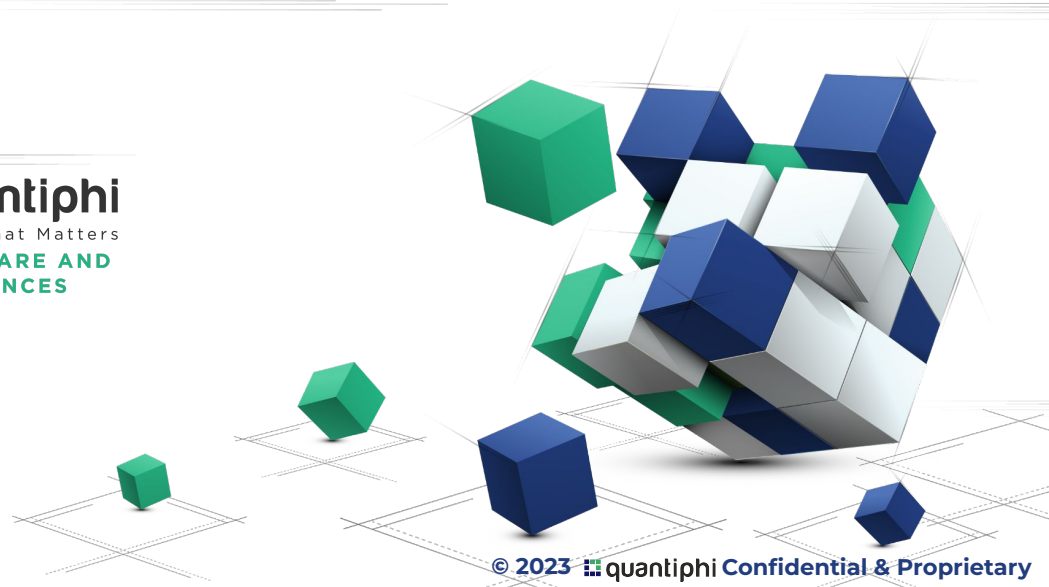




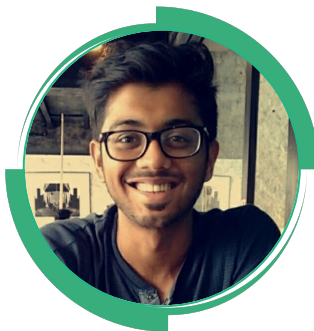
# Exploring the Role of Generative AI in Healthcare and Analyzing the Opportunities and Challenges Ahead



 **quantiphi**  
Solving What Matters  
**HEALTHCARE AND  
LIFE SCIENCES**



# Speakers



**Siddharth Kotwal**  
NVIDIA Practice Head,  
Quantiphi



**Anthony Costa**  
Global Lead, Healthcare &  
Lifesciences Alliances,  
NVIDIA



**Rahul Ramchandra Ganar**  
Advisory Lead - Healthcare  
& Life Sciences,  
Quantiphi



# AGENDA

1. Quantiphi Overview
2. Why Generative AI?
3. The business value of Generative AI for HCLS Enterprises
4. Quantiphi Experience in supporting HCLS Enterprises
5. How can Enterprises get started with their Generative AI Journey?



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# QUANTIPHI FACTSHEET

## Highlights



2013

Year Of Inception



3800+

Professionals



70+

F500 clients

~102%



3Yr Revenue CAGR



250+

R&D team

42%



Rev share of F500+G500



8

Patents filed



40%

Rev share of Top 10 clients

## Geographic Reach



## Industries



BFSI



Telecom



Manufacturing



Public Sector



CPG / Retail



M&E, Gaming



Healthcare & Lifesciences



Energy

## Expertise



Computer Vision

Digital Twins and Avatars



Conversational AI

Natural Language Processing



Document AI

Marketing Analytics



Custom AI

Data Modernization



Data Analytics

Infrastructure



## Awards/Recognition



Americas Service Delivery Partner, 2023  
2022



Breakthrough Partner, 2022  
Data Analytics, 2020  
Social Impact Partner, 2019  
Machine Learning, 2017 & 2018



