THE USE OF ARTIFICIAL INTELLIGENCE IN UROLOGY

Where AI Can Realistically Improve Resident Education

Beth Israel Lahey Health

Rus Korets MD

Beth Israel Deaconess Medical Center | HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

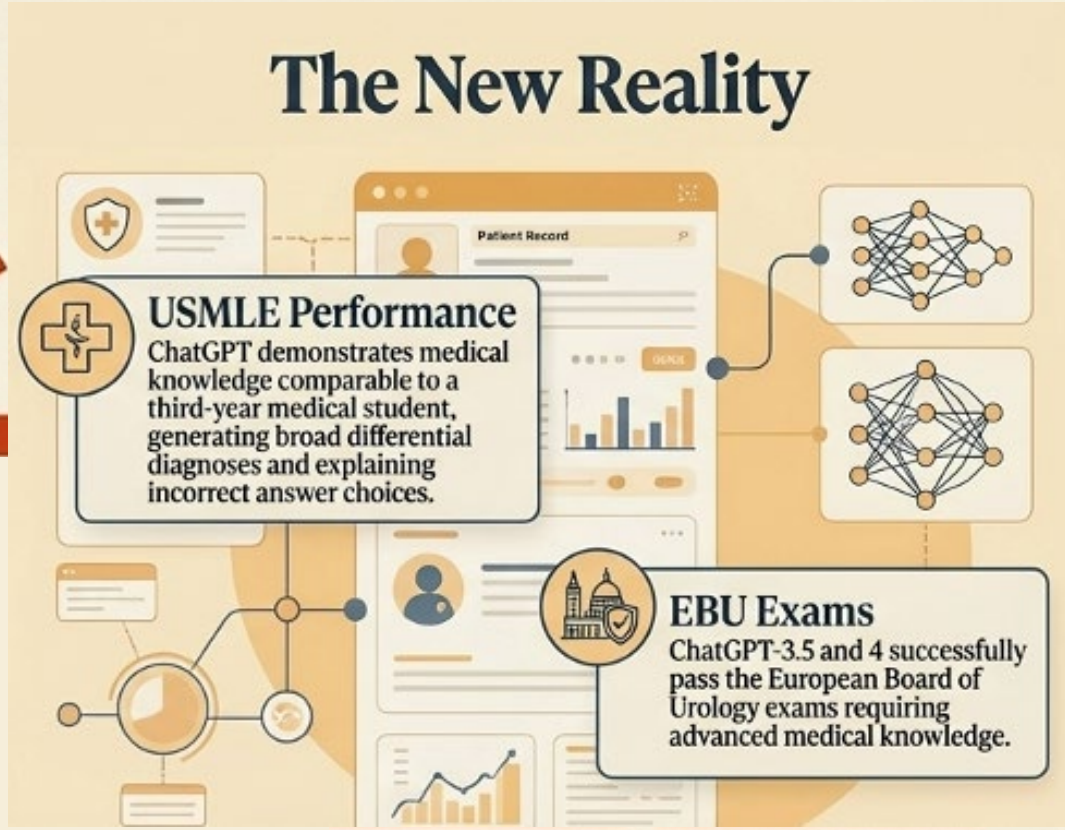
@BIDMCUrology


Restaurants
RESERVOIR DOGS.
PEARL JAM
BOSTON BRUINS
THE X FILES
You've Got Mail!

Status Quo

November 2022

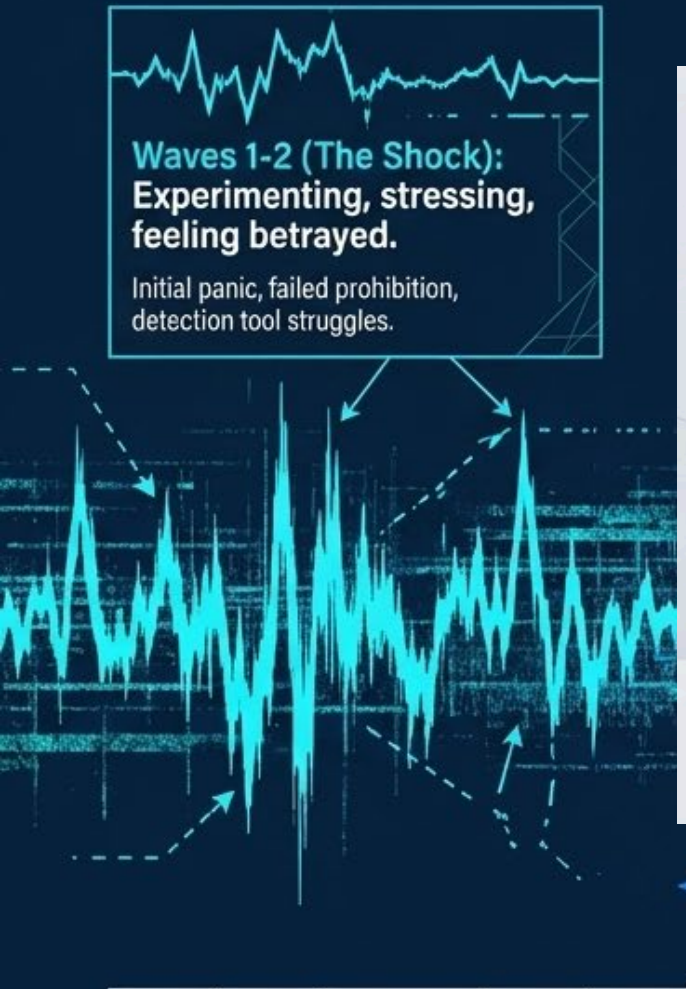
The New Reality

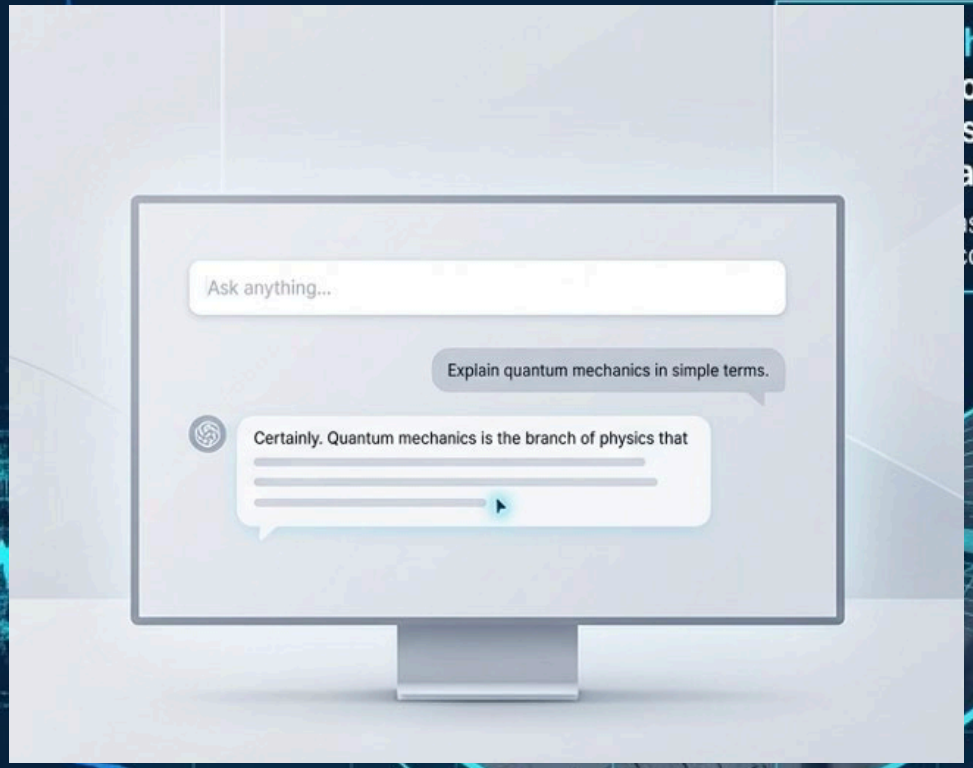


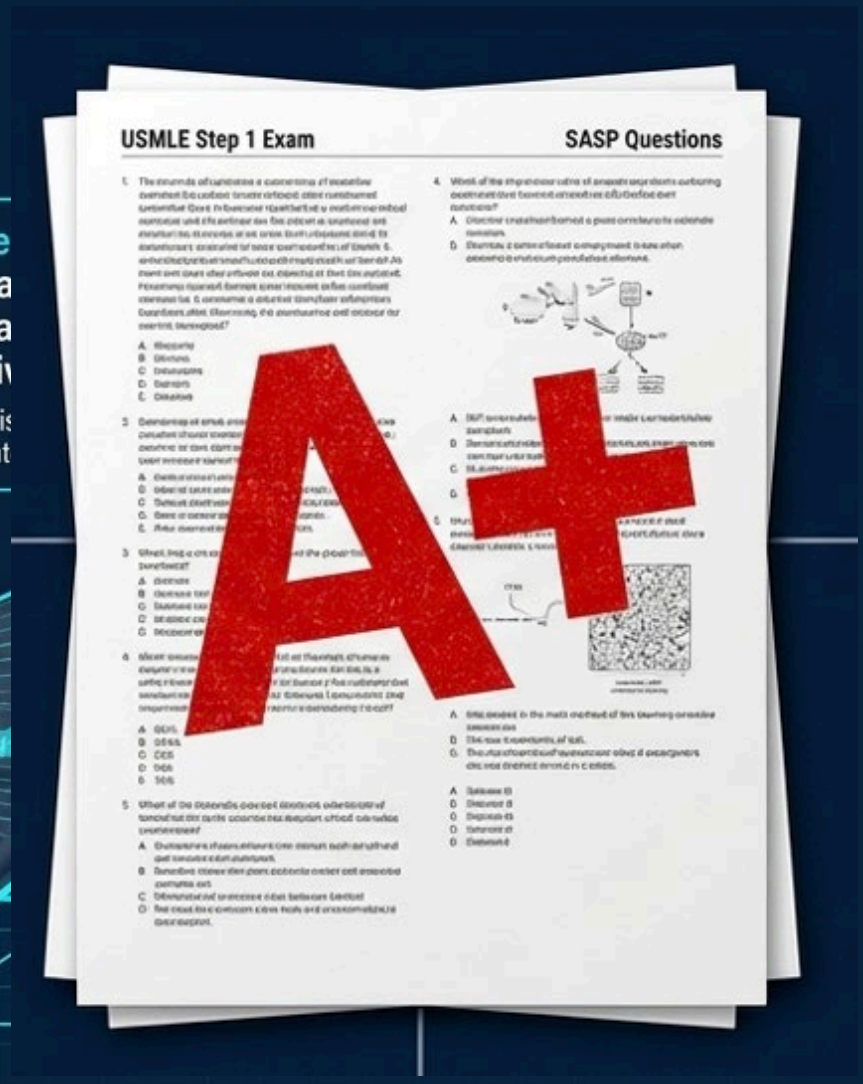
The two-year evolutionary curve of academia's response to AI.

Waves 1-2 (The Shock):
Experimenting, stressing, feeling betrayed.

Initial panic, failed prohibition, detection tool struggles.





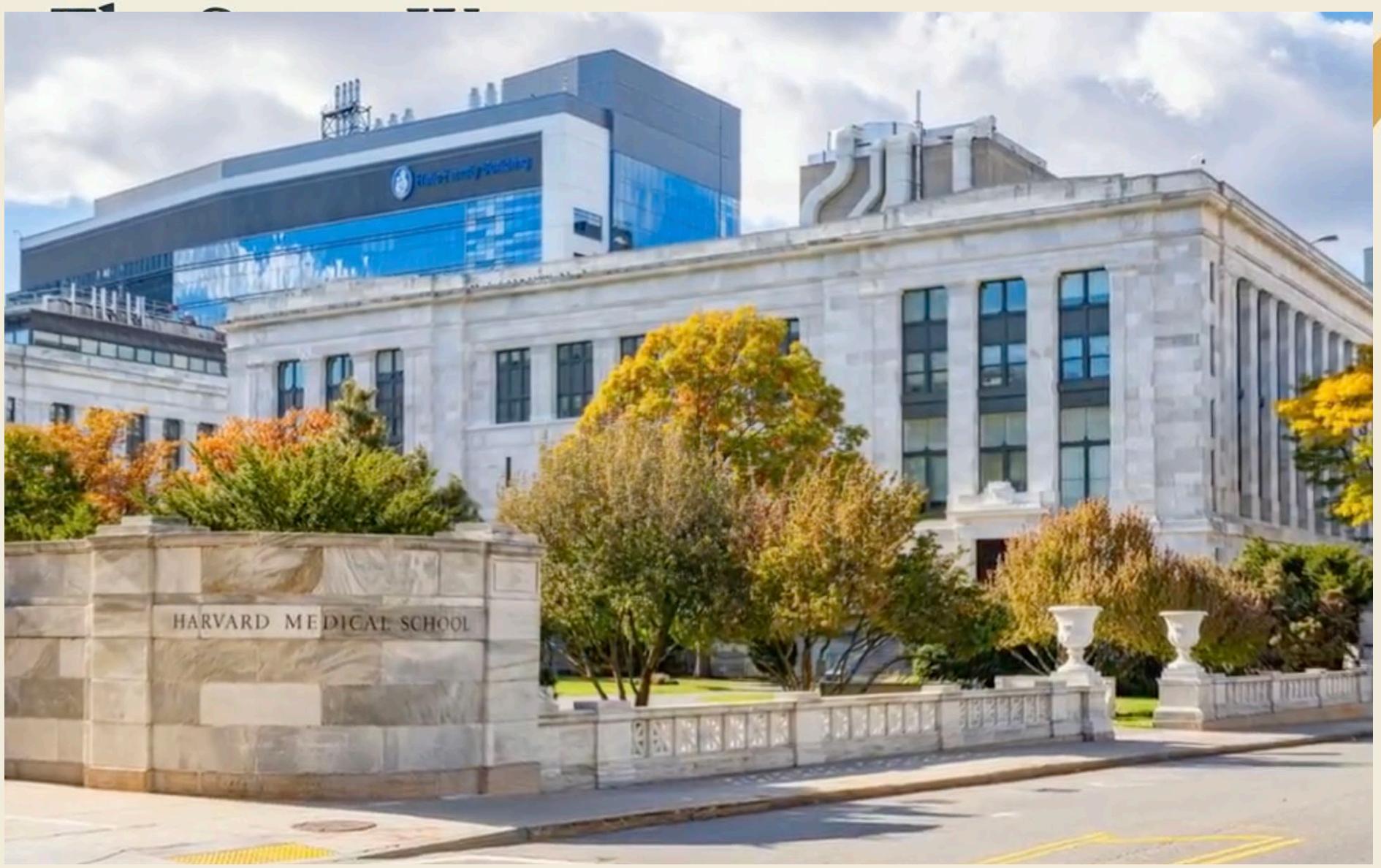


2023

2025

Time

The Institutional Crisis:



Wave 6 & 7: Symbiosis

Using AI to support learners and actively actively revising policies to integrate AI into curricula.

