



MAYO CLINIC
PLATFORM

The Next Milestones for Predictive and Generative AI in Healthcare

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A new vision for a fragmented system

Mayo Clinic Platform is transforming care with data and technology, creating a world where the best care is available to patients everywhere.

Healthcare 2024



Healthcare 2030

Reactive.....	Preemptive
Symptom-based	Molecular-based
Corrective	Curative
Invasive.....	Minimally invasive
Late-stage	Early-stage
Expensive	Affordable
De-personalized	Personalized
In-person.....	Accessible anywhere



Wheel of AI

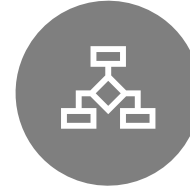
10. Real-world surveillance

Monitoring of the deployed system for ensuring intended behavior and identifying potential flaws.



1. Use case specification

Specification of the functional requirements of the system to be developed.



2. Data access & anonymization

It involves accessing clinical reports and patients' medical data and anonymizing it appropriately to preserve privacy.



3. Data annotation

Labeling the access (anonymized) data according to annotation guidelines. May involve expert clinicians.



4. ML model development

Training of the appropriate ML model, e.g., CNN, LSTM, GAN, etc.



5. Algorithmic audit

Expert clinicians are engaged to test and improve the performance of the developed ML system.



6. Multisite validation

Validation of the developed system is performed using multiple testing strategies.



7. Regulatory approvals

Involves approval of the developed ML-based medical system from regulatory authorities.



8. Clinical integration

The deployment of the developed system into actual clinical environment.



9. User acceptance

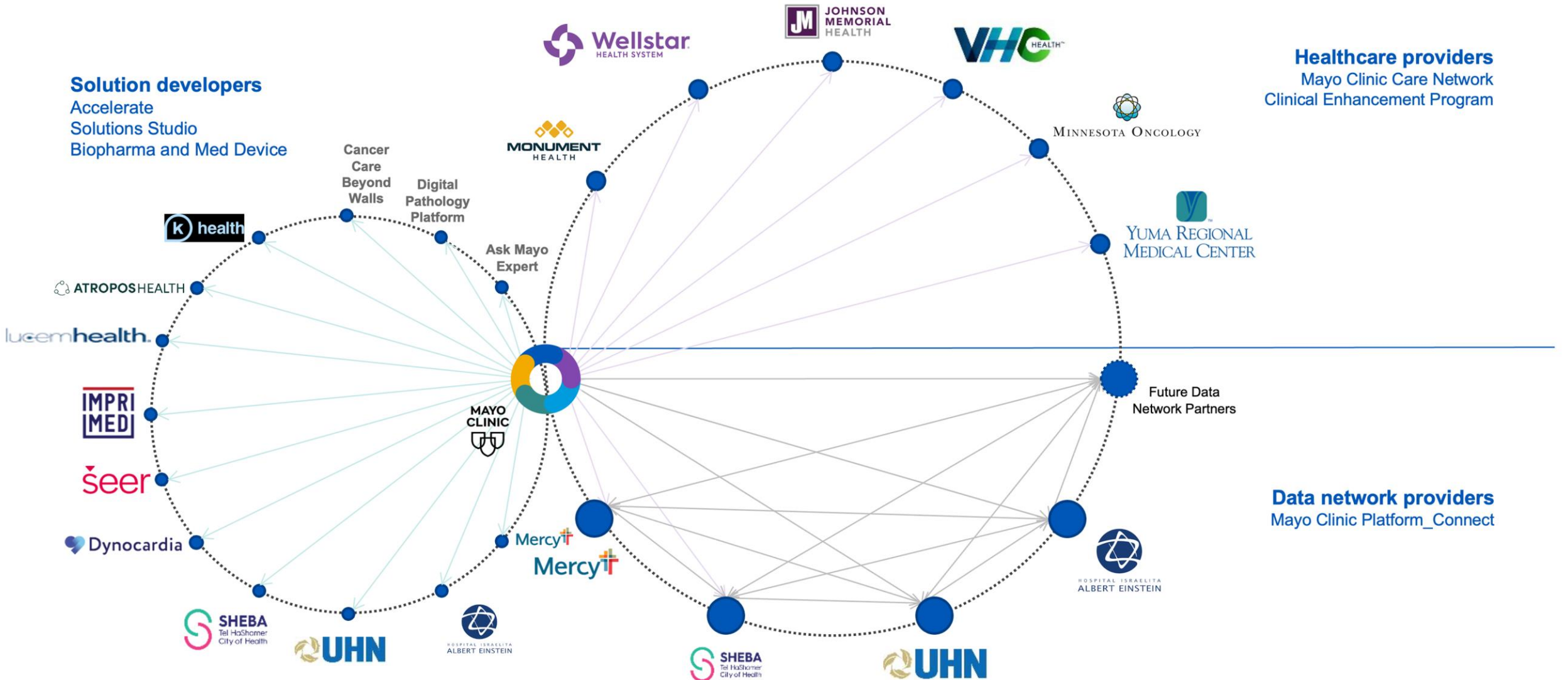
Acceptance of the developed ML-based medical system by end users, e.g., hospital staff and physicians.



