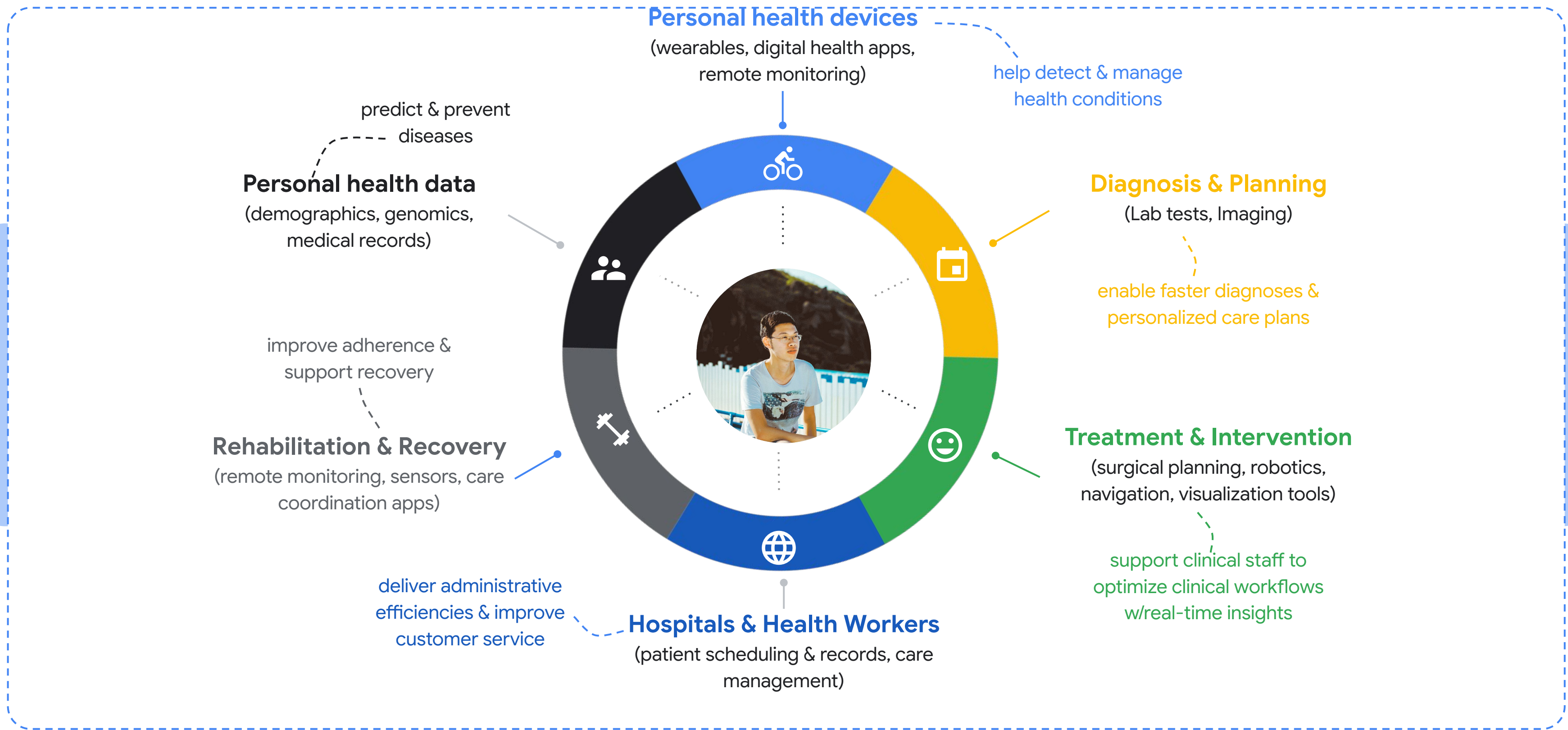# Google for Health

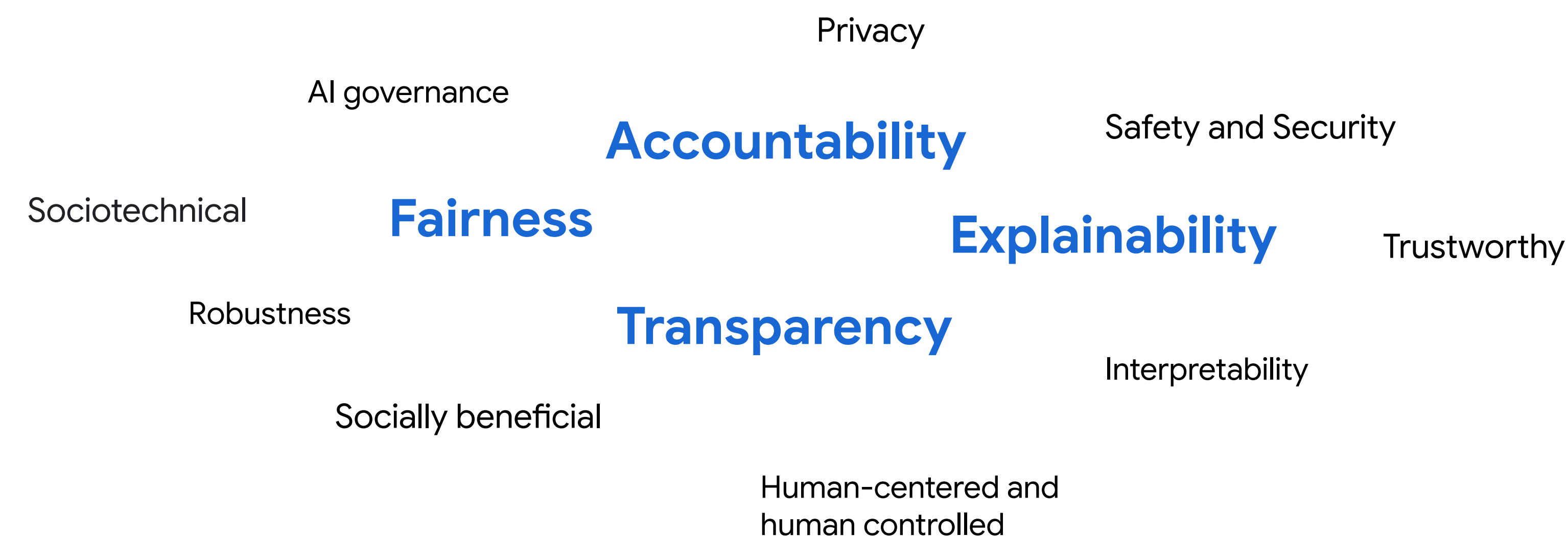# Approaches for AI/GenAI in Healthcare

Bakul Patel
Sr. Director - Global Digital Health Strategy

The AI Revolution in Healthcare

Personal health devices
(wearables, digital health apps, remote monitoring)

help detect & manage health conditions

predict & prevent diseases

Personal health data
(demographics, genomics, medical records)

Diagnosis & Planning
(Lab tests, Imaging)

enable faster diagnoses & personalized care plans

improve adherence & support recovery

Rehabilitation & Recovery
(remote monitoring, sensors, care coordination apps)

Treatment & Intervention
(surgical planning, robotics, navigation, visualization tools)

support clinical staff to optimize clinical workflows w/real-time insights

deliver administrative efficiencies & improve customer service

Hospitals & Health Workers
(patient scheduling & records, care management)

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Responsible AI is

Privacy

AI governance

Accountability

Safety and Security

Sociotechnical

Fairness

Explainability

Trustworthy

Robustness

Transparency

Interpretability

Socially beneficial

Human-centered and human controlled

Google for Health

Google's Approach: Responsible AI in Practice

Govern
- Principles and policies
- Decision Making
- Transparency and Accountability

Measure
- Rigorous Evaluation
- Multi-layered Red Teaming
- AI-assisted auto-raters

