So good to see you everybody. Welcome to our ChatGPT has arrived and I really have the honor of introducing 2 faculty and two students who have really worked hard for the presentation today. Conrad Sefranek is an MD student interested in pursuing internal medicine and research regarding clinical applications of artificial intelligence. He graduated with honors from Stanford with ABS in Computational Biology and a minor in Management Science and Engineering at Stanford’s.
His research focused on applying machine learning algorithms to clinical decision support systems. And now at Yale, his research has focused on how large language models, such as what he's going to talk about today, can be applied both in the clinical practice and to augment medical education. Elizabeth Sidiman Aristof is an MDPHD student intending to study how early life stress exposure alters neurodevelopment. She graduated summa *** laude from Princeton. She had an AB in Spanish and Portuguese and a certificate in neuroscience. She worked during her Princeton years,
00:01:22.760 --> 00:01:24.312 studying early life stress.
00:01:24.312 --> 00:01:27.153 And then she went to Boston Children’s
00:01:27.153 --> 00:01:29.718 and conducted research on how
00:01:29.720 --> 00:01:31.571 children’s environments influence
00:01:31.571 --> 00:01:34.039 their mental health outcomes.
00:01:34.040 --> 00:01:35.595 I’m so thrilled that they’re
00:01:35.595 --> 00:01:36.839 both with us today.
00:01:36.840 --> 00:01:38.145 On this presentation,
00:01:38.145 --> 00:01:41.190 David Cartash is a lecturer in the
00:01:41.274 --> 00:01:43.450 section of Biomedical Informatics
00:01:43.450 --> 00:01:46.714 and Data Science at Yale University.
00:01:46.720 --> 00:01:48.940 His undergrad degree in Engineering
00:01:48.940 --> 00:01:51.160 Science in Electrical Engineering from
00:01:51.220 --> 00:01:53.805 the University of Western Ontario was
00:01:53.805 --> 00:01:56.830 specializing in biomedical signals and
00:01:56.830 --> 00:01:58.516
systems at the University of Toronto.

He went on to earn a master’s of Health Science in Clinical Engineering,

focusing on the evaluation of the prediction of hospital decompensation events.

He then obtained his PhD in Medical Informatics and Complex Systems Science from Indiana University,

and he’s been here working with us on many of these issues,

Talan Wejesakara, an assistant professor on the Clinician, Educator, Scholar Track.

I have to brag a little.

He completed his master’s in Health Science, medical education.
He was part of our first cohort. He did his undergrad at Duke, and then he went to University of Rochester for his MD. He then came to Yale for his internship and residency and did a fellowship in the general internal medicine that's under Donna Windish. And I see that she's with us today. He's had a number of leadership positions. He's been the Course Director of Clinical Reasoning since 2017 and he's also an associate in our Center for Medical Education providing educator development on clinical reasoning.
He’s also an advisor to the clinical, the clinician educator distinction path for residents in the Department of Medicine.

And they’ve all put a lot of time and I’m really looking forward to hearing this presentation. We have so much to learn. So thank you very much for putting this together.

I’ll pass it over to you, thalan, Conrad and Anna Elizabeth. Hello, everybody. Thanks so much for coming.
I’m sure many, if not all of you have heard of Chatcha BT, probably with a range of excitement to skepticism and maybe some apprehension. Today, we’d like to share with you our perspective as medical students on how Chatcha BT could and we argue should, be used to augment medical education. This is the accreditation and disclosure slide. I think there’s information in the chat, but make sure you don’t forget that overall, in this presentation we’ll cover some context and recent research on large language models.
followed by an exploration of its integration into medical education. And the second-half will focus on some ways that faculty may use these models to augment their teaching practices. So this is a very basic neural network. The idea is that there’s an input layer and an output layer, and then a hidden layer that does computation that gets a. The idea is that you can strengthen or weaken the connections between particular nodes based on prior experience, and this would be represented by changing the thickness of the arrows.
the probability of a particular output being generated given an input. A deep neural network is a much more complicated version of this with more layers and non-linear layers, and the computation of this goes way beyond the scope of our presentation. But it’s important to understand the basics because ChatGPT and large language models broadly are a type of deeper neural network. So we’re creating a probability distribution to understand not only the definitions of words, but also their usage in relation...
to other words, and this allows for the abstraction of information.

O just to clarify, Chat GT stands for Chat generative retrained Transformer.

So ChatGPT is by no means in isolation. I think it sparked a lot of people’s interest in large language models, but it wasn’t the 1st and it’s definitely not the last. There are a ton of these new models coming out right now, and they’re rapidly expanding in terms of the size of the models and their performance. This graph is already out of date,
so it’s important to note ChatGPT as I was explaining, was trained to produce plausible text using the probability it is not actually trained on what is true versus what is not true, and that means that it is capable of generating text that is fundamentally wrong. These have been termed hallucinations, and the reason that this is possible is because we’re asking it to do next word prediction to give us a plausible string of text to answer a question, but it’s not actually doing the cognitive task of answering that question.
Additionally, ChatGPT does not have access to data behind paywalls, so it was trained on a huge volume of information on the Internet, but only that was freely available. The free version of ChatGPT 3.5 was not trained on data past 2021, and ChatGPT 4 was not trained on data past 2023, I believe April. So it’s not browsing the Internet in real time or in our case reading scientific or medical literature that is coming out as it immediately comes out. So for a little bit more context there was a recent research study actually conducted at Yale looking at how ChatGPT
this was the original base 3.5 model could perform on the USMLE exam and to sum it all up in one phrase it passed step one. That original base model which spiked sparked a lot of excitement and I think the medical community and the more recent update. So that was equivalent to you could argue about an M3 able to pass a step one exam. But these more recent GPT 4 which is open AIS latest model has been shown to achieve like greater than an 85% on all three-step exams. So this is performing at a pretty high percentile on these tasks. So to be clear, in this presentation
we are not proposing using ChatGPT as the definitive source of truth, but rather as a tool. So think of it like a calculator. For doctors like a Wikipedia, you still need to understand the underlying computation of what you’re entering into the calculator, but you don’t necessarily need to do out all the math. So we equate using ChatGPT to having a conversation with a friend. Then this next part of the presentation, we’re going to highlight a few use cases that have emerged over the past year of using ChatGPT often on a daily basis.
So this first use case is when reviewing multiple choice exams. So this is an example of a multiple choice question that we had on a midterm and I missed the question, I wasn’t totally sure why and I couldn’t really explain the correct answer. And unfortunately faculty have so much on their play and sometimes you want more of a rationale than is provided. So this was plugging in that whole question into Chat CPT. We were able to explore its response to try to better understand the question and you also get this nice verification of
if Chat BT chooses the correct answer, that’s at least some protection against you knowing its response is an hallucination.

