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Google for Health

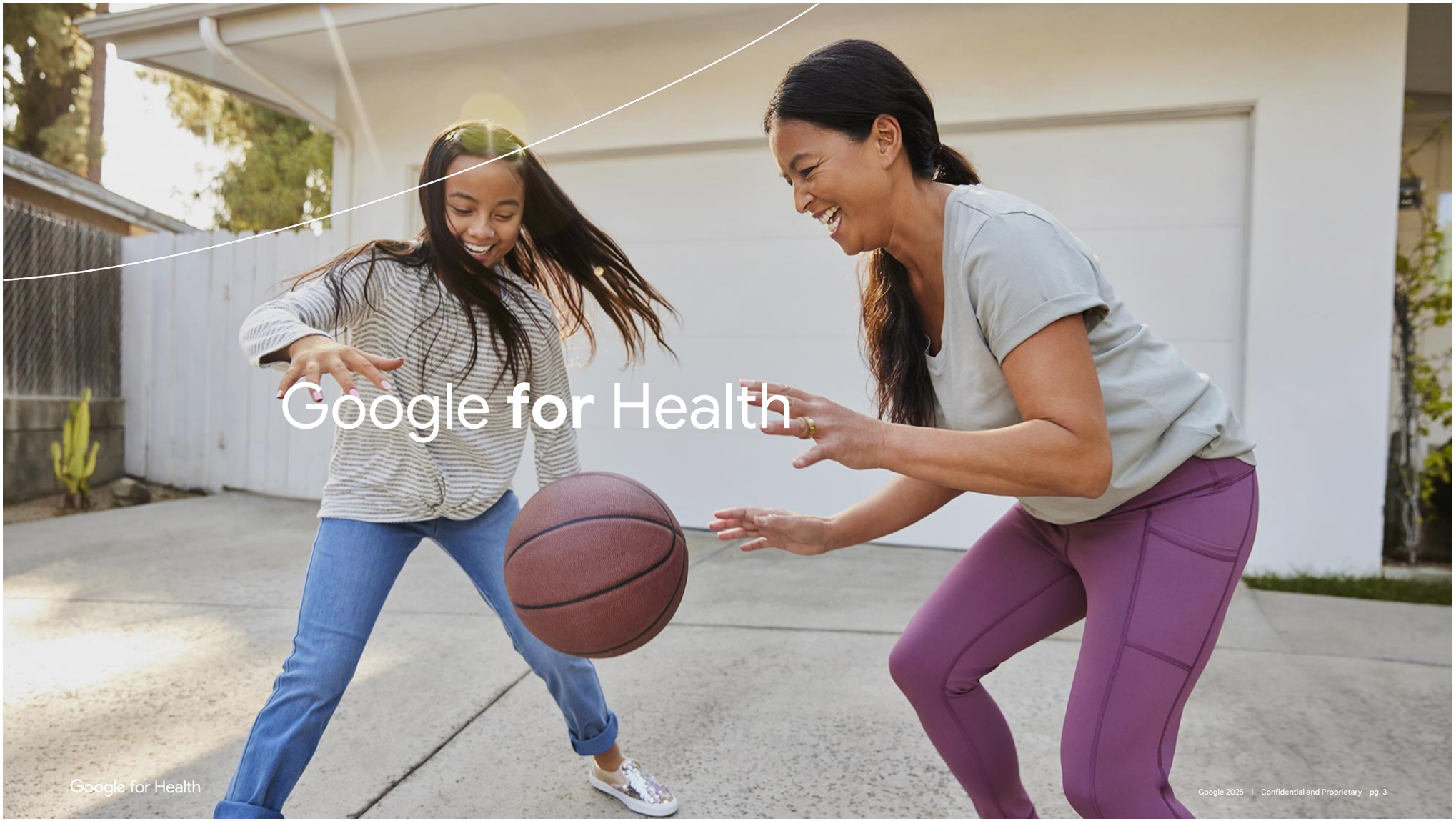
Breakthroughs, Trends, and the Road Ahead

Rob Brisk

June 2025

Agenda

1. Intro to Google for Health
2. Health GenAI: a story of breakthroughs
3. Key trends today
4. Future directions
5. Challenges
6. Q&A



Google **for** Health

At Google,
we're committed
to helping **everyone**,
everywhere, live a
longer, healthier life.

Google products each serve more than half a billion people and businesses.

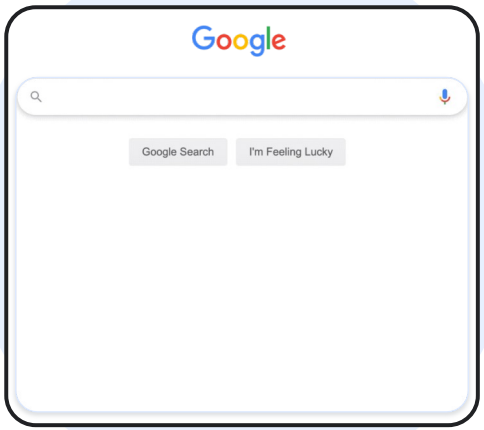
And the Google products above serve **over two billion users each.**

Source: Q1 2024 Alphabet earnings call

Google is uniquely positioned to help billions of people across the globe be healthier.

