

**Healthcare and Life Sciences**

# **Your quick- start guide to generative AI**

Google Cloud



# Boost innovation and productivity with gen AI for healthcare and life sciences.

## \$15–35B

**Gen AI potential value across the life sciences industry in North America<sup>1</sup>**

Generative AI is helping transform the healthcare and life sciences (HCLS) industry. Key markets are experiencing rapid transformation due to gen AI including biotechnology, pharmaceuticals, and MedTech and medical devices.

Tasks that HCLS companies see as bottlenecks — generating interoperable insights, personalizing experiences, driving sustainable operations, and enriching customer interactions — now have the potential to flow more seamlessly.

## 1,700

**DNA and life sciences-related patents generated in 2021 by the top 20 pharma and the top 20 medtech companies<sup>2</sup>**

Across domains, gen AI is helping create real value. It has the potential to help unlock insights from previously untapped data sources to find accurate information faster, enhance drug discovery, enhance patient care, and streamline internal processes.

1. McKinsey. (2023). [The economic potential of generative AI: The next productivity frontier.](#)

2. McKinsey. (2023). [Top ten observations from 2022 in life sciences digital and analytics.](#)

# Find out how your organization can realize value from gen AI in the following markets.

1 Biotechnology →

2 Pharmaceuticals →

3 MedTech and medical devices →

**Ready to go?**

# 01 Biotechnology

Biotech companies focus on cultivating relationships and building trust with care providers, pharmacists, insurers, and patients — all of which can be deepened using gen AI tools. For researchers, gen AI can improve each step of the discovery process — from lab experimentation to the prioritization of hypotheses. This could lead to the expediting of treatment development and personalized therapies, which could lead to better patient experiences.

For marketers, gen AI can help accelerate content approval, business development, and compliance checks, while also synthesizing complex data. It can also help enable brand leaders to refine campaign strategies in real time.

Early adopters of gen AI could stand to gain a competitive edge. From indication finding using advanced medical models to streamlining regulatory submissions with natural language processing, these companies are experiencing accelerated clinical development. You can, too.

**\$15-28 billion**

in operating profits from gen AI  
in life sciences<sup>3</sup>

**5-15%**

potential increase in marketing  
productivity with gen AI<sup>5</sup>

**30-45%**

projected improvement of current servicing  
costs in customer service with gen AI<sup>4</sup>

**20-45%**

of current annual spending on the function is  
the productivity of software engineering<sup>4</sup>

3. McKinsey. (2024). [Generative AI in the pharmaceutical industry: Moving from hype to reality.](#)

4. McKinsey. (2023). [The economic potential of generative AI: The next productivity frontier.](#)

5. McKinsey. (2023). [How generative AI can boost consumer marketing.](#)

## Key considerations

# Evaluate tech partners.

The future of gen AI for biotech is reliant on a holistic tech stack. Biotech companies can consider a comprehensive gen AI solution that allows them to easily deploy new use cases without having to stitch together point solutions.

Google's cohesive, integrated [gen AI platform](#) can cover the entire data value chain in one platform — giving you a 360 view of your business. For example, with [Vertex AI Search](#), you can build a Google-quality search app on your own data and embed a search bar in your web pages or app. Plus, rapid time to insights can free you from the risks of disparate vendors and competing agendas.

# Enhance your multimodal data foundation.

Gen AI helps leverage huge amounts of data across multiple modalities, including image, chemistry, natural language, and large molecule data. Think creatively about what sources of data your competitors do not have and use gen AI to generate more actionable insights based on your multimodal data.

# Prioritize gen AI use cases.

For research in biotech companies, Gen AI helps drive value in three key areas: speed, cost efficiency, and probability of success. Gen AI-based identification of scientific insights from patents, publications, web, and clinical trials can enhance all three of these areas.





## Educate employees for an evolving ecosystem.

Investing in your people will allow you to make the most of gen AI. Coach your employees around prompt generation, when to leverage AI tools, and how to use them safely in environments with patient data. Customer service agents can act as a ‘human-in-the-loop’ to provide expert guidance to customers on complex cases and prevent bias.