Another use case that Conrad and I have been discussing is practice cases. So we have workshops and preclinical where we go through practice cases with faculty member, but there’s so many more important topics that we simply don’t have time to cover in those spaces. And so we can input into ChatGPT and ask for workshop cases that we can then work through on our own. The advantage of doing this with ChatGPT over using a clinical cases
textbook or what’s available on like the New England Journal website is that we can actually interact with it. So we can ask it to rephrase things that don’t make sense to us. We can ask for additional details. But perhaps most importantly, the cases that it’s generating are not static. So we could ask it to change one finding. So for example, change a physical exam finding or a lab finding and then redo the case. And that really helps us hone our clinical reasoning skills to see
how one element can change the whole differential or not. So it’s allowing us to practice applying the pathophysiological frameworks that we are learning. We’re saving a third use case for the end of our presentation, so we’ll come back to it. But this is a more recent update from Open AI, the development of these personalized GPT models. And with these models, you can custom build a version of Chat PT by providing relevant contextual information. For example,
I'm a second year medical student and I'm interested in learning content at the level of death needed for my upcoming USMLE STEP exam. Moreover, for my personal learning style, I like information presented concisely, using familiar medical abbreviations and bulleted lists when applicable. So Conrad is significantly better at memorizing patterns than I am, and I really need a framework for thinking that is Physiology driven so that I can work my way up from the basic principles.
Med school GPT tutor,

I specifically told it that I wanted explanations to be longer centered on pathophysiological frameworks and building from the underlying mechanisms up through the presentation of disease. So this is really great because Conrad and I are using the same tool ChatGPT 4, and I are using the same tool ChatGPT 4, but we are able to tailor it based to or based on what we specifically need for our own individual learning styles. So here are a few other things that Conrad and I have come up with and that are suggested in the literature as to ways that chat. GPT can be used in medical education,
so it could be used to reduce the overwhelming landscape of available resources for students. It could help create a study plan, and it could also be a simulated patient. And we could practice doing a history taking, typing it out. So there’s lots of potential taking a step back from the day-to-day trench of the medical school, whether we like it or not, large language models are coming to healthcare. Here is a smattering of a few of the recent papers coming out about potential uses of Chat Chipetia.
00:13:03.661 --> 00:13:05.314 Medicine and since making these
NOTE Confidence: 0.7728168325
00:13:05.314 --> 00:13:07.156 slides there’s been a lot more.
NOTE Confidence: 0.7728168325
00:13:07.160 --> 00:13:10.015 Moreover, Microsoft and Epic announced
NOTE Confidence: 0.7728168325
00:13:10.015 --> 00:13:13.160 and expanded Bring Chat BT into the
NOTE Confidence: 0.7728168325
NOTE Confidence: 0.7728168325
00:13:15.160 --> 00:13:16.360 Whether we like it or not,
NOTE Confidence: 0.7728168325
00:13:16.360 --> 00:13:19.392 we need to be prepared here.
NOTE Confidence: 0.7728168325
00:13:19.392 --> 00:13:21.264 I’ll also highlight that in as
NOTE Confidence: 0.7728168325
00:13:21.264 --> 00:13:23.640 part of this expanded partnership,
NOTE Confidence: 0.7728168325
00:13:23.640 --> 00:13:25.635 there’s actually a pilot program
NOTE Confidence: 0.7728168325
00:13:25.635 --> 00:13:28.161 that’s happening at Y and HH Yell
NOTE Confidence: 0.7728168325
00:13:28.161 --> 00:13:30.580 is one of 10 sites selected for
NOTE Confidence: 0.7728168325
00:13:30.580 --> 00:13:33.580 this pilot program where we can
NOTE Confidence: 0.7728168325
00:13:33.580 --> 00:13:36.320 actually have for the Mychart
NOTE Confidence: 0.7728168325
00:13:36.320 --> 00:13:38.090 inbox messaging from physicians.
NOTE Confidence: 0.7728168325
00:13:38.090 --> 00:13:40.040 They’ll there can be so free.
In the specific example, this patient asked about the poor air quality and whether it is impacting or should impact her exercise routine and whether she can keep going on walks and chat to BT GB T4, this auto reply that the physician absolutely needs to read, review, likely edit before and of course you have the option to reject that draft. But this is coming to Epic very soon. So I think that’s part of the impetus for us really learning about these models.
So there are many proposed ways in the literature at large about how ChatGPT can be used in medical practice. So Conrad and I have talked about in particular that ChatGPT can be applied to reduce the administrative load of physicians. So for example, it could be used for insurance filings or generating discharge instructions. It can also be used for reducing errors. So for example, detecting potential drug drug interactions and it might actually be able to reduce the burden on patients. So for example, there may be a way to fall or do a
follow up appointment with the chat bot without actually scheduling a whole visit for something that’s very routine. But ultimately, the goal is to use automation to reduce physician burnout and to improve patient care. So as Conrad said, we really need to be prepared for this inevitable integration of AI into healthcare. And I think that part of that is evaluating very critically how we can use large language models responsibly, but also what the limits are of large language models in AI at large.
So we think questions about hallucinations, bias chat, GP, TS evaluation of its own uncertainty and legal and ethical issues would be great to address in spaces like professional responsibility, which is a preclinical course that goes through some of the major ethical problems that physicians face. And we’ll add, they did indeed have a session on this for the first year students, which we are really excited to see and we want, we’d love to see more of those kind of discussions happening. So for this part, we’re going to show a short live demo of 1/3 use case.
00:16:06.680 --> 00:16:09.600 So this is something that we use when reviewing our like clinical cases so far in this first year of didactic curriculum,
00:16:09.600 --> 00:16:12.130 but also something that we might use on the wards after seeing a patient brainstorming our initial differential,
00:16:12.130 --> 00:16:15.359 but then wanting to check back and see if there’s other differentials that we’re potentially missing,
00:16:15.360 --> 00:16:17.145 that we’re that we should be considering here.
00:16:17.145 --> 00:16:19.583 So hopefully this screen share works
00:16:19.583 --> 00:16:21.199 and here I’ll click submit and chat.
00:16:21.200 --> 00:16:23.636 BT can help brainstorm this list and it gives us initial list linking the
specific symptoms in the presentation to
different potential diagnosis on that list.
But I think the most useful thing here is the
additional follow up questions you can ask.
So I won’t go through each one individually,
but things ranging from which physical
exam maneuvers might we want to
consider to further differentiate
between these diagnosis.
What laboratory should we order and
what might, what results might we
expect for each of these diagnosis,
what for their work up,
what treatments, etcetera.
And you know,
in addition to asking across
the board for all of them,

you can hone in and say

for PCOS specifically,

what do I need to be thinking about?