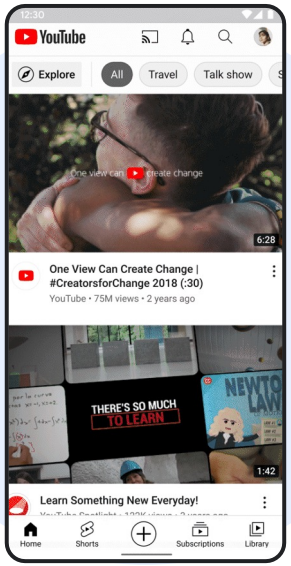
100s of millions

daily health searches



200+ billion

hours of health-related video views in 2023



Google searches, YouTube Health stats, Gen AI Startups, Android Users

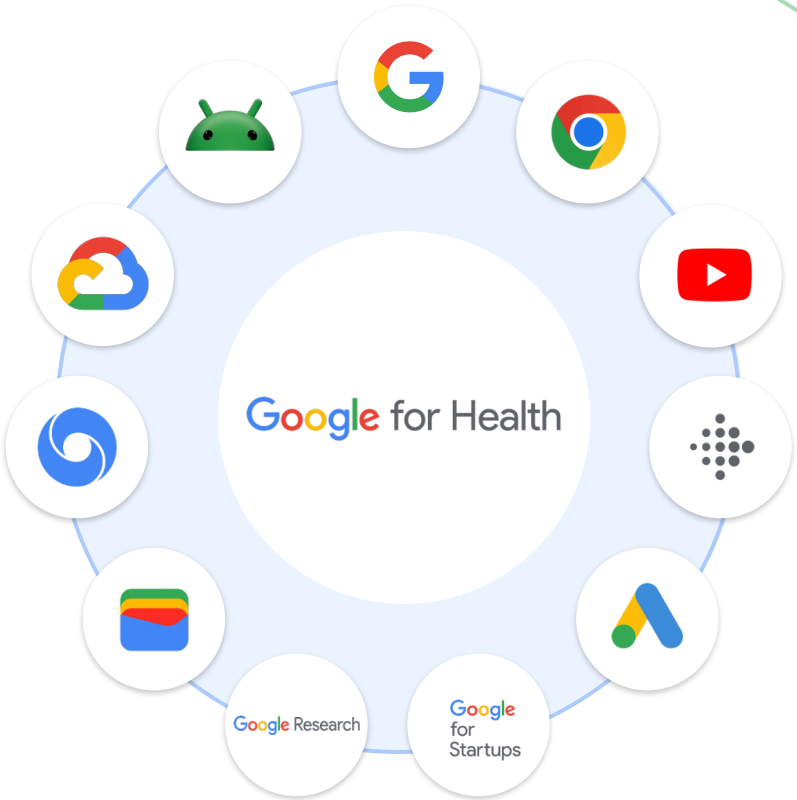
A unified approach to health across Google.

Interconnected products

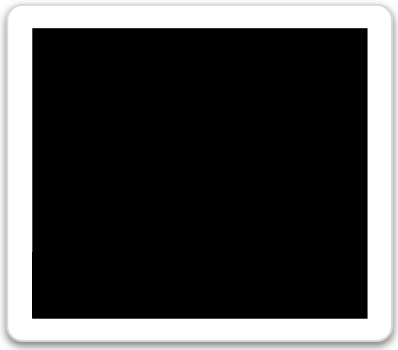
Come together to contribute to our efforts across health, ensuring a comprehensive and integrated approach to supporting users across their health journey.

Centralized expertise

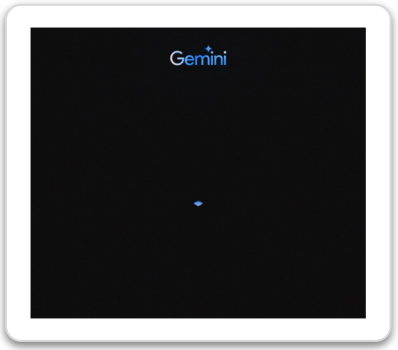
Ensures our products make the biggest difference possible, combining clinical know-how with a deep understanding of health.



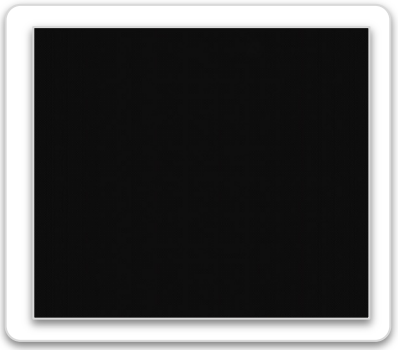
Gemini marks the next phase on our journey to making AI more helpful for everyone



