

Guidelines for AI in Oncology

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National Academies workshop on
Policy Issues for Integrating Artificial Intelligence
in Cancer Research and Care |
NASEM AI and Cancer

Disclosures 2026

Employee: **University Hospital Dresden, University Hospital Heidelberg**

Scientific advisory board member, consulting: **Bioptimus** (France)

Shareholder: **StratifAI** (Germany), **Synagen** (Germany), **Spira Labs** (Germany)

Honoraria: **AstraZeneca, Bayer, Daiichi Sankyo, Eisai, Janssen, MSD, BMS, Roche, Pfizer, Fresenius**

Evolution of biomedical AI

nature reviews cancer

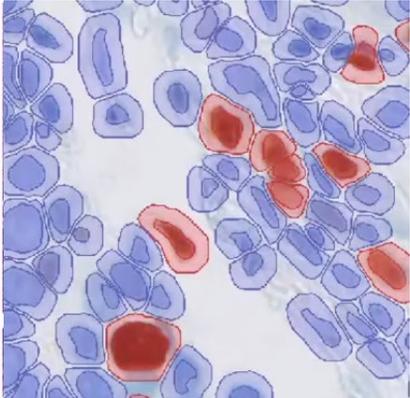
Review article

A guide to artificial intelligence for cancer researchers

Raquel Perez-Lopez¹, Narmin Ghaffari Laleh², Faisal Mahmood^{3,4,5,6,7,8} & Jakob Nikolas Kather^{2,9,10}✉

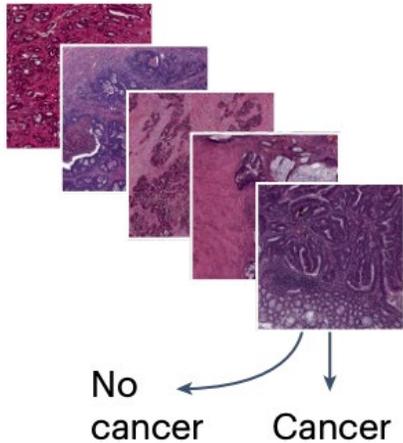
2000s

Classical
Machine learning
methods



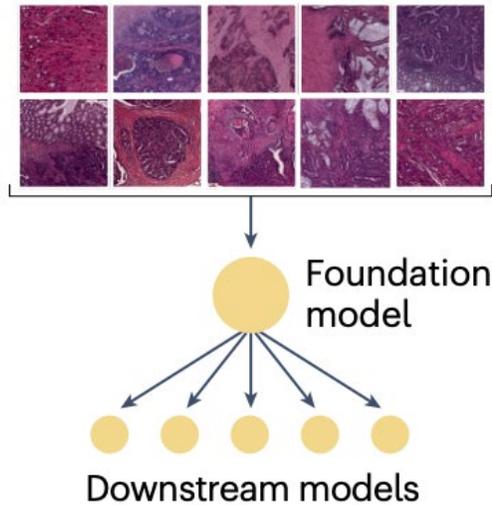
2010s

Single-purpose
Deep learning
models



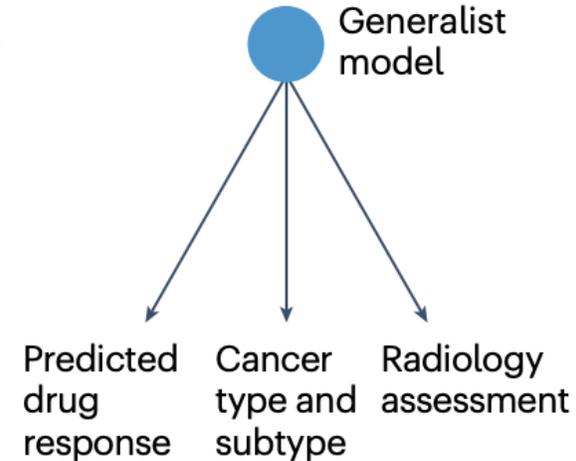
2020

Foundation models
trained with self-
supervised learning



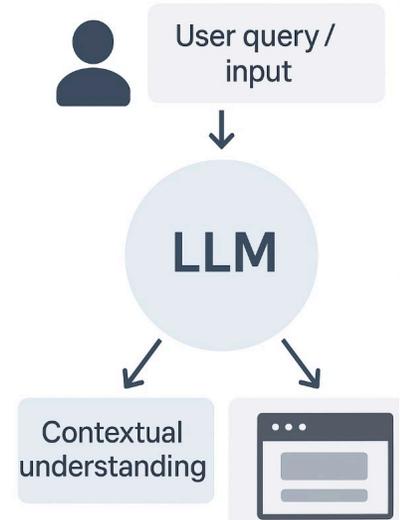
2023

Generalist models
(e.g. large
language models)



