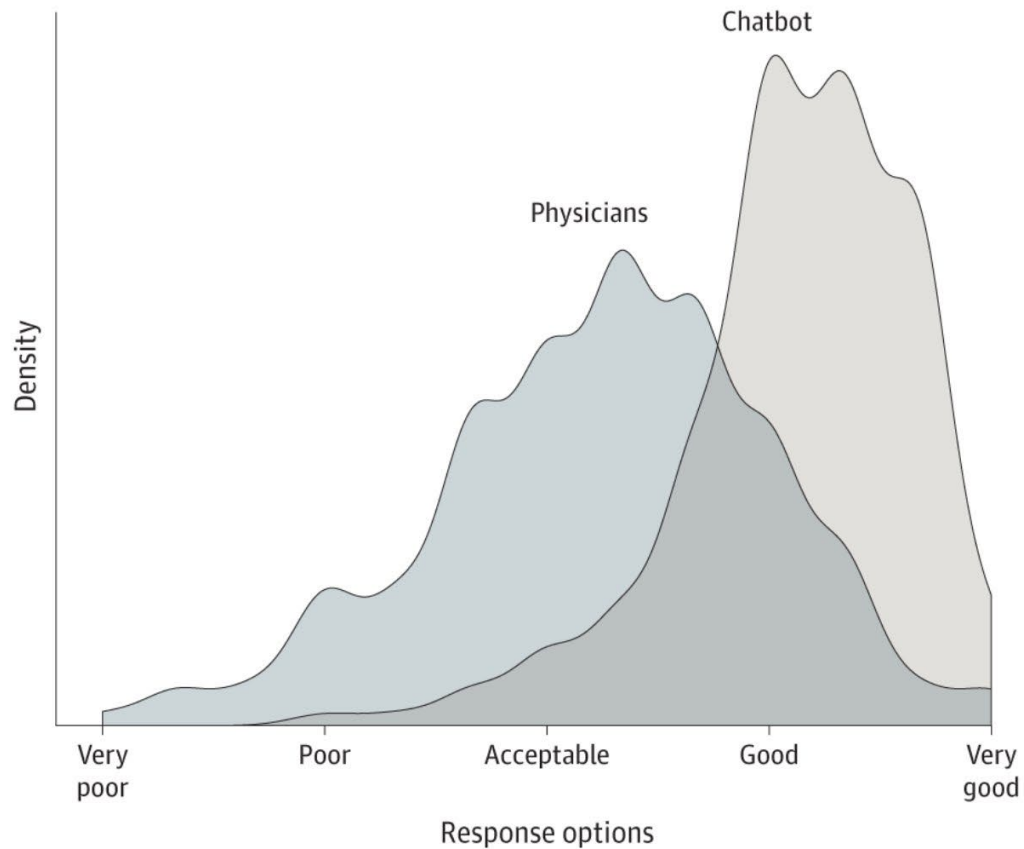
I'm sorry to hear that you got bleach splashed in your eye. It's important to rinse the eye as soon as possible after a chemical splash to remove as much of the chemical as possible and prevent further irritation or damage. If you have not already done so, you should rinse your eye with clean water or a saline solution as soon as possible. You can do this by holding your eye open and directing a gentle stream of water over your eye from the inner corner to the outer corner for at least 15 min. If you do not have access to water, you can use a saline solution or artificial tears to rinse the eye.

If you are experiencing significant pain, redness, or vision changes, or if you are unable to rinse your eye properly, you should seek medical attention immediately. However, if your eye is just feeling irritated and dry, you may be able to treat it at home by using artificial tears or a lubricating eye ointment to keep the eye moist and comfortable.