State-of-the-art, natively multimodal reasoning capabilities



Highly optimized while preserving choice

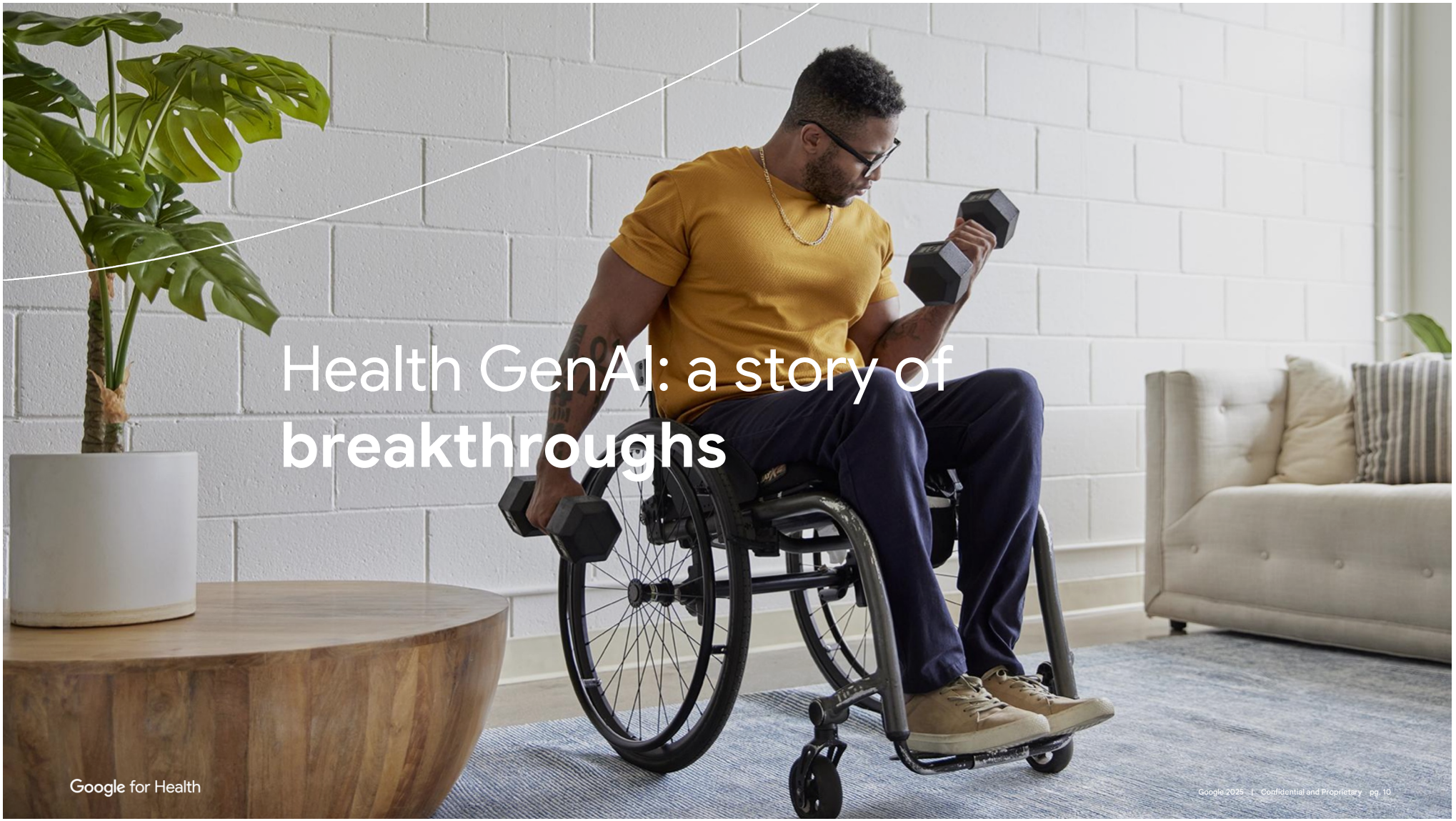


Built with responsibility and safety at the core

A new era for health and medicine

"As a doctor and Google's Chief Health Officer, I believe AI has the potential to transform the health of people on a planetary scale... if developed boldly and responsibly, AI stands to be a powerful force for improving outcomes for everyone, everywhere."

Dr. Karen DeSalvo, Chief Health Officer, Google


Health GenAI: a story of
breakthroughs
Google for Health

1. Learning to see

Going Deeper with Convolutions

Christian Szegedy[1], Wei Liu[2], Yangqing Jia[1], Pierre Sermanet[1], Scott Reed[3],
Dragomir Anguelov[1], Dumitru Erhan[1], Vincent Vanhoucke[1], Andrew Rabinovich[4]
[1]Google Inc. [2]University of North Carolina, Chapel Hill
[3]University of Michigan, Ann Arbor [4]Magic Leap Inc.