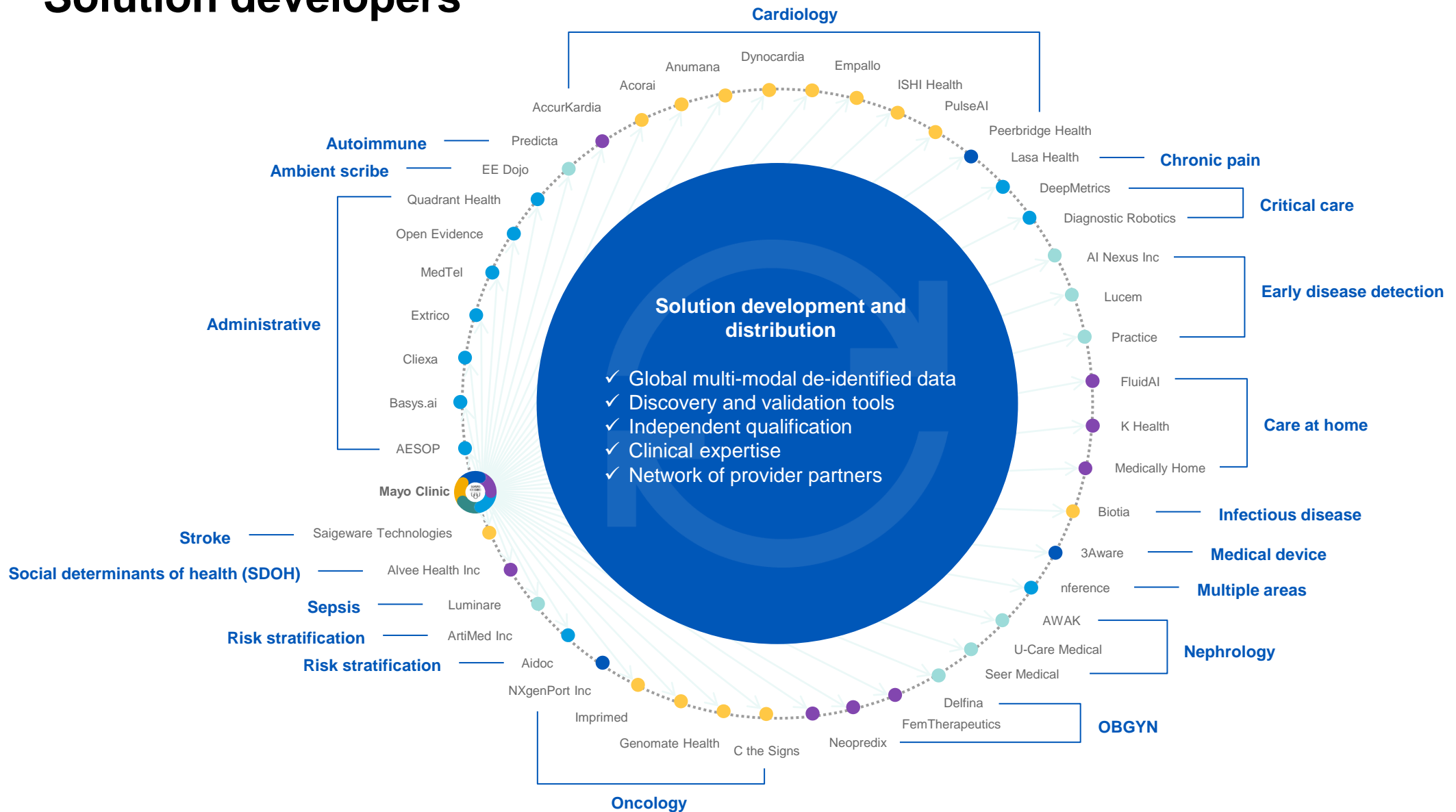
ML IN CLINICAL WORKFLOW

- Data Network
- Discover
- Validate
- Validation Services
- QMS
- Deploy

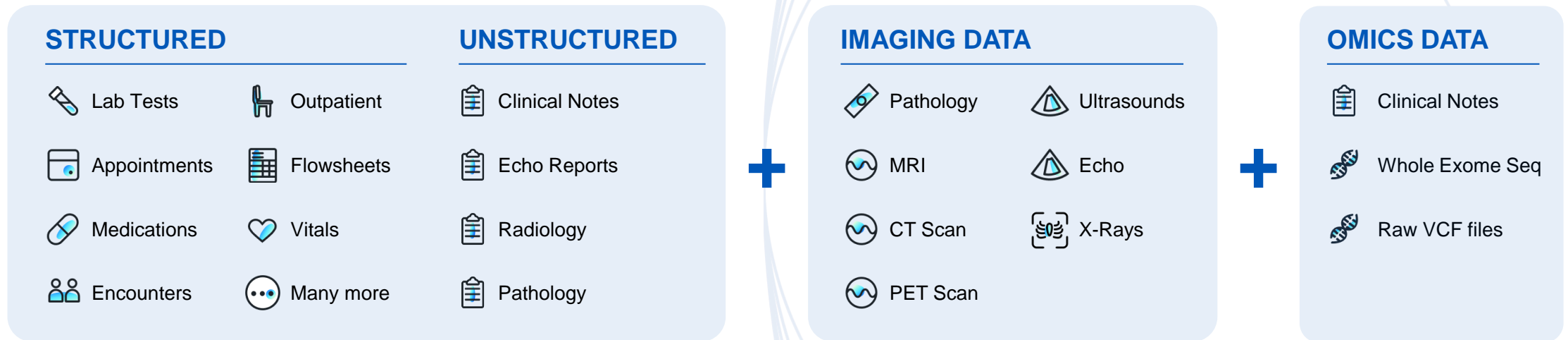
A truly global ecosystem



Solution developers



Integrated deep multimodal data captured in the electronic medical record system



Data Network & Data Services

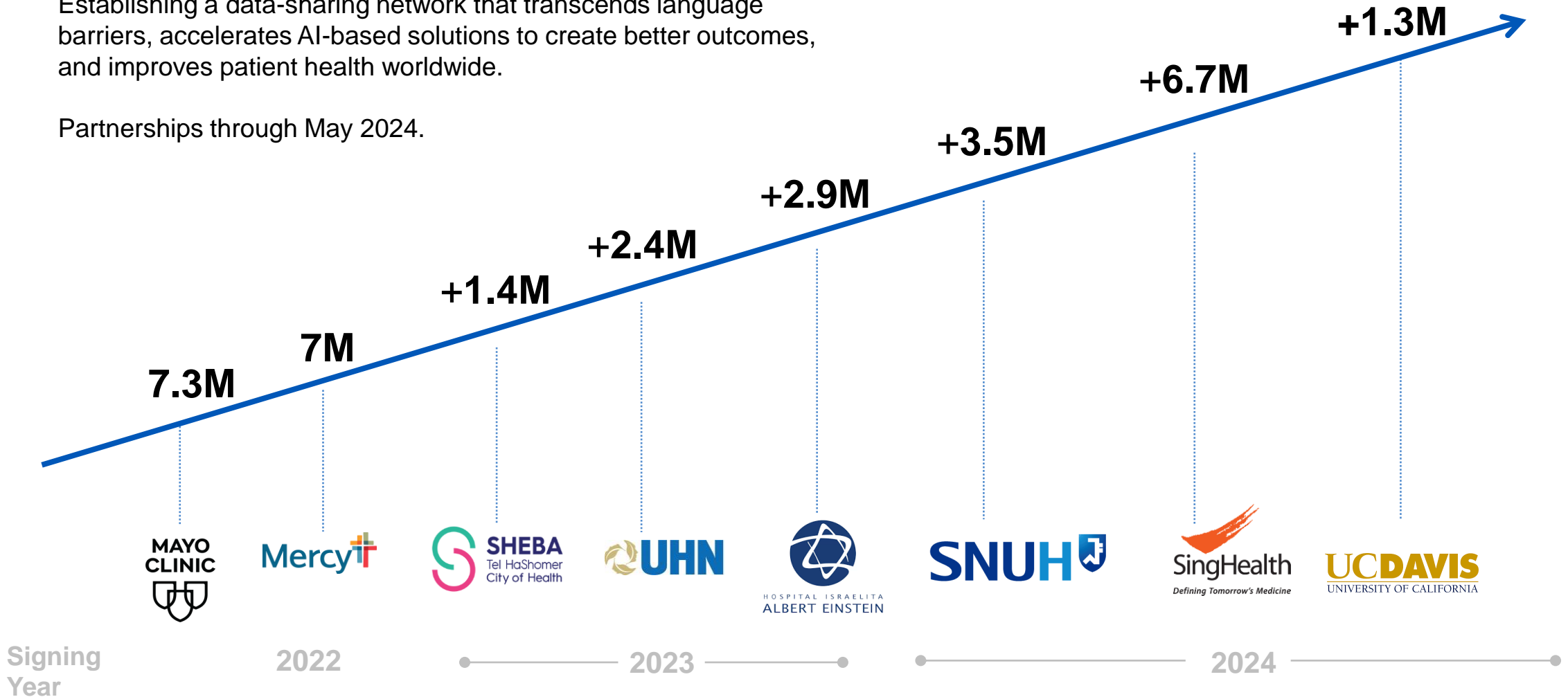
De-identification • Data harmonization • Natural language processing • Analytics & visualization • Algorithm training

32.5*
Total patient lives

Scaling the platform with Connect

Establishing a data-sharing network that transcends language barriers, accelerates AI-based solutions to create better outcomes, and improves patient health worldwide.

