Fostering Collaboration between Developers and Physicians to Optimize AI in Healthcare

AIME 2025 Conference
Pavia, IT

Your Chairs and Disclosures

Gemma Postill, MD/PhD Candidate, University of Toronto

T-CAIREM: Temerty Center for Artificial Intelligence Research and Education in Medicine

No conflicts of interest to disclose.

Christopher Khoury MSc, MBA, VP Strategic Insights, American Medical Association

No conflicts of interest to disclose.

Kimberly D. Lomis, MD, VP Medical Education, American Medical Association

No conflicts of interest to disclose.

Laura Rosella, PhD, Professor, Population Health Analytics Lab, University of Toronto

T-CAIREM: Temerty Center for Artificial Intelligence Research and Education in Medicine

No conflicts of interest to disclose.
[Not Present Today]

Warm Up Exercise

Poll: How many of you are primarily:

1. Medical Trainees,
2. Clinicians or Medical Educators
3. Technical Practitioners (e.g. Comp Sci, Data Science, Engineer)

Flow of Today

20’	*150’*	*15’*
Setting the Stage	**Case Study Discussions**	**Closing Discussion**

- Data Rich Environment
- AI in Healthcare
- Gen and Non-Gen AI
- Ethical and Legal

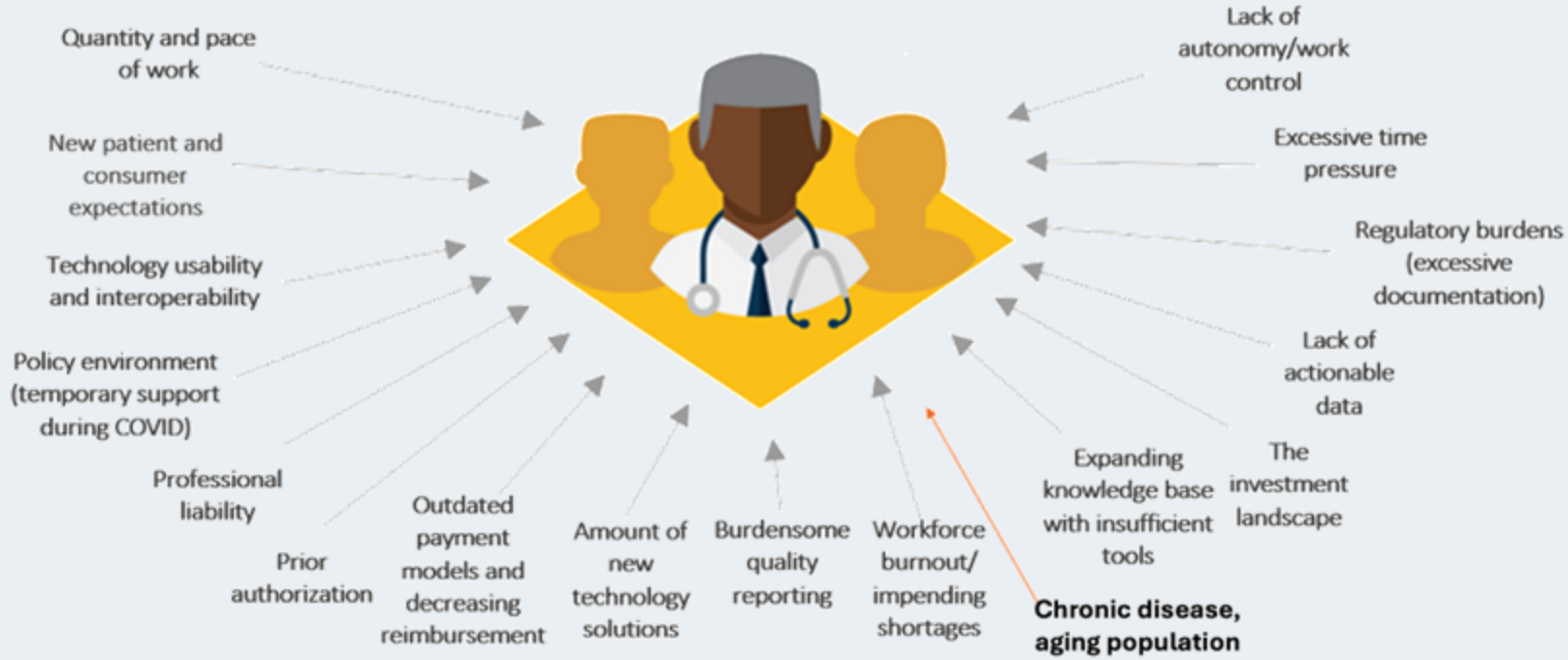
- Compare trade-offs between model complexity and clinical utility
- Understand how data modality affects model performance
- Identify validation gaps and fairness concerns
- Reflect on the ethical and implementation implications of AI in healthcare