To plan for effective change management, communicate new responsibilities to your employees, update internal policies in line with changing regulations, and create a culture focused on the responsible use of gen AI.

## Adhere to changing regulations.

AI algorithms often require access to large quantities of patient data, and can use the data differently over time. To ensure confidentiality and data integrity, prioritize security measures like encryption, access control, and audit trails. It’s also important to ensure new quality checks on AI-led processes that were once human-led, such as drug discovery.

[Med-PaLM 2](#) helps you implement rigorous testing and deploy LLMs tailored for medical language.



## Strategies

# Personalize the experience.

From research to insights, gen AI can help you transform your value chain. In research, gen AI can help expedite the development of treatments and personalized therapies, accelerating the advancement of healthcare solutions.

In clinical operations, you can use gen AI to personalize communications such as emails, improving the overall experience.

**70%**

of business activities will potentially be automated by 2030<sup>6</sup>

# Drive sustainable and efficient operations.

Biotech companies can leverage gen AI to drive efficiency and improve sustainability by automating operations across the entire value chain. This could include screening candidate compounds *in silico*, limiting the *in vitro* and *in vivo* screenings, and auto-generating regulatory documents.



6. McKinsey. (2023). *The organization of the future: Enabled by gen AI, driven by people.*

## Strategies

# Enrich customer interactions.

Biotech companies can also leverage gen AI to improve customer service.

With enhanced insights on patient behavior, gen AI can also strengthen service conversions by prompting agents with suggested topics and questions, supporting employees in MSL and sales representative roles. Meanwhile, AI-powered chatbots can handle professional and patient inquiries more efficiently, increasing employee productivity and reducing operational costs.

# Enhance outcomes from clinical trials.

Gen AI can help companies assemble more diverse and representative clinical-trial populations. Additionally, the use of models that examine genetic

and phenotypic data alongside real-world data, can help researchers better understand why different subgroups of patients respond differently to the same treatments ultimately enhancing quality of personalized care.

Gen AI can be used to identify new biomarkers of diseases. These improvements are key to shorter, more efficient trials with a greater likelihood of success.







Ginkgo is developing new, state-of-the-art large language models (LLMs) using Google Cloud's Vertex AI platform, enhancing innovation in fields like drug discovery, agriculture, and biosecurity. They are making Google Cloud their primary cloud services provider, significantly increasing their cloud computing resources to position both Ginkgo and its customers favorably as cloud computing needs grow.

[Read the full story](#)

# 02 Pharmaceuticals

For pharma companies, Gen AI can accelerate the process of identifying compounds for possible new drugs, as well as speed up their development and approval. These advances could contribute to reducing the global burden of disease. Streamlining the drug discovery process means reducing the time and resources required for pre-clinical testing and drug development, possibly leading to substantial cost savings and better patient outcomes.

Gen AI can be helpful for researchers who are trying to speed up the research phase significantly. It also has the potential to help take the actionable insights gained from gen AI and use it to boost productivity and improve the way drugs are marketed once they're developed.

## **\$60-110 billion**

Expected annual value from gen AI across the pharmaceutical industry value chain (globally)<sup>3</sup>



## Key considerations

# Evaluate tech partners.

The future of gen AI for pharma organizations is reliant on a holistic tech stack. Pharma companies can consider a comprehensive gen AI solution that allows them to easily deploy new use cases without having to stitch together point solutions.

Google's cohesive, integrated [gen AI platform](#) can cover the entire data value chain in one platform — giving you a 360 view of your business. Plus, rapid time to insights can free you from the risks of disparate vendors and competing agendas.

# Prioritize gen AI use cases.

Pharma companies can look at gen AI use cases across the value chain to determine which can drive maximum value for the patients and life-sciences ecosystem.

This prioritization will differ from company to company. For example, accelerating speed of discovery and development or improving cost efficiency across the value chain might be more of a priority for your organization. Early estimates show the highest potential of gen AI in drug discovery, development, and commercialization.<sup>7</sup>

In drug discovery, gen AI can help accelerate speed to market, improve cost efficiency, and increase value capture. In clinical drug development, gen AI can help deliver proactive alerts — with data-driven tagging of risks and prescriptive recommendations of early interventions to support on-time trial delivery.

