



Advancing oncology together

AI's potential in advancing cancer
research, treatment, and care

The global fight against cancer demands innovative solutions. Globally, cancer is a leading cause of death, with millions of new cases and deaths annually.¹ Research and development in cancer is crucial for improving detection, treatment, and ultimately reducing this significant disease burden. Google is committed to being a driving force for progress. We're harnessing the power of technology, especially AI, to support the health ecosystem across the oncology continuum - from detection to treatment planning and scientific discovery.

In this resource you will find examples of early research, promising advancements in AI, and partnerships across Google's efforts in oncology. We hope this provides a meaningful snapshot of our impact and inspires you to join us in our goal to help everyone, everywhere live a longer, healthier life.

It is important to note that the technologies and applications detailed herein represent Google's pioneering research and development efforts in oncology and are not yet commercially available products.



¹ Global cancer burden growing, amidst mounting need for services, WHO
[\[https://www.who.int/news/item/01-02-2024-global-cancer-burden-growing--amidst-mounting-need-for-services\]](https://www.who.int/news/item/01-02-2024-global-cancer-burden-growing--amidst-mounting-need-for-services)

Pioneering AI foundations for oncology research

Google has developed powerful multimodal AI models that help accelerate the development and deployment of specialized health solutions that could be utilized across the global oncology landscape.

Specialized open-weight models

We're committed to helping foster open innovation through specialized open-weight models designed as a starting point for developers that are building health applications. MedGemma is optimized for multimodal medical text and image comprehension built from Gemma 3,² while TxGemma is specifically designed as a research tool to help scientists predict therapeutic properties early in drug discovery and development.³ Both are available as part of Google's Health AI Developer Foundations (HAI-DEF) collection.

Resources for AI development

HAI-DEF provides open-weight, foundation models and tools across various healthcare modalities, such as radiology, histopathology, and others. HAI-DEF aims to democratize AI development in health by offering downloadable models, instructional notebooks, and documentation for developers.⁴



² MedGemma [<https://developers.google.com/health-ai-developer-foundations/medgemma>]

³ TxGemma [<https://developers.google.com/health-ai-developer-foundations/txgemma>]

⁴ Helping everyone build AI for healthcare applications with open foundation models (HAI-DEF).
[<https://research.google/blog/helping-everyone-build-ai-for-healthcare-applications-with-open-foundation-models/>]

Advancing diagnostic research with AI

Ongoing research shows AI has the potential to transform how cancer is detected and diagnosed, empowering clinicians to improve accuracy, reduce workload, and standardize care delivery across the diagnostic pathway.

Reducing radiologist workload and accelerating care through AI research

Our research shows how AI can assist in screening mammography, with studies indicating its potential to function comparably to human readers as an independent “second reader”. In a prospective study, AI-assisted mammography triage demonstrated a reduction in the time to additional imaging by 25% and time to biopsy diagnosis by 30% for suspicious findings.⁵ These findings suggest that AI-powered approaches may contribute to fewer unnecessary follow-up procedures, reduced patient anxiety, and decreased burden on healthcare systems.

Improving imaging performance in lung cancer screening

Google has helped demonstrate how AI assistance shows promise in improving the specificity of lung cancer screening CT scans in multinational retrospective studies, leading to fewer false positives thereby reducing the number of unnecessary procedures.⁶ To translate this research into real-world clinical impact, we are collaborating with DeepHealth, a leading AI-powered health informatics provider; and Apollo Radiology International, a leading provider of Radiology services in India, to explore integrating this technology into their future products.⁷

Image-text alignment with PathAlign

Google researchers have demonstrated a vision-language model specifically designed for gigapixel-scale whole slide histopathology images. PathAlign streamlines analysis by integrating visual data with pathology reports.⁸