Breaks
Coffee: 10:30-11:00
Lunch: 13:00

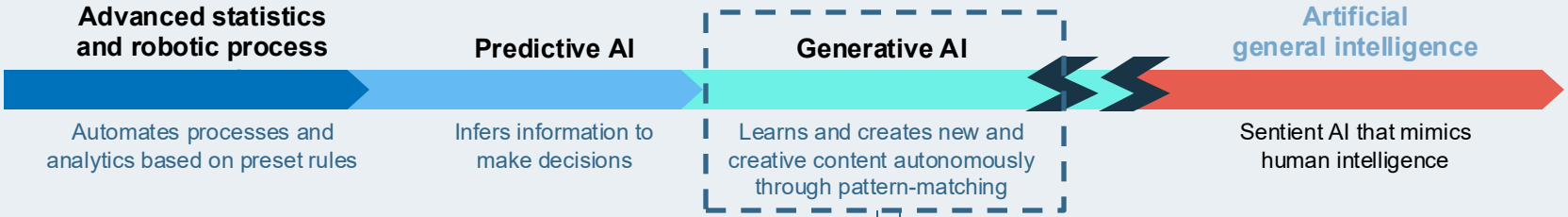
When asking a question or commenting, please say your name/affiliation.
Please feel free to step outside for bathroom breaks!

MACRO TRENDS OF AI IN HEALTHCARE

Forces Impacting the Future of Health



Why this time is different



Increase of awareness and accessibility to the general public

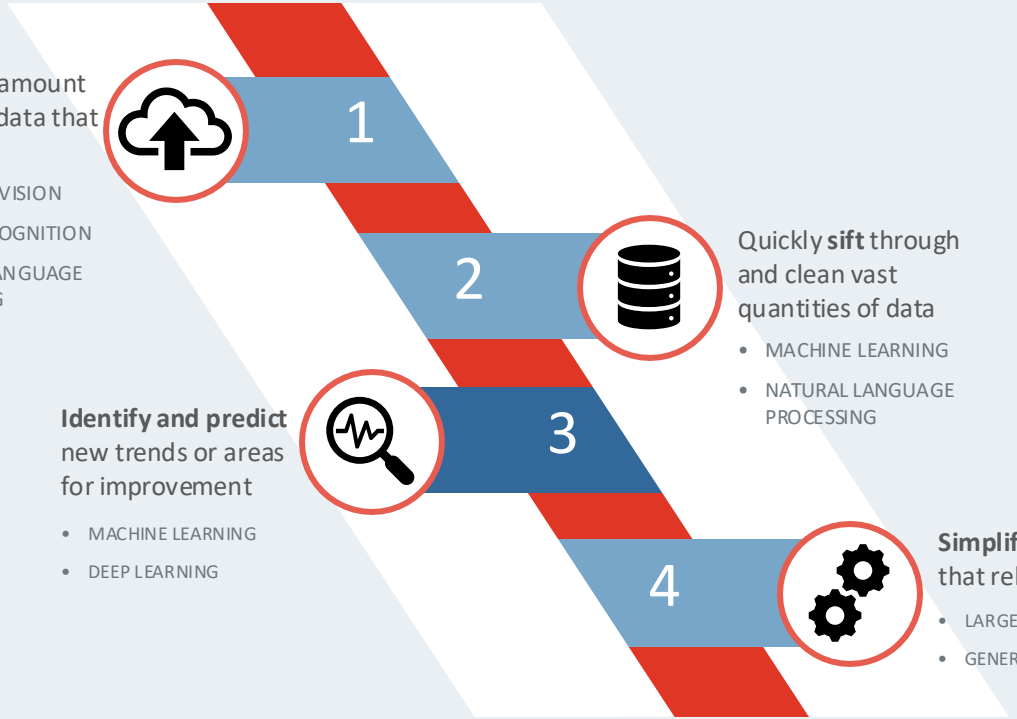
- Free and public access to generative AI tools such as ChatGPT and Bard
- Integration into consumer tech (ex: search engines)
- Simple to use interface for non-technically proficient users

Expansion of capabilities and utility

- Conversational; human-like communication
- Remembers prior inquiries in a session
- Accounts for user intent in search, even for complex inquiries

Data becomes a more critical asset

AI models *may* unlock data practicality at scale



Expand the amount and type of data that is captured

- COMPUTER VISION
- SPEECH RECOGNITION
- NATURAL LANGUAGE PROCESSING

Quickly **sift** through and clean vast quantities of data

- MACHINE LEARNING
- NATURAL LANGUAGE PROCESSING

Identify and predict new trends or areas for improvement

- MACHINE LEARNING
- DEEP LEARNING

Simplify or automate processes that rely on data inputs

- LARGE LANGUAGE MODELS
- GENERATIVE AI

DATA SPOTLIGHT

137 terabytes

Of data are produced by the average hospital every day

↑47%

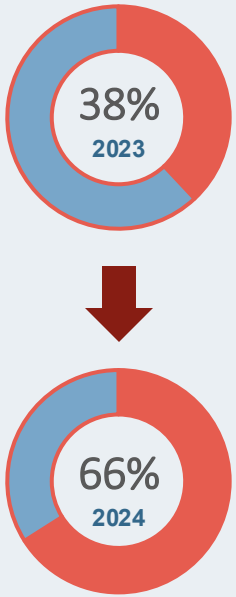
Growth rate of data produced in health care per year

