

LEVEL UP 2023

AI in Healthcare:
Democratising or Dystopian?

We are at the beginning of a major technological era

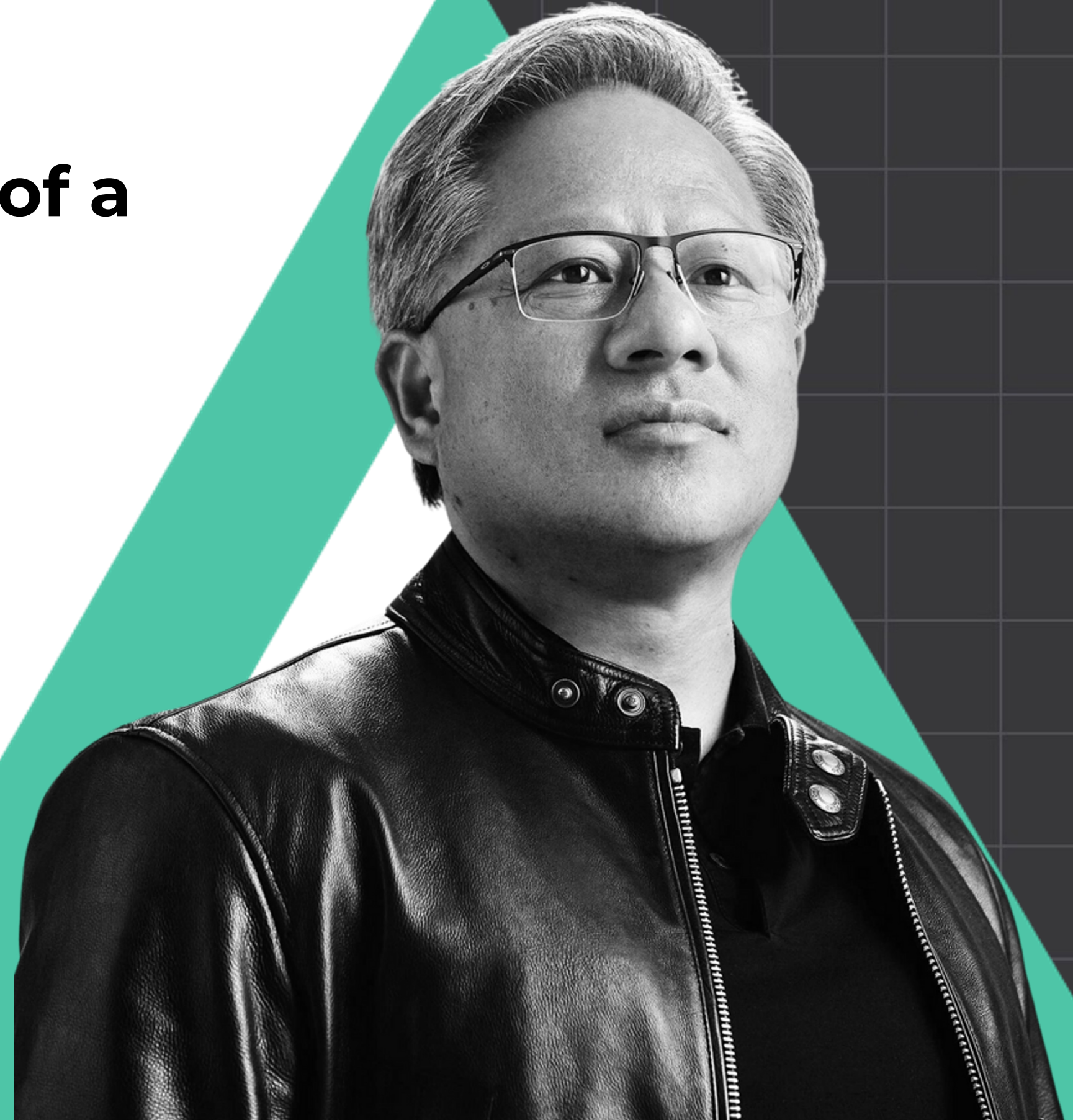
"Every industry will be
revolutionised."

