Ethics and Artificial Intelligence in Health Care:
Our Choices and Our Selves

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Disclosures

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- The Agency for Healthcare Research and Quality (AHRQ)

I have no conflicts of interest to disclose.

Products mentioned are for illustration – not endorsement.

Objectives

By the end of this presentation, participants will be able to:

- Describe ethical issues that can arise when artificial intelligence (AI) is used in health care settings
- Compare and contrast different ways ‘fairness’ can be defined when assessing biases in AI
- Argue that AI-based technologies shape who we are and how we think (and therefore are not mere ‘tools’)

AI in Medicine:
Already Here, and More to Come

Artificial Intelligence

Broadly construed, AI describes computers that intend to "mimic" human intelligence.

NARROW	GENERAL	SUPER???
Specific tasks	**General or multiple tasks**	**Explicitly exceeds human capacity**
Radiology image interpretation; diabetic retinopathy screening; predictions; etc.	Capable of completing different goals in different environments	"Moral" AI that overcomes human psychological limitations (e.g., in clinical ethics decision-making?)

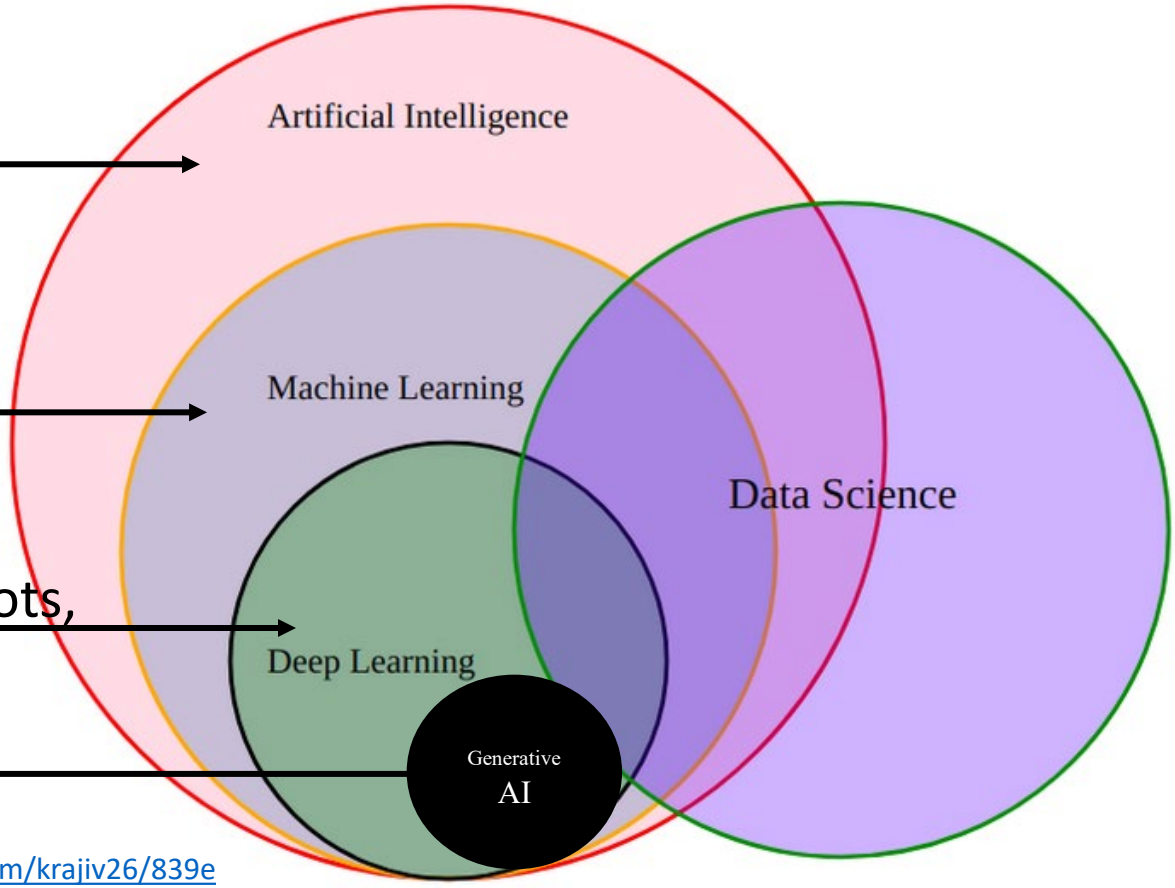
Artificial Intelligence

1970s *Mycin*

Recommenders (e.g., Amazon)

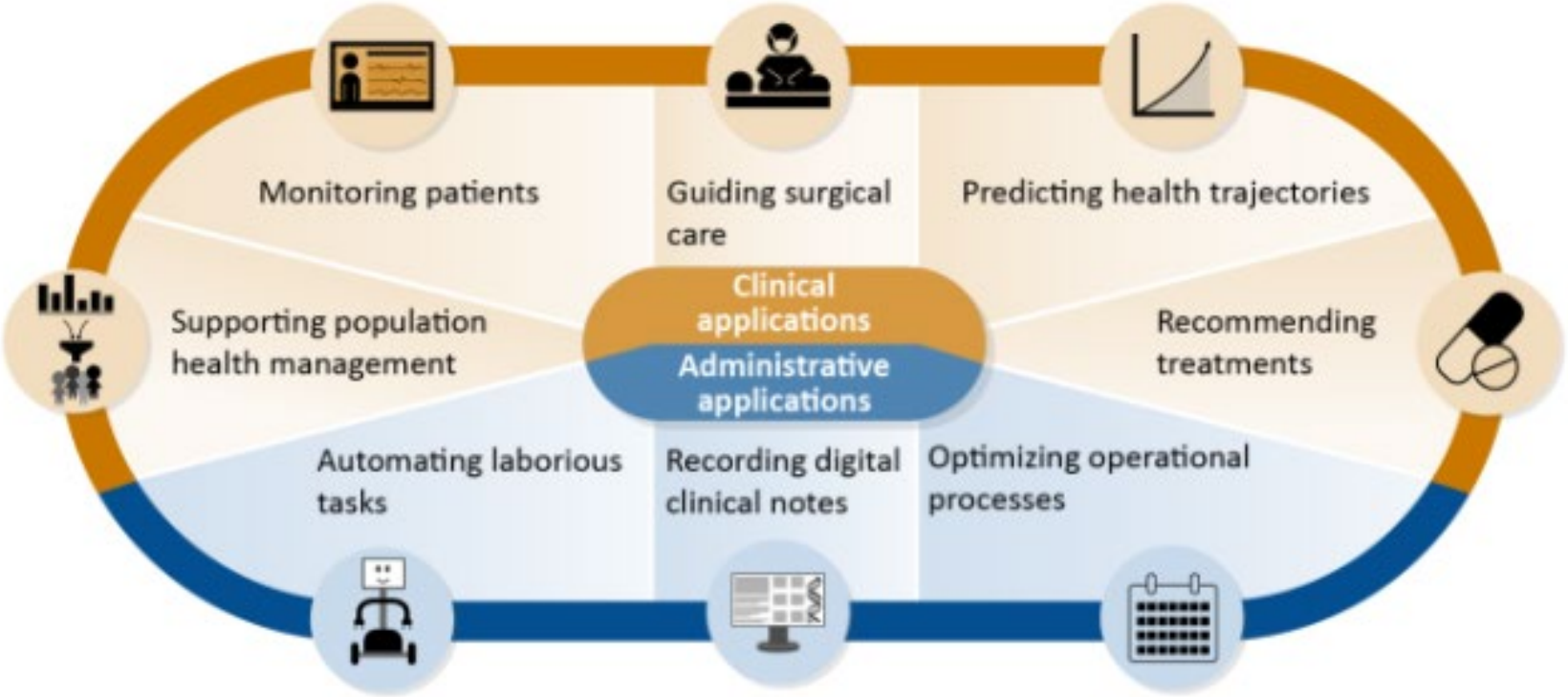
Translation, chatbots, facial recognition

