



# Practical Use(s) of AI in Medical Education

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# Outline



Finding a shared definition of AI



Current impacts on medical education



Current and near future impacts on clinical care



Risks to monitor



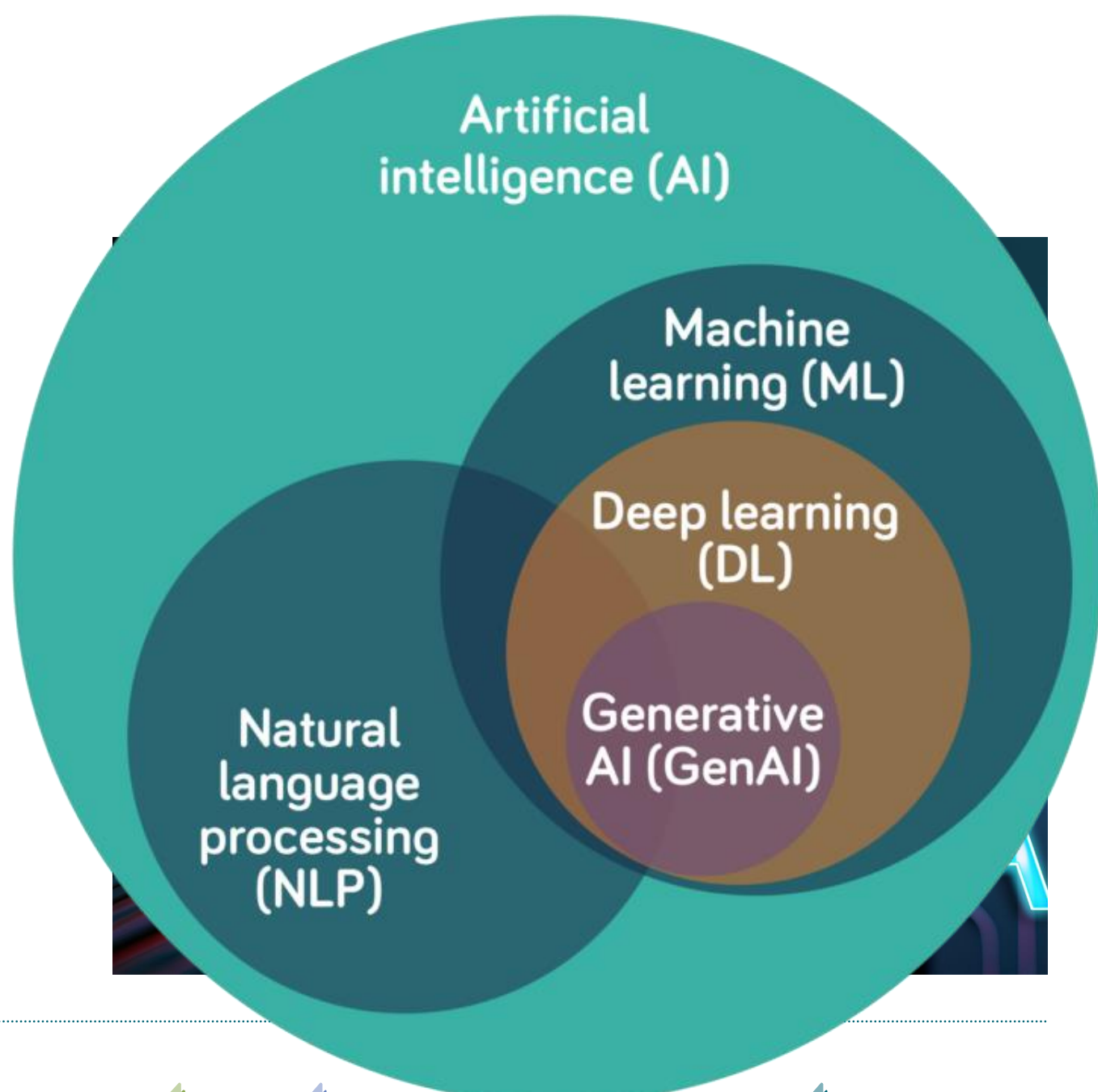
Discussion/Questions

# Disclosures

- No relevant financial disclosures
- Chair, ACP Medical Informatics Committee
- Voting Representative to HL7 International Standards Organization
- Neither of these roles are compensated
- ...and I did use ChatGPT4o to create parts of this talk