2025

AI
agents



2020s: Specialized AI systems

Artificial Intelligence in Gastro...
medtronic.com/us-en/c/digestive-gastrointestin...
United States
medtronic
THE FUTURE IS NOW
GI Genius™ intelligent endoscopy module
DOWNLOAD BROCHURE
CONTACT

This screenshot shows a webpage for Medtronic's GI Genius AI endoscopy module. The page features a large image of an endoscopic view with a green box highlighting a specific area. The text includes the company name, a slogan, the product name, and a call to action to download a brochure or contact.

Mindpeak News | BreastIHC CE...
mindpeak
Mindpeak Blog
Home > Blog > BreastIHC CE-IVD certified
May 25, 2021
BreastIHC CE-IVD certified

This screenshot shows a blog post from Mindpeak. The post is titled "BreastIHC CE-IVD certified" and is dated May 25, 2021. It features a microscopic image of tissue with various colored spots indicating detected areas.

Veye Lung Nodules - Aidence
aidence.com/veye-lu...
aidence
human sense in artificial intelligence
Veye Lung Nodules, your AI solution for pulmonary nodule management
The second pair of eyes in the search for lung nodules on chest CT scans
Veye Lung Nodules supports the improvement of patient outcomes by delivering fast results, lowering the risk of misdiagnosis, and by detecting and segmenting possible early-stage lung cancer.

This screenshot shows a webpage for Aidence's Veye Lung Nodules AI solution. The page features a colorful abstract graphic and text describing the AI solution for pulmonary nodule management. It highlights the product as "The second pair of eyes in the search for lung nodules on chest CT scans" and mentions its benefits for patient outcomes.

Introducing FDA-Approved Paige Pro...
https://info.paige.ai/prostate
Paige Prostate
Software to Enhance Confidence in Prostate Cancer Diagnosis
Introducing Paige Prostate, the first AI-based pathology product to receive FDA marketing authorization for in vitro diagnostic (IVD) use in detecting cancer in prostate needle biopsies.

This screenshot shows a webpage for Paige Prostate. The page features a clean design with a large heading "Software to Enhance Confidence in Prostate Cancer Diagnosis" and a sub-heading "Introducing Paige Prostate, the first AI-based pathology product to receive FDA marketing authorization for in vitro diagnostic (IVD) use in detecting cancer in prostate needle biopsies."

DoMore Diagnostics achieves CE-IVD mark for Histotype Px® Colorectal, an AI algorithm that predict patient outcomes in colorectal cancer patients by analyzing standard histology images
Oslo, Norway - DoMore Diagnostics, a leader in cancer outcome prediction with

This screenshot shows a webpage for DoMore Diagnostics. The page features a large heading "DoMore Diagnostics achieves CE-IVD mark for Histotype Px® Colorectal, an AI algorithm that predict patient outcomes in colorectal cancer patients by analyzing standard histology images" and a sub-heading "Oslo, Norway - DoMore Diagnostics, a leader in cancer outcome prediction with".

Indica Labs receives CE-IVD Mark for prostate cancer screening tool
NEWS | May 24, 2022
The study was conducted on 4,973 core needle biopsies obtained from three independent arms.

This screenshot shows a news article from the Medical Device Network website. The article is titled "Indica Labs receives CE-IVD Mark for prostate cancer screening tool" and is dated May 24, 2022. It features a microscopic image of tissue with yellow highlights indicating detected areas.

First CE-IVD marked AI solution for prognostic risk stratification of breast cancer patients.
Stratipath, a global leader in AI-based precision diagnostic solutions, today announced that its AI software for prognostic risk stratification of breast cancers, Stratipath Breast, is now CE-IVD marked.
June 01, 2022 03:59 ET | Source: Stratipath

This screenshot shows a news article from GlobeNewswire. The article is titled "First CE-IVD marked AI solution for prognostic risk stratification of breast cancer patients." and is dated June 01, 2022. It features the Stratipath logo and text describing the AI solution for prognostic risk stratification of breast cancers.