For commercialization, gen AI can help synthesize and curate brand and healthcare personnel (HCP) data, and generate real-time insights around interactions to ensure seamless coordination and optimization of sales efforts.

**20%**

increase in the possibility of success for trials with gen AI<sup>3</sup>

**10%**

reduction in trial cost and duration with gen AI<sup>3</sup>

7. McKinsey. (2024). [Generative AI in the pharmaceutical industry: Moving from hype to reality](#).

## Key considerations

# Enhance your multimodal data foundation.

Gen AI helps leverage huge amounts of data across multiple modalities like molecular structures, clinical operations, and patient data. Think creatively about what sources of data your competitors do not have and use gen AI to generate multimodal data to generate more actionable insights.

Combining traditional and gen AI in data management for pharma can potentially lead to:<sup>3</sup>

# 30%

in cost savings for data management

# 50%

reduction in time to database lock

# 70%

fewer manual queries

## Key considerations

# Balance the risk-reward trade-off.

Pharma companies are highly regulated, and handle highly confidential and sensitive information that directly impacts patient outcomes. As a result, it is essential they carefully assess the risks posed by gen AI. To address and mitigate risks, embed security and data privacy requirements across all tools to remain compliant with regulations and preserve HCP and patient trust and ensure that humans always make the final decisions. Ensure explainability in the gen AI outputs and that gen AI

outputs are factually grounded on enterprise data and adheres to brand guidelines, again using human oversight for precision and validation.

[Google's Chronicle](#) uses gen AI capabilities to help organizations defend against threats. Chronicle is a cloud-naive SecOps platform that uses natural language to search your data, iterate, and drill down, using gen AI to create summaries of findings, and, in the future, create detections and also create playbooks

# Educate employees for an evolving ecosystem.

Investing in the development of your workforce will enable you to maximize the benefits of gen AI. Train your employees on prompt generation techniques, educate them on when and how to utilize AI tools, and ensure they understand how to handle patient data securely. Customer service agents can play a crucial role as a 'human-in-the-loop' to offer expert assistance to customers in complex situations and prevent biases.

To successfully implement changes, it is important to effectively manage the transition. This involves clearly communicating new responsibilities to your employees, updating internal policies to align with evolving regulations, and fostering a culture that prioritizes the responsible and ethical use of generative AI.

## Strategies

# Personalize experiences from research to insights.

Patients and HCPs expect personalized interactions from medicine manufacturers. With gen AI, there is further potential to personalize trial engagements and insights.

Clinical operations managers could deliver trials faster and more efficiently with actionable insights and personalized engagement through gen AI. For example, gen AI can power personalized site engagement and can automatically draft personalized messaging to engage PIs and site coordinators, with high engagement based on tailored content

and timing. Also, an interactive gen AI-powered companion can help patients in clinical trials for personalized 24/7 support and monitoring of real-time outcome, with connection to the trial site care team.

In commercialization, sales representatives who use gen AI can more quickly create personalized engagement plans, for example, more personalized messaging, leveraging synthesized and curated brand data and HCP-specific data using gen AI. This could lead to a two or three-fold boost in engagement.<sup>3</sup>

**71%**

of consumers expect companies to deliver personalized interactions (including with HCPs)<sup>8</sup>

Using gen AI in customer enablement for pharmaceuticals can lead to:<sup>3</sup>

**10-15%**

improvement in the productivity and effectiveness of field teams

**1-2%**

in top line growth

8. McKinsey. (2023). [What is personalization?](#)

## Strategies

# Generate interoperable insights.

Gen AI can help integrate diverse and interconnected healthcare datasets to enable seamless communication and integration across different platforms and legacy systems. This helps pharma companies extract valuable insights from data that would have otherwise been untapped.

A gen AI-enabled regulatory intelligence engine in pharma can have a potential impact of:<sup>3</sup>

**30%**

faster responses

**50%**

fewer HAQ follow-ups

**35%**

increase in productivity with gen AI<sup>3</sup>



## Strategies

# Drive sustainable and efficient operations.

Automation is the key to sustainable and efficient operations. By automating operations across the value chain, leading pharma companies can enhance their productivity more than ever before.

