The NSBA's Health Law Section presents:

AI in Healthcare

Wednesday, March 11, 2026

Glacial Till - Ashland, NE

Speaker: Eric Zacharias, MD, Copic

Dr. Zacharias was named Chief Medical Officer in 2024 and oversees Copic's Patient Safety and Risk Management department. He joined Copic in 2015 and previously served as Director of Medical Education. He is Assistant Clinical Professor of Medicine, University of Colorado.

Prior to Copic, Dr. Zacharias held key leadership roles, including Chair of the Department of Internal Medicine and Medical Director of Patient Safety at Boulder Medical Center, Board Chair of Boulder Valley Care Network Clinically Integrated Network and Assistant Clinical Professor of Medicine at the University of Colorado School of Medicine. He has led patient safety and risk management efforts for over 20 years for several organizations, including large, multi-specialty groups, a state-wide consortium of medical groups, and community health systems. Dr. Zacharias is board-certified, earned his medical degree from Vanderbilt University School of Medicine, and completed his internal medicine residency at University of Colorado Health Sciences Center. He is also the author of The Mediterranean Diet: A Clinician's Guide for Patient Care and the host of Copic's podcast, Within Normal Limits.

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Adoption of Artificial Intelligence in Health Care: Impacts on Malpractice Risks

Eric Zacharias, MD

Chief Medical Officer, Copic

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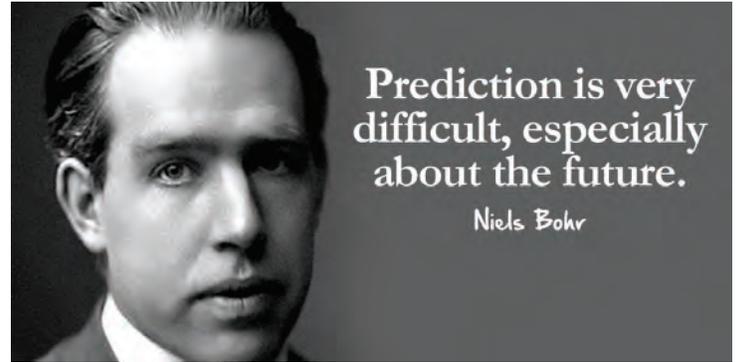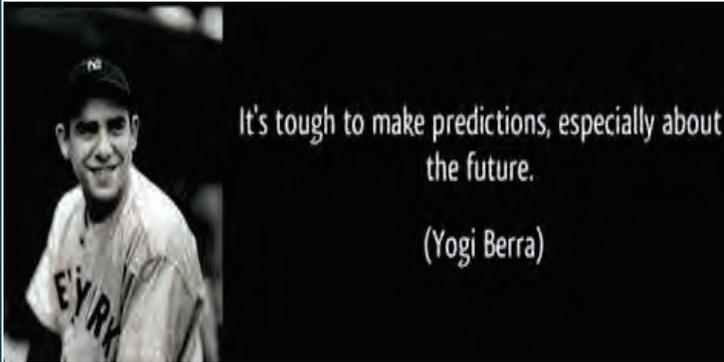
Course Learning Objectives

1. Discuss the basic principles and applications of AI and Machine Learning and how these differ from traditional "computer programs."

2. Identify error pathways and concerns about using AI for medical tasks, such as communication, documentation, and decision-support.

3. Evaluate trends and implications of AI for patient safety, professional liability, and regulatory policy.

4. Articulate key actions providers can take to reduce the risk of errors when using AI tools.

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Pre-/Post-Test

Artificial Intelligence systems will always produce factual and accurate responses to inquiries and should therefore be relied upon as the final and authoritative answer. **True or False.**

Since everyone knows AI is being used in healthcare, there is no reason to request consents from patients when using AI as a virtual scribe. **True or False.**

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AI: Forecasting the Future and Retrospective Counterfactuals

It's tough to make predictions, especially about the future.

(Yogi Berra)

Prediction is very difficult, especially about the future.

Niels Bohr

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My Favorite Delusion: *"AI Will Eliminate Risk In The Modern Healthcare Environment!"*

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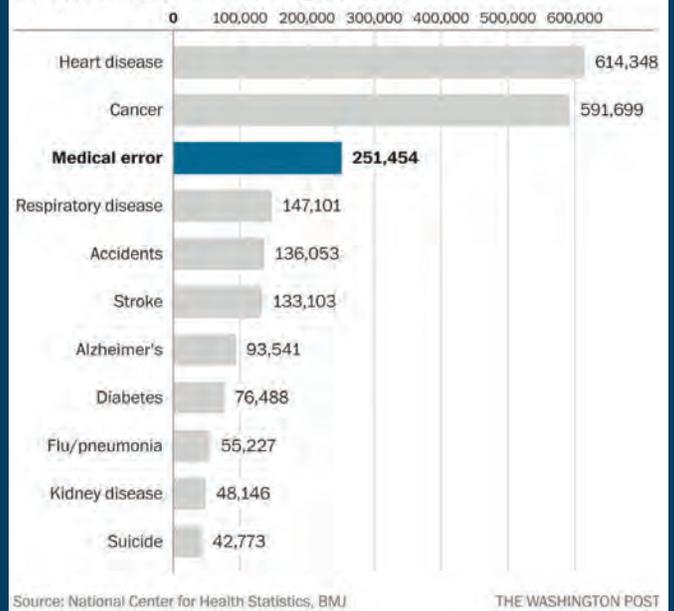Better Medicine • Better Lives

Maybe AI will help us reduce harm?