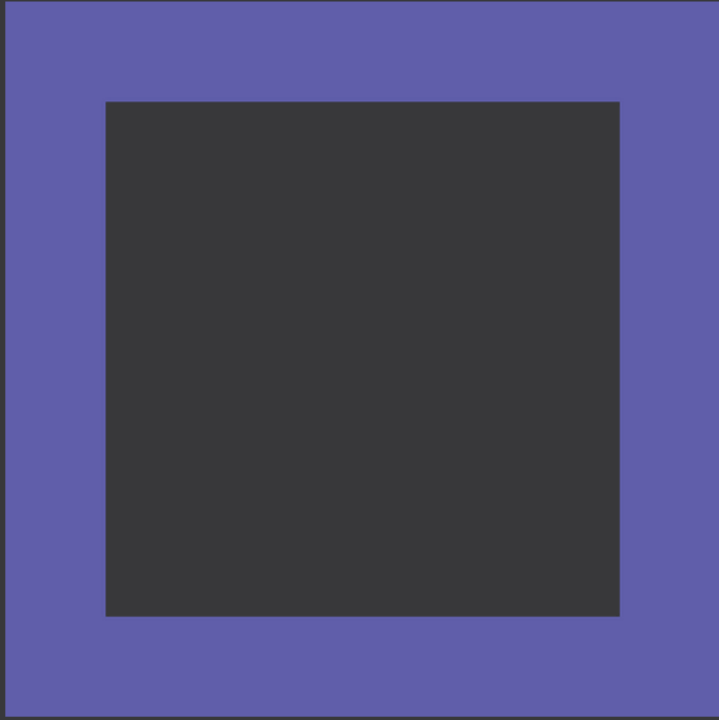
Jensen Huang

Founder
CEO



\$1T





HEALTHCARE SYSTEMS
are **STRESSED**





**STRESSED
GLOBAL
HEALTHCARE
SYSTEMS**



DEMAND

- Ageing
- Disease burden
- Expectations
- Resources



SUPPLY



OUTCOMES

Patients



Inequity

TECHNOLOGY



PEOPLE

PROCESS



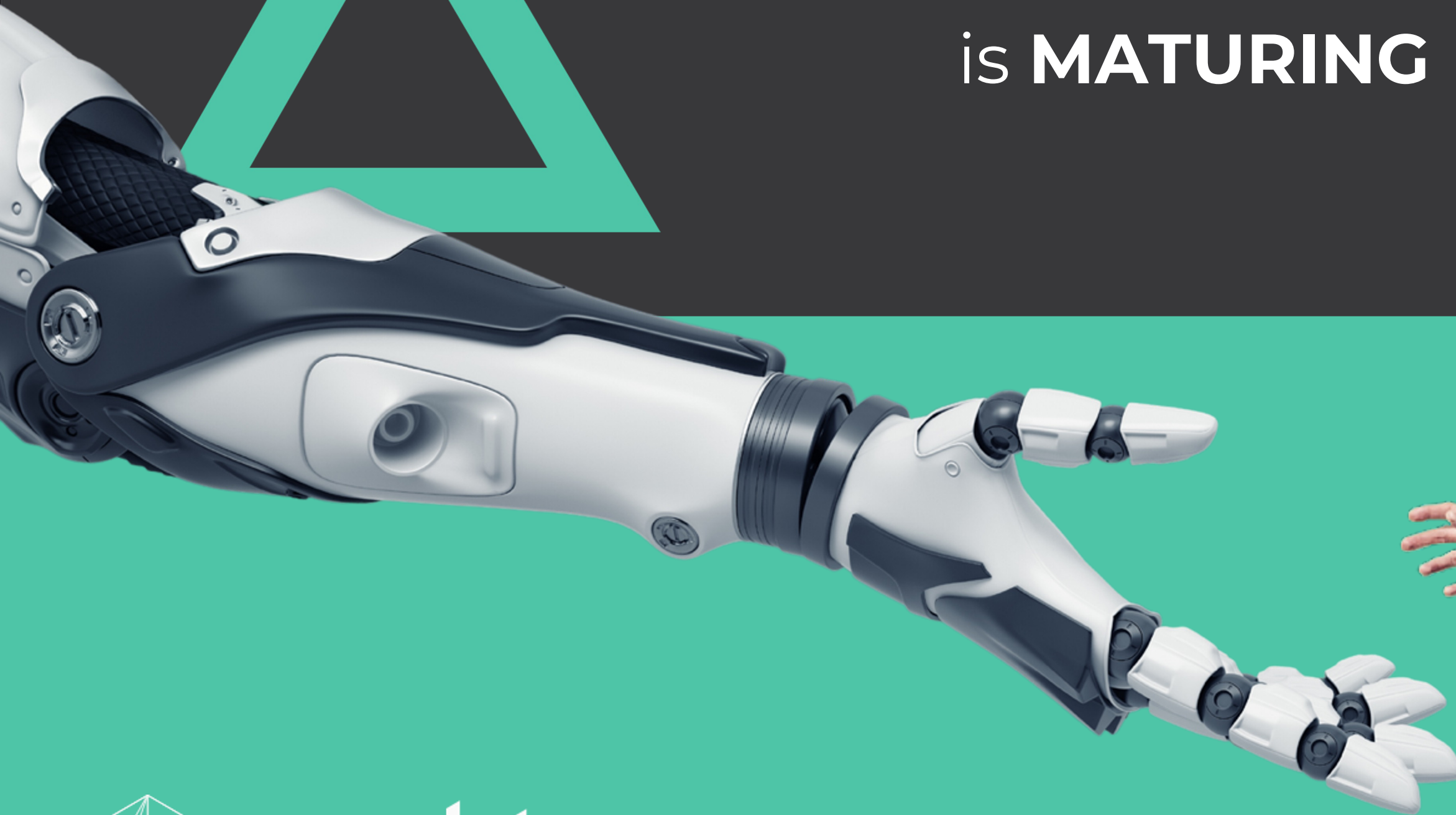
Staff



Burnout

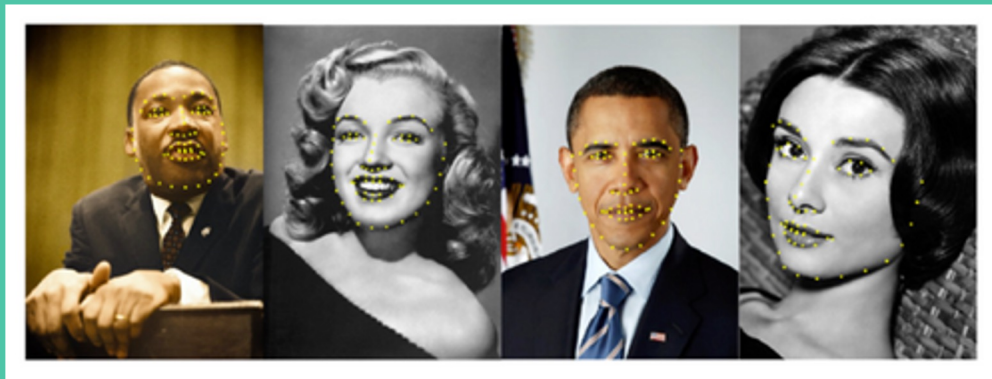
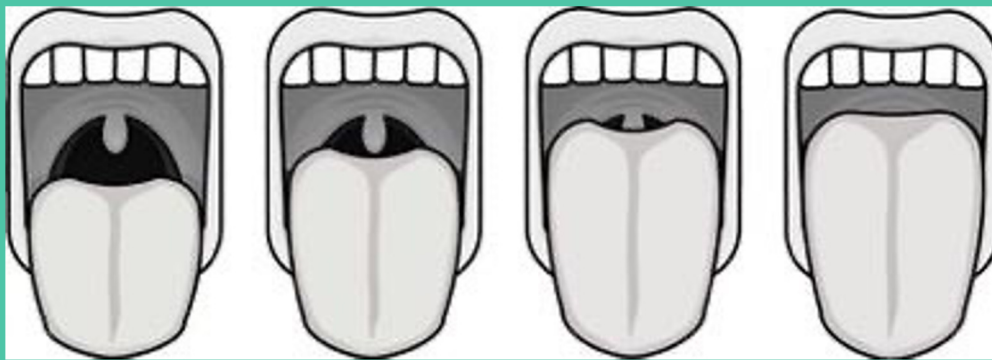


APPLIED (TASK-BASED) AI is MATURING



ANAESTHESIOLOGY

75–93% of difficult
intubations unanticipated.



AI outperforms
conventional bedside tests

Comput Biol Med. 2021 September; 136:104737.

Low BP (hypotension)

< 65 mmHg (mean)

Predicts organ injury

1 minute: **70%**

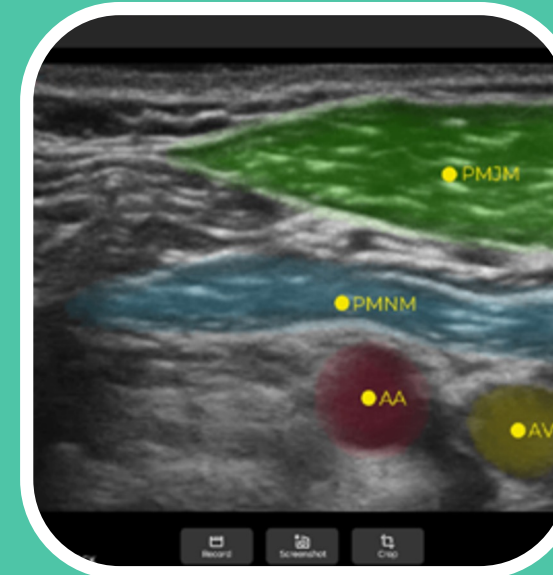
10-15 mins: **30%**



Hypotension

Prediction Index (HPI)

