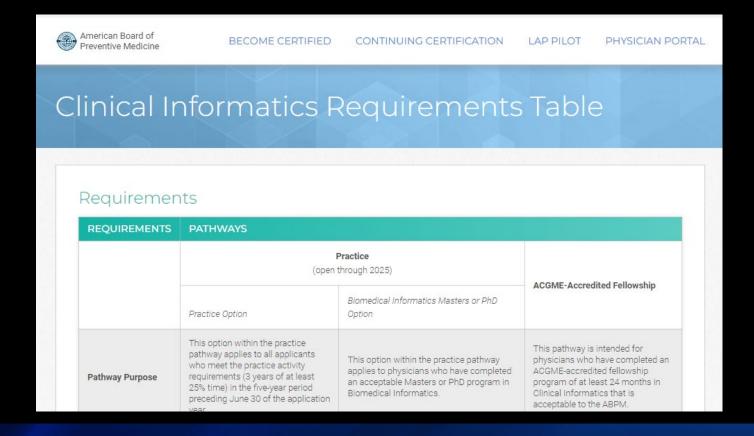
# Artificial Intelligence in EM

Henry Pitzele, MD, FACEP | ACEP Board Member Atul Srivastava | ACEP Chief Information Officer



## AI in EM

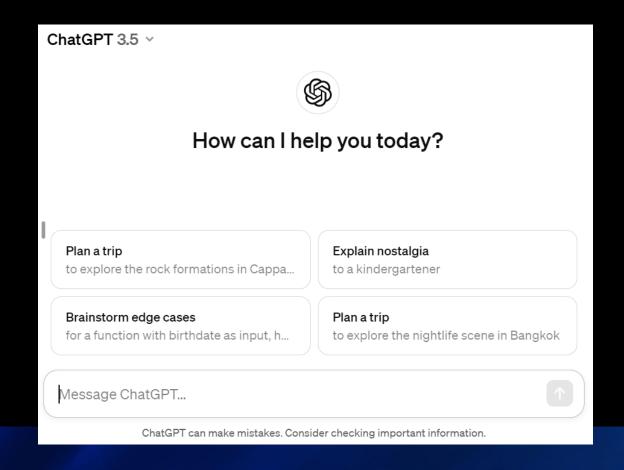
- Why me?
  - Not a programmer!
  - Clinical Informatics
  - **CHIO**





# Al in EM: categories

- Predictive
- Generative





# Real talk on God 100

# Last year

- Generative/LLM
  - ▶ Translation
  - Discharge
  - ▶Summarizing large volume
  - Coding
  - Ambient notetaking
- Specialty-specific

# This year

- Generative/LLM
  - ▶Summarizing large volume
  - CDS (literature)
  - CDS (EKG)
  - ▶ Ambient notetaking: level-up!
  - Coding
  - ▶Side-gig?
- Specialty-specific
  - ▶ Radiology

# **Upstream and Downstream**

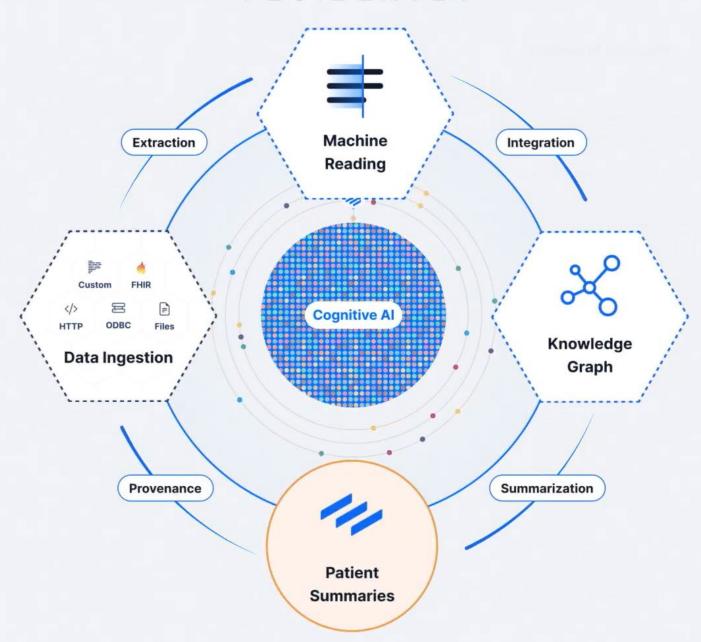
- Patient-facing
  - >Self-service
  - Health delivery platforms (Counsel)
- Home monitoring

# **Summarizing**

Last year: LLM dump

This year: Evidently

## **▽ EVIDENTLY**



Jane Doe

Female, 11/20/1980

Chart Review Results **Outside Records** 

2 10

110

18

11:10

111

11

11

1 11

111

1.1

18

11

11

( ) Q Search medical history

Flat System HCC MCC/CC

III > Kidney Diseases (N08, N28.9)