ML/AI Partner of the Year, North America 2022  
Industry Partner of the Year, North America 2022  
Rising Star, 2021

## Partnerships



NVIDIA Elite Partner



NVIDIA Preferred Partner Embedded Edge



NVIDIA Preferred Partner Visualization



NVIDIA Solution Provider



Google Cloud Premier Partner



aws Premier Global Consulting Partner



ORACLE Cloud Infrastructure OPN Member

## Certifications



DEEP LEARNING INSTITUTE

400+ DLI Certified



1700+ GCP Certifications



800+ AWS Certifications



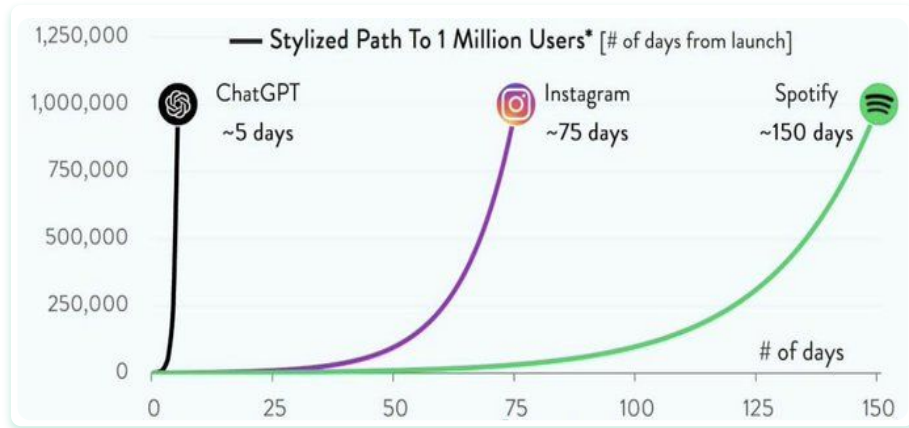
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## “The ‘iPhone Moment’ of Artificial Intelligence”

- Jensen Huang, CEO, NVIDIA



Healthcare Industry Could Be Generative AI’s Biggest Proving Ground

Generative AI could augment 40% of healthcare working hours

OpenAI’s new creation, ChatGPT could bring the first ray of the artificial intelligence revolution

OpenAI’s ChatGPT Breaks The Internet, Records 672 Mn Visits

“Greater reliance on generative AI solutions could be a major step forward for reducing cognitive fatigue and burnout among clinicians” says Dr. Lance Owens, Chief Medical Information Officer of UMHW