TensorFlow: A system for large-scale machine learning

Martín Abadi, Paul Barham, Jianmin Chen, Zhifeng Chen, Andy Davis, Jeffrey Dean,
Matthieu Devin, Sanjay Ghemawat, Geoffrey Irving, Michael Isard, Manjunath Kudlur,
Josh Levenberg, Rajat Monga, Sherry Moore, Derek G. Murray, Benoit Steiner, Paul Tucker,
Vijay Vasudevan, Pete Warden, Martin Wicke, Yuan Yu, and Xiaoqiang Zheng

JAMA | Original Investigation | INNOVATIONS IN HEALTH CARE DELIVERY

Development and Validation of a Deep Learning Algorithm for Detection of Diabetic Retinopathy in Retinal Fundus Photographs

Varun Gulshan, PhD; Lily Peng, MD, PhD; Marc Coram, PhD; Martin C. Stumpe, PhD; Derek Wu, BS; Arunachalam Narayanaswamy, PhD;
Subhashini Venugopalan, MS; Kasumi Widner, MS; Tom Madams, MEng; Jorge Cuadros, OD, PhD; Ramasamy Kim, OD, DNB;
Rajiv Raman, MS, DNB; Philip C. Nelson, BS; Jessica L. Mega, MD, MPH; Dale R. Webster, PhD

2. Thinking very big

Mastering the game of Go with deep neural networks and tree search

David Silver[1]*, Aja Huang[1]*, Chris J. Maddison[1], Arthur Guez[1], Laurent Sifre[1], George van den Driessche[1], Julian Schrittwieser[1], Ioannis Antonoglou[1], Veda Panneershelvam[1], Marc Lanctot[1], Sander Dieleman[1], Dominik Grewe[1], John Nham[2], Nal Kalchbrenner[1], Ilya Sutskever[2], Timothy Lillicrap[1], Madeleine Leach[1], Koray Kavukcuoglu[1], Thore Graepel[1] & Demis Hassabis[1]

Attention Is All You Need

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Jakob Uszkoreit* Google Research usz@google.com

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Aidan N. Gomez* † University of Toronto aidan@cs.toronto.edu

Łukasz Kaiser* Google Brain lukaszkaiser@google.com

Illia Polosukhin* ‡ illia.polosukhin@gmail.com

Towards Generalist Biomedical AI

Authors: Tao Tu, Ph.D. , Shekoofeh Azizi, Ph.D. , Danny Driess, M.S. , Mike Schaekermann, Ph.D. , Mohamed Amin, B.S. , Pi-Chuan Chang, Ph.D. , Andrew Carroll, Ph.D. , Charles Lau, M.B.A. , Ryutaro Tanno, Ph.D. , Ira Ktena, Ph.D. , Anil Palepu, M.S. , Basil Mustafa, M.S. , Aakanksha Chowdhery, Ph.D. , Yun Liu, Ph.D. , Simon Kornblith, Ph.D. , David Fleet, Ph.D. , Philip Mansfield, Ph.D. , Sushant Prakash, M.S. , Renee Wong, B.Sc. , Sunny Virmani, M.S. , Christopher Semturs, M.S. , S. Sara Mahdavi, Ph.D. , Bradley Green, Ph.D. , Ewa Dominowska, M.S. , Blaise Aguera y Arcas, M.S. , Joelle Barral, Ph.D. , Dale Webster, Ph.D. , Greg S. Corrado, Ph.D. , Yossi Matias, Ph.D. , Karan Singhal, M.S. , Pete Florence, Ph.D. , Alan Karthikesalingam, M.D., Ph.D. , and Vivek Natarajan, M.S. -25 Author Info & Affiliations

3. Thinking very small

Ab initio solution of the many-electron Schrödinger equation with deep neural networks

David Pfau*,†, James S. Spencer*, and Alexander G. D. G. Matthews

W. M. C. Foulkes

A universal SNP and small-indel variant caller using deep neural networks

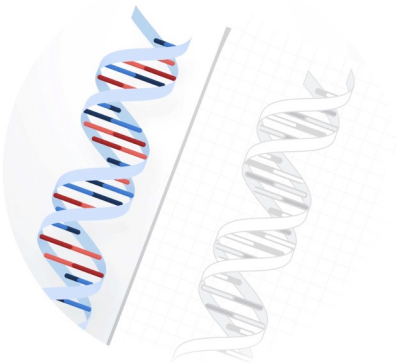
Ryan Poplin, Pi-Chuan Chang, David Alexander, Scott Schwartz, Thomas Colthurst, Alexander Ku, Dan Newburger, Jojo Dijamco, Nam Nguyen, Pegah T Afshar, Sam S Gross, Lizzie Dorfman, Cory Y McLean & Mark A DePristo

Highly accurate protein structure prediction with AlphaFold

John Jumper, Richard Evans, Alexander Pritzel, Tim Green, Michael Figurnov, Olaf Ronneberger, Kathryn Tunyasuvunakool, Russ Bates, Augustin Žídek, Anna Potapenko, Alex Bridgland, Clemens Meyer, Simon A. A. Kohl, Andrew J. Ballard, Andrew Cowie, Bernardino Romera-Paredes, Stanislav Nikolov, Rishub Jain, Jonas Adler, Trevor Back, Stig Petersen, David Reiman, Ellen Clancy, Michal Zielinski, Martin Steinegger, Michalina Pacholska, Tamas Berghammer, Sebastian Bodenstein, David Silver, Oriol Vinyals, Andrew W. Senior, Koray Kavukcuoglu, Pushmeet Kohli & Demis Hassabis