The Illusion of Competence



Hallucinations & Misinformation

Confident outputs can be wrong

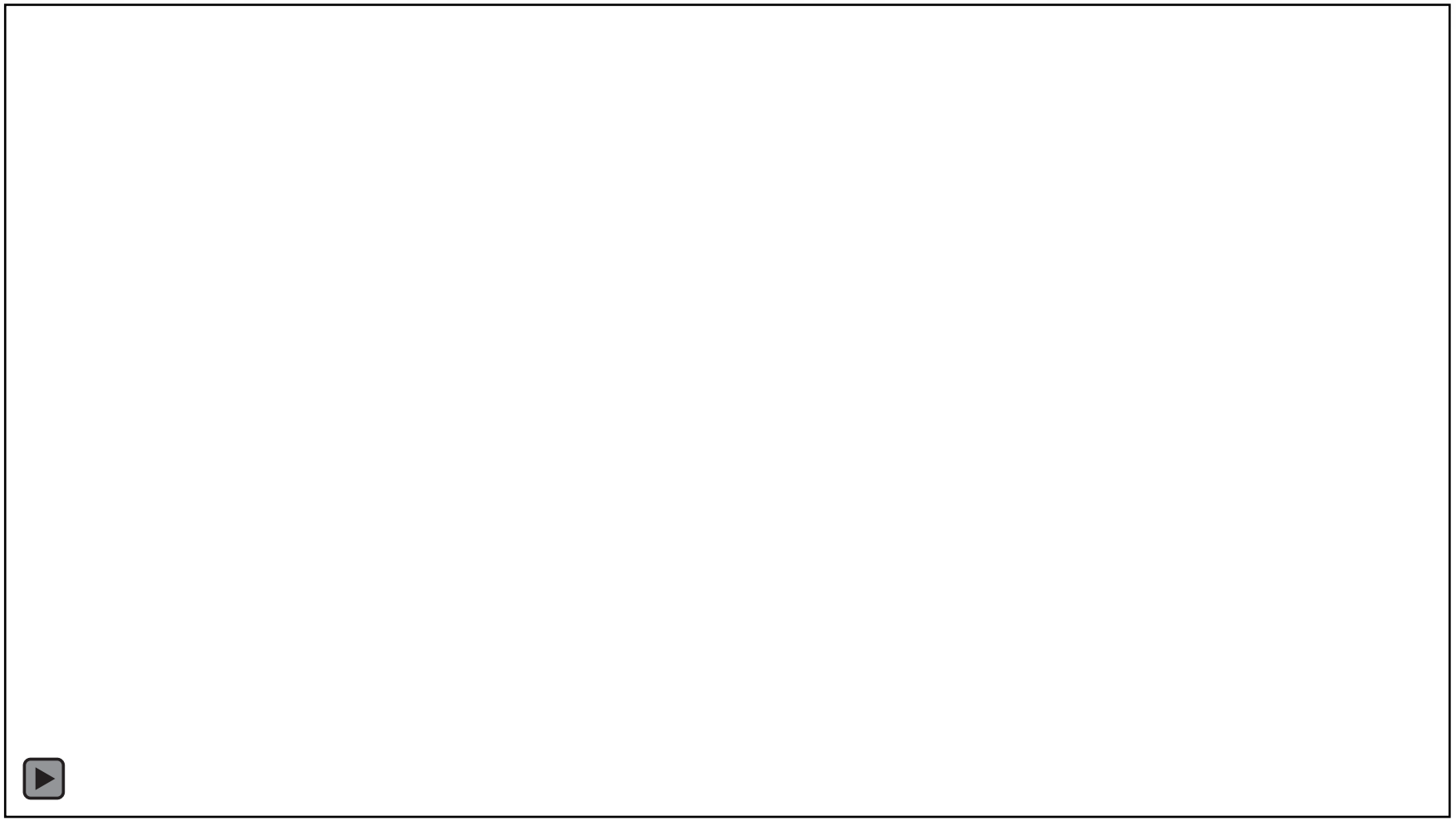
Contextual Blind Spots

Misses situational and clinical context

Loss of Humanism

Can erode empathy and inductive judgment

The Dangers of Offloading Clinical Reasoning



WALL·E, Pixar Animation Studios / Walt Disney Pictures, 2008

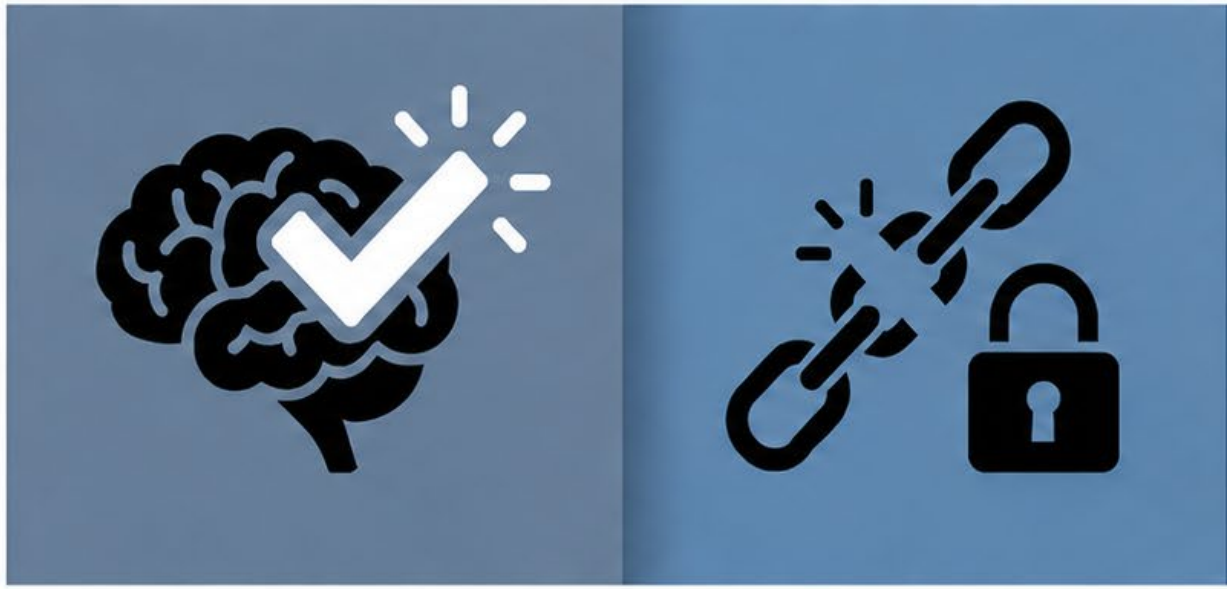
The Dangers of Offloading Clinical Reasoning



Automation Bias

- Over-reliance on AI
- Assume the machine is right
- Less independent judgment

The Dangers of Offloading Clinical Reasoning



Automation Bias

- Over-reliance on AI
- Assume the machine is right
- Less independent judgment

Never-skilling

- Core skills never fully develop
- Learners skip fundamentals
- AI handles tasks too early

The Dangers of Offloading Clinical Reasoning



Automation Bias

- Over-reliance on AI
- Assume the machine is right
- Less independent judgment

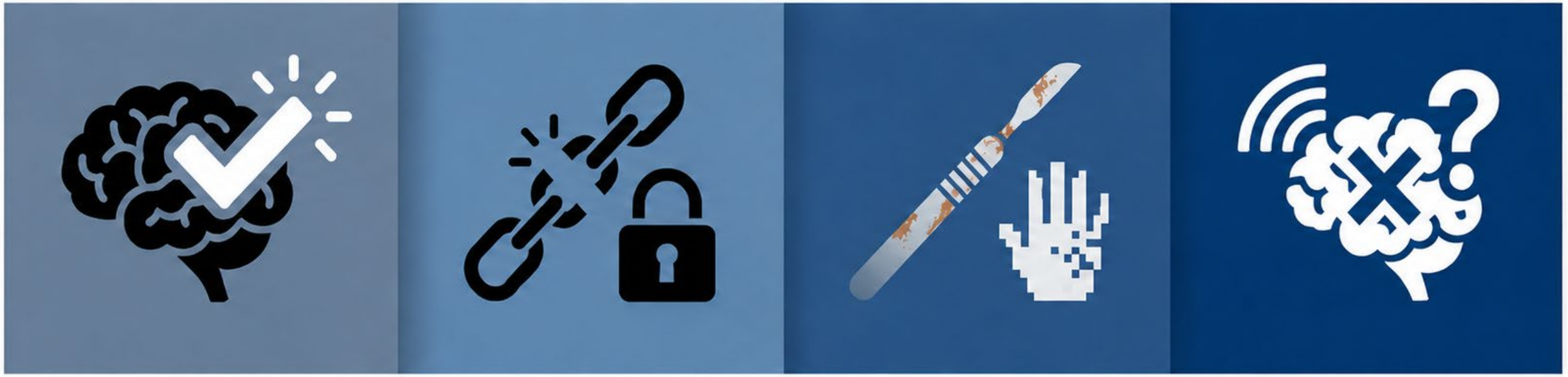
Never-skilling

- Core skills never fully develop
- Learners skip fundamentals
- AI handles tasks too early

De-skilling

- Previously learned skills fade
- Cognitive offloading increases
- Expertise gradually erodes

The Dangers of Offloading Clinical Reasoning



Automation Bias

- Over-reliance on AI
- Assume the machine is right
- Less independent judgment

Never-skilling

- Core skills never fully develop
- Learners skip fundamentals
- AI handles tasks too early

De-skilling

- Previously learned skills fade
- Cognitive offloading increases
- Expertise gradually erodes

Mis-skilling

- AI errors go unchecked
- Incorrect habits get reinforced
- Hallucinations mislead decisions

The Educational Paradigm Shift Matrix

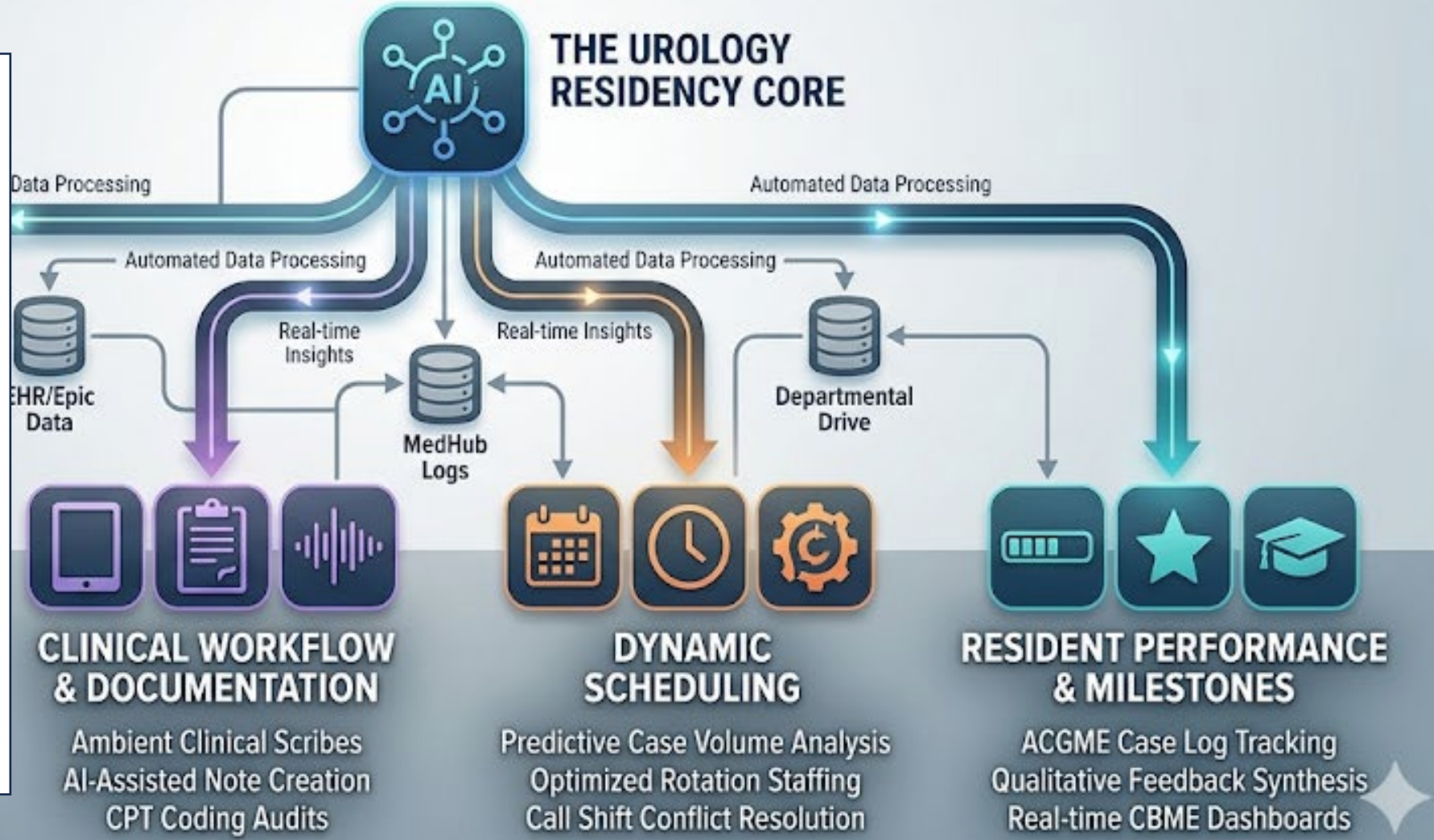
	Pre-GenAI Model	AI-Augmented Model
Primary Goal	Rote knowledge retention and recall.	Critical synthesis, ethical vetting, and systems thinking.
Assessment Type	Standardized multiple-choice testing.	Authenticated clinical reasoning, oral boards, and simulated encounters.
AI's Role in Education	Feared as a plagiarism threat and cheating mechanism.	Embraced as a Socratic tutor, workflow enhancer, and standardized patient.