Risk stratification with deep learning

Our research applies deep learning to predict lymph node metastasis. This approach generates and combines machine-learned features from tumor histology with established clinicopathologic factors to provide enhanced prognostic information and aiding clinical decision-making. This approach also shows potential to enhance risk-stratification of patients with and without identified metastasis.⁹

⁵ Triaging mammography with artificial intelligence: an implementation study [<https://link.springer.com/article/10.1007/s10549-025-07616-7>]

⁶ Assistive AI in Lung Cancer Screening: A Retrospective Multinational Study in the United States and Japan [<https://pubs.rsna.org/doi/10.1148/ryai.230079>]

⁷ Computer-aided diagnosis for lung cancer screening [<https://research.google/blog/computer-aided-diagnosis-for-lung-cancer-screening/>]

⁸ PathAlign: A vision-language model for whole slide images in histopathology [<https://arxiv.org/abs/2406.19578>]

⁹ Predicting lymph node metastasis from primary tumor histology and clinicopathologic factors in colorectal cancer using deep learning [<https://www.nature.com/articles/s43856-023-00282-0>]

Driving progress in discovery & cancer care with AI

Google's AI research tools are helping scientists generate hypotheses, analyze large datasets, and discover new therapeutic insights, which could lead to accelerating the pace of cancer research. In addition, AI is being explored to support complex decision-making in oncology treatment planning - enhancing consistency, reducing manual workload, and enabling more personalized approaches to care.

AI co-scientist for hypothesis generation

AI co-scientist, a multi-agent system built on Gemini 2.0, is designed to augment researchers by uncovering new knowledge and formulating novel research hypotheses and proposals, accelerating the scientific discovery process.^{10,11} As a research-phase initiative, Google is collaborating with a select number of partners to obtain feedback and evaluate its strengths and limitations.

Revolutionizing protein structure prediction

AlphaFold has dramatically accelerated protein structure prediction, a decades-long challenge that previously took a year or more per protein. This breakthrough, which has been called the most significant advance in biology in decades, helps scientists understand how amino acid sequences affect protein structure, leading to faster insights into cancer biology and aiding drug design. Open-sourced by Google, AlphaFold 2 has been used by over 2.5 million scientists in more than 190 countries.¹²

Improving radiation oncology workflows

A Google deep-learning model has been validated for automated segmentation of organs-at-risk in head-and-neck radiotherapy planning. This significantly improves the efficiency and consistency of this critical step, reducing total contouring time by 76% in studies.¹³

Large language models for clinical management

AMIE (Articulate Medical Intelligence Explorer), a research conversational AI system, is being explored for its capabilities in specialist-level conversation and reasoning. Studies have included investigating its potential in oncology care, including breast oncology case interpretation, as well as how it could assist physicians in longitudinal disease management. Early research shows its potential to significantly aid clinical decision-making and enhance treatment planning discussions.^{14,15,16} AMIE is a research-only system, exploring the 'art of the possible' in the use of LLMs in clinical care, and is not available as a product.

¹⁰ Accelerating scientific breakthroughs with an AI co-scientist. [<https://research.google/blog/accelerating-scientific-breakthroughs-with-an-ai-co-scientist/>]

¹¹ Towards an AI co-scientist. [<https://arxiv.org/abs/2502.18864>]

¹² AlphaFold [<https://alphafold.ebi.ac.uk/>]

¹³ Validation of clinical acceptability of deep-learning-based automated segmentation of organs-at-risk for head-and-neck radiotherapy treatment planning. [<https://www.frontiersin.org/journals/oncology/articles/10.3389/fonc.2023.1137803/full>]

¹⁴ Exploring Large Language Models for Specialist-level Oncology Care. [<https://arxiv.org/pdf/2411.03395>]

¹⁵ AMIE 2.0: From diagnosis to treatment, advancing AMIE for longitudinal disease management.