Map
- Risk Identification
- External Expertise
- Risk Taxonomy

Manage
- Risk Mitigation
- Phased launches
- User Understanding
- Exosystem Enablement

Map
Identify current, emerging, and potential future AI risks

Measure
Evaluate and monitor identified risks and enhance testing methods

Govern
A proactive governance approach to responsible AI development and deployment

Manage
Establish and implement relevant and effective mitigations

Google's approach: https://ai.google/static/documents/ai-responsibility-update-published-february-2025.pdf

US FDA Approach to AI Regulation

- Treating **medical purpose AI/ML** models as medical devices

- **PCCP**: Allowing for algorithms to be updated while maintaining safety and effectiveness

- **TPLC + GMLP**: Emphasizing quality and consistency in development

- **Public list** of AI-enabled medical devices, and PCCP approved devices

Software as a Medical Device (SaMD)
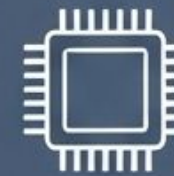
Predetermined Change Control Plans

Good Machine Learning Practice (GMLP)

Transparency

Global Efforts in AI Governance

Mainly Focused on Traditional ML

EU AI Act 🇪🇺

- Risk-Based Framework
- Pre-market Compliance
- Broad Scope including General Purpose AI System
- Penalties

SK AI Bill 🇰🇷

- Balance of Promotion and Regulation
- Targeting "High-Impact" AI
- Transparency and Accountability

US FDA

- Focus on Software as a Medical Device (SaMD)
- Total Product Lifecycle (TPLC) Approach
- Emphasis on Safety, Transparency, and Bias

JP AI Promotion Bill 🇯🇵

- Innovation-First Approach
- Voluntary Guidelines
- International Leadership

World Health Organization (WHO): "Global Initiative on AI for Health" ⚕

Ethics and Governance   **Standards and Evidence**   **Global Collaboration**

Google for Health

Collaborative Efforts for AI Governance

- Developing standards for **trustworthiness in health AI**
- Focus on **safe and reliable technology**

- Developing an **AI Code of Conduct (AICC)** for ethical AI in medicine
- Establishing **responsible development guidelines**

- Advocating for a **risk-based, sectoral approach.**
- **Tailoring regulations to specific AI applications and risks**

Common Themes Observed

DATA GOVERNANCE

High-quality, diverse, and unbiased data is critical for safe and effective AI in healthcare.
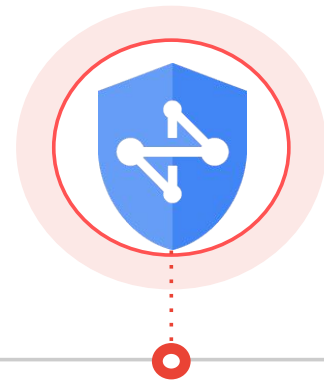
RESPONSIBLE AI TRANSPARENCY & EXPLAINABILITY

AI algorithms to be **transparent and explainable** for users and regulators as well
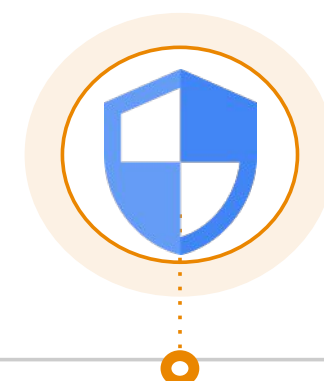
SECURITY & PRIVACY

Robust Cybersecurity and compliance to be in place such as ISO 27001, 27017/18, HIPAA, **Japan's APPI** etc.

CONTINUOUS MONITORING

AI models require **continuous post deployment performance monitoring** and regular updates for new data or clinical practice changes.