Generative AI can help researchers more easily access, identify, and correlate large troves of research data for possible connections.

By removing barriers between systems and infrastructure, gen AI can reduce costs across the discovery process. Products like [Vertex AI Feature Store](#), built with BigQuery, can break down infrastructure silos and help you access disparate data sources faster.

Additional applications could include screening candidate compounds, analyzing trial performance insights, auto-generating trial documents and regulatory documents, synthesizing content for medical or commercial functions, and reporting on quality and deviations in manufacturing.



# Enrich customer interactions.

Marketers, field reps, and other customer-facing teams have huge amounts of information at their disposal. With gen AI, customer interactions, commercialization processes, and campaigns can be brought together to uncover unique, actionable insights.

Insight-driven campaigns can enable richer, more targeted conversations between field staff and care providers. And gen AI-powered chatbots can speed up the delivery of crucial information — quickly delivering accurate, personalized, and timely responses to patients inquiring about drug interactions, side effects, and dosage adjustments.





Chugai will leverage Google Cloud's AI technology to improve the success rate of drug development, significantly reduce the time and cost of the drug discovery process, and achieve overwhelming efficiency and innovation. Chugai's use of AI will enable the inference of more than 1000 protein structures per day. This integration with Google Cloud will drastically cut the research process to just months, shortening the time to efficiently create more drug candidates.

[Read the full story](#)

# 03 MedTech and medical devices

The MedTech and medical devices market is expanding — fueled by an aging population, a desire for personalized medicine, and an increase in chronic diseases. Despite growth, the industry remains riddled with challenges. Slow R&D, costly device development processes, manual data analysis, and limited personalization are acting as bottlenecks to true innovation.

Gen AI can help a range of teams across MedTech. For product development, gen AI can boost the hardware design process by analyzing scans and generating customized designs.

For sales and marketing, gen AI can automate document creation, personalized outreach campaigns, and promotional texts, while also simplifying customer support tasks by automating complaint evaluation and resolution.

For regulatory teams, gen AI's ability to analyze large volumes of data can help streamline and enhance quality management systems and documentation processes.



## Key consideration

# Evaluate tech partners.

MedTech companies can prioritize the adoption of platform-based solutions, such as single-provider gen AI platforms, over model-based solutions. This approach helps you to adapt to dynamic market conditions and accelerate development, while also ensuring flexibility and avoiding dependency on specific vendors.

Opting for a single-provider gen AI platform can be a powerful force-multiplier to drive broader impact, so you can respond to changing market conditions and build quicker.

# Develop a foundational infrastructure.

Investing in the right infrastructure is paramount to running gen AI models efficiently and avoiding data silos.

While ensuring the smooth integration of AI solutions with existing medical device systems is critical, choosing a scalable solution will enable you to grow your gen AI capabilities in the future.



## Key consideration

# Prioritize data that matters most.

Accessing and leveraging disparate data that's spread across different legacy systems is critical to unlocking the most value from your data and insights.

Gen AI can help you unlock internal data like electronic health records and medical devices, and external data — like genomic databases and research publications — to discover this value.

Remember, using high-quality, clean, and relevant data is the key to the adequate training and validation of gen AI models. Focus on working with data that can provide unique insights beyond what you already have.

# Focus on quick wins with a long-term strategy in mind.

Solutions that require lower upfront investment and can be implemented easily — while also delivering demonstrable value and quick ROI — can help you find momentum in the gen AI space.

Gen AI has the potential to improve patient experience and engagement in a meaningful way. Use gen AI to help personalize patient interactions including answering questions, scheduling appointments, and offering basic medical advice.

To enhance operational efficiency, use gen AI-powered image analysis to automate defect detection, improve product quality, and reduce waste.

