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AI in Oncology: From Promise to Practice

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ASCO

April 4, 2025

Setting the stage…

- Growth of AI in Oncology
- What has changed?
- Where will we be in 2-3 years?
- How is ASCO helping us safely transition to this future?

Where to start…

- How many people use Gemini, ChatGPT or Claude on a weekly basis?
- How many people use a “co-pilot” on a weekly basis?
- How many have AI chat in your EMR?
- How many of you use…
  - Social Media?
  - Music Streaming?
  - Waze or Google maps?

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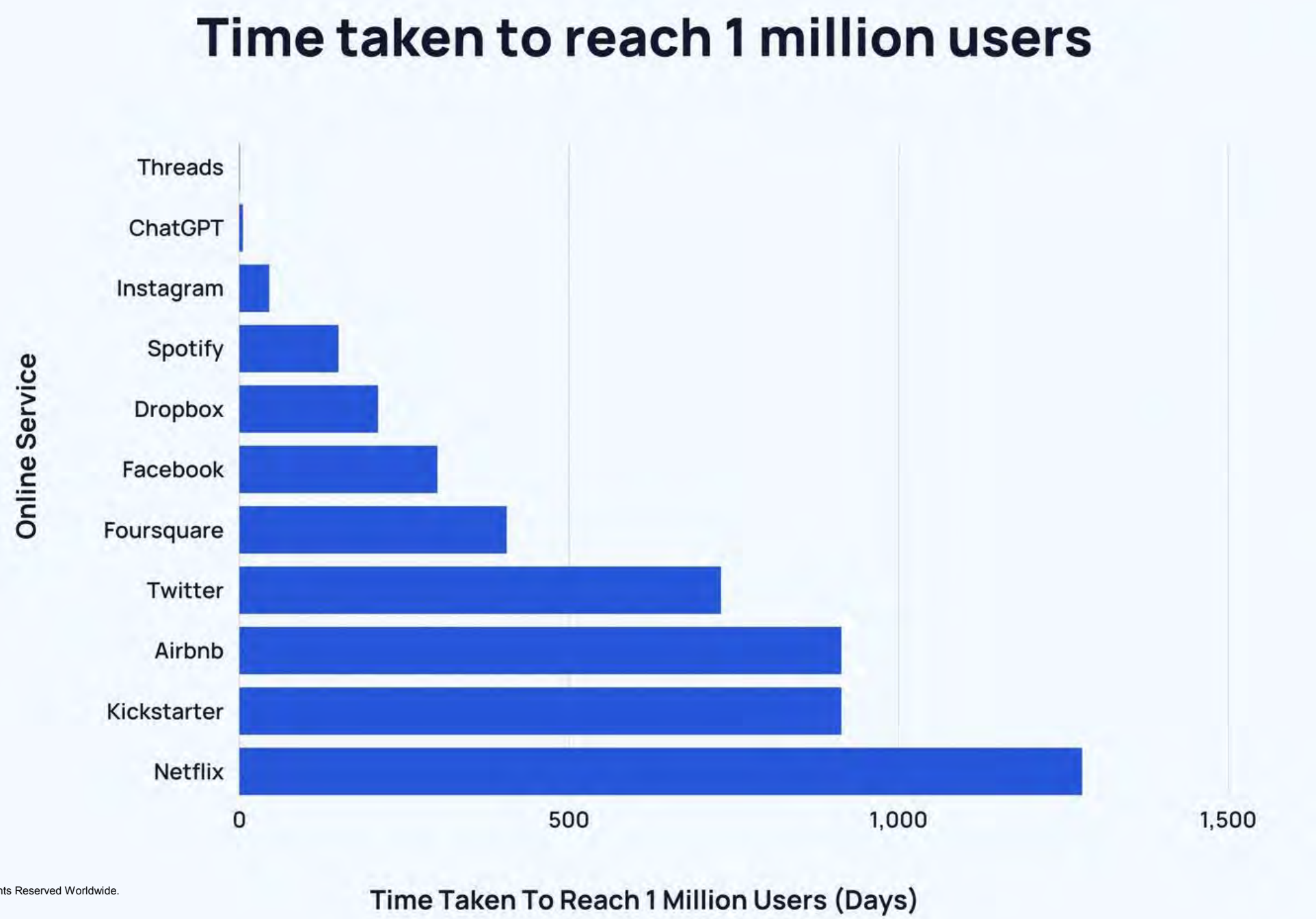
Growth of AI in Oncology

AI in March 2023

- Chat GPT 4 was released in March of 2023
- Focus was on finding practical uses for AI and Generative AI
- Significant focus on ethical considerations, copyright, bias
- Both fear and excitement were prevalent

- 5 days!!!