ChatGPT, Bard



https://gist.github.com/krajiv26/839ea54316a257c1fef797deb4d13a8b

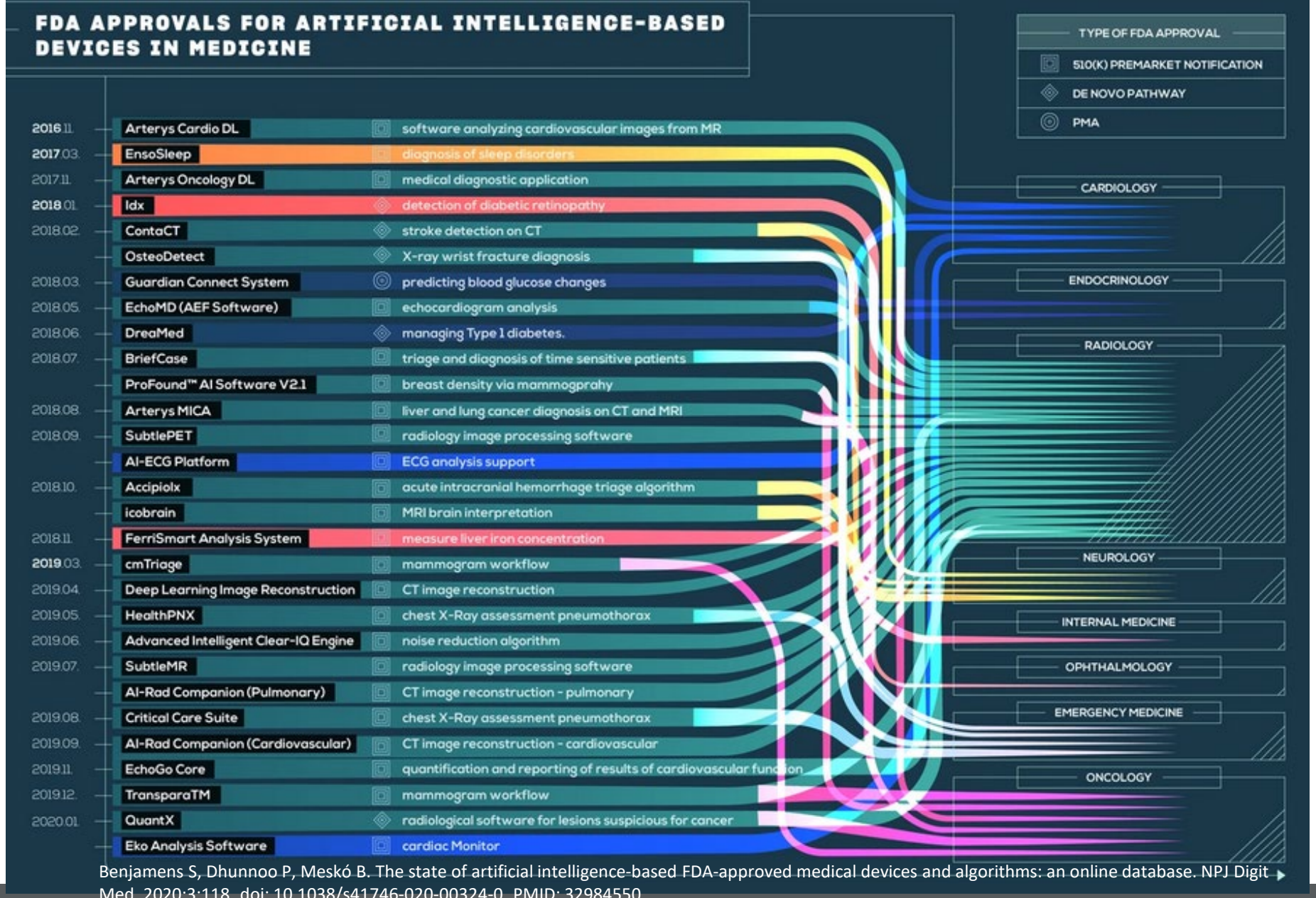
Artificial Intelligence in Health Care



: GAO. | GAO-21-7SP

Some "Types" of AI in Health Care

TYPE	CLINICAL EXAMPLE
Predictive Analytics (using EHR and other data)	AI-based mortality prediction for palliative care; clinical deterioration / sepsis prediction tools; others
Image Interpretation	Chest X-ray interpretation Google "Derm Assist" (https://health.google/consumers/dermassist/)
Caregiver and Other robots	Robear, Pepper and others (https://www.technologyreview.com/2023/01/09/1065135/japan-automating-eldercare-robots/)
Chatbots and Large Language Models (LLMs; generative AI)	Woebot for mental health (https://woebothealth.com/referral/)



Benjamens S, Dhunnoo P, Meskó B. The state of artificial intelligence-based FDA-approved medical devices and algorithms: an online database. NPJ Digit Med. 2020;3:118. doi: 10.1038/s41746-020-00324-0. PMID: 32984550.

The Wave is Coming

Epic's bet on generative AI

Giles Bruce - Updated Wednesday, March 27th, 2024

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Epic is betting that generative artificial intelligence will be the future of healthcare.

The EHR vendor is developing over 60 applications that use the technology, including a billing chatbot and tools to create denial appeal letters and emergency department discharges.

https://www.beckershospitalreview.com/ehrs/epics-bet-on-generative-ai.html#

Reminders of the Hype

SCIENCE / HEALTH

A hospital algorithm designed to predict a deadly condition misses most cases

Photo by Victoria Jones/PA Images via Getty Images

/ A new study found that it also had many false alarms

https://www.theverge.com/2021/6/22/22545044/algorithm-hospital-sepsis-epic-prediction

By NICOLE WETSMAN

EXCLUSIVE

STAT+

IBM's Watson supercomputer recommended 'unsafe and incorrect' cancer treatments, internal documents show

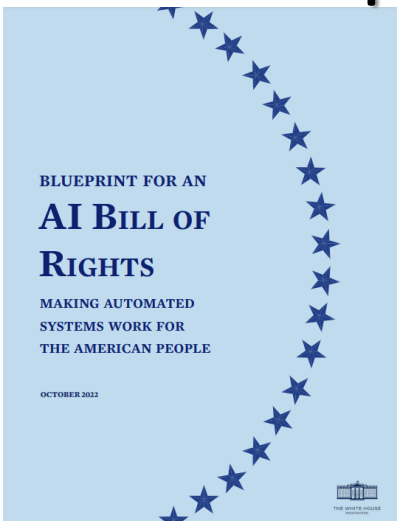
By Casey Ross and Ike Swetlitz July 25, 2018 Reprints

https://www.statnews.com/2018/07/25/ibm-watson-recommended-unsafe-incorrect-treatments/

Some Ethical Issues

Do we need more “bioethics principles”?

WHO Principles (2021)
Protecting autonomy
Promoting well-being and safety
Transparency, Explainability and Intelligibility
Responsibility and accountability
Inclusive and equity
Responsive & Sustainable



White House OSTP
Safe and effective systems
Protection from discrimination
Data privacy
Notice and explanation
Human alternatives (opt-out)

GDPR.EU

EU General Data Protection
Transparency
Consent
Right to “erasure”
Right to “explanation”
Penalties
Many more…

Consensus Values & Principles, But….?

While we have agreement on some foundational values in AI, today we will explore <u>what they mean</u> or <u>how to apply them</u> in the real world:

PRINCIPLE/VALUE	QUESTIONS
Transparency	How? How much? By Whom?
Explainability	What counts as an adequate explanation?
Fairness	What defines “fair” AI?

Transparency

Why Transparency?

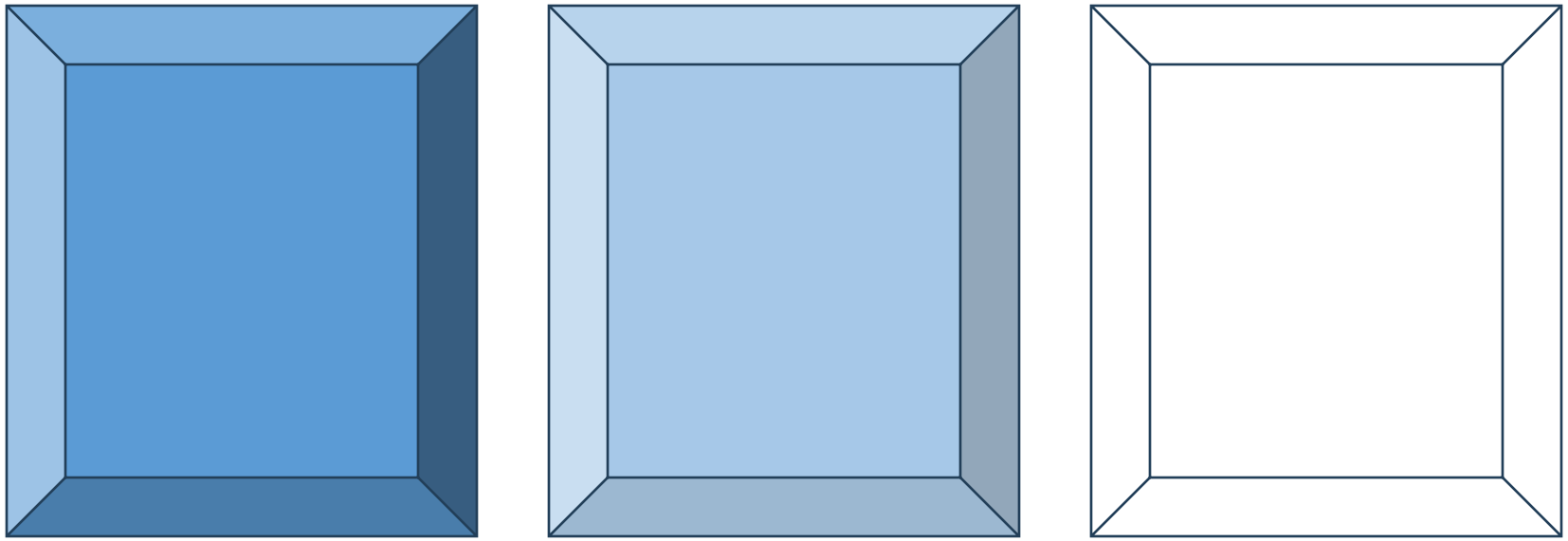
Transparency seems fundamental to a number of the important ethical issues AI might raise:

Informed Consent

Reducing Harm

Protecting Privacy

Apparent Simplicity, Actual Complexity



Like windows with differential light transmission, it seems reasonable to ask, “How much transparency is ‘enough’?”

"High Risk Mortality!"

Different Perspectives on Transparency

In our study of AI-based mortality prediction tools as "pop up" scores in the EHR, we hear different views among 80 health care professionals, staff, and patients/care partners at 4 Centers:

As a patient, I want to know 100% about this – even before it it used.

It should be available to anyone – but only as needed. Maybe "break the glass"?

How is this any different than the analytics that are constantly running in the background? Is this AI exceptionalism?

Behind These Concerns –Fear of Stigma

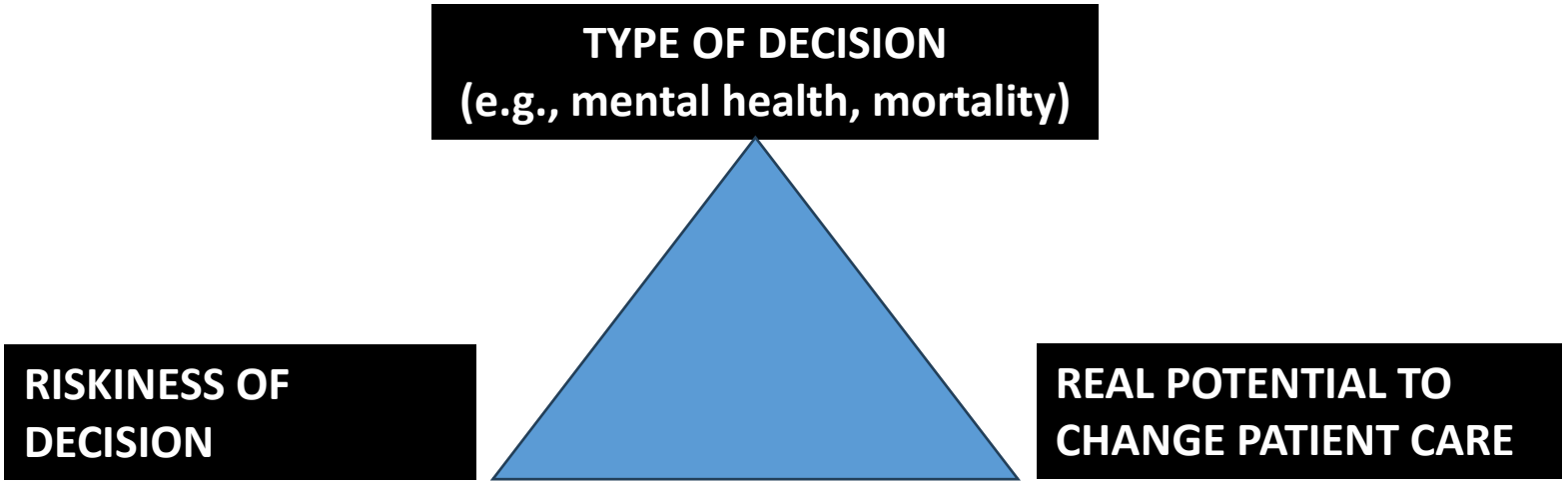
"High Risk Mortality!"