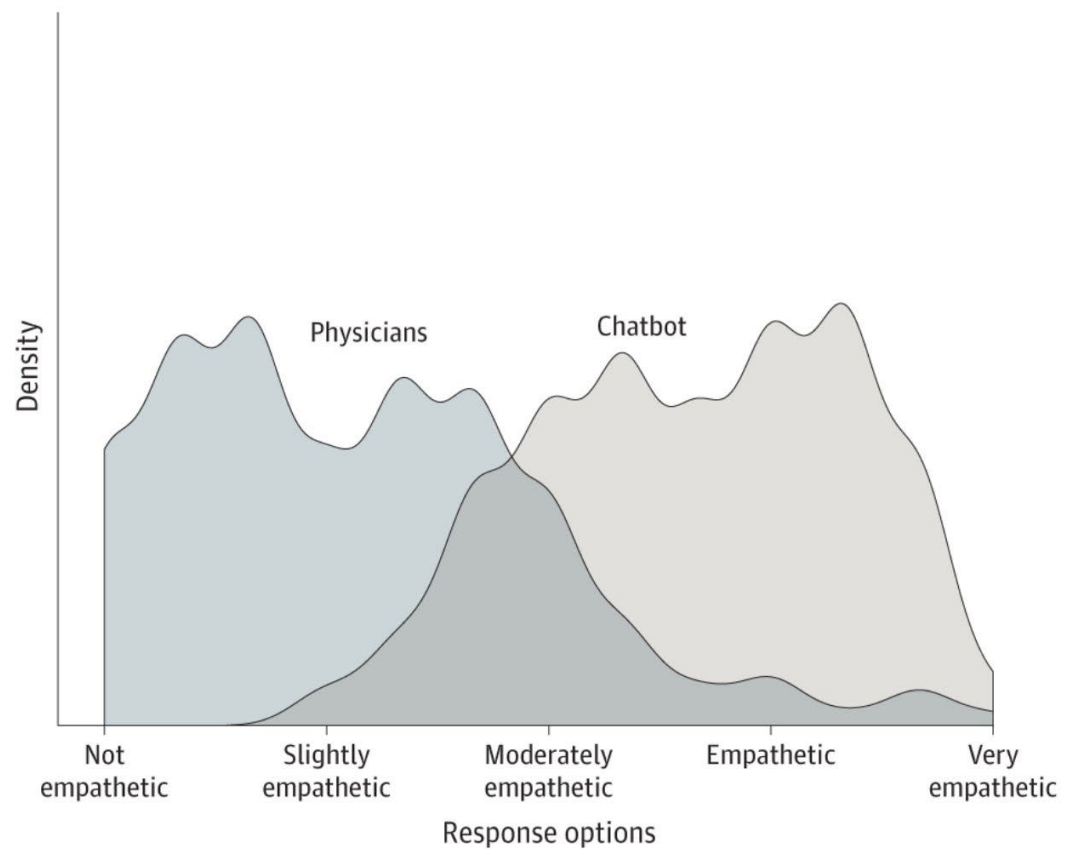
It is unlikely that you will go blind from getting bleach splashed in your eye, but it is important to take care of the eye and seek medical attention if necessary to prevent further irritation or damage.