AI AS OPERATIONAL INFRASTRUCTURE: OPTIMIZING UROLOGY RESIDENCY FLOWS

Beyond Education: Building a Smarter, More Efficient Residency Program



Jason Joseph, MD
University of Florida
School of Medicine



Streamlined Onboarding Materials

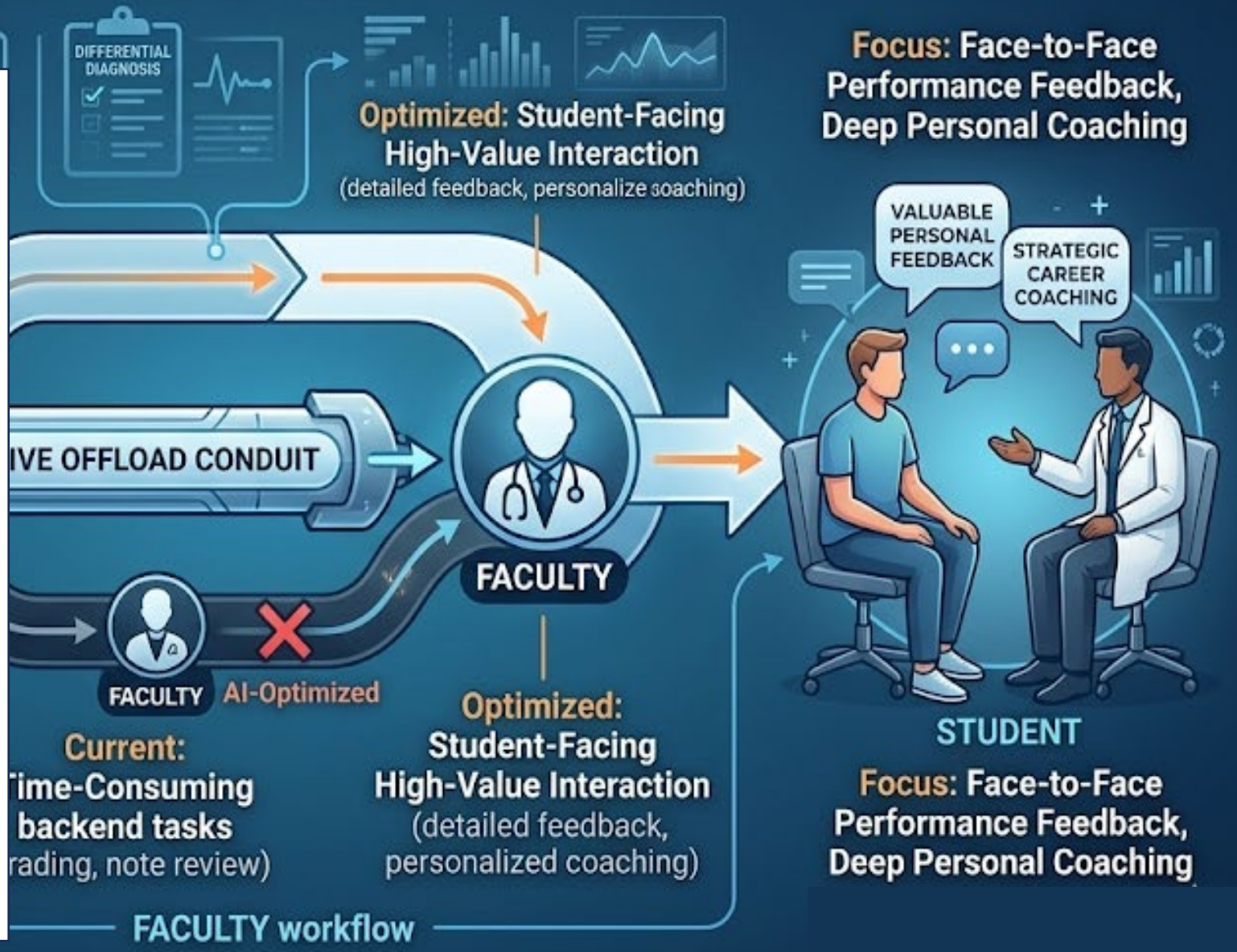
INTEGRATED AI-FACULTY PARTNERSHIP IN CLERKSHIP ASSESSMENT



Melissa Laudano, MD

Montefiore Medical Center

Albert Einstein College of Medicine





Evan Kovac, MD
Rutgers New Jersey Medical School

AI as a Force Multiplier in Resident Education:

From Cognitive Offloading to Procedural Mastery

AI as operational infrastructure.

Jason P. Joseph, MD

Residency Program Director · Department of Urology

University of Florida · Gainesville, FL

UF Health UROLOGY

THE PROBLEM

It's 6:40 AM.

A PGY-4 just called in sick. A PGY-3 gets a text from the admin chief resident…

Today 6:38 AM

Sorry for the short notice. I know you've not done his service but need you to cover Dr. Su's RARP double-header today.

Q1

Which hospital and OR is Dr. Su in today?

→

Q2

Is an extender covering the case, or is she scrubbing in herself?

→

Q3

What are Dr. Su's OR expectations and post-op pathway?

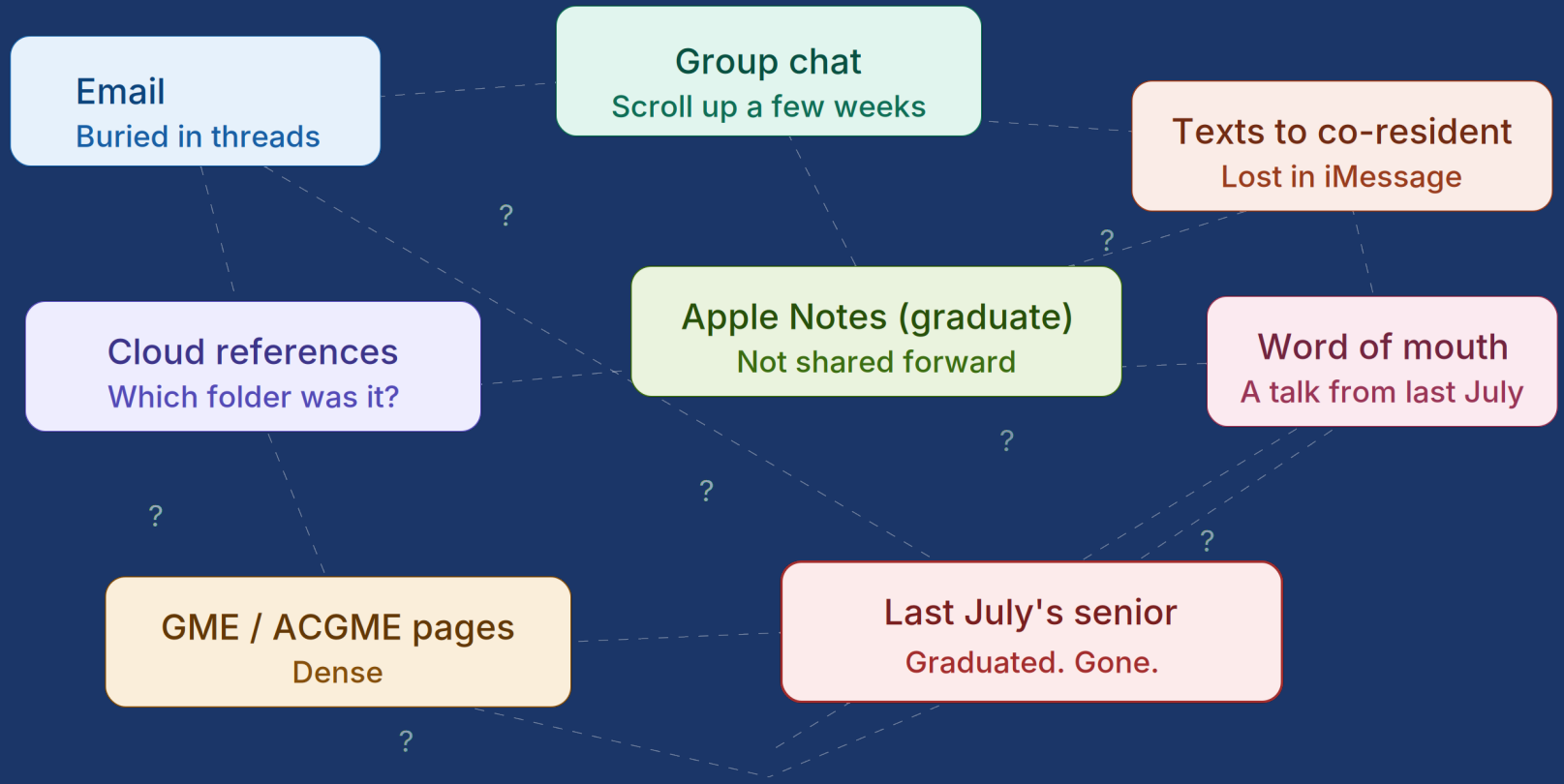
She texts two co-residents, searches her inbox, and scrolls through a group chat.

Four sources, 15+ minutes, and she still walks into the OR not sure she has it all.

UFHealth UROLOGY

THE PROBLEM

Operational knowledge lives in 7+ different places.



What if all of this lived in one place?

And the resident could just ask, in plain English, and get a cited answer back.

UFHealth UROLOGY

WHAT IT NEEDS TO DO

Four Requirements

		WHERE AI USUALLY BREAKS
01	GROUNDING **Answer only from our sources.**	Fills gaps from the open web by default.
02	TRACEABILITY **A citation behind every claim.**	Fluent answer, no audit trail.
03	NO SILENT EVICTION **Hold all sources, all the time.**	Long context windows drop earlier sources.
04	MAINTAINABILITY **A non-coder can keep it current.**	No handoff path. Dies when the builder graduates.

UFHealth UROLOGY

WHAT WE BUILT

A retrieval-augmented workspace on NotebookLM.

The AI is locked to a closed set of documents you give it. No internet. No fabrication. It tells you exactly which document each answer came from.

Source-grounded

~70 curated sources. Every claim claim cites the exact passage.

Plain-English query

Type it the way you'd say it to another human.

On their phone

Mobile-first. Six seconds. In the parking lot.

UFHealth UROLOGY

SAME RESIDENT. SAME MORNING.

One place. Plain English in. Cited paragraph out.

Six seconds. Three questions. One synthesized answer.

I'm covering Dr. Su's RARPs today, never been on his service. Which OR? Am I scrubbed in or is there an extender? What does he expect, and what's the post-op pathway?

South Tower OR 17, 8 AM. No extender today, you'll likely be bedsiding. Dr. Su will expect you to have reviewed the imaging and have it up on the OR computer. Post-op: overnight labs, clear liquid diet advanced as tolerated; typical discharge POD 1 with Foley.

[1] Weekly coverage email · 5/13

[2] APP coverage schedule ┌ 5/12

[3] Su · service preferences (META)

UFHealth UROLOGY

PLUS EVERYTHING ELSE RESIDENTS ASK

Two more everyday examples.

ADMIN CHIEF · COVERAGE LOGIC

Dr. Smith called in sick, she was scheduled for OR with Crispen. Apply the coverage hierarchy; tell me who to pull.

Same color before cross-service. **Dr. Fisher** is on Yellow service and assigned to double scrub Dr. O'Malley's OR. Confirm with Crispen and O'Malley.

ATTENDING PREFERENCE

Covering DeMarco's pyeloplasty tomorrow. How does he handle the anastomosis, what suture, how does he manage the stent?

Running anastomosis, **6-0 PDS** , antegrade stent before the back wall, removal usually at 4 weeks.

UFHealth UROLOGY

UNDER THE HOOD

Documents are contextualized, not dumped in raw.

WITHOUT CONTEXT

"When is Dr. Joseph next in clinic?"

Standing schedule
Clinic on the third Friday of the month.

Away calendar
Dr. Joseph at AUA, May 14–18.

↓

Confidently answers:

May 15

Not a hallucination. The AI could not arbitrate between conflicting sources.

WITH CONTEXT

✓

Every source wrapped in three layers:

- **Metadata — what it is, when it's current, priority hierarchy**
- **Anticipated Questions — 5-10 ways a resident might phrase it**
- **Interpretation Guide — worked examples, ambiguous → concrete**

UFHealth UROLOGY

THE TAKE-HOME

Maintenance Prompt Playbook

Prompt-Maintained Knowledge Infrastructure: the Hub is built and maintained with a small set of reusable, plain-English prompts. No code. No IT.

1. **Create**
   Raw doc → structured source file
2. **Edit**
   Specific update to an existing source
3. **Faculty Away**
   Merge new vacation entries; normalize, sort
4. **Weekly Schedule**
   Append-only block from coverage email
5. **Consolidate**
   Roll up months of sources into one master

PROGRAM COORDINATOR RUN

No code. No IT. Co-built over a handful of working sessions. She copies, pastes, adjudicates.

UFHealth UROLOGY

A SIX-MONTH QI STUDY

What we found.

18 RESIDENTS · RETROSPECTIVE PRE/POST

4 Domains: Preparedness · Scheduling · Policies · Attending Preferences

BEHAVIOR SHIFT

Texted a senior first



72%

agree the Hub makes them feel more independent and prepared

33%

save 10+ minutes per week

22% save 30-60 min · 89% mobile

COORDINATOR · N=1

"Less than 30 minutes a week to maintain. Very confident in maintenance workflow. Removing the Hub would be a significant inconvenience."