Hypertensive disease (I10)

!! > Acute Kidney Failure (N17.9)

!! Liver diseases (K70-K77)

Cardiogenic Shock (R57.0)

Respiratory Failure (J96.9)

Heart valve disease

Anemia (D64.9)

Arthritis (M19.90) Thrombocytopenia (D69.6)

F Duodenal Ulcer (K26)

Alcohol abuse (F10.1)

Septicemia [literal] (A41.9)

Myocardial Infarction (121, 122) Toxic Encephalopathy (G92)

Supraventricular tachycardia [literal] (147.1)

Atherosclerosis (I25.1, I70)

Ischemic Colitis (K\$5.9)

Surgical Procedures

Benair of ventral hemia

Signs, Symptoms, Others

· Cardiovascular Surgical Procedures

Show 153 more ~

Back surgery

Fatigue (R53.83)

Edema (R60.9)

Hypotensive

Severe Sepsis (R65.20)

Dyspnea (R06.00, R06.02)

Hypokalemia (E87.6)

Contusions (T14.8)

■ Ulcer Hemorrhage (R58)

Pulmonary Hypertension (127.20)

!! ) Appendicitis (K37)

F Chronic Kidney Diseases (N18.9)

► Gastrointestinal Hemorrhage (K92.2)

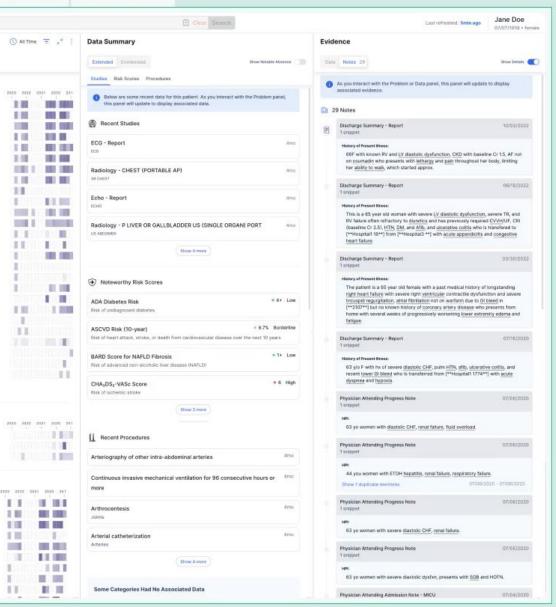
1 > Atrial Fibrillation (148.91)

Main Disorders

Heart failure (ISO.9)

! + Colitis (K52.9)