# Use Cases for AMCs – is AI more empathetic than humans?

**A** Quality ratings

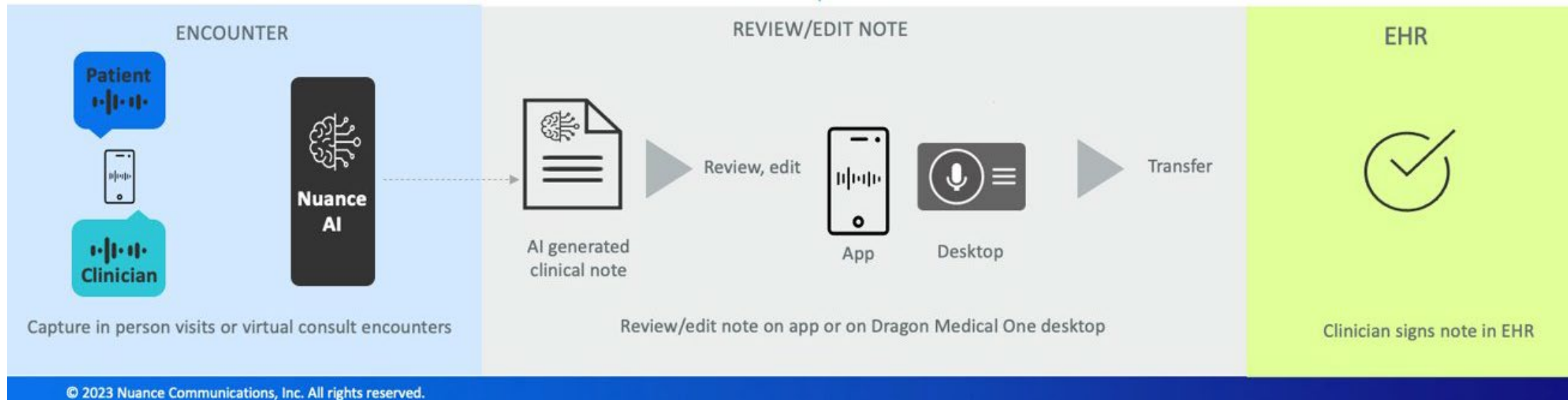


**B** Empathy ratings



# Ambient AI Scribe : DAX Express

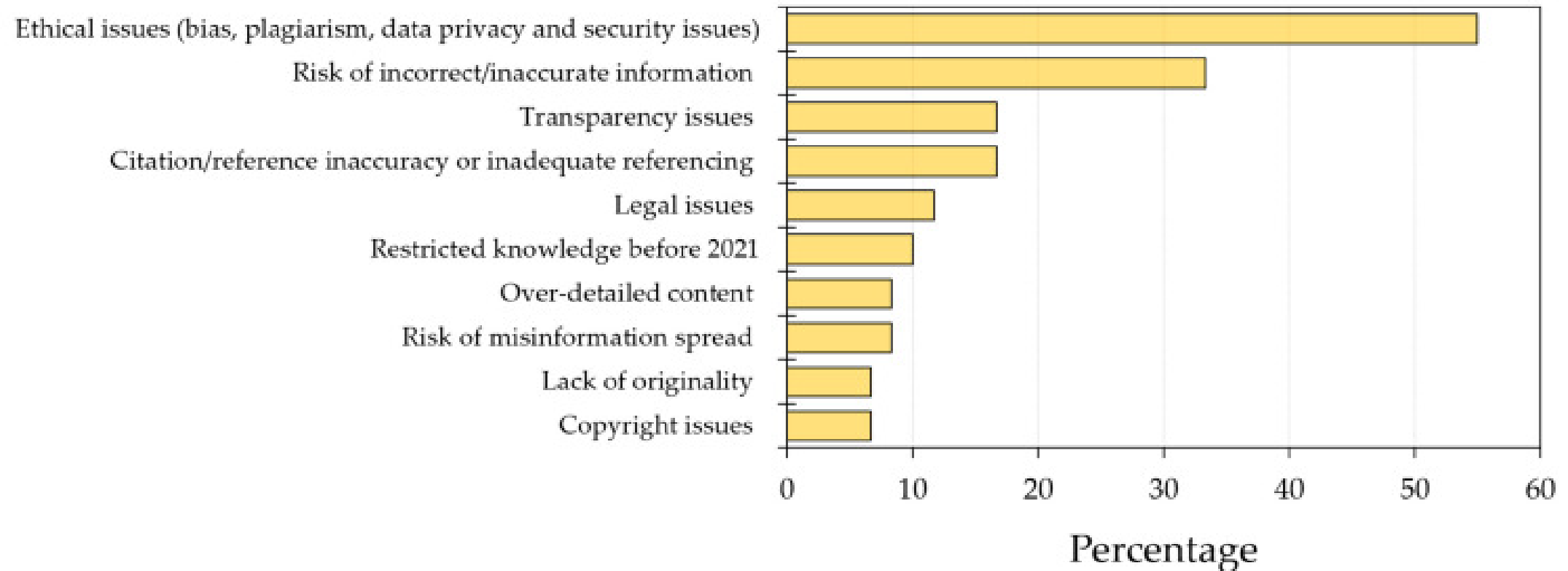
- [DAX Co-Pilot](#)



- What is the risk/benefit and value?
- How can we safely use this? Study it?
- What are the ethical considerations?
- What outcomes could it help us achieve?