So that interactive component

is really helpful for us.

Yeah, we joke that you’re arguing

with ChatGPT and that’s actually

the most useful part of it.

And the last note is the

same thing we if we have,

if we’re rotating together and

we had a few minutes before

talking to the attending,

we definitely want to go back and
00:17:44.501 --> 00:17:45.848 forward talking about our differentials
NOTE Confidence: 0.867193211666667
00:17:45.848 --> 00:17:47.857 and seeing if there’s things that and
NOTE Confidence: 0.867193211666667
00:17:47.857 --> 00:17:49.558 Elizabeth thought of that maybe I missed.
NOTE Confidence: 0.867193211666667
00:17:49.560 --> 00:17:50.984 So we kind of think of it as
NOTE Confidence: 0.867193211666667
00:17:50.984 --> 00:17:51.799 a conversation like that.
NOTE Confidence: 0.878394846666667
00:17:53.600 --> 00:17:56.260 So we know that AI and medicine
NOTE Confidence: 0.878394846666667
00:17:56.260 --> 00:17:58.520 sounds really scary and uncertain,
NOTE Confidence: 0.878394846666667
00:17:58.520 --> 00:17:59.980 and we have our own
NOTE Confidence: 0.878394846666667
00:17:59.980 --> 00:18:01.440 hesitations about it as well.
NOTE Confidence: 0.878394846666667
00:18:01.440 --> 00:18:03.939 But the reality really is that we
NOTE Confidence: 0.878394846666667
00:18:03.939 --> 00:18:06.096 don’t actually have a choice because
NOTE Confidence: 0.878394846666667
00:18:06.096 --> 00:18:09.000 this is coming whether we like it or not.
NOTE Confidence: 0.878394846666667
00:18:09.000 --> 00:18:12.320 Conrad and I are starting in the hospital
NOTE Confidence: 0.878394846666667
00:18:12.320 --> 00:18:15.198 starting in January on our clerkships
NOTE Confidence: 0.878394846666667
00:18:15.200 --> 00:18:18.262 and as we mentioned there is ChatGPT
NOTE Confidence: 0.878394846666667
00:18:18.262 --> 00:18:22.278 being integrated into EPIC at Yale New Haven.
And so that means literally from the beginning of our time in the clinical spaces ChatGPT will be present.

So Yale School of Medicine’s mission statement says that the school is striving to create leaders in medicine and science. And we really believe that in order to be equipped to be future leaders in medicine and science, we must be at the forefront of AI and medicine from the beginning of this movement.

That really is quite inevitable. So we built in a little pause midway through this. We have about 3 to 5 minutes
for one or two questions, if people have them.
I haven't been watching the chat, so maybe we want to go there.
The one I'll let you decide how we open things up.

No, let's open up to the group if they have any chats.
If you want to unmute yourself and share your questions, we'd love to hear them. I had a question about accuracy again, I want you to review again how is the accuracy of the information that you are getting? Like if you use it as a mentor in the differential before.
00:19:32.780 --> 00:19:34.960 you present to the attending.
00:19:34.960 --> 00:19:36.880 I mean we're so used to everything being peer reviewed and up to date or the other learning modules by another human being.
00:19:36.880 --> 00:19:38.638 peer reviewed and
00:19:38.640 --> 00:19:39.560 up to date or the
00:19:39.560 --> 00:19:41.680 other learning modules by
00:19:41.800 --> 00:19:43.240 another human being.
00:19:43.240 --> 00:19:46.680 So who is reviewing the chat review, especially if the Internet they're looking at is like you know,
00:19:46.680 --> 00:19:48.272 over a year old which is what you said
00:19:48.272 --> 00:19:51.000 looking at is like you know,
00:19:51.000 --> 00:19:53.040 over a year old which is what you said
00:19:53.040 --> 00:19:56.240 in the beginning. So how is the accuracy being monitored?
00:19:56.240 --> 00:19:58.272 especially if the Internet they're looking at is like you know,
00:20:01.838 --> 00:20:03.510 So I think that’s a really good question and something we’re always thinking about as we’re using it.
It was trained on the Internet and that’s a scary thought. We all know we’ve all read things that are not true on the Internet. So that’s definitely something we need to acknowledge and like understand when we’re interpreting the responses from Chatchibiti. Never use Chatchibiti as a replacement of up to date for example. That being said, it is performing. I would say most of our classmates right now are not able to hit 85% across all the STEP exams. I think that’s one indicator of the pretty high accuracy that things
are able to achieve right now.

So it’s not, it’s imperfect and it’s really important that people understand that it’s imperfect.

But I do think that it can be a really helpful classmate. I would even argue more helpful than myself.

I know I’m not achieving those scores on any of the STEP exams right now.

So I would recommend shooting questions to ChatGPT maybe before a classmate asked me.

And that’s also why we recommend arguing with it and why we think it’s important that we like start using it in our
classrooms to then be able to learn,
like how you can tell if it’s hallucinating or not,
or sort of learn how we can implement our own best practices
I think that there isn’t necessarily a best practice established at this point.
And I think that’s where Yale School of Medicine comes in.
That’s an opportunity for us to really lead the way,
right. So we have time maybe for one more question live, but because there are so many of us presenting,
we'll have everybody start replying in the chat as well once we're done. So Rob, I think you were the first question that I saw, if you wouldn’t mind us sharing, I think Dana actually went before me, but I I would just wanted to reply to Peggy, which is to point out that the idea that students are using definitive textbooks only for all of their look UPS is not really what’s happening, right. So people look up whatever they find,
and the question is not, is it perfect, but is it better or at least as good as the alternatives? I mean, you know, I, as, you know, I teach a course and I sit through courses and I see people say things that aren’t true. And so, you know, even at Yale, even with the fancy Yale professors, people say something that’s wrong. I see things in textbooks that are wrong. So the idea that they’re, you know, it’s like the idea that somebody on the Internet might be wrong and we have to correct them. I think that’s really not really not correct.
I think the idea is what the really idea is. Is it better than the alternative? That's really the issue.