0 - 100



**Ultrasound-
guided nerve
block**

SCREENING and DIAGNOSIS



**Autonomous
diagnosis**
of diabetic
retinopathy
(2018)



\$50

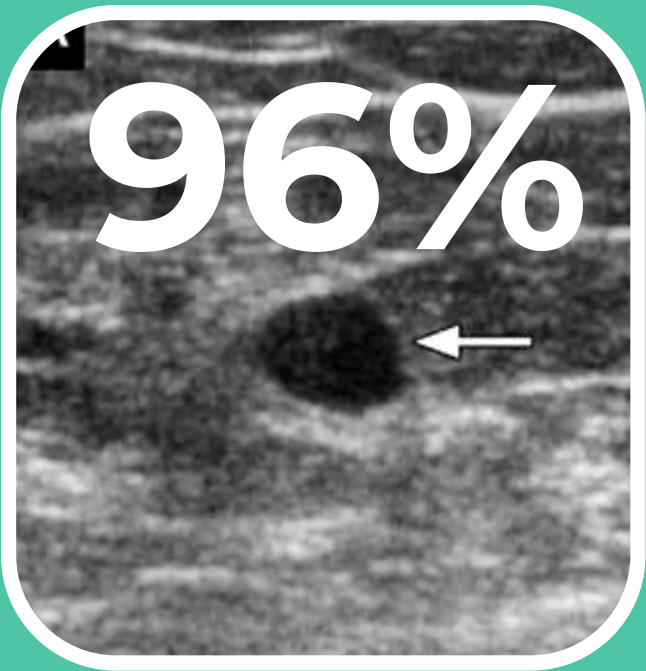


BREAST CANCER

Non-radiologist +
POC Ultrasound + AI

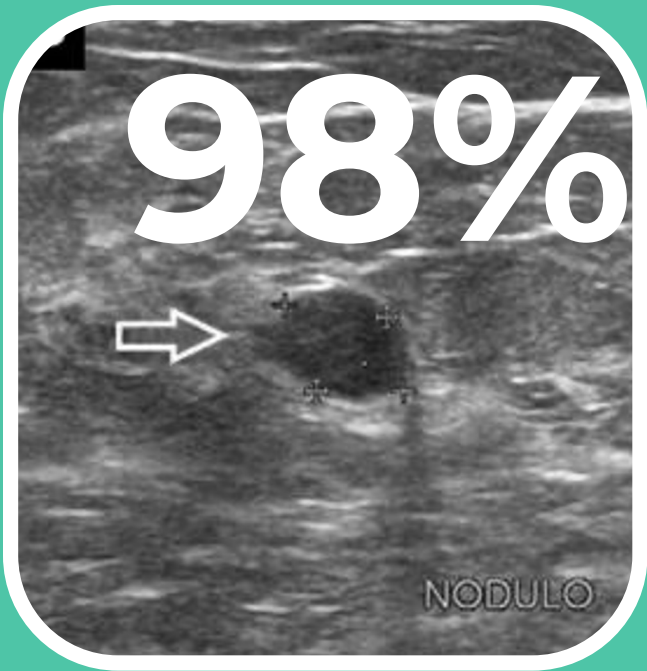
“Primed to revolutionize”

Slanetz P. Radiology. May 2 2023



Point of care ultrasound
(POCUS)

AI
correctly
identifies
cancer



Standard of care
ultrasound **(SOC)**



ChatGPT



Bing AI



Bard AI

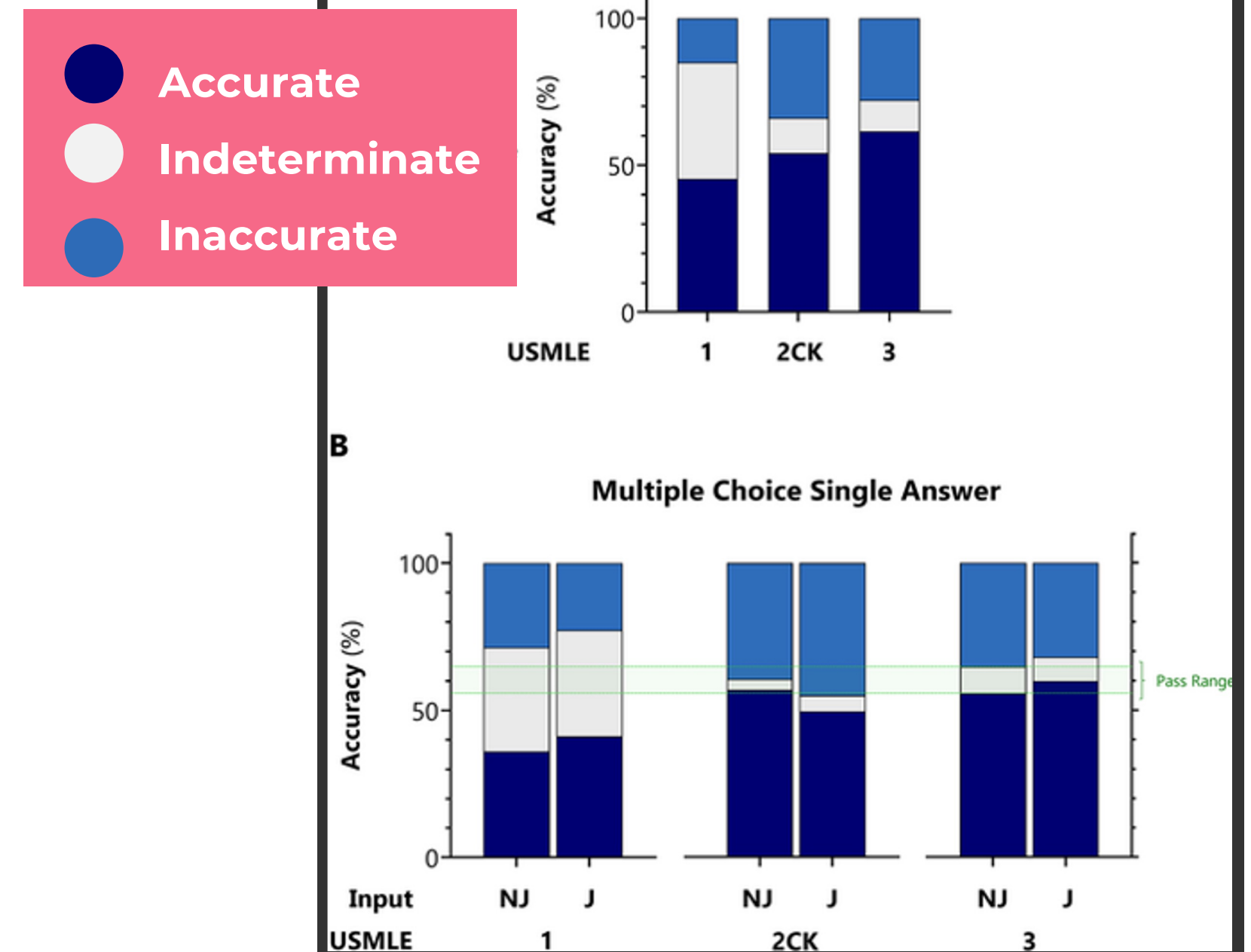
GENERATIVE AI (LLM):
INTELLIGENT, CAPABLE and
MORE HUMAN than
HUMANS?



“ChatGPT is now comfortably within the passing range”

- without specialised training

UNITED STATES MEDICAL LICENSING EXAM (USMLE)



Dec 2022



IMAGES



MUSIC



WRITING



Can We No Longer Believe Anything We See?