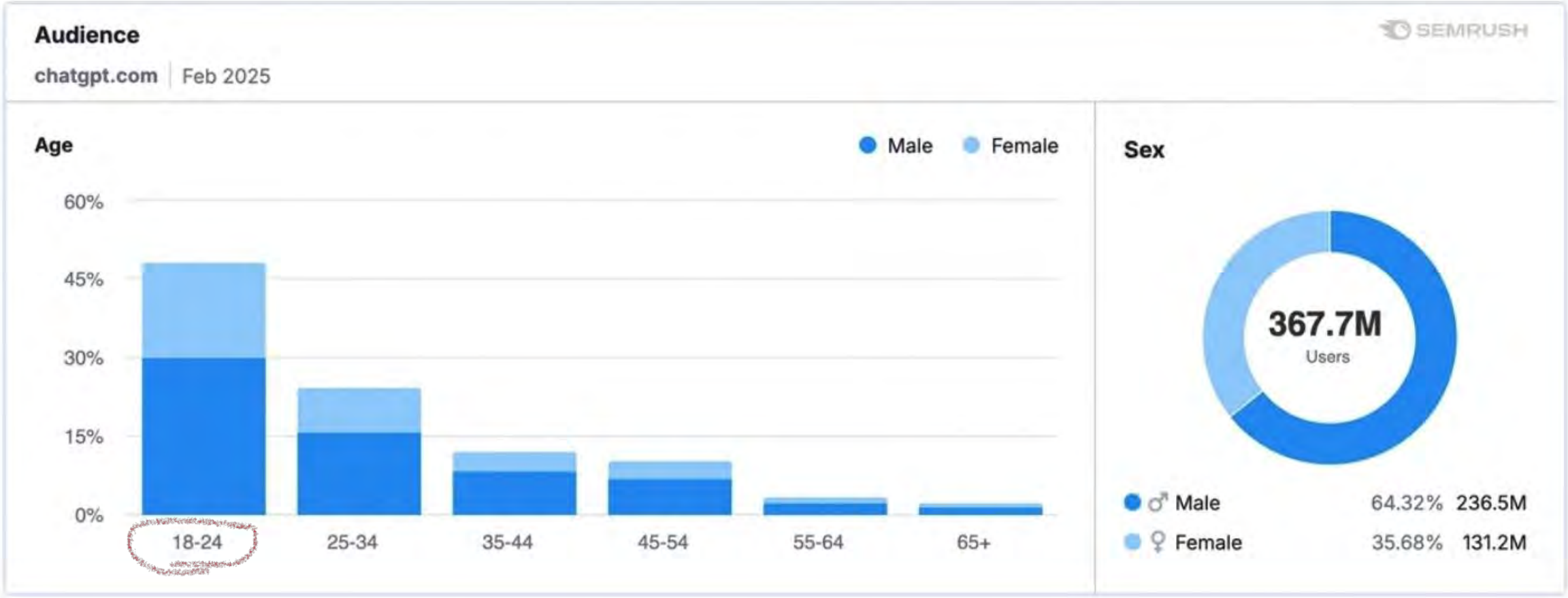


AI Today

- Chat GPT has 5.2 Billion visits per month
- Chat GPT has ~400 Million users
- Google Gemini has ~275 Million users

Position	Website	Change	Visits
1	google.com	–	139,921,474,003
2	youtube.com	–	78,565,951,681
3	facebook.com	–	12,696,015,128
4	instagram.com	–	7,488,154,694
5	wikipedia.org	–	6,980,450,238
6	reddit.com	–	6,527,291,392
7	bing.com	–	6,328,123,923
8	chatgpt.com	↑ 1	5,186,274,195

AI Today



Oncology and AI in early 2023

- 35-40% of healthcare organizations had adopted some form of AI *(McKinsey)*
- 15-20% of Oncology practices were using AI assisted decision support tools *(JCO-CCI)*
- 30% of large US hospitals were using AI for image-based cancer diagnostics (breast, lung, prostate)
- 38% of physicians felt confident in the transparency and explainability of AI tools *(AMA Survey)*
- Global AI in oncology market generated ~$1.2 billion in 2023