Physician sentiments toward AI trending positive

AI usage nearly doubles

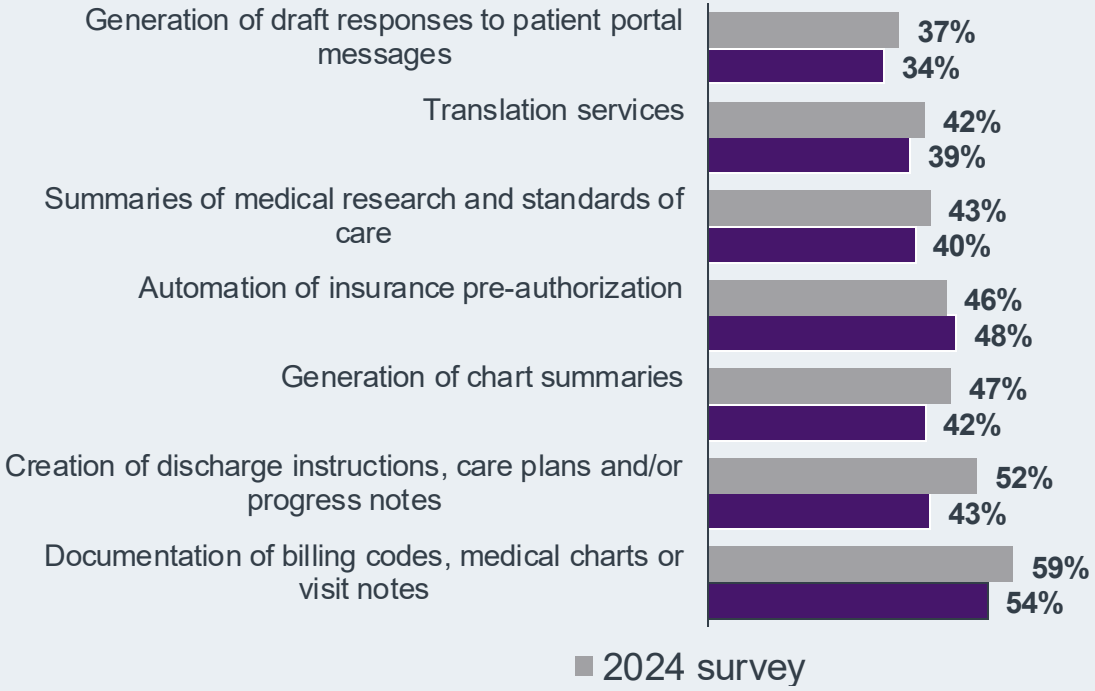
Source: AMA

Percent of respondents stating they currently use at least one of the 15 AI use cases presented



Physician enthusiasm for AI use cases grows (2023 vs. 2024)

Source: AMA



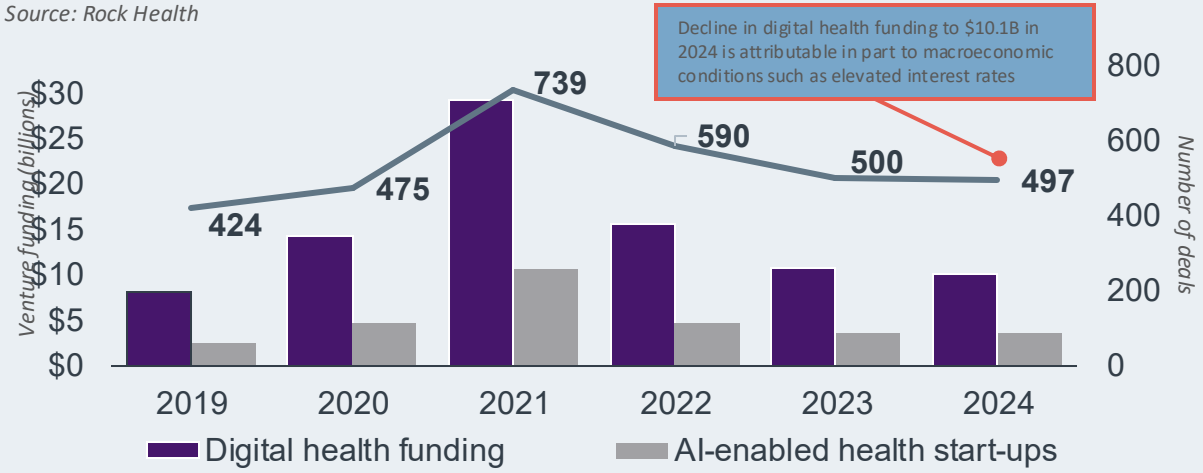
AI consumes most digital health venture funding

DATA SPOTLIGHT

All 10 of the largest global big pharma players have partnered with **AI-based drug discovery start-ups** since 2023 for target identification, drug repurposing, drug-target interactions, and generative chemistry (source: CB Insights)

Digital health venture funding and deal activity in the U.S.