Partnerships through May 2024.



* Projected. **Initial patient lives based on enterprise data readiness, potentially increasing by 15M for Apollo Hospital and 5-10M for NY-P/Cornell/Columbia in year three and beyond.

Cardiovascular Application: ECG-AI™ for Asymptomatic Low EF

Exemplar for Mayo Clinic Platform _Validate & _Deploy capabilities



Can an **AI screening tool** aimed at detecting low EF from ECGs **improve the diagnosis of this condition *in routine practice?***



A **more cost-effective and accessible solution** (based on 12-lead EKG data), relative to echocardiogram imaging

Results:

For every 1,000 patients screened, ECG-AI yielded **5 new diagnoses of low EF over usual care**
In patients with a positive AI screening test, **diagnosis of low EF increased by 43%**

- Low EF is defined as < 50%
- [AI-enabled ECGs for identification of patients with low EF: A pragmatic, randomized clinical trial](#) (May 2021)
- [Clinician adoption of an AI algorithm to detect LVSD in primary care](#) (Nov 2022)

Cardiovascular Application: ECG-AI™ for Asymptomatic Low EF

Exemplar for Mayo Clinic Platform _Validate & _Deploy capabilities

Data | Clinical Expertise | AI Expertise

- State-of-the-art **deep learning model**
- Developed & trained on over **100,000 ECG + echo data pairs** from unique Mayo patients