UFHealth UROLOGY

LESSONS LEARNED

Both about people. Not technology.

01

Co-architect with the residents already maintaining the shared notes.

They're not your users, they're your collaborators. Build alongside them, then dial back the parallel channels.

02

The maintainer should be a user first.

Don't recruit a maintainer. Recruit a user who happens to maintain. Maintenance stops feeling like overhead.

UFHealth UROLOGY

INTERESTED IN BUILDING ONE FOR YOUR PROGRAM?

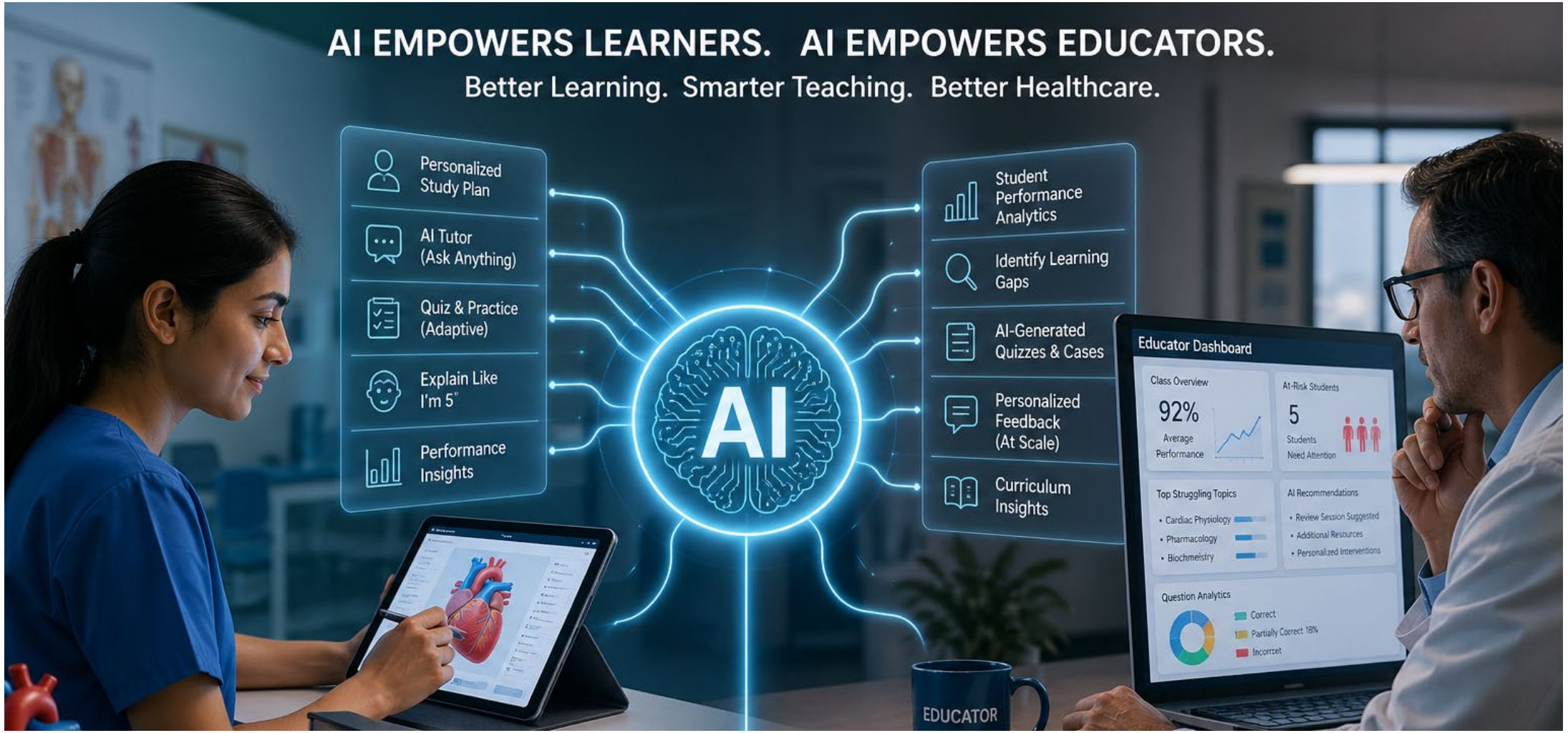
Our Toolkit

1. **Setup**
   The notebook, first sources, live-sync layer
2. **Source template**
   Metadata · Anticipated Questions · Interpretation Guide
3. **The five prompts**
   Create · Edit · Faculty Away · Weekly Schedule · Consolidate
4. **Cadence**
   Weekly for schedule. Quarterly for cleanup. Coordinator-owned.

jason.joseph@urology.ufl.edu

UFHealth UROLOGY

For Both Learners and Educators



Why does this matter in urology specifically?

- Procedure heavy specialty
- Short rotations with a steep learning curve
- Variable exposure
- Multiple subspecialty areas (e.g. oncology, endourology, pediatrics, reconstruction)
- Need for efficient, high-yield teaching tools



EINSTEIN
Albert Einstein College of Medicine
Montefiore
nspired Medicine

How are students using AI on clinical rotations?



AI tutors for quick explanations



Practice questions and case simulations



Clinical decision support tools

EINSTEIN
Albert Einstein College of Medicine

Montefiore
nspired Medicine

AI Tutors for Quick Explanations

JMIR MEDICAL EDUCATION Ebihara et al

Original Paper

Development of a Clinical Clerkship Mentor Using Generative AI and Evaluation of Its Effectiveness in a Medical Student Trial Compared to Student Mentors: 2-Part Comparative Study

Hayato Ebihara[1]; Hajime Kasai[2,3,4], MD, MHPE, PhD; Ikuo Shimizu[2,3], MD, MHPE, PhD; Kiyoshi Shikino[2,3,5], MD, MHPE, PhD; Hiroshi Tajima[2,3,4], MD, PhD; Yasuhiko Kimura[3], BEd; Shoichi Ito[2,3,5], MD, PhD



- Created 5 common cases encountered on clerkship rotations
- AI mentors out-performed senior student mentors as rated by clerkship student

EINSTEIN Albert Einstein College of Medicine

Montefiore nspired Medicine

USMLE Practice Questions

JMIR MEDICAL EDUCATION Gilson et al

Original Paper

How Does ChatGPT Perform on the United States Medical Licensing Examination (USMLE)? The Implications of Large Language Models for Medical Education and Knowledge Assessment

Aidan Gilson[1,2], BS; Conrad W Safranek[1], BS; Thomas Huang[2], BS; Vimig Socrates[1,3], MS; Ling Chi[1], BSE; Richard Andrew Taylor[1,2*], MD, MHS; David Chartash[1,4*], PhD

[1]Section for Biomedical Informatics and Data Science, Yale University School of Medicine, New Haven, CT, United States
[2]Department of Emergency Medicine, Yale University School of Medicine, New Haven, CT, United States
[3]Program of Computational Biology and Bioinformatics, Yale University, New Haven, CT, United States
[4]School of Medicine, University College Dublin, National University of Ireland, Dublin, Dublin, Ireland
*these authors contributed equally





Note: Similar scoring to a third-year medical student

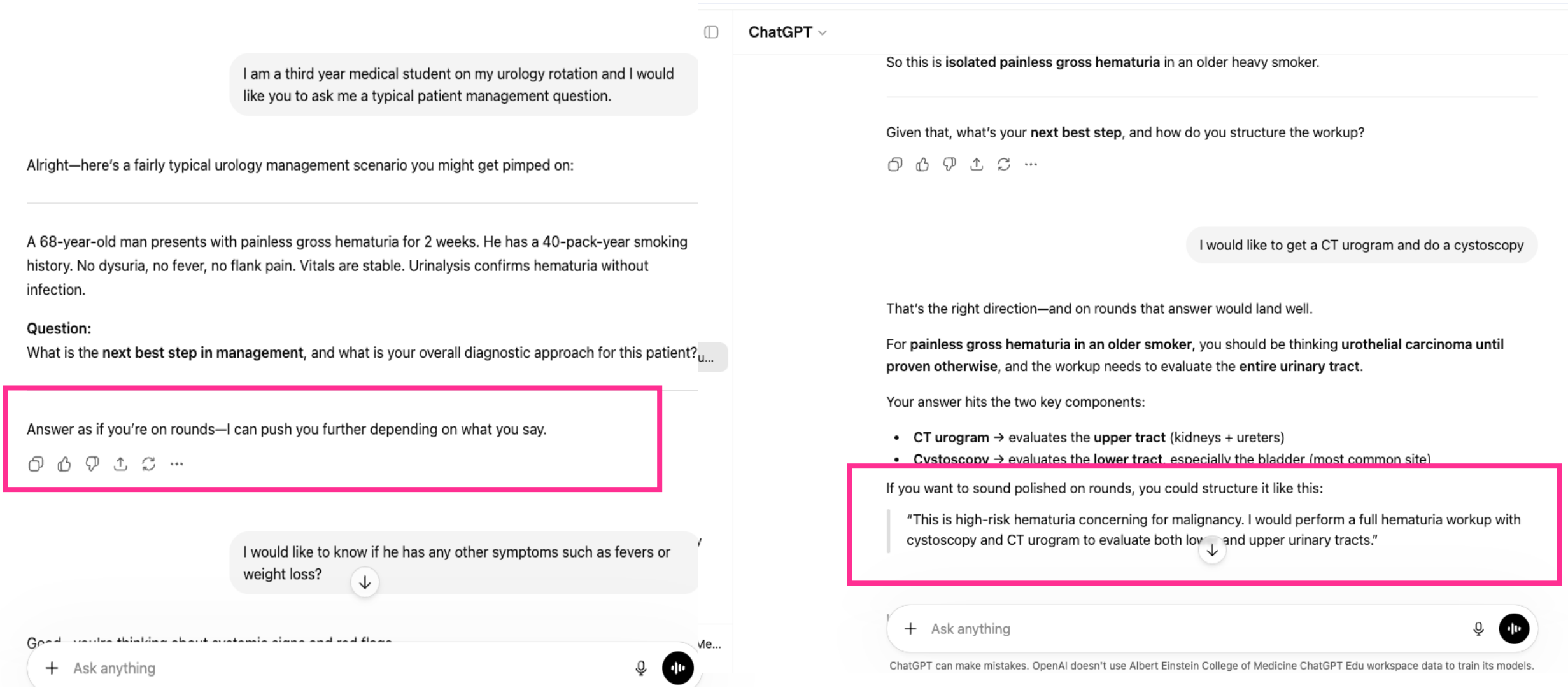
How did ChatGpt perform on questions within the scope of USLME step 1 and step 2

Correctly answered over 60% of questions

EINSTEIN Albert Einstein College of Medicine

Montefiore nspired Medicine

A Trial Run – Urology Case Simulation



EVERYDAY ChatGPT PROMPTS

MEDICAL STUDENTS USE ON CLINICAL ROTATIONS



1. BEFORE SEEING A PATIENT (PRE-ROUNDING)

- "Give me a quick, high-yield summary of acute cholecystitis for a third-year medical student"
- "What should I ask in the history for suspected heart failure?"
- "Key physical exam findings for appendicitis?"
- "What labs and imaging are used to diagnose pulmonary embolism?"
- "What are the common complications after a C-section?"

2. BUILDING A DIFFERENTIAL DIAGNOSIS

- "65-year-old male with chest pain, shortness of breath, and elevated troponin—give a differential diagnosis ranked by likelihood"
- "Differential for altered mental status in an elderly patient"
- "Causes of hyponatremia with low serum osmolality"
- "Pediatric fever + rash differential diagnosis"

Follow-ups:

- "What findings would help distinguish these?"
- "Which are life-threatening and must not be missed?"

3. MANAGEMENT & TREATMENT FRAMEWORKS

- "First-line treatment for community-acquired pneumonia"
- "Stepwise management of asthma exacerbation"
- "How is DKA treated step by step?"
- "Antibiotic choices for UTI and when to escalate"
- "Management of sepsis in the first 6 hours"

Follow-ups:

- "When do you admit vs discharge?"
- "What are the red flags?"

4. PRACTICING ORAL PRESENTATIONS

- "Here's my patient presentation—make it more concise and polished: [paste]"
- "Rewrite this HPI to sound like a senior medical student"
- "What should I include in an assessment and plan for CHF?"
- "Give me a template for presenting a new admission"

5. TURNING PATIENTS INTO STUDY MATERIAL

- "Turn this case into 5 USMLE-style questions: [paste case]"
- "Make Anki flashcards for nephritic vs nephrotic syndrome"
- "Quiz me on causes of chest pain"
- "Give me rapid-fire questions for surgery shelf exam"

How are educators using AI on clinical rotations?