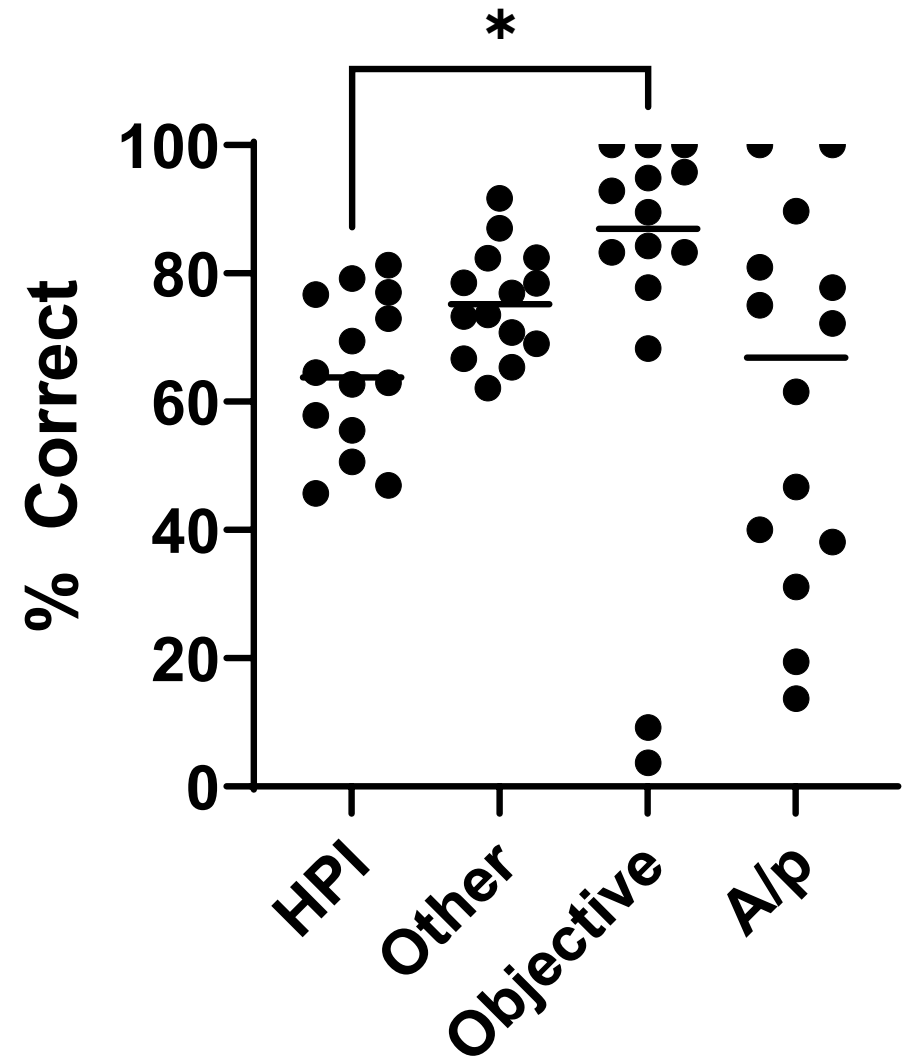
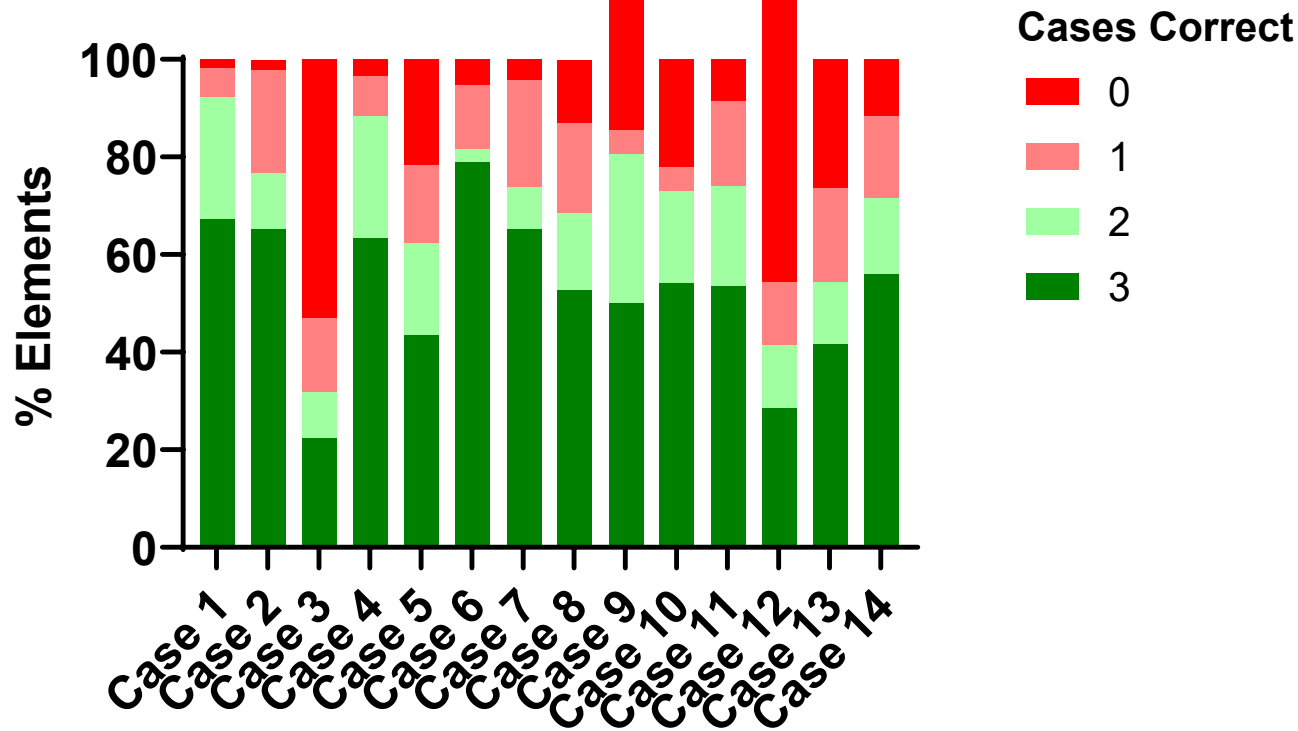
# Concerns and their validity