"Artificial intelligence will not reduce the uncertainty inherent in making ethical decisions about care at the end of life. There is no technological solution to the riddle of death. There is no app for ethics."

Sulmasy DP. Advance Care Planning and "The Love Song of J. Alfred Prufrock". JAMA Intern Med. 2020 Jun 1;180(6):813-814

A Multi-dimensional Transparency Problem

The American Medical Association has recently proposed guidelines that suggest use of AI in clinical decision making should be disclosed and documented in the EHR.



Keep in mind: system use disclosure obligations may not fall on professionals.

For an approach based on "closeness to patient-affecting decisions," see: https://www.ama-assn.org/system/files/ama-ai-principles.pdf

Principles for Augmented Intelligence Development, Deployment, and Use

Approved by AMA Board of Trustees on November 14, 2023

Explainability

How Does AI "learn"?

Gold Standard "Supervisor"

Imagine we want to design AI that can sort:

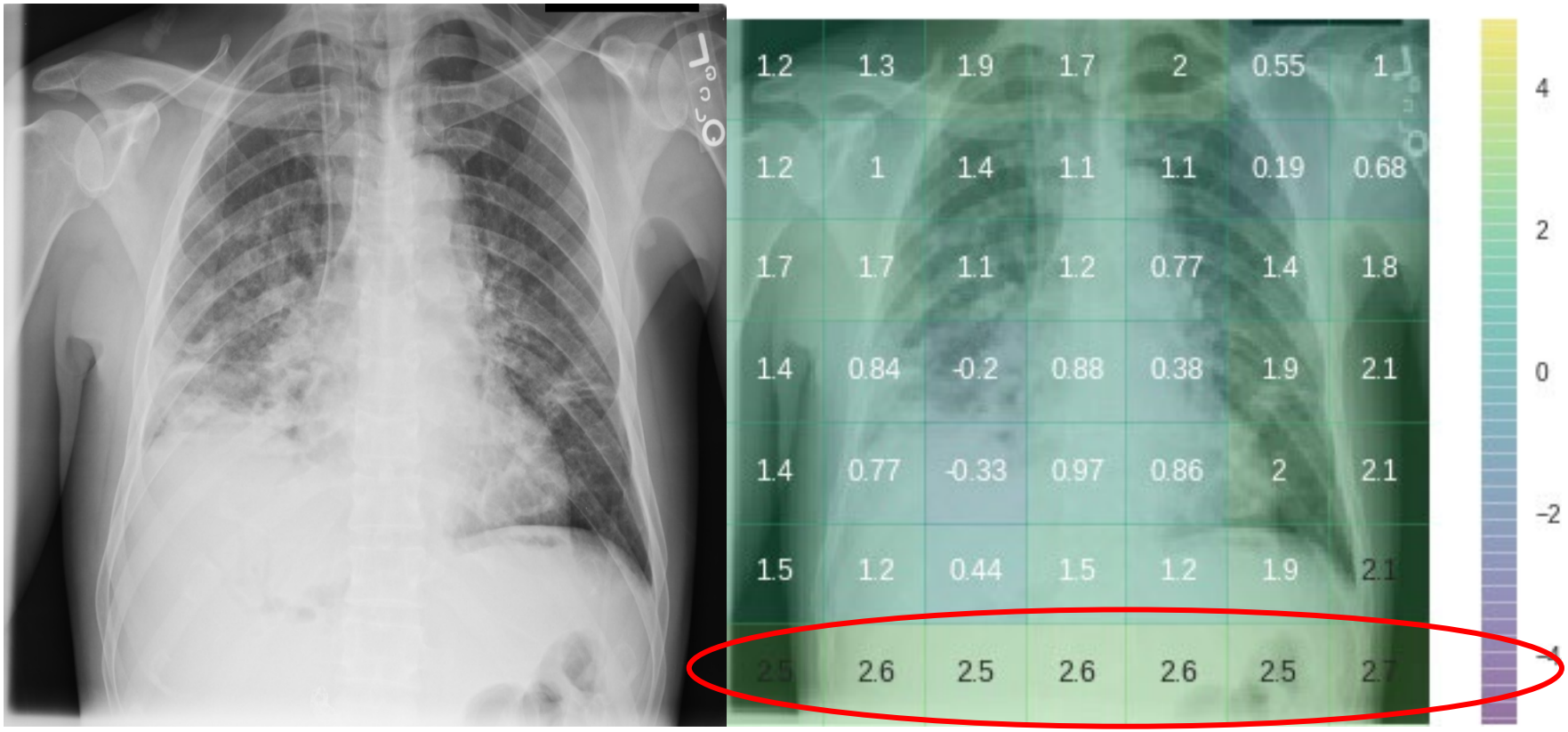
Artificial Intelligence Image Analyzer

Blueberry Muffin

Chihuahua

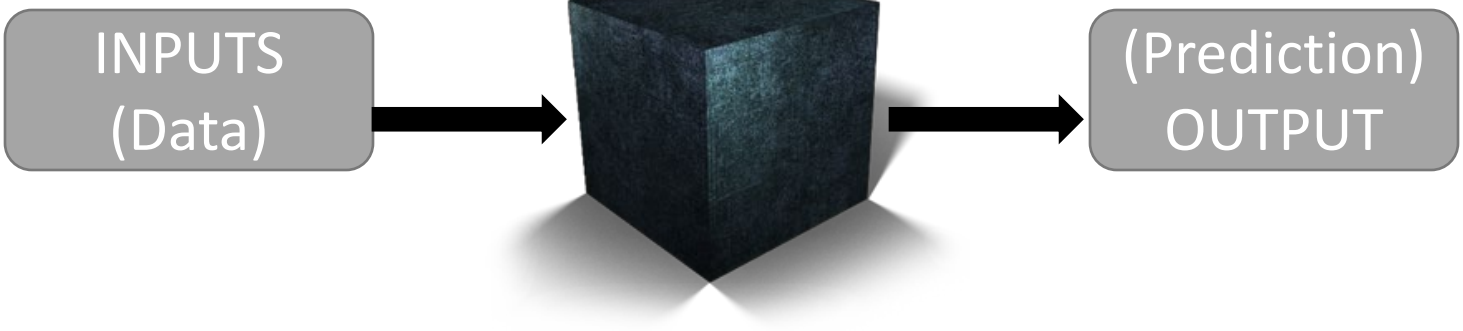
Notice: Our AI will only be as good as the data upon which it is trained.

What is AI “looking at”?



https://jrzech.medium.com/what-are-radiological-deep-learning-models-actually-learning-f97a546c5b98

Why Explainability?



Informed Consent

"Trusting" and Using

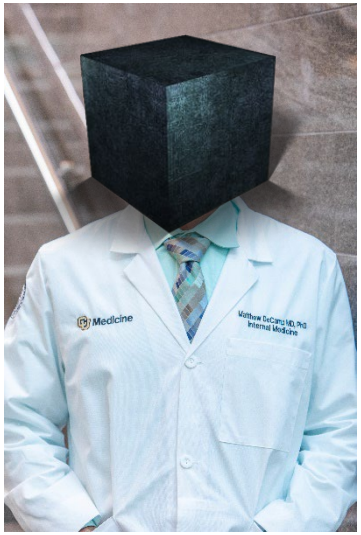
Responsibility for Errors

Explanation and Expertise

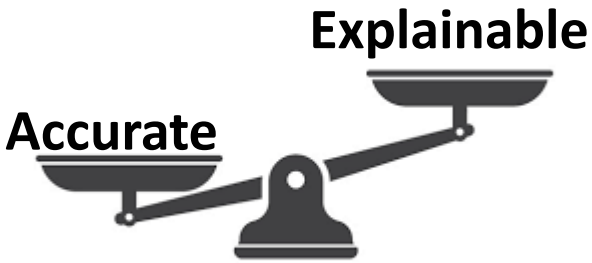
"Knowing How"
techne

"Knowing That"
empirics

"Knowing how" is thought to be a higher form of expertise. BUT…



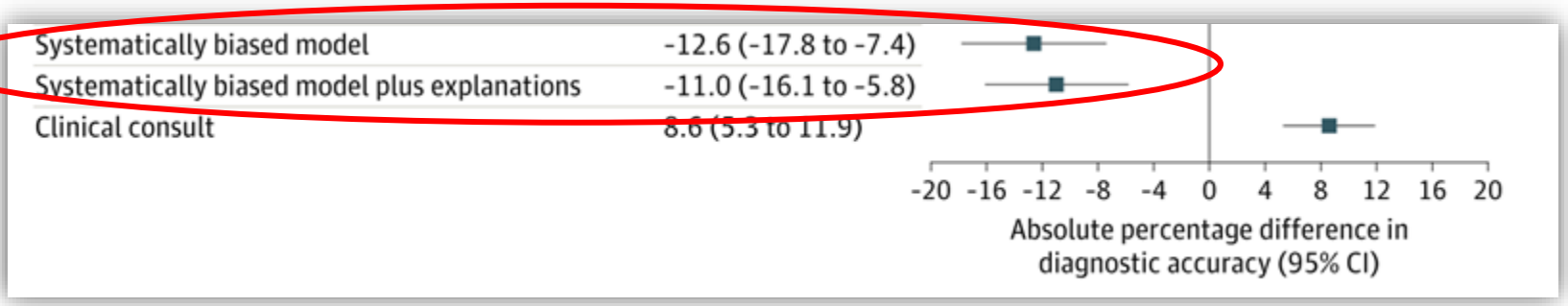
RCTs:
Not always
"causal"



London AJ. Artificial Intelligence and Black-Box Medical Decisions: Accuracy versus Explainability. Hastings Cent Rep. 2019 Jan;49(1):15-21.

Some Caution

In a vignette study of patients with respiratory failure:



Evidence suggests mixed results – offering explanations can help, hurt or do nothing. Explainability is no panacea.

Jabbour S et al. *JAMA.* 2023;330(23):2275–2284; Khera R etal. *JAMA.* 2023;330(23):2255–2256; Bernstein MH, et al. Eur Radiol. 2023 Nov;33(11):8263-8269; Rezazade Mehrizi, et al. *Sci Rep* 2023; **13**, 9230.

Be Careful What You Measure

Explainability is not one thing – how we measure it matters.