By Tiffany Hsu and Steven Lee Myers

April 8, 2023



TV and film writers are fighting to save their jobs from AI. They won't be the last



By Samantha Murphy Kelly, CNN Business
Updated 5:28 PM EDT, Thu May 4, 2023



An A.I. Hit of Fake 'Drake' and 'The Weeknd' Rattles the Music World

April 19, 2023



EVERYTHING

Disease diagnosis

Precision medicine

Drug discovery

Robotics

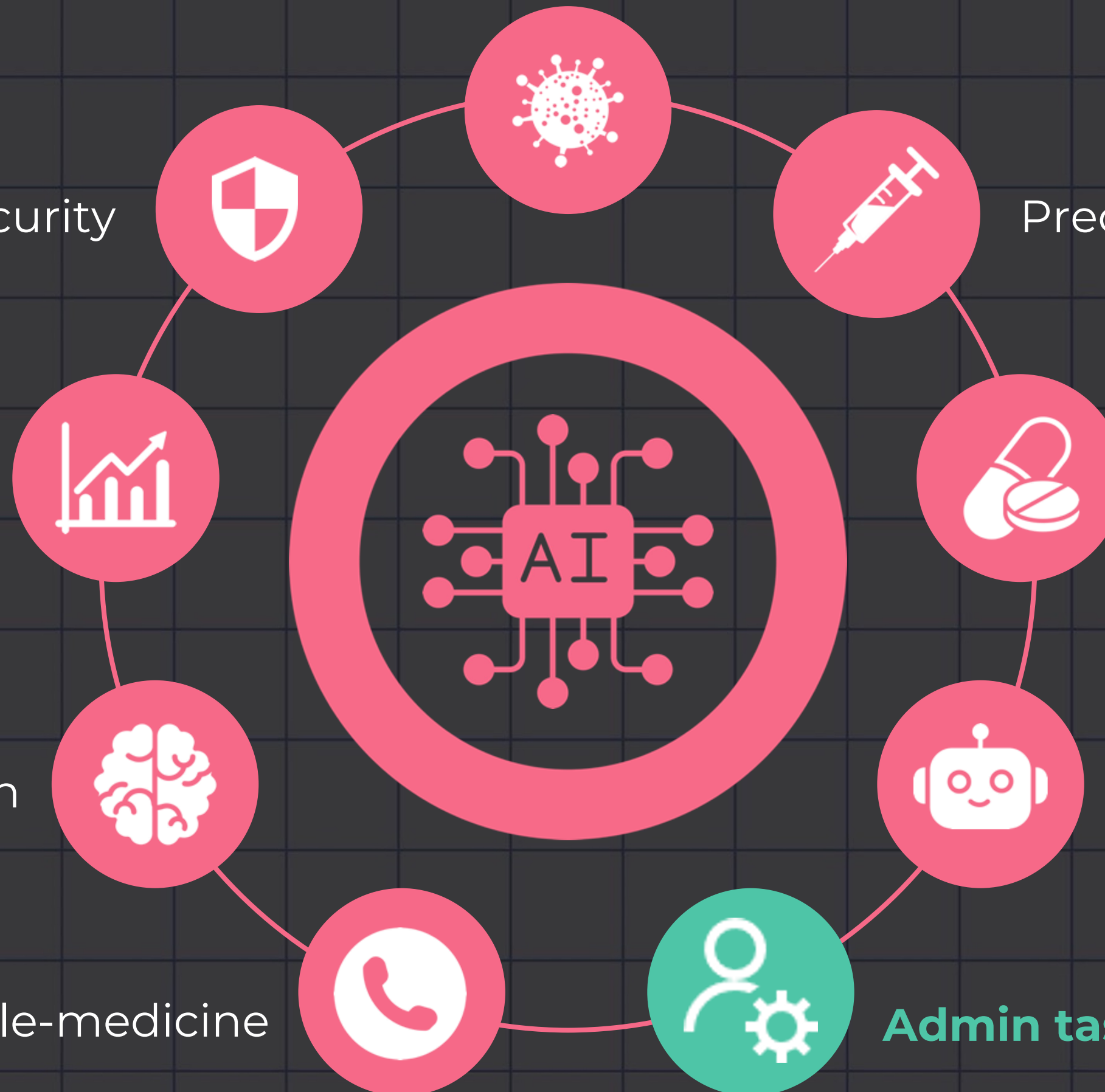
Admin tasks

Tele-medicine

Mental health

Epidemic prediction

Health data security

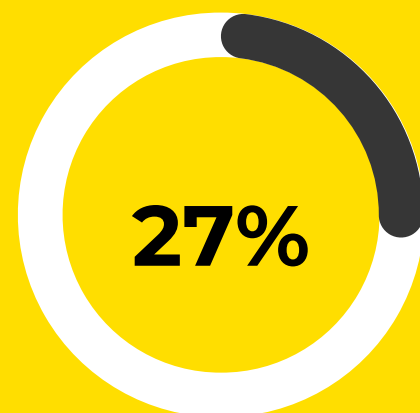


EXPECTATIONS *and* REALITY

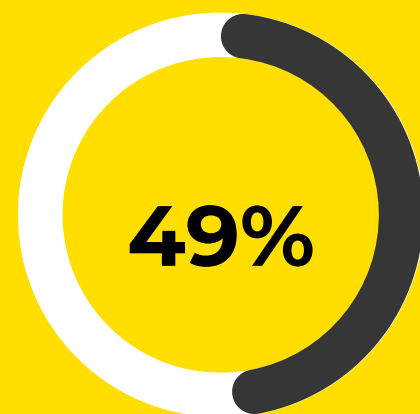




During the office day:



Direct face time
with patients



EHR/Desk work



Pyjama time:

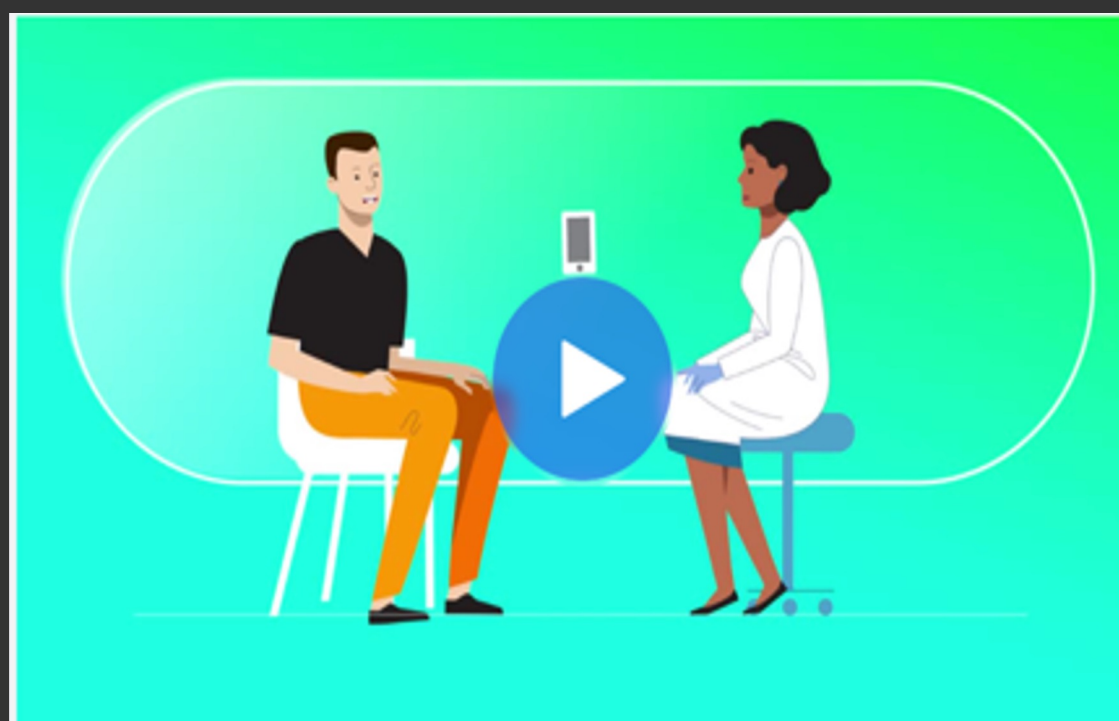


1-2 hours/night

Mostly EHR Tasks

- Family medicine
- Internal medicine
- Cardiology
- Orthopedics

Listen to the conversation. Create structured notes.