Oncology and AI today

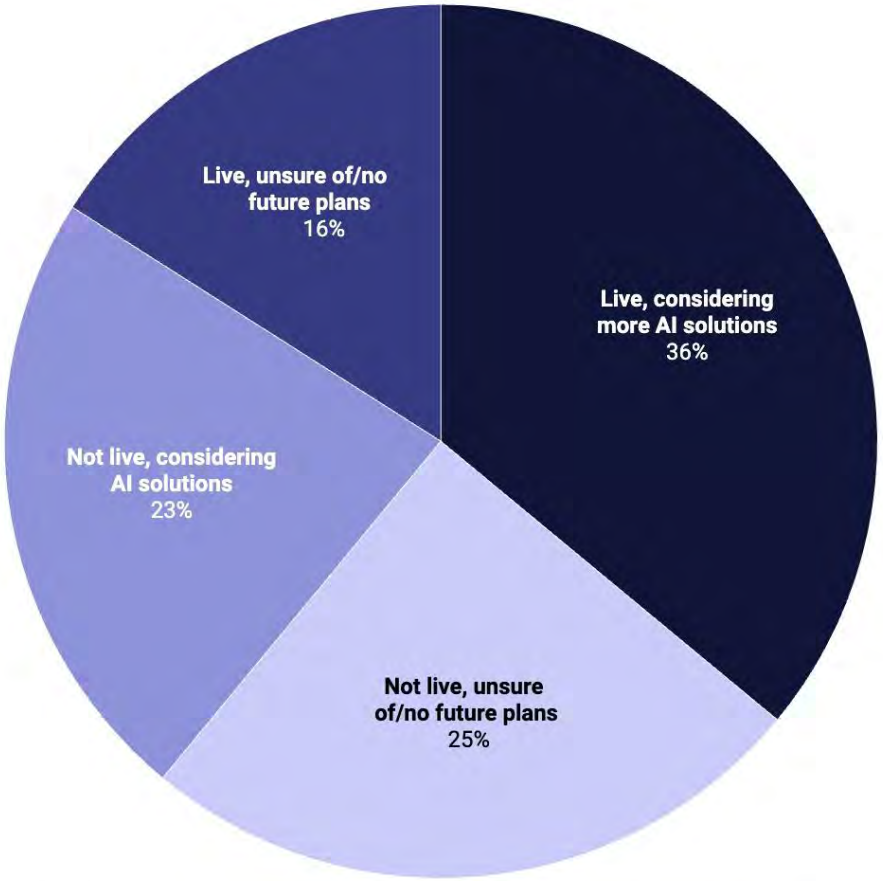
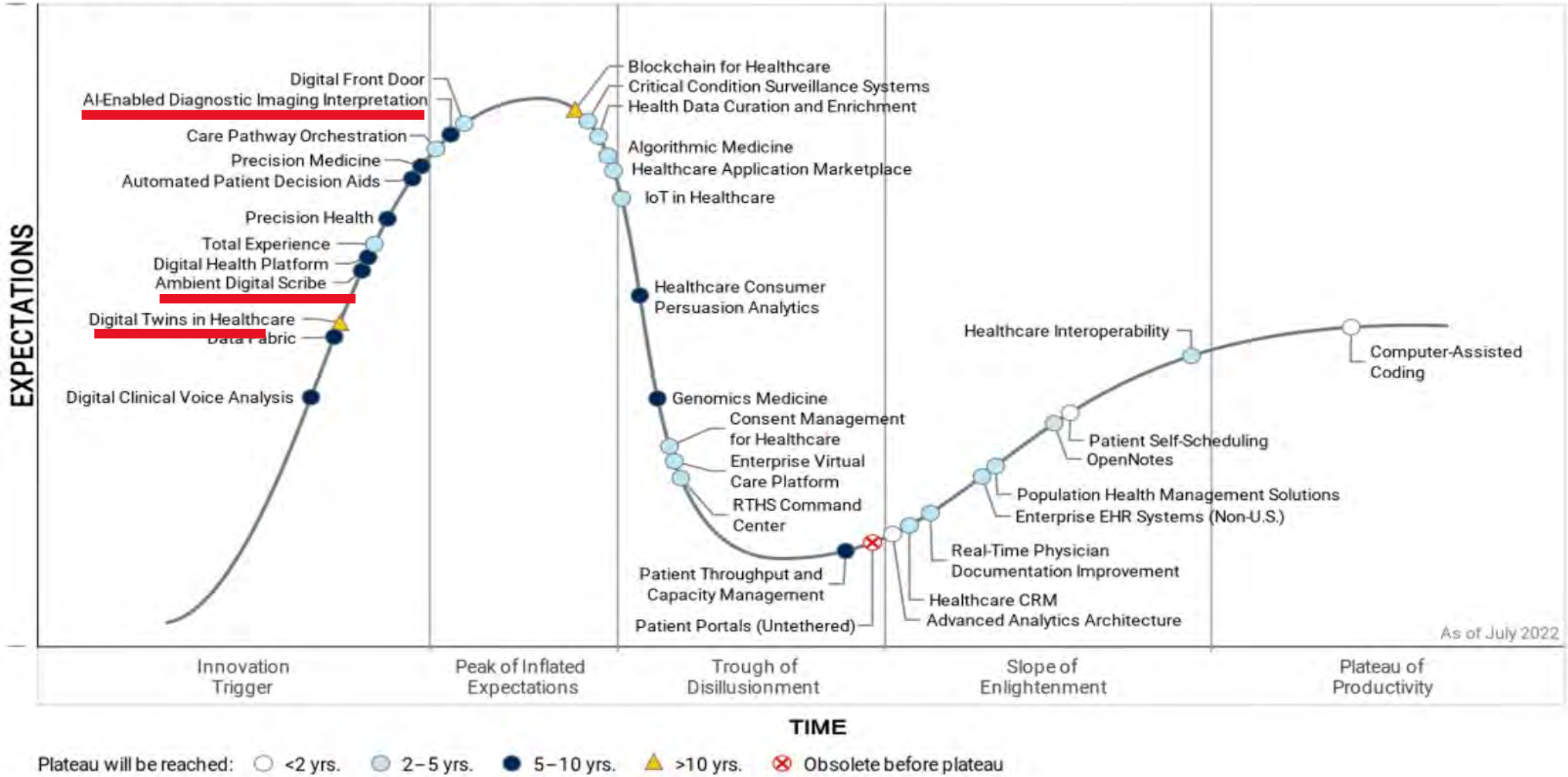


Chart: Emily Olsen/Healthcare Dive • Source: Klas Research • Get the data • Created with Datawrapper