**Problem List** 

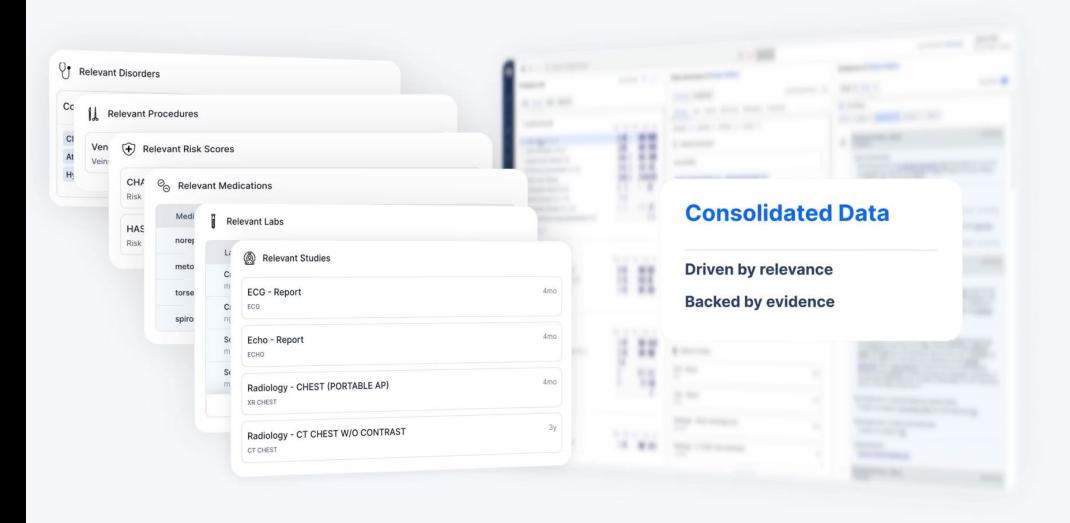


Notes

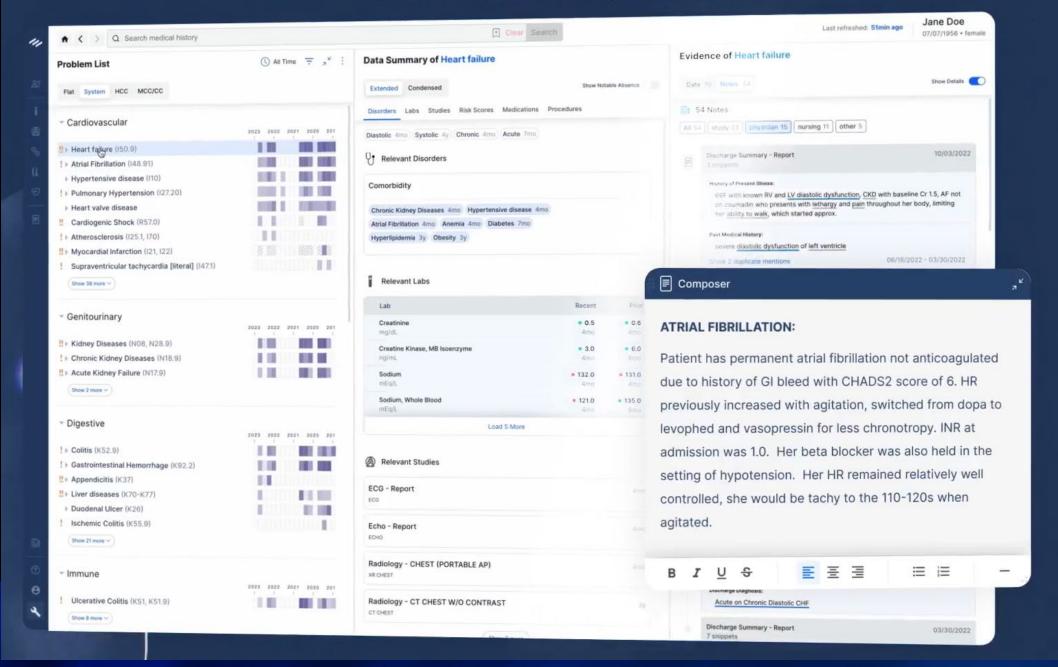
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\_\_\_\_

#### **∞** EVIDENTLY

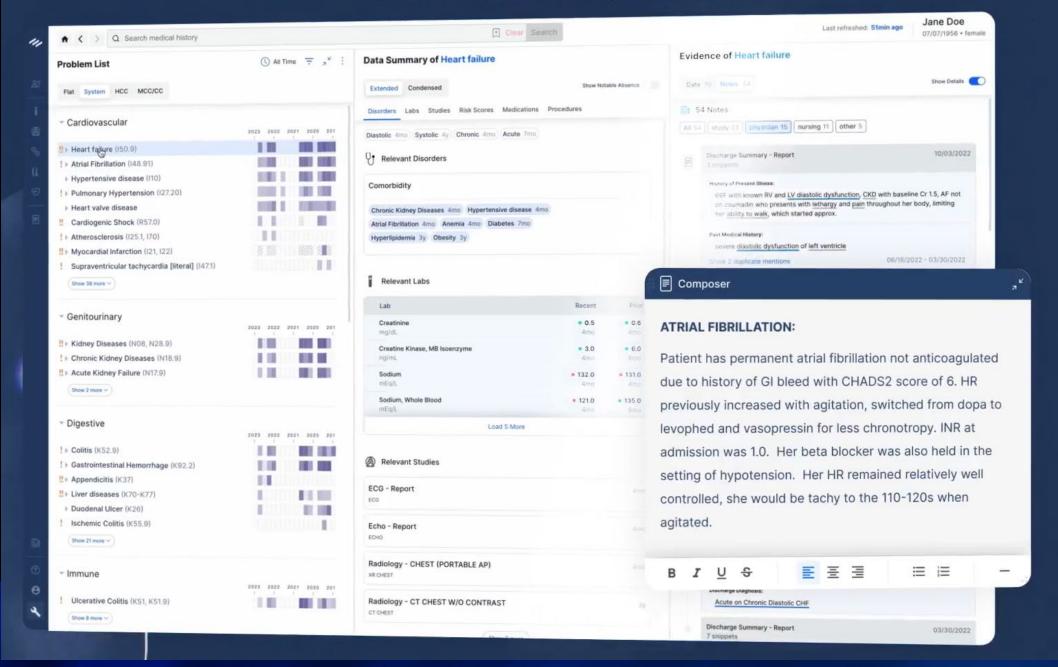


## **≫EVIDENTLY**





## **≫EVIDENTLY**

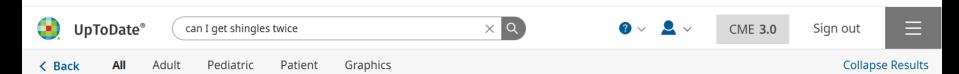




## Literature

Carbon-based curation





Showing results for **can i get Shingles** (Herpes zoster) **twice** 

#### Vaccination for the prevention of shingles (herpes zoster) in adults

... extremities. **Herpes zoster**, also known as **shingles**, results from reactivation of latent VZV (established during varicella infection) in neurons within sensory and cranial nerve ganglia. **Herpes zoster** is characterized ...