- Privacy concerns
- Details missed / added
- Review and sign off

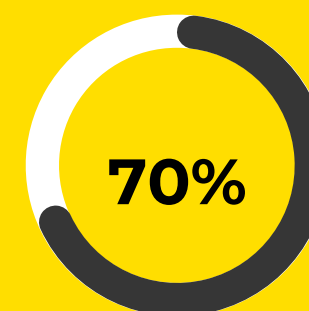
\$8-10,000 / doctor / year



7 minutes
Saved per counter



Documentation
Time



Burnout
and fatigue



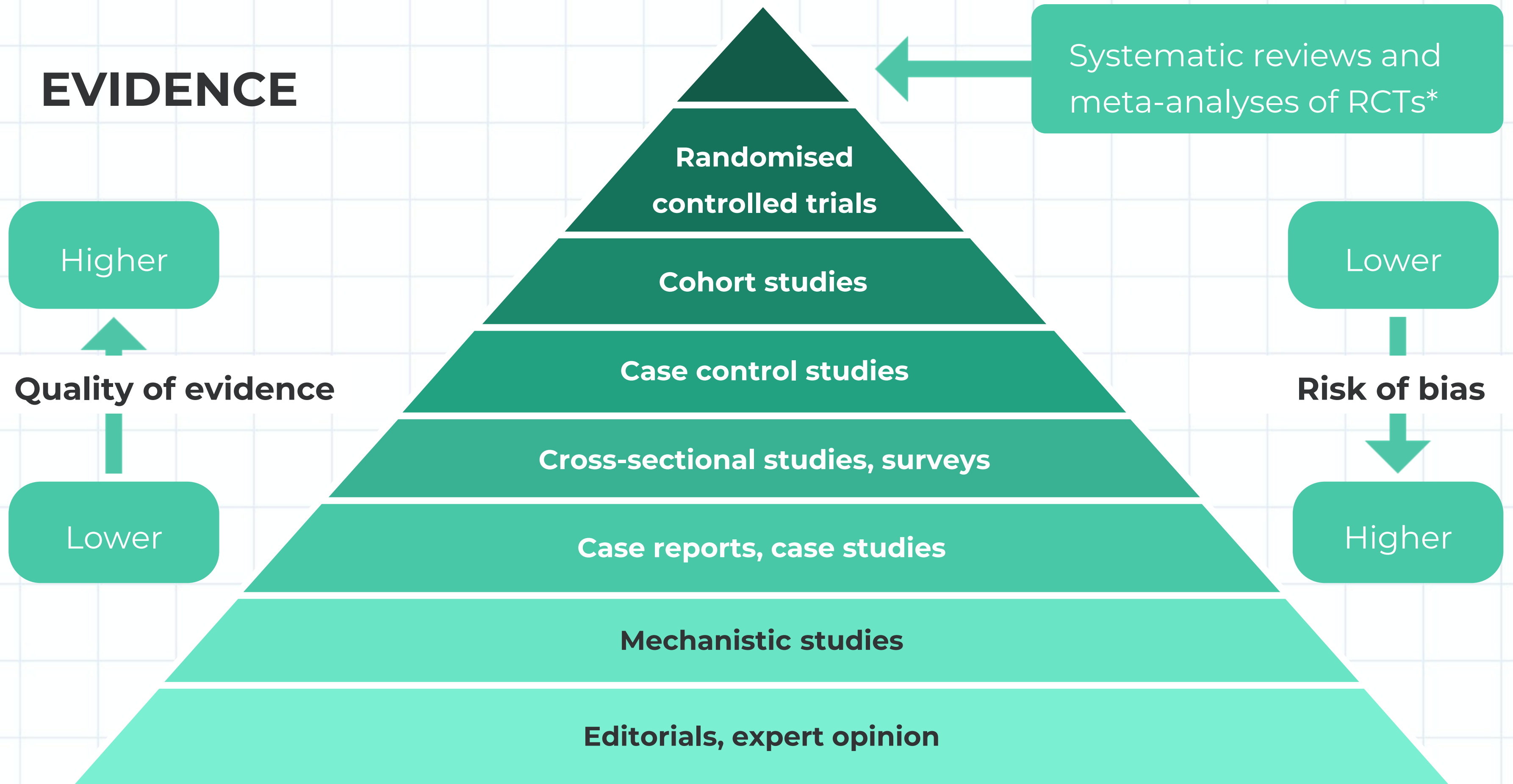
3 of 4
Documentation
Quality



More
personable and
conversational



EVIDENCE



EVIDENCE

Hypotension Prediction Index for Prevention of Hypotension during Moderate- to High-risk Noncardiac Surgery

A pilot randomized trial in adults having noncardiac surgery with invasive arterial pressure monitoring



The Hypotension Prediction Index (HPI) is an algorithm based on the arterial waveform that predicts hypotension defined as mean arterial pressure (MAP) < 65 mmHg for at least 1 min

Hypothesis: HPI-based guidance reduces the severity of hypotension in patients undergoing noncardiac surgery

Median time-weighted
average MAP
(*first quartile, third quartile)



Median difference in
amount of hypotension
(*95% CI)

'0'
(-0.03 - 0.04*), P = 0.7

Around half of **1,500** alerts were not followed by treatment.

HPI guidance did not reduce the amount of intraoperative hypotension compared with controls

Maheshwari K, et al. ANESTHESIOLOGY. December 2020



EVIDENCE

BRIEF COMMUNICATION: GENERAL GI

ChatGPT Fails the Multiple-Choice American College of Gastroenterology Self-Assessment Test

Suchman, Kelly¹; Garg, Shashank²; Trindade, Arvind J MD^{1,3,a}

"We do not recommend its use for medical education in gastroenterology."