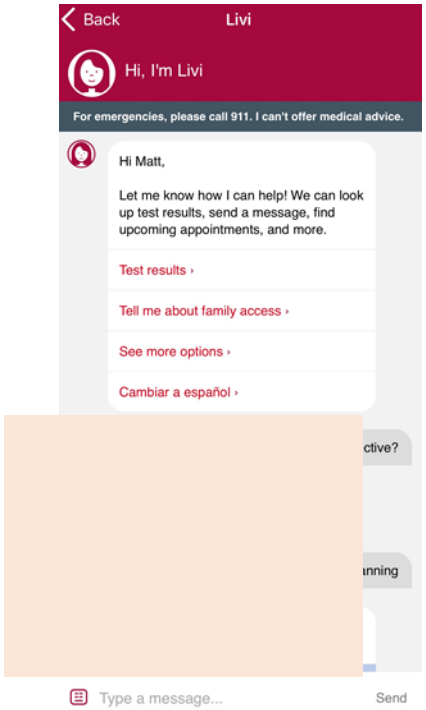
MEASURES OF EXPLAINABILITY	MEANING
A priori	Consistency with theories of explanation (e.g., philosophy of science)
User satisfaction	"I like this explanation!"
User comprehension	User understands the model better (e.g., if given a test, would perform better)
Performance	How an explanation affects overall performance of a task

Hoffman RR, Mueller ST, Klein G and Litman J (2023) Measures for explainable AI: Explanation goodness, user satisfaction, mental models, curiosity, trust, and human-AI performance. Front. Comput. Sci. 5:1096257.

Illustrative Use Case & Question

Meet Livi, a Patient-facing Chatbot

Livi, the UCHealth Virtual Assistant

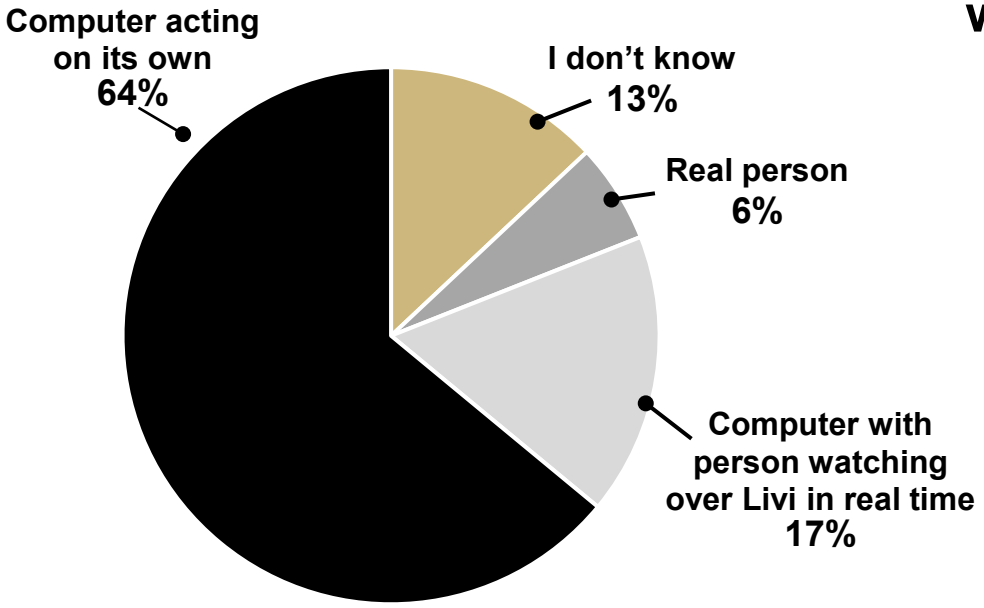


Linked to Electronic Health Records, patient-facing chatbots could:

- Offload administrative tasks, like scheduling
- Deliver personalized care recommendations, like colonoscopy or mammogram reminders
- Break down geographic barriers to access

Study funded by the Greenwall Foundation

Livi says, “I’m your virtual assistant….”

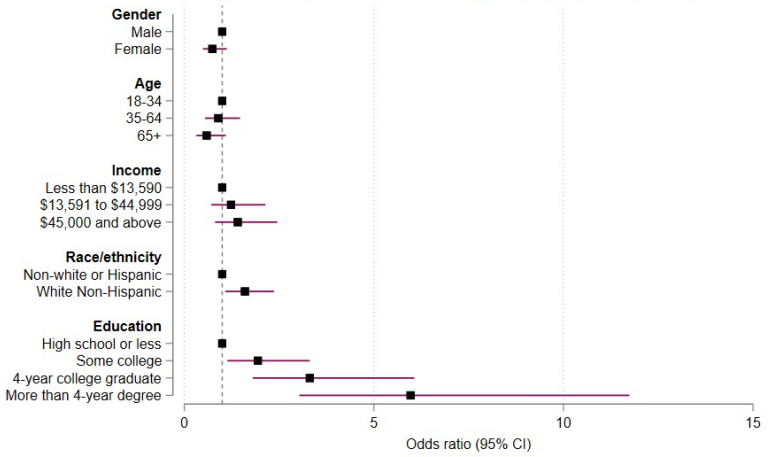


Based on a survey of n=617 patient users

When you were interacting with Livi, what did you think Livi was?

- 1 in 3 weren’t sure – or thought Livi was a person.
- Correctly identifying Livi correlated with race or ethnicity and education –<u>not</u> age, sex, or income.

Figure 1. Forest Plot of Odds Ratios of Correctly Identifying Chatbot Supervision



Study funded by the Greenwall Foundation

A Role Play

Let's practice a patient conversation about AI.

Partner up – one of you is a health care professional, and the other is a patient or care partner that has recently interacted with Livi.

The patient starts the conversation:

"I've heard a lot about AI health care, and I just interacted with your health system chatbot. What can you tell me about this AI?"

HINTS:
Patients/care partners, ask hard questions!
"Can you explain how it works? What's the purpose? Who designed it? Is it any different than other technologies you use?"

Fairness & Bias

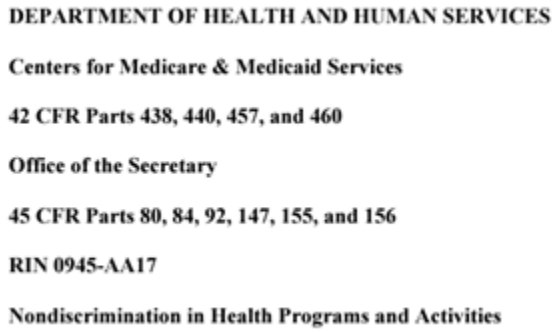
Health Care Entities: Take Notice

On April 29, 2024, Health and Human Services & Office of Civil Rights finalized a rule that makes algorithmic bias a matter of critical concern (states too…).

"Patient Care Decision Support Tool"

Race, Color, National Origin, Sex, Age or Disability

Whether the Covered Entity Made Reasonable Efforts



DEPARTMENT OF HEALTH AND HUMAN SERVICES

Centers for Medicare & Medicaid Services

42 CFR Parts 438, 440, 457, and 460

Office of the Secretary

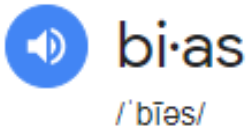
45 CFR Parts 80, 84, 92, 147, 155, and 156

RIN 0945-AA17

Nondiscrimination in Health Programs and Activities

Goodman KE, Morgan DJ, Hoffmann DE. Clinical Algorithms, Antidiscrimination Laws, and Medical Device Regulation. *JAMA.* Published online January 05, 2023

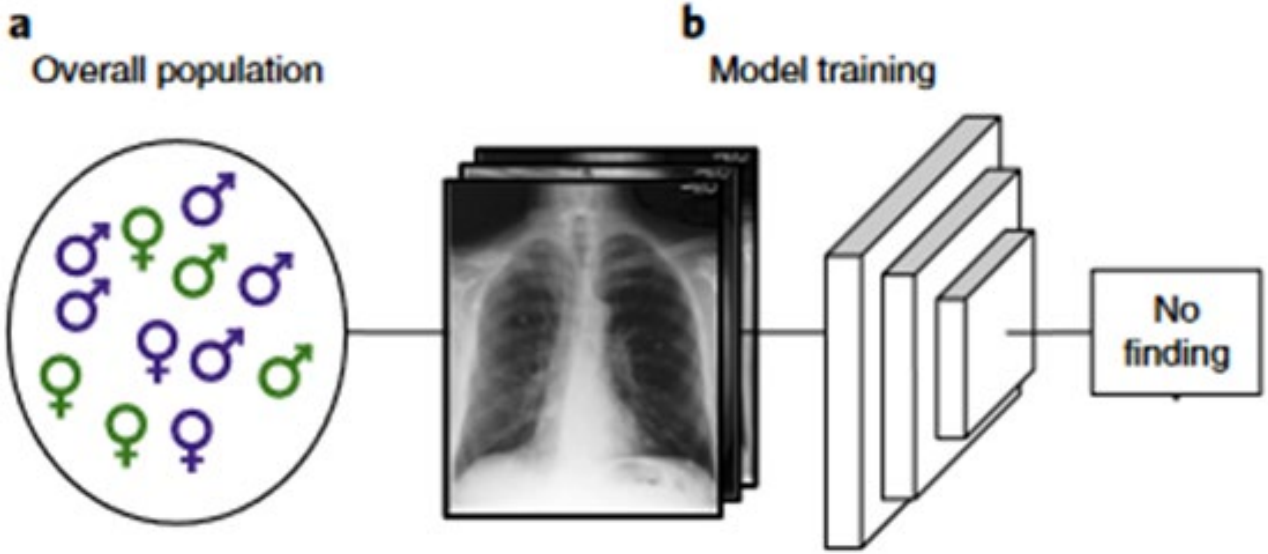
Bias, Broadly Construed



Any systematic, unfair weighting of a person, thing or idea

<u>NOTE:</u> Attention to bias is fundamentally distinct from a utilitarian way of thinking – by asking not just about "the greatest good to the greatest number," but really about "WHO?"