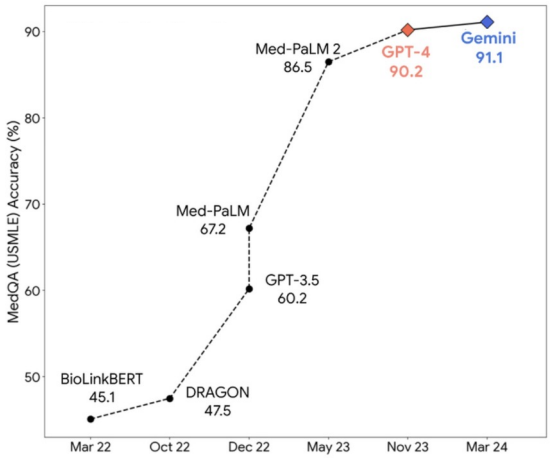

Health GenAI **today**
Google for Health

Ground-breaking biological research



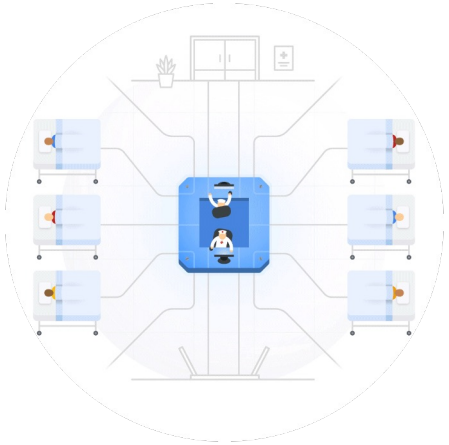
Google DeepMind's AI technology enabled the **2024 Nobel Prize** winning AlphaFold breakthrough

Expert medical knowledge and reasoning



Last year's GenAI models **saturated** the US medical licencing exams

Adoption **at scale** (consumer & clinical)

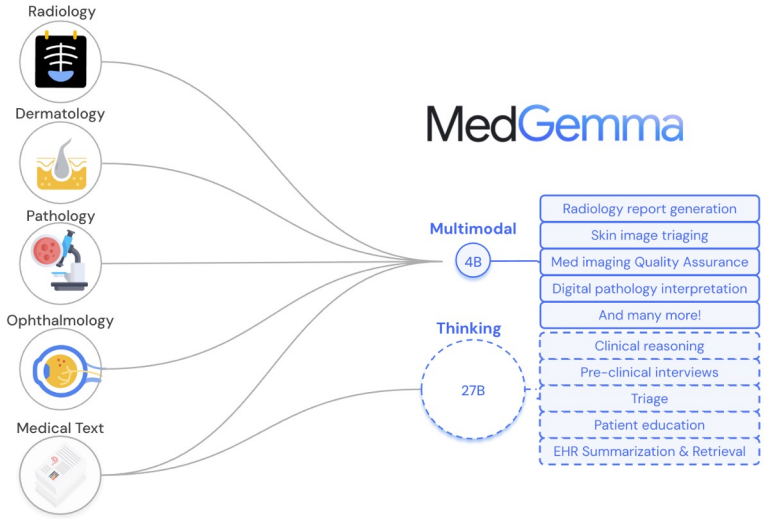


Health makes up a significant chunk of queries from > **1.5bn monthly users** of AI overviews

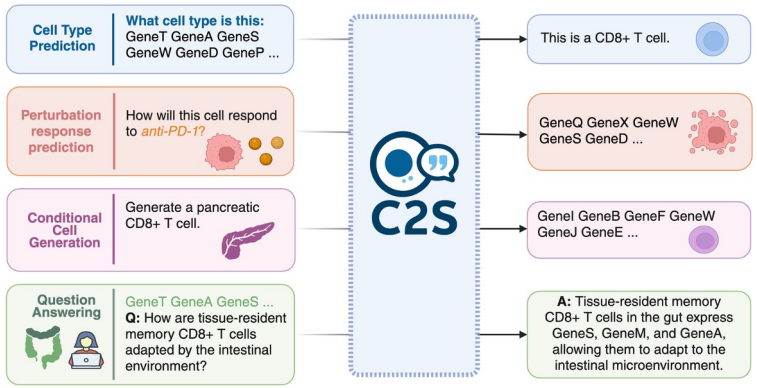
The 2024 AMA survey found **66% of physicians** were using AI, compared with 38% in 2024

Future directions

1. For research: Multi-scale integration



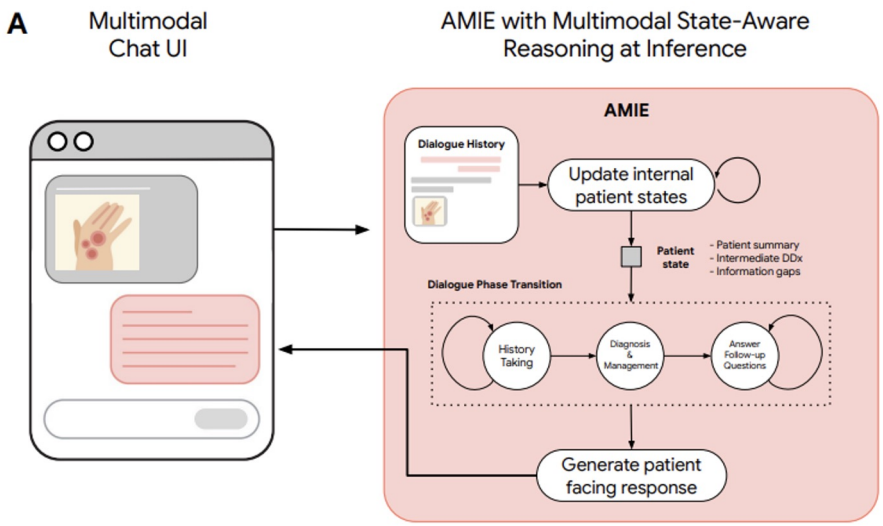
https://deepmind.google/models/gemma/medgemma/