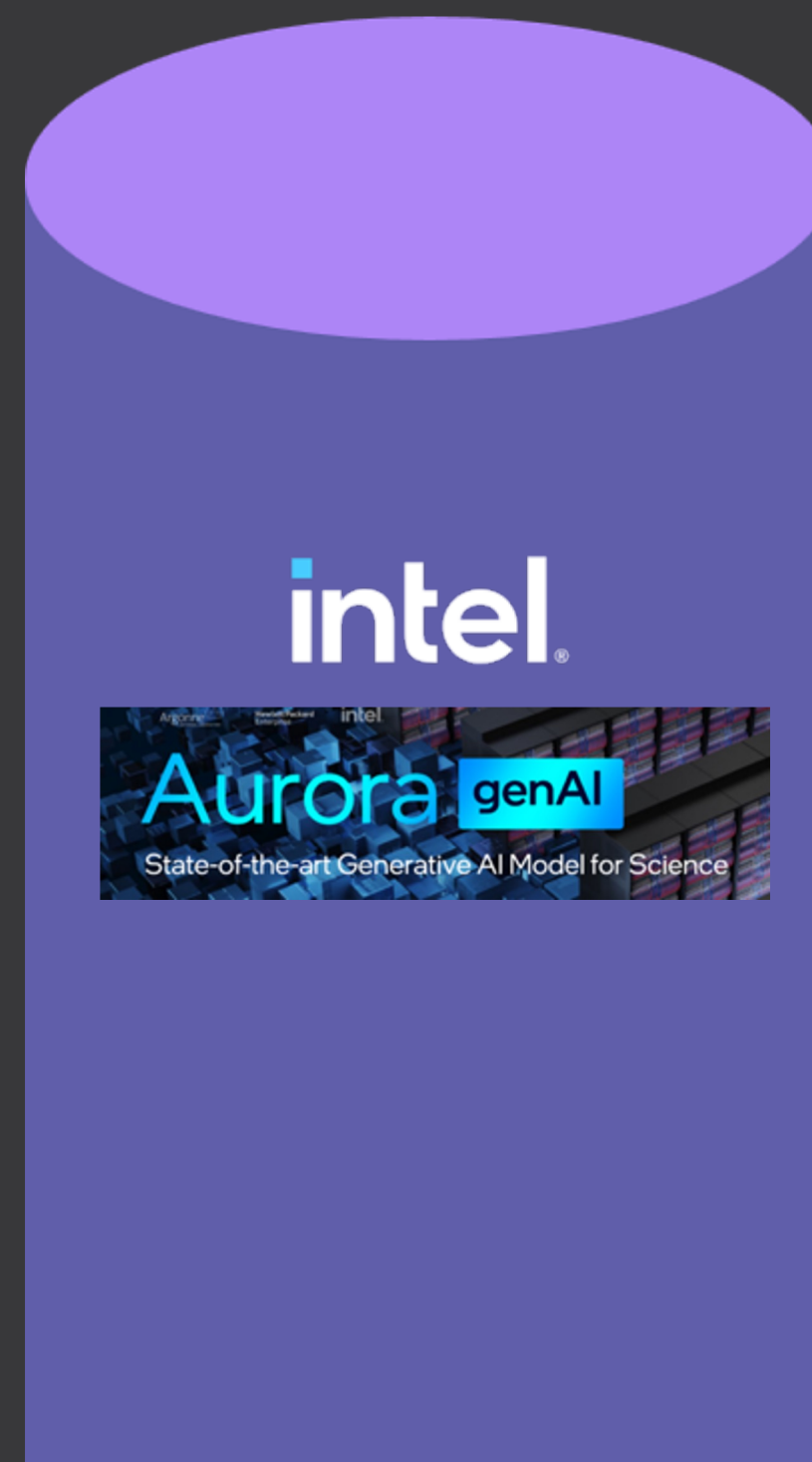
American Journal of Gastroenterology May 22, 2023



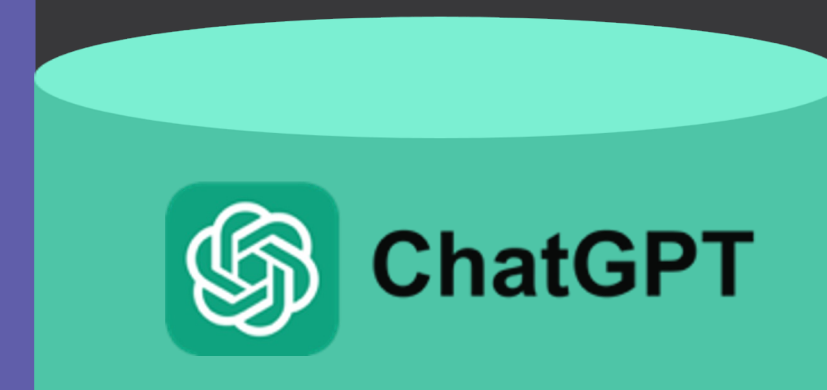
"Development of fine-tuned models specifically geared towards **medical education** can offer a potential solution to this issue"

American Journal of Gastroenterology May 22, 2023

○ 1 TRILLION
parameters (x 5.7)



△ 175 BILLION
parameters



LEARNING SYSTEM

NASSS:

Non-adoption or

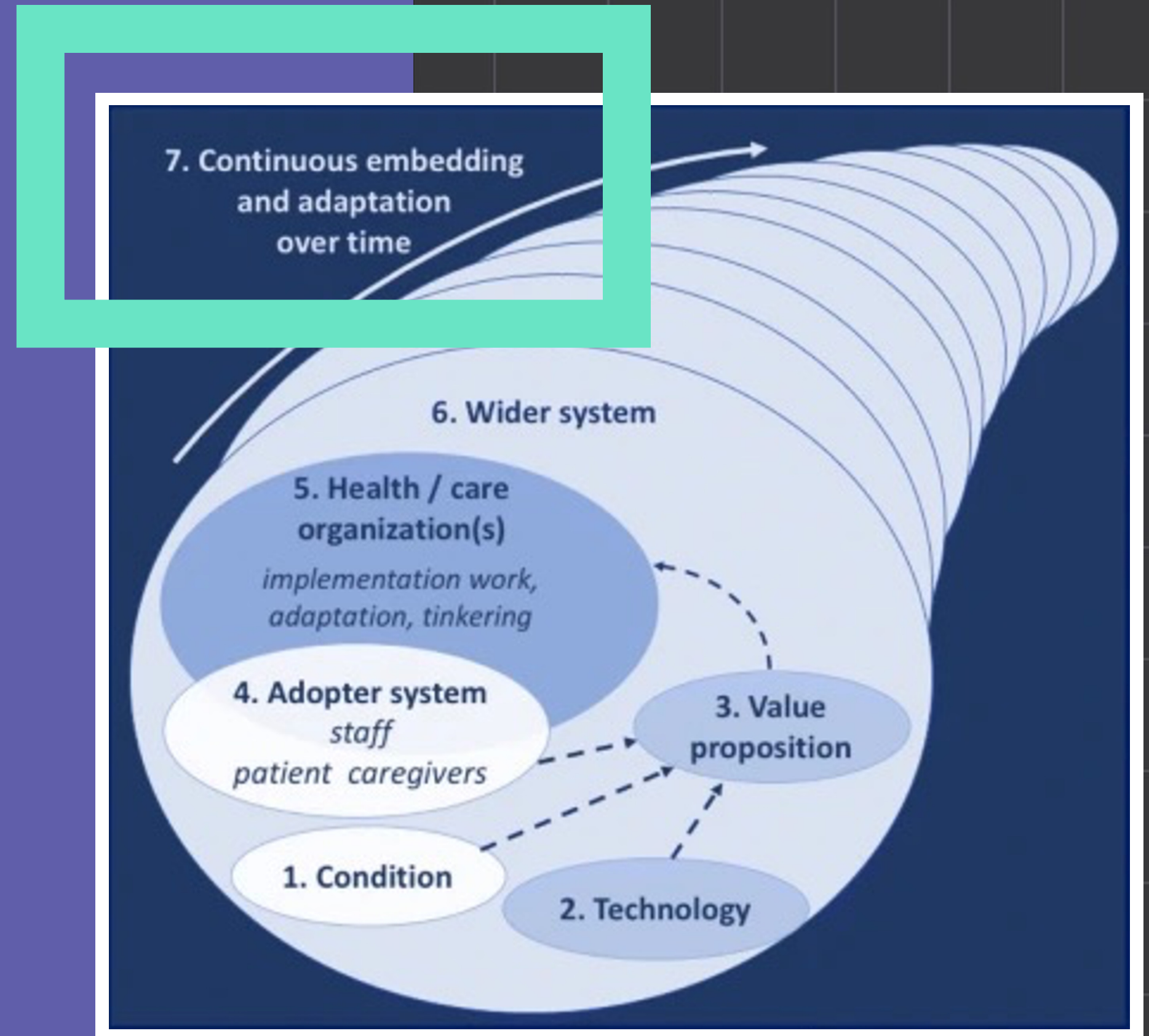
Abandonment of technology by

individuals and difficulties achieving

Scale-up

Spread and

Sustainability



AI needs
**REGULATION &
CERTIFICATION**



“GPT-4 is not a human being, and it might not always be able to understand or relate to the **emotions, values and contexts** that affect human health and well-being”

“Since GPT-4 was trained on data from the Internet, it has integrated **biases** into its neural net.”