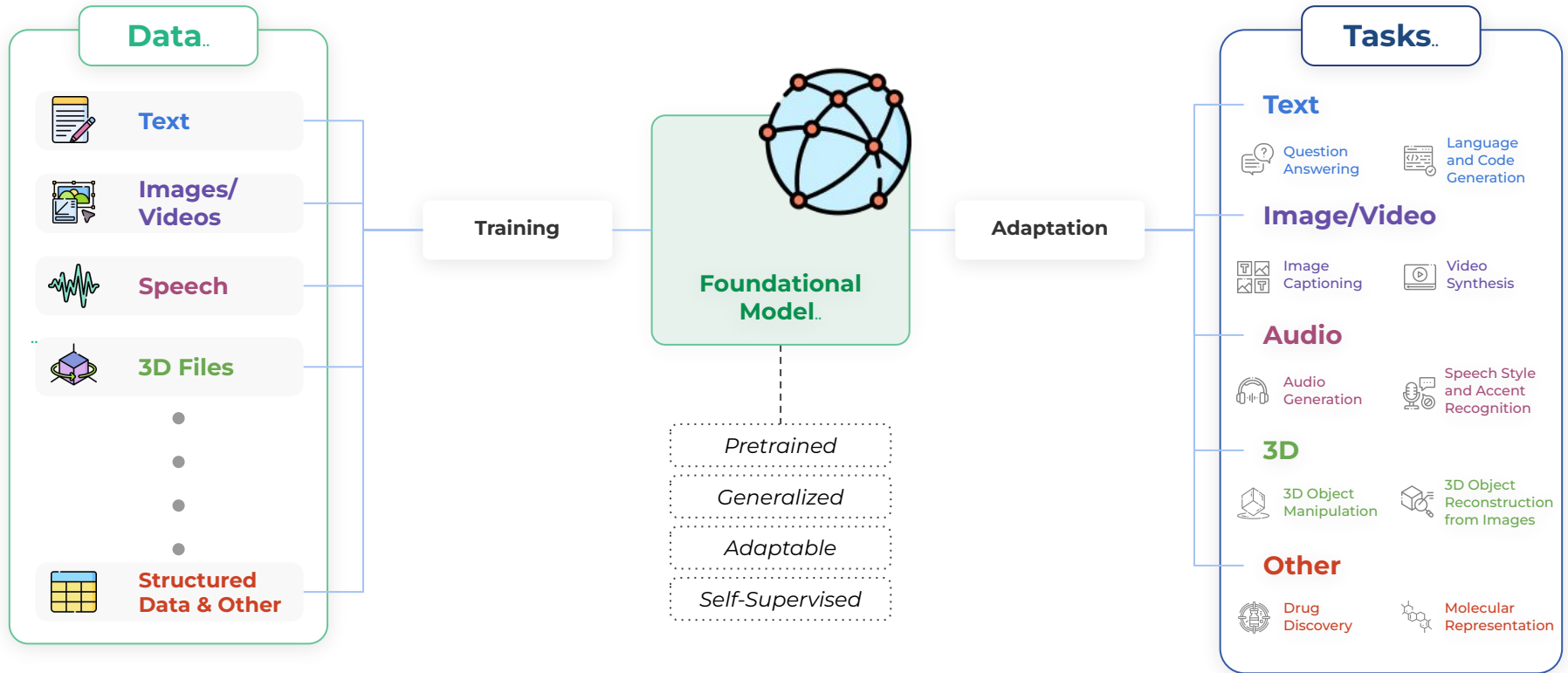
NVIDIA Brings Generative AI to World’s Enterprises With Cloud Services for Creating Large Language and Visual Models

OpenAI says new model GPT-4 is more creative and less likely to invent facts

**BioGPT: A game-changer for pharma and healthcare**

Andrew Ng, Founder of deeplearning.ai: “DALL-E 2 represents a major leap forward in generative AI”

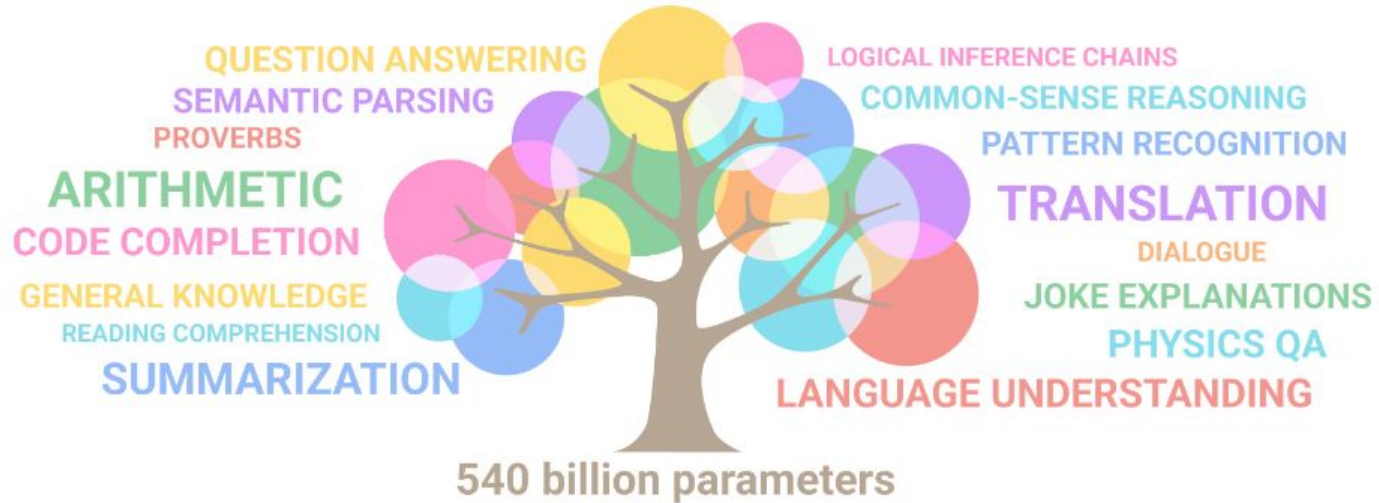
# FOUNDATION MODELS: POWERING GENERATIVE AI