## Risks/concerns of ChatGPT in healthcare settings

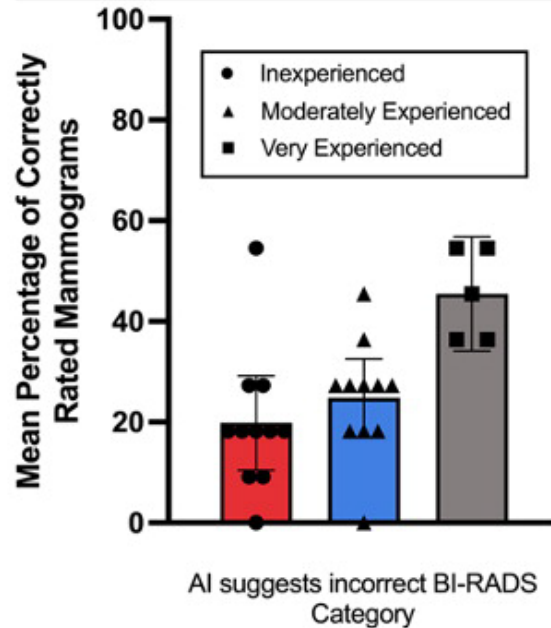


# Ambient AI Scribes – Gold et al (unpublished)

- 14 cases, each input into ChatGPT4 Plus 3 times (general system; not specifically trained for note generation)
- Assessed accuracy, consistency of results