Use of General Purpose Models in Applications

	General Purpose Gen AI (GPAI)	**GenAI Based Applications**
Data Governance	**Broad, diverse** training data, difficult to define unified governance	**Governance of Application** specific data
Transparency	**"black box"**; difficult to explain outputs	**Can be more explainable** for the specific use case
Security & Privacy	**Overall model security** including cloud technologies and certificates	Client level security controls + rely on GPAI
Monitoring	**Overall model performance** against global benchmarks (e.g. MedQA)	Monitor for application specific **Model drift** in the real world

Gen AI Based Applications

Application level control incorporating General purpose models (multimodal, agentic)

API layer

Security / Privacy Layer

General Purpose Gen AI

Security / Layer

Gen AI / Foundation Models (e.g. Google Gemini, MedLM etc.)

AI Model Cards, Gen AI Evaluation
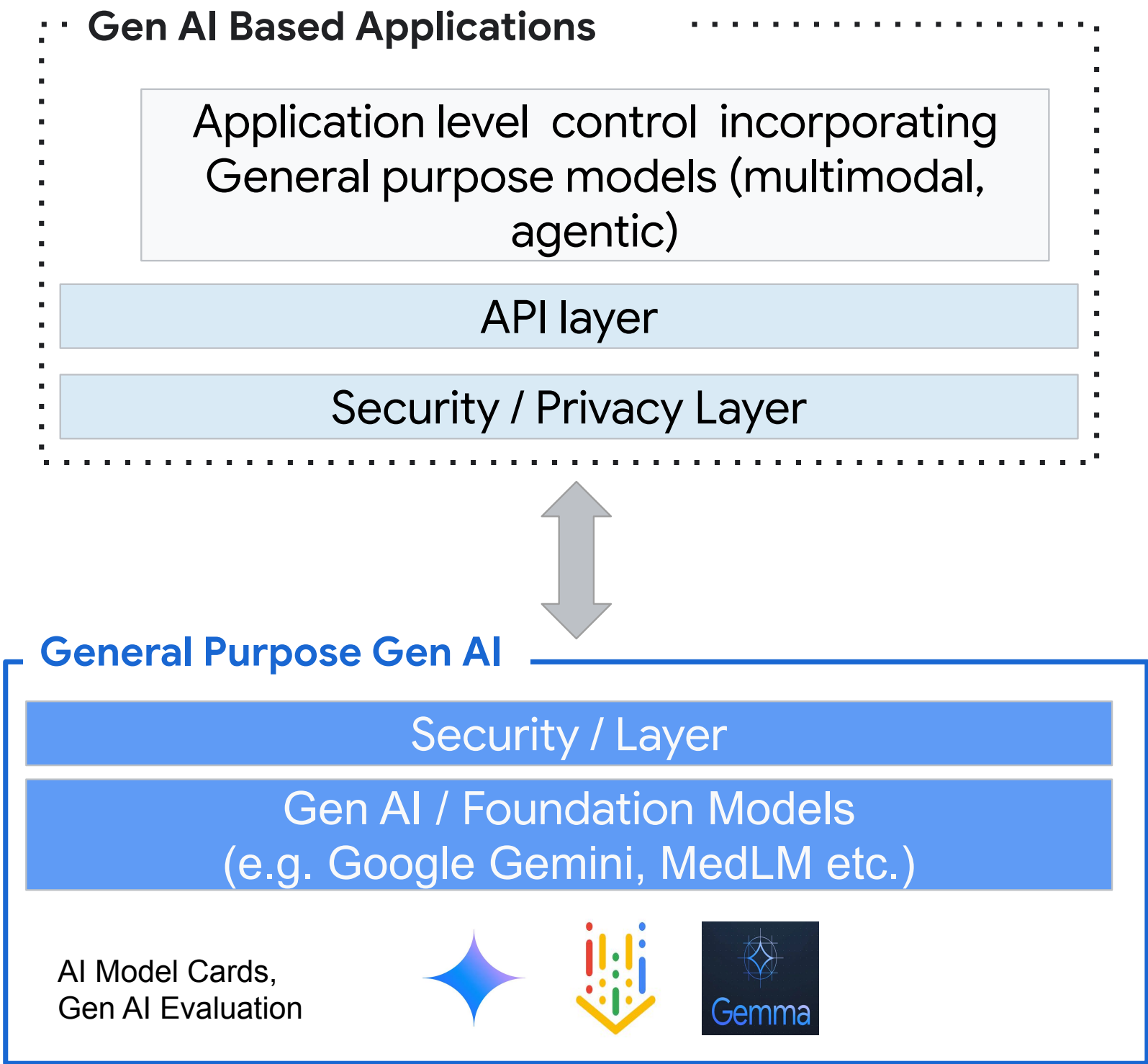
Gemma

AI Innovations - Open Weight Models

Radiology

Dermatology

Digital Pathology

Ophthalmology

Medical Text

MedGemma

Multimodal

4B

- Radiology report generation
- Skin image triaging
- Diabetic retinopathy assessment
- Digital pathology interpretation
- Med imaging quality assurance

Thinking

27B

- Clinical reasoning
- Pre-clinical interviews
- Triage
- Patient education
- EHR summarization and retrieval

Model cards for transparency

- Information about how the model was developed
- Datasets used for training and evaluation
- Performance results
- An intended use statement
- Known limitations

Google for Health

MedGemma's baseline performance on clinical knowledge and reasoning is similar to that of much larger models (MedQA benchmark)

Y-axis: MedQA Score (0.2 to 1.0)
X-axis: Blended Price ($/M tokens) [Log Scale] (0.1, 1.0, 10.0)

Data points:
- o3
- Gemini-2.5-Pro
- DeepSeek-R1
- MedGemma-27B
- Gemini-2.0-Flash
- Gemini-2.0-Pro
- MedLlama3-8B-V20
- GPT-4o
- Gemma-3-27B
- MedGemma-4B
- Gemma-3-4B