# What is AI?

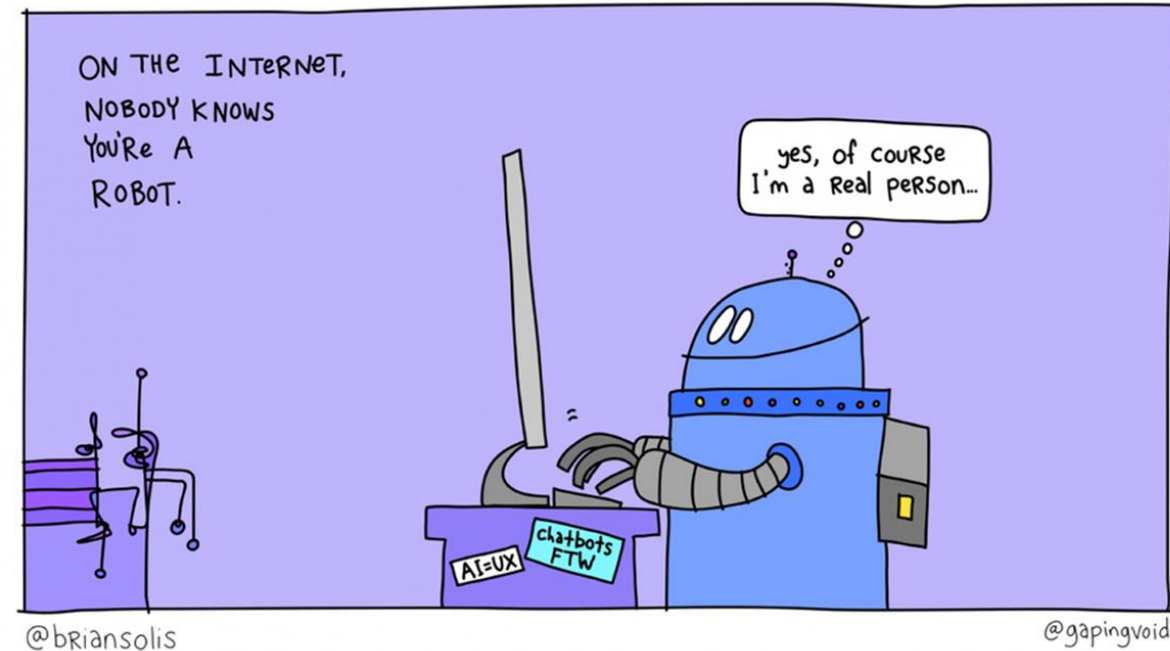
- Preferred term, supported by ACP and AMA policies, is “Augmented Intelligence”
- AI
  - Machine Learning / Deep Learning
  - Large Language Models
  - Generative AI
  - Natural Language Processing (NLP)
  - Computer “Vision”
  - Differential Builders
  - Diagnosis Aids
  - Self-Triage



<https://neosnetworks.com/resources/blog/what-is-ai-in-networking/>

# Why all the hype now?

- Chat GPT release
- Advancement in medical applications
  - Prediction models
  - Generative text
- Popular press
- Medical applications:
  - AI's potential to reduce workload, enhance diagnostic accuracy, and improve learning through data-driven decisions.



# Current Medical Education Impacts

- **Personalized Learning:** AI algorithms that tailor educational content to individual learning styles and needs, improving comprehension and retention
- **AI Tutors:** Virtual assistants that help medical students review and understand complex concepts outside of traditional classroom hours
- **Simulation and Virtual Reality:** AI in simulations provides a risk-free environment for students to practice procedures and decision-making
- **Assessment Tools:** AI can create and grade exams, analyze answers for trends, and provide feedback to learners, making assessments more efficient and data-driven

# Let's try management of COPD exacerbations

I have a patient with a COPD exacerbation in the hospital, can you remind me the core principles of managing this?