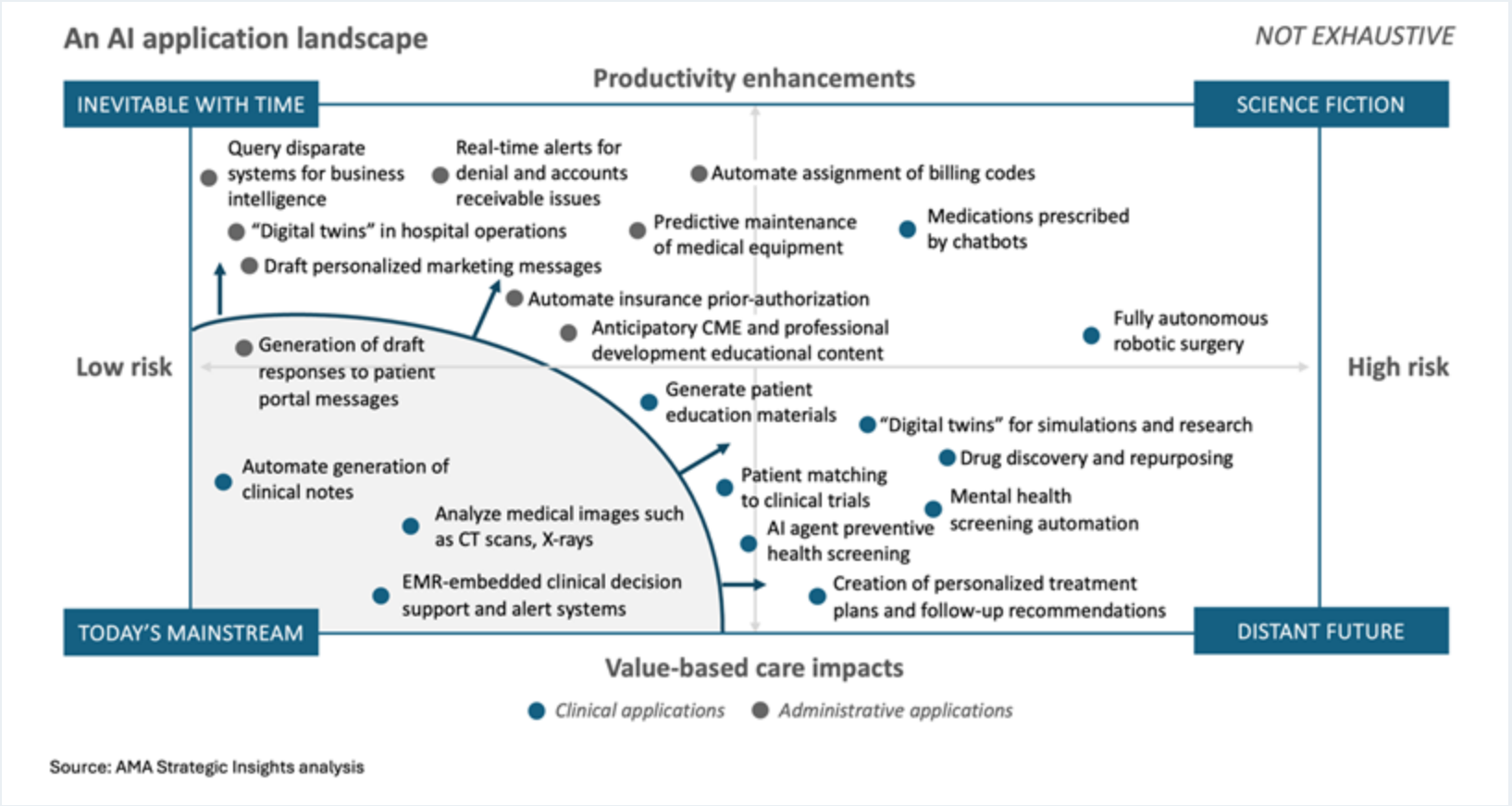
Source: Rock Health



Top funded areas (Q1-Q3 2024 only)