Scaling Large Language Models for Next-Generation Single-Cell Analysis

Syed Asad Rizvi, Daniel Levine, Aakash Patel, Shiyang Zhang, Eric Wang, Sizhuang He, David Zhang, Cerise Tang, Zhuoyang Lyu, Rayyan Darji, Chang Li, Emily Sun, David Jeong, Lawrence Zhao, Jennifer Kwan, David Braun, Brian Hafler, Jeffrey Ishizuka, Rahul M. Dhodapkar, Hattie Chung, Shekoofeh Azizi, Bryan Perozzi, David van Dijk

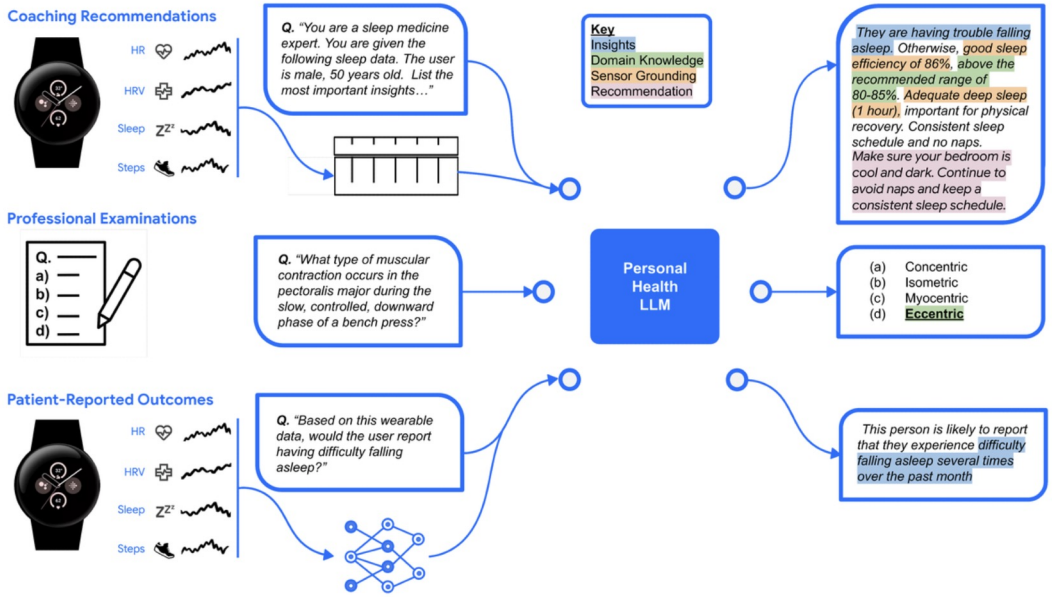
2. For practice: Intelligent clinical assistants



Advancing Conversational Diagnostic AI with Multimodal Reasoning

Khaled Saab[*,1], Jan Freyberg[*,2], Chunjong Park[*,1], Tim Strother[1], Yong Cheng[1], Wei-Hung Weng[1], David G.T. Barrett[1], David Stutz[1], Nenad Tomasev[1], Anil Palepu[2], Valentin Liévin[1], Yash Sharma[2], Roma Ruparel[2], Abdullah Ahmed[2], Elahe Vedadi[1], Kimberly Kanada[2], Cian Hughes[2], Yun Liu[2], Geoff Brown[1], Yang Gao[1], Sean Li[1], S. Sara Mahdavi[1], James Manyika[2], Katherine Chou[2], Yossi Matias[2], Avinatan Hassidim[1], Dale R. Webster[2], Pushmeet Kohli[1], S.M. Ali Eslami[1], Joëlle Barral[1], Adam Rodman[2], Vivek Natarajan[2], Mike Schaekermann[2], Tao Tu[1], Alan Karthikesalingam[†,2] and Ryutaro Tanno[†,1]
[*]Equal contributions, [†]Equal leadership, [1]Google DeepMind, [2]Google Research