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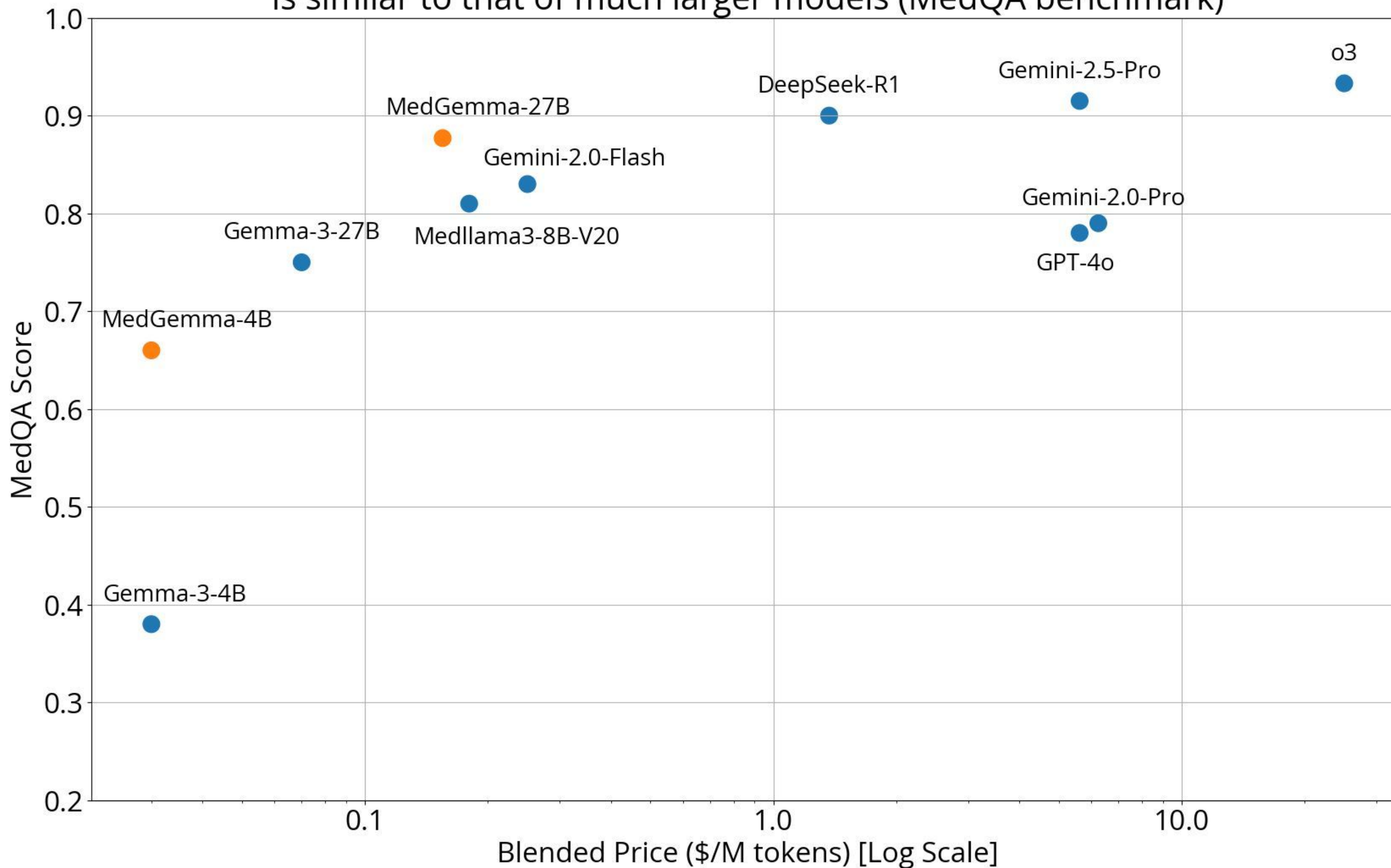
Major Challenges
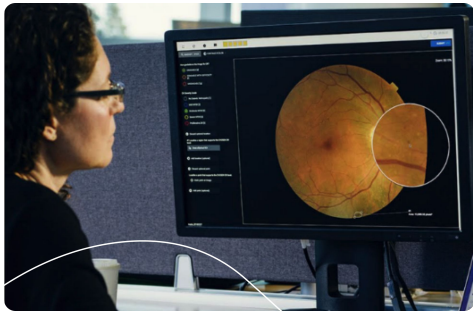
	Conventional AI (e.g. CNN, RNN)	Gen AI - LLMs — Closed General purpose models / Open source / open weights models	Fine-Tuned GenAI Applications
Data Governance: Ensuring privacy, security, and appropriate use of sensitive health data	✅	✅	✅
Algorithmic Bias: The risk of AI models perpetuating or even amplifying existing health disparities	✅	❓	❓