Managing a COPD exacerbation in the hospital follows a structured approach aimed at stabilizing the patient's respiratory status, alleviating symptoms, and addressing the underlying triggers. Here's a summary of the core principles:

## 1. Oxygen Therapy:

- **Goal:** Maintain target oxygen saturation of 88-92% (or patient's baseline if known).
- Avoid excessive oxygenation, which can cause hypercapnia (high CO<sub>2</sub> levels) in COPD patients.

## 2. Bronchodilators:

- **Short-acting  $\beta_2$ -agonists (SABA):** Albuterol (nebulized or metered-dose inhaler) is first-line.
- **Short-acting anticholinergics:** Ipratropium can be added to improve bronchodilation.
- Use nebulizers or inhalers with spacers for delivery depending on patient condition.

## 3. Systemic Corticosteroids:

- Prednisone 40 mg daily (or equivalent) for 5-7 days.
- Can shorten recovery time and improve lung function.

## 4. Antibiotics (if needed):

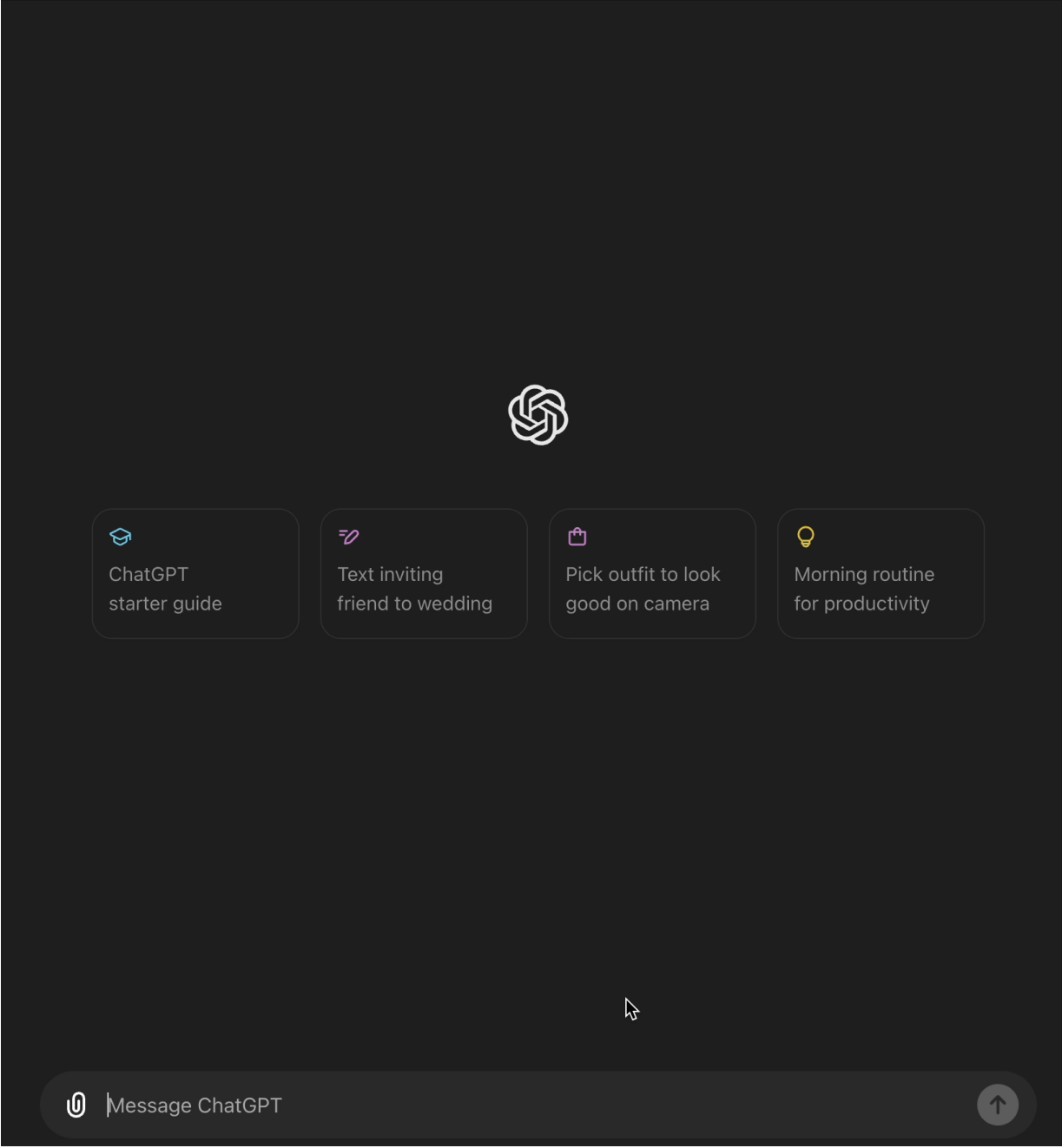
- Indicated if there's evidence of a bacterial infection, such as:

# More Medical Education Impacts

- **Medical School & Residency Applications:** We know applicants are using ChatGPT and other similar tools to help write personal statements/summaries
- **Reviewing Applications:** For several years, residency programs have used AI tools that use NLP to "read" resident applicant files



# Example of a personal statement



# Can we reliably detect AI generated text?

Weber-Wulff et al.  
*International Journal for Educational Integrity* (2023) 19:26  
<https://doi.org/10.1007/s40979-023-00146-z>


International Journal for  
Educational Integrity

ORIGINAL ARTICLE

Open Access



## Testing of detection tools for AI-generated text

Debora Weber-Wulff<sup>1</sup>, Alla Anohina-Naumeca<sup>2</sup>, Sonja Bjelobaba<sup>3\*</sup> , Tomáš Foltýnek<sup>4</sup>, Jean Guerrero-Dib<sup>5</sup>,  
Olumide Popoola<sup>6</sup>, Petr Šigut<sup>4</sup> and Lorna Waddington<sup>7</sup>

### Discussion

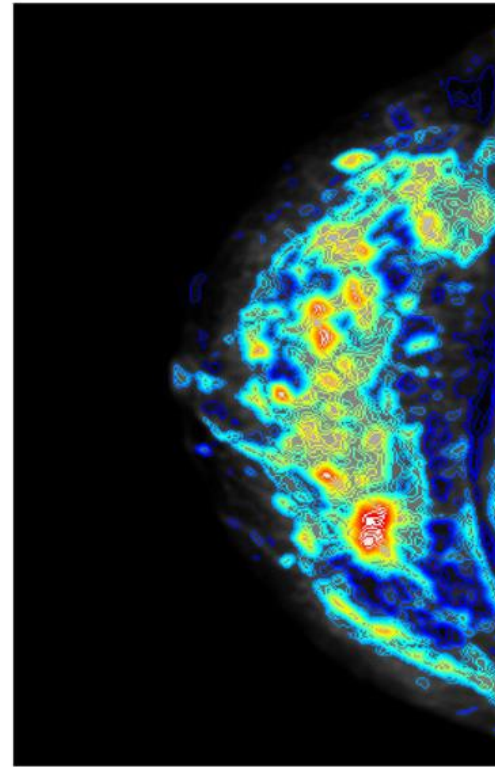
Detection tools for AI-generated text do fail, they are neither accurate nor reliable (all scored below 80% of accuracy and only 5 over 70%). In general, they have been found to diagnose human-written documents as AI-generated (false positives) and often diagnose AI-generated texts as human-written (false negatives). Our findings are consistent