Dana, I think we can sneak you in. What's your question?

I was just going to add something that's probably not a novel thought, but that the input is only going to be as good as the clinical skills will allow insofar as did you ask the right question, you know what's missing from the STEM? Did you do the right physical exam? And it's just to say sometimes when new technology comes along like radio radiology, like CAT scans and new learners start.
to say the answer is in the CAT scan. And that’s more sensitive and specific than anything else.

So it’s just an opportunity to remind people to use it as you are both saying, as a tool and that it can’t be a substitute for clinical skills.

We are gonna have some good discussion today.

Conrad, do you have any last thoughts before I move on?

One last insertion is just I also think there is value in practicing differentials without ChatGPT.
And I think the parallel analogy is that, like, students need to learn their multiplication tables to be able to do algebra. If they just use a calculator and never learn how to do multiplication tables, that’s going to cause a lot of problems for them down the line.

So I think it’s really important to develop these skills, independently without these tools as well. I just think it’s a no one would say no one should use calculators ever. It’s just we have to be thoughtful about when we use them and how.
they’re augmenting our education.

Awesome. Thank you so much.

We’re definitely going to have time at the end where we can fool some of these questions.

But Conrad and Elizabeth David, if you want to start answering some of these other questions in the chat, that’d be great.

So we’ve heard about some questions on student use of ChatGPT.

But how can faculty use ChatGPT to augment medical education?

And I say this as someone who doesn’t consider themselves particularly tech savvy.

I run a couple courses.
But to be honest, more than anything, I'm a millennial who has significant fear of missing out more than anything else. And so I follow my journals, we all get our updates right in our e-mail. And I'm seeing in academic medicine, JGME, medical teacher, more articles about how we can use this, even published medical education articles in JAMA and the New England Journal of Medicine, which as all of Y'all scholars know is very challenging to do. So clearly it is becoming
mainstream not just in healthcare but specific to medical education.

So with that in mind and we're starting to get a feeling about this, I wanted to see just that, how are you as faculty and learners feeling about chat GBD. So we're putting up a poll there. You can put as many choices as I want and I know, I know there are multiple choices in there too. I'll answer this after as well, but I'll say at least for me, for the past 6 three to six months, I've been talking to educators at Yale,
Basic science, clinical science, and leaders across the country around ChatGPT. And these are some of the adjectives that I'm seeing and I know they've all crossed my mind to some degree. So I want to think about why we're having these concerns, some that have already been named. So the first one is the quality of the information. This is by far the biggest concern that's come up with educators. And I would certainly agree with Rob that...
while it’s something to be concerned about, I think we have to remember like teaching comes from different sources all the time. We ask our learners to often study in groups together and where this where’s that information coming from? I think another barrier that comes up is familiarity or comfort with use, where we hear things like large language models, predictive texts, chats, prompts, and it feels almost like we’re coding and that’s not what ChatGPT is. But I can understand where that concern comes from.
And I think a very real one is cost. There's a literal cost of a monthly fee if you wanted to get Chachi BT4. But I think that more than that, it's the time investment kind of to the second point of how long is it going to take to learn. I think we're getting a lot of the similar concerns as when the EHR first came up in my training. So with that in mind, I wanted to also ask about how often you're using ChatGPT. But before that, David,
show us about our feelings

on ChatGPT right now. So good.

We have a lot of people who are curious.

That’s probably why you’re here.

That makes sense.

But I’m kind of surprised we have a lot,

a lot more optimism in the room.

So we can build on that.

That’s right.

We’re already winning here,

Conrad and Elizabeth and David.

So next poll that’s coming up

is how often do you use ChatGPT.

So David,

we wouldn’t mind closing this poll and

opening up the next one about frequency.
So are you never, have you never ever used it? Are you using it daily or have you tried it once and that was more than enough for you. And as we think about how often people are using it, I think it’s important to think about change in the greater perspective of innovation and technology. So Everett Rodgers had some work in the 1960s around the diffusion of innovation, also known as the technology adoption cycle. For those of you who are Malcolm Gladwell enthusiasts and have
read The Tipping Point,

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generally we think around getting to

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this 16 to 18% of any population.

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And after that point,

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you’re starting to move more and

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more towards something that’s

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just going to happen,

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something that’s inevitable.

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And so I wanted to get David’s

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take as probably the one with

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the most expertise on ChatGPT.

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David, how do you feel?

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Where do we feel like we are on

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ChatGPT in general academic use?

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And then specific to medical education,

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how many people are using it.

50
So I think this is, this is partially a question of how we see it. You know, there’s a lot of people who are certainly talking about it. There’s a lot of conversations, there’s a lot of hype, but and certainly students are using it quite more frequently than I ever expected them to be. But it hasn’t quite hit that public consciousness moment. So I would estimate, you know, we’re somewhere across the chasm in the early majority and
specifically in medical education,

I think there’s been a lot of hesitancy,

There’s been a lot of questions about,

you know,

rightly as we’ve even seen today about

validity and the the larger problems of,

you know,

accuracy of medical information

amidst the Internet.

But there’s been some focus efforts to,

to use it well.

This is really what we’re talking about,

right, Using it well.

And that’s going to be the tipping point.

Once that has hit mainstream,

once we’re all talking about it
or using it more commonly,
that’s when we’ll tip to the late majority from the early majority.
And I think we’re really just breaching the chasm right now.
All right. So David, how’s that poll looking?
I love harkening back to a time of zoom polls.
So we have a lot of never users, maybe a little bit, even some daily users.
I'd say.

I probably personally am a weekly user of it, probably every time I write up or start doing some sort of curriculum development.

But I will say that honestly, if you're using it within the next like three to six months to some degree at least, like a few times, you probably would be in the early adopters is my read of the room from medical schools across the country.