Predict breast cancer recurrence with AI

nature communications



Article

<https://doi.org/10.1038/s41467-025-57283-x>

Multimodal histopathologic models stratify hormone receptor-positive early breast cancer

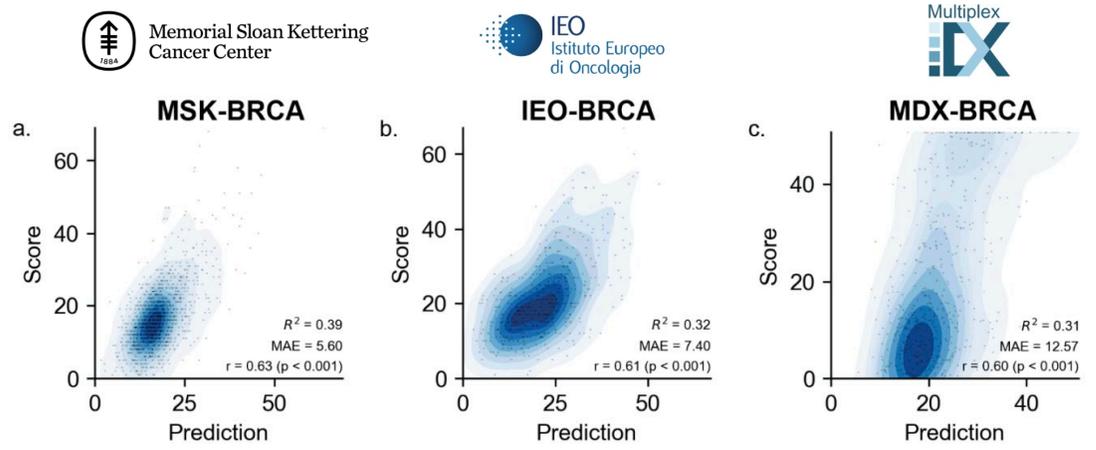
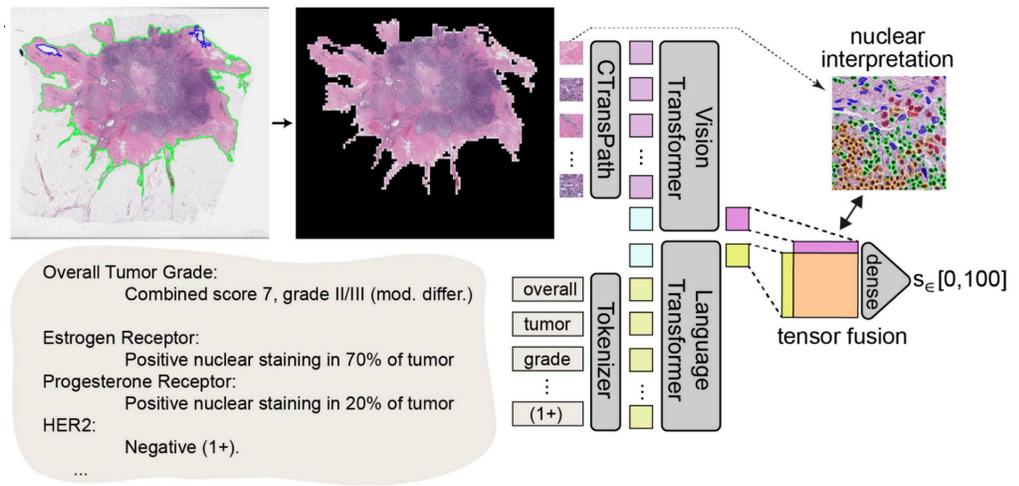
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Check for updates

Kevin M. Boehm^{1,2,18}, Omar S. M. El Nahhas^{3,4,18}, Antonio Marra^{5,6,18}, Michele Waters¹, Justin Jee^{1,7}, Lior Braunstein², Nikolaus Schultz^{1,8,9}, Pier Selenica⁵, Hannah Y. Wen⁵, Britta Weigelt⁵, Evan D. Paul^{10,11}, Pavol Cekan^{10,11}, Ramona Erber¹², Chiara M. L. Loeffler³, Elena Guerini-Rocco^{13,14}, Nicola Fusco^{13,14}, Chiara Frascarelli^{13,14}, Eltjona Mane¹³, Elisabetta Munzone¹⁵, Silvia Dellapasqua¹⁵, Paola Zagami^{6,14}, Giuseppe Curigliano^{6,14}, Pedram Razavi⁷, Jorge S. Reis-Filho^{5,17,19}, Fresia Pareja^{5,19}, Sarat Chandarlapaty^{7,8,19}, Sohrab P. Shah^{1,19} & Jakob Nikolas Kather^{3,16,19} ✉



j.