- I would love to eliminate harm from medical care.
- No harm = No litigation
- Will AI help us accomplish this?

Death in the United States

Johns Hopkins University researchers estimate that medical error is now the third leading cause of death. Here's a ranking by yearly deaths.

	Deaths
Heart disease	614,348
Cancer	591,699
Medical error	**251,454**
Respiratory disease	147,101
Accidents	136,053
Stroke	133,103
Alzheimer's	93,541
Diabetes	76,488
Flu/pneumonia	55,227
Kidney disease	48,146
Suicide	42,773

Source: National Center for Health Statistics, BMJ   THE WASHINGTON POST

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35 Years of Electronic Innovations in Health Care

- Paper to Electronic Health Records
- Automatic Drug-Drug Alerts
- Electronic Prescribing
- Bar Codes on Blood Products
- Locked Drawers of High-Risk Medications
- Web Search Medical Queries

→ *How Much Have These Decreased Risk?*

Innovative use of Technology in Healthcare

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Incidence of Adverse Events and Negligence in Hospitalized Patients — Results of the Harvard Medical Practice Study I

Troyen A. Brennan, M.P.H., M.D., J.D., Lucian L. Leape, M.D., Nan M. Laird, Ph.D., Liesi Hebert, Sc.D., A. Russell Localio, J.D., M.S., M.P.H., Ann G. Lawthers, Sc.D., Joseph P. Newhouse, Ph.D., Paul C. Weiler, LL.M., and Howard H. Hiatt, M.D.

Article   Figures/Media
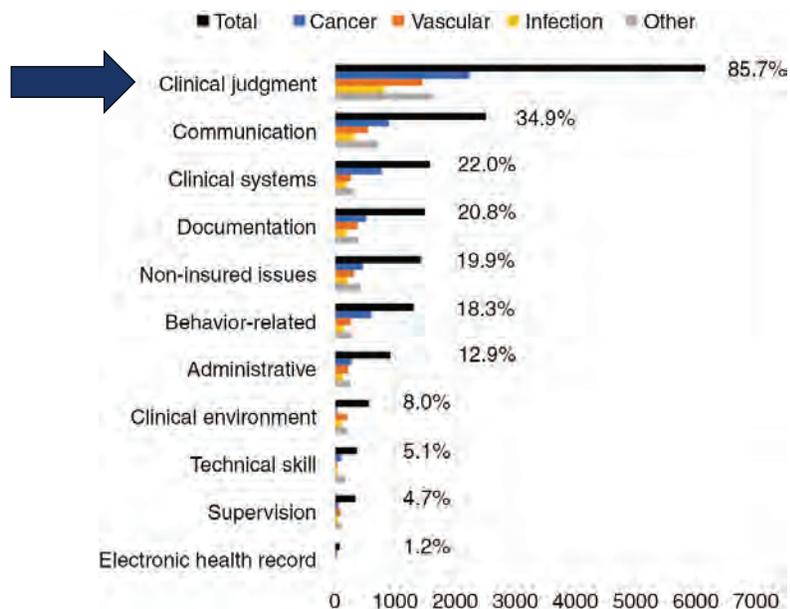
20 References   2831 Citing Articles   Letters

- 3.6% of hospital admissions have an error
- 13% result in death
- 2025 essentially unchanged from 1991

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Aspects Present in Medical Errors Causing Harm

■ Total ■ Cancer ■ Vascular ■ Infection ■ Other

Aspect	Percentage
Clinical judgment	85.7%
Communication	34.9%
Clinical systems	22.0%
Documentation	20.8%
Non-insured issues	19.9%
Behavior-related	18.3%
Administrative	12.9%
Clinical environment	8.0%
Technical skill	5.1%
Supervision	4.7%
Electronic health record	1.2%

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"It's Harder Than it Looks"
-*Bon Scott, AC/DC*

Ridin' down the highway
Goin' to a show
Stop in all the byways
Playin' rock 'n' roll

Gettin' robbed
Gettin' stoned
Gettin' beat up
Broken-boned
Gettin' had
Gettin' took
I tell you, folks
It's harder than it looks

It's a long way to the top if you wanna rock 'n' roll!

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What is AI and Why Is This All Happening Now?

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AI is just math!

Really, really complex math is used to make predictions.

Machine Learning- software is used to "learn on its own" by identifying "relevant" data that is aggregated; a value (number) is then attached to this.

Deep Learning- Machine Learning data runs through multiple computer nodes to interpret future inputs (queries) that lead to this value (number).

Generative AI- Deep Learning algorithm generates probable outputs (numbers), aka "answers," based on what has learned an input (query) leads to.

MATH!

Head 1:

$$Q_1 = K_1 = V_1 = \text{Input Matrix}$$
$$A_1 = Q_1 \cdot K_1^T$$
$$A_1 = \begin{bmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{bmatrix}$$
$$A_1 = \begin{bmatrix} 1 & 0 & 0 \\ 4 & 5 & 0 \\ 7 & 8 & 9 \end{bmatrix} \text{(Masked)}$$
$$W_1 = \text{softmax}(A_1)$$
$$O_1 = W_1 \cdot V_1$$

Head 2:

$$Q_2 = K_2 = V_2 = \text{Input Matrix}$$
$$A_2 = Q_2 \cdot K_2^T$$
$$A_2 = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$
$$A_2 = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 5 & 6 \\ 0 & 0 & 9 \end{bmatrix} \text{(Masked)}$$
$$W_2 = \text{softmax}(A_2)$$
$$O_2 = W_2 \cdot V_2$$

Concatenate and Linear Transformation:

$$\text{Concatenate}([O_1, O_2])$$
(Apply Learnable Linear Transformation)