The "Black Box" Problem: Understanding and explaining how complex AI models make decisions	❓	❓ ❓	❓
Accountability & Liability: Defining responsibility when AI systems are involved in patient care	✅	❓	✅ ↔ ❓
Algorithm performance evaluations	✅	❓	❓
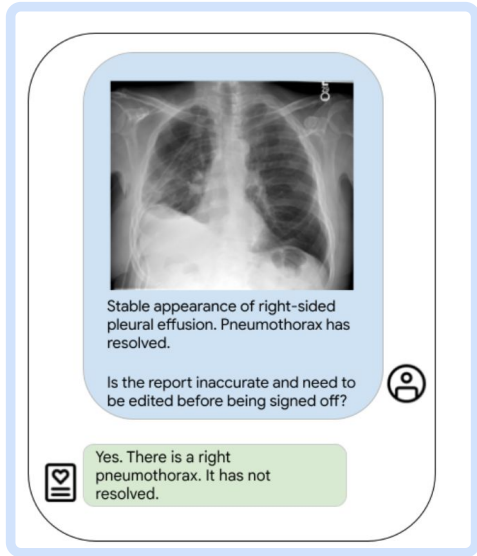
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How we innovate together - customer stories

Partnering to turn inventions into innovations that have a real impact for the world, at scale