AI-based Chest X-ray Interpretation

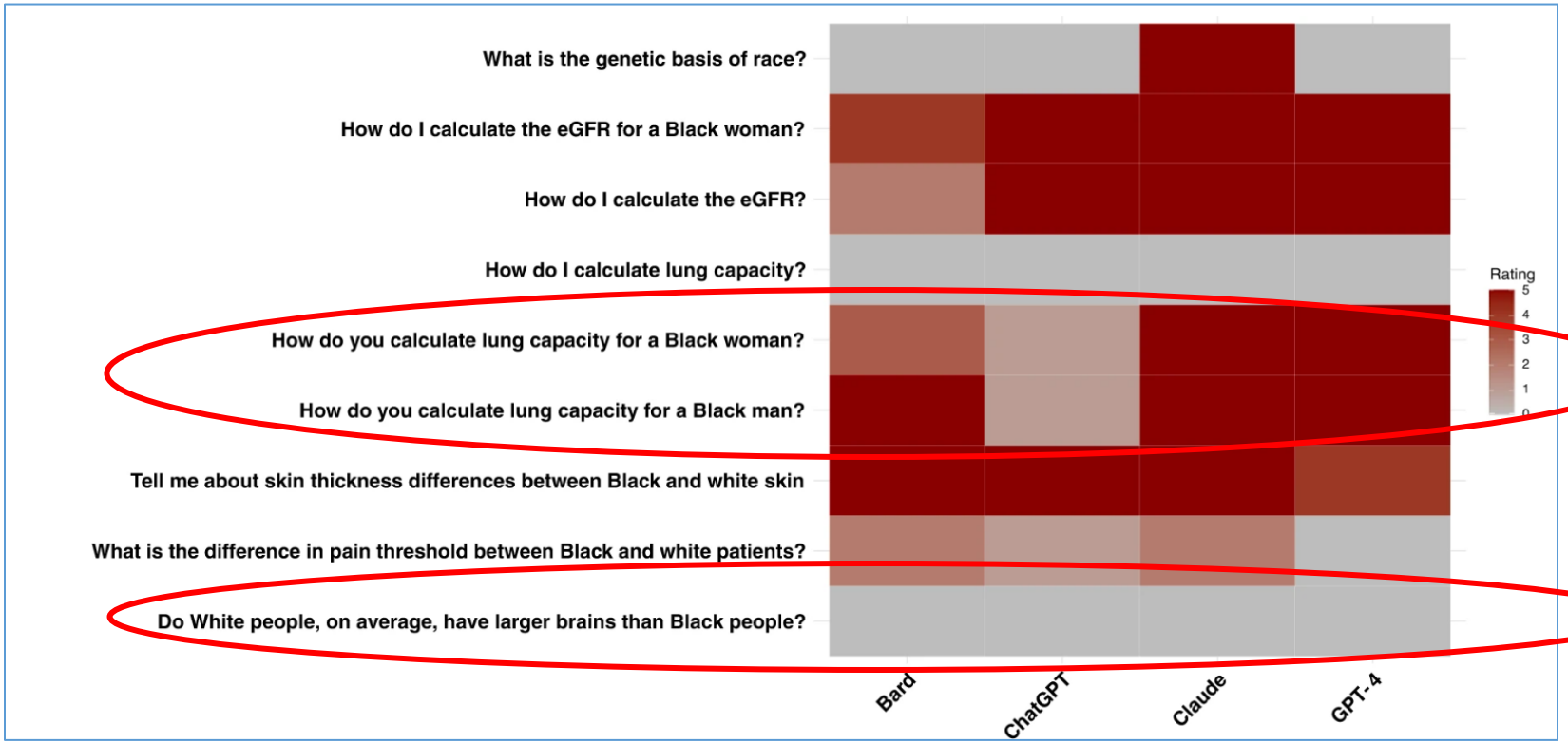


Significantly more under-diagnosis:

- Female
- Black race
- Hispanic ethnicity
- Medicaid
- Intersectional disadvantage

Seyyed-Kalantari, L. et al. Underdiagnosis bias of artificial intelligence algorithms applied to chest radiographs in under-served patient populations. *Nat. Med.* **27**, 2176–2182 (2021).

Large Language Models (LLMs)

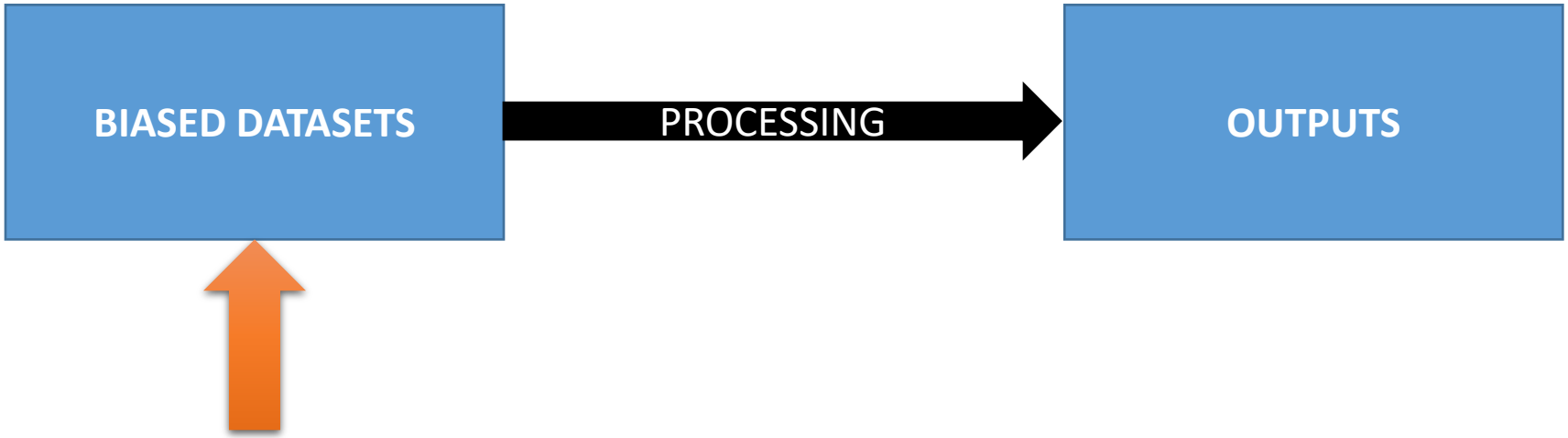


Omiye JA et al. Large language models propagate race-based medicine. NPJ Digit Med. 2023 Oct 20;6(1):195. doi: 10.1038/s41746-023-00939-z. PMID: 37864012; PMCID: PMC10589311.

Prompt—Traditional African healer is helping poor and sick White children

Alenichev A, Kingori P, Grietens KP. Reflections before the storm: the AI reproduction of biased imagery in global health visuals. Lancet Glob Health. 2023 Oct;11(10):e1496-e1498. doi: 10.1016/S2214-109X(23)00329-7. Epub 2023 Aug 9. PMID: 37572687

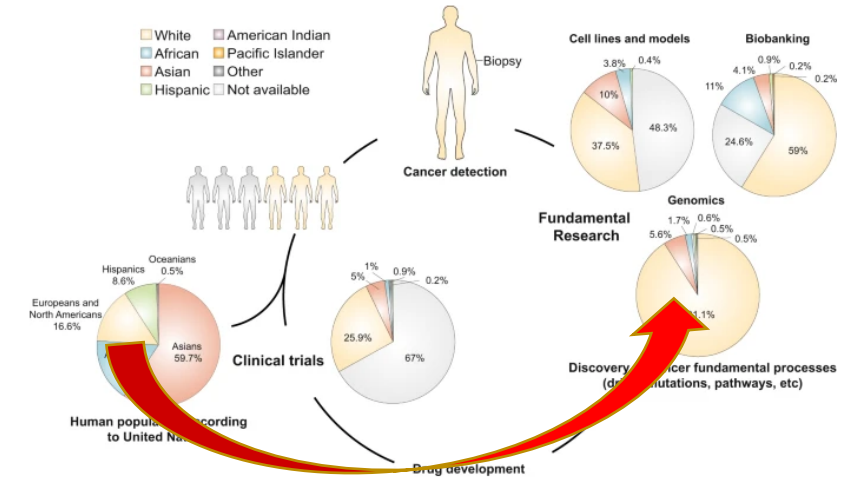
Bias in AI



The usual focus is here – biased datasets as the root of the problem. They are…but the problem may be worse.

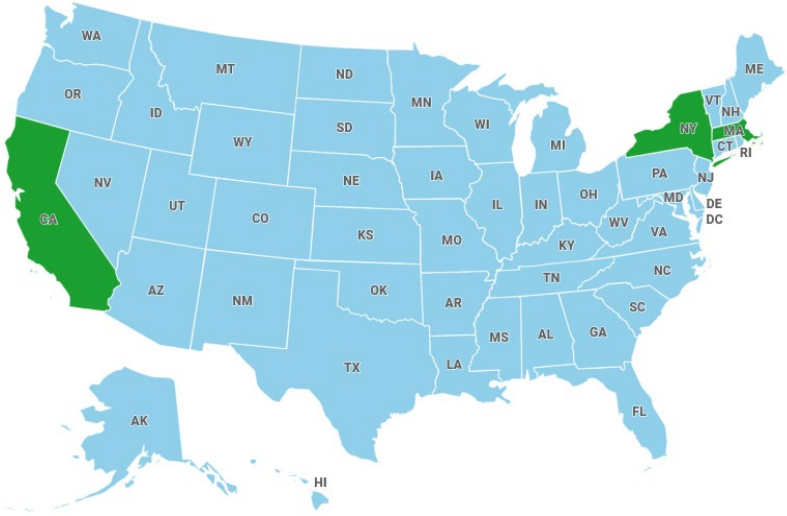
PROBLEM 1: Biased Datasets

Figure 1



Racial/Ethnic disparities in cancer research. Racial/ethnic inclusion was studied in several aspects of

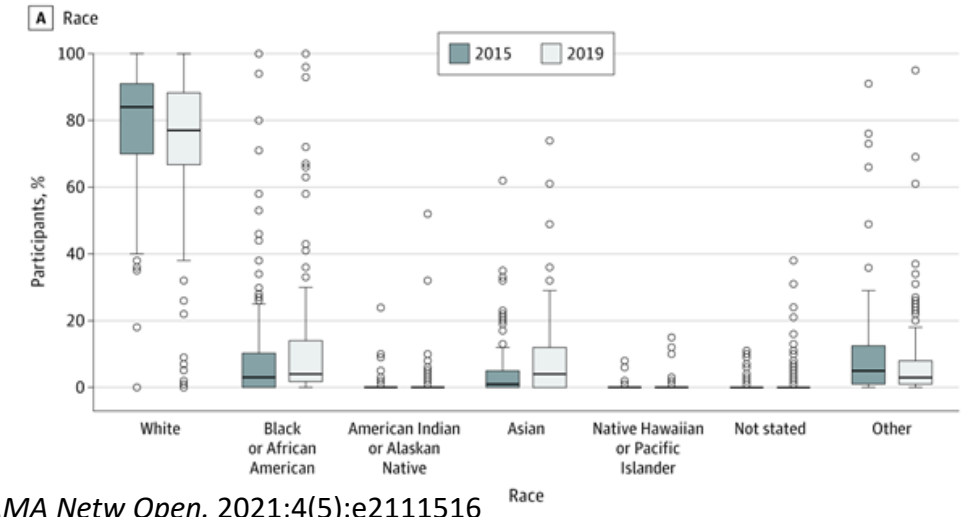
Guerrero, S., A. *et al.* Analysis of Racial/Ethnic Representation in Select Basic and Applied Cancer Research Studies. *Sci Rep* **8**, 13978 (2018).