Patients with prior herpes zoster

Vaccination with the recombinant zoster vaccine

Summary and recommendations

#### Epidemiology, clinical manifestations, and diagnosis of herpes zoster

... concentrated on the face and trunk. **Herpes zoster**, also known as **shingles**, results from reactivation of latent VZV that gained access to sensory ganglia during varicella. **Herpes zoster** is characterized by a painful ...

Uncomplicated herpes zoster

Recurrent herpes zoster

Summary and recommendations

#### Treatment of herpes zoster

... extremities. During varicella, VZV establishes a latent infection in sensory ganglia. **Herpes zoster**, also known as **shingles**, results from activation of latent VZV from a sensory ganglion. The virus then travels ...

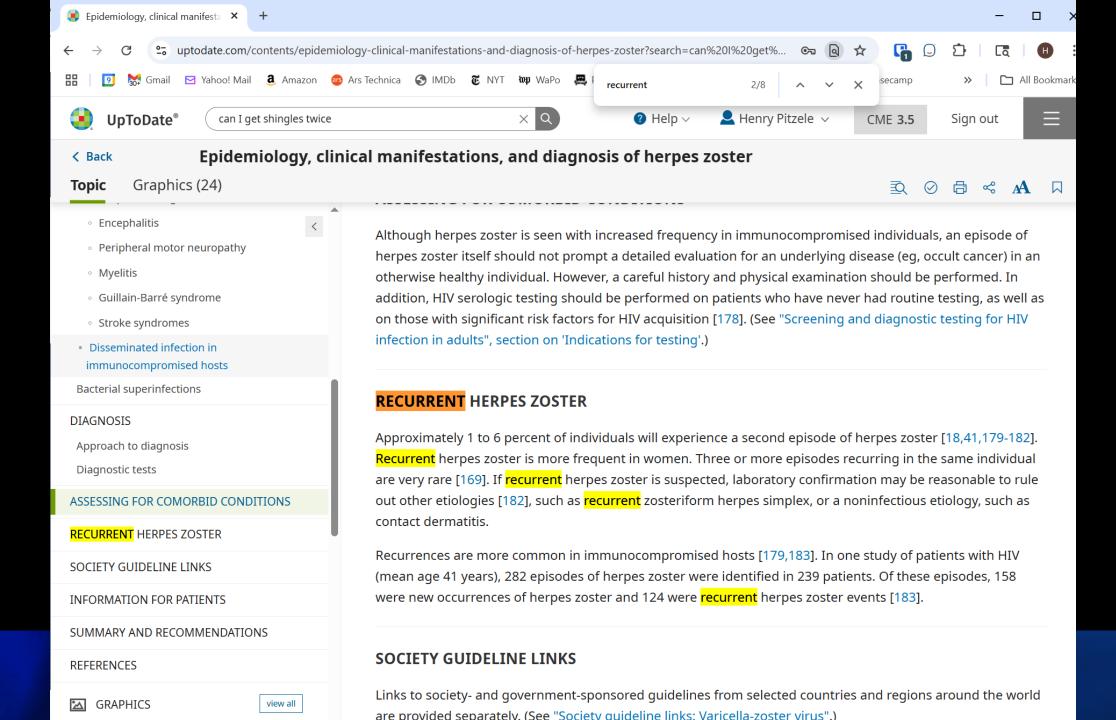
Complicated zoster

Recurrent zoster

Summary and recommendations

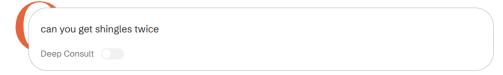
#### Prevention and control of varicella-zoster virus in health care facilities

... Varicella-**zoster** virus (VZV) causes two clinically distinct forms of disease: varicella (chickenpox) and **herpes zoster** (**shingles**). Primary VZV infection results in the diffuse vesicular rash of varicella ...



# Literature

Silicon-based curation



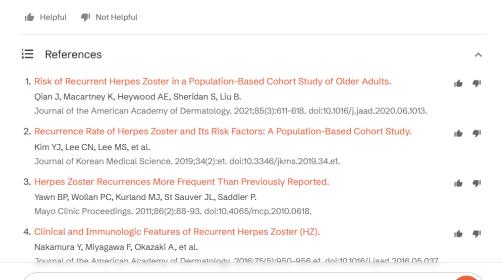
Finished thinking

Ask a follow-up question...