3. For consumers: Personal health assistants

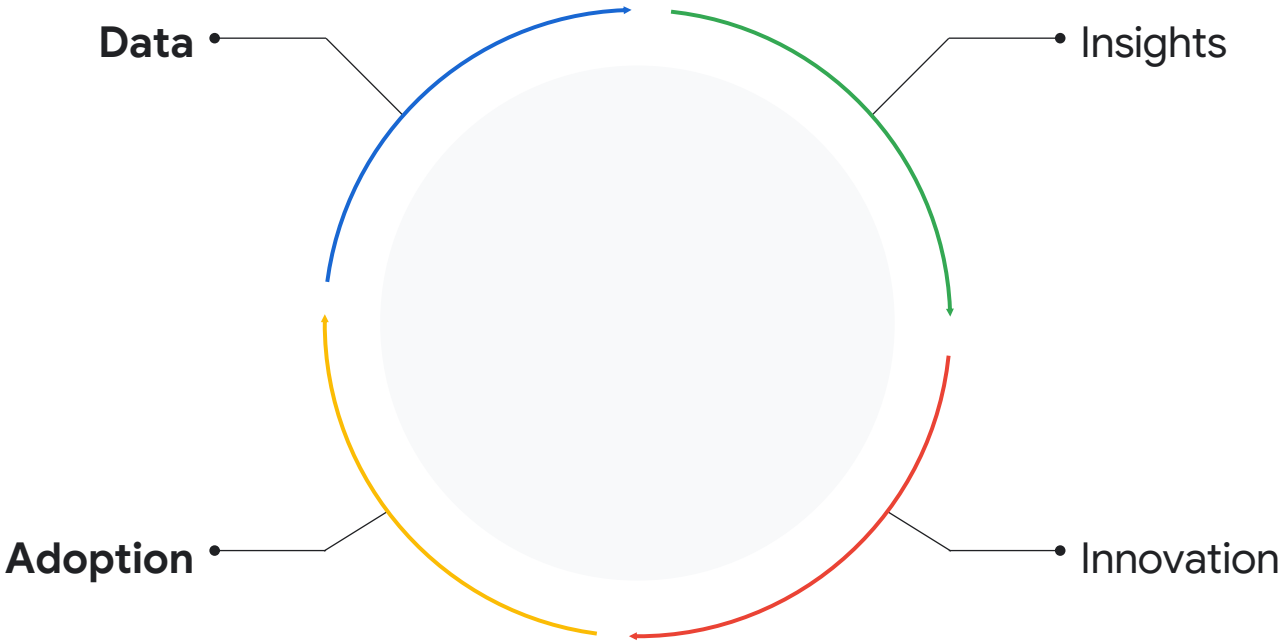


TOWARDS A PERSONAL HEALTH LARGE LANGUAGE MODEL

Justin Cosentino*, Anastasiya Belyaeva*§, Xin Liu*§, Nicholas A. Furlotte*, Zhun Yang‡, Chace Lee‡, Erik Schenck‡, Yojan Patel‡, Jian Cui‡, Logan Douglas Schneider‡, Robby Bryant , Ryan G. Gomes , Allen Jiang , Roy Lee , Yun Liu , Javier Perez , Jameson K. Rogers , Cathy Speed , Shyam Tailor , Megan Walker , Jeffrey Yu , Tim Althoff , Conor Heneghan , John Hernandez , Mark Malhotra , Leor Stern , Yossi Matias , Greg S. Corrado , Shwetak Patel , Shravya Shetty , Jiening Zhan , Shruthi Prabhakara , Daniel McDuff†§, and Cory Y. McLean†§

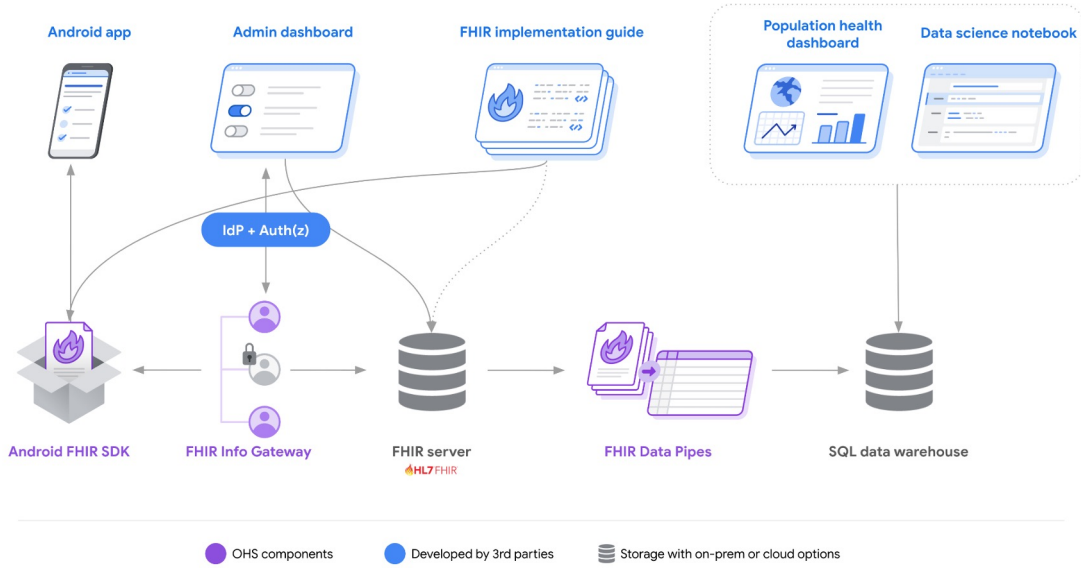

Challenges
Google for Health

The virtuous cycle of AI in health



The individual as the data owner

HealthConnect



Open Health Stack

NEJM AI

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The Regulation of Clinical Artificial Intelligence