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1. The Data: Enough and Accessible

- Chat GPT= Generative <u>Pre-trained</u> Transformer
- **Supervised Learning**
  - AI models were initially trained with manually labeled data
  - Expensive and time-consuming
- **Un-/Self-Supervised Learning**
  - AI models scour large data sets on their own to form predictions and models.
  - Need a huge repository of digital data, with words, pictures, news etc.
  - Turn it loose on the whole internet

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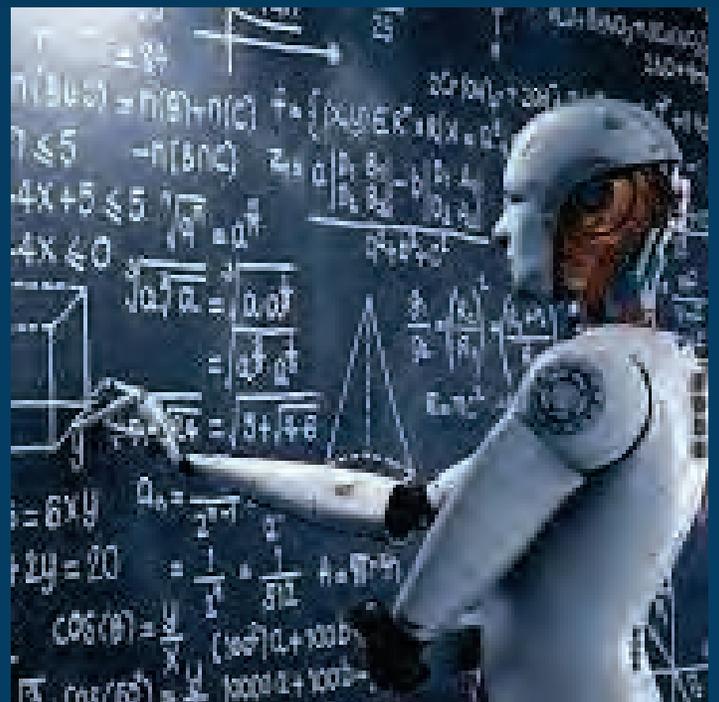
2. The Math

- Chat GPT= Generative Pre-trained <u>Transformer</u>

- Transformer Architecture proposed in research paper in 2017.

- Compressed information (**Think genes versus full human**)

- Vastly increases speed, efficiency of AI engine by allowing computer to **"read" whole sentence at once.**

- Older math was like reading left to right- **in sequence**. Newer reads all the words at once-**in parallel and simultaneously**. Much faster!
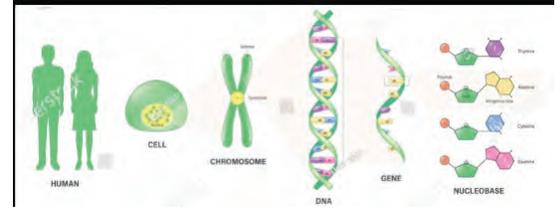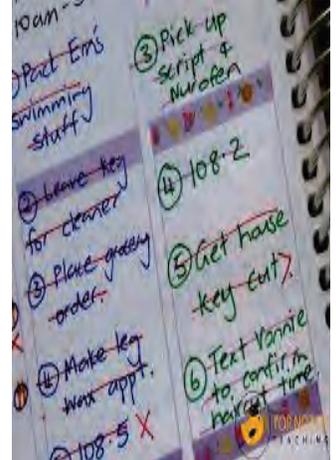

AI in Action:

What does "bank" mean/ "crossing" mean:

"I arrived at the <mark>bank</mark> after <mark>crossing</mark> the…"

"*I arrived at the bank after crossing the…*"

3. The Computing Power: Simply Didn't Exist Until Now

Everything is Digitized. Definition of Irony?

OpenAI Says DeepSeek May Have Improperly Harvested Its Data

The San Francisco start-up claims that its Chinese rival may have used data generated by OpenAI technologies to build new systems.

3 MIN READ

Hello Pot.....

...Meet Kettle

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Using AI in Diagnostics

- This is not new.
- We are just doing it better and faster on more complex scenarios.
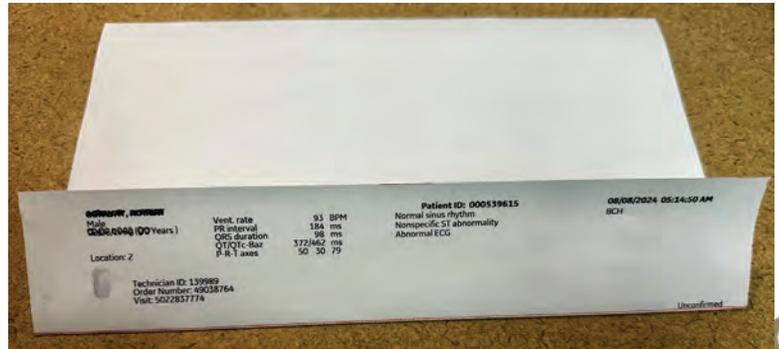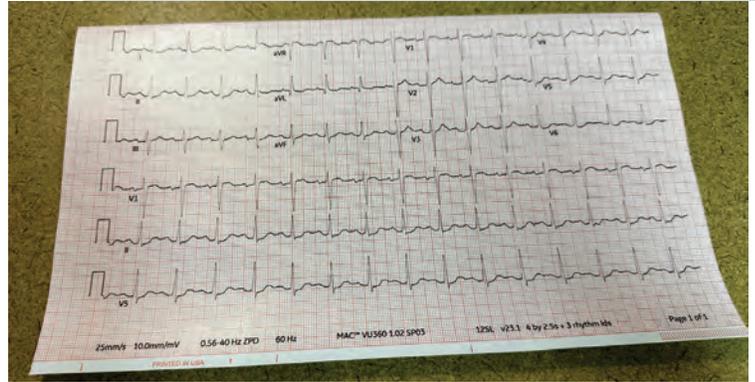- Same pros, same cons, same legal issues, *plus* new legal issues.

medical infographic

01 INFOGRAPHIC
04 INFOGRAPHIC
02 INFOGRAPHIC
28%

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The OG AI in Diagnostics- You Can Conceive How This Works

How does a cardiologist read an ECG?