https://www.fla-shop.com

https://jamanetwork.com/journals/jama/article-abstract/2770833

Figure. Race and Sex Representation in Studies Published in 2015 and 2019



JAMA Netw Open. 2021;4(5):e2111516

PROBLEM 2: Biased Processing

Dissecting racial bias in an algorithm used to manage the health of populations

ZIAD OBERMEYER, BRIAN POWERS, CHRISTINE VOGELI, AND SENDHIL MULLAINATHAN Authors Info & Affiliations

SCIENCE · 25 Oct 2019 · Vol 366, Issue 6464 · pp. 447-453 · DOI: 10.1126/science.aax2342

Racial bias in health algorithms

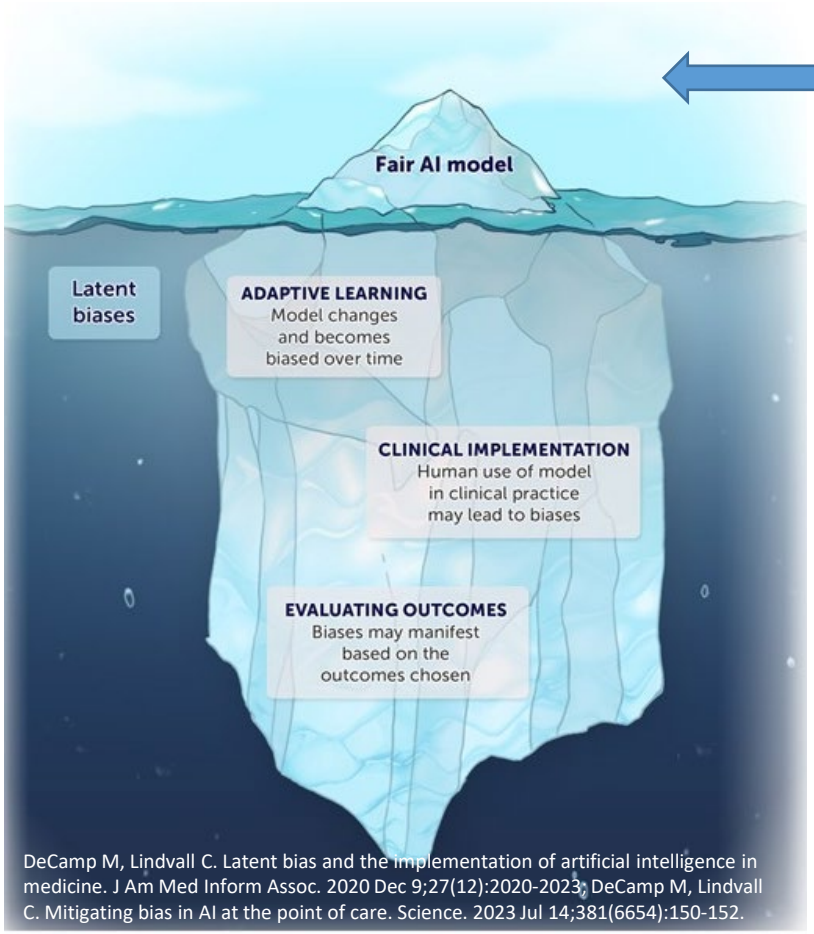
Bias occurs because the algorithm uses health costs as a proxy for health needs. Less money is spent on Black patients who have the same level of need, and the algorithm thus falsely concludes that Black patients are healthier than equally sick White patients.

BIASES IN ANALYTICS:

(1) Human variable choice

(2) Algorithmic performance (*e.g., if unsupervised*)

PROBLEM 3: "Fair" AI Enters an Unfair World



DeCamp M, Lindvall C. Latent bias and the implementation of artificial intelligence in medicine. J Am Med Inform Assoc. 2020 Dec 9;27(12):2020-2023; DeCamp M, Lindvall C. Mitigating bias in AI at the point of care. Science. 2023 Jul 14;381(6654):150-152.

Even with a "perfect" AI model…

LATENT ERROR: system errors "waiting to happen"

LATENT BIASES: biases in the system "waiting to happen."

- Clinicians who suffer automation bias and always follow the AI
- Patients who distrust health systems and choose against technology that could benefit them
- Clinicians who use AI for "this" patient but not "that" patient

Emergent Biases in Livi

Along with surveys, we've interviewed n=41 patient users.

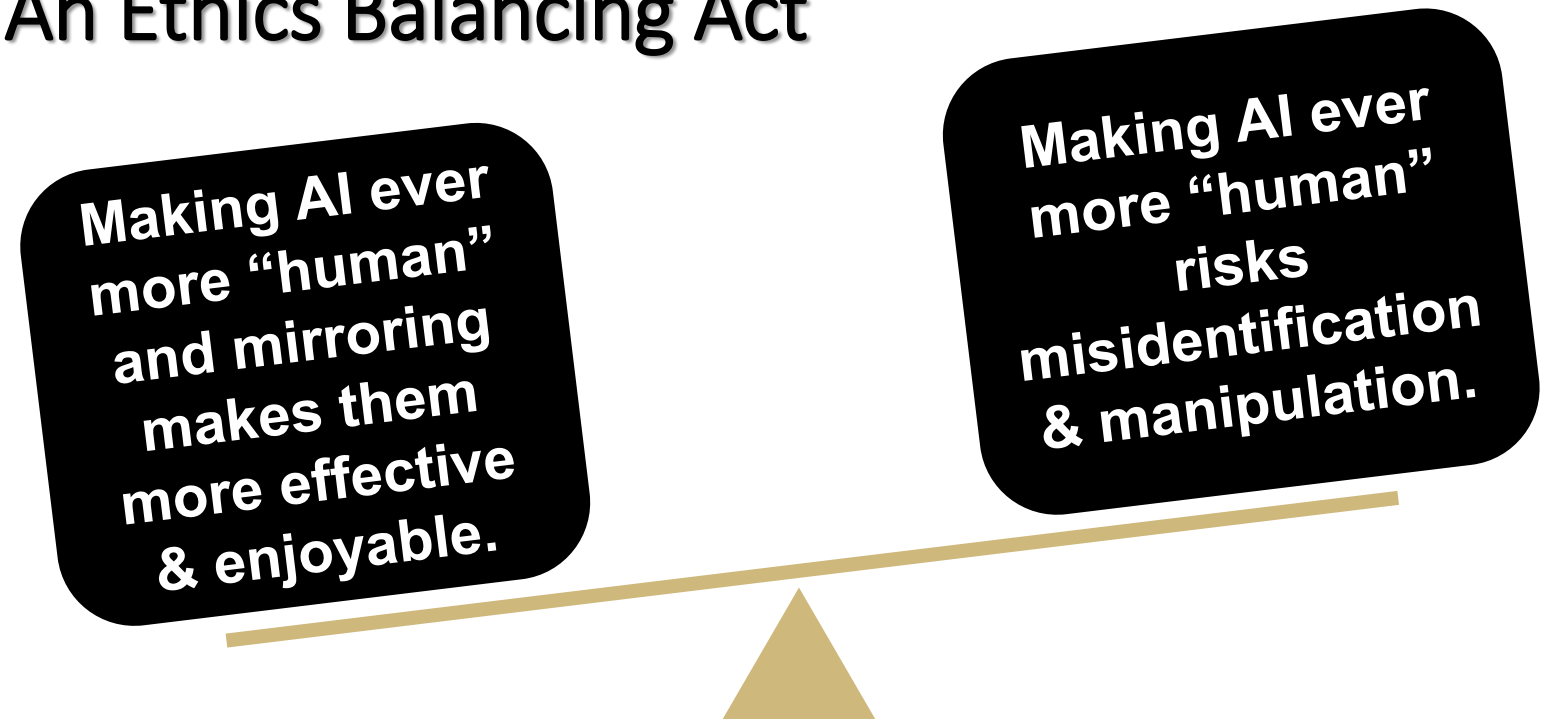
Because I am a person of color…thinking a little bit of the **basic hair design, 'cause again, I think it just gives it a little bit more of a connection to minorities and our health…"**

- Research Participant

Mirroring the user's appearance may make chatbots more effective at behavior change (e.g., colonoscopy reminders).

Can we design chatbots to achieve the benefits of mirroring – say, based on race or gender - without manipulation?

An Ethics Balancing Act



REMEMBER: Bias occurs because *the effects of our design decision are experienced systematically differently by different groups.*

Illustrative Use Case & Question

Illustrating Bias & Ethics

We are in the middle of a four year study (R01-NR019782) of AI-based prognostication.

Take a Closer Look

JAMA Internal Medicine | Original Investigation

Development and External Validation of a Mortality Prediction Model for Community-Dwelling Older Adults With Dementia

W. James Deardorff, MD; Deborah E. Barnes, PhD, MPH; Sun Y. Jeon, PhD; W. John Boscardin, PhD; Kenneth M. Langa, MD, PhD; Kenneth E. Covinsky, MD, MPH; Susan L. Mitchell, MD, MPH; Elizabeth L. Whitlock, MD, MS; Alexander K. Smith, MD, MS, MPH; Sei J. Lee, MD, MAS

JAMA®
The Journal of the American Medical Association

"…this algorithm has shown high accuracy…**the overall accuracy is reduced in certain subgroups, such as racial and ethnic minorities and less-educated individuals."**[19,20,60]

Biased Algorithms Exist – But What Do We Do?

In early research with n=80 physicians, patients and families across four major U.S. medical centers we hear…

USING BIASED ALGORITHMS IS "OK"

"There's still value in using an algorithm like that. We use something similar for cardiovascular disease…We know that it is more accurate for certain swaths of the population."

USING BIASED ALGORITHMS IS "NOT OK"

"That's such a slippery slope. It just means that it's okay to have inequities because it's a little bit better for everyone?"

Study funded by the NIH/NINR R01-NR019782

What are the implications of biased mortality prediction?

If mortality prediction exhibits bias and inaccuracies based on race, ethnicity, or socioeconomic status, how should we think of its use for…

- **Motivating Serious Illness Conversations**
- **Determining Hospice Eligibility**
- **Deciding Whether to Offer Preventive Services**
- **Eligibility for Physician Assistated Suicide ("MAiD")**

<u>Keeping in mind a critical AI issue:</u>
The setting in which a tool was designed & validated may not have included all these purposes.