# Current Clinical Care Impacts

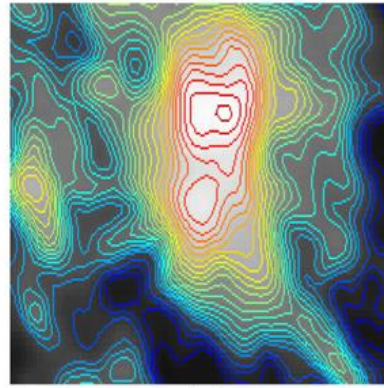
- **AI in Diagnostics:** AI-powered systems that analyze medical data, imaging, and pathology results to assist in early and accurate diagnosis.
- **AI in Decision Support:** AI systems that assist clinicians by offering evidence-based treatment suggestions, reducing the margin for human error.
- **Virtual AI Assistants:** Virtual assistants that screen patients or even participate in visits and help documentation



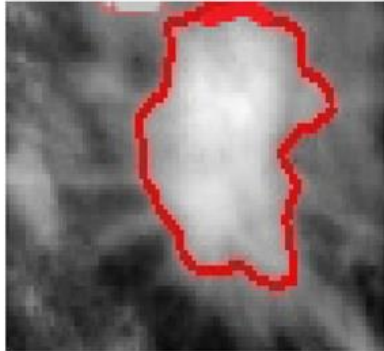
(a)



(b)



(c)



(d)

# Computer Visualization

# Predictive Analytics

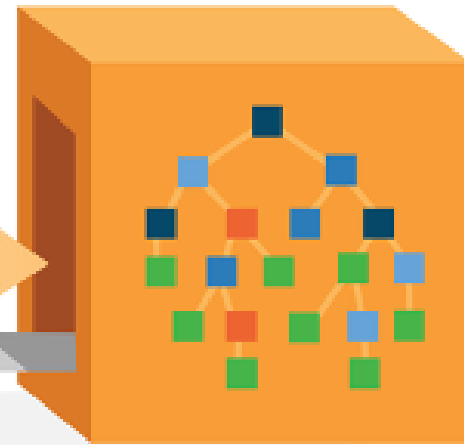
## Patient Data

Structured and Unstructured



## HBI Risk Model Engine

Machine Learning



## Patient Risk Scores

Population & Admission Event Based



Demographic & Socioeconomic



Real-time Clinical Data with Natural Language Processing



Billing & Claims



Modeling processes include ensemble, decision tree, random forest, & survival.