# TEXT-TO-TEXT FOUNDATION MODELS: LARGE LANGUAGE MODELS (LLMs)

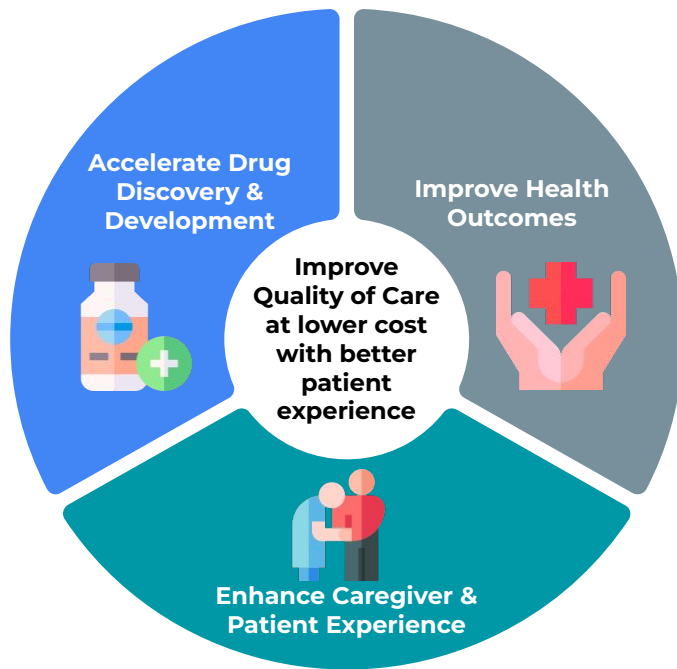
*LLMs can be used as a substrate in an AI system and fine-tuned inexpensively to perform a huge variety of tasks . . .*