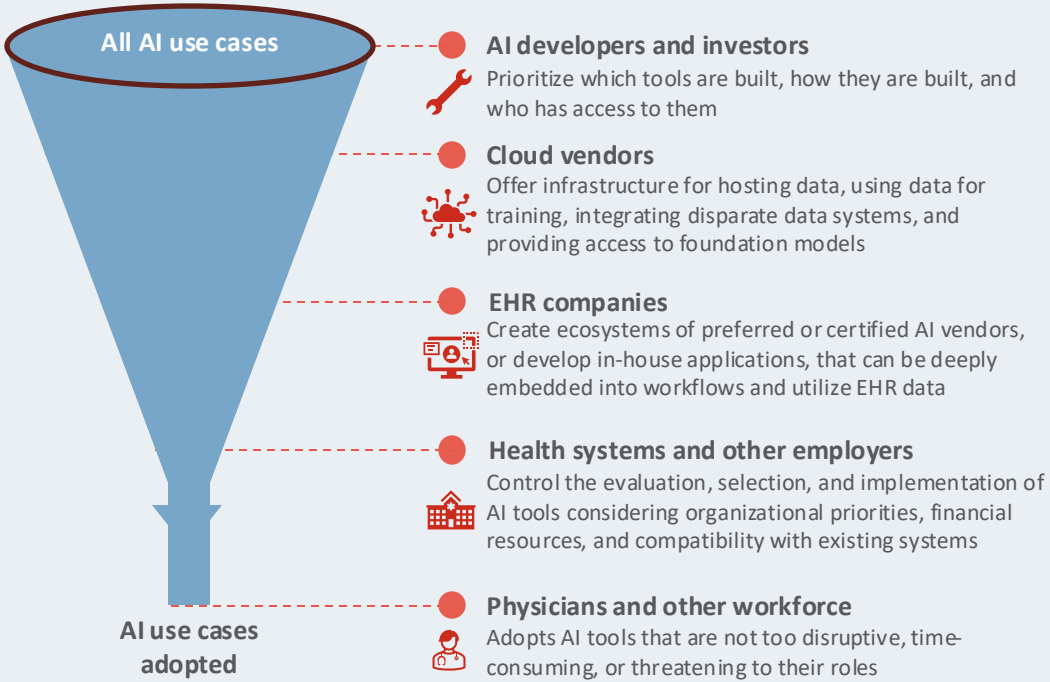
$3.3B	$916M	$664M
AI	Wearables	Digital obesity care

Where we are and where we're going



AI adoption dependent on several gatekeepers

Gatekeepers from AI development to adoption



AI developers and investors
Prioritize which tools are built, how they are built, and who has access to them

Cloud vendors
Offer infrastructure for hosting data, using data for training, integrating disparate data systems, and providing access to foundation models

EHR companies
Create ecosystems of preferred or certified AI vendors, or develop in-house applications, that can be deeply embedded into workflows and utilize EHR data

Health systems and other employers
Control the evaluation, selection, and implementation of AI tools considering organizational priorities, financial resources, and compatibility with existing systems

Physicians and other workforce
Adopts AI tools that are not too disruptive, time-consuming, or threatening to their roles

DATA SPOTLIGHT

High market concentration grants significant power to a small number of companies

70% Of the U.S. health care **cloud market** in 2020 was accounted for by AWS, Microsoft, and Google Cloud

73% Of the U.S. hospital **EHR market** in 2024 was accounted for by Epic, Oracle Cerner, and MEDITECH

Recent focus areas and announcements

Clinical intelligence

iCAD

November 2024: First FDA approved AI-detection program for mammography

ELSEVIER

February 2024: Launched ClinicalKey AI that summarizes evidence-based information in response to clinician inquiries (e.g., drug interactions, comorbidities)

Workflow tools

ORACLE

October 2024: Announced AI-enabled EHR with conversational search, voice navigation, multimodal search, AI-enabled summaries, streamlined docs, and auto coding

Microsoft

October 2024: Launched generative AI-powered agent service with use cases including appointment scheduling, clinical trial matching, and patient triaging

Notes & transcription

aws

July 2023: Announced HealthScribe (join Microsoft, Google who have AI scribes)

ABRIDGE

August 2024: Kaiser Permanente rolls out abridge across 24,600 physicians, 600 medical offices, and 40 hospitals

Incorporating LLMs into workflows

Case examples

Patient-facing application

Chatbot 2.0: Ana addresses health disparities with specially trained agents

Hippocratic AI — Do No Harm

1. GenAI health care agent contacts patients without a MyChart account by telephone for:
   - Colorectal cancer screenings
   - Colonoscopy preparation and follow-up
2. AI agents ask and answer questions with patients in multiple languages
3. Send full transcript to clinician for review; Escalate to a live clinician, or request follow-up; Receive at-home stool test

AGENTS IN DEVELOPMENT

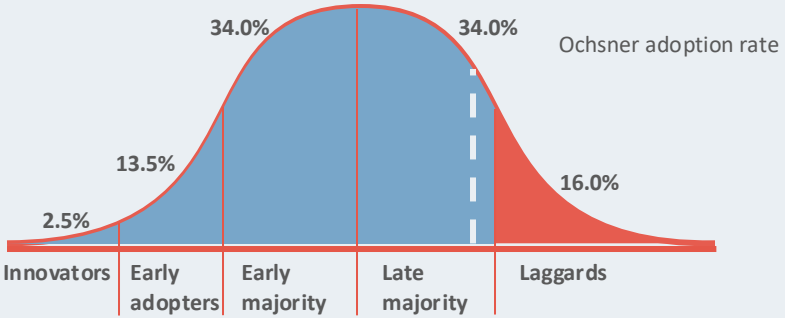
- Post-discharge follow-up for congestive heart failure and kidney disease
- Wellness and social determinants of health surveys
- Health risk assessments
- Pre-operative patient instructions
- Other chronic care management