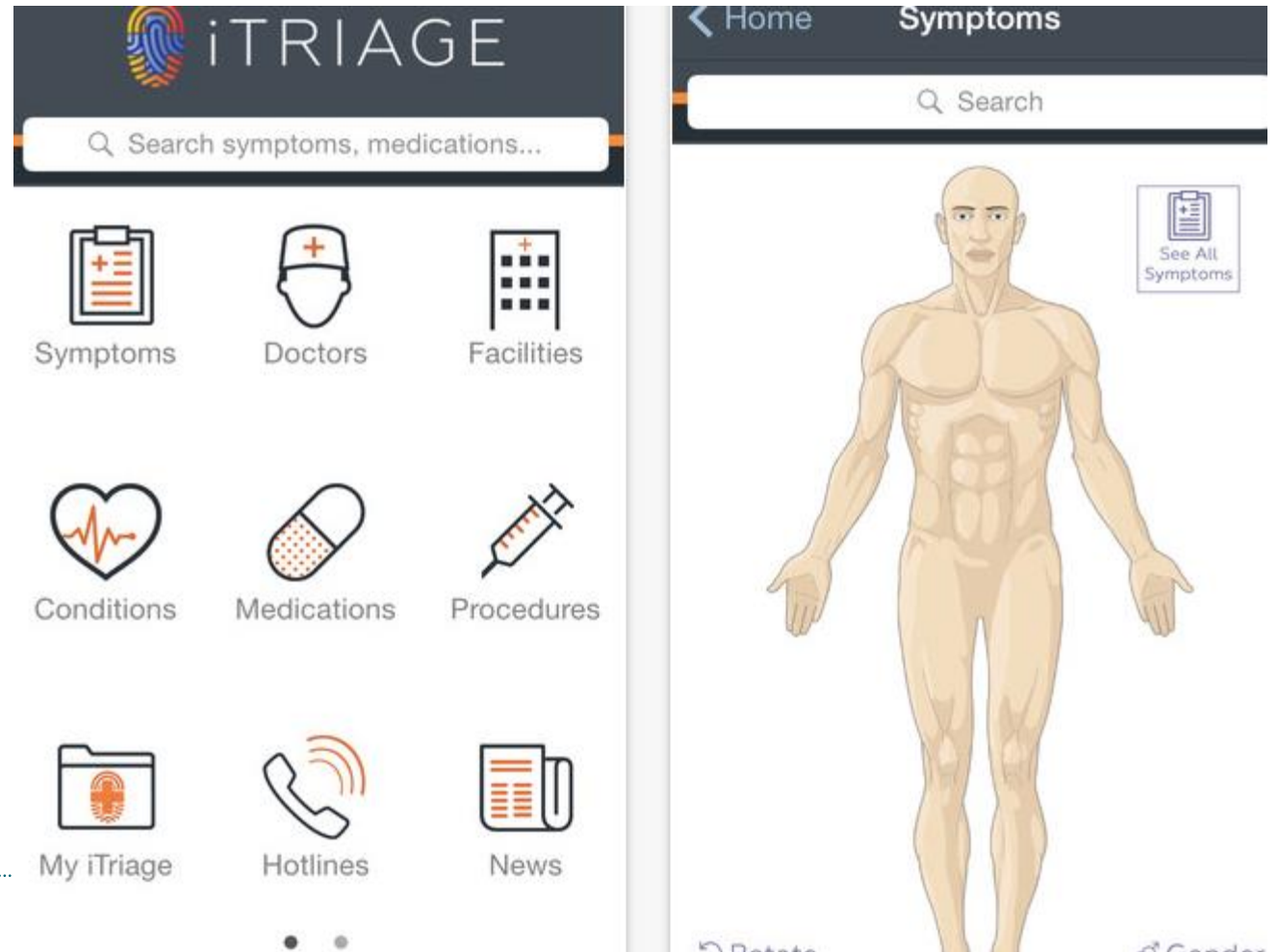
30-Days Post-Discharge Risk



Future 12-Month Risk

# Symptom Assessments & Self Triage

- Patient reported information
- Can help build differential
- Potentially suggest diagnostic testing
- Opportunity to incorporate into documentation
- Opportunities
  - Appropriate Triage (Office vs. ED vs. Urgent Care vs. remain at home)
  - Streamline communication



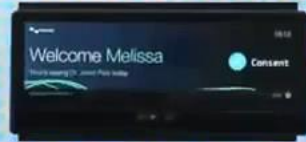
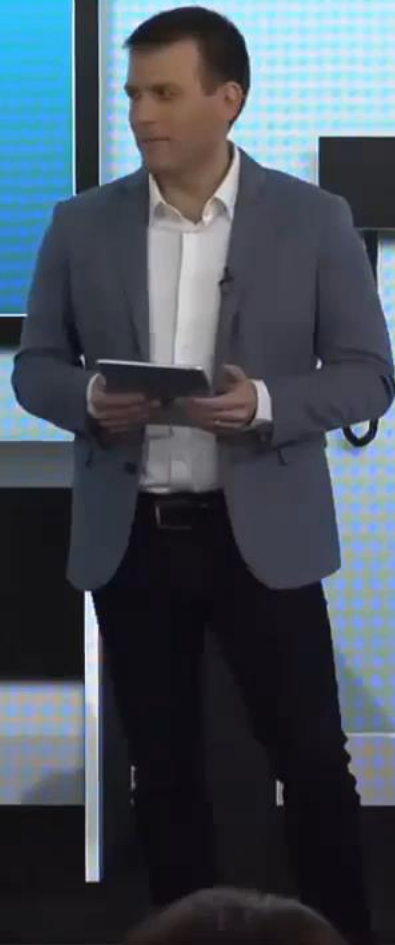