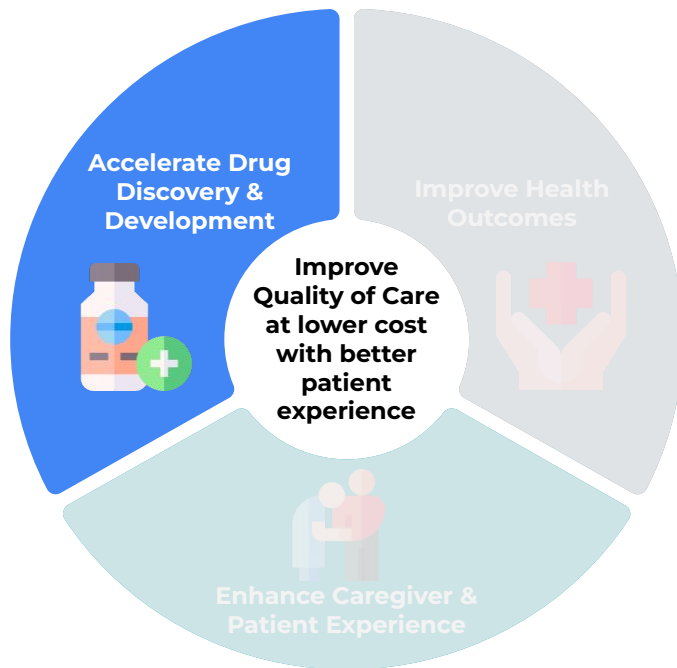
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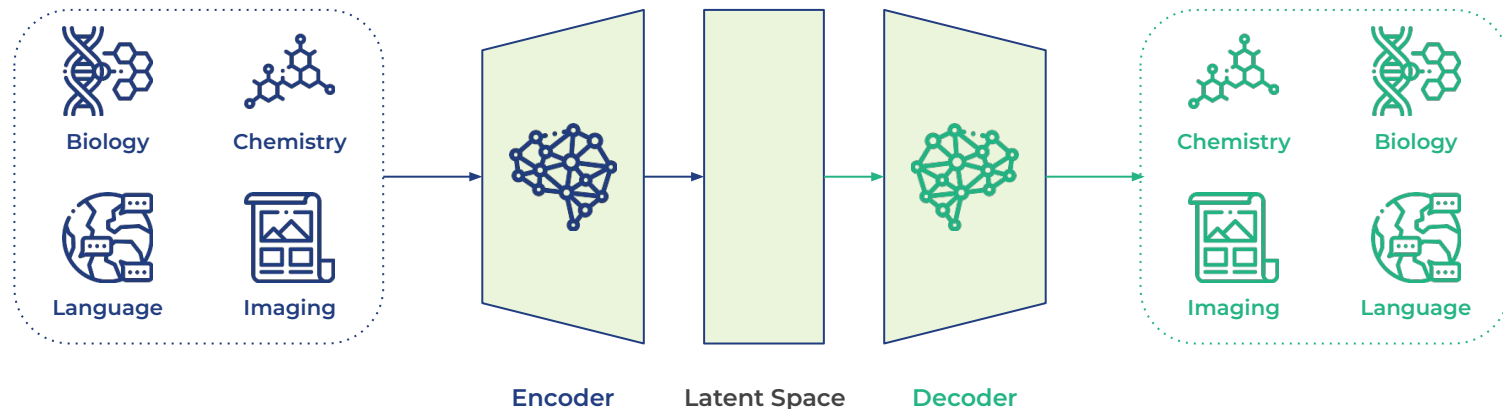
# HOW GENERATIVE AI IS TRANSFORMING CARE



# HOW GENERATIVE AI IS TRANSFORMING CARE



# ACCELERATE DRUG DISCOVERY AND DEVELOPMENT FROM IDENTIFICATION TO VIRTUAL SCREENING



Reaction Prediction  
(Forward & Retrosynthesis)



Property Prediction



Molecular Optimization



De Novo Design



Nucleotide Sequence  
Encoding



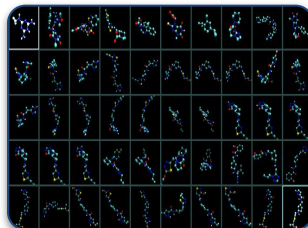
Protein Structure  
Analysis &  
Optimization

# NVIDIA BioNeMo

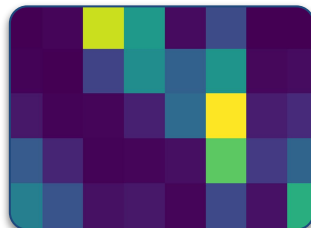
AI Tools, Frameworks, and Applications for Drug Discovery