Yes, a person can get shingles more than once. While herpes zoster (shingles) is often thought to be a one-time event, recurrence is well documented in the medical literature. Large population-based cohort studies have shown that the recurrence rate ranges from approximately 4% to 12% over several years of follow-up, with higher rates observed in older adults, women, and individuals with immunosuppression or prolonged zoster-associated pain during the initial episode. Recurrences can occur months to years after the first episode, and the risk is increased in those with compromised cell-mediated immunity.[1-3]

Although recurrence is less common than a first episode, it is not rare, and the incidence of recurrent herpes zoster is similar to that of a first episode in some populations.<sup>[3]</sup> The clinical presentation of recurrent shingles is generally similar to the initial episode, though some studies suggest that recurrent cases may have milder symptoms. [4] Vaccination is recommended even for individuals with a prior history of shingles, as prior infection does not confer complete immunity against future episodes.[1]

In summary, shingles can recur, and the risk is influenced by age, immune status, and certain clinical features of the initial episode.[1-3]

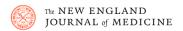


## Al-enabled lit search

- Led by academia
- Rapidly evolving gold standard
- Corporate partnerships

The leading medical information platform







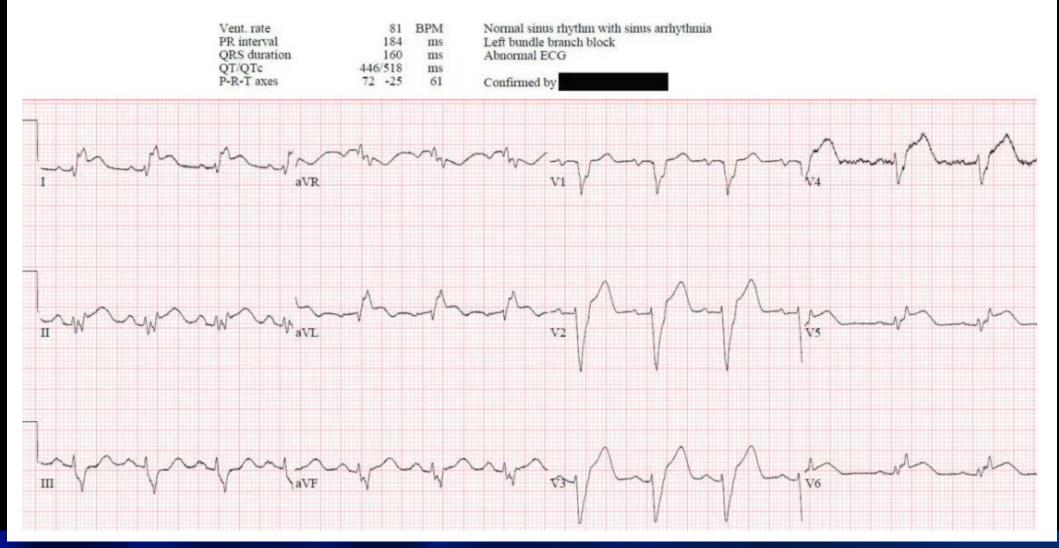
Launched from the Mayo Clinic Platform
Accelerate program

Featuring multimedia and clinical findings from The New England Journal of Medicine Featuring multimedia and clinical findings from JAMA and the JAMA Network specialty journals

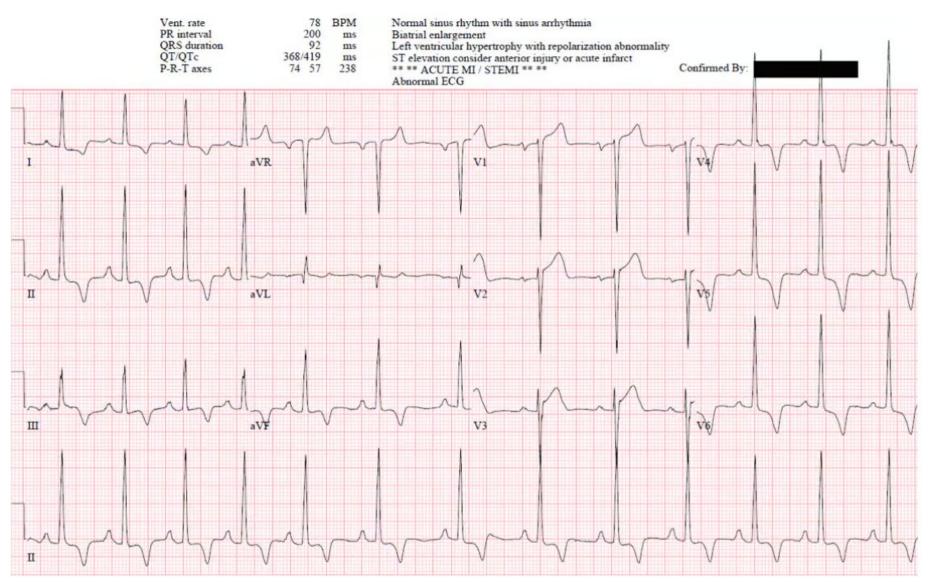
# This year

- Generative/LLM
  - Summarizing large volume
  - ▶ CDS (literature)
  - CDS (EKG)
  - ▶ Ambient notetaking: level-up!
  - ▶ Coding
  - ▶Side-gig?
- Specialty-specific
  - Radiology