How does a [insert other specialist here] read an ECG?

- Develop Deep Skills?

- Atrophy?

- Who is Checking?

Example of AI for Dx Assistance. Risks?

scientific reports

nature > scientific reports > articles > article

Article | Open access | Published: 13 October 2023

Differential diagnosis of neurodegenerative dementias with the explainable MRI based machine learning algorithm MUQUBIA

Silvia De Francesco, Claudio Crema, Damiano Archetti, Cristina Muscio, Robert I. Reid, Anna Nigri, Maria Grazia Bruzzone, Fabrizio Tagliavini, Raffaele Lodi, Egídio D'Angelo, Brad Boeve, Kejal Kantarci, Michael Firbank, John-Paul Taylor, Pietro Tiraboschi & Alberto Redolfi for the ADNI, Frontotemporal Lobar Degeneration Neuroimaging; NIA Alzheimer's Disease Centers; and the RIN – Neuroimaging Network

Scientific Reports 13, Article number: 17355 (2023) | Cite this article

-A machine learning algorithm (MUQUBIA) accurately distinguished *Alzheimer's disease, frontotemporal dementia, dementia with Lewy bodies, and cognitively normal controls* using routine MRI scans and basic clinical information.

-Overall accuracy was 87.5%. Features like white matter integrity, cortical volumes and thickness were most informative.

*This system detects subtle brain patterns beyond human visual assessment.

Example of AI Enhancing Procedures. Risks?

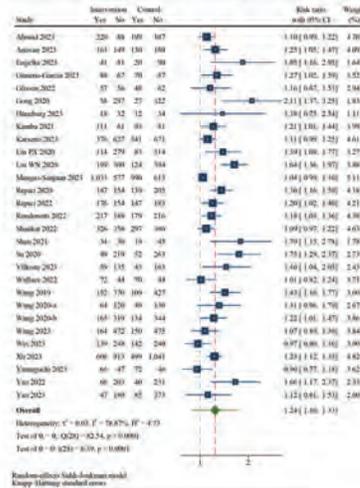**EClinicalMedicine**
Published by THE LANCET

Artificial intelligence for colorectal neoplasia detection during colonoscopy: a systematic review and meta-analysis of randomized clinical trials

—33 randomized trials, 27,404 patients

—>50% reduction of missed polyps and adenomas

—Inspection time increase only 20 seconds

Lou S, 29 November 2023

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Are A.I. Tools Making Doctors Worse at Their Jobs?

Physicians are using the technology for diagnoses and more — but may be losing skills in the process.

THE LANCET
Gastroenterology & Hepatology

ARTICLES - Volume 10, Issue 10, P896-903, October 2025   ⬇ Download Full Issue

Endoscopist deskilling risk after exposure to artificial intelligence in colonoscopy: a multicentre, observational study

- 1443 colonoscopy patients in Poland
- Looked at rate of detection of adnemomas before and after use of AI assistance
- Rate of detection on standard (non-AI) studies fell from 28.4% to 22.4% after only three months of use

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Some Warning Signs: Is AI Plus Clinician *Always* Better?

How machine-learning recommendations influence clinician treatment selections: the example of the antidepressant selection

Maia Jacobs [1], Melanie F Pradier [1], Thomas H McCoy Jr [2,3], Roy H Perlis [2,3], Finale Doshi-Velez [1], Krzysztof Z Gajos [4]

→ • **Sophisticated explanations** *lowered* AI+clinician accuracy if the AI recommendation was incorrect.

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AI in Summarization

- ICU patient in status epilepticus.
- Care team tries to learn history, previous potential clues to triggers.
- AI tool instantly reviews all 2,700 pages of records.
- Generates summary of key and useful info:
  - Happened before?
  - History of imaging (meningioma)
  - Changes (trauma, meds, etc) to lower threshold.

AMAZING!

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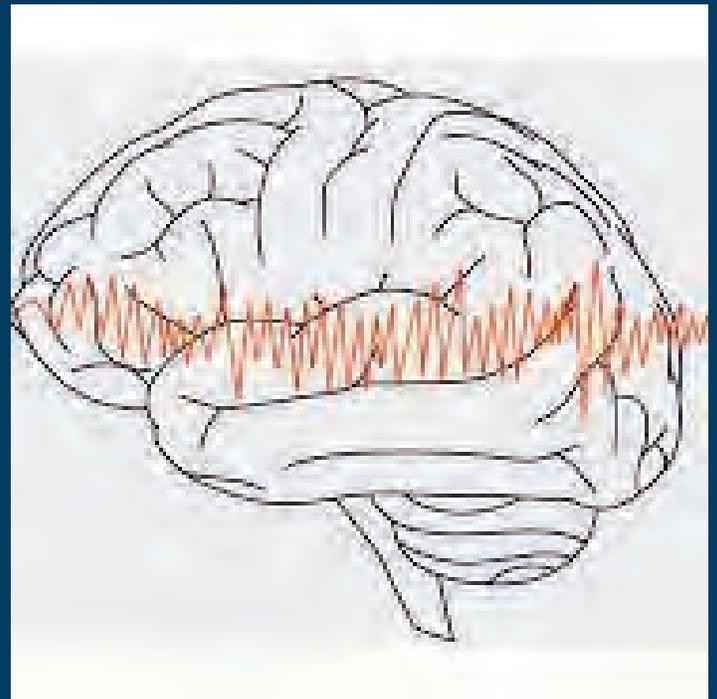
Sensitivity vs. Specificity in Summarizations and Predictions