$10^{60}$  Molecules

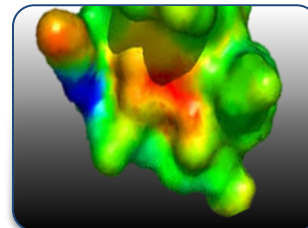
$10^{130}$  Antibodies



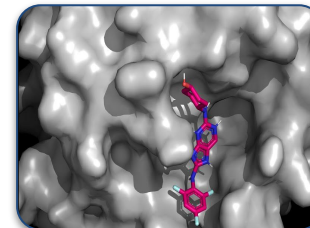
GENERATE



REPRESENT

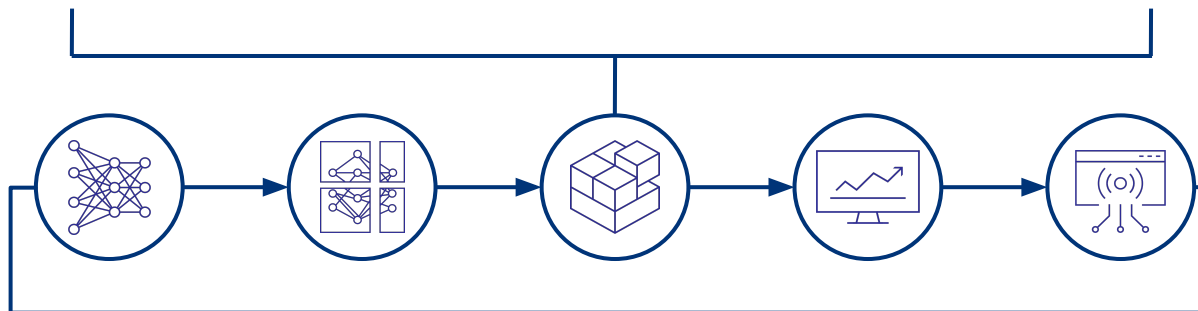


PREDICT



BIND

Interactions







# OPTIMIZING CLINICAL TRIALS WITH GENERATIVE AI

According to Insider Intelligence' AI in Drug Discovery and Development report, AI could curb drug discovery costs for companies by as much as 70%. Generative AI has huge potential in optimizing clinical trials from patient recruitment to trials designs and data analysis.

\$1.2 B Approx. average cost for patient recruitment globally  
6-7 years average time for clinical trials alone

**Phase 0 Trials**  
Lab research to human microdose studies, Involves exploratory, first-in-human (FIH) Trials.

**Phase 1 Trials**  
Pharmacokinetics, Gain evidence in support for therapeutic value

**Phase 2 Trials**  
Small-scale trials to assess efficacy & dosage, Long term toxicology studies

**Phase 3 Trials**  
Large Scale Controlled Clinical Trials, Comparison with other treatments

**Phase 4 Trials**  
Review by regulatory agencies, Pharmacovigilance studies



## Generative AI Touchpoints

Faster Recruitment

Streamline enrollment

Adhere to regulatory review compliances

**Clinical Trial Design**

Identifying potential patient cohorts demographic or clinical characteristics, analyzing previous trial data, and proposing optimized study designs

**Clinical Trials Matching Chatbot**

Clinical Trial Matching chatbot for volunteers to find and enroll for relevant clinical trials that match their preferences, medical history, and other criteria.

**Clinical Trials Summarization**

Generate summary of the key findings from a clinical trial report, including the study design, participant characteristics and outcomes

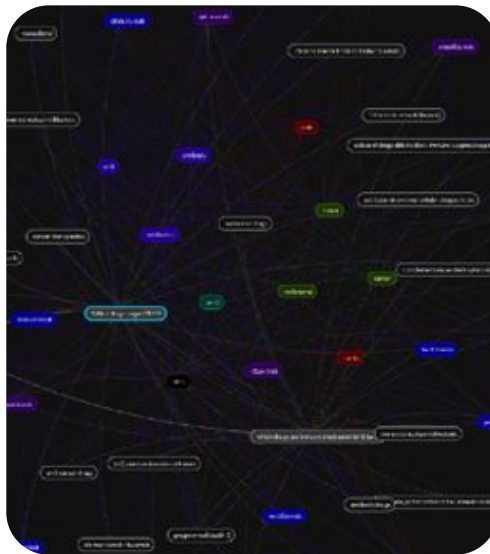
# NON-EXHAUSTIVE DOMAINS FOR HEALTHCARE LLMS

Each has challenges in factuality, bias and toxicity reduction, mitigating hallucinations, and grounding/explainability