So how should educators use ChatGPT now? This review was published in the spring of 2023 in Academic Medicine.
00:30:49.428 --> 00:30:51.256 on how artificial intelligence
00:30:51.256 --> 00:30:53.435 large language models like ChatGPT
00:30:53.435 --> 00:30:55.835 should be used in medical education.
00:30:55.840 --> 00:30:57.520 They came up with some competencies,
00:30:57.520 --> 00:30:59.760 knowledge of AI, ethical implications.
00:30:59.760 --> 00:31:01.356 Think about the bias, for example,
00:31:01.360 --> 00:31:02.515 of data sets.
00:31:02.515 --> 00:31:04.440 It can actually propagate bias
00:31:04.440 --> 00:31:06.268 if not reviewed correctly,
00:31:06.268 --> 00:31:08.553 how it’s affecting clinical encounters
00:31:08.553 --> 00:31:11.197 and how we’re working to improve it.
00:31:11.200 --> 00:31:12.460 But I think it’s important
00:31:12.460 --> 00:31:13.720 to remember a couple things.
00:31:13.720 --> 00:31:16.975 One is that this isn’t what every
00:31:16.975 --> 00:31:19.440 single medical educator needs to do.
These are institutional values that we’re trying to promote. With that in mind, we have our whole informatics department here at Yale, for example, that David is a part of who are helping and are going to develop more and more curricula and workshops for students and faculty alike to develop those skills. So I think honestly it might be better just to play around with it ourselves and see how it might be beneficial to us as educators. So I’ll tell you my story.
It’s nothing particularly special, but when I first started using ChatGPT was over the summer. I direct our academic support program and I had to develop some cases for SP standardized patients. And I saw Barbara Hildebrandt on the call. She gave me a few reminders and it wasn’t until the day before that I started writing these cases and I blocked out a few hours and I was like alright, I can write them myself or I could see what ChatGPT can do for me.
So, not feeling great initially, but I saw what ChatGPT can do. I put in a general prompt below this and don’t worry, Medicine, school, medicine, curricula, one of our representative cases. Use this new prompt and chief concern and this is what it spit out to me now. This is a script for a standardized patient and it’s written very, very similarly, but on a new case. So this is talking about knee pain. It gives us an HPI,
but also things like emotional context as well social history. This is more than enough for an SP to use to play a role. It even gives us a little bit of a differential diagnosis. If you wanted a faculty to have a little bit of teaching points that they could give. Obviously they could add their own expertise, but I saw that and at least for case development, as someone who’s involved in clinical skills, I was like, this is pretty good enough for me to pay 20 bucks a month.
now for a ChatGPT for.
Since then I’ve used a few times creating facilitator guides.
Literally after this we’ll be doing a clinical reasoning session with one-on-one consultations between faculty and tutors, I think. And Elizabeth has a slot coming up soon too. And we use ChatGPT for the facilitator guide.
I’ve used it to update curricula. For example, we have a session on Bayesian reasoning in the physical exam. I got feedback from learners on ways to improve and we use that to create new cases and learning objectives.
I've used the prayer feedback on the wards, had a couple struggling learners and had to deliver feedback, and I put in like the pearls format, the go ask, tell, ask model. And just so I didn’t have to perseverate on the hard discussion, I kind of had an idea of what might be some things that I could say. We’ve also had within our clinical reasoning course, one of our associate course directors, Darius developed some exercises around CHAP GBT 5 prompts and that I think our students found OK.
Conrad and Elizabeth were in that class. I think it was like tolerable. But I think more than anything I realized from that is that we don’t have to teach and use ChatGPT all the time. Our students are going to get that information. It’s more important for us to, for them to learn somewhere along the lines about the concerns, earns and ways to use it and then for us to use it ourselves. And so with that in mind, when it comes to teaching and these are some general categories from a review or that came out or a
00:34:56.430 --> 00:34:58.102 perspective piece that came out in
00:34:58.102 --> 00:35:00.376 that kind of medicine in August from Bascard.
00:35:00.376 --> 00:35:02.116 And some opportunities for teaching,
00:35:02.120 --> 00:35:03.720 like I mentioned around
00:35:03.720 --> 00:35:05.320 curriculum development are there,
00:35:05.320 --> 00:35:06.241 But also evaluation.
00:35:06.241 --> 00:35:08.390 We can look at our curricula and
00:35:08.453 --> 00:35:10.598 eventually with large language files,
00:35:10.600 --> 00:35:12.200 if not already, say like, hey,
00:35:12.200 --> 00:35:14.000 are we meeting our goals,
00:35:14.000 --> 00:35:15.408 our educational program objectives?
00:35:15.408 --> 00:35:17.889 We can put our content in that
00:35:17.889 --> 00:35:18.798 and evaluate it.
00:35:18.800 --> 00:35:20.291 One conversation I’ve had a lot with
00:35:20.291 --> 00:35:21.759 David is around teaching framework.
So we teach knowledge and medical education, but then eventually they have to practice and there’s this huge space in between about how students synthesize and connect information. And that is a place where ChatGPT could really help. How do you interact with information? How can you make things iterative in ways that we can’t do as faculty because we simply aren’t there all the time with students now? So the concerns are there, the quality of the resources, information for sure. But I think a sneaky concern that...
00:35:52.016 --> 00:35:54.280 comes up that I think is a good concern for us is that chat DVD
00:35:54.280 --> 00:35:56.240 can replace a lot of the stuff
00:35:56.240 --> 00:35:58.310 that we're already doing and that might increase the need for more in person faculty tasks like where's the real value in medical education?
00:36:00.560 --> 00:36:03.128 Is gonna come up more often than not.
00:36:04.947 --> 00:36:07.275 There's certainly gonna be opportunities in assessment, creating items which will talk about rubrics, providing feedback both in answers, keys or as Anne Elizabeth talked about, and more about personalized tutor mode.
00:36:10.000 --> 00:36:11.988 The way that you won't that you
might have it in office hours if it was only you and the faculty member going back and forth, and so certainly there are opportunities there. The concerns as well arise between, for example, if you have open-ended answers, they’re going to have to be reviewed carefully for AI generation for the ability to answer multiple choice questions clearly at a very high level. In my opinion, it’s probably functioning somewhere between the level of a sub I and
an intern at medical knowledge

at least ChatGPT 4,

so strengthening proctoring

It hasn’t done great with automating scoring,

at least in our early studies,

but I imagine it’ll get better

It's a paper that came out of Colorado’s medical school.
teacher I think maybe two months ago.