# Exam Room of the Future



# Exam Room of the Future NOW





# Certainly some false starts with predictive analytics

JAMA Internal Medicine | [Original Investigation](#)

## External Validation of a Widely Implemented Proprietary Sepsis Prediction Model in Hospitalized Patients

Andrew Wong, MD; Erkin Otles, MEng; John P. Donnelly, PhD; Andrew Krumm, PhD; Jeffrey McCullough, PhD; Olivia DeTroyer-Cooley, BSE; Justin Pestrue, MEcon; Marie Phillips, BA; Judy Konye, MSN, RN; Carleen Penozza, MHSA, RN; Muhammad Ghous, MBBS; Karandeep Singh, MD, MMSc

**IMPORTANCE** The Epic Sepsis Model (ESM), a proprietary sepsis prediction model, is implemented at hundreds of US hospitals. The ESM's ability to identify patients with sepsis has not been adequately evaluated despite widespread use.

**OBJECTIVE** To externally validate the ESM in the prediction of sepsis and evaluate its potential clinical value compared with usual care.

**DESIGN, SETTING, AND PARTICIPANTS** This retrospective cohort study was conducted among 27 697 patients aged 18 years or older admitted to Michigan Medicine, the academic health system of the University of Michigan, Ann Arbor, with 38 455 hospitalizations between December 6, 2018, and October 20, 2019.

- + Editorial
- + Multimedia
- + Supplemental content

# What's coming (relatively soon)?

- **More Predictive Algorithms:** Increased integration of AI into clinical care with more predictive algorithms
- **Patient Communication:** Provide more detailed (and empathetic) responses to patient messages. Triage messages when appropriate
- **Personalized Medicine:** Enhancing personalized medicine (e.g., predicting patient outcomes and tailoring treatments)
- **Sifting Through Data:** Near term NLP within scanned documents in Epic, later more sophisticated abilities to summarize patient history after "reading" the chart

# Patient Message Example

## Doximity GPT

A HIPAA-compliant medical writing assistant that can compose patient education, recommendation letters, grant proposals, odes to being post-call—basically any writing task you can think of.

Powered by GPT-4o

Write a prior auth letter for a CGM device  
Write a prior authorization letter for my patient with type 1 diabetes who...

Explain renal dosing of antihypertensives  
What is the proper renal dosing for antihypertensive meds?

What's the DDX for sudden dyspnea?  
What is the differential diagnosis for sudden onset dyspnea?

Draft a SOAP note for an ACL tear  
Draft a sample SOAP note for 30yo M with soccer ACL tear

Tap on prompt library or type here.

Please review for accuracy. Remember, GPT is an assistant; you're the authority here.



# Epic Development

- AI generated patient summaries
  - Background
  - Insights for recent events
  - Hospital Course
  - Inter-visit summary
- Patient reply drafts
- CDI within your notes as you write
- LOTS of other AI related work

The screenshot shows the Epic EHR interface with a 'Patient Story Summary' generated by AI. The summary is titled 'Draft By Art' and 'AI Pioneering'. It is addressed to 'Hello Michael' and discusses blood pressure concerns, medication adherence, and dietary recommendations. The interface includes a 'Learn More' link, 'Start with Draft' and 'Start Blank Reply' buttons, and a 'Generate Summary' button at the bottom. A 'References' section is also visible, listing medical findings like 'Patient's respiratory depth is irregular' and 'Treatment plan now includes medicated aerosol therapy and bronchodilators via nebulizer'.