Physician-facing application

Deploying ambient scribes into EHRs for the masses

Ochsner Health — DeepScribe

Ochsner reaches **78%** adoption rate for its EHR scribe technology by enabling customization to specific specialties and clinicians within Epic



RESULTS

75% reduction in documentation time (three to four minutes per note)

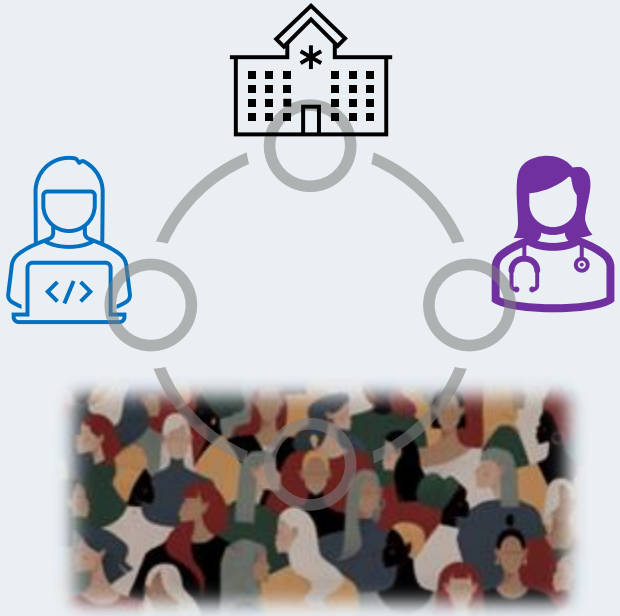
96% patient satisfaction rate

ETHICAL LEGAL AND SOCIAL CONSIDERATIONS

What are sociotechnical systems?

Socio-technical systems theory explores how social and technical elements interact. Organizations work best when their social and technological parts align. **Socio-technical systems theory believes people and technology should not be separated in analysis.** Instead, you should view them as interconnected parts of a whole system…

It aims to create a balanced environment where **technology supports human roles and social structures.** The theory applies to workplace design, software development, and organizational change management.



Source: Interaction Design Foundation

We must avoid coded inequity

"Whereas in a previous era, the intention to deepen racial inequities was more explicit, today coded inequity is perpetuated precisely because those who design and adopt such tools are not thinking carefully about systemic racism."

Ruha Benjamin, PhD

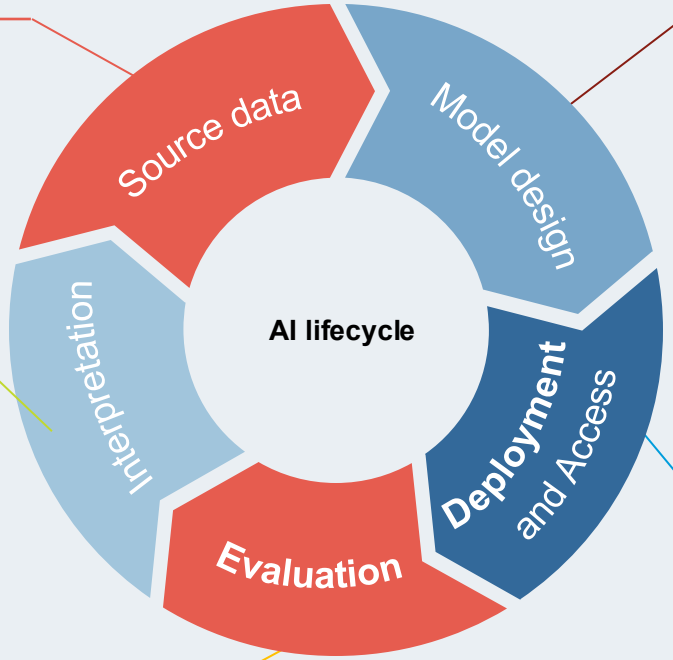
Princeton University

Assessing risk, automating racism | Science

Bias can creep in along the entire AI lifecycle

- **Data collection bias** from underrepresentation in data
- **Historical bias** reflecting past healthcare disparities in training data

- **Algorithmic bias** due to algorithms not considering disparities
- **Feature selection bias** from selecting features without considering intended use, ethical, and clinical constraints



- **Clinical interpretation** bias from healthcare professionals interpreting AI recommendations differently
- **Patient compliance bias** from patient factors affecting adherence

- **Deployment bias** when not considering different user groups or regions
- **Access bias** resulting from the oversight of resource accessibility, including technology and financial means

- **Validation data bias** due to not representing all healthcare settings
- **Outcome measurement bias** from prioritizing certain outcomes

What is Human-Centeredness?