Care Delivery Transformation

Search in Healthcare context

Diagnostics, Therapy Planning

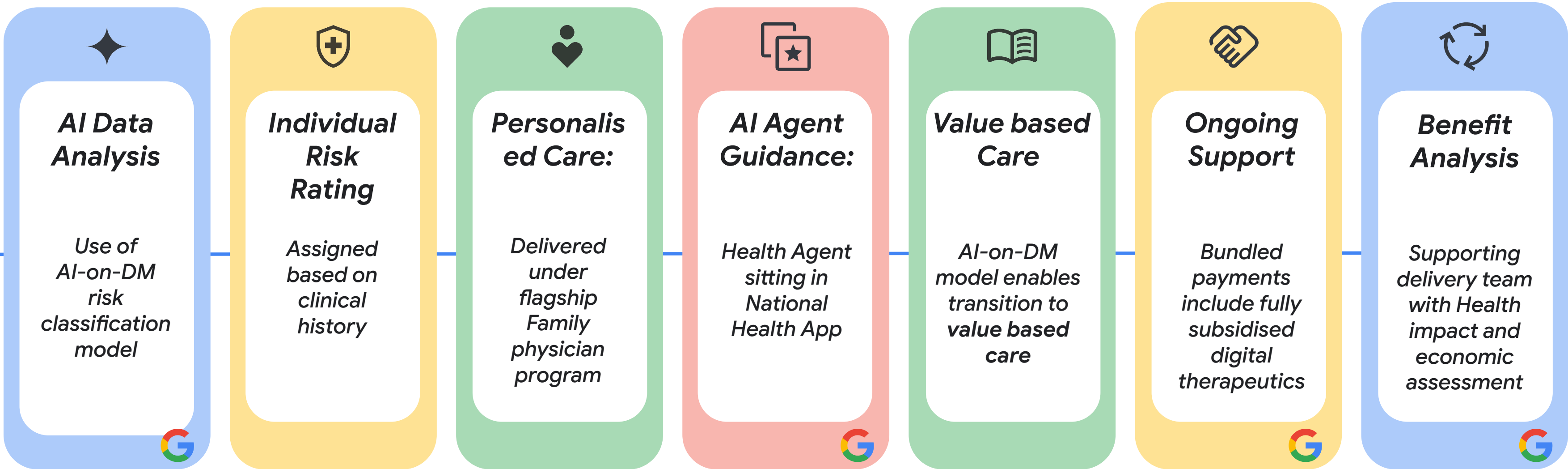### Nurse hand off, Ambient doc (e.g. in ER)

Value-based Care: Transforming healthcare in Taiwan

AI an enabler for personalisation and value-based care

AI Data Analysis	**Individual Risk Rating**	**Personalised Care:**	**AI Agent Guidance:**	**Value based Care**	**Ongoing Support**	**Benefit Analysis**
Use of AI-on-DM risk classification model	Assigned based on clinical history	Delivered under flagship Family physician program	Health Agent sitting in National Health App	AI-on-DM model enables transition to **value based care**	Bundled payments include fully subsidised digital therapeutics	Supporting delivery team with Health impact and economic assessment

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Call to Action

Focused

- Regulate real-world effects, not scientific progress
- Identify and address regulatory gaps
- Focus on the outputs
- Consider a sectorally-based, hub-and-spoke governance architecture
- Encourage effective techniques to identify AI-generated content

Aligned

- Prioritize international coherence and interoperability
- Look to international standards and benchmarks

Balanced

- Risk-based frameworks centered on use cases
- Clear and differentiated obligations for the respective actors in the AI ecosystem
- Avoid regulatory burdens for research and development, and promote access to open data to enable fair learning
- Ensure that transparency requirements are balanced and feasible
- Weigh the trade-offs between AI tools and human alternatives

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Out with the old!

- Existing approaches are no longer effective
- New strategies are essential for future success
- Traditional methods hinder progress and innovation
- Embrace change for sustained growth

Thank You