“... it has no formal certification or regulation to guide or constrain its use in medical scenarios. It makes **errors and hallucinates** in sometimes dangerous ways...”

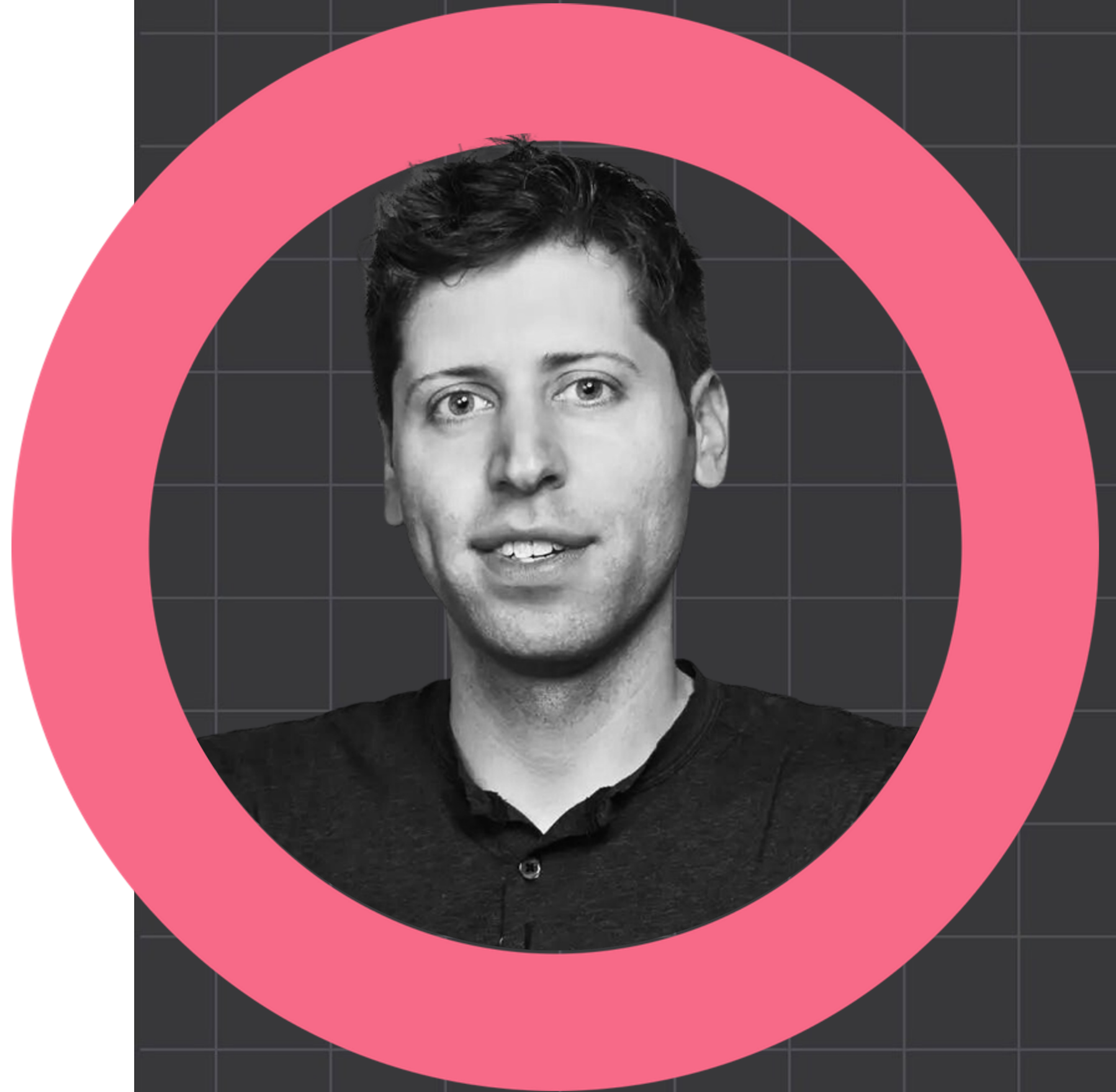
- New government agency **to license AI companies**
- **Safety standards** for AI models and to assess their **level of danger**
- **Independent** third-party experts to **audit** various aspects of AI products
- **International approach** because of pervasiveness and scope



Sam Altman

CEO OpenAI

US Congress, May 2023



HOW to
PROCEED?