- What if we used AI to help pick up pheochromocytomas?
- Providers don't have time/ability to scan enough data.
- How many false positives before these alerts are ignored?
- Who will set the threshold?

Pheochromocytoma

Adrenal gland

Pheochromocytoma

Adrenal medulla

Adrenal cortex

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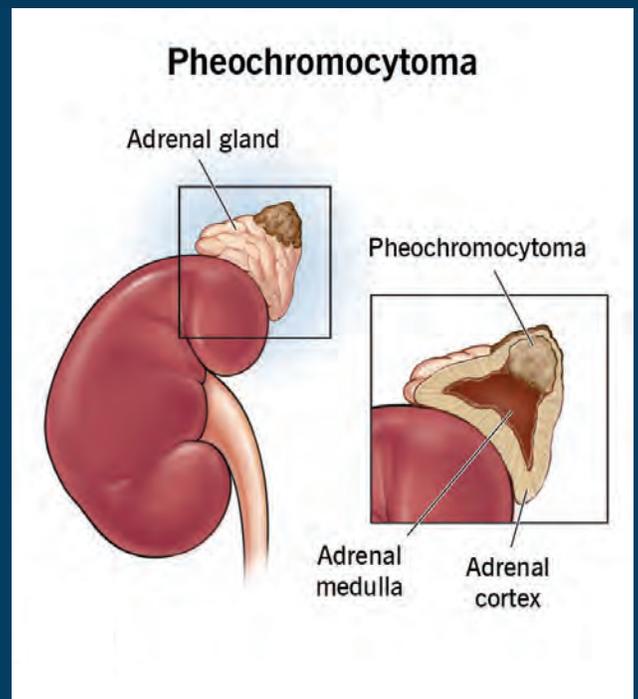
Key Areas for AI Adoption: Primary Care and ER May Be Impossible Without AI

→ **Revisiting the Time Needed to Provide Adult Primary Care**

Justin Porter, MD[1], Cynthia Boyd, MD, MPH[2], M. Reza Skandari, PhD[3], and Neda Laiteerapong, MD, MS[4]

[1]Department of Medicine, University of Chicago, Chicago, IL, USA; [2]Johns Hopkins School of Medicine, Baltimore, MD, USA; [3]Imperial College Business School, Centre for Health Economics & Policy Innovation, Imperial College London, London, UK; [4]Departments of Medicine & Psychiatry and Behavioral Neuroscience, University of Chicago, Chicago, IL, USA.

J Gen Intern Med 38(1):147–55
DOI: 10.1007/s11606-022-07707-x

→ PCPs require 26.7 h per day (14.1h for preventive care, 7.2 h for chronic care, 2.2 h for acute care, 3.2 h for documentation and inbox management).

MEDPAGETODAY®

→ Over 550 Emergency Medicine Positions Unfilled in This Year's Match

— It's a "radical change" from just a few years ago, one emergency physician says

by Kristina Fiore, Director of Enterprise & Investigative Reporting, MedPage Today March 14, 2023

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AI as Virtual Physician Scribe

- Uses "ambient listening".
- Produces visit note.
- Benefits:
  - Huge potential time savings for clinicians.

  - Allows physician to focus on patient, eye-to-eye contact.

  Open Question:

  ➡ ?More free time or just see more patients?
    - One person uses steam shovel instead of hand shovel

2-7
Minutes less per visit

50%
Less time spent on documentation

13
hours per week saved

AI Chatbot for In Box Problem

- **Chatbot Responses Versus Clinicians:**

  - 45% vs. 5% Highly Empathetic
  - 80% vs. 20% High Quality
  - 80% vs. 20% Preferred Overall

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AI is just going to continue to improve, right? Hallucinations will eventually no longer be an issue?

- "Despite our best efforts, they will always hallucinate," said Amr Awadallah, the chief executive of Vectara, a start-up that builds A.I. tools for businesses, and a former Google executive. "That will never go away."

"Since late 2023… Vectara, has tracked how often chatbots veer from the truth. The company asks these systems to perform a straightforward task that is readily verified: Summarize specific news articles. Even then, chatbots persistently invent information.

Vectara's original research estimated that in this situation chatbots made up information at least 3 percent of the time and sometimes as much as 27 percent.

https://www.nytimes.com/2025/05/05/technology/ai-hallucinations-chatgpt-google.html?smid=url-share

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Medical Workflow: It's Harder Than It Looks

- Using LLM to respond to pt messages didn't save clinicians' time- *UCSD, JAMA 2024.*
  - *AI-Generated Draft Replies Integrated Into Health Records and Physicians' Electronic Communication, JAMA*

- LLM's did poorly at matching pt dx to diagnostic codes- *Mt. Sinai, NEJM 2024.*
  - *Large Language Models Are Poor Medical Coders — Benchmarking of Medical Code Querying, NEJM AI*

- Safety errors in LLM responses to pt questions- *MGHB, Lancet 2024.*
  - *The effect of using a large language model to respond to patient messages, The Lancet Digital Health*

AI Scribes: Consent and Privacy

- Consent:
    - State regulations vary.
    - <mark>Best Practice:</mark> Always obtain consent from patients.
    - ➡ Class action for negligent consent??
- Privacy:
    - Vendors vary.
    - They own the audio recording and the data.
    - How long do they store the information? Is it discoverable in the case of a lawsuit?
    - Some vendors use information to help train the AI engine. <mark>PHI!</mark>
    - ➡ Cybersecurity data leaks.