And for their five week reproductive course they had a total of 290 questions that were included across quizzes, across their qualifier, and they used ChatGPT to create some of those items, about 10% of them. They used this flow chart, which isn't as serious as it seems and honestly not as detailed as it is. If you look at that paper, this third purple box was very limited. It was give us a four sentence question on a reproductive system.
So it didn’t even specify in ways that I did like. This is how I want to format, this is the specific topic within that. And yet they still used it. And when all was said and done, they found that these questions were similar and difficulty granted after expert review, assessment team review. And they found that the difficulty was similar and arguably more importantly the discrimination, the discrimination ability was similar. So between high performers and lower performers,
the question performed similarly
and faculty found it easy to use and saved a lot of time in their question development process. There are other ways that ChatGPT will certainly be used in medical education, probably beyond the scope of what we talked about in research authorship. I know journals are still trying to figure that out right now. Also in admissions as well. I think there is something to be said. I know there might be an initial concern that people are writing their personal statements with artificial intelligence, but I think there's a counter argument
that actually can be good for reducing disparities for a lot of students who don’t have the resources that maybe some universities have as far preparing their health profession students for application. So there’s certainly other ways, but at least we focused here on teaching and assessment. So some takeaways, at least from my use and my reading of the room when it comes to ChatGPT is First off, you’re still in the early adopters, just try it. Remember that you don’t need to be a super user right away.
Also remember that what you’re developing should be really seen as first steps, not final products, and that way you can use your time and expertise to edit and get higher quality products.

Another thing I mentioned reinforcing with Dave and I talked about, it can be used for synthesis and framework, less so for primary information.

I don’t think that students are using it for primary information and we asked them about it. That’s not how they said they’re using as well.

In fact,
that’s where they’ve been telling us.

They’ve been skeptical too.

It will force us to find where

the limited resources are where

students aren’t able to use it.

So just keep your eyes open for updates,

but ask for help when available.

And in this sense,

a quick shout out to David,

whose e-mail will be at the end,

whose e-mail will be at the end,

and other colleagues as far as keep your

eyes open for opportunities to learn more.

So with that in mind,

I wanted to move on to just some examples

so you can kind of see what I’m doing.
I know I did some screenshots, but in addition to that I wanted to show you some examples of some of the chats that I did and see if maybe you can take a look at these and say you know, how helpful would it be. In this example, a basic science lecture on water soluble vitamins, your vitamin BS, vitamin CS. If you wanted to help create a lecture outline, this might be an example of what it would look like. So I give a prompt. I’m a faculty member. I have 60 minutes.
I'm mostly didactic, little bit large group, but also I was able to put in a Yale School of Medicine educational program objective so that could help me make sure I'm hitting the right points and spit out this. So I'll wait for 510 seconds to let you skim the links. David, would you mind throwing the link to this in the chat for our faculty? Take a look at another time. But at least for me, looking at this, I would give this maybe like a two 1/2.
but if I had to make 60 slides on something, it would be helpful to figure out what I should probably think about putting into it, maybe with my own resources. Now let’s say I wanted to add some cases. Let’s write some cases, let’s not. I don’t want them to be too long. I want to chance always told me, God, I got to make sure I keep the words on my slides limited. So let’s only make it 250 words. Let’s see what a case might look like on thiamine deficiency or B6 deficiency. And the first paragraph is a case, and for me this is a person
who writes cases, who talks to colleagues around the country, for example, the clinical problem solvers at UCSF. They’ve told me that you don’t really need to have a perfect case. You can tweak cases, you can adjust them for what you need to know. This is more than enough initially, and I can add and change some things to make it more representative based off of my own expertise with this topic. So I’d give this maybe a three then let’s say I want to write a question.
Now, one way that we can get faculty to buying in general, to medication, to medication, to our educational content is that it can relate to them and what their needs are. And so one thing you could ask is hey, like let’s make this format, USM LE1 style, USML E2 style. And you can at least say that to your students as well. And that might make them more interested and increase their motivation for doing some of those questions. And even more than that, you can see it can create tables for you.

Now I certainly would adjust
and edit this table, but it would give me a good start if I wanted to have an answer. Key of illness scripts for any of these given vitamins on deficiency specifically range from epidemiology to diagnostic testing. So all of this, it was created in less than 5 minutes. It might have taken a little bit longer if I had it truly searched through all of like USM, LE1 parameters through their database, but you can see that it certainly is a star. And so as we’re nearing the end,
00:43:43.360 --> 00:43:45.124 I do want to move on to a large
NOTE Confidence: 0.939190502222222
00:43:45.124 --> 00:43:46.615 room discussion 'cause I know
NOTE Confidence: 0.939190502222222
00:43:46.615 --> 00:43:48.475 the chat has been pretty active.
NOTE Confidence: 0.939190502222222
00:43:48.480 --> 00:43:50.706 So we'll skip our second case
NOTE Confidence: 0.939190502222222
00:43:50.706 --> 00:43:54.799 though David put one in the
NOTE Confidence: 0.939190502222222
00:43:54.800 --> 00:44:01.187 chat of a clinical example.
NOTE Confidence: 0.939190502222222
00:44:01.187 --> 00:44:04.467 What are your impressions of
NOTE Confidence: 0.939190502222222
00:44:04.467 --> 00:44:08.460 ChatGPT for creating content?
NOTE Confidence: 0.939190502222222
00:44:08.460 --> 00:44:11.496 And what are some next steps
NOTE Confidence: 0.939190502222222
00:44:11.496 --> 00:44:13.756 that you think EOS Good Medicine
00:44:13.756 --> 00:44:16.276 should be looking at for ChatGPT?

00:44:16.280 --> 00:44:17.240 So what do y'all think?

00:44:25.520 --> 00:44:27.716 So thalan, I love Gary’s question,

00:44:27.720 --> 00:44:29.820 he says, Curious how much of

00:44:29.820 --> 00:44:32.080 this talk was AI generated?

00:44:33.000 --> 00:44:35.135 So I would say our cases obviously

00:44:35.135 --> 00:44:37.026 are that we plugged into Chat

00:44:37.026 --> 00:44:39.024 but no, at least none of

00:44:39.024 --> 00:44:40.440 my slides where I had to use,

00:44:40.440 --> 00:44:42.320 you know, this one myself.