Student Performance analytics



Automated assessment tools

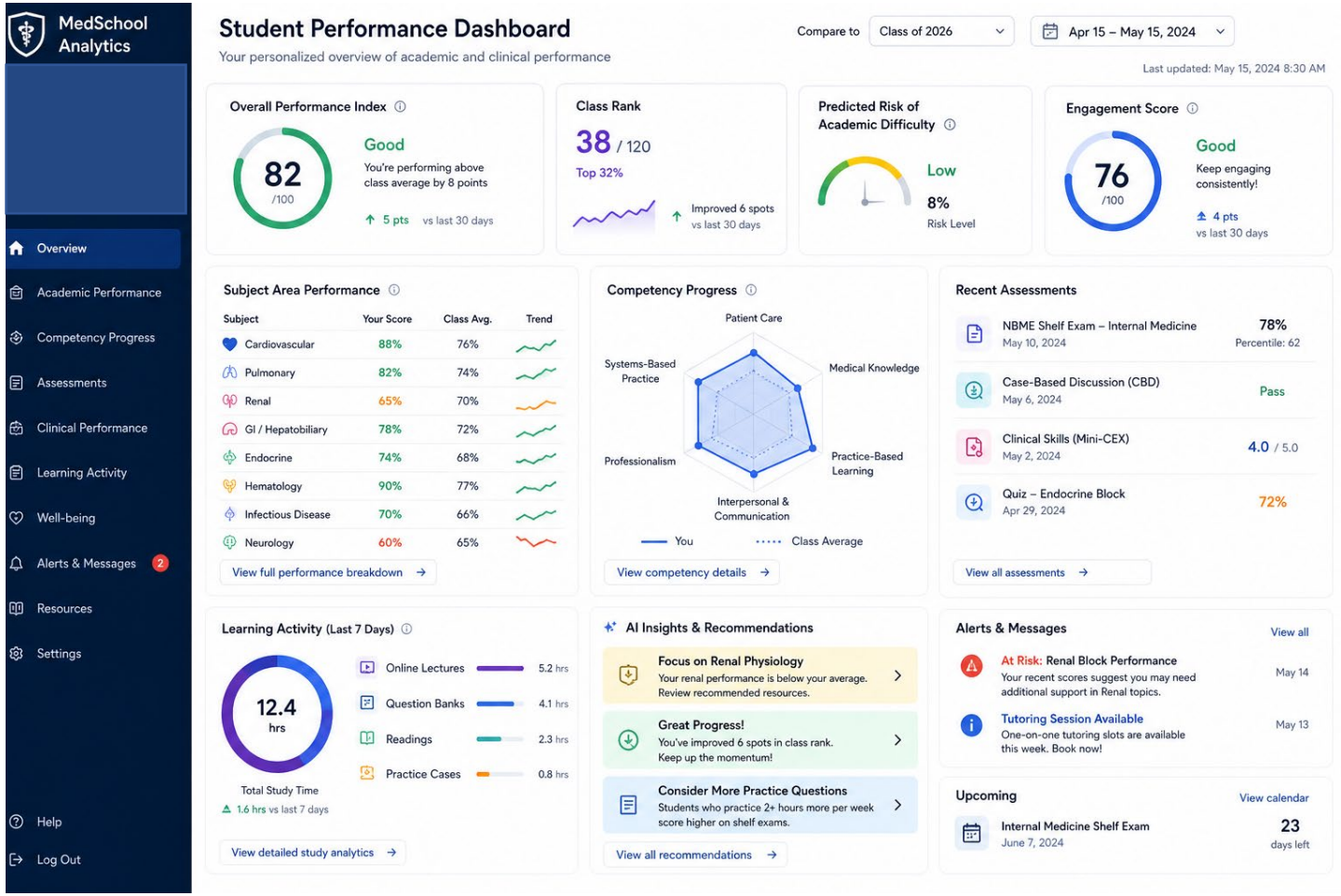


Personalized Feedback

EINSTEIN
Albert Einstein College of Medicine

Montefiore
nspired Medicine

Student Performance Analytics



- Creation of student dashboards, tracking competencies or milestones
- Early warning system to identify students at risk
- Program level analytics to improve the curriculum itself, e.g. 70% student missed the same concept

EINSTEIN
Albert Einstein College of Medicine

Montefiore
nspired Medicine

Automated Assessment Tools



NEJM AI

This article is available to subscribers. SUBS

CASE STUDY

Assessment of Short-Answer Questions by ChatGPT in a Medical School Course

Authors: Grey Kuling, Ph.D. , Sam Pullman, B.Sc. , Dzhuliyan Vasilev, M.D., M.M.Sc. , Noelle Ozimek, M.S. , Nathan Palmer, Ph.D. , Randall W. King, M.D., Ph.D. , Barbara Cockrill, M.D. , and Henrike Besche, Ph.D. Author Info & Affiliations

Published January 12, 2025 | NEJM AI 2026;3(2) | DOI: 10.1056/AIcs2500239 | VOL. 3 NO. 2

Copyright © 2025

More time to spend on giving feedback and coaching than actually grading, not always student facing

- Grading of short answer questions at Harvard Medical school
- 10 human graders
- Looked at factual accuracy and completeness
- 94% of GPT scores falling within range of human scores for factual accuracy
- 85% of GPT scores within 1 point of human scores for accuracy and completeness

EINSTEIN Albert Einstein College of Medicine

Montefiore nspired Medicine

OSCE Case Creation and Grading



Creation of 8 new OSCE cases



Basis of cases generated by chief complaint



Rubrics generated for history, physical and note grading



Looking at concordance of note grading by attendings vs chatGPT

EINSTEIN
Albert Einstein College of Medicine

Montefiore
nspired Medicine

OSCE Case Creation and Grading – RLQ Pain

1. The pain is sharp and constant.
2. Pain started at 4 or 5, now 8 out of 10
3. The pain started around patient's belly button and then moved to the right lower quadrant.
4. Moving and coughing triggers the pain, nothing makes it better.
5. Nauseated and vomited once last night.
6. Vomit color of food, nonbloody, nonbilious.
7. Ate last night, grilled chicken, now only able to drink water.
8. Felt feverish. Hot and sweaty.
9. No bowel movement since pain started. No Diarrhea.
10. Had some dysuria.
11. Tried Tylenol no improvement in pain.
12. Surgical history - for csection x2.
13. 1-2 drinks on the weekend.
14. Menstruation is regular.
15. No birth control except for occasional condoms.
16. Had sexual intercourse 3 days ago with a condom.
17. Had chlamydia in 20s.
18. No vaginal discharge.

	PE documented
1	Abdominal exam including 1. Bowel sounds - normoactive 2. Percussion – yes rebound tenderness 3. Palpation – tenderness in right lower quadrant to light and deep palpation 4. Rovsing's sign – positive 5. Obturator and psoas signs - negative
2	GU: CVA Tenderness- Negative
3	Pelvic exam: Normal external gentalia, no pelvic or vaginal masses, no cervical motion tenderness, no

Tier 1	**Tier 2**
Acute Appendicitis	Right incarcerated inguinal hernia
Ectopic Pregnancy	Diverticulitis
Ovarian torsion (right)	Irritable Bowel Disease
Cecal Volvulus	Kidney Stone
Small Bowel Obstruction	PID

Personalized Narrative Feedback – Ob/GYN Clerkship

"The student was an active and engaged member of the OB/GYN team throughout the clerkship. The student was dependable, punctual, and interacted professionally with patients, residents, fellows, and faculty.

They demonstrated improving clinical reasoning and communication skills over the course of the rotation. The student performed thorough histories and physical exams and presented patients in an organized manner.

They would benefit from continuing to build confidence in developing differential diagnoses and formulating assessment and management plans independently. Overall, the student performed at the expected level for a third-year medical student and has strong potential for continued growth in clinical medicine."

Personalized Narrative Feedback – Ob/GYN Clerkship

"The student demonstrated progressive achievement of core OB/GYN clerkship competencies across patient care, communication, professionalism, and clinical reasoning domains.
In the area of **Patient Care**, the student reliably obtained focused obstetric and gynecologic histories and performed appropriate physical examinations with increasing efficiency and sensitivity. By the end of the rotation, they were able to recognize common labor and postpartum concerns, participate meaningfully in triage evaluations, and contribute to perioperative patient care with indirect supervision.
Regarding **Medical Knowledge and Clinical Reasoning**, the student demonstrated developing competency in constructing prioritized differential diagnoses for common OB/GYN presentations, including vaginal bleeding, pelvic pain, hypertensive disorders of pregnancy, and labor abnormalities."

How do we begin using this?

The NEW ENGLAND JOURNAL of MEDICINE

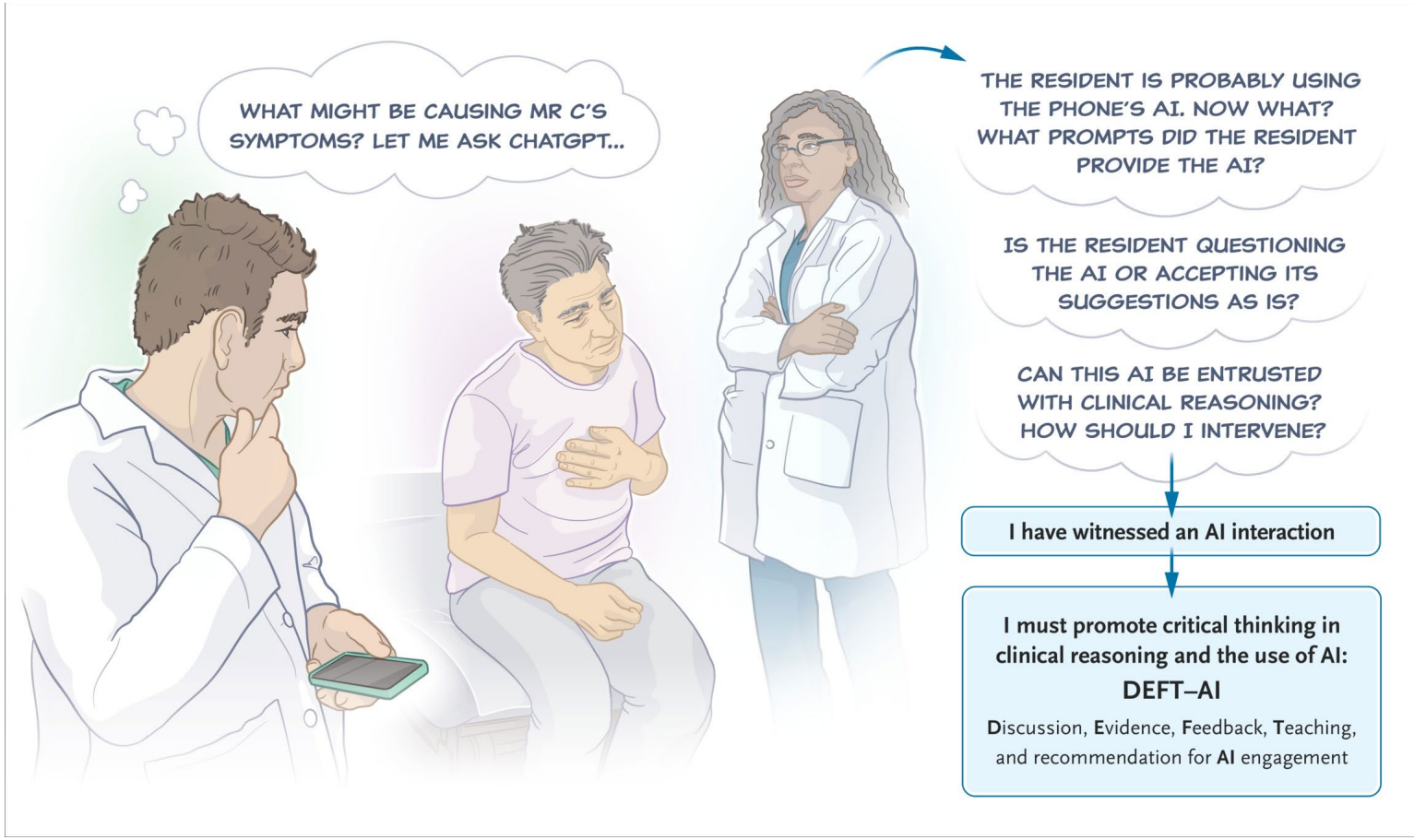
REVIEW ARTICLE

MEDICAL EDUCATION

Educational Strategies for Clinical Supervision of Artificial Intelligence Use

Raja-Elie E. Abdulnour, M.D.,[1] Brian Gin, M.D., Ph.D.,[2] and Christy K. Boscardin, Ph.D.[3,4]

- Many learners have more experience with AI than the educators
- Proposal for mitigating perils and amplifying promise of AI



Key Points

- DEFT-AI (Diagnosis, evidence, feedback, teaching and recommendation for AI use) is a structured framework
- Two AI behaviors emerge
  - Cyborg – tight intertwining of user and AI for each task
  - Centaur – division of tasks between user and AI with critical oversight
  - Must shift between to have adaptive practice



Diagnosis, Discussion, and Discourse	The educator asks for a description of the learner's specific use of AI.
What specific AI did you use?	I used the free version of ChatGPT on my phone.
How did you use AI in this process?	I just typed in, "*What is the differential diagnosis for wheezing?*"
What prompts did you enter in the app?	I asked it for the best diagnostic test and treatment strategy.
Evidence	The educator asks for an evaluation of the learner's evidence-based use of AI
How did you verify the AI-generated outputs?	Hmm. I didn't. The answers seemed reasonable to me.
Is the AI that you used shown to be accurate and safe?	Yes. I keep seeing social media posts about how great it is at making diagnoses.
Feedback	The educator asks the learner to reflect on growth opportunities in the use of AI.
How do you evaluate your own use of AI in this case?	I think I've become quite familiar at using ChatGPT. I use it all the time now.
How can you improve your use of AI?	I can't wait for an AI that can interpret ECGs and chest radiographs. I should verify the AI outputs next time.
Teaching	The educator provides focused teaching points based on findings from the conversation and recommends whether, when, and how to use AI safely moving forward.

Use AI tools that are known to be effective. Look for peer-reviewed evidence of their accuracy and safety. Our institution may have adapted and validated a similar model on the basis of high-quality data.

Prompting a chatbot is critical to generate valuable and accurate outputs. **Think of it as talking with a consultant:** provide enough specific information about the **Who** (the intended role of the AI and your role), the **Where** (description of the context), and the **What** (your goal and specific task or question). Always ask the AI to **explain its reasoning,** which improves its answers and lets you assess how it is thinking and how much to trust it. **One prompt is not enough:** have a conversation and give it feedback. Just like I did with you, you can also **ask it to engage in self-reflection and look for errors.**

AI is always prone to error and bias: always **verify and trust**. Make sure to check its answers against your knowledge, trusted sources of medical information, like publications from the NEJM Group, and your trusted peers, like me.

Recommendation for AI engagement	The educator provides learner-specific recommendations for the safe use of AI.

Keep practicing using AI to inform your reasoning rather than replace it. AI outputs are your preliminary inputs, just like a preliminary radiology report or automated ECG interpretation: verify, ***then*** trust. **Know when you can rely on it (cyborg) and when you need to confirm the outputs (centaur).**

N ENGL J MED 393;8 NEJM.ORG AUGUST 21/28, 2025

Einstein Policy for AI - Privacy Concerns

Artificial Intelligence Tools & Resources

Montefiore Einstein Home ▸ Albert Einstein College of Medicine ▸ Administration ▸ AI Tools & Resources

Albert Einstein College of Medicine provides resources and guidance for the responsible use of generative artificial intelligence (AI), which in response to prompts, can produce new content such as summaries, images, code, or data.