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AI Virtual Scribes:
--What Should Patient Consent
    Include?
--Will Doctors do Consents?

- Your encounter with the provider will be recorded electronically.
- This information will be processed by the computer system to help draft a note.
- I will review the note.
- All of your information will be kept secure.

- If patients have additional questions, probably not time-effective to use the tool.

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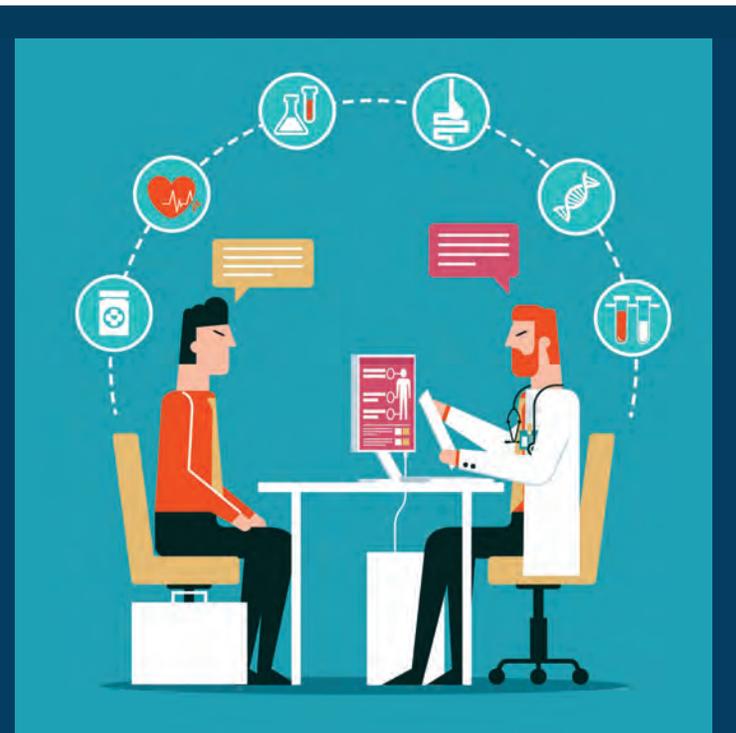
AI Scribes: Hallucination Risks

Hallucinations:

- AI scribe added information in progress note that patient was scheduled for open heart surgery.
- This was false.
- Bad optics (at best)
- Potentially dangerous if error propagated by other readers of note.

- The biggest risk of AI Scribe-physicians not reading and correcting their note!
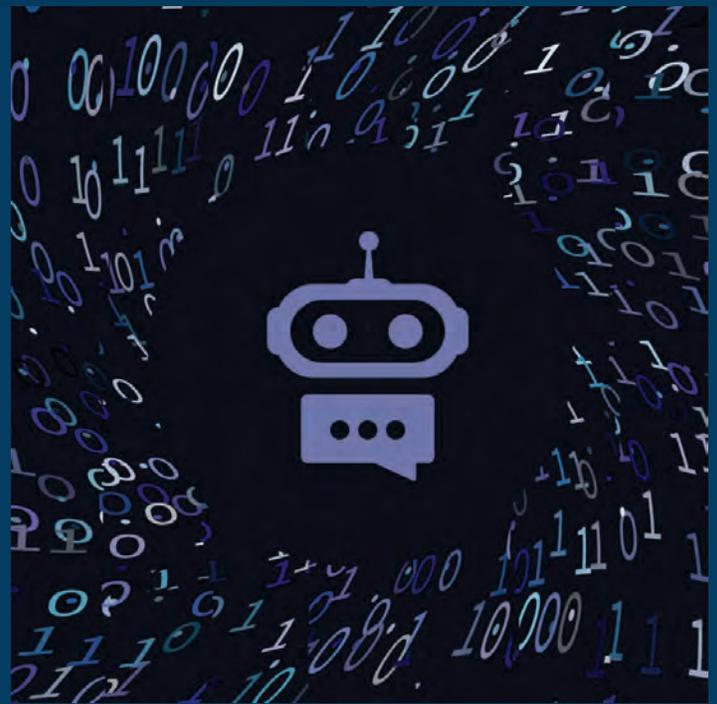
Voice Transcription Has Already Revealed Proofreading Habits:

DISCLAIMERS ARE WORTHLESS OR WORSE!!!

Classic Examples:

- "the patient has a 4cm renal mass oh yeah that was insane last night I can't believe she picked Johnny in the rose ceremony."
- "this is a white lady sedating medicine" (Instead of "lightly sedating medication")
- "Nipples equal round reactive"

- Easy to tell that something has gone wrong here.
- But what about when AI says that a patient has a history of CABG…?

Will Humans Change Habits?

Burnout Impacts Risk. Will AI help??

- 200-400 physician suicides per year
  - > 2 medical school classes
- 1 in 10 have contemplated/attempted.
- 55% personally know a peer victim.
- Highest rate of any profession.
- 54% of physicians would take a pay cut to reduce work overload.