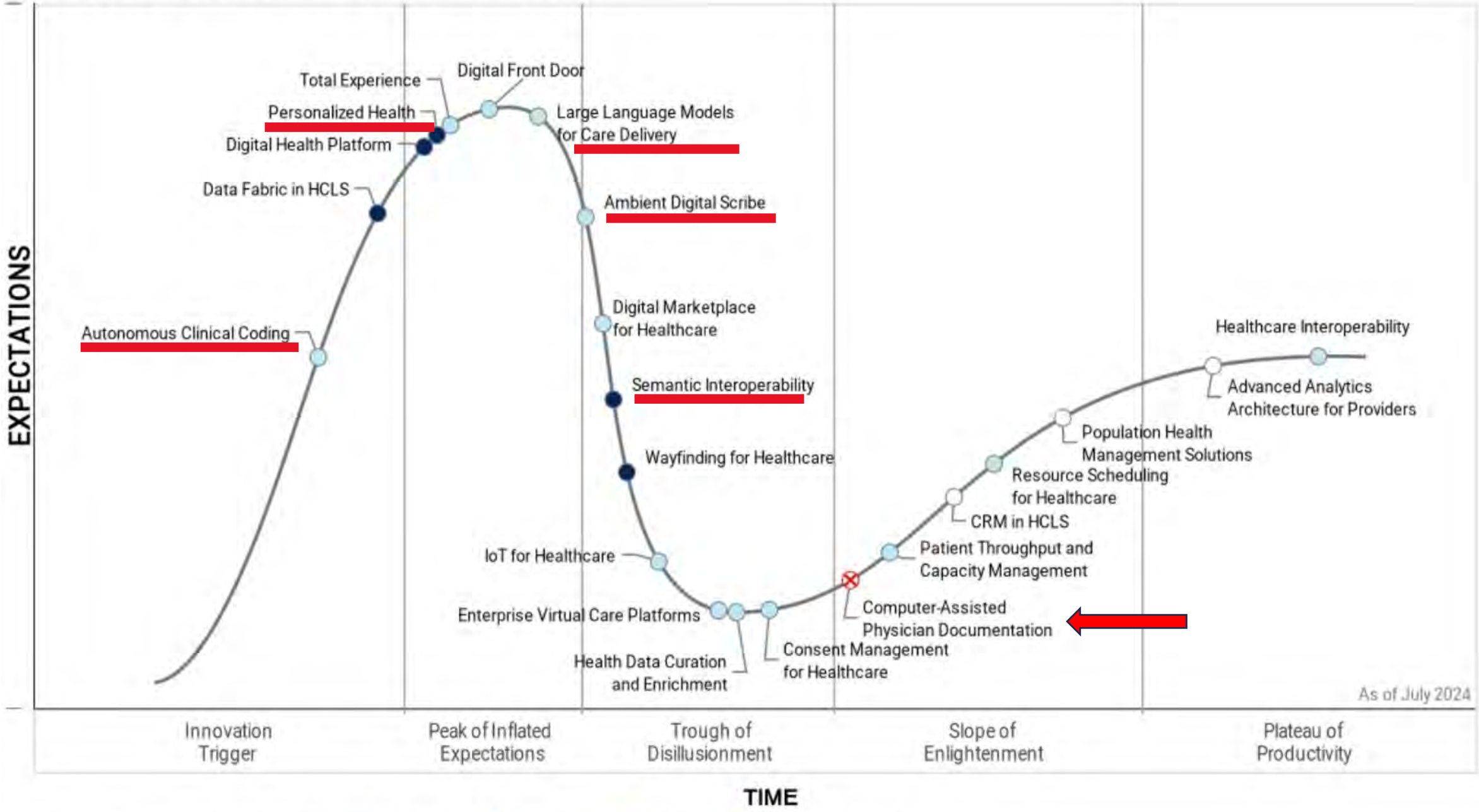
- 50% healthcare organizations using AI imaging tools *(Klas Research)*
- 86% of medical organizations are leveraging AI in their operations *(HIMMS)*
- ~50% of Oncology practices are using AI assisted decision support tools *(OncLive survey)*
- 66% of U.S. physicians reported using AI in their practice *(AMA)*
- Global AI in oncology market projected at ~$3.2 billion in 2025

Hype Cycle for Healthcare Providers, 2022



Source: Gartner (July 2022)