00:44:44.320 --> 00:44:45.544 Did you use Chat Chi T

00:44:45.544 --> 00:44:46.800 for any of your slides?

00:44:47.840 --> 00:44:49.268 They didn’t make any of the

00:44:49.268 --> 00:44:50.480 slides one place we did.
I had a few conversations back and forth when, like brainstorming ideas on how Chatship team might be used in medical education. So that was one place where I don’t know if it added any ideas, but was reassuring that we’d thought of most of the ideas that came up with. We thought of them already. So that was one place we used it. But good question.

And I will say Comrade and Elizabeth have been giving this talk in a couple iterations. So this is not the first time if it seems too smooth to be real.
It’s just their practice and expertise.

Awesome. Allison, you have a question.

Hi, Salon, thank you so much. And and to all of our presenters today,

this is just really, really interesting and I appreciate the time it took

to prepare this. I do have a question Thelan being on the continuing professional development side and thinking of our faculty

and I’ve used it once one of I was a one,

but there’s so much opportunity,

but I think it’s a vulnerability
of saying I don’t know how to do this and
how to best prepare. So from Acme side,
how can we provide those opportunities
to teach our faculty and to be vulnerable and to say you don’t know and
still find a a best practice for integrating this in, even if it’s very slowly and
we’re figuring this out on your own by the way. Yeah,
we’re figuring this out we’re figuring this out
on your own by the way.
If you have questions for specific people,
feel free to like put that in the comment
box with your question or ask initially.
I’ll take this one.
I guess initially, Allison,
I’ll say that we’re all learning together and I think it might be a little bit bumpy as we create more content. I’ve seen other institution workshops, they’ll have these like playgrounds where they’ll give an open space and all faculty can kind of use whatever tools that they’re working on at any given time and ask questions to someone who’s hosting it. And some people will just like take those links and go offline and use it. And that’s OK. But I think just having low requirements or expectations and...
just having a lot of opportunities

is just the best way to do it.

David,

I know you’ve like thought about this a lot.

What do you think would be a good approach for helping our faculty learn about ChatGPT and other like large language models?

So first point, do you mind taking down the slides so we can see everybody in panorama.

The easy answer to that is everybody’s talking about it from the Porvu Center, from us to the larger groups within the Faculty of Arts and Science and there’s been a lot of
00:47:35.243 --> 00:47:37.120 communities built as a product of that.

00:47:37.120 --> 00:47:39.430 The section I'll say is for Biomedical Informatics and

00:47:40.766 --> 00:47:42.470 Data Science should be your first stop because we're here to help.

00:47:44.720 --> 00:47:47.058 You know myself as well as others have been using large language

00:47:49.492 --> 00:47:52.198 models before chat EBT ever existed.

00:47:54.536 --> 00:47:56.568 opinion or that kind of expertise

00:47:58.638 to join you please reach out.

00:48:00.200 I believe the slide deck will be shared at the end my phone number and

00:48:07.240 e-mail or at the end of everything.
Very happy to help.

While I’m talking, let me quickly also mention that within the larger strategic partnership between the health system and the School of Medicine, there are capacities to use LLMS with Phi with, you know, proprietary resources within the School of Medicine that are being explored. You know, like I can’t even begin to name the whole list of people involved in this process, but through Biomedical Informatics and Data science, through the YNHH, Medical Information Officers and
Digital Transformation Solutions folks, it is happening. If you want to be involved, if you want to be connected, reach out and I will do my best to get you to the right person. So for questions, maybe we can go to Dana next. Thanks for the presentation. With respect to challenges and applications, a quick thing that came to mind as a recent clerkship director and trying to embrace more holistic inclusion of social determinants of health into our clinical teaching.
And I know Sheila Gupta, who’s working on our masters right now, is working on this whole project of how to develop faculty to include this kind of thing in their content. And it seems so massive to train everyone and to like find all the articles to put them. So it just seems like a really good potential application if you can train it to for this individual content, can you incorporate and incorporate social determinism of health? It would really help a lot of faculty to some of those EP OS and curricular demands. So I love that possibility.
And then to that point, we just had a case that was written by faculty specialists that had some issues as far as bias and sigmatizing language goes. To some extent developing case to ChatGPT allows you to spend more time looking at that instead of creating the content. But also like Conrad and Elizabeth have said, we can ask follow up questions to watch out for these types of terms, these type of themes. So it can actually be helpful in that.
00:50:20.101 --> 00:50:21.515 sense too if you’re on the lookout

NOTE Confidence: 0.933403

00:50:24.520 --> 00:50:27.120 Gary. So one

NOTE Confidence: 0.9309023

00:50:27.120 --> 00:50:29.192 of the questions that I see coming

NOTE Confidence: 0.9309023

00:50:29.192 --> 00:50:31.230 up most often regarding AI is sort

NOTE Confidence: 0.9309023

00:50:31.230 --> 00:50:33.849 of the ethics of it and I I deeply

NOTE Confidence: 0.9309023

00:50:33.849 --> 00:50:35.732 recognize that were very early in the

NOTE Confidence: 0.9309023

00:50:35.732 --> 00:50:38.003 world of AI to to really substantively

NOTE Confidence: 0.9309023

00:50:38.003 --> 00:50:40.400 we have those conversations.

NOTE Confidence: 0.9309023

00:50:40.400 --> 00:50:43.396 But I’m wondering how each of you

NOTE Confidence: 0.9309023

00:50:43.396 --> 00:50:45.480 are managing transparency with this.