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Legal Considerations

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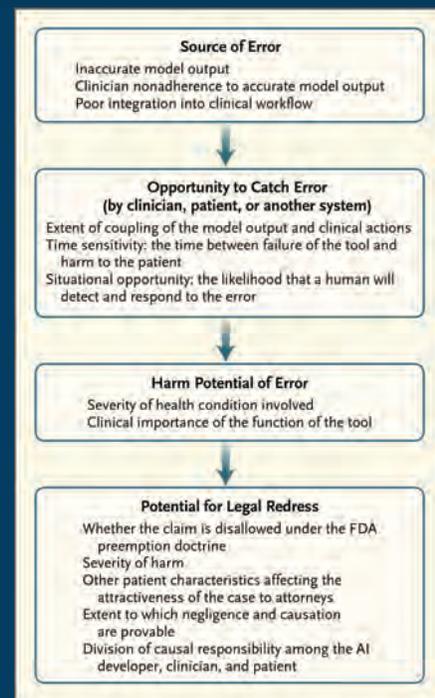Better Medicine • Better Lives

Federal Bodies with Regulatory Oversight

- **White House**
- **Senate**
- **House of Representatives**
- **OCR**
- **ONC (National Coordinator HIT)**
- **CMS**
- **FDA**
- **DOJ**
- **FTC**

Typology of Factors Influencing Risk

- How liability risk flows:
  - source of error
  - opportunities to catch mistakes,
  - harm potential,
  - legal redress.

- The legal landscape remains unsettled regarding who bears responsibility when AI-related errors cause patient harm

Understanding Liability Risk from Using Health Care Artificial Intelligence Tools. N Engl J Med. January 17, 2024.

Source of Error
Inaccurate model output
Clinician nonadherence to accurate model output
Poor integration into clinical workflow

Opportunity to Catch Error
(by clinician, patient, or another system)
Extent of coupling of the model output and clinical actions
Time sensitivity: the time between failure of the tool and harm to the patient
Situational opportunity: the likelihood that a human will detect and respond to the error

Harm Potential of Error
Severity of health condition involved
Clinical importance of the function of the tool

Potential for Legal Redress
Whether the claim is disallowed under the FDA preemption doctrine
Severity of harm
Other patient characteristics affecting the attractiveness of the case to attorneys
Extent to which negligence and causation are provable
Division of causal responsibility among the AI developer, clinician, and patient

Liability allocation remains ambiguous across multiple potential defendants

- **When diagnostic algorithms contribute to missed or incorrect diagnoses**, it is unclear whether clinicians, healthcare institutions, or AI developers will be held liable, and how the burden of proof would be met in such cases.
- **The principal-agent relationship**, where physicians are held responsible for AI decisions, may reduce adoption due to liability concerns.
- **Product liability approaches** are complicated by AI's dynamic learning nature, which differs from static medical devices

WHO'S TO BLAME?


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Regulatory gaps create additional risk

- **Most AI/ML-enabled medical devices** (96.7% of 691 FDA-approved devices as of October 2023) were approved via the 510(k) pathway without requiring clinical data submission.
- **This weak evidence base** increases uncertainty about performance and safety.
- **Current medical device laws** lack clarity on evidence standards for AI and do not cover generative AI, which introduces novel safety concerns including the tendency to "hallucinate" false information.

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There are currently no published court decisions or legal precedents involving AI-related medical malpractice claims

- **AI medical devices have only recently** achieved widespread clinical deployment, and medical malpractice litigation typically takes years to progress through the court system.
- **The weak evidence base supporting most AI tools**—with 96.7% of FDA-approved AI/ML devices cleared via the 510(k) pathway without requiring clinical trial data—may contribute to limited deployment in high-stakes clinical scenarios where errors would most likely trigger litigation.
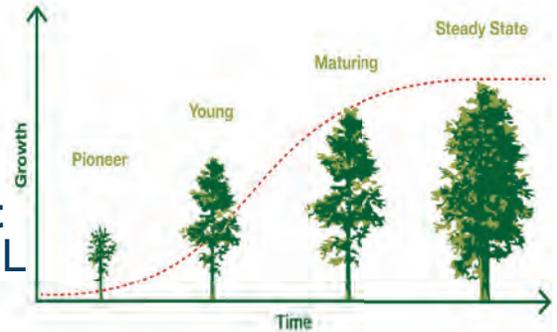
Legal scholars have instead focused on experimental studies of potential juror behavior to predict how courts might handle these cases

- **Study of 2,000 U.S. adults** found that when AI recommends standard care and physicians accept that advice, liability risk may decrease; however, when AI recommends nonstandard care, rejecting it provides no similar protection.
- **Another survey** revealed that 57.3% of the public and 66.0% of physicians believe physicians should be held responsible for AI-related errors.
- **Physicians are more likely than the public** to believe vendors (43.8% vs 32.9%) and healthcare organizations (29.2% vs 22.6%) should share liability.

Lack of established precedent means that liability allocation remains legally uncertain across physicians, healthcare institutions, AI developers, and device manufacturers

- This uncertainty itself represents a significant risk.
- Clinicians cannot reliably predict their exposure when incorporating AI into clinical decision-making.

Malpractice considerations using/not using

- **Clinical error reduction and diagnostic accuracy (+)**
- Documentation and info management (+)
- Clinical communication (+)
- Decision support (+/-)
- Spreading liability (+/-)
- Standards of care (+/-)
- Privacy and data security (-)
- Informed consent (-)
- Algorithmic bias (-)
- Over-reliance, unrealistic expectations (-)
- Configuring, monitoring, updating (-)
- Changes in interdisciplinary collaboration (-)
- Training, education, certification (-)

> Potentially assist with diagnosis, prognosis, workup, guideline adherence, efficiency, cost effectiveness. Error reduction.