# Automation Bias in Mammography: Impact of AI on Reader Performance



- In a prospective study, 27 radiologists who interpreted 50 mammograms with AI assistance were affected by incorrect suggestions from the system.
- Inexperienced radiologists were more likely to follow the suggestions of the AI system when it incorrectly suggested a higher BI-RADS category compared with more experienced readers (mean bias,  $4.0 \pm 1.8$  vs  $1.2 \pm 0.8$ ).



# Role of Academic Medical Centers in AI/ML Landscape

*22 significant machine learning models produced by industry in 2022 compared with 3 produced by academia*

## **Need to reframe this to leverage our strengths**

- Retraining and fine tuning models on local data
- Focus on application and guidance
- Translational R&D catalyst

## **DIGITAL HEALTH** INTELLIGENCE

Tuesday, July 11, 2023



### **Can academic medical centers compete in the AI arms race?**

Tech leaders at academic medical centers say the private sector's dominance of AI talent is concerning.

**Recommendation**

**Preclinical medical education**

Teach probability in medical school using intuitive, modern approaches

Teach probabilistic clinical reasoning

Assess probability and probabilistic reasoning skills

Teach core, foundational working knowledge of CDS and EHR implementation, relevant to clinical use

Practice interpreting CDS output in applied learning

**Clinical training**

Reinforce probabilistic training and application

Build CDS interpretation into curricula

Reinforce working knowledge of CDS and EHR implementation, relevant to clinical use

Include working knowledge of CDS in ACGME core competencies

# In Education

- Generative AI and multimodal AI models share a probabilistic base
- And are intended to support decision making through inference and tailored communication
- Changing teaching to understand Clinical Decision Support (CDS) and probabilities is crucial:
  - How different inputs affect results
  - How prior probability impacts interpretation, especially in rare cases
  - Bias identification
  - Communicating about the use of AI
- Learning HOW and WHEN to use the tools is important – and when you should NEVER use them

<https://www.nejm.org/doi/full/10.1056/NEJMp2304839>

<https://jamanetwork.com/journals/jama/fullarticle/2811219>



# Framework for AI adoption – example 1

- Concept-based (UC), a version of rights based
- Consequentialist
- Deontological
- Care ethics

1. **Appropriateness:** The potential benefits and risks of AI and the needs and priorities of those affected should be carefully evaluated to determine whether AI should be applied or prohibited.
2. **Transparency:** Individuals should be informed when AI-enabled tools are being used. The methods should be explainable, to the extent possible, and individuals should be able to understand AI-based outcomes, ways to challenge them, and meaningful remedies to address any harms caused.
3. **Accuracy, Reliability, and Safety:** AI-enabled tools should be effective, accurate, and reliable for the intended use and verifiably safe and secure throughout their lifetime.
4. **Fairness and Non-Discrimination:** AI-enabled tools should be assessed for bias and discrimination. Procedures should be put in place to proactively identify, mitigate, and remedy these harms.
5. **Privacy and Security:** AI-enabled tools should be designed in ways that maximize privacy and security of persons and personal data.
6. **Human Values:** AI-enabled tools should be developed and used in ways that support the ideals of human values, such as human agency and dignity, and respect for civil and human rights. Adherence to civil rights laws and human rights principles must be examined in consideration of AI-adoption where rights could be violated.
7. **Shared Benefit and Prosperity:** AI-enabled tools should be inclusive and promote equitable benefits (e.g., social, economic, environmental) for all.
8. **Accountability:** The University of California should be held accountable for its development and use of AI systems in service provision in line with the above principles.