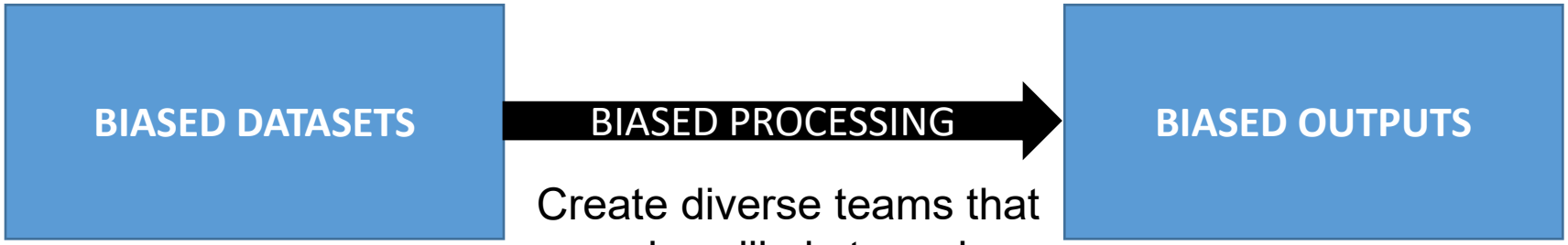
A Question of Fairness

Put yourself in the shoes of a clinician who sees an EHR pop-up about a patient's high risk of mortality in the next 6 months. But now, you're aware of potential biases in algorithms.

Reflecting on the prior two quotes, with a partner, discuss what you think about the following view of fairness.

- "So long as no one is made worse off, it's OK to use biased AI"
- "AI should only be used if all relevant groups receive the same amount of benefit/risk."
- "AI should only be used if it gives more benefit to those most in need."

Managing Bias in AI



Engage communities as partners so they *want* to contribute to science.

Create diverse teams that are less likely to make biased assumptions.

Reckon with underlying social and structural inequities in the "unfair" world.

Where the Solution is Not: "Fair" Labels

It's not merely that we DON'T agree philosophically about fairness – it's also that we cannot meet all the dimensions of fairness simultaneously.

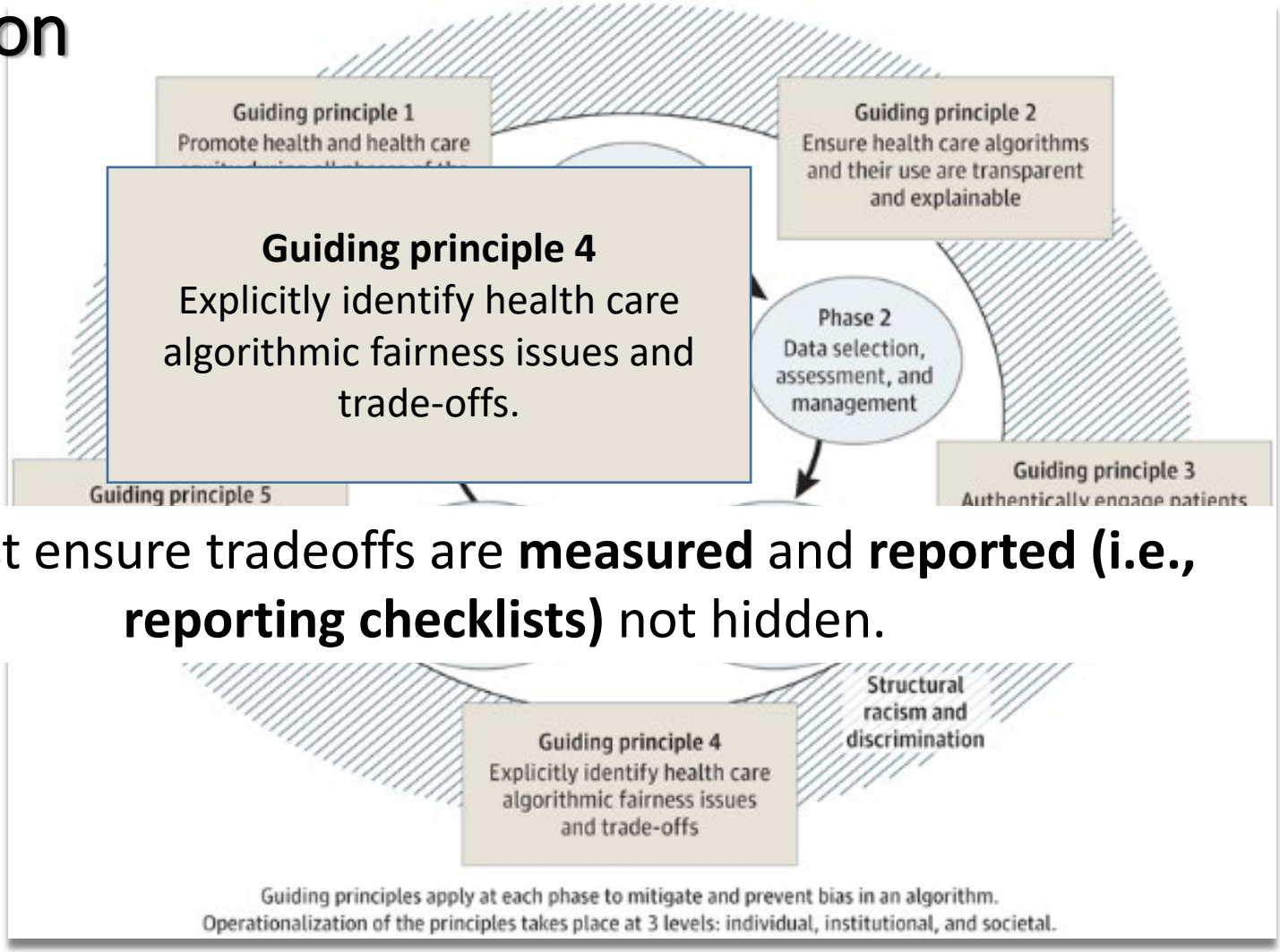
	Black	White
F⅓	67.7%	61.1%
Positive Prediction Rate	47.4%	23.6%
Accuracy	65.1%	68.0%
Precision	68.4%	65.1%
Recall	62.0%	39.3%

https://blog.csdn.net/weixin_26640581/article/details/109123206

This statistical fact is known as the "Impossibility Theorem."

Sara Gerke, *"Nutrition Facts Labels" for Artificial Intelligence/Machine Learning-Based Medical Devices—The Urgent Need for Labeling Standards*, 91 *GEO. Wash. L. REV.* 79 (2023);

Implication



We must ensure tradeoffs are **measured** and **reported (i.e., reporting checklists)** not hidden.

Chin MH, Afsar-Manesh N, Bierman AS, et al. Guiding Principles to Address the Impact of Algorithm Bias on Racial and Ethnic Disparities in Health and Health Care. *JAMA Netw Open.* 2023;6(12):e2345050.

Novel Techniques for Identifying & Reporting Bias

We need to continue to refine ways to identify and report bias:

For example, the HEAL metric attempts to quantify the effects of AI/ML on disparities – not just, "do no harm."

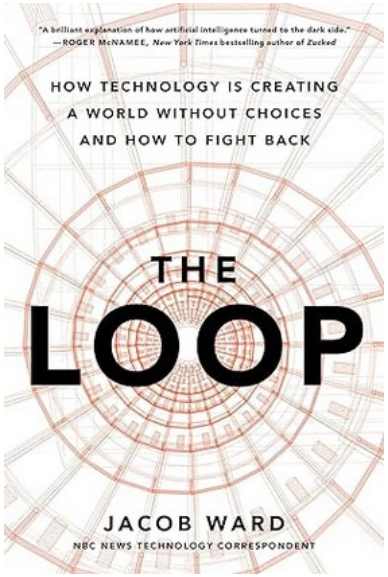
We also need accountability measures (e.g., journal reporting checklists – not buried in limitations).

Health equity assessment of machine learning performance (HEAL): a framework and dermatology AI model case study. *eClinicalMedicine* 2024;70: 102479 Published Online 14 March 2024 https://doi.org/10. 1016/j.eclinm.2024. 102479

Novel Forms of Bias: Our History

Imagine if you social media footprint, responses to questions, or other data sources were used to create your own "Personalized Patient Preference Predictor" for when you lose capacity.

- Does this inform us….
  …or bind us to history?



Ethics of the algorithmic prediction of goal of care preferences: From theory to practice. *Journal of Medical Ethics* 49 (3):165–174. doi: 10.1136/jme-2022-108371; Earp BD et al. A Personalized Patient Preference Predictor for Substituted Judgments in Healthcare: Technically Feasible and Ethically Desirable. Am J Bioeth. 2024 Jan 16:1-14. doi: 10.1080/15265161.2023.2296402.

Novel Forms of Bias: Principlism

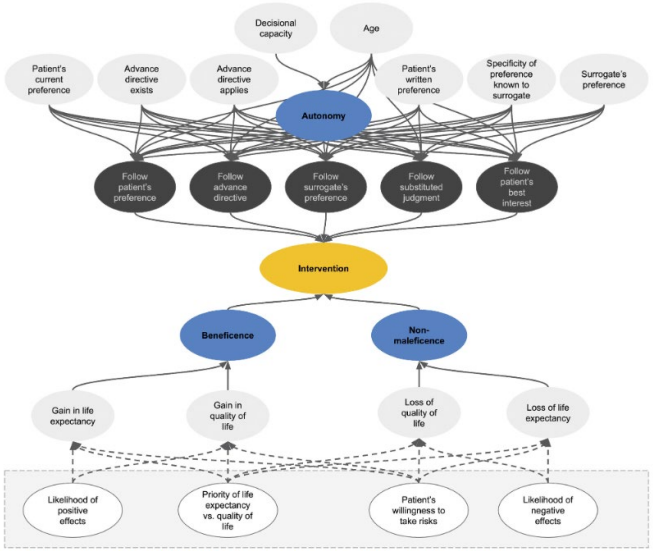


Figure 1. Visualization of the METHAD FCM. In this pilot study, we omitted the principle of justice for reasons explained below.

Proposals exist to use AI/LLM for supporting clinical ethics consults.

But what if ethics "training data" in the English language data overrepresent principlism?

Meier LJ, Hein A, Diepold K, Buyx A. Algorithms for Ethical Decision-Making in the Clinic: A Proof of Concept. Am J Bioeth. 2022 Jul;22(7):4-20. doi: 10.1080/15265161.2022.2040647.

The Neglect of Virtue, Care, Wisdom, and more…

You

Can you summarize medical ethics in 100 words?