Hype Cycle for Healthcare Providers, 2024



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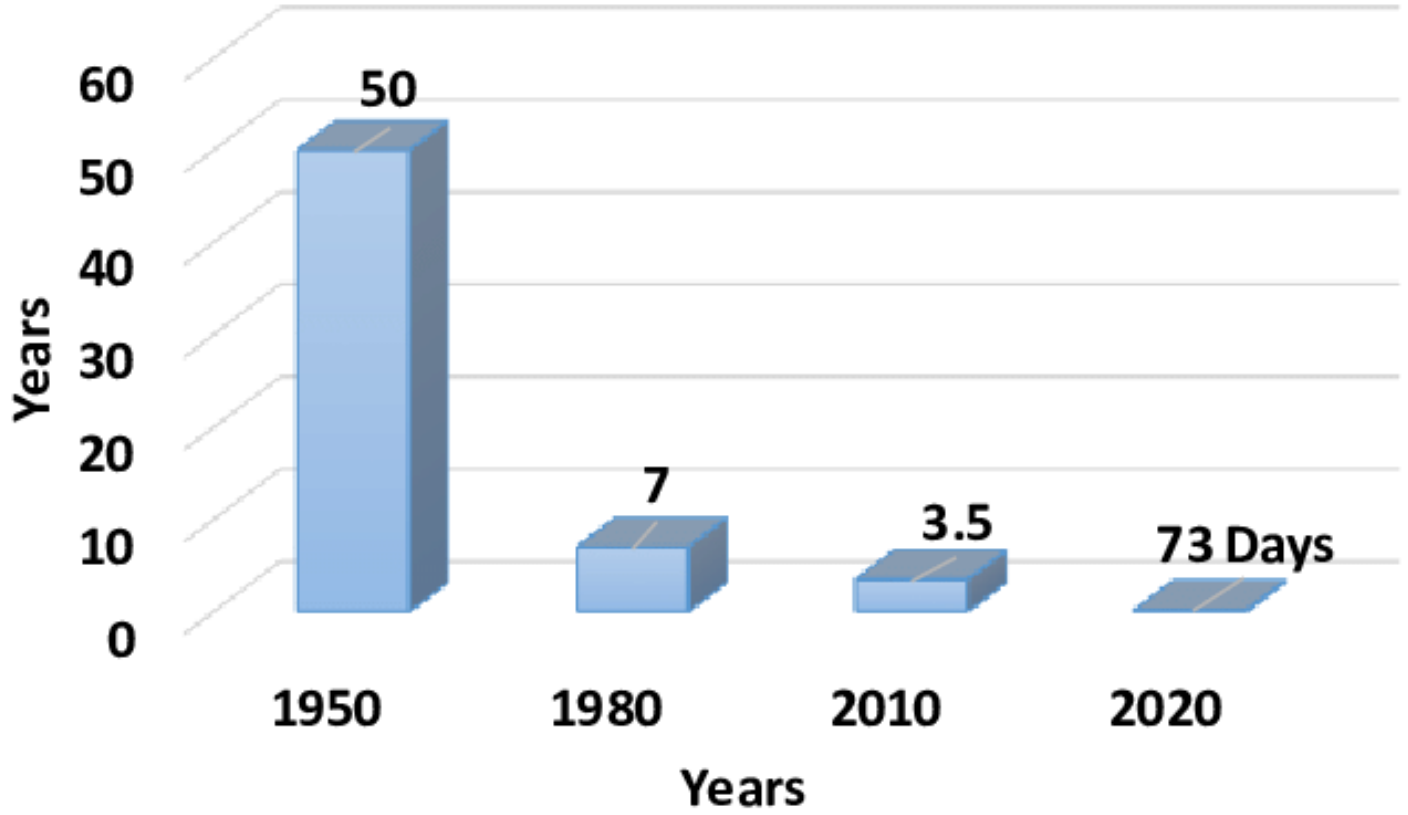
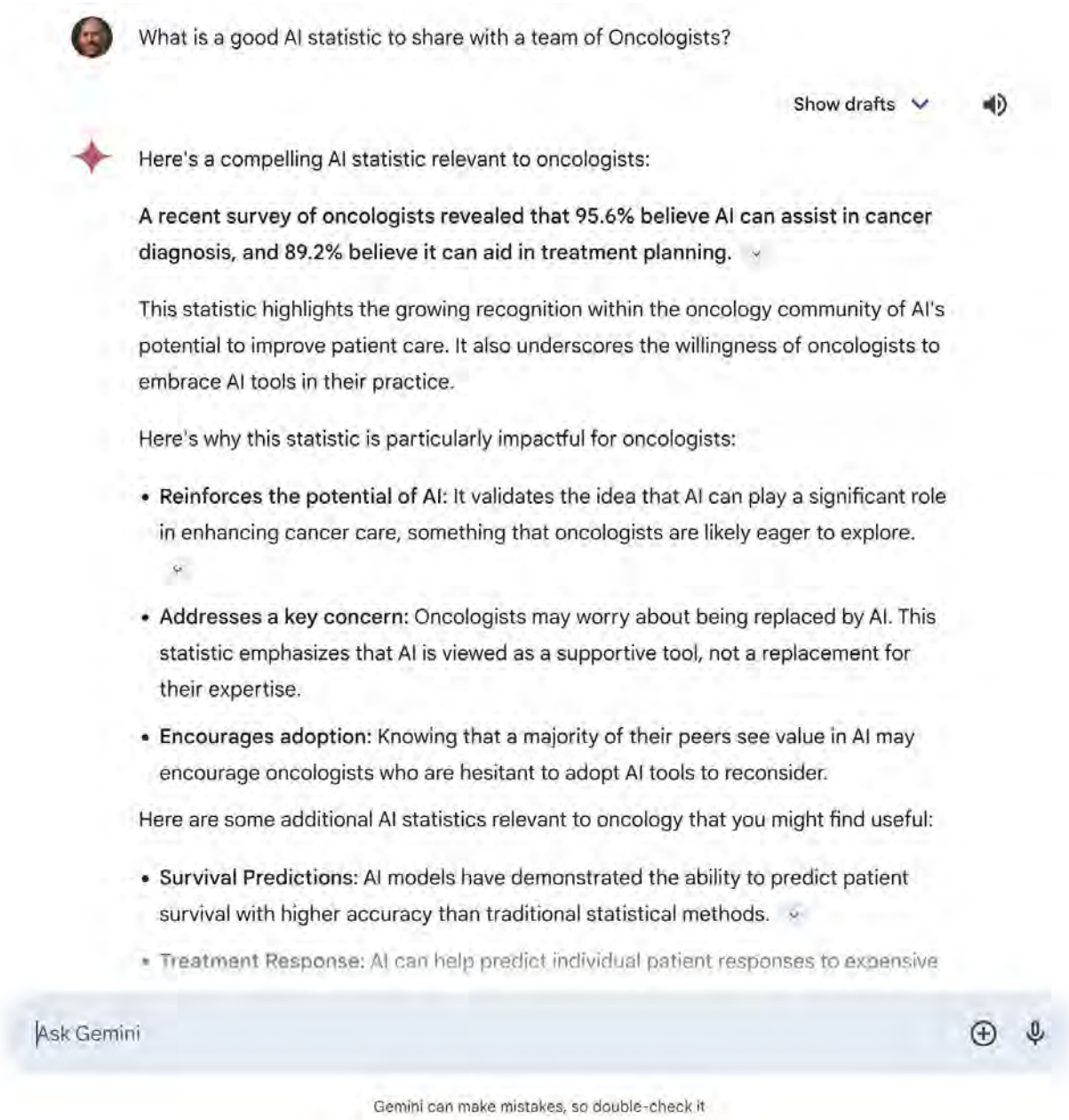
What has changed?