Einstein recognizes the potential for AI to transform how education, research, and patient care are conducted and managed. We support researchers, educators, students, and administrative staff who wish to explore how AI can drive innovation in science and medicine, while ensuring secure, legal, and ethical use of generative AI tools.

Einstein-Approved Generative AI Tools

Einstein offers access to two institutionally approved generative AI tools:

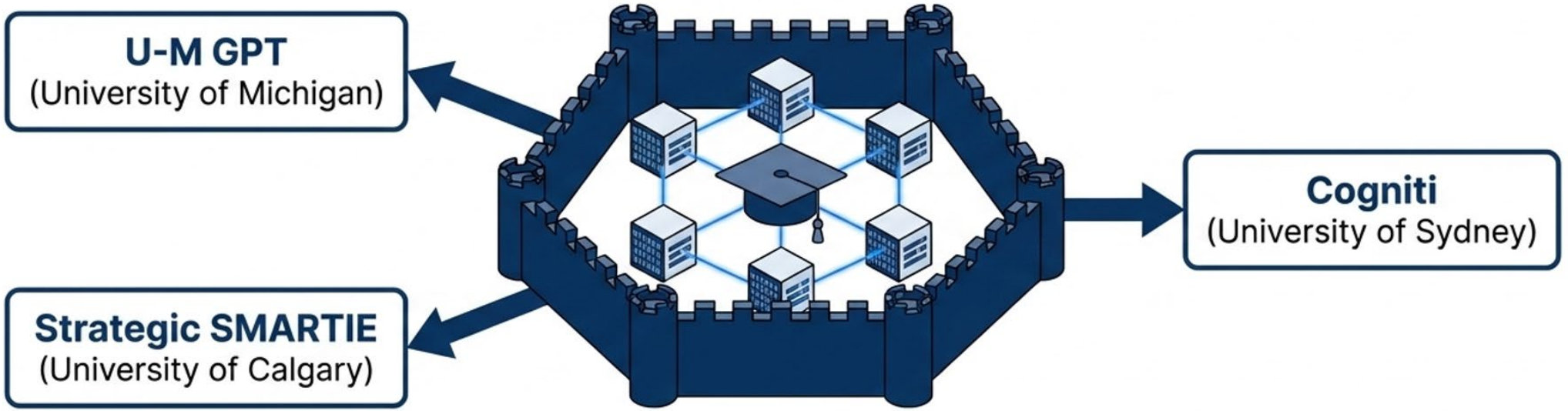
- OpenAI's ChatGPT Edu
- Microsoft's CoPilot

Using these enterprise tools ensures that any data included in a prompt or product generated by the tool is not shared outside of Einstein. Only users with confirmed, licensed access benefit from this protection. All full-time students, postdoctoral fellows, and faculty on the Einstein payroll, as well as select members of the Einstein administration, have access to these tools.

Privacy Concerns

The Walled Garden Solution

Universities built closed-loop, proprietary **large language models** to protect **student data** and **comply with privacy laws** like **FERPA.**



Final Thoughts



- Our learners will be using AI and will need our guidance and guard rails
- As educators we need to leverage AI to help diminish our workload and make us more effective

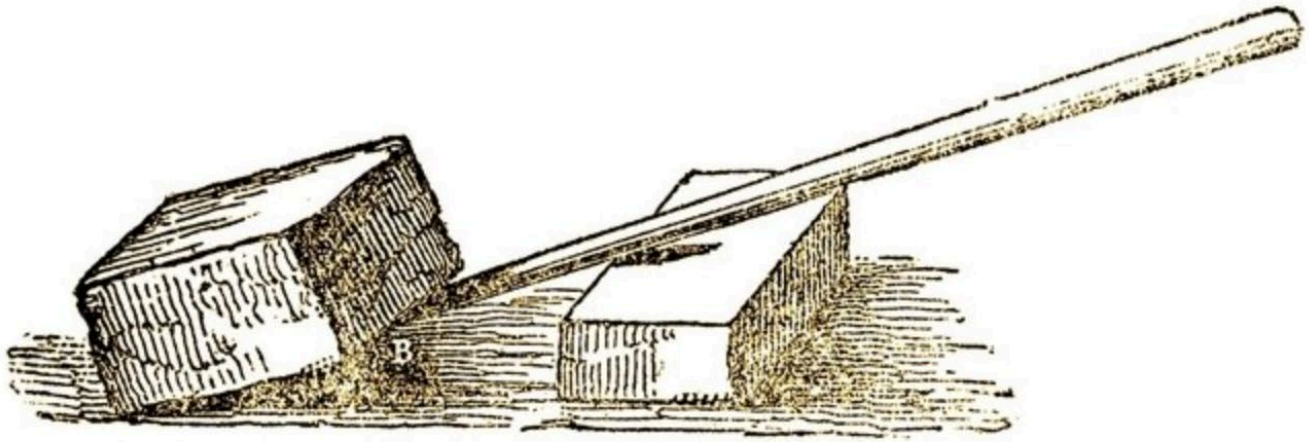
melissa.laudano@einsteinmed.edu

EINSTEIN
Albert Einstein College of Medicine

Montefiore
nspired Medicine

RUTGERS HEALTH

AI as a Force Multiplier in Resident Education:
From Cognitive Offloading to Procedural Mastery



Evan Kovac, MD CM FRCSC

Associate Professor

Residency Program Director

Rutgers Health

Newark, NJ

The Problem: Time Is the Limiting Reagent



Documentation burden and RVU pressure



Clinic compression and inbox overload



Duty hour constraints



Fragmented operative exposure



The limiting reagent in resident education is not knowledge — **it's time.**

Educational AI Framework



Time Creator → Scribing



Inquiry Partner → Conversational tools



Skill Accelerator → Procedural AI + XR

AI Scribes: Creating Teaching Bandwidth

↓ Documentation time, ↓ after-hours charting, ↑ satisfaction

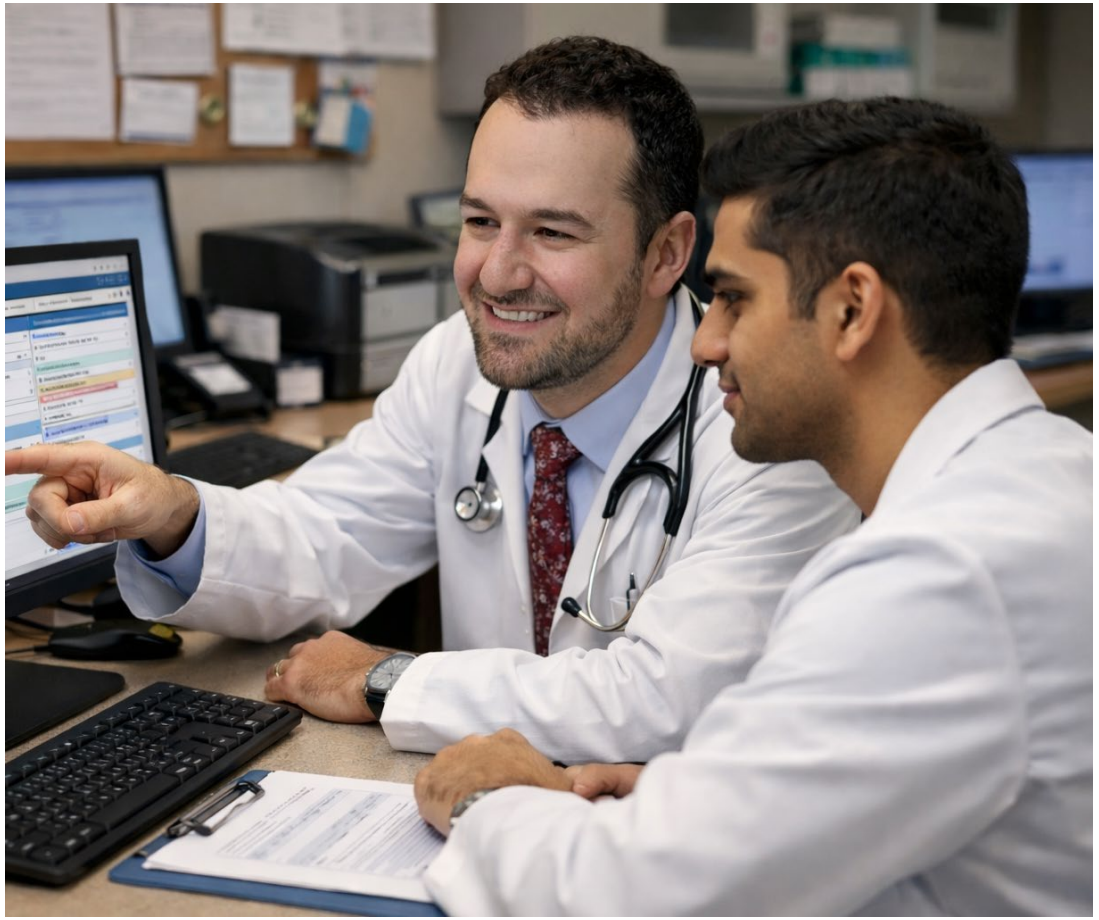
More time for imaging review and case discussion

Improved counseling and decision-making teaching

If AI gives us time back, that time becomes curriculum.



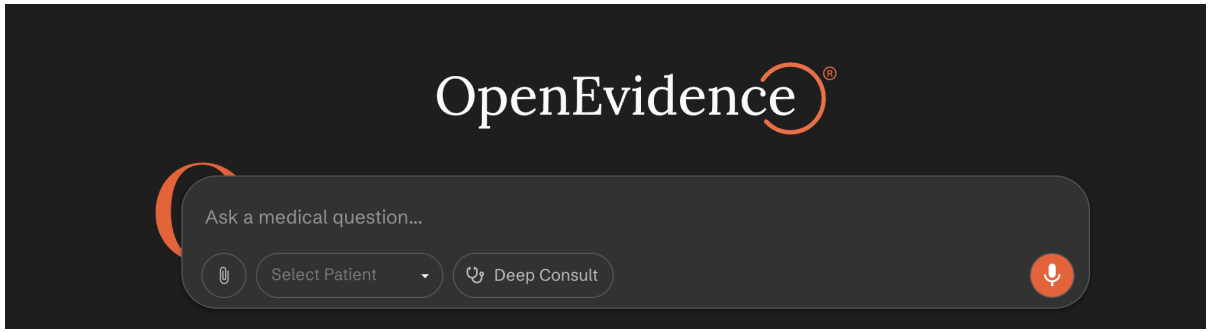
Conversational AI as a Teaching Modality



- Traditional: attending lectures, resident listens
- AI-enabled: shared inquiry and real-time questioning

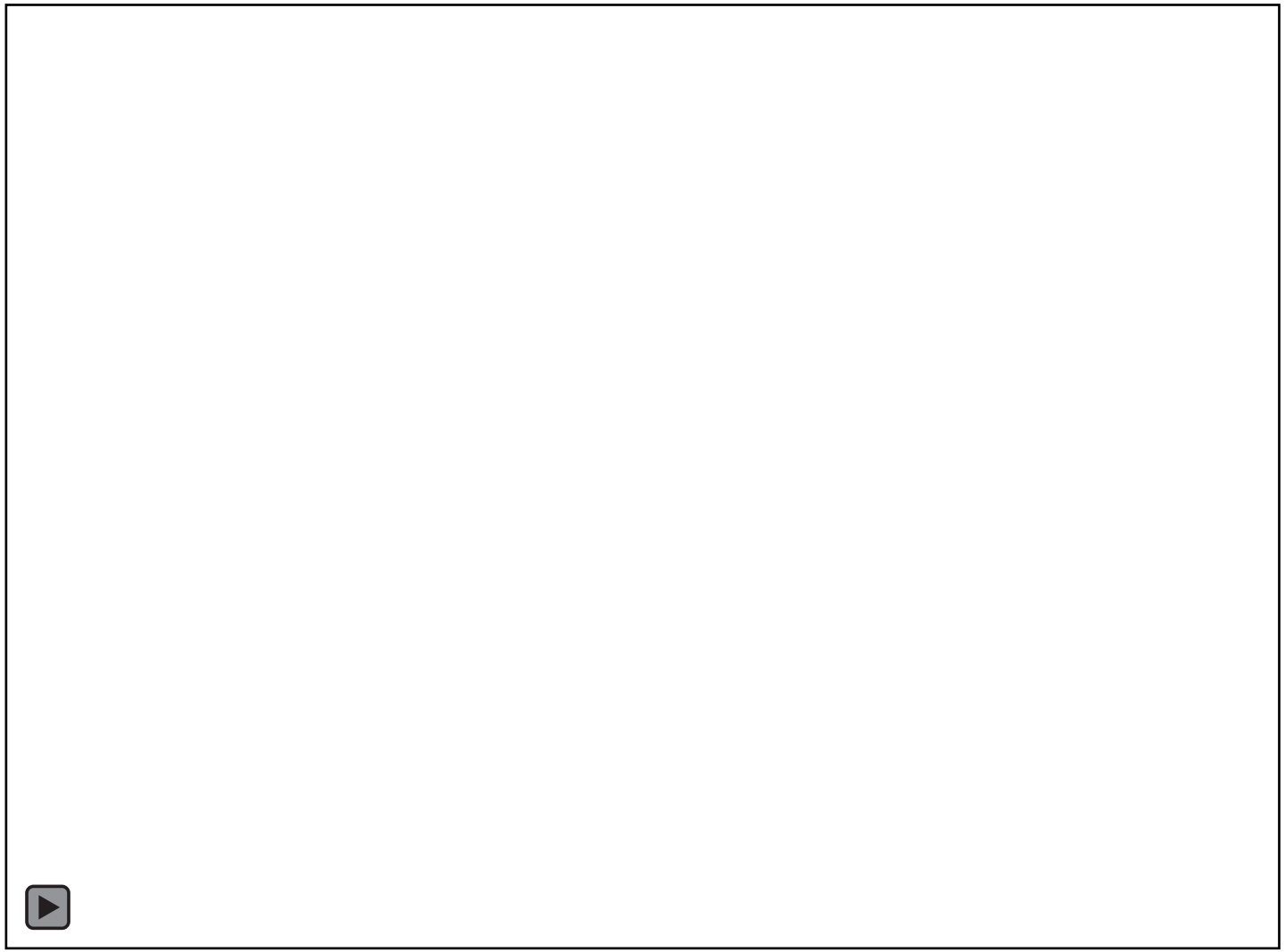
Conversational AI as a Teaching Modality

- Live trial review and evidence verification
- AI as a Socratic engine
- Builds evidence literacy and clinical reasoning



One Day In Clinic…

- Resident presents ED consult for 68 yo male with recent partial nephrectomy (done outside, of course!) and gross hematuria
- Suspicion for pseudoaneurysm
- Resident suggests:
  - IV bolus
  - CT angio stat
  - Bedrest
- Great time for joint learning!