Malpractice considerations using/not using

- Clinical error reduction and diagnostic accuracy (+)
- Documentation and info management (+)
- Clinical communication (+)
- Decision support (+/-)
- Spreading liability (+/-)
- Standards of care (+/-)
- Privacy and data security (-)
- Informed consent (-)
- Algorithmic bias (-)
- **Over-reliance, unrealistic expectations (-)**
- Configuring, monitoring, updating (-)
- Changes in interdisciplinary collaboration (-)

> Risk of becoming overly reliant on AI functions; chilling effect on questioning, skepticism, inquiry; atrophy of judgment; complacent culture, defensiveness.

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Malpractice considerations using/not using

- Clinical error reduction and diagnostic accuracy (+)
- Documentation and info management (+)
- Clinical communication (+)
- Decision support (+/-)
- Spreading liability (+/-)
- **Standards of care (+/-)**
- Privacy and data security (-)
- Informed consent (-)
- Algorithmic bias (-)
- Over-reliance, unrealistic expectations (-)
- Configuring, monitoring, updating (-)
- Changes in interdisciplinary collaboration (-)
- Training, education, certification (-)

> **Pro:** Reset the standard of care. **Con:** Reset the standard of care.

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What does AI know? Who should provide care?

AI Bot ChatGPT Passes US Medical Licensing Exams Without Cramming – Unlike Students

Alicia Ault

January 26, 2023

ChatGPT can pass parts of the US medical licensing exam, researchers have found, raising questions about whether the AI chatbot could one day help write the exam or help students prepare for it.

Victor Tseng, MD, and his colleagues at Ansible Health, a company that manages mostly homebound patients with chronic lung disease, initially wanted to see whether ChatGPT could aggregate all the communications

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Malpractice considerations using/not using

- Clinical error reduction and diagnostic accuracy (+)
- Documentation and info management (+)
- Clinical communication (+)
- Decision support (+/-)
- Spreading liability (+/-)
- Standards of care (+/-)
- **Privacy and data security (-)**
- Informed consent (-)
- Algorithmic bias (-)
- Over-reliance, unrealistic expectations (-)
- Configuring, monitoring, updating (-)
- Changes in interdisciplinary collaboration (-)
- Training, education, certification (-)

> Loss of control of PHI. Consent issues. Commercial use of PHI.

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Some Potential theories of liability using/not using

- Negligence; failure to meet the standard of care
  - Failure to manage known risks
  - Failure to use necessary devices
- Failure to disclose; failure to inform; failure to obtain consent
- Vicarious liability (device/app is an "agent" of the provider)
- Product liability (device/app known to be defective)
  - Inadequate diligence
- Privacy breach
- Patient abandonment
- Failure in device selection, installation, configuration, maintenance
- Failure to monitor, follow-up; improper delegation
- Foreseeable injury or adverse effect
- Fraud, misrepresentation, quackery

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Precision Performance

TECH

There's a Pretty Glaring Issue With Tesla's Autopilot, Says New Study

DAVID NIELD   26 SEPTEMBER 2021

It's something that has long been suspected. Now, we have evidence from a new study – once the Autopilot self-driving tech is enabled on Tesla cars, human drivers tend to pay less attention to what's happening on the road.

- Oversight

  "Human-in-the-loop"
  "Competent human intervention"

- Currently no clear liability standards for "AI users"

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Definition of Standard of Care Has Not Changed

- You will still be held to practicing at **"the standard of care."**

- Humans will continue to be caregivers!
- AI *may* help.

AI and Risk: This Time is Different….

- EHR's have not made care easier or safer.
  - E.g., No reduction in medication errors.
  - Still takes 4,000 clicks to complete a single EM shift.
- Significant noise is present in AI documentation, diagnoses.
- Attentive users are critical.
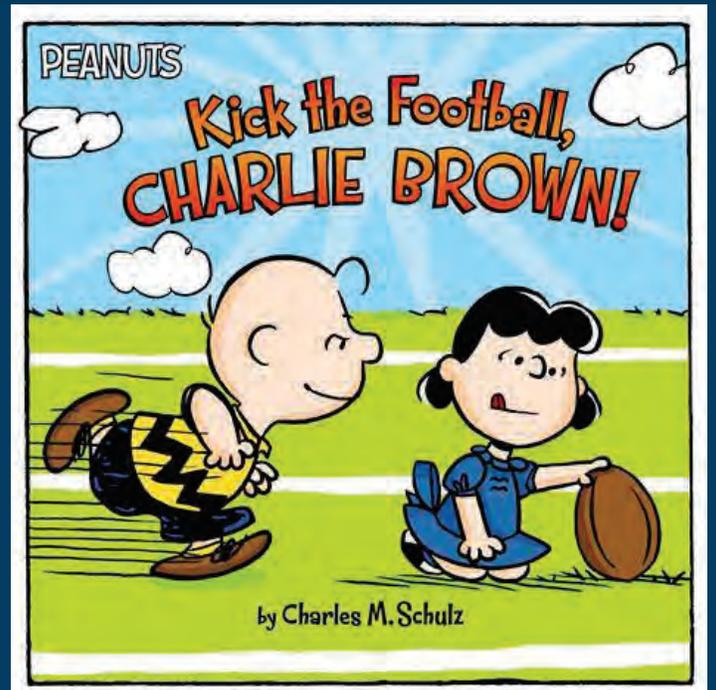
Thank You! Questions?

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