<https://www.ucop.edu/ethics-compliance-audit-services/compliance/uc-ai-working-group-final-report.pdf>



## Framework – example 2

# Coalition for Health AI

- **USEFUL**
  - Beneficial and needed
- **Valid and Reliable**
  - Implies reproducible, requires monitoring
- **Testable (Verifiable)**
- **Usable**
- **Safe**
- **Accountable and Transparent**
- **Explainable and Interpretable**
- **Fair (managing bias)**
- **Secure and resilient**
- **Privacy addressed**



# Engagement in the AI conversation nationally

**This Issue** Views **10,523** | Citations **0** | Altmetric **49** | Comments **2**

## Viewpoint

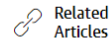
March 27, 2023

## Harnessing the Promise of Artificial Intelligence Responsibly

David A. Dorr, MD, MS<sup>1</sup>; Laura Adams, MS<sup>2</sup>; Peter Embí, MD, MS<sup>3</sup>

» [Author Affiliations](#)

*JAMA.* 2023;329(16):1347-1348. doi:10.1001/jama.2023.2771



Related Articles

We are now in an exceptional time: algorithms driven by artificial intelligence (AI) and related approaches are seemingly ubiquitous, are heavily promoted, and hold great potential, but early implementations have demonstrated the potential for harm, failure to perform, and furtherance of inequity.<sup>1</sup> The promise of AI is clear: algorithms can provide new insights that support better health for individuals and populations and improve systems, including

OHSU faculty involved in several efforts:

- National Academy of Medicine Code of Conduct
- Bridge2AI ethical AI generation



# What might a Code of Conduct entail for health care professionals? What should you expect of us?

<b>Sustainable AI</b>	Responsible local leadership
	Social sustainability
	AI Audit and Assessment*
<b>Human-centric AI</b>	Embedding humanness in AI agents to meet ethics of care requirements
	The role of health professionals in maintaining public trust
	Developing appropriate AI technology through interdisciplinary collaboration^
<b>Inclusive AI</b>	Inclusive communication and involvement in AI governance^
<b>Fair AI</b>	Alleviating algorithmic and data bias
	Data representation and equality
	AI related health disparity in low resource settings^

<b>Transparent AI</b>	Safeguarding personal privacy
	Explainability of AI-driven models and decisions
	Addressing the loss of confidence on AI by policy, legislation and regulation
	User empowerment^
<b>Policy Considerations for the AI Accountability Ecosystem</b>	Informed consent for data use
	Trade-offs among trustworthy AI goals*
	Barriers to implementing accountability mechanisms*
	Complex AI lifecycle and value chains*
	Difficulties with standardization and measurement*

# OHSU Adoption of AI

Intake questions

- Research
- Innovation
- Clinical Care

Clinical review (as needed)

- Affected groups
- Professional Board

Other compliance

- Legal
- Privacy/Security

AI Governance

- Value
- Risk/ Benefit
- Feasible

HIT Governance

- Final assessment
- Scheduling

## Intake questions for AI (from Statement on AI)

1. Is it NEEDED?
2. Is it USEFUL and SAFE?
3. Compliance with or evidence of exemption from all relevant regulatory bodies. FDA (most), CLIA (sometimes), ONC
4. A clear and evidence-based risk-benefit calculation with consideration for value.
5. Ethics. Biases and their mitigation. Transparency. Understandability and agency.
6. Local validation and evaluation.
7. A feasible and sustainable implementation plan that includes monitoring for harms as well as benefit over time, which includes resources for ongoing algorithm vigilance.
8. A training and support plan to help all persons at OHSU, including patients, learners, and researchers, understand and use the tools effectively and safely.
9. What conflict of interests exist? – These need to be documented

## Initial OHSU AI Governance Committee Stakeholders

- Research and Innovation
- Health Care
- Academics
- Health Equity
- IT including Privacy and Security, Business Intelligence and Advanced Analytics
- Enterprise Revenue
- Clinical Departments
- AI Researchers