Doubling time of Medical data

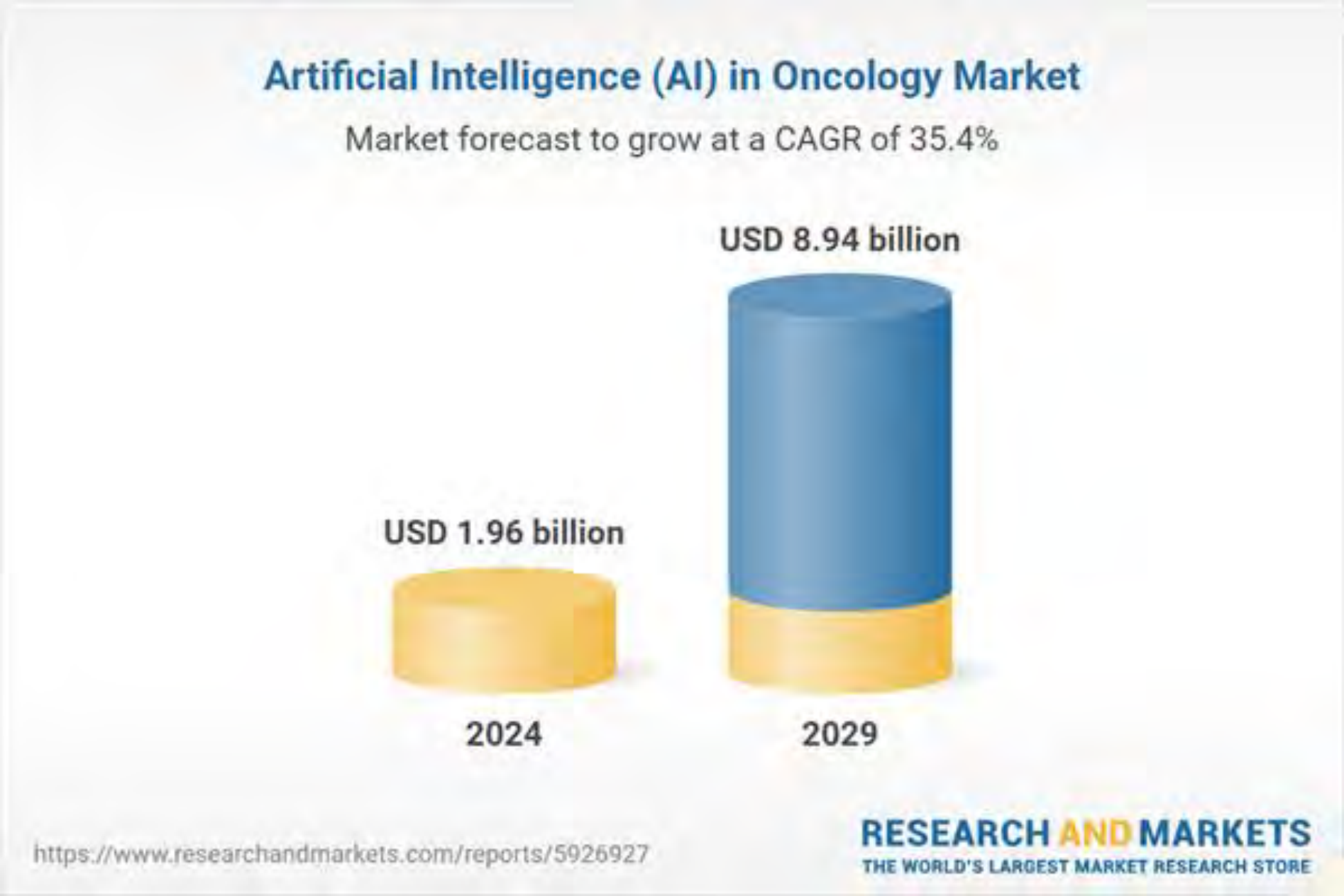
Oncology research and Oncology Care is data-rich and complex, making it ripe for AI disruption.



Estimated Doubling Time of Medical Knowledge by Year. Students starting medical school in 2010 will master 6% of the knowledge available in 2020. Adapted from Denson, 2010. 17