Peter A. Noseworthy
MD MBA

Advisory Network Services

Data Services | nSights Workspaces

Data Network



Evaluation Trial | Formal Validation

- RCT-based validation (EAGLE study) on **22,600+ patients**
- **348 clinicians & 45 sites**



_Validate

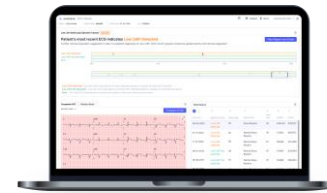
Model Development Services

Advisory Network Services



Network Deployment | Clinical Adoption

- ECG-AI™ further validated via **40,000+ patients & 25+** peer-reviewed publications
- **160+ PCPs across 48 practice sites**



Solution Deployment Services

_Deploy

Advisory Network Services



FDA Submission | 510k / SaMD Clearance

- FDA Breakthrough Device (2019)
- FDA 501k clearance (Oct 2023)
- AMA CPT codes (2022)
- SaMD validation expertise



Anumana Receives U.S. FDA 510(k) Clearance for ECG-AI Algorithm to Detect Low Ejection Fraction

Based on pioneering research from Mayo Clinic, ECG-AI LEF aims to aid physicians in identifying low ejection fraction in patients at risk of heart failure.

CAMBRIDGE, Mass. – Oct. 2, 2023 – Anumana, Inc., a leading AI-driven health technology and digital portfolio company working in collaboration with Mayo Clinic, today announced U.S. Food and Drug Administration (FDA) 510(k) clearance for ECG-AI LEF, a breakthrough artificial intelligence (AI)-powered medical device to detect low ejection fraction (LEF) in patients at risk of heart failure.

Advisory Network Services

Data Network

Data Services

- Low EF is defined as < 50%
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Exemplary Platform Solutions

Digital transformation & AI-enabled medicine, across care settings & specialties



**Advanced Care
at Home**



**Early Disease
Detection**



**Radiology
AI**



**Cancer Care
Beyond Walls**



**Digital
Pathology**



**Gastroenterology
Video AI**



Cardiology AI

Solution developer ecosystem



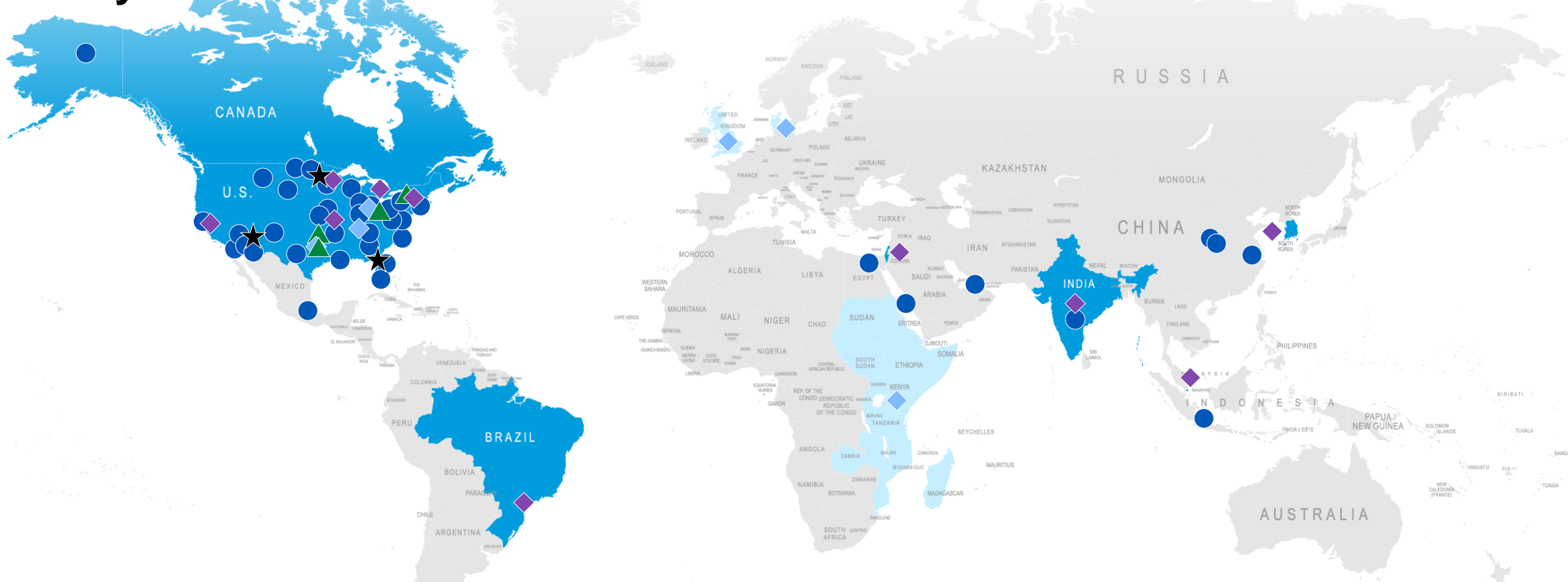
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Solution developers
Ecosystem partners