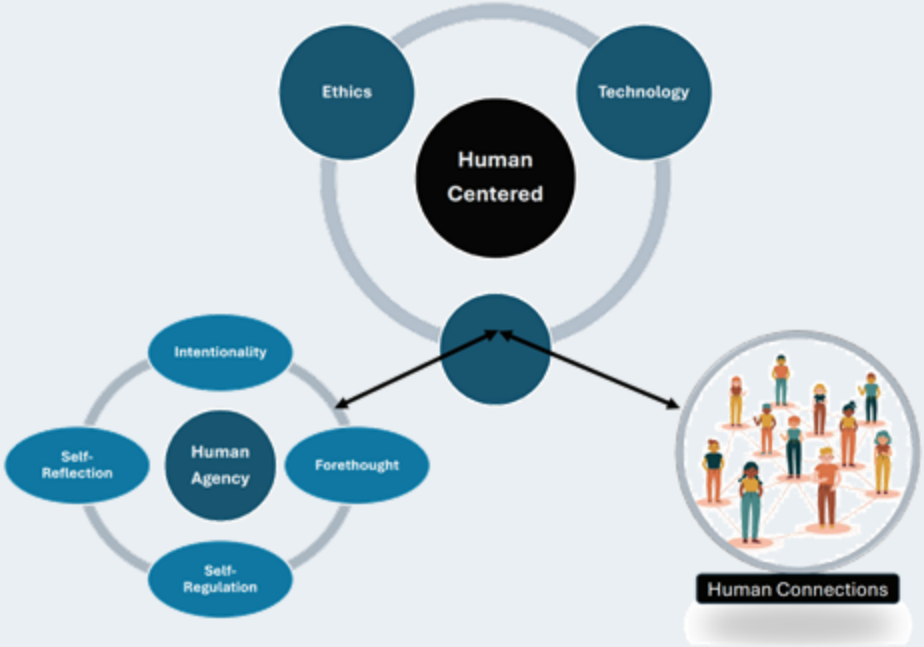


FIGURE 2-2 | Conceptualization of human centeredness emphasizing human agency and connections.
SOURCE: Bandura, 2006.

AMA AI principles

1.) General governance

There should be mandatory compliance with national governance policies. Clinical experts should define standards in specific domains addressing ethical, equitable, responsible, accurate, and transparent design, development, and deployment.

2.) When to disclose: Transparency in use impacting decision making at the point of care

Use should be disclosed and documented when impacting access to care, decision making, or patient-facing use.

3.) What to disclose: Required disclosures by AI-enabled systems and technologies

AI developers should allow the purchaser and/or end user to evaluate the system or technology prior to purchase or utilization (regulatory approval status, intended use etc.).

4.) Generative AI

HCO governance policies should address and educate users on issues related to accuracy, sources, training data set limitations, oversight and validation mechanisms, inequities, data privacy, cybersecurity, liability, and appropriate prompts.

5.) Physician liability for use of AI-enabled technologies

Individuals or entities best positioned to know the AI system risks and avert or mitigate harm should hold liability. Physicians should not hold responsibility when concerns are unknown, when use is mandated, or when autonomous systems are used.

6.) Data privacy and AI

Patients should be educated and have rights to opt-out, update or request deletion of their data. AI systems should not be used for re-identification of deidentified data.

7.) AI cybersecurity

AI systems require strong protections against input data manipulations and malicious attacks. Entities should monitor for abnormal behavior, notify users of breaches promptly, and educate users on proper mitigation and reporting.

8.) Mitigating misinformation in AI-enabled technologies

Developers should allow for reporting of mis- and disinformation. Manuscript submissions should disclose that AI was used in research methods and data collection, exclude AI systems as authors, and validate the veracity of AI-generated content.

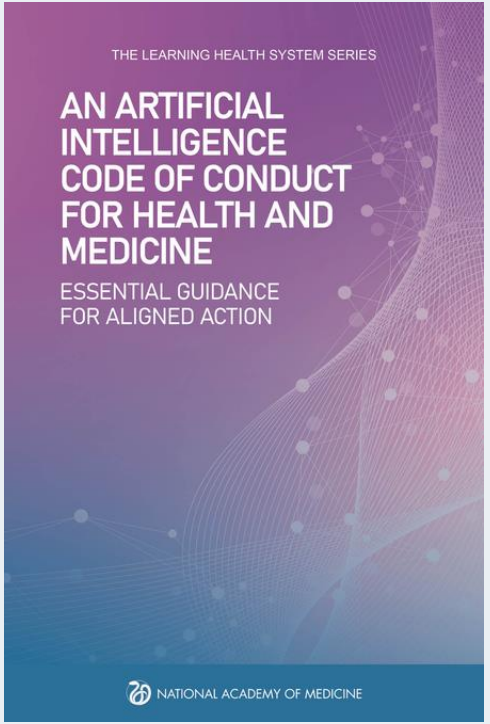
9.) Payor use of AI and automated decision-making systems

Use for claim determinations, coverage limits, and benefit design should be disclosed and audited. Systems must be evidence-based and account for unique patient circumstances. Limitations or denials should be reviewed by a physician licensed in the state and specialty of the case.