# Adhere to changing regulations.

To safeguard the privacy and integrity of patient data, it is crucial to implement robust security measures when utilizing AI algorithms, as these algorithms often rely on extensive amounts of patient data and may evolve in their data usage over time. Prioritizing security measures such as encryption, access control, and audit trails is essential. Additionally, it is important to establish new quality checks for AI-driven processes, such as drug discovery, that were previously conducted by humans — to ensure accuracy and reliability.

## Key consideration

# Balance the risk-reward trade-off for responsible AI.


To prevent IP infringement and boost data privacy, train models on IP and write IP protections into contracts. Be aware of data privacy regulations, like keeping patient medical data on domestic servers.


For improved model accuracy, place guardrails on gen AI content, such as ensuring that content is reviewed by humans before being distributed. Gen AI should never be the final decision maker in a workflow.


Furthermore, gen AI models can perpetuate existing biases in healthcare data, requiring careful training and interpretability to ensure fair and equitable outcomes.


## Ensure talent and organizational readiness.

Here are some ways you can ensure your organization is AI ready:

 **Build the right team** by hiring AI specialists, domain experts, data and analytics experts, and project managers.

 **Establish a collaborative culture** to break down silos and foster shared understanding.

 **Plan for effective change management** by communicating new responsibilities to employees and updating internal policies in line with the changing regulatory landscape.

 **Invest in gen AI skills training** for staff to ensure the effective deployment of these new tools.

Vertex AI's [Explainable AI](#) helps MedTech companies mitigate bias and promote transparency.

## Strategies

# Personalize the experience.

Today, patients expect a personalized experience, and MedTech companies can leverage gen AI to help deliver. Gen AI can help you design and manufacture medical devices tailored to individual patient anatomy and physiological parameters to ensure optimal fit and efficacy.

Gen AI can also be used to predict individual patient responses to treatments and devices, optimizing trial designs and tailoring future therapies for more effective outcomes.

# Generate interoperable insights.

MedTech companies have volumes of data from multiple systems and platforms. If your data remains siloed, you'll struggle to extract its value. Leveraging gen AI can help you connect multiple datasets and sources to ensure that the insights you are getting are invaluable.



## Strategies

# Drive sustainable and efficient operations.

Boosting R&D is high on the priority list for MedTech companies. Gen AI can help you test and refine medical device designs virtually before physical prototypes are made. The outcome? Reduced material waste and accelerated development cycles.

Gen AI can also help streamline your supply chain and manufacturing operations by boosting demand forecasting and inventory management. And it can also help in the selection and design of sustainable material.

# Enrich customer and healthcare personnel interactions.

Gen AI has the ability to help transform customer interactions. Gen AI can proactively identify service and repair needs using unstructured customer feedback and device data, generating user instructions for customer service needs using natural language and addressing product questions and simple repairs (via ChatBot) using LLMs.

For HCPs, you can auto-generate content for engagement and brand messaging using large language and image models, as well as help answer HCP sales questions using customer service chatbots.

Leading MedTech companies are starting to integrate gen AI into their products and software, such as by leveraging voice prompts as well as applying AI capabilities for remote patient monitoring, detecting early warning signs, and providing personalized feedback and support.



HCA Healthcare is using generative AI and Google Cloud to redesign patient care. Using automation to support its healthcare workers and improve the efficiency of workflows, doctors and nurses can now spend more time with their patients and less time analyzing data and extracting insights.

[Watch the full story](#)



# Get started with gen AI for HCLS.

We've covered a number of considerations for adopting gen AI in your organization. Here are some key steps that you can prioritize, today:



**Align on vision** and commitment from the leadership team by prioritizing key domains based on impact and transformation feasibility as well as business and P&L implications.



**Assess foundational capabilities for gen AI** to make sure you have the right people, technology, and models in place.



**Create a roadmap by identifying pilot use cases** in prioritized domains and planning for scaled use cases.



**Plan for company-wide adoption** ensuring skill building and responsible AI practices are at the core.

# Time to take action with gen AI?

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When a new technology moves as fast as gen AI, it can be hard to keep up. Google Cloud helps you solve for all the considerations outlined in this guide.

Our gen AI tools are backed with frameworks, tools, and governance structures to help you hit the ground running.



Contact us to set up time to discuss how to get started on your gen AI journey.