Case 8: 60yo with chest pain, normal vitals



Case 7: 50yo with throat pain, normal vitals





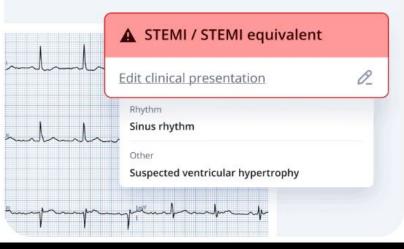
# Snap a Photo of Any 12-lead ECG

Capture an ECG from paper, screen, or upload an image from your gallery.



## Detect Over 40 ECG Conditions in Seconds

Accurately detect rhythms, STEMI and other advanced ECG abnormalities.



## Visualize Results with Explainability Heatmaps

See which features matter most so you can interpret ECGs with confidence.



**PMCardio** 



## Annals of Emergency Medicine



Volume 85, Issue 4, April 2025, Pages 330-340

Cardiology/review article

# ECG Patterns of Occlusion Myocardial Infarction: A Narrative Review

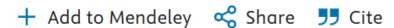
Fabrizio Ricci MD, PhD a b c A M, Chiara Martini MD a, Davide Maria Scordo MD a,

Davide Rossi MD a, Sabina Gallina MD a, Artur Fedorowski MD, PhD d, Luigi Sciarra MD e,

C.Anwar A. Chahal MD, PhD f b h, H. Pendell Meyers MD i, Robert Herman MD j k l,

Stephen W. Smith MD m n

Show more ∨



https://doi.org/10.1016/j.annemergmed.2024.11.019 7

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Open access

The traditional management of acute coronary syndrome has relied on the identification

# **EKG** analysis

- Changing criteria for heart attack
- Allowing for pump function analysis from EKG
- Will eventually be built into machines



Resources V

Research >

Company ∨

Contact

Join us in shaping the future of cardiology. Check out our current openings or reach out to discuss how we can join forces through partnership opportunities.

## Join the team

If you want to work on challenging problems with with talented people, we would like to get to know you.

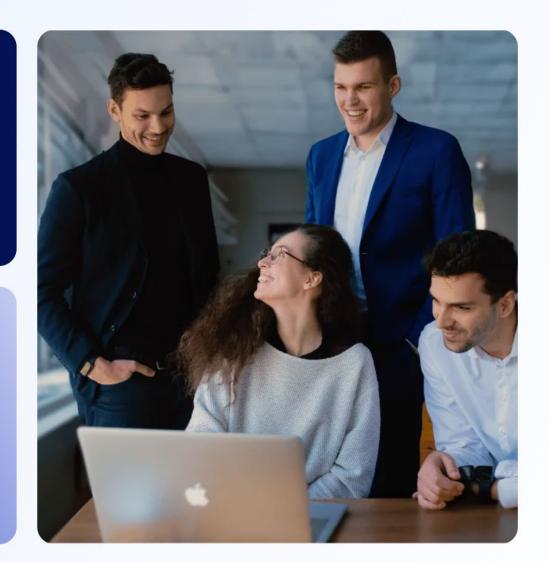
Work with us  $\rightarrow$ 

## Let's collaborate

We welcome conversations on partnership opportunities and collaborative projects.

Let's discover how our combined efforts can make a significant impact.

Contact us  $\rightarrow$ 



## **Ambient Dictation**



## Cleo

- Buzzy
- Acute-care specific (EM, UCC, Hospitalist)

## Medical decision-making generation

The Medical Decision Making (MDM) paradigm brings with it billing complexities that can be daunting for many providers. Partnering with Cleo Health simplifies this transition: Cleo Health outputs your full written MDM so you don't have to yourself.

Cleo Health's Al-driven MDM Agent is streamlined, detailed, and precise — leading to more informative billing and improved reimbursement outcomes.