Chat interface and LLM's are a game changer



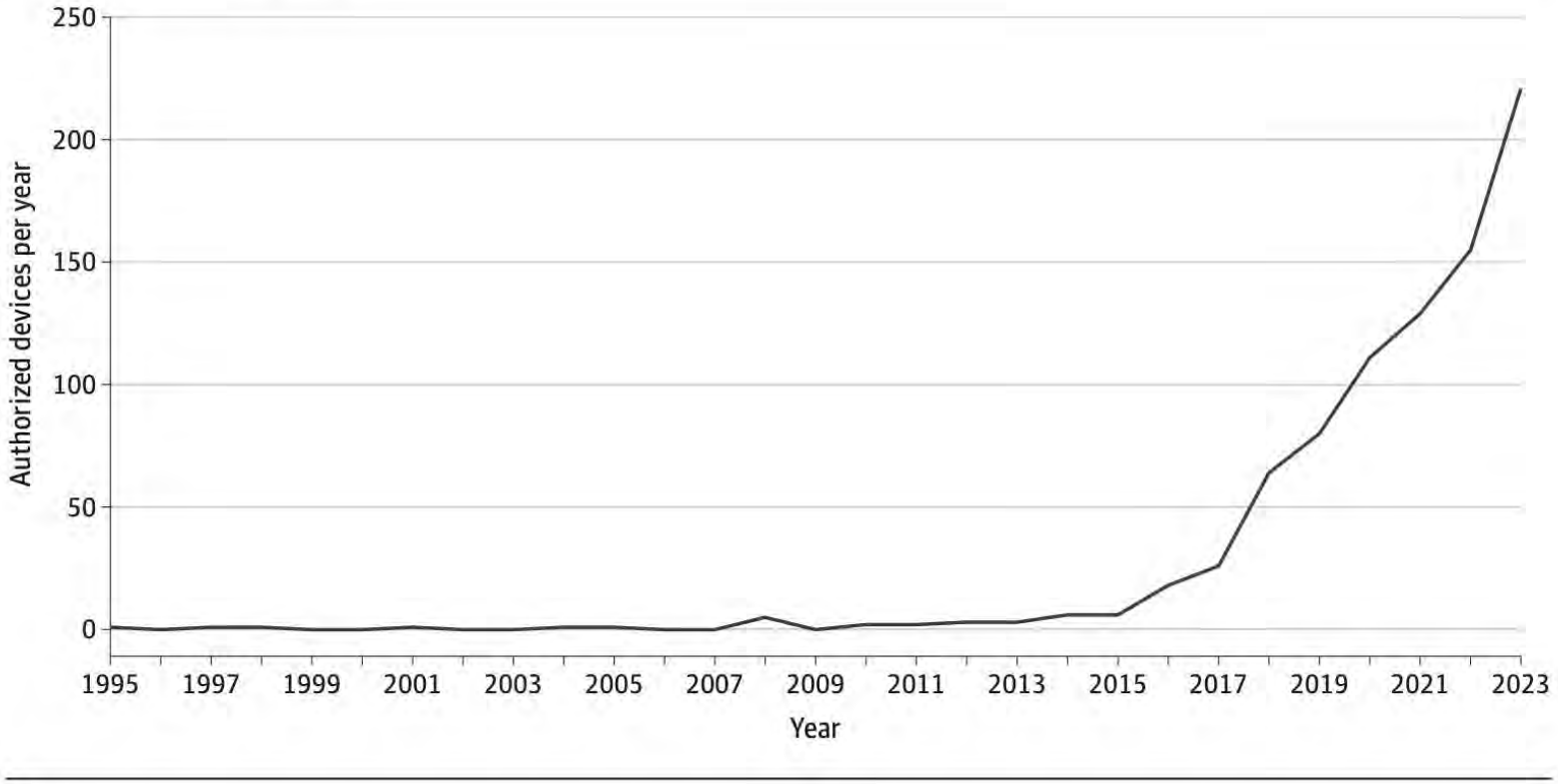
Companies are projected to spend a lot on AI in Oncology – Clinicians beware!

FDA Perspective on the Regulation of Artificial Intelligence in Health Care and Biomedicine

Haider J. Warraich, MD; Troy Tazbaz, BS; Robert M. Califf, MD

FDA Approval on Drugs is much stricter than approval on medical devices – Clinicians beware!

Figure 1. Artificial Intelligence–Enabled Medical Devices Authorized for Marketing by the US Food and Drug Administration, by Year



Radiology accounts for the majority of devices

The number of FDA authorized AI/ML-enabled devices by FDA panel from 1995 to Aug. 7, 2024, which include hardware or software features.