[<https://research.google/blog/from-diagnosis-to-treatment-advancing-amie-for-longitudinal-disease-management/>]

¹⁶ Towards Conversational AI for Disease Management. [<https://arxiv.org/pdf/2503.06074>]

Global partnerships as our foundation for impact

Meaningful progress in oncology requires deep collaboration across the global health ecosystem, empowering our partners to develop and validate real-world solutions using our technology

Apollo Radiology International



In India, our collaboration with Apollo Radiology International is bringing AI advancements to communities across the country. We're partnering to bring AI models, initially developed to help with tuberculosis screening, lung cancer screening, and breast cancer screening, to regions where specialized expertise may be limited. Over the next decade, Apollo Radiology plans to provide 3 million free AI-powered screenings aiming to help hundreds of thousands more people across India access timely care.¹⁷

Institute of Women's Cancers



Our partnership with the Institute of Women's Cancers, which is founded by France's world-renowned cancer research and treatment center Institut Curie, aims to advance AI applications in oncology. This collaboration includes research into how AI tools can better address cancer, particularly focusing on difficult-to-treat cancers like triple-negative breast cancer. The goal is to develop more precise and effective treatments and to help predict the progression of cancer and the risk of relapse for each patient.¹⁸

American Society of Clinical Oncology (ASCO)



Google Cloud is collaborating with ASCO to launch an AI-based ASCO Guidelines Assistant. Developed with Google Cloud's Vertex AI platform and Gemini models, this tool is poised to transform how oncology professionals access and use critical recommendations by providing faster access to ASCO's full library of evidence-based clinical guidelines. It aims to provide timely and accurate information, supporting evidence-based decision-making in cancer care.¹⁹

¹⁷ How AI supports early disease detection in India

[https://blog.google/technology/health/google-ai-india-early-disease-detection/?utm_source=ai.google&utm_medium=referral]

¹⁸ Partnering to advance AI research for women's cancers. [<https://blog.google/technology/health/google-ai-institute-womens-cancers/>]

¹⁹ Introducing ASCO Guidelines Assistant [<https://www.asco.org/practice-patients/guidelines/assistant>]

Global partnerships as our foundation for impact (*cont.*)

Servier



Our partnership with Servier, an international pharmaceutical group in France with a focus on oncology and rare cancer treatments, leverages Google Cloud's AI and generative AI to accelerate the research and development of innovative therapeutic solutions. This collaboration aims to shorten drug development times and enhance efficiency, including identifying new therapeutic targets and advancing precision medicine.²⁰

Ai2



Google Cloud and Ai2 have partnered with Cancer AI Alliance (CAIA), committing a combined \$20 million to advance AI-powered cancer research. This partnership leverages Google Cloud's AI infrastructure and data analytics tools, while Ai2 provides expertise in training large-scale AI models for cancer research.²¹



Cancer AI Alliance

Together, we can accelerate progress

Google is committed to advancing oncology through technology, partnerships, and a shared belief in the potential of AI to transform cancer care. This commitment is built on fairness, reliability, and developing AI for everyone, everywhere. Whether it's enhancing diagnosis, supporting treatment planning, or unlocking new scientific insights through our AI research, we believe the greatest breakthroughs come through collaboration.

Learn more at health.google.com



²⁰ Servier and Google Cloud Expand Partnership on using data and AI
[\[https://servier.com/en/newsroom/servier-google-cloud-expand-partnership-on-using-data-and-ai/\]](https://servier.com/en/newsroom/servier-google-cloud-expand-partnership-on-using-data-and-ai/)

²¹ Google Cloud and Ai2 Commit \$20M to Advance AI-Powered Research for the Cancer AI Alliance
[\[https://www.prnewswire.com/news-releases/google-cloud-and-ai2-commit-20m-to-advance-ai-powered-research-for-the-cancer-ai-alliance-302420874.html\]](https://www.prnewswire.com/news-releases/google-cloud-and-ai2-commit-20m-to-advance-ai-powered-research-for-the-cancer-ai-alliance-302420874.html)