Risk group	low	med.	high
low	56	178	4
med.	40	565	40
high	0	73	73
	low	med.	high

$p < 0.001$

k.

Risk group	low	med.	high
low	16	28	5
med.	36	152	68
high	4	43	100
	low	med.	high

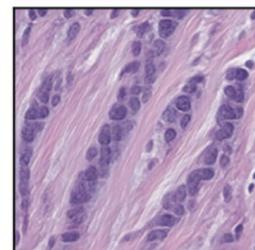
$p = 0.382$

l.

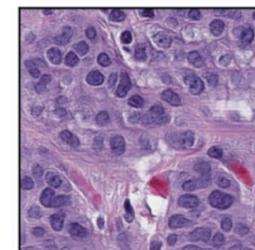
Risk group	low	med.	high
low	17	218	26
med.	3	102	25
high	2	72	110
	low	med.	high

$p < 0.001$

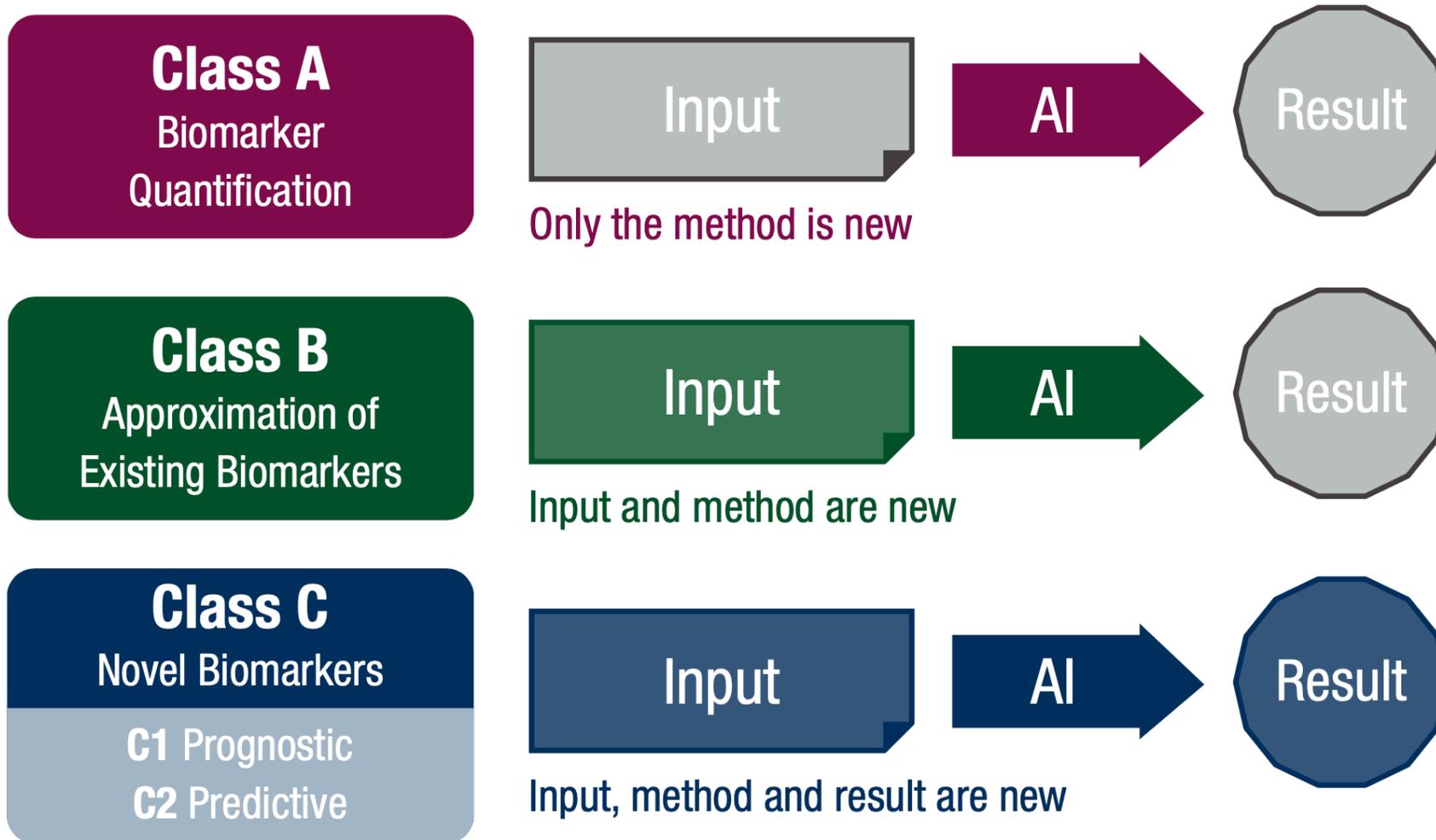
synthetic low risk



synthetic high risk



ESMO Basic Requirements for AI-based Biomarkers In Oncology (EBAI)



Real World use of AI

theguardian.com/so...

The Guardian

News Opinion Sport Culture Lifestyle

UK UK politics Education Media Society Law Scotland Wales Northern Ireland

Health

'From taboo to tool': 30% of GPs in UK use AI tools in patient consultations, study finds

Survey shows rise in GPs using tools such as ChatGPT to produce appointment summaries and assist with diagnosis



The report also highlights growing concern among GPs that using the tech could lead to clinical errors and being sued. Photograph: Andrew Brookes/Getty Images/Image Source

Denis Campbell Health policy editor
Wed 3 Dec 2025 20:07 CET

Share

Almost three in 10 GPs in the UK are using AI tools such as ChatGPT in consultations with patients, even though it could lead to them making mistakes and being sued, a study reveals.

theguardian.com/te...

The Guardian

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UK UK politics Education Media Society Law Scotland Wales Northern Ireland

Chatbots

'I feel it's a friend': quarter of teenagers turn to AI chatbots for mental health support

Experts warn of dangers as England and Wales study shows 13- to 17-year-olds consulting AI amid long waiting lists for services



About 40% of 13- to 17-year-olds in England and Wales affected by youth violence are turning to AI chatbots for mental health support. Photograph: Antonio Guillem/Shutterstock

Robert Booth UK technology editor
Tue 9 Dec 2025 06:00 CET

Share

It was after one friend was shot and another stabbed, both fatally, that Shan asked ChatGPT for help. She had tried conventional mental health services but "chat", as she came to know her AI "friend", felt safer, less intimidating

theguardian.com/te...

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ChatGPT

ChatGPT-5 offers dangerous advice to mentally ill people, psychologists warn

Research finds OpenAI's free chatbot fails to identify risky behaviour or challenge delusional beliefs



ChatGPT-5 was found to give some good advice when presented with milder mental health conditions. Photograph: Dado Ruvic/Reuters