AI as a Socratic Engine:
Multi-Disciplinary GU Tumor Board

GU tumor boards require:

- Multimodal data integration (imaging, pathology, genomics)
- Cross-specialty expertise
- Rapid synthesis of evolving literature



➡️ Cognitive load is high
➡️ Teaching opportunities are often missed

AI-Augmented Tumor Board

- Explicit stepwise reasoning
- Evidence surfaced in real time
- Multimodal data integration
- From the 2024 Nature Cancer perspective, AI agents can:
  - Integrate imaging, genomics, and clinical data

nature cancer

Article

https://doi.org/10.1038/s43018-025-00991-6

Development and validation of an autonomous artificial intelligence agent for clinical decision-making in oncology

Received: 13 August 2024

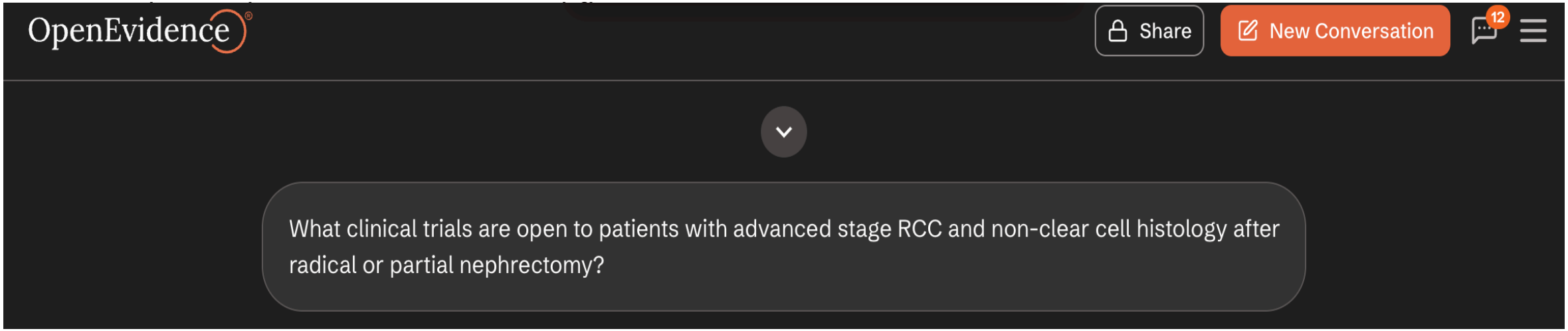
Accepted: 29 April 2025

Published online: 6 June 2025

Check for updates

Dyke Ferber[1,2], Omar S. M. El Nahhas[2], Georg Wölflein[3], Isabella C. Wiest[2,4], Jan Clusmann[2,5], Marie-Elisabeth Leßmann[2,6], Sebastian Foersch[7], Jacqueline Lammert[8,9,10,11], Maximilian Tschochohei[12], Dirk Jäger[1], Manuel Salto-Tellez[13], Nikolaus Schultz[14], Daniel Truhn[15] & Jakob Nikolas Kather[1,2]

Opportunity for **shared inquiry:**



Beyond Cognitive Teaching



- AI doesn’t just teach knowledge
- It can help teach procedures

- Shift from cognitive offloading to technical skill amplification

AI in Procedural Education: Framework



Computer vision → step recognition

AI in Procedural Education: Framework



Computer vision → step recognition



Performance analytics → error detection

AI in Procedural Education: Framework



Computer vision → step recognition



Performance analytics → error detection

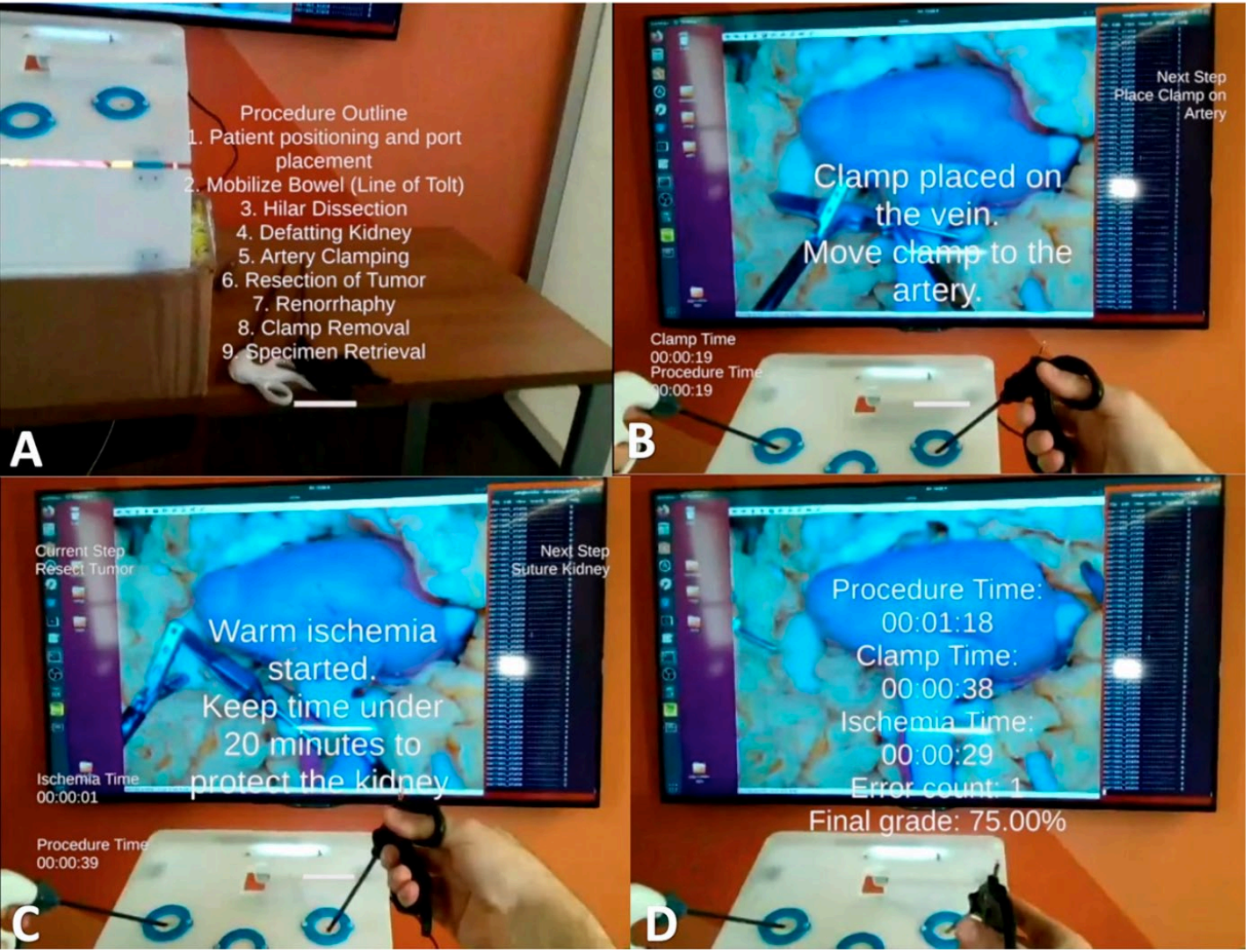


Feedback systems → real-time coaching

AI in Procedural Education: Framework

- Computer vision → step recognition
- Performance analytics → error detection
- Feedback systems → real-time coaching
- Shift from subjective to objective skill measurement

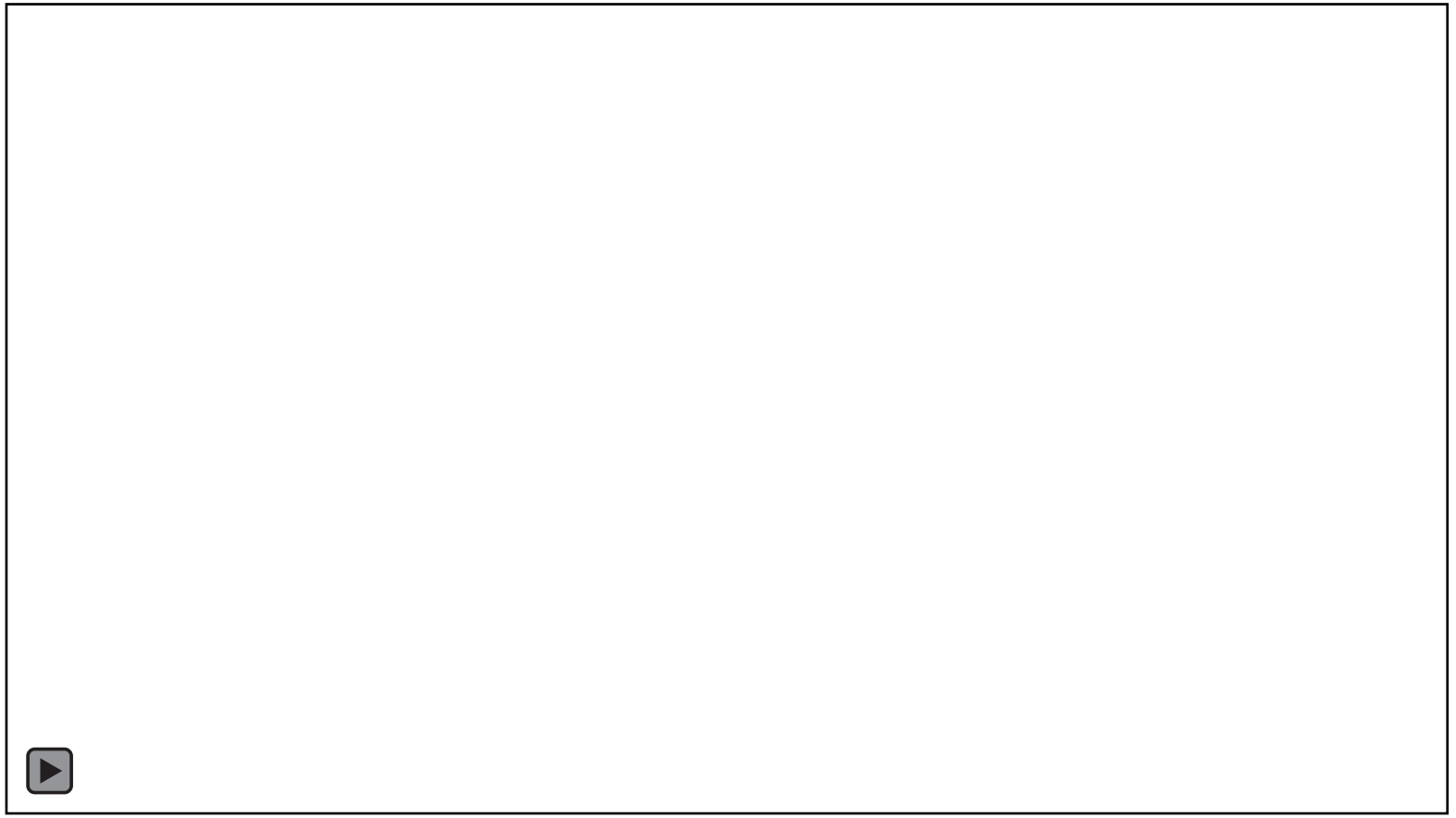
Autonomous AI Procedural Training (Stone et al. 2025)



- Deep learning trained on ~396,000 images
- XR headset delivers real-time prompts
- Automated error detection and scoring
- ~99% step recognition accuracy
- AI provides feedback without proctor presence

Application: Rectal Spacer Teaching

- Defined anatomical planes and repeatable steps
- AI can assist needle trajectory and plane recognition
- Hydrodissection and symmetry assessment
- Real-time alerts for misplacement
- “AI scales procedural teaching.”