These principles build upon and are supplemental to the AMA's existing AI policy, especially Policy H-480.940, "Augmented Intelligence in Health Care," Policy H-480.939, "Augmented Intelligence in Health Care," and Policy D-480.956, "Use of Augmented Intelligence for Prior Authorization," as wellas the AMA's Privacy Principles.

AI Code of Conduct from NAM

1. Advance Humanity
2. Ensure Equity
3. Engage Impacted Individuals
4. Improve Workforce Well-Being
5. Monitor Performance
6. Innovate and Learn



Source: https://nap.nationalacademies.org/read/29087/chapter/1

EU Ethics Guidelines for Trustworthy AI

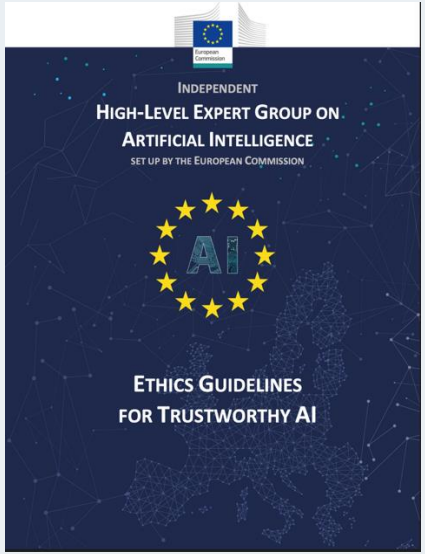
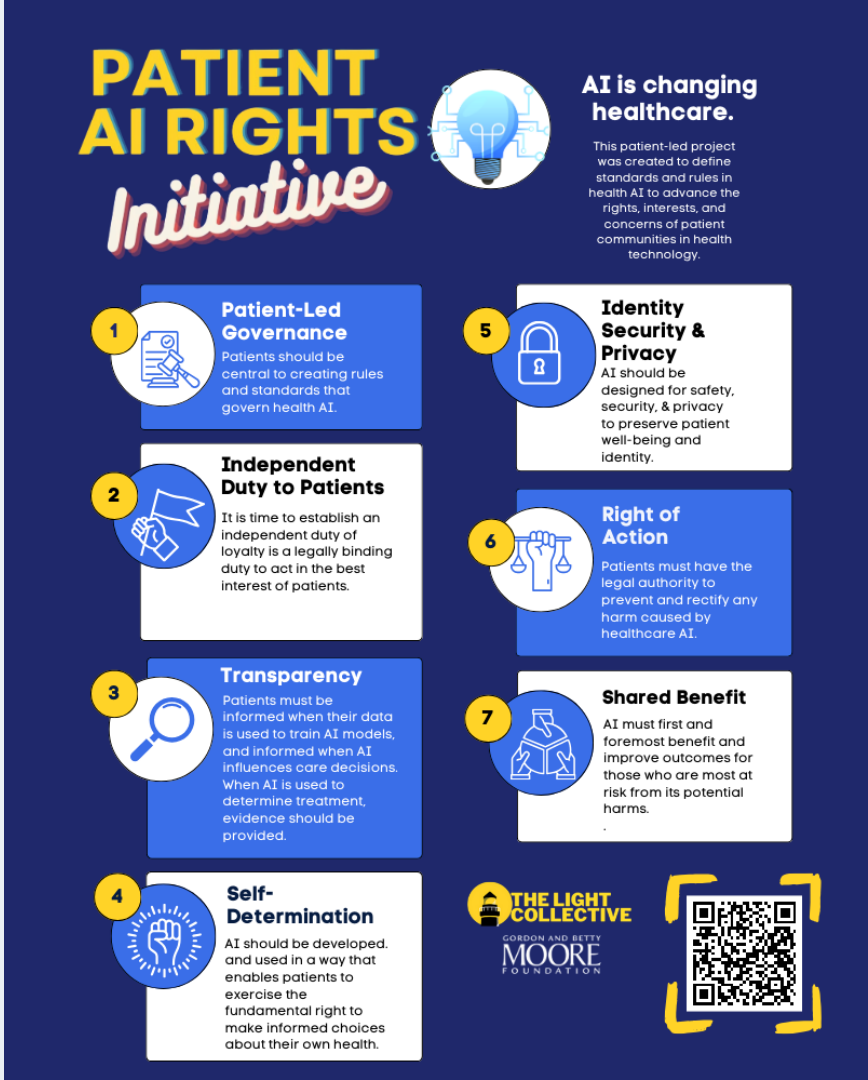


Figure 2: Interrelationship of the seven requirements: all are of equal importance, support each other, and should be implemented and evaluated throughout the AI system's lifecycle

Other Models: The Light Collective



WORKSHOP CLOSING DISCUSSION

Thought Questions

1. What is the most meaningful thing you learned from the workshop today?
2. What do you think requires more interprofessional discussion?
3. What do you wish developers and practitioners understood better?
4. What do you wish clinicians and other health professionals understood better?

Visit our Github Microsite:

github.com/gpostill/AIME25-AI-Workshop