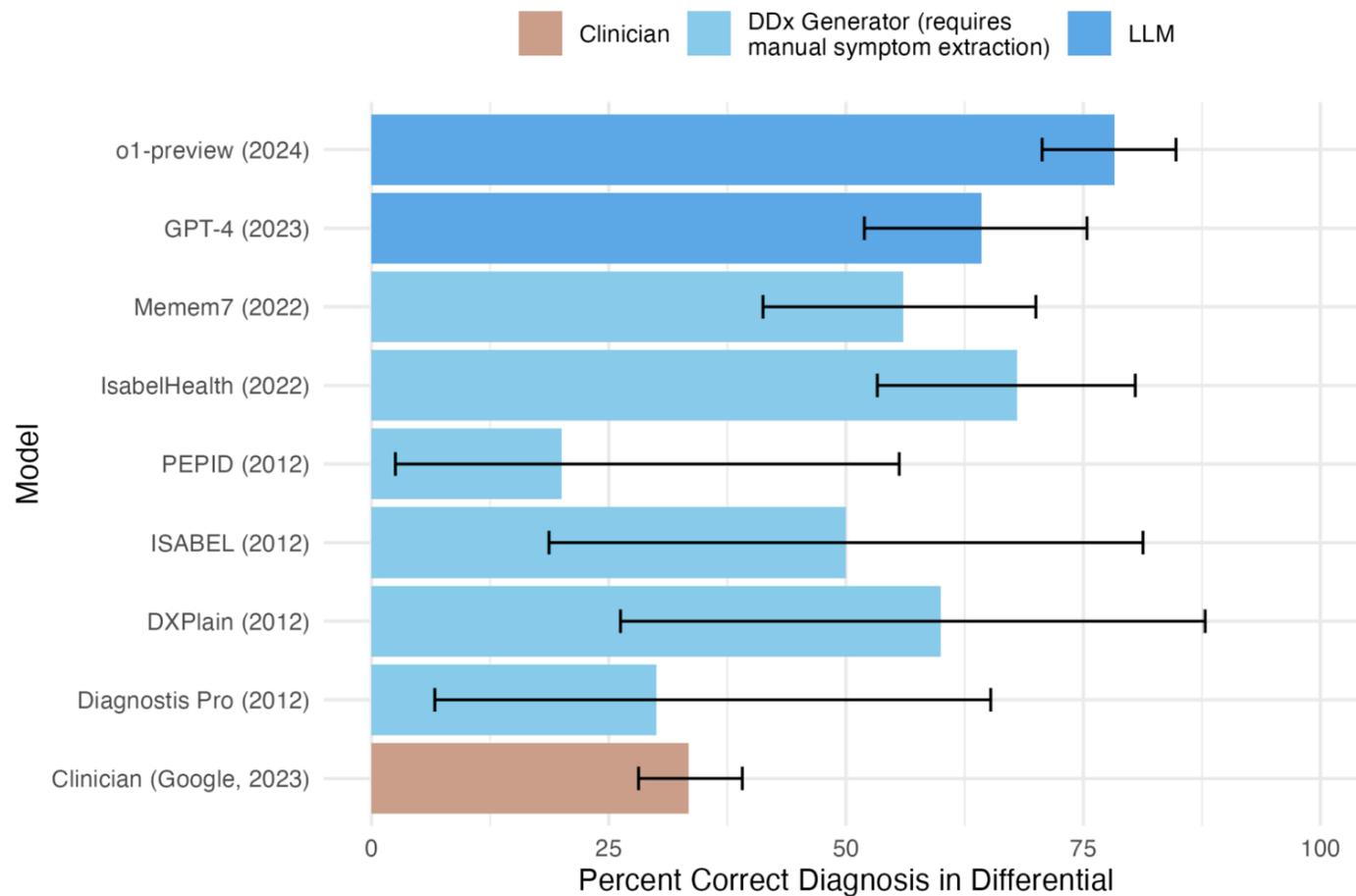
Rachel Hall
Sun 30 Nov 2025 13:00 CET

Share

ChatGPT-5 is offering dangerous and unhelpful advice to people experiencing mental health crises, some of the UK's leading psychologists have warned.

Medical reasoning is superhuman now

Figure 1. Performance of Differential Diagnosis Generators and LLMs on *NEJM* Clinicopathologic Case Conferences (CPCs) 2012-2024



Case 26-1964 — Clinicopathological Conference of the Boston City Hospital

Authors: William Dameshek and Leonard S. Gottlieb [Author Info & Affiliations](#)

Published May 28, 1964 | *N Engl J Med* 1964;270:1190-1197 | DOI: 10.1056/NEJM196405282702212

[VOL. 270 NO. 22](#)



Abstract

Presentation of Case

A fifty-nine-year-old housewife was referred to the Tufts Hematology Clinic for evaluation of anemia.

Nine months before she had noted the gradual onset of weakness and fatigue and a weight loss of 9.1 kg. (20 pounds). Shortly thereafter pounding headaches developed. The family noted that her skin was a pale-yellow color. There was no history of dark urine, drug ingestion or exposure to toxins.

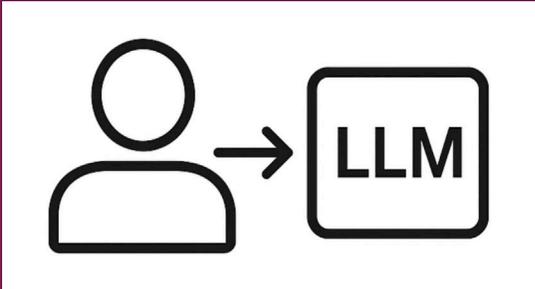
Four months previously she had been admitted to another hospital for investigation, and an enlarged spleen, severe anemia and mild jaundice were discovered. She was treated with prednisone, 40 mg. a day, and . . .

“The cases have never been publicly released specifically to protect evaluation validity against memorization.”