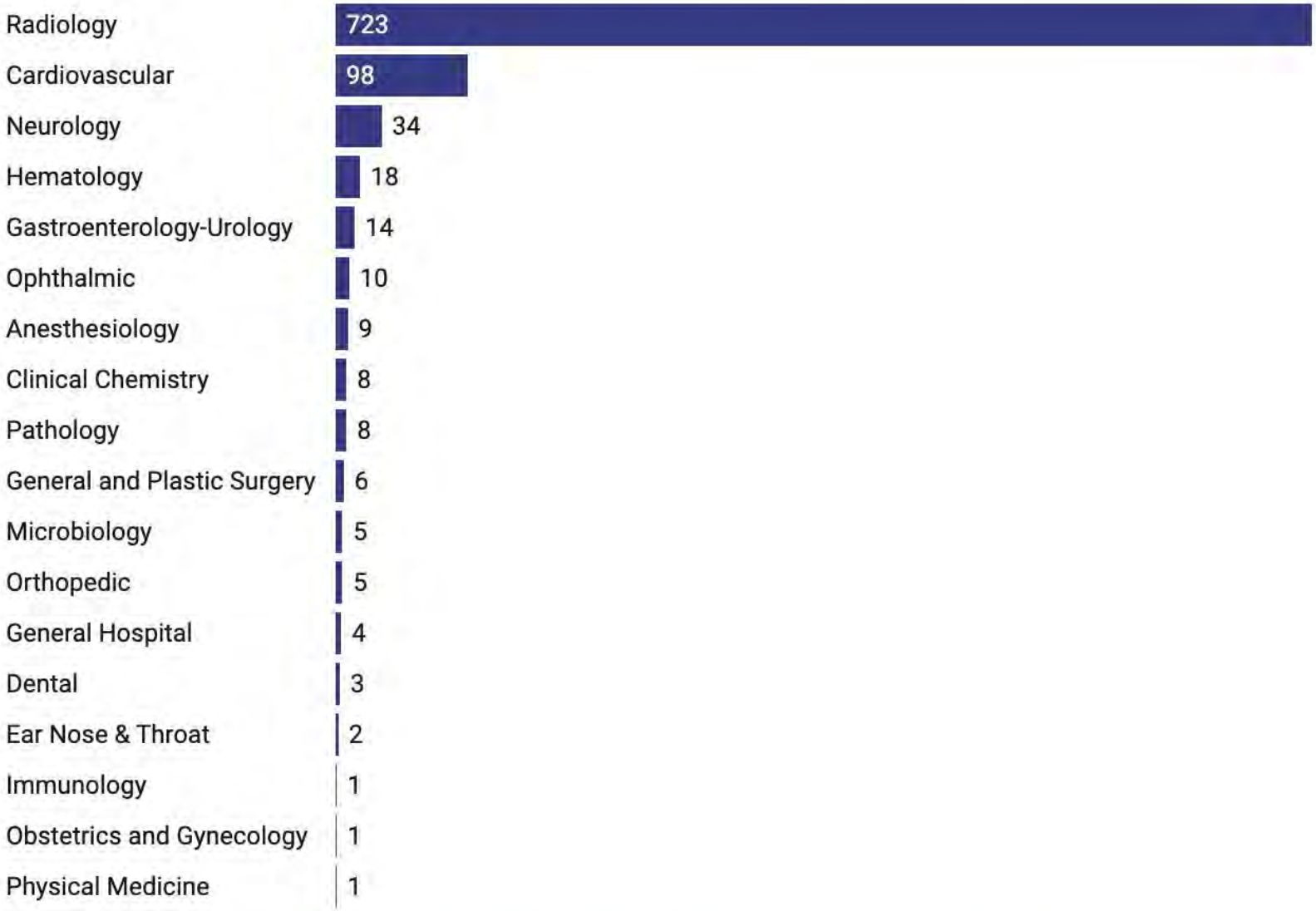


Chart: Elise Reuter • Source: The Food and Drug Administration • Get the data • Created with Datawrapper

A.I. Chatbots Defeated Doctors at Diagnosing Illness

A small study found ChatGPT outdid human physicians when assessing medical case histories, even when those doctors were using a chatbot.

Listen to this article · 9:25 min Learn more

By Gina Kolata

Nov. 17, 2024

Dr. Adam Rodman, an expert in internal medicine at Beth Israel Deaconess Medical Center in Boston, confidently expected that chatbots built to use artificial intelligence would help doctors diagnose illnesses.

He was wrong.

Instead, in a study Dr. Rodman helped design, doctors who were given ChatGPT-4 along with conventional resources did only slightly better than doctors who did not have access to the bot. And, to the researchers' surprise, ChatGPT alone outperformed the doctors.

"I was shocked," Dr. Rodman said.

The chatbot, from the company OpenAI, scored an average of 90 percent when diagnosing a medical condition from a case report and explaining its reasoning. Doctors randomly assigned to use the chatbot got an average score of 76 percent. Those randomly assigned not to use it had an average score of 74 percent.

The study showed more than just the chatbot's superior performance.

"The study showed more than just the chatbot's superior performance. It unveiled doctors' sometimes unwavering belief in a diagnosis they made, even when a chatbot potentially suggests a better one."

"They didn't listen to A.I. when A.I. told them things they didn't agree with…"

But many doctors may not be exploiting its potential.

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What does the future look like? Can ASCO help?

The AI Revolution is Here: How Will it Impact Oncology?

- A few early benefits from AI Adoption in Oncology Care
  - **Ambient Listening** – increased billing, burnout reduction
  - **Clinical Trials Matching** – more patients on trials
  - **Drug Development** – Protein folding, modelling
    - A large pharmaceutical company has described cutting months off the initial generation of the new drug application paperwork.
  - **EMR and LLM Integration** – Reduce burnout, guideline concordant care
  - **Virtual Clinical Chatbots / Digital People / Avatars**

How can ASCO help?

1. **ASCO's Guiding Principles for AI in Oncology**
   A. Transparency
   B. Informed Consumers
   C. Bias limitation
   D. Accountability
   E. Oversight & Privacy
   F. Human-Centered Application – aka "human in the loop"
2. **Advocate –** responsible AI, quality patient outcomes, research on AI efficacy and accuracy
3. **Policy –** help influence policy to ensure quality outcomes, reduced burnout, advance clinical trial participation
4. **Educate**
5. **Product Development –** embrace opportunities where ASCO can leverage AI to help our members

What does the future hold for AI in Oncology?

- **Multi-Modal Foundation Models** - process and understand information from diverse data types simultaneously – such as medical images (radiology, pathology), genomic sequences, clinical notes, lab results, and even patient-reported outcomes
- **Digital Twins** - allows researchers to run treatment simulations in a risk-free environment to see how both a patient or their cancer might respond to novel molecules or treatments
- **CTC, ctDNA and AI** - identify cancer-specific biomarkers and detect cancer recurrence earlier even with minimal residual disease
- *A future where oncologists are empowered to spend more time with their patients because of AI*

In Closing

- Not if, not when, **it's here**…
- AI will not replace you…just augment your expertise and impact
- As practitioners you **must** to be involved with your hospital's selection of AI tools
  - Understand ROI and patient value
- Focus on patient-centric care
- Be curious!

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Thank you!