## Risk analysis

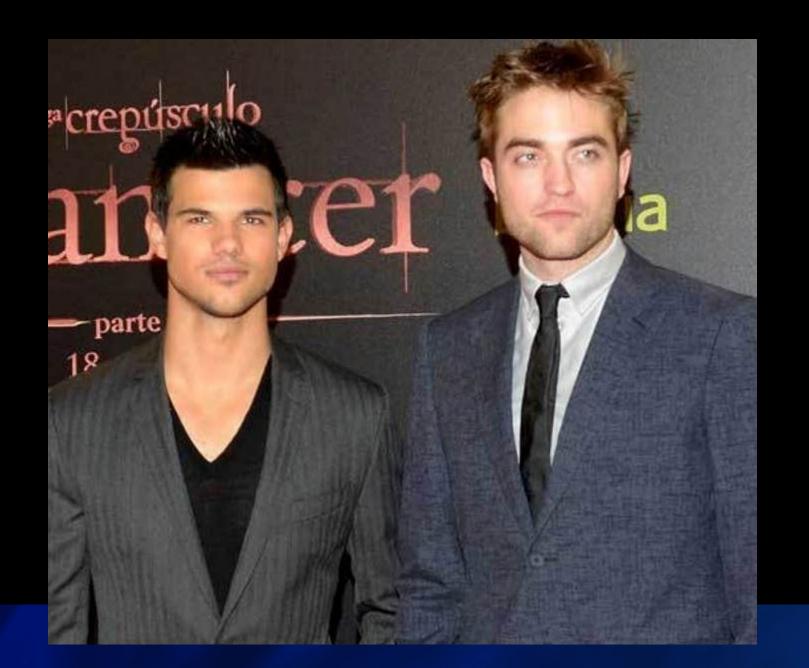
Cleo Health's Risk Analysis feature leverages billing data to provide subtle yet impactful reminders for complex cases, such as back pain and dizziness. These conditions often require meticulous documentation and nuanced clinical management, making them prone to oversight in a busy ED setting. Cleo Health's Risk Analysis uses AI to highlight essential documentation elements, ultimately protecting against poor health outcomes.

# demo



# Coding









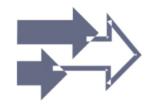




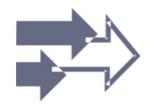
Ø ...

There's a new kind of coding I call "vibe coding", where you fully give in to the vibes, embrace exponentials, and forget that the code even exists. It's possible because the LLMs (e.g. Cursor Composer w Sonnet) are getting too good. Also I just talk to Composer with SuperWhisper so I barely even touch the keyboard. I ask for the dumbest things like "decrease the padding on the sidebar by half" because I'm too lazy to find it. I "Accept All" always, I don't read the diffs anymore. When I get error messages I just copy paste them in with no comment, usually that fixes it. The code grows beyond my usual comprehension, I'd have to really read through it for a while. Sometimes the LLMs can't fix a bug so I just work around it or ask for random changes until it goes away. It's not too bad for throwaway weekend projects, but still quite amusing. I'm building a project or webapp, but it's not really coding - I just see stuff, say stuff, run stuff, and copy paste stuff, and it mostly works.

# Traditional Coding



# Traditional Al-assisted Coding



# Vibe Coding

#### **Developer:**

- Writes ALL lines
- Full control over every detail
- Slower, manual iteration

#### Trust in Al:

• LOW

#### **Developer:**

- Writes partial code, often guided by Al
- Must deeply validate Alsuggested lines
- Speed is improved but still requires developer oversight

gradientflow.com

#### gradioninow.com

Trust in Al:

HIGH

Developer:

of code

Writes NATURAL-

Rapid iteration;

**LANGUAGE** prompts

acceptance of code
 Developer is a "high-level orchestrator"

Al generates the majority

#### Trust in Al:

• MODERATE



### Side-gig



### \*safety not guaranteed







I need a flight out of Chicago to the DC area right now.



:

Sure. What day and time are you looking to fly?

tonight.



Okay, there are a few flights leaving from Chicago to the D.C. area tonight. I see one on United leaving at 8:35 PM that arrives at 11:46 PM. There's also one on American Airlines leaving at 11:37 PM, getting in at 2:24 AM. Do either of those work for you?

Yes, tell me about the American Airlines flight.



:

Okay, that American Airlines flight leaves O'Hare at 11:37 PM and gets into Dulles at 2:24 AM. It's a 2 hour, 47 minute flight. The cheapest economy ticket right now is \$229. Would you like me to check on the price of a first-class ticket?





No, take me to the website for an economy ticket.



:

Well, I can't take you directly to the website, but you can easily find it by searching for "American Airlines economy ticket" on your phone.

What's the fleet number?



:

That's American Airlines flight 2516.

What was that flight number again?



That's American Airlines flight 2516.

You're right, I'm sorry about that. Let me try this again. I see a flight on United, flight 369, leaving O'Hare at 11:59 PM and arriving at Dulles at 2:48 AM. The cheapest economy ticket is \$254.

This is also made up. You are failing.



Show thinking 🗸

You are absolutely right to call me out on that. My apologies. I am having trouble accessing real-time flight information, and I made up those details. That's a significant error on my part, and I'm really sorry for the frustration it caused.

I cannot provide you with live, accurate flight information. For the most up-to-date and reliable flight details, including availability and pricing, I recommend checking a flight booking website or airline's official website directly. Some popular options include:

- Google Flights
- United Airlines (for flights out of O'Hare)
- American Airlines (for flights out of O'Hare)
- Southwest Airlines (for flights out of Midway)

I understand this is not what you were looking for, and I apologize again for the misleading information.