Peter Lee
VP - Healthcare,
Microsoft

\$10B

- Everyone: experience & opinion
- Dazzled by tech
- Solvable or solved problems

**Conflicting ideas, gaps,
incentives**

➔ **TECHNO-OPTIMISM**

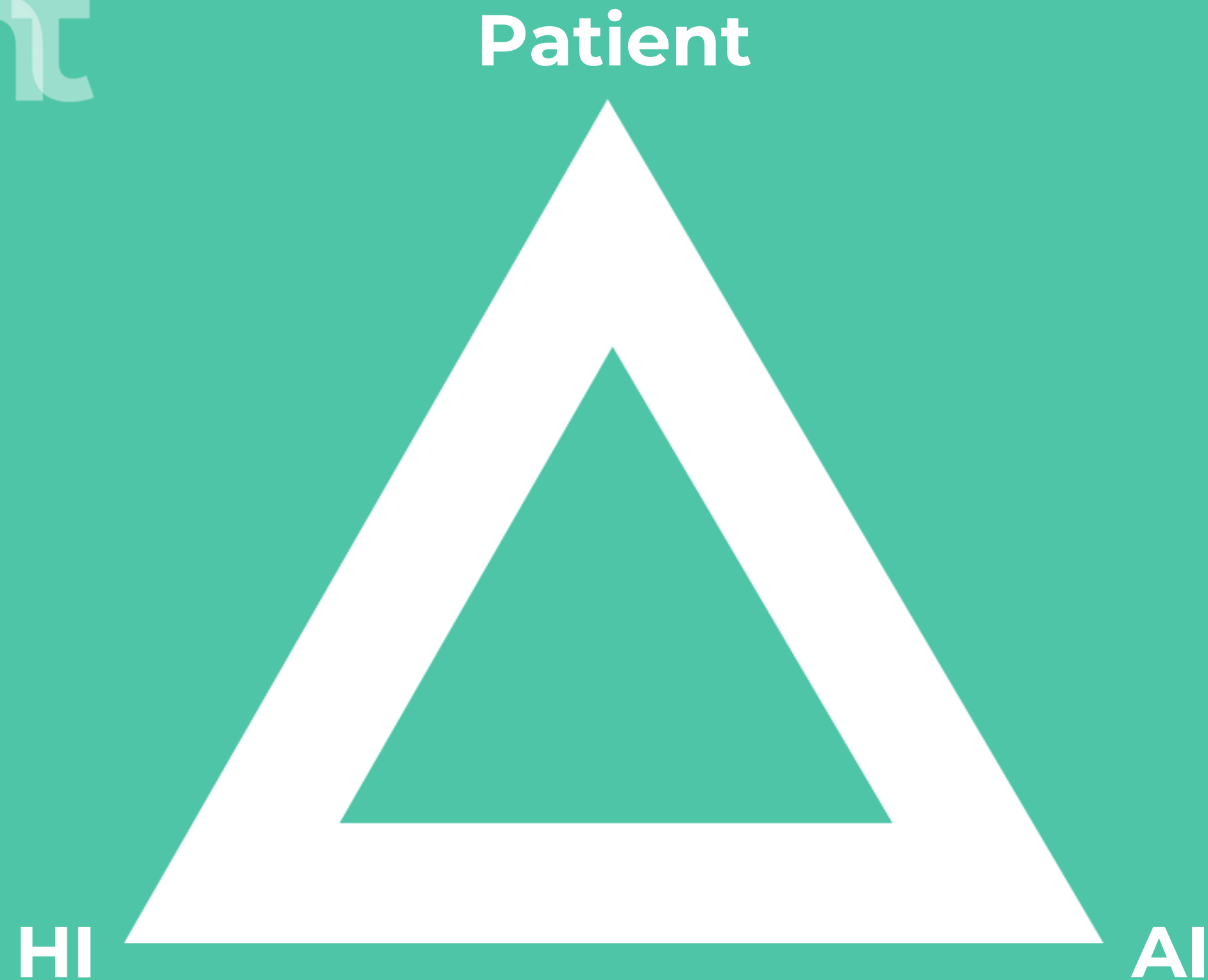


➔ **LOCAL
OPTIMISATION**

- *Not disruption or transformation*
- *Understand and connect to aims*

Improve workflow

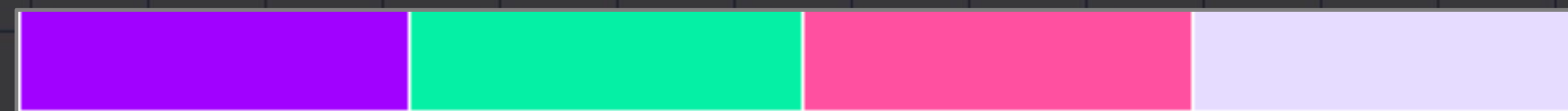
“... the day-to-day effectiveness and satisfaction of people delivering health care”



Humans (healthcare professionals) must be “in the loop”

Higher potential for
automation (28%)

Lower potential for
augmentation (33%)



Higher potential for
augmentation (11%)

Non-language
tasks (27%)

HOW TO USE AI TO LEVEL UP our HEALTHCARE?

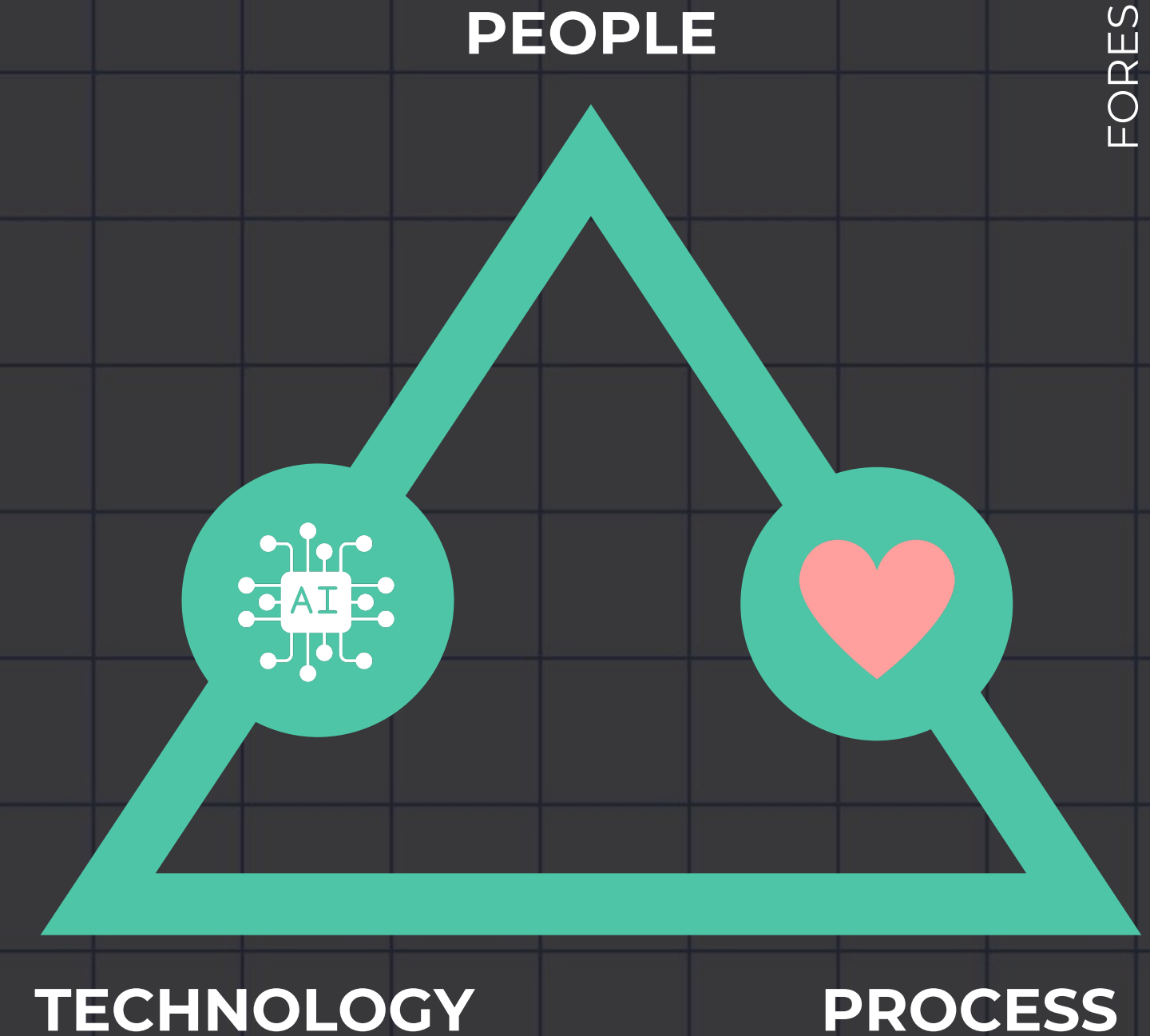


A NEW KIND OF TECHNO OPTIMISM

- AI-powered technology
- Enhancing processes
- HI-AI collaboration
- Care and Love

CONTEXT-AWARE

- Aims and Value
- Learning and improvement
- Ethical, safe, regulated



“The greatest opportunity offered by AI is not reducing **errors or workloads**, or even **curing cancer**: it is the opportunity to restore the precious and time-honored **connection and trust**.”

-Eric Topol

“Mitigating the risk of **extinction** from AI should be a global priority alongside other societal-scale risks such as pandemics and nuclear war.”

-Center for AI Safety



Thank You