Additional Prospects

Clearstep • AWAK Technologies • Digbi Health • Harper • Higia • Dimer Health • RxStudio
OPTT Health • Pria.care • Lasa Health • Olive Diagnostics • Voythos • Pep Inc • RISA Labs Inc

Mayo Clinic Platform Healthcare Provider and Data Network Members

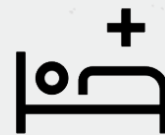


Map Legend

- ★ Mayo Clinic Campus
- Mayo Clinic Care Network member
- ▲ Client – other service program
- ◆ Mayo Clinic Platform_Connect members
- ◆ Future Mayo Clinic Platform_Connect members



48M
Patient lives
Mayo Clinic
Platform_Connect



9,5K
Staffed patient beds
Mayo Clinic
Care Network



44M
Patient lives
we impact

Generative AI projects

1

ACCRUE-L: Automating the creation of clinical registries using existing large language models (LLMs)

These two projects seek to extract information from unstructured medical record notes to enable downstream applications.

2

Incorporating LLMs into RecordTime to enhance outside records review efficiency

These two projects will improve Mayo's ability to intake outside records and facilitate patient triage. two projects seek to extract information from unstructured medical record notes to enable downstream applications.

3

Digital Twin: Using CBC and genomic data to drive personalized patient insights

These two projects will use genomic data enabled by LLM technologies to transform medical care.

4

Revolutionize genetic test selection and interpretation through generative AI and LLM

This project will extract information from the electronic health record to guide appropriate genetic tests and facilitate results interpretation, providing detailed patient-specific phenotypic information. two projects seek to extract information from unstructured medical record notes to enable downstream applications.

5

Using GAI and LLM to create a multi-specialty peri-procedural platform for visit-specific education

This multi-specialty project will use pre-trained GAI and LLM to create content that prepares patients for common procedures by leveraging physician-vetted, de-identified data.

6

Mayo discharge summary system

This project will optimize the inpatient discharge process by introducing an AI-LLM disposition optimization tool to facilitate discharge, streamline workflows, provide virtual discharge assistance (chatbot) and enhance operational efficiency.

7

Nursing virtual assistant for individualized nursing care and education plan generation

This project will leverage LLMs to generate individualized nurse care and education plans to improve workflow.

8

MAYA Chatbot: Bridging the gap between electronic health record and generative AI integration

This project enables the integration of advanced digital solutions, including AI and LLMs, into clinical workflows, enhances productivity and mitigates fatigue by facilitating more streamlined integrations with the electronic health record (EHR).



CURE



CONNECT



TRANSFORM

A photograph of a man with a beard and glasses, wearing a dark suit and a light blue tie, smiling warmly. He is wearing a name tag. He is looking towards another person whose face is partially visible on the right side of the frame. The background is a blurred office setting.

**Together we can
transform healthcare
to benefit everyone,
everywhere.**



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PLATFORM

Thank you