## Healthcare Chatbots

Patient, Physician-Facing  
Payers, Hospital Systems, Healthcare LLM ISVs



## Reasoning Tools

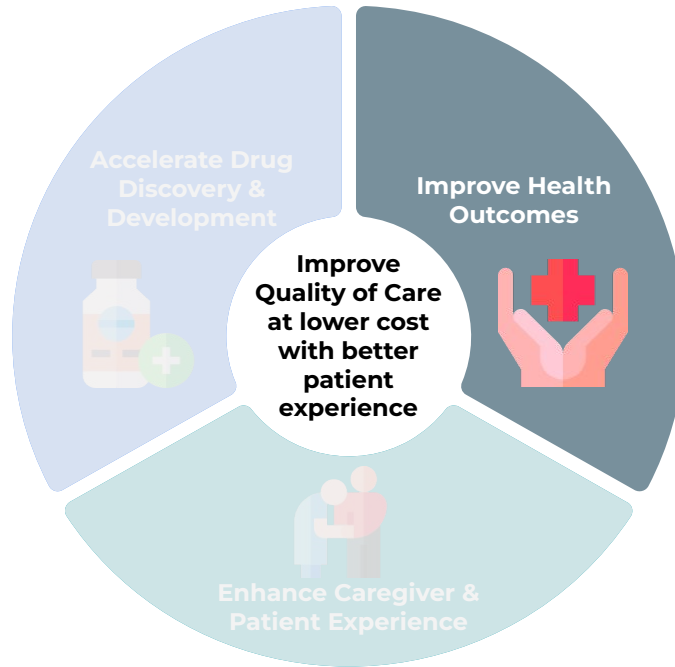
Reason Over Proprietary Data, Discovery Applications  
Pharma, CROs, Data Brokers, Payers



## Operational Assistance

Documentation Generation, Summarization, Coding,  
Automation

# HOW GENERATIVE AI IS TRANSFORMING CARE



# IMPROVE HEALTH OUTCOMES WITH LARGE LANGUAGE MODELS



**LLM Powered Virtual Nurse**

**LLM Powered Clinical Decision Support**

**LLM Powered Health Coach for Patient Support**

**Patient Access**

**Disease detection based on pattern analysis**

**Personalized treatments based on patient data analytics**

**Behavioral Intervention & Health Support**

**Rehabilitation Support**

**Symptom Assessment & Triage**

**Clinical Notes Summarization (Automated Notes Summarization)**

**Disease progression analysis**

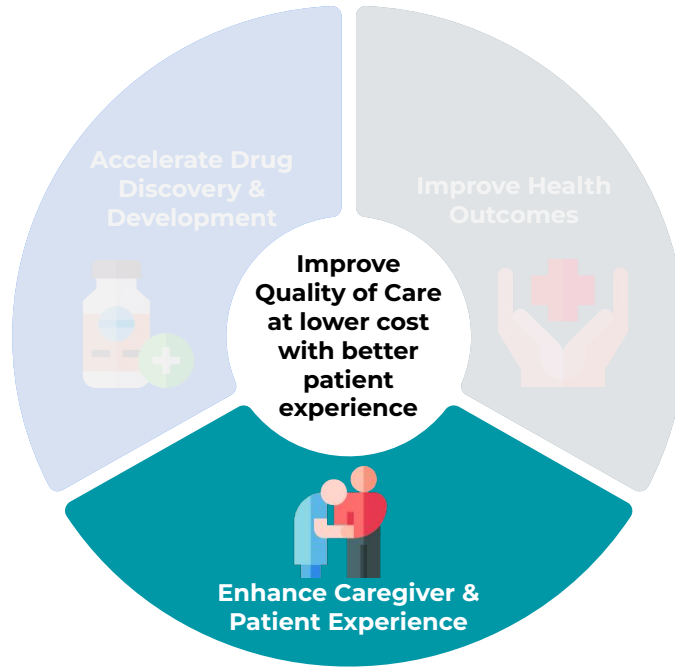
**Personalized Nutrition Planner and Wellness Recommendations**

**Digital Patient Intake**

**Intuitive Insights & Intelligence**

**Chronic Disease Management**

# HOW GENERATIVE AI IS TRANSFORMING CARE



# ENHANCE CAREGIVER & PATIENT EXPERIENCE WITH LLM POWERED VIRTUAL ASSISTANTS



Caregiver Experience

Patient Experience



## Solution Benefits



**Increased Operational Efficiency**



**24\*7 Support**



**Emotion-driven assistance**



**Information Retrieval Powered by LLMs**





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# INTRODUCING LLMS FOR HEALTHCARE AND LIFESCIENCES



Quantiphi is helping organizations quickly onboard generative AI capabilities and apply them to domain-specific tasks