XR and Immersive Platforms



- First-person overlays and remote proctoring
- Deliberate practice without faculty presence
- Combine with AI for closed-loop training
- Accelerates safe learning curves

Guardrails: What AI Should NOT Do



- Replace operative judgment
- Substitute complication management
- Remove graded autonomy
- Bypass faculty supervision
- Residents must learn to think before they learn to prompt AI

Educational AI Framework



Time Creator → Scribing



Inquiry Partner → Conversational tools



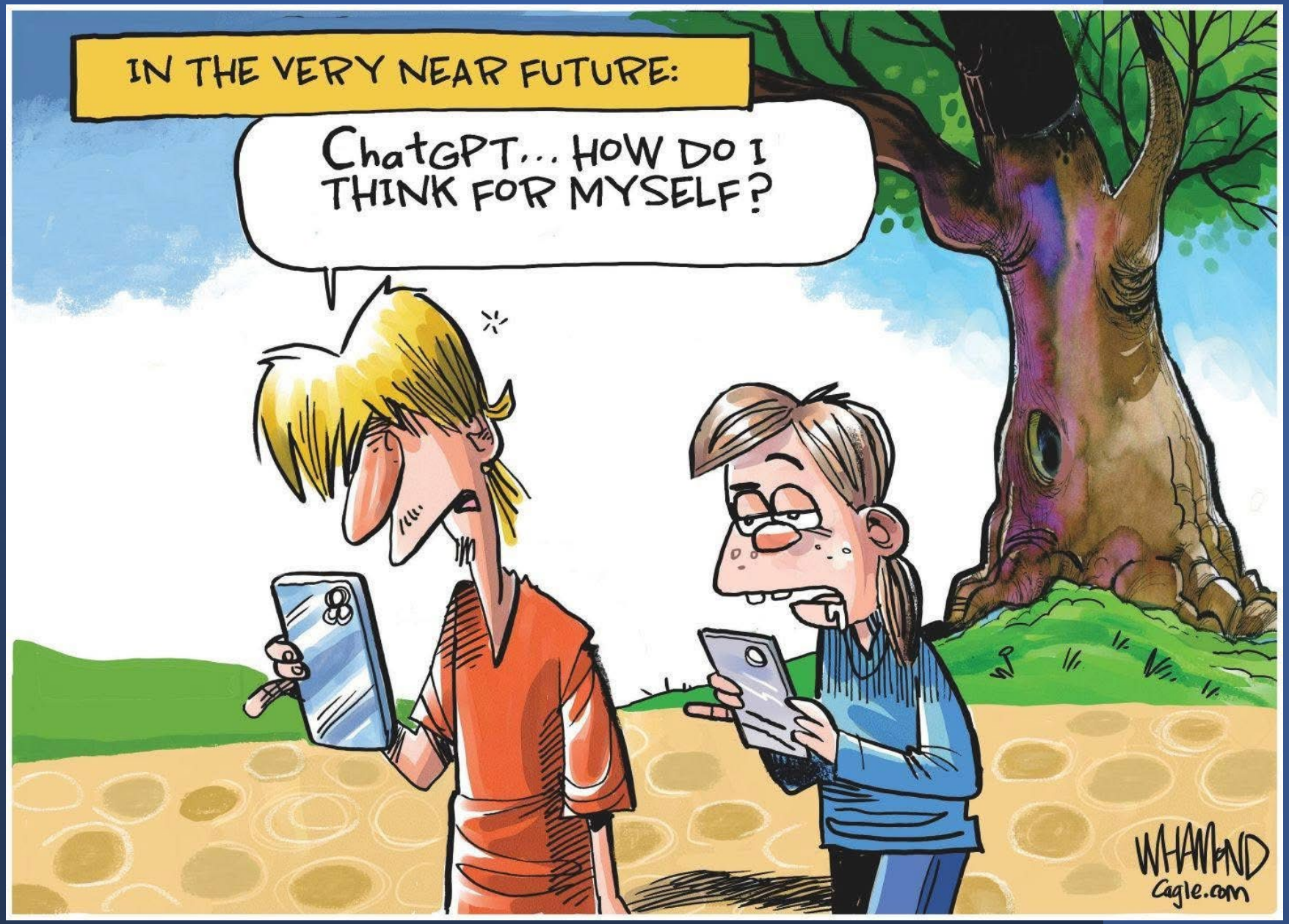
Skill Accelerator → Procedural AI + XR



Educators who use AI will out-teach those who don’t

Thank You!




IN THE VERY NEAR FUTURE:
ChatGPT... HOW DO I THINK FOR MYSELF?
WHAMOND
Cagle.com

A Strategic Blueprint for Institutional Adoption

Step 1: Pilot Targeted Domains



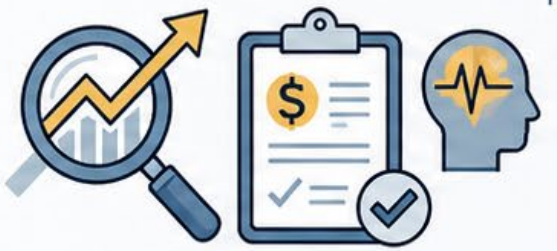
- Start small
- Target bottlenecks
- Test scheduling & note tools

Step 2: Solicit Resident Input



- Make residents stakeholders
- Build trust
- Reduce burden, not add to it

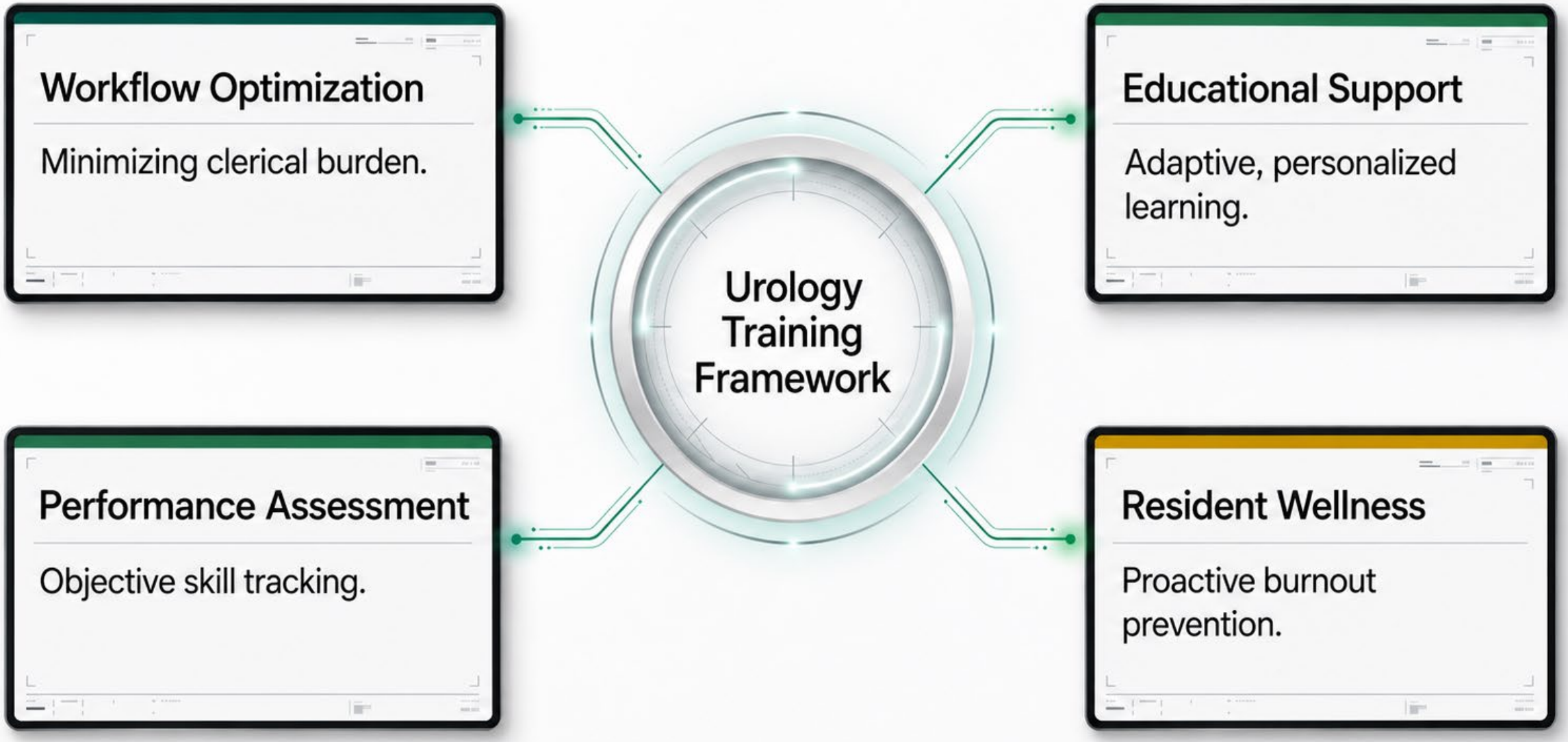
Step 3: Scale & Evaluate



- Expand to analytics & wellness
- Measure value continuously
- Track cost, training outcomes

AI adoption is a strategic imperative for future-ready surgical education.

The Four Pillars of AI Integration



AI Tools for Urology Residency Training

DOMAIN	KEY PLATFORMS	PRIMARY FUNCTION	ANNUAL COST
Resident Workflow Optimization	Nuance Dragon; Abridge; Epic AI Suite	Automates documentation & note summarization	$7K – $50K
Scheduling & On-Call Distribution	Amion; QGenda; Lightning Bolt	Automates equitable duty schedules	$395 – $10K
OR Case Distribution	QGenda Surgical Module; Surglogs	Tracks and balances procedural exposure	$5K – $25K
Performance Assessment	Touch Surgery Enterprise; Theator; OR Black Box	Video-based objective surgical skill feedback	$10K – $50K
Resident Monitoring	Centrak; Aeroscout; RTLS Dashboards	Tracks workflow & wellness metrics	$50K – $200K
Educational Analytics	Osso VR; VirtaMed; Touch Surgery	Identifies skill gaps & tailors learning	$15K – $150K
Clinical Note Summarization	Epic AI; Glass Health; AthenaOne	Generates concise pre-rounding summaries	$10K – $50K
Personalized Learning Assistants	AMBOSS; UpToDate; Lecturio	Links cases to guidelines & adaptive resources	$500 – $5K *per resident*
Mock Interview & Board Prep	MyInterviewPractice; Boardbot; Surgitest	Simulates oral boards & fellowship interviews	$150 – $5K *per year*
Wellness Monitoring & Support	Oura Ring; Flowtime; Welltory	Tracks stress, sleep & burnout risk	$100 – $500 *per resident*

Adopted from Daneshvar et al Realistic Applications of AI in Urology Residency

ETHICAL INTEGRATION

"Could I, Would I, Should I?" — A Bioethics Framework

Journal of Graduate Medical Education | Wolthusen et al., 2025



Non-maleficence

Guard against AI hallucinations reaching learners. Teach critical appraisal — not just 'find the answer' with AI.



Beneficence

Does an AI shortcut undermine long-term skill acquisition? AI can improve efficiency to the detriment of quality.



Justice

Monitor for algorithmic bias in AI outputs. Training data bias perpetuates healthcare disparities.



Fidelity

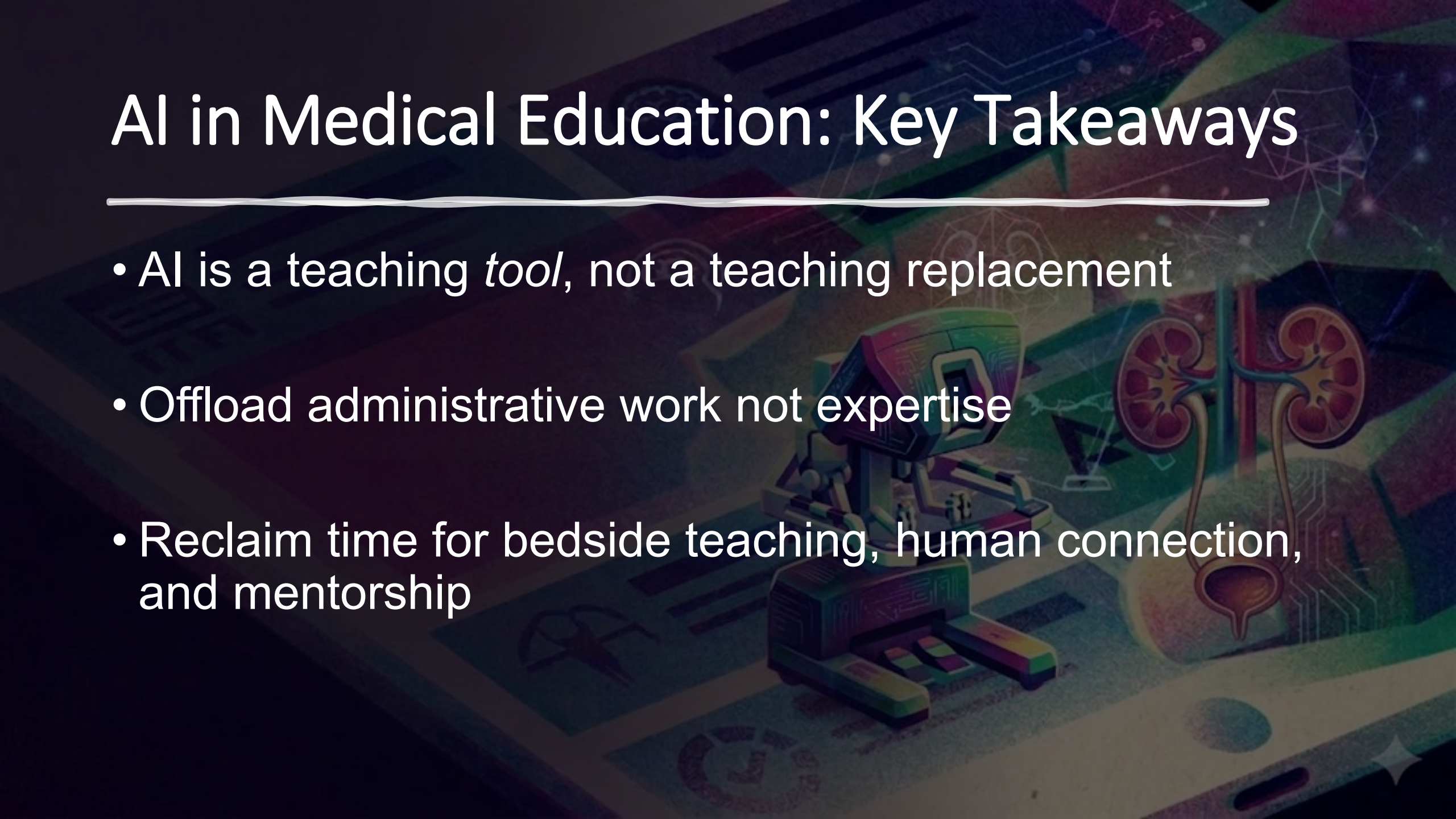
Protect what isn't ours to share — patient data, trainee information, and institutional IP must never enter unsecured AI.

AI in Medical Education: Key Takeaways

- AI needs a strong pedagogical framework
- AI can adapt to individual learners
- AI can expand access and reduce disparities
- AI creates safe spaces to build clinical skills

AI in Medical Education: Key Takeaways

- AI is a teaching *tool*, not a teaching replacement
- Offload administrative work not expertise
- Reclaim time for bedside teaching, human connection, and mentorship




SAU 20
AT AUA 26
ANNUAL MEETING
MAY 14, 2026 - WASHINGTON DC