# Where is the quicksand?

- **Data Privacy and Security:** Handling sensitive patient data within AI systems raises concerns about data breaches and ethical management.
- **Bias in AI Models:** AI models may be biased if trained on non-representative data, leading to skewed or unfair outcomes in medical decisions or educational assessments.
- **Over-reliance on AI:** The risk of clinicians or students relying too heavily on AI, potentially reducing critical thinking or clinical judgment.
- **Regulation and Accountability:** Ensuring there are clear regulations for AI's use in healthcare and education, including who is held accountable if something goes wrong.
- **Job Displacement:** Concerns about AI replacing certain roles in healthcare and education, although it is likely to augment rather than replace professionals.

# Advocacy and Regulation

Annals of Internal Medicine

POSITION PAPER

## Artificial Intelligence in the Provision of Health Care: An American College of Physicians Policy Position Paper

Nadia Daneshvar, JD, MPH; Deepti Pandita, MD; Shari Erickson, MPH; Lois Snyder Sulmasy, JD; and Matthew DeCamp, MD, PhD; for the ACP Medical Informatics Committee and the Ethics, Professionalism and Human Rights Committee\*

Internal medicine physicians are increasingly interacting with systems that implement artificial intelligence (AI) and machine learning (ML) technologies. Some physicians and health care systems are even developing their own AI models, both within and outside of electronic health record (EHR) systems. These technologies have various applications throughout the provision of health care, such as clinical documentation, diagnostic image processing, and clinical decision support. With the growing availability of vast amounts of patient data and unprecedented levels of clinician burnout, the proliferation of these technologies is cautiously welcomed by some physicians. Others think it presents challenges to the patient-physician relationship and the professional integrity of physicians. These dispositions are understandable, given the “black box” nature of some AI models, for which specifications and development methods can be closely guarded or proprietary, along with the relative lagging or absence

of appropriate regulatory scrutiny and validation. This American College of Physicians (ACP) position paper describes the College’s foundational positions and recommendations regarding the use of AI- and ML-enabled tools and systems in the provision of health care. Many of the College’s positions and recommendations, such as those related to patient-centeredness, privacy, and transparency, are founded on principles in the ACP Ethics Manual. They are also derived from considerations for the clinical safety and effectiveness of the tools as well as their potential consequences regarding health disparities. The College calls for more research on the clinical and ethical implications of these technologies and their effects on patient health and well-being.

*Ann Intern Med.* doi:10.7326/M24-0146

For author, article, and disclosure information, see end of text.

This article was published at Annals.org on 4 June 2024.

Annals.org

1. Complement physician work
2. Adhere to medical ethics, enhance patient care & equity
3. Transparency in development and testing
4. Prioritize privacy and confidentiality
5. Safety, effectiveness, equity as top priorities
6. Reduce rather than exacerbate disparities
7. Developers should be accountable for performance of models
8. Reduce physician burden
9. Training at all levels
10. Environmental impacts should be considered

# What should we focus on in education?

- Assure learners know risks of AI tools, where they can fall short
- Provide a strong knowledge base, so that learners can identify inaccuracies
- Educate on risks of bias, need to investigate sources
- Maintain sense of curiosity, seeking primary sources
- Be open to POSITIVE impacts on our learners (and patients) from AI tools







**Discussion/Questions?**

# Thank you!

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- [Ross.Hilliard@mainehealth.org](mailto:Ross.Hilliard@mainehealth.org)



# Additional References

1. Quinonez S, Stewart D, Banovic N. *ChatGPT and Artificial Intelligence in Graduate Medical Education Program Applications*. JGME. Aug 2024.
2. Weber-Wulff, D., Anohina-Naumeca, A., Bjelobaba, S. *et al*. Testing of detection tools for AI-generated text. *Int J Educ Integr* **19**, 26 (2023).
3. Osheroff, J.A., Teich, J.A., D. Levick et al. [Improving Outcomes with Clinical Decision Support: An Implementer's Guide](#). 2nd Edition. Chicago, IL: HIMSS, 2012: p. 15.
4. Nuance Internal Demo – Dragon Ambient Xperience (DAX)
5. Epic User Group Meeting 2024 – “Cool Stuff Ahead” **NOTE: Not to be replicated or shared outside of MaineHealth**