The first guideline for LLM use in Oncology

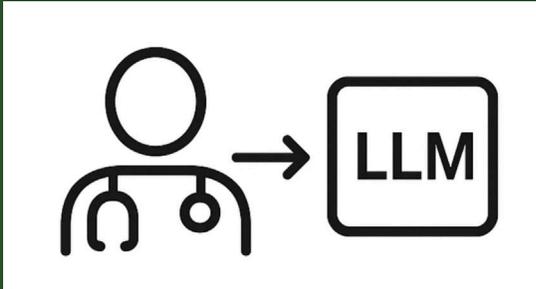
ESMO Initiative ELCAP: Evaluation of Language Models in Clinical Practice

Type 1
Patient-facing
AI systems



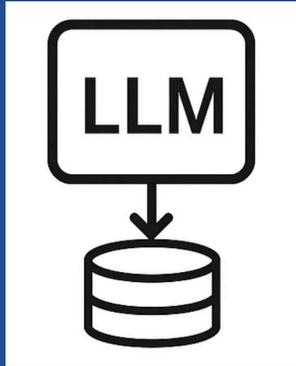
Symptom Queries
Patient Education
Lifestyle Tracking

Type 2
HCP-facing
AI systems



Clinical Decision Support
Multilingual Communication
Education and Training

Type 3
Background
AI systems



Data Extraction
Background Alert Systems

Large language models

LLM “zero shot”

Which treatment is appropriate for my patient, cirrhosis Child B, HCC 6 cm and another one 4 cm

Your patient has **Child-Pugh B cirrhosis** and **two HCC tumors (6 cm and 4 cm)**. Based on the **Barcelona Clinic Liver Cancer (BCLC) staging system**, this likely corresponds to **BCLC B (Intermediate stage) or BCLC C (if vascular invasion or metastases are present)**. The appropriate treatment depends on several factors:

Treatment Options:

- 1. Transarterial Chemoembolization (TACE) (Preferred for BCLC B)**

- **Indication:** Intermediate-stage HCC, multinodular tumors, no vascular invasion or metastasis.
- **Rationale:** TACE is the first-line treatment for **non-resectable intermediate HCC** in Child-Pugh A or B.

LLM with context

EASL-CPG-2024.pdf PDF

Which treatment is appropriate for my patient, cirrhosis Child B, HCC 6 cm and another one 4 cm, based on the EASL Clinical Practice Guidelines of 2024 (attached)

Read EASL-CPG-2024.pdf

Based on the **EASL Clinical Practice Guidelines 2024**, the recommended treatment approach for a **patient with cirrhosis Child-Pugh B and hepatocellular carcinoma (HCC) with two lesions (6 cm and 4 cm)** depends on multiple factors, including liver function, tumor burden, portal hypertension, and feasibility of different treatment modalities.

Treatment Options According to EASL 2024:

- 1. Liver Transplantation (LT) Consideration:**

LLM with tools = agents

nature reviews cancer

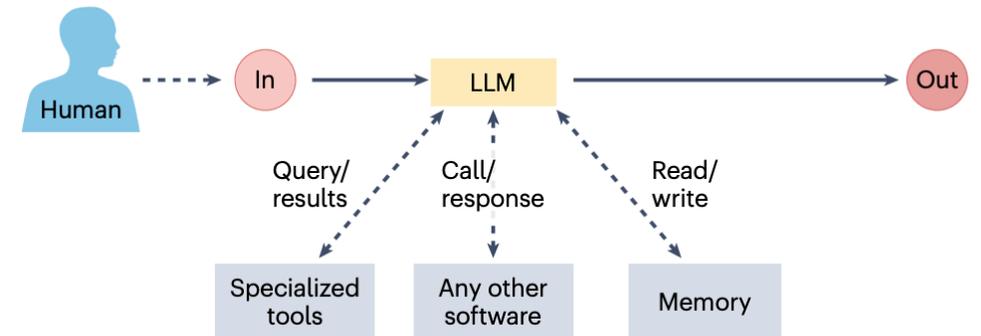
<https://doi.org/10.1038/s41568-025-00900-0>

Review article

Check for updates

Artificial intelligence agents in cancer research and oncology

Daniel Truhn¹, Shekoofeh Azizi², James Zou³, Leonor Cerda-Alberich⁴, Faisal Mahmood⁵ & Jakob Nikolas Kather^{6,7}✉





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