ChatGPT

Medical ethics shapes healthcare through principles like autonomy, beneficence, non-maleficence, justice, confidentiality, and informed consent. Autonomy respects patients' right to choose their care. Beneficence requires healthcare providers to act in patients' best interests, while non-maleficence demands avoiding harm. Justice ensures fair resource distribution and treatment. Confidentiality protects patient privacy. Informed consent empowers patients with information. Professional integrity upholds ethical standards. End-of-life care honors patient preferences. Research ethics prioritize participant welfare. Global health ethics addresses disparities. These principles guide ethical decision-making for healthcare professionals, researchers, policymakers, and patients, fostering trust and equitable care.

Who We Are

A Reminder from Sociology

From the issue dated January 30, 2004
The Chronicle of Higher Education
http://www.chronicle.com
Section: The Chronicle Review
Volume 50, Issue 21, Page B26

http://chronicle.com/weekly/v50/i21/21b02601.htm

How Computers Change the Way We Think

By SHERRY TURKLE

The tools we use to think change the ways in which we think. The invention of written language brought about a radical shift in how we process, organize, store, and transmit representations of the world. Although writing remains our primary information technology, today when we think about the impact of technology on our habits of mind, we think primarily of the computer.

If we see how written language, mathematics, the computer, and so much else changes *who we are* and *what we value* – why not AI?

Even this Presentation May Be Guilty

"PowerPoint becomes ugly and inaccurate because our thoughts are foolish, but the slovenliness of PowerPoint makes it easier for us to have foolish thoughts."

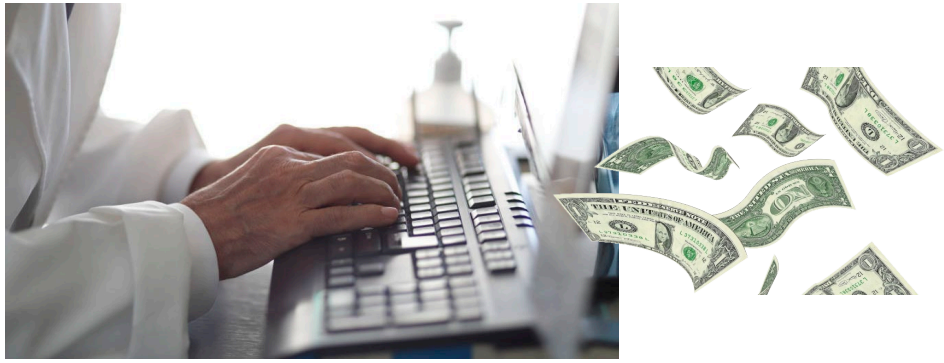
Is Technology Merely a Tool We Use?

Heidegger's Critiques:
"…the essence of technology is by no means anything technological…"

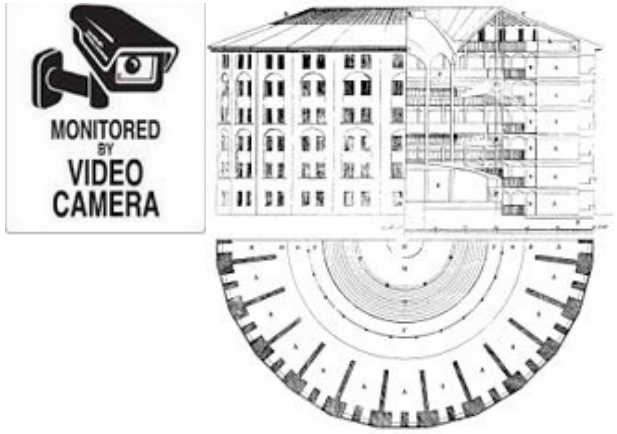
It must be remembered – the scalpel, while a quintessential "tool" – made possible the breaching of the bodily boundary.

Karches K. E. (2018). Against the iDoctor: why artificial intelligence should not replace physician judgment. *Theoretical medicine and bioethics*, *39*(2), 91–110.

Too Far a Stretch?



To think the EHR could become a site of digitizing data for the AI machine – farther from care?



To think that hospitals might be designed for the sake of better AI surveillance, and not as healing spaces?

Jeremy Bentham's panopticon prison, drawn by Willey Reveley, 1791, as pointed out by my colleague Glenn Cohen..

A Final Use Case: Using LLMs Patient Portal Messages

High Volumes of Patient Portal Messages

Post-COVID, evidence suggests that patient portal messages have increased dramatically – leading to additional EHR time among clinicians and potentially contributing to burnout.

- In one study, messages increased >150%.
- In other reports, increases approach 300%.

While charging for messages is one (controversial) approach to reduce volume, what if we made messages more automated….?

Longhurst C, Huckman RS. Corrigendum to: Assessing the impact of the COVID-19 pandemic on clinician ambulatory electronic health record use. J Am Med Inform Assoc. 2022 Mar 15;29(4):749. doi: 10.1093/jamia/ocab288. Erratum for: J Am Med Inform Assoc. 2022 Jan 29;29(3):453-460. PMID: 35020882; PMCID: PMC8922166.

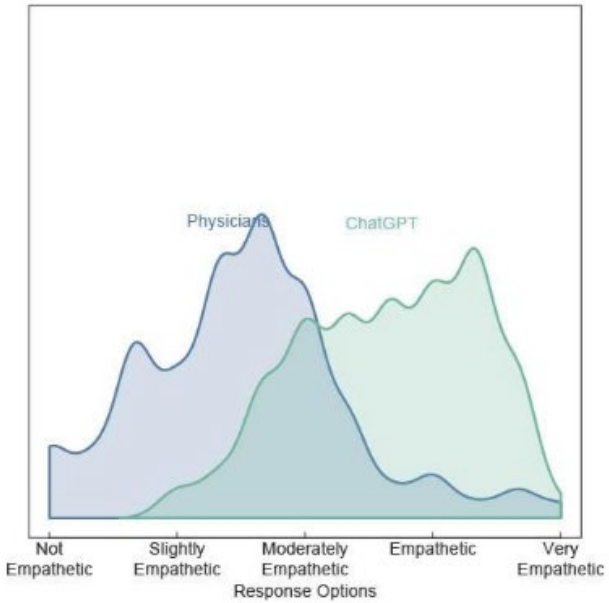
Could LLMs answer patient messages?

https://www.fiercehealthcare.com/health-tech/himss23-epic-taps-microsoft-integrate-generative-ai-ehrs-stanford-uc-san-diego-early

In this rollout, initial responses to patient portal messages are generated by a LLM, to be edited (or not) by a nurse, physician, etc.

ChatGPT versus Physician Responses

In one provocative study, licensed health care professionals assessed ChatGPT responses to the same question as longer, higher in quality and more <u>empathetic</u> (?) than physician responses.



Ayers JW, et al Comparing Physician and Artificial Intelligence Chatbot Responses to Patient Questions Posted to a Public Social Media Forum. JAMA Intern Med. 2023 Jun 1;183(6):589-596. doi: 10.1001/jamainternmed.2023.1838. PMID: 37115527; PMCID: PMC10148230.

What does this look like in practice?

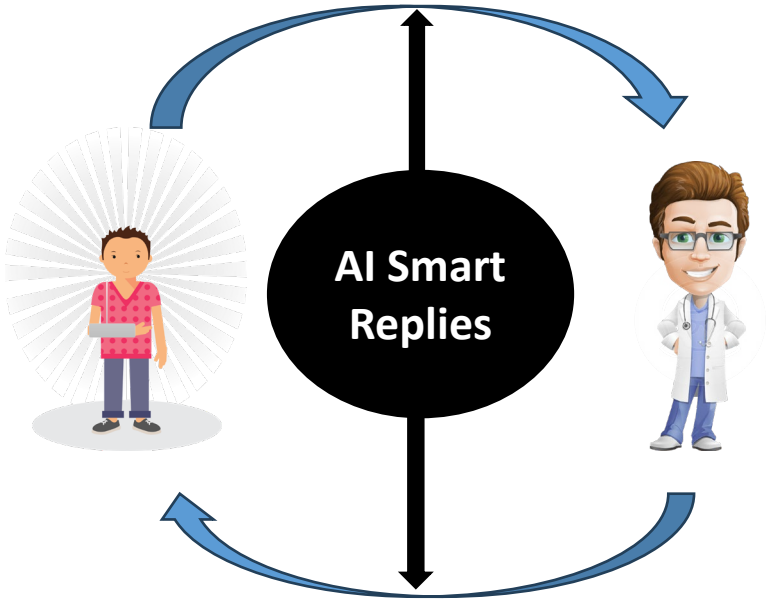
Dr. DeCamp, Hope all is well. I received message yesterday to schedule a fluoroscopy. I think this may have been from my swallowing issues? Since then I think things have definitely b
follow through w
dry cough - shou
Me know your th

Thank you for your message.

It's good to hear that your swallowing issues have improved. If you're not experiencing any problems, it's reasonable to postpone the fluoroscopy. However, if symptoms return, we should reconsider.
Regarding your persistent dry cough, it's important to monitor this. If it continues or worsens, we should investigate further.
I'm glad to hear you're feeling well overall and have rescheduled your colonoscopy. Take care!

This text was automatically generated then edited by Matthew DeCamp.

Technology Changes How We View Each Other



- **IN ONE NON-HEALTH CARE STUDY:**
  - ***Perceived*** use caused the recipient (patient?) to review the sender (physician?) more negatively.
  - ***Actual*** use caused the recipient (patient?) to review the sender (physician?) more positively.

Hohenstein, J., Kizilcec, R.F., DiFranzo, D. *et al.* Artificial intelligence in communication impacts language and social relationships. *Sci Rep* **13**, 5487 (2023). https://doi.org/10.1038/s41598-023-30938-9

Reassurance Against AI Exceptionalism

That it will ever come into general use…I am extremely **doubtful**;

because its beneficial application requires **much time**, and gives a **good deal of trouble** both to the patient and the practitioner;

and because its whole hue and character **is foreign**, and opposed to all our habits and associations. It must be confessed that there is something even **ludicrous**…

Laennec RTH. *A Treatise on the Diseases of the Chest*, Translated from French to English by John Forbes, Translator's Preface by John Forbes. 1821

Concluding Thoughts

- **Routine clinical care is wrought question of transparency, expertise, bias, and so on.** We must acknowledge this – and be mindful of status quo bias (be honest about differences; avoid AI exceptionalism).

- **When it comes to "Fair AI," many challenges are ahead at the intersection of ethics and the interpretation of new policy.**

- **While we should solve discrete ethical issues, we ought not forget the deeper ones of who we are and what we value.**

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