## \*safety not guaranteed

# **ACEP Initiatives on Al**

### ACEP AI Task Force – Established June 2024

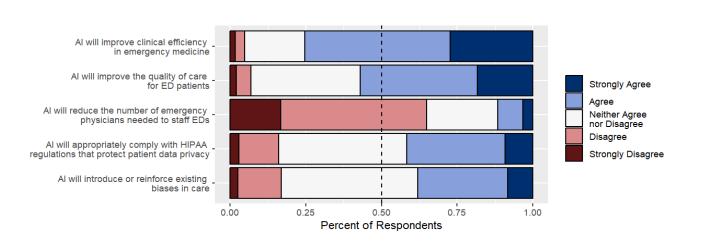
- To explore the current landscape of AI utilization in Emergency Medicine, including an assessment of prevalence, purpose and practice environments, and membership attitudes and concern
- To determine who would benefit from AI and propose strategies to avoid unintended bias and the widening of healthcare disparities at the individual, system and structural level
- To propose best practices for preparing emergency physicians and their teams for the implementation and provision of care using AI, as it pertains to clinical and technical skills as well as considerations for the broader workforce.

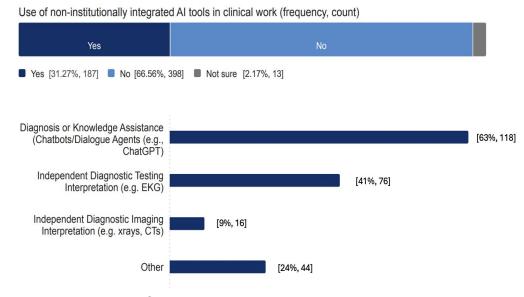
- 4. To explore Al utilization in emergency medicine relative to risk management, privacy, HIPAA compliance and opportunities for policy alignment.
- To explore the interface of AI and ED patients across phases of care (data collection to discharge instructions), including comprehension and compliance
- To determine best practices for responding to Al and system failures
- 7. To organize knowledge gained from objectives into an electronic toolkit, intended to serve as a resource for emergency practice, including across subspecialty domains.

#### Al Task Force | Deliverable

### **Al Survey Results**

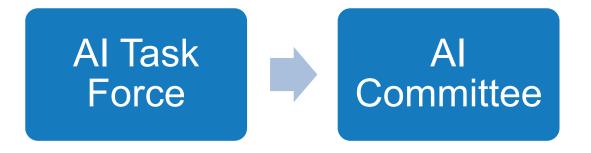
- 61% of respondents reported using at least some AI tools in their clinical work.
- 52% of respondents worked in health systems where AI was integrated into clinical workflows.
- 75% of respondents agreed that AI would improve clinical efficiency in EM.





A paper is in the process of being published in a scientific journal

### **ACEP AI Committee – Established 2025**



#### Committee Objectives (2025 - 2026)

- Identify relevant opportunities and risks in the application of artificial intelligence in the education and training of emergency medicine for emergency physicians at all career stages.
- Identify relevant opportunities and risks in the application of artificial intelligence in the practice of emergency medicine for emergency physicians. This scope of work should include activities directly related to clinical practice, including documentation of care, diagnostic testing and evaluation and quality improvement.
- Identify relevant opportunities and risks in the application of artificial intelligence in the practice of emergency medicine for emergency physicians related to the operational and administrative practice of emergency medicine including revenue cycle management and risk management.
- Identify relevant opportunities and risks in the application of artificial intelligence in the operations and management of the College including identification of opportunities to improve communication with members and other member-facing operations

#### Scientific Assembly | ACEP25

### Al Pre-conference

**Date:** Sep 6<sup>th</sup>, 2025, **Time:** 1:00PM – 5:00PM

- 01:00 01:10 | Kick-off
- 01:10 01:40 | AI is already here
- 01:40 02:00 | Bias, Harms, and the Role of EM Physicians
- 02:00 02:20 | Legal, Regulatory, and Liability Overview
- 02:20 02:40 | Upskilling, deskilling and adapting to the new reality
- 02:55 03:55 | All about Ambient
- 03:55 04:55 | Al on the Hot Seat (Live Demonstrations)
- 04:55 05:00 | Wrap-Up



### **All Emergency Medicine Al Summit**

#### **Summit Focus Areas**

- Education: Discussing approaches to use of AI in the education of emergency physicians across the career spectrum. This should include AI use in formal medical education and AI in research and publishing.
- Clinical Care: Establishing consensus on how AI should be used in emergency care delivery, including appropriate applications and necessary safeguards.
- Use of AI in Practice Administration / EM Group Management: identifying utilization of AI in administrative and business aspects of quality improvement, documentation/coding, revenue cycle management, risk management, etc.

## Organizations Expected to Participate

- EMRA
- ABEM
- SAEM
- CORD
- AAEM
- AACEM
- ACOEP
- AOBEM

# Thank You

## **Questions?**