Authors: David Blumenthal, M.D., M.P.P., and Bakul Patel, M.S.E.E., M.B.A. Author Info & Affiliations

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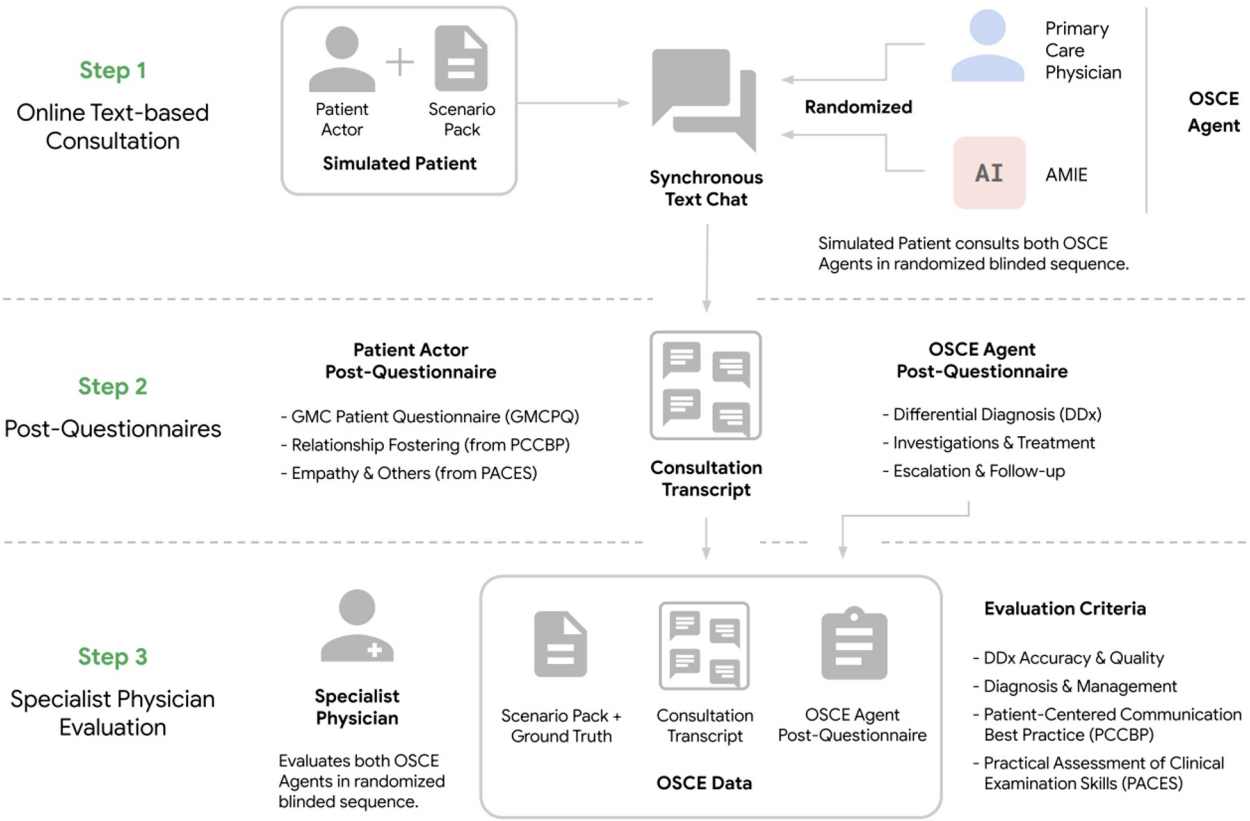
Abstract

The regulation of clinical artificial intelligence (AI) poses novel challenges for policy makers worldwide. Existing approaches to assuring the safety and efficacy of AI technologies may suffice for older forms of AI that preceded the development of generative artificial intelligence (GAI). However, the regulation of clinical GAI may require the development of new regulatory paradigms. This article reviews approaches in the United States to regulating pregenerative clinical AI and examines a novel possible approach to GAI regulation. The sooner policy makers in the United States and elsewhere tackle the challenges of regulating clinical AI, the sooner its benefits will be made available to people and patients with acceptable assurances of safety and efficacy.

Towards Conversational Diagnostic AI

Tao Tu[*,1], Anil Palepu[*,1], Mike Schaekermann[*,1],
Khaled Saab[1], Jan Freyberg[1], Ryutaro Tanno[2], Amy Wang[1], Brenna Li[1], Mohamed Amin[1],
Nenad Tomasev[2], Shekoofeh Azizi[2], Karan Singhal[1], Yong Cheng[2], Le Hou[1], Albert Webson[2],
Kavita Kulkarni[1], S. Sara Mahdavi[2], Christopher Semturs[1],
Juraj Gottweis[1], Joelle Barral[2], Katherine Chou[1], Greg S. Corrado[1], Yossi Matias[1],
Alan Karthikesalingam[†,1] and Vivek Natarajan[†,1]

[1]Google Research, [2]Google DeepMind




Thanks for listening!
Any questions?
Google for Health