NOTE Confidence: 0.9309023

00:50:45.480 --> 00:50:47.676 And I mean, I tried writing a letter of

NOTE Confidence: 0.9309023

00:50:47.676 --> 00:50:49.230 recommendation this year using ChatGPT

NOTE Confidence: 0.9309023

00:50:49.230 --> 00:50:52.380 and I just there was like a a deep

NOTE Confidence: 0.9309023

00:50:52.463 --> 00:50:55.440 almost dirty feeling doing it and so

NOTE Confidence: 0.9309023

00:50:55.440 --> 00:50:57.756 how how are you approaching transparency

NOTE Confidence: 0.9309023

00:50:57.760 --> 00:50:59.278 with with this

92
Conrad man? Elizabeth what do you think about that? Definitely something. But I think there needs to be better guidelines about like I think people need to think more about how we’re addressing this. The first thing that comes to mind is like research literature. Different journals are dealing with this in very ad hoc different ways, this in very ad hoc different ways, and a recent submission I did, they asked for every ChatGPT log I’d had related to the content of the research that we were submitting.
And that was a really extensive. I'd gone back and forward a lot with ChatGPT asking questions about like how to analyse statistical results. It's really good at statistics too, again needing to be corroborated, but it is a complex question and I think better guidelines need to be developed. I really agree with that. But I think, I mean Yale is one of the most prestigious academic institutions in the world. And I think like enforcing that above all we stand for academic integrity and personal integrity as physicians.
NOTE Confidence: 0.941669352
00:52:09.880 --> 00:52:13.330 essentially encouraging students
NOTE Confidence: 0.941669352
00:52:13.330 --> 00:52:17.036 to be to act in a way that is
NOTE Confidence: 0.941669352
00:52:17.036 --> 00:52:18.977 consistent with those values and
NOTE Confidence: 0.941669352
00:52:18.977 --> 00:52:20.862 also to take personal responsibility
NOTE Confidence: 0.941669352
00:52:20.862 --> 00:52:22.795 and then having very severe
NOTE Confidence: 0.941669352
00:52:22.795 --> 00:52:24.595 consequences if they do not,
NOTE Confidence: 0.941669352
00:52:24.600 --> 00:52:27.078 I think makes a lot of sense.
NOTE Confidence: 0.941669352
00:52:27.080 --> 00:52:30.560 But definitely having like very explicit
NOTE Confidence: 0.941669352
00:52:30.560 --> 00:52:33.262 policies as to how you want things
NOTE Confidence: 0.941669352
00:52:33.262 --> 00:52:36.200 cited and how you want transparency
NOTE Confidence: 0.941669352
00:52:36.200 --> 00:52:38.372 to be specified in anything that
NOTE Confidence: 0.941669352
00:52:38.372 --> 00:52:41.159 you submit is is really important.
NOTE Confidence: 0.911572608571429
00:52:43.160 --> 00:52:45.092 Another example that I can think
NOTE Confidence: 0.911572608571429
00:52:45.092 --> 00:52:47.886 of is when I was shadowing a few
NOTE Confidence: 0.911572608571429
00:52:47.886 --> 00:52:50.320 probably months ago now in the CCU
NOTE Confidence: 0.911572608571429

95
I was following along and as AI
NOTE Confidence: 0.911572608571429
was a first year medical student I
NOTE Confidence: 0.911572608571429
don’t think at the time and really didn’t
NOTE Confidence: 0.911572608571429
have that much of a grasp and had
NOTE Confidence: 0.911572608571429
asked the
NOTE Confidence: 0.911572608571429
attending that I was following if it’s OK to be on my phone a little bit
NOTE Confidence: 0.911572608571429
in the background Googling things.
NOTE Confidence: 0.911572608571429
Well I asked.
NOTE Confidence: 0.911572608571429
admitted to using ChatGPT and
NOTE Confidence: 0.911572608571429
was actually he was very interested
NOTE Confidence: 0.911572608571429
and enthusiastic and read a lot of
NOTE Confidence: 0.911572608571429
the responses and was very happy
NOTE Confidence: 0.911572608571429
that I was using it.
NOTE Confidence: 0.911572608571429
And I think it for a lot of those
NOTE Confidence: 0.911572608571429
little questions that come up it
00:53:21.520 --> 00:53:23.720 can be really helpful augmenting

00:53:23.720 --> 00:53:26.435 again recognizing not as a source

00:53:26.435 --> 00:53:27.800 of truth etcetera.

00:53:27.800 --> 00:53:29.220 But that kind of transparency

00:53:29.220 --> 00:53:30.640 I think can be helpful,

00:53:30.640 --> 00:53:34.021 but is definitely a nervous step to

00:53:34.021 --> 00:53:37.175 admit to your professor or attending.

00:53:37.175 --> 00:53:39.665 But maybe that’s a tool you’re

00:53:39.665 --> 00:53:41.125 using and being cognizant of how

00:53:41.125 --> 00:53:42.640 you’re using it is very important.

00:53:43.280 --> 00:53:45.592 But that being said, like on the PhD

00:53:45.592 --> 00:53:48.075 side of what I’m doing here at Yale,

00:53:48.080 --> 00:53:51.264 so much of that type of learning is

00:53:51.264 --> 00:53:54.406 harnessing the tools that we have to

00:53:54.406 --> 00:53:56.671 produce the best research possible.
And then when we write out our methods, you know, we talk about what tools we used and why. I think that this, the applications of ChatGPT into medicine is almost pushing us to be more scientific in the way that we are thinking because we have to be using the methods correctly essentially in order to produce the appropriate output. I think that’s a great segue into to highlight one of the questions in the chat about mitigating systemic bias where ultimately at the end of
the day we may not be able to right.

This is essentially something running

on the statistical collective

intelligence of the Internet and

related sources and then generating

what that likely is going to say.

It’s going to be biased.

We can’t avoid it, but we can recognize it.

We can identify it.

We can work with scientific rigor

to mitigate it.

And if we are transparent and

we do the best we can,

then we are doing the best we can.

And I think to an Elizabeth’s point,
you know, this is what leadership looks like.

The last thing I don’t want to run right up to the last minute, but I do think it’s really important to address the chat comment about HIPAA compliance. And that is another thing that really needs to be emphasized to students, to residents, to everyone in the hospital is that with the public available versions of Chat BT you use through a browser, no patient like private health information should ever go into those models because open AI for those public models specifically
that are on the web browser,

they do sometimes use what you input to further improve the models.

So there is definitely risk of like Phi leakage.

That’s why the hospital has blocked those public models.

And I think it’s important for the hospital to explain why that’s happening.

And I also think that there can be future solutions as David mentioned,

for research purposes right now there are HIPAA compliant workarounds that never embed Phi into these models.

And I think there could be interactive
like mobile uses as well in the future, but we don’t have those yet and it’s important that people understand the limitations in the meantime. So I think on that note, it’s about time to wrap. Let’s give you like a minute or two before whatever you have to do in the afternoon. Thank you for joining us to talk more about ChatGPT. This is going to be an ongoing discussion for many years as we’re in medical education. So feel free to reach out. Thanks again and have a great afternoon.
00:56:38.360 --> 00:56:39.600 This has been MEDG.