<b>Focus on Patient 360 support</b>	<b>Enable new levels of precision, insight, and outcomes</b>
<b>Facilitate continuous patient care</b>	<b>Empower Healthcare professionals</b>



## LIFE SCIENCE

### Drug Discovery

Scientific information search

### Clinical Trials

Trials design, protocols writing, patient enrollment, study report

### Pharmacovigilance

Detection of AE from literatures

### Manufacturing

Outer specification identification

### Regulatory

Submission and Publishing quality checks



## PROVIDER

### Knowledge Extractions from EHRs

### Medical Research Assistance

### Patient Records Management

### Medical Literature Summarization

### Clinical pathways based treatment



## PAYER

### Complaints and grievances management

### Optimised benefits designs

### Eligibility checking and onboarding

### Streamline the claims process



## Customer Overview & Challenges

- One of the largest global life sciences organization based out of USA focusing on cardiology, Oncology, among other therapies.
- Protocol is a soul of any clinical trial. Customer was looking for “Authoring & Recommendation Solution” for Study Protocols that will enable users to search through external and internal repositories more quickly and efficiently

## Key Customer Challenges

- **Innovative Approach to Automation-** AI driven organization driving innovation using historical information enabling data driven recommendations, deep insights leading new breakthrough medicines
- **Effort Optimization-** Leverage Automation, ML and AI to minimize the effort to extract and upload data from clinical documents.
- There is **no uniform source** available for researchers to obtain the data.
- **Unlocking the business value** from the clinical information which is stored across structured and unstructured sources.

## Quantiphi Solution

### Solution Proposition:

- Semantic Search & Content Recommendation based on query from External Documents (Clinicaltrials.gov+PubMed) and also from Internal Documents
- Content Recommendation from relevant and historical protocols searched and processed to write protocol documents.
- Comprehensive, Quality, Compliant Protocol Supported by LLMs/ Generative AI

### Implementation & Flow:

Fine-tuned to follow natural language instructions and is suitable for a variety of language tasks, such as: Classification, Sentiment Analysis, Entity extraction, Extractive Question Answering, Summarization, Re-writing text in a different style etc

### Tools & Methods



## Engagement Highlights



Reduction in amendments in protocols to 60%



Yearly \$80M Saving on amendments



Reduce protocol development time by 40%



Approx. 40-50% reduction in operating cost for assimilating the clinical information

## Results

- Innovative approach to assimilate information from Clinicaltrials.gov, PubMed, and internal clinical database with significant time saving
- Integrate data from multiple systems managed by multiple stakeholders
- Standard access to data, making medical writers and data scientists to receive required recommendations instantly
- Easily available high quality data
- Significant reduction in time for protocol writing for a study in scope



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# BOOK A GENERATIVE AI WORKSHOP WITH QUANTIPHI + NVIDIA!



## Executive Briefing

Gain a comprehensive understanding of generative AI, its applications, and its potential impact on businesses. Explore case studies, and discuss how to leverage generative AI for their organizations.

2 Hours



## Use Case Discovery & Prototyping

Focus on identifying and discussing client-specific use cases for generative AI. Gain hands-on experience in designing, implementing, and testing a generative AI MVM on NVIDIA AI Enterprise stack

1 Day



## Hackathon Generative AI with NVAIE and DGX Cloud

Programmers, designers, and the extended engineering teams come together to collaborate, brainstorm, and build a functional Proof of Concept with deployment using Triton Inference Server

3 Days



## Define Path to Production Build your GenAI Pilot with NVIDIA

Design and develop a path to production for Generative AI systems tailored to function and integrate with existing enterprise processes

1 Day

# Reach Out To Us

 NVIDIA |  quantiphi



 SCAN ME

Are you here to solve a similar challenge for your organization?

Get in touch with our experts!

[nvidia.practice@quantiphi.com](mailto:nvidia.practice@quantiphi.com